DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
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PEARL HARBOR HI 96860-3131

IN REPLY REFER TO:
5090
Ser N46/0222
March 31, 2025

Ms. Kate Huckelbridge
Executive Director
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, California 94105-2219

Dear Ms. Huckelbridge:

SUBJECT: CONSISTENCY DETERMINATION FOR PROPOSED MILITARY READINESS ACTIVITIES WITHIN CALIFORNIA

In accordance with 15 C.F.R. §930,Subpart C for Consistency for Federal Agency Activities, the U.S. Navy, Commander, U.S. Pacific Fleet is submitting the enclosed Consistency Determination (CD) for proposed military readiness activities within the California Study Area as proposed in the Hawaii-California Training and Testing (HCTT) Environmental Impact Statement / Overseas Environmental Impact Statement (EIS/OEIS). The enclosed CD documents the military's consistency with the applicable enforceable policies of the California Coastal Management Program, to the maximum extent practicable. The Navy is providing an informational brief to the Coastal Commission on April 11, 2025 in Santa Barbara and requests that the CD be considered by the Commission at the June 11-13, 2025 meeting in San Diego. The majority of these military readiness activities are a continuation of activities that have been conducted off the coast of California for decades and have been the subject of prior consistency reviews by the Commission, most recently in 2018 (Hawaii-Southern California Testing and Training) and 2022 (Point Mugu Sea Range). Some new areas for amphibious approaches in Central California and range modernizations are contemplated which are evaluated against enforceable policies as well.

If you have any questions, please contact Mr. Alex Stone, U.S. Pacific Fleet, (619) 524-9707, alexander.m.stone6.civ@us.navy.mil or Ms. Kelly Finn, Commander Navy Region Southwest, at (619) 705-5406, kelly.l.finn.civ@us.navy.mil.

Sincerely,

J. H. BEATTIE
Captain, U.S. Navy
Deputy Fleet Civil Engineer
By direction

Enclosure: (see next page)

5090
Ser N46/0222
March 31, 2025

Enclosure: CD for the California Study Area

Copy to:
Chief of Naval Operations (N4I) (w/o enclosure)
Commander, Navy Region Southwest (N40) (w/o enclosure)
Mary Alice Evans, Hawaii Department of Business, Economic Development & Tourism, Office of Planning (w/enclosure)

COASTAL ZONE MANAGEMENT ACT
CONSISTENCY DETERMINATION FOR CALIFORNIA

Department of the Navy

United States Pacific Fleet

APRIL 2025

California Coastal Consistency Determination

Hawaii-California Training and Testing

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Acronyms and Abbreviations

Acronym	Definition
AINJ	Auditory Injury
Army	U.S. Army
CCMP	California Coastal Management Program
CD	Consistency Determination
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
dB	Decibel(s)
dB re 1 µPa	Decibels referenced to one micropascal
DoD	Department of Defense
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
ft.	Foot/feet
HCTT	Hawaii-Southern California Training and Testing
HSTT	Hawaii-Southern California Training and Testing
in.	Inch(es)
kHz	Kilohertz
lb.	Pound(s)
m	Meter(s)
MCM	Mine Countermeasure
MEM	Military Expended Material
MMPA	Marine Mammal Protection Act
Navy	U.S. Department of the Navy
NBVC	Naval Base Ventura County
NEPA	National Environmental Policy Act
NEW	Net Explosive Weight
NHPA	National Historic Preservation Act
NM	Nautical Miles
NM^2	Square Nautical Miles
NMFS	National Marine Fisheries Service
NOCAL	Northern California
NOTAM	Notice to Air Missions
NOTMAR	Notices to Mariners
OEIS	Overseas Environmental Impact Statement
ONR	Office of Naval Research
OPAREAS	Operating Areas
PCW	Phocid in Water
PMSR	Point Mugu Sea Range
PTS	Permanent Threshold Shift
RDT&E	Research, Development, Testing, and Evaluation
SCI	San Clemente Island
SEL	Sound Exposure Level
SNI	San Nicolas Island
SOAR	Southern California Offshore Anti-Submarine Warfare Range
SOCAL	Southern California
SSTC	Silver Strand Training Complex
SWTR	Shallow Water Training Range
TA	Training Area
TTS	Temporary Threshold Shift
U.S.	United States
U.S.C.	United States Code
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USFWS	United States Fish and Wildlife Service
USMC	U.S. Marine Corps
XLUUV	Extra Large Unmanned Underwater Vehicle
yd.	Yard(s)

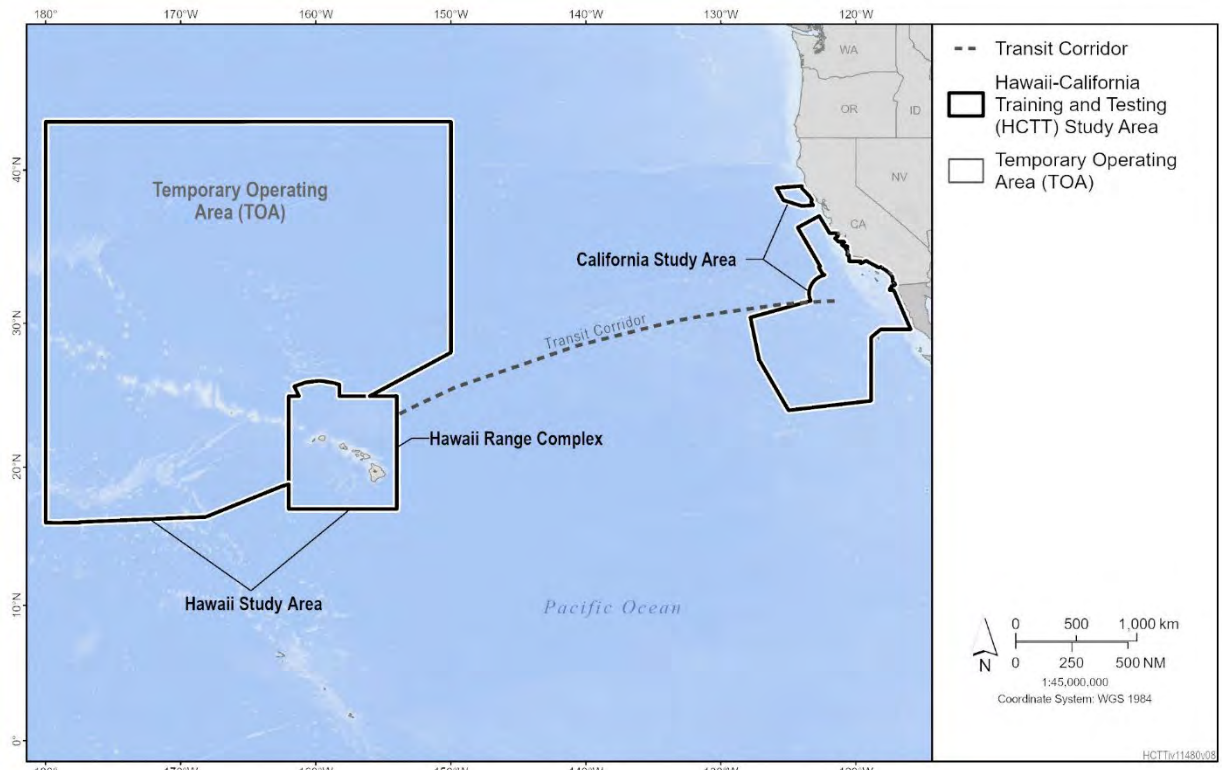
1

1 INTRODUCTION

This document is the Action Proponents'[1] Consistency Determination (CD) under the Coastal Zone Management Act (CZMA) for the California Study Area described in the Hawaii-California Training and Testing (HCTT) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). The HCTT Study Area is shown in Figure 1-1. This document is submitted in accordance with the CZMA (16 United States Code (U.S.C.) section 1456 (c)) and 15 Code of Federal Regulations (CFR) Part 930 Subpart C. The information in this CD is provided pursuant to 15 CFR section 930.39. The Action Proponents have determined that the Proposed Action would have reasonably foreseeable effects on coastal resources and coastal use in California. Therefore, this CD has been prepared to address the enforceable policies of the California Coastal Management Program (CCMP) (California Coastal Act section 30200-30265.5).

Under section 307(c)(1) of the CZMA, federal activities that affect any land or water use, or natural resource of the coastal zone are required to be consistent with the affected state's coastal management program to the "maximum extent practicable." The Action Proponents have determined that the Proposed Action is consistent to the maximum extent practicable with the CCMP. The authority of the CCMP, which was approved by the federal government in 1977, is defined in the California Coastal Act (Section 30008). The CCMP uses a variety of planning, permitting, and non-regulatory mechanisms to manage its coastal resources. Specifically, to federal agency actions, the Commission's standard of review is the enforceable policies found in the CCMP. As defined in California Coastal Act Section 30103, the coastal zone extends seaward from the shoreline to the State of California's outer limit of jurisdiction (3 nautical miles [NM]), including all offshore islands, and extending inland generally 1,000 yards (yd.) from the mean high tide line of the sea. Federally controlled lands are not part of the coastal zone (15 CFR section 923.33).

[1] The Action Proponents include the U.S. Department of the Navy (Navy) (including both the U.S. Navy and the U.S. Marine Corps [USMC]) jointly with the U.S. Coast Guard (USCG), U.S. Army (Army), and U.S. Air Force (USAF). The Navy is the lead agency and as the lead agency, the Navy represents the Action Proponents.



Notes: HCTT = Hawaii-California Training and Testing
The Hawaii Study Area is approximately 2,000 nautical miles from the California Study Area. Typical Navy ship transit time between the two range complexes is 5–7 days.

Figure 1-1: Hawaii-California Training and Testing Study Area

1.1 PREVIOUS CONSISTENCY DETERMINATIONS

This CD is submitted as part of Phase IV of environmental compliance for the Action Proponents' at-sea military readiness activities off California. Phase I of at-sea environmental planning covered environmental compliance for activities from 2009 to 2014 and Phase II covered the time-period from 2013 to 2018. Phase III covers the time-period from 2018 to 2025 for the Hawaii-Southern California Training and Test (HSTT) EIS/OEIS, and 2022 to 2029 for the Point Mugu Sea Range (PMSR) EIS/OEIS. For each Phase of environmental planning, the Navy has combined ranges for the purposes of the National Environmental Policy Act (NEPA) analysis where similar training and testing is conducted, as shown in Table 1-1. CDs have been previously completed in support of the ongoing operations in areas such as the Silver Strand Training Complex (SSTC), PMSR, San Clemente Island (SCI), San Nicolas Island (SNI), and Naval Base Ventura County (NBVC) prior to the inclusion areas and their associated activities in the 2024 HCTT Draft EIS/OEIS. The Navy has also completed and submitted a CD to the State of Hawaii Office of Planning and Sustainable Development as part of Phase IV of environmental compliance for the Action Proponents' military readiness activities off the Hawaiian Islands.

Table 1-1: History of NEPA/EO 12114 Coverage of the HCTT Study Area

<table>
<tr><th>Phase</th><th>Hawaii Range Complex</th><th>Southern California Range Complex</th><th>Silver Strand Training Complex</th><th>Point Mugu Sea Range</th><th>Northern California Range Complex</th></tr>
<tr><td>I</td><td>2008 Hawaii Range Complex EIS/OEIS</td><td>2008 Southern California Range Complex EIS/OEIS</td><td>2011 Silver Strand Training Complex EIS</td><td rowspan="2">2002 Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu Sea Range (PMSR) EIS/OEIS</td><td rowspan="3">Note 1</td></tr>
<tr><td>II</td><td colspan="3">2013 Hawaii-Southern California Training and Testing EIS/OEIS</td></tr>
<tr><td>III</td><td colspan="3">2018 Hawaii-Southern California Training and Testing EIS/OEIS</td><td>2022 PMSR EIS/OEIS</td></tr>
<tr><td>IV</td><td colspan="5">Hawaii-California Training and Testing EIS/OEIS</td></tr>
</table>

Note 1: The 2014 U.S. Navy F-35C West Coast Homebasing EIS analyzed aircraft activities in airspace within the HCTT Study Area (Warning Area [W]-283, W-285, W-532).

The Navy has completed the Federal Consistency process for previous phases of Action Proponent activities off California. In 2018, the Navy completed an EIS/OEIS (Phase III) and initiated the CZMA process with the California Coastal Commission as described below.

On March 12, 2018, the Navy (Commander, U.S. Pacific Fleet) submitted a CD for training and testing activities within the Southern California portion of the HSTT Study Area to the California Coastal Commission. On June 8, 2018, the California Coastal Commission notified the Commander, U.S. Pacific Fleet that it objected to the Navy’s CD based on its conclusion that the activities as proposed were not consistent to the maximum extent practicable with the marine resource protection policy (Section 30230) of the California Coastal Act, which is one of the enforceable policies under the CCMP. On August 24, 2018, Commander, U.S. Pacific Fleet replied to the California Coastal Commission’s June 8, 2018, letter, responding to the measures the Commission deemed necessary for it to concur with the activities. The Navy agreed to some of the recommended geographic mitigation measures suggested by the California Coastal Commission and explained that the Navy was complying either fully or partially with many of the procedural measures requested. In a letter dated October 5, 2018, the Commission responded to the Navy, summarizing the discussions that had taken place and stating that there was not sufficient new information to recommend a change in the Commission’s objection.

In a letter dated October 16, 2018, the Navy notified the Commission that it would proceed with the proposed HSTT activities based on the Navy’s determination that these activities were fully consistent with the applicable enforceable policies of the CCMP in accordance with 15 CFR section 930.43(d)(2). The Navy’s correspondence with the California Coastal Commission regarding the CD submitted for the HSTT EIS/OEIS in 2018 is provided in Appendix D (Agency Correspondence from the Previous Consistency Determination) of this CD.

On September 2, 2020, the Navy submitted a Coastal Consistency Determination to the California Coastal Commission for training and testing within the PMSR. A Commission hearing was held on December 9, 2020, and the Navy received concurrence from the Commission that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of the California Coastal Management Plan on December 11, 2020.

1.2 Other Compliance Processes

The Navy prepared the 2024 HCTT Draft EIS/OEIS in accordance with NEPA (42 U.S.C. section 4321); the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508); Department of the Navy procedures for implementing NEPA (32 CFR Part 775); Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*; and Department of Defense (DoD) regulations implementing EO 12114 (32 CFR Part 187). Additional compliance processes are as follows:

- In accordance with 50 CFR section 402.12, the Navy evaluated the potential effects of the Proposed Action on species protected under the Endangered Species Act (ESA) and managed by the National Marine Fisheries Service (NMFS). The Navy is consulting with NMFS in accordance with legal requirements set forth under regulations implementing Section 7 of the ESA (50 CFR Part 402; 16 U.S.C. section 1536) for listed species under the jurisdiction of NMFS.
- In accordance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (16 U.S.C. sections 1801 et seq.), the Navy prepared a designated (or identified) Essential Fish Habitat Assessment that analyzes potential adverse effects from the Proposed Action on Essential Fish Habitat.
- The Navy has prepared Sanctuary Resource Statements, in accordance with Section 304(d) of the National Marine Sanctuaries Act (16 U.S.C. 1434(d), that describe the potential effects of the Proposed Activity on resources found within the established National Marine Sanctuaries within the HCTT Study Area.
- The Navy is consulting with the U.S. Fish and Wildlife Service (USFWS) in accordance with legal requirements set forth under regulations implementing Section 7 of the ESA (50 CFR Part 402; 16 U.S.C. section 1536) for listed species under the jurisdiction of USFWS.
- In accordance with the Marine Mammal Protection Act (MMPA) (16 U.S.C. section 1371(a)(5)), the Navy has submitted a request for Letters of Authorization to NMFS for the incidental taking of marine mammals, including those also covered by the ESA, resulting from the Proposed Action.
- In accordance with 36 CFR Part 800, the Navy initiated a National Historic Preservation Act (NHPA) Section 106 consultation with the State Historic Preservation Officer for potential effects on historic properties resulting from the Proposed Action.

2 PROPOSED FEDERAL AGENCY ACTION

2.1 PROPOSED ACTION

The Proposed Action is to conduct military readiness activities, comprised of training, testing, and modernization and sustainment of ranges in the HCTT Study Area (Figure 1-1). A portion of the military readiness activities include the use of active sonar and explosives at sea off the coast of California, and at select Navy pierside and harbor locations. These military readiness activities are generally consistent with those analyzed in the HSTT Final EIS/OEIS completed in October 2018 and the PMSR EIS/OEIS completed in January 2022 and are representative of the military readiness activities that the Action Proponents have been conducting in the HCTT Study Area for decades. The purpose of the Proposed Action is to ensure the U.S. military services are able to organize, train, and equip service members and personnel, needed to meet their respective national defense missions, in accordance with their Congressionally mandated requirements under Title 10[2].

Only a small portion of the proposed military readiness activities would take place within the California coastal zone (see Appendix A, Military Readiness Activities in the California Study Area of this CD). Land components associated with the range complexes in the HCTT Study Area are not included in the Study Area; however, the effects of missiles, targets, or artillery projects fired from SNI within PMSR in support of military readiness activities are considered in this CD due to the potential impact on pinnipeds hauled out on the coastline of SNI.

2.2 ACTIVITIES THAT MAY AFFECT CALIFORNIA'S COASTAL ZONE OR COASTAL RESOURCES

2.2.1 PROPOSED TRAINING AND TESTING ACTIVITIES

Military readiness activities have been conducted in the California Study Area for decades. Although the California Study Area covers a very large area, the activities discussed in this section, especially major ones, occur on ranges in the specific areas described in Section 2.2.2 (Proposed Modernization and Sustainment of Ranges) of this CD. Appendix A (Military Readiness Activities in the California Study Area) of this CD lists the military readiness activities that would occur in the California Study Area under the Proposed Action. For each military readiness activity, Appendix A provides a short description of the activity, identifies whether the activity would occur within the coastal zone, and identifies tempo and areas used under current (ongoing) conditions and under the Proposed Action.

2.2.2 PROPOSED MODERNIZATION AND SUSTAINMENT OF RANGES

The Navy's training and testing ranges provide the air, sea, and undersea space necessary for personnel to conduct live training and testing. As technology changes, weapons and systems evolve to provide improved capabilities. Often those new capabilities require modifications to the range to allow for full utilization of the new technology. In addition, existing components of the ranges require maintenance or replacement as they come to the end of their service life. These modernization and sustainment

[2] See Title 10, Sections 8062 (Navy), 8063 (USMC), 7062 (Army), 9062 (USAF) U.S.C. and Title 14, Sections 101 and 102 U.S.C. (USCG) for each service's specific language. Army and USAF are included only for their activities in Hawaii with potential in-water effects.

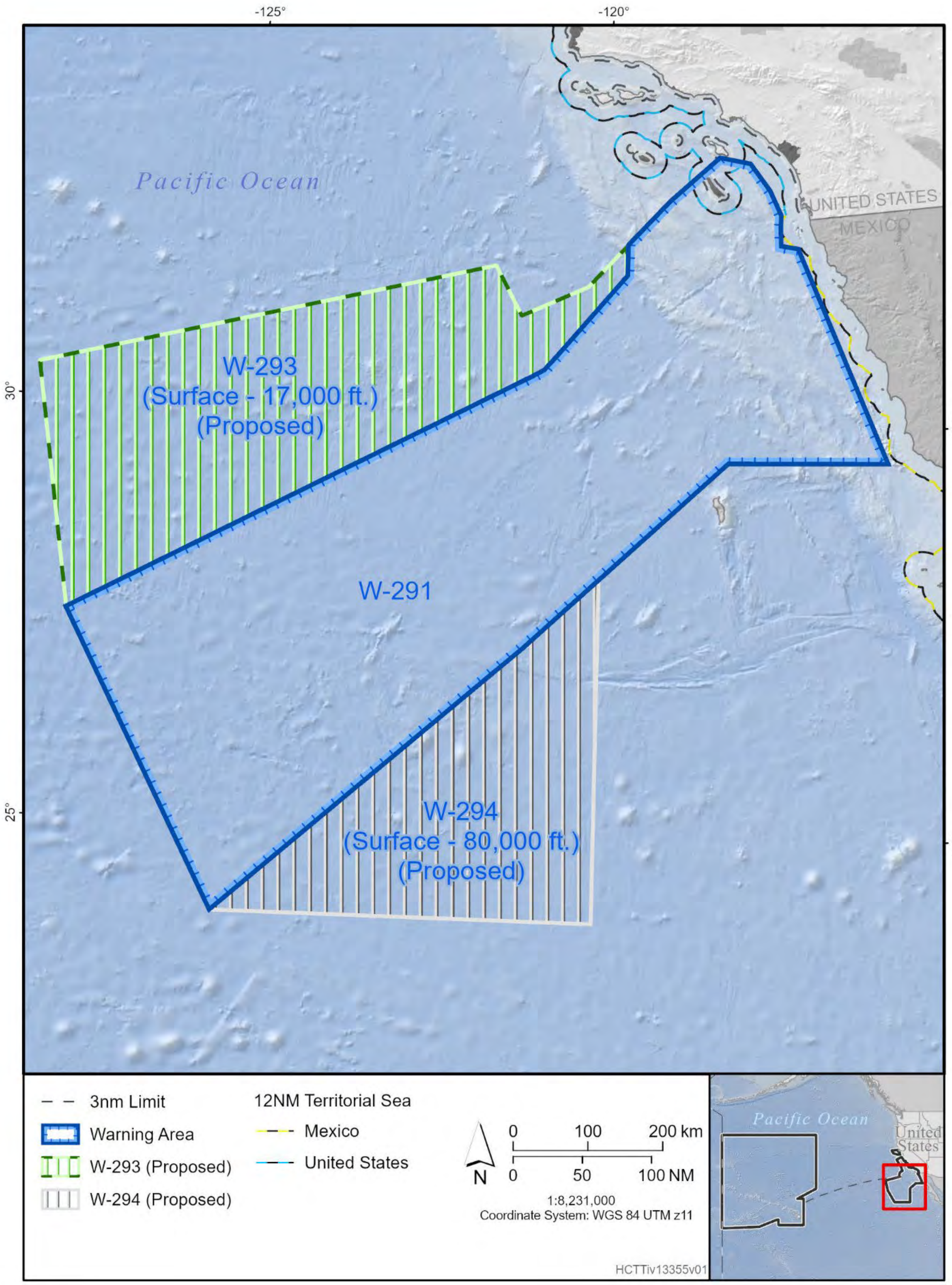
actions are described in this section. Section A.3 in Appendix A (Activity Descriptions) of the 2024 HCTT Draft EIS/OEIS (U.S. Department of the Navy, 2024a) has more detailed descriptions of the activities.

Proposed Special Use Airspace Modification

The two proposed new Warning Areas (Figure 2-1), proximate to the existing Southern California (SOCAL) Range Complex W-291, would provide the Navy with the air maneuver space for real-world, advanced training with manned and unmanned systems (Figure 2-9). The additional airspace is crucial to the Navy's ability to meet its mission because it provides the requisite maneuver space in support of advanced operational scenarios, latest-generation aircraft tactics, and unmanned airspace system operations and counter-targeting. These changes would enable aircrew to realistically train and test to combat modern threats and employ their aircraft and weapon systems in accordance with their full capability and Tactics, Techniques, and Procedures while also increasing the number of aircraft and other participants able to safely utilize the training complex simultaneously.

Due to airspace confines with altitude restrictions, there exists the potential for hazardous situations to develop between multiple aircraft in highly dynamic training evolutions. These new warning areas would reduce that potential.

W-293 airspace would be restricted to 17,000 feet (ft.) to avoid trans-Pacific airline routes at the western end of Control 1177 corridor. W-293 airspace within Control 1177 overlapping Southern California Offshore Anti-Submarine Warfare Range (SOAR) would be restricted to 5,000 ft. In addition, sea space in northwestern portion of the extension has been designated to facilitate testing activities by the Office of Naval Research (ONR).



Notes: ft. = feet, km = kilometers, NM = nautical miles

Figure 2-1: Proposed Special Use Airspace

Sustainment of Undersea Ranges

Undersea ranges provide essential mission readiness capabilities. Range sustainment includes maintenance of systems and associated components. Maintenance may include, but is not limited to, inspections, system replacement to extend service life (e.g., anodes and clamps), replacement of corrosion inhibitor solutions, and catastrophic repairs. Sustainment activities at undersea training ranges may require the use of divers, vessels, and unmanned underwater vehicles. Vessels may be required to anchor to the seafloor. Activities may take up to several weeks at a time.

Installation and Maintenance of Mine Warfare and Other Training Areas

Support crews deploy, move, and retrieve mine countermeasure (MCM) targets or targets simulating adversary subsea and seabed infrastructure to include cables of varying diameters and lengths, bottom equipment, and equipment tethered to the bottom that is floating in the water column. MCM targets could be inserted on the seafloor (bottom targets) or tethered to anchors that are on the seafloor (moored), avoiding hard bottom. MCM targets are non-explosive and emulate real world threats with a variety of sizes and shapes including spheres, cylinders, clamshells, and truncated cones as shown in Figure 2-2.

Minefields and mine training areas occur from the very shallow water (0–40 ft.) to deep water (>500 ft.). MCM targets need to be replaced every 1–2 years.

The shape and mooring line would be retrieved for refurbishment and redeployed with a new anchor nominally once per year. The concrete anchors would typically be abandoned in place on the bottom after each installation.

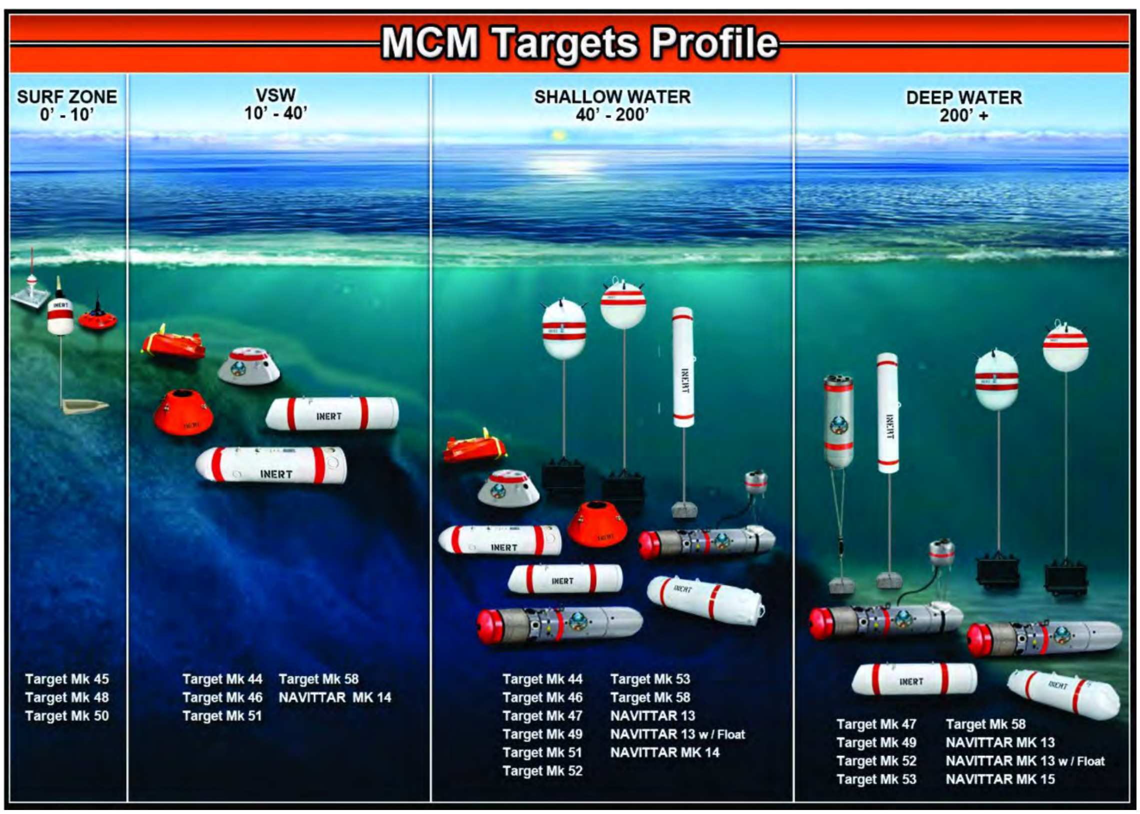


Figure 2-2: Example of Mine Countermeasure Targets

To seed a training minefield, MCM target shapes would be deployed from a stationary ship using precision GPS for positioning. Moored shapes are typically deployed in two stages. The shape (with attached mooring tether) is first lowered into the water and released to float on the surface. The vessel then positions over the installation site and releases the anchor to settle to the bottom. As the anchor falls, it pulls any slack out of the mooring line and then pulls the shape under. Bottom shapes are initially lowered into the water by crane, then released to settle to the bottom. Accounting for variables such as wind and current, the actual location is expected to be within approximately 100 yd. of the drop point.

For underwater detonation training, individual target mines are inserted either by small boat, by diver, or both, depending on the training scenario.

Depending on the training scenario, a mine installation could consist of one or two mines or involve an entire minefield including a mix of 30 or more bottom and tethered mine shapes.

Existing and proposed minefield locations include:

- Southern California
    - Point Mugu Sea Range (Proposed) (Figure 2-11) (approximately 15 NM from shore on average)
    - Tanner Bank Mine Training Range (includes the Tanner/Cortes Banks outside the Mine Training Range) (Existing) (Figure 2-9) (approximately 30 NM west of San Clemente Island)
    - Pyramid Cove Mine Training Range (Existing) (Figure 2-9) (extends approximately 4 NM from SCI's Pyramid Cove)
    - Training Area (TA)-Kilo (Existing) (Figure 2-10) (approximately 2 NM from shore)
    - SSTC-North and South Boat Lanes (Existing) (Figure 2-10) (extends from shore approximately 2 NM)
    - Imperial Beach Minefield (Existing) (Figure 2-10) (approximately 2 NM from shore)
    - Ocean Beach Mine Training Area (Existing) (Figure 2-10) (approximately 4 NM from shore)
    - Advanced Research Projects Agency Training Minefield (Existing) (Figure 2-10) (approximately 2 NM from shore)
    - Camp Pendleton Amphibious Assault Area (Existing) (Figure 2-7) (extends from shore approximately 19 NM)

Installation and Maintenance of Underwater Platforms

An underwater landing platform is required to facilitate underwater vehicle pilot proficiency training in the SOCAL Range Complex. The platform to be installed in SOCAL is new and would be located within the coastal zone.

Situated in the non-restrictive, flat, sandy seafloor training areas, the platform would be permanently mounted, but removable for maintenance. The landing platform would be approximately 40 ft. by 20 ft. and stand 15 ft. high, with a weight of approximately 16 tons, situated at a depth between 60 and 100 ft. (Figure 2-3). Prior to the installation, numerous pre-poured concrete blocks would be installed in a pre-surveyed area to create a positive anchor point to keep the platforms stationary.

To support navigation to the training platform, two high-frequency transponders are affixed to each platform. The transponders are only designed to be used during training evolutions and would be installed and removed within 24 hours prior to and after each series of scheduled training evolutions.

The transponders would only be turned on during active training periods of approximately 4–6 hours. The platform would be located on the sandy bottom just west of the SSTC boat lanes.

The underwater vehicles would deploy from their basing location and begin navigation to each respective geographic training platform location. Small surface craft would typically accompany and loiter the training area for safety. Pilots would follow their flight plans until they are within transponder range to which they would then train their equipment for precision navigation. Upon arrival at the training platform, pilots would accomplish repeated take-off and landing evolutions. Once landed, personnel may also practice a variety of insertion or extraction exercises, which may include using nearby training boat lanes for Over-the-Beach activities.

The landing platform would require routine inspections which would be accomplished by divers prior to each training evolution, during transponder installations. The platform would be preserved in a coating that is similar to the bottom of a surface ship and would require annual cleanings in place to maintain the coating. Furthermore, a floating crane would be used approximately every five years to remove each platform from the ocean floor and then be taken to a ship repair facility to accomplish in-depth structural inspections, repairs, and preservation. Upon completion, the platform would be returned and installed to their approved locations.

Figure 2-3: Depiction of a Notional Underwater Platform

Southern California Offshore Anti-Submarine Range and Shallow Water Training Ranges

The Proposed Action includes refurbishing the existing SOAR underwater tracking and communication range. Refurbishment includes the installation of undersea cables integrated with hydrophones and underwater telephones to sustain the capabilities of the SOAR. The entire refurbishment would be a one-time, short-term activity with an approximate one-month duration. The new system would provide sufficient instrumentation to refurbish and maintain the full underwater telephone coverage and hydrophone tracking capability within the existing 670 square nautical miles (NM^2) instrumented area. The new system would be operated concurrently (i.e., redundantly) with the existing capability. Refurbishment of the system would provide enhanced range coverage with both the old sensor nodes and the new sensor nodes. This refurbishment is needed to ensure continuous tracking and communication coverage of the SOAR instrumented deep water range in support of safe, effective undersea warfare training and testing.

The Proposed Action would also include the installation of two new Shallow Water Training Ranges (SWTRs) as extensions to the SOAR. In 1999, the Navy formally identified the requirement for a SWTR on the West Coast of the United States to improve the U.S. Navy's shallow water anti-submarine warfare (ASW) capabilities through more effective training on an instrumented range in shallow water. In 2008, the Navy completed an analysis of impacts for the construction and use of the SWTR in the 2008 SOCAL Range Complex EIS/OEIS (U.S. Department of the Navy, 2008b). The Record of Decision for the 2008 SOCAL Range Complex EIS/OEIS (U.S. Department of the Navy, 2009b) included the installation of the SWTR, but the installation of the underwater hydrophone array was delayed. In 2019, the boundaries of the proposed SWTR were modified to better align with SOAR in-water instrumentation, creating Tanner Bank SWTR and SCI SWTR adjacent to the existing, deep-water SOAR to the west and east, respectively (Figure 2-4). The requirements identified in 1999 are still valid, and the Navy is once again proposing to construct the SWTR.

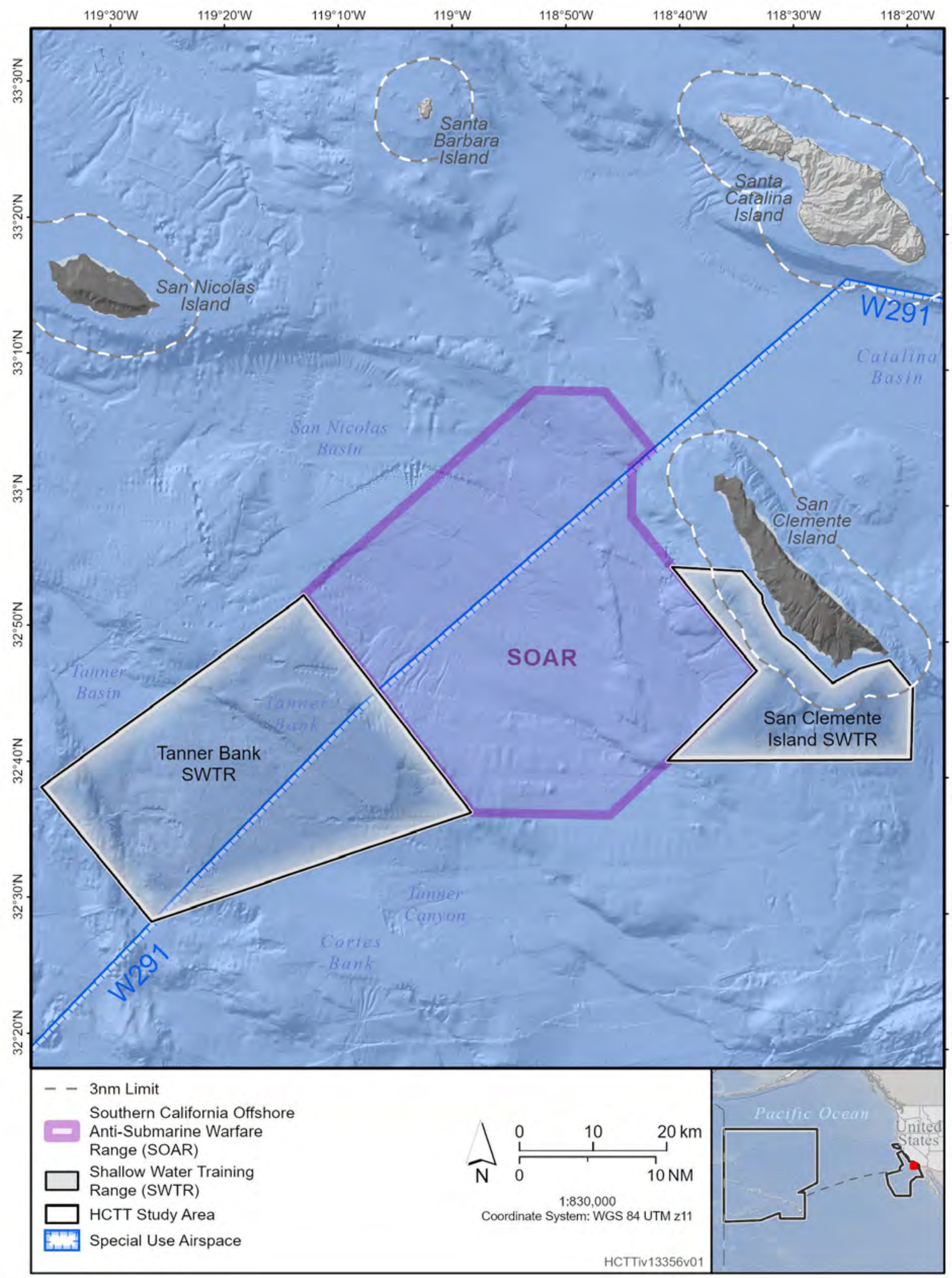


Figure 2-4: Proposed Shallow Water Training Range

The Tanner Bank SWTR would encompass an area of 388 NM^2, and SCI SWTR would encompass an area of 129 NM^2. When installed, the underwater instrumentation would significantly enhance training effectiveness, increasing the use of these areas for ASW training involving mid-frequency active sonar. While training here would increase, overall ASW training in the California Study Area would not change.

The proposed instrumentation would be similar to instrumentation currently in place in SOAR. The new areas would form an instrumented deep-to-shallow water capability in Southern California. The combination of deep water and shallow water instrumentation would support a seamless tracking interface from deep to shallow water, which is an essential element of effective ASW training.

The SWTR instrumentation would consist of a system of undersea telecommunication cables, referred to as array cables, arranged on the seafloor and connecting a series of nodes. Each node may contain one or more transducers, which enable the transmission of sound, or a hydrophone, which receives sound and converts it into an electrical signal. The array cables would be connected to an existing underwater junction box close to shore and pulled through existing bores on the western side of SCI. The cables would terminate in the Cable Termination Shelter, where data would be transmitted to the Range and would be used to evaluate participant performance in shallow water training exercises. Because each range would require a new trunk cable and a new junction box, the installation of three trunk cables and three junction boxes would be a part of the Proposed Action. The basic features of the proposed instrumentation and construction are described in Appendix A (Activity Descriptions) of the 2024 HCTT Draft EIS/OEIS (U.S. Department of the Navy, 2024a).

California Study Area Cable Expansion

In the California Study Area, an existing trunk cable (submarine fiber-optic cable) system would be expanded, involving approximately 600 kilometers of fiber-optic cable with several junction boxes installed along the cable for devices under test. A submarine fiber-optic cable currently extends from SCI west into deep water (typically greater than 1,500 ft. deep). None of the installation would take place in shallow water, with the new cable starting approximately 100 NM from SCI and going further west from there (Figure 2-5).

The cable allows for data transmission and would be used for a variety of tests described in Section 2.2.1 (Proposed Training and Testing Activities).

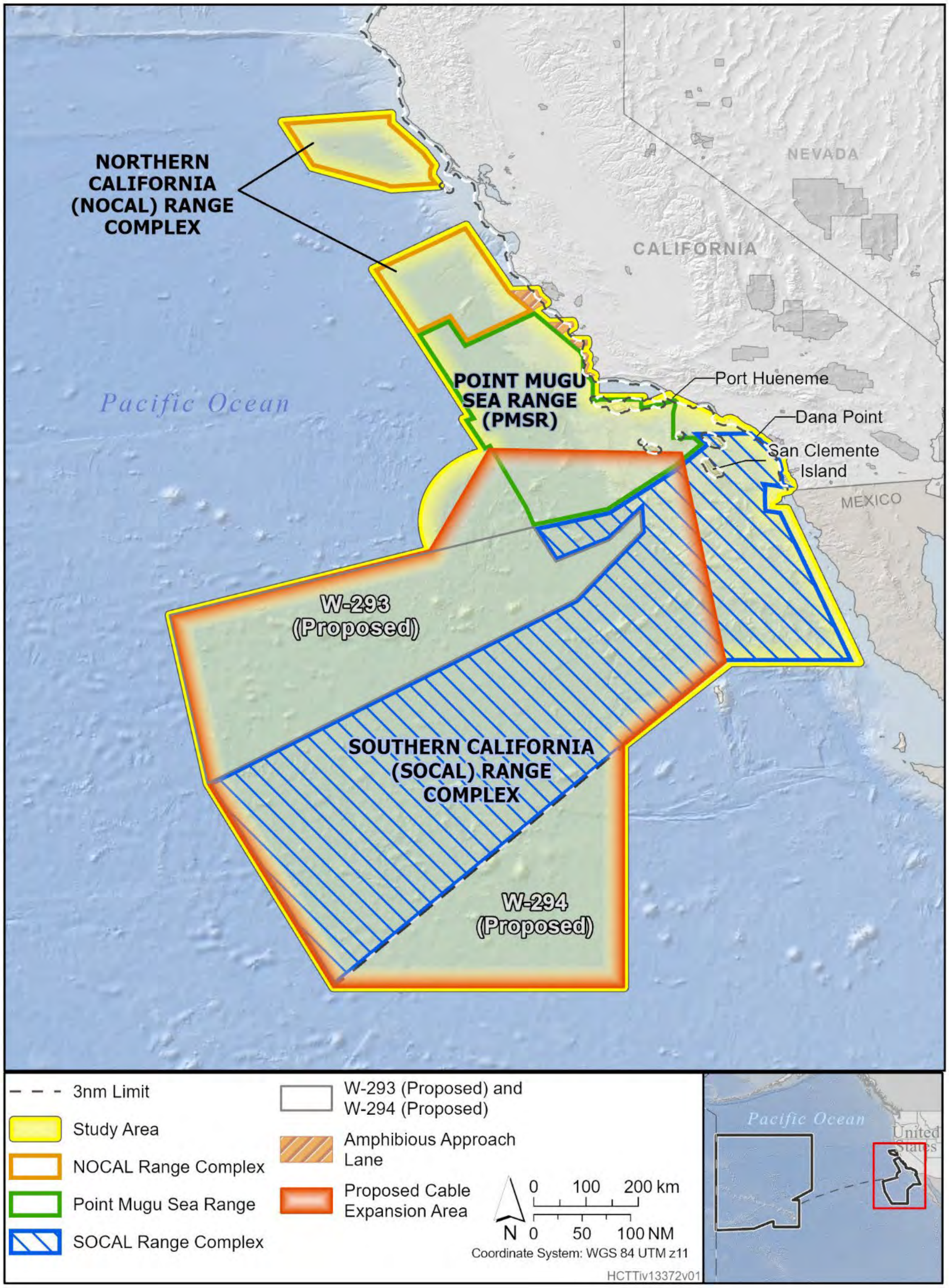


Figure 2-5: California Study Area Cable Expansion (Approximate Location)

2.2.3 CALIFORNIA STUDY AREA

The airspace, sea space, and undersea space of the California Study Area encompasses the area covered in this CD. This area has changed from the study area analyzed in the 2018 HSTT EIS/OEIS (Phase III) and the 2018 HSTT EIS/OEIS CD, and the 2022 PMSR EIS/OEIS CD. The California Study Area for HCTT (Phase IV) (Figure 2-6) includes the following: an expanded SOCAL Range Complex; special use airspace corresponding to the new extensions; two existing training and testing at-sea ranges, PMSR, and Northern California (NOCAL) Range Complex; areas along the Southern California coastline from approximately Dana Point to Port Hueneme; and four amphibious approach lanes providing California land access from the NOCAL Range Complex and PMSR. The California Study Area also includes the SSTC.

The California Study Area extends seaward of the mean high-water mark on the coast of California to offshore training and testing areas in the Pacific Ocean. While only the at-sea components of the range complexes are considered in the HCTT Draft EIS/OEIS, the potential effects of sound related to missiles, targets, or artillery projectiles fired from SNI on pinnipeds hauled out along the coastline are analyzed in the HCTT Draft EIS/OEIS for the purpose of the MMPA. All other land-based activities remain valid and continue to be covered by other NEPA documents and consultations. The Action Proponents did not re-analyze its activities on the land ranges in the California Study Area, with the exception of SNI land-based launches, because the NHPA compliance, incidental take statements, and biological opinions of non-jeopardy for land activities remain valid and would not be altered by the Proposed Action.

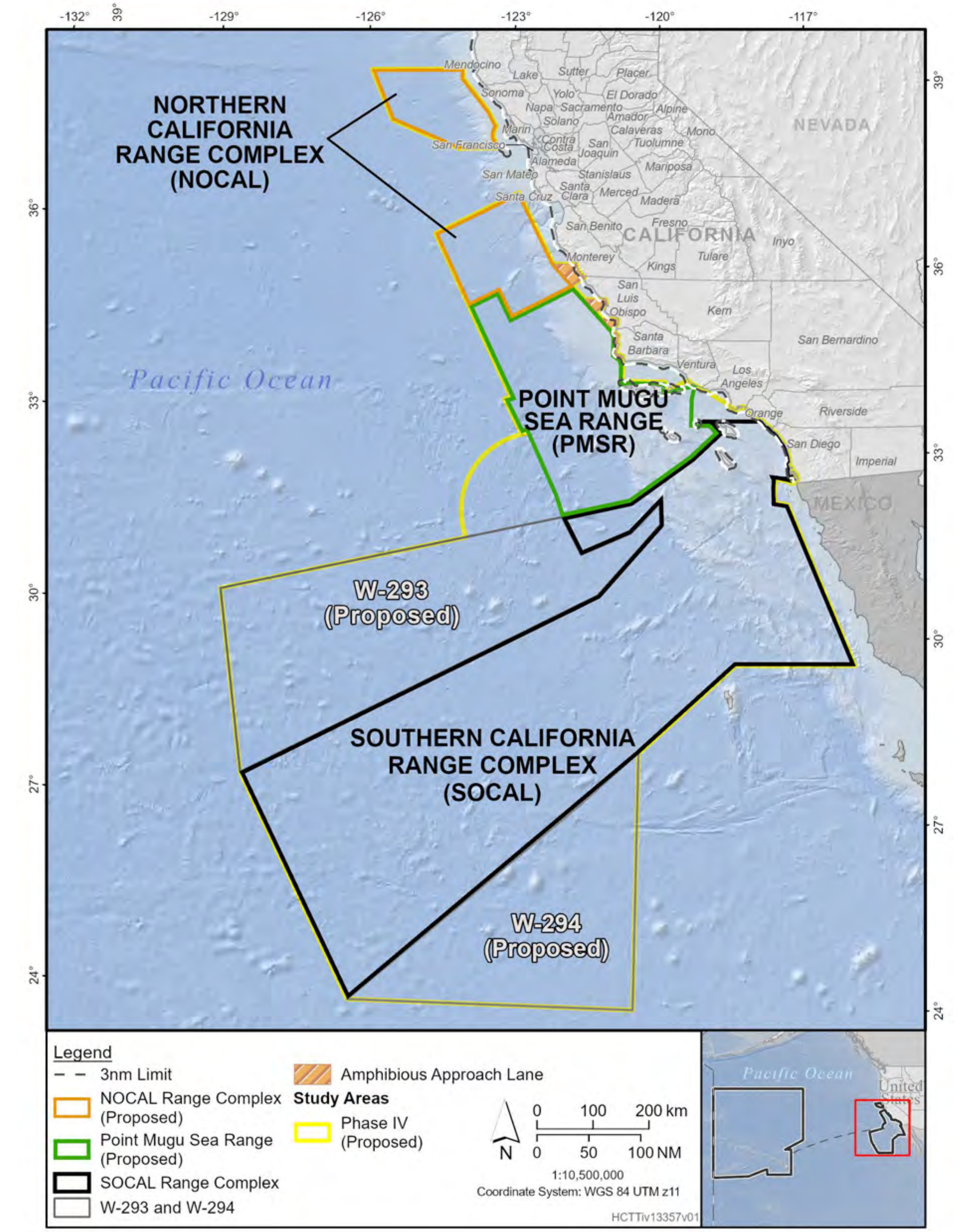


Figure 2-6: The California Study Area

2.2.3.1 The Southern California Range Complex

The two primary components of the SOCAL Range Complex (Table 2-1 and Figure 2-7) are the ocean Operating Areas and the special use airspace. The airspace in the SOCAL Range Complex was originally developed to support a previous generation of aircraft, weapons and tactics. Today, the SOCAL Range Complex is still used as the tactical cornerstone for training and certifying all deploying Strike Groups in the Pacific. However, due to current airspace configuration constraints, the air and sea space no longer meets naval aviation training requirements conducted off the coast of Southern California. In addition, test parameters of a specific proposed testing activity require an area southwest of PMSR and north of the current SOCAL Range Complex boundary (Figure 2-8). The various air and sea ranges associated with SCI are shown in Table 2-2 and Figure 2-9. The SOCAL Range Complex includes instrumented underwater training ranges, mine training ranges, laser training ranges, and access to the seaside of Naval Base Point Loma. The Study Area also extends to the pierside locations at Naval Base Point Loma and Naval Base San Diego.

2.2.3.2 The Silver Strand Training Complex

The SSTC is an integrated set of training areas (Table 2-3) located on and adjacent to the Silver Strand, a narrow, sandy isthmus separating the San Diego Bay from the Pacific Ocean. It is divided into two non-contiguous areas: SSTC-North and SSTC-South (Figure 2-10). SSTC-North includes 10 oceanside boat training lanes (numbered as Boat Lanes 1–10), ocean anchorage areas (numbered 101 through 178), bayside water training and testing areas (Alpha through Hotel), and the Lilly Ann drop zone. The boat training lanes are each 500 yd. wide, extending 4,000 yd. seaward and forming a 5,000 yd. long contiguous training and testing area. SSTC-South includes four oceanside boat training lanes (numbered as Boat Lanes 11–14) and the TA-Kilo training area. The anchorages lie offshore of Coronado in the Pacific Ocean and overlap a portion of Boat Lanes 1–10. The anchorages are each 654 yd. in diameter and are grouped together in an area located primarily due west of SSTC-N, east of Zuniga Jetty and the restricted areas on approach to the San Diego Bay entrance. Training activities occur on the seaside of the Silver Strand and in San Diego Bay (bayside).

Table 2-1: Southern California Range Complex Area Descriptions

Area Name	Area Description	In the Coastal Zone?
Advanced Research Projects Agency (ARPA) Training Minefield	Located west of the La Jolla area of San Diego within the ENETA, the ARPA Training Minefield extends from the ocean bottom to the surface. Mine detection and avoidance exercises are conducted. Ordnance use is not permitted.	A portion of this area is in the coastal zone.
Camp Pendleton Amphibious Assault Area (CPAAA)	CPAAA is an open ocean area located approximately 40 nautical miles northwest of Naval Base Coronado (NBC), used for amphibious operations. Ordnance use is not permitted.	A portion of this area is in the coastal zone.
Encinitas Electronic Training Area (ENETA)	The ENETA extends from the ocean bottom up to 700 feet (ft.) mean sea level (MSL). Exercises conducted include Fleet training and testing. Ordnance use is not permitted.	A portion of this area is in the coastal zone.
Fleet Training Area (FLETA) HOT	FLETA HOT is an open ocean area that extends from the ocean bottom to 80,000 ft. The area is used for hazardous operations, primarily surface-to-surface, surface-to-air, and air-to-air ordnance. Types of exercises conducted include Anti-Air Warfare, anti-submarine warfare (ASW), Naval Special Warfare, underway training, and Independent Steaming Exercises in which ships conduct onboard training, separate from other units. Ordnance use is permitted.	This area is not in the coastal zone.
Helicopter Offshore Training Area (HCOTA)	Located in the ocean area off San Diego, the Helicopter Offshore Training Area is divided into “dipping areas” and extends from the surface to 700 ft. MSL. This area is designed for search and rescue and ASW training for helicopters with dipping sonar. Ordnance use is not permitted.	This area is not in the coastal zone.
Imperial Beach Minefield	The Imperial Beach Minefield is a concurrent use mine training range located off the coast of Imperial Beach, CA. It extends from the seafloor to the surface and is primarily used for mine detection, identification, and neutralization of bottom and tethered mine shapes.	A portion of this area is in the coastal zone.
Navy Test Area	Located offshore near Naval Base Point Loma, the Navy Test Area is a nearshore area used for in-water testing.	A portion of this area is in the coastal zone.
Ocean Beach Mine Training Area	Located approximately four miles west of the Ocean Beach and Point Loma area of San Diego, the Ocean Beach Mine Training Area is utilized for shallow water mine detection training and testing.	This area is not in the coastal zone.
Pyramid Cove Mine Training Range	This mine training range is located south of San Clemente Island and is used primarily for mine	This area is in the coastal zone.

Area Name	Area Description	In the Coastal Zone?
	countermeasures training, mine detection, and neutralization of bottom and moored mine shapes. It includes a semi-permanent target minefield primarily for mine detection training using ALMDS.	
Shore Bombardment Area (SHOBA)	SHOBA is the only eastern Pacific Fleet range that supports naval surface fire support training using on-the-ground spotters and surveyed targets. The southern one-third of San Clemente Island (SCI) contains Impact Areas I and II, which comprise the onshore portion of SHOBA. (The offshore component provides designated locations [fire support areas] for firing ships to maneuver.). The main training activities that occur in SHOBA are naval gun firing, artillery, and air-to-ground bombing. A variety of munitions, both live and inert, are expended in SHOBA. Naval special warfare operations also occur in this area.	A portion of this area is in the coastal zone.
Shallow Water Training Ranges (SWTRs)	Tanner Bank SWTR and San Clemente Island SWTR are planned training ranges that will be instrumented with underwater hydrophones. This range would be used to evaluate the performance of aircraft, ships, and submarines conducting ASW training.	A portion of the San Clemente Island SWTR is in the coastal zone. The Tanner Bank SWTR is not in the coastal zone.
Tanner Bank Minefield	Located in the Tanner and Cortes Banks areas, the Tanner Bank Minefield is utilized for shallow water mine detection training and testing. Mine warfare training in this area remains contained within the Tanner Bank SWTR.	This area is not in the coastal zone.
Transit Lane	W-291 includes seven transit lanes that extend from the surface to 80,000 ft. MSL and provides Beaver a 5 nautical mile-wide corridor to transit users to and from the Operating Areas in the southern portion of the SOCAL Range Complex.	This area is not in the coastal zone.
Warning Area (W-291)	W-291 encompasses 113,000 square nautical miles located off of the Southern California coastline, extending from the ocean surface to 80,000 ft. above MSL. W-291 supports aviation training and Research, Development, Test, and Evaluation conducted by all aircraft in the Navy and Marine Corps inventories. Ordnance use is permitted.	This area is not in the coastal zone.

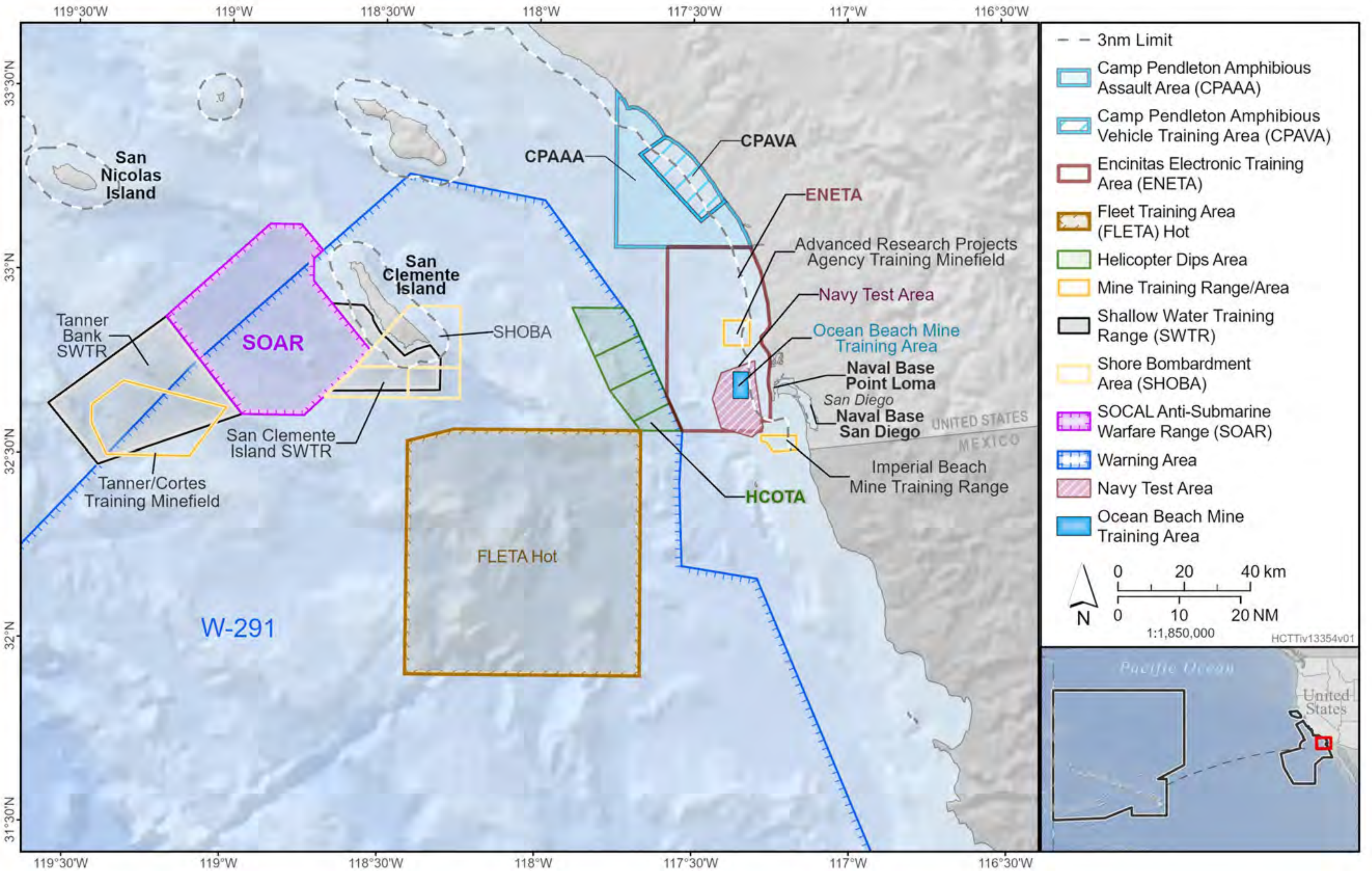


Figure 2-7: Southern California Range Complex

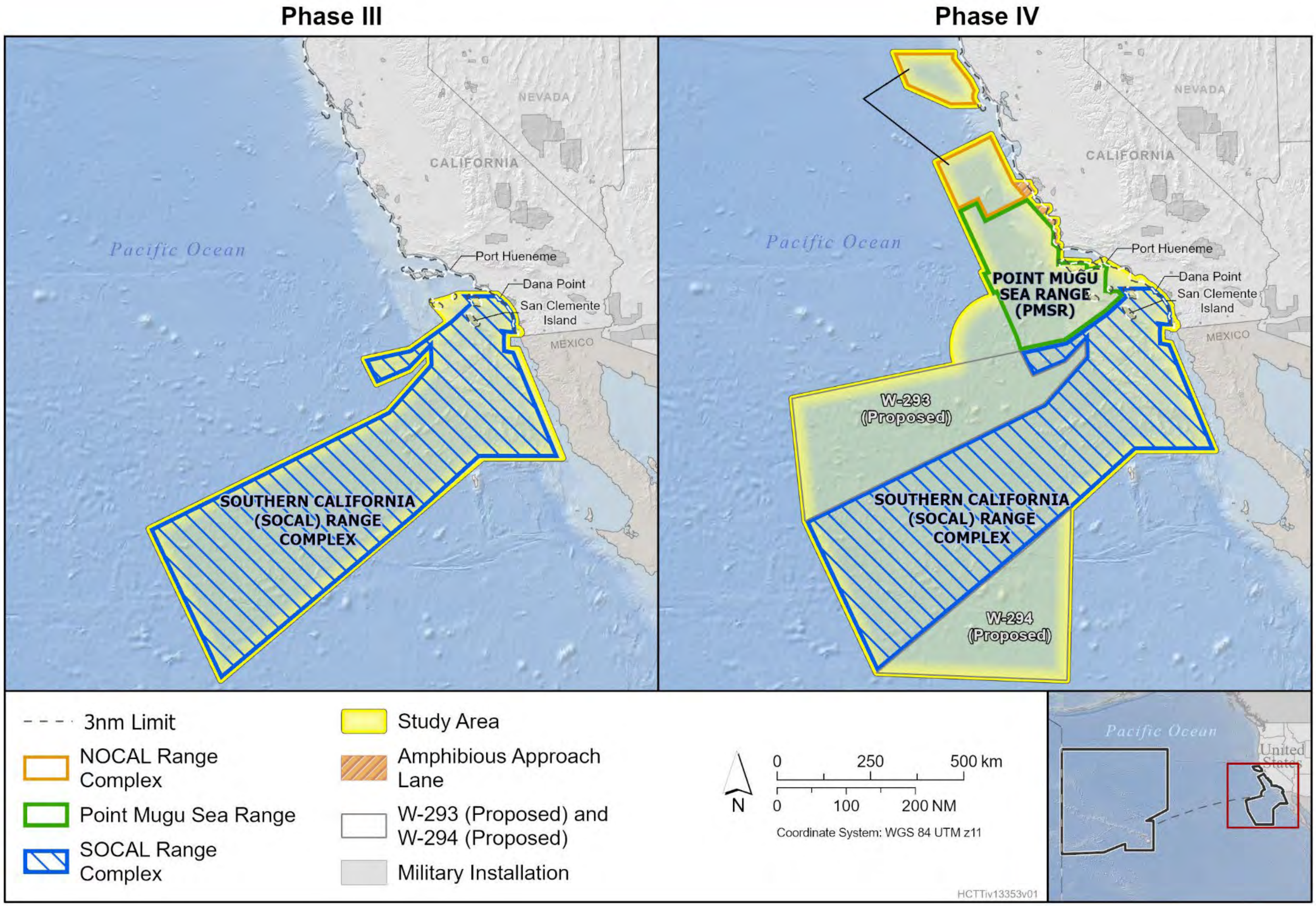


Figure 2-8: Proposed Southern California Range Complex Expansion

Table 2-2: San Clemente Island Offshore Training and Testing Area Descriptions

Area Name	Area Description	In the Coastal Zone?
Warning Area (W-291)	W-291 encompasses 113,000 square nautical miles (NM^2) located off of the Southern California coastline, extending from the ocean surface to 80,000 feet above mean sea level. W-291 supports aviation training and Research, Development, Test and Evaluation conducted by all aircraft in the Navy and Marine Corps inventories. Ordnance use is permitted.	This area is not in the coastal zone.
Mine Training Range (MTR)	Two MTRs and two mine laying areas are established in the nearshore areas of San Clemente Island (SCI). MTR-1 is the Castle Rock Mining Range off the northwestern coast of the island. MTR-2 is the Eel Point Mining Range off the midpoint of the southwestern side. In addition, mining training takes place in the China Point area, off the southwestern point of the island, and in the Pyramid Head area, off the island's southeastern tip. These ranges are used for training of aircrews in offensive mine laying by delivery of inert mine shapes (no explosives) from aircraft. Underwater detonations up to 300 pounds net explosive weight are authorized.	These areas are in the coastal zone.
Shore Bombardment Area (SHOBA) Impact Areas	SHOBA is the only eastern Pacific Fleet range that supports naval surface fire support training using on-the-ground spotters and surveyed targets. The southern one-third of SCI contains Impact Areas I and II, which comprise the onshore portion of SHOBA. (The offshore component provides designated locations [fire support areas] for firing ships to maneuver.). The main training activities that occur in SHOBA are naval gun firing, artillery, and air-to-ground bombing. A variety of munitions, both live and inert, are expended in SHOBA. Naval special warfare operations also occur in this area.	A portion of this area is in the coastal zone.
Southern California Anti-Submarine Warfare Range (SOAR)	SOAR is located offshore to the west of SCI. The underwater tracking range covers over 670 NM^2, and consists of seven subareas. The range has the capability of providing underwater tracking of submarines, practice weapons, and targets. SOAR supports various anti-submarine warfare training scenarios that involve air, surface, and subsurface units.	This area is not in the coastal zone.
Training Areas and Ranges (TARs)	TAR-2 and TAR-3 provide underwater demolition areas where explosives up to 500 lb. net explosive weight may be used.	These areas are in the coastal zone.

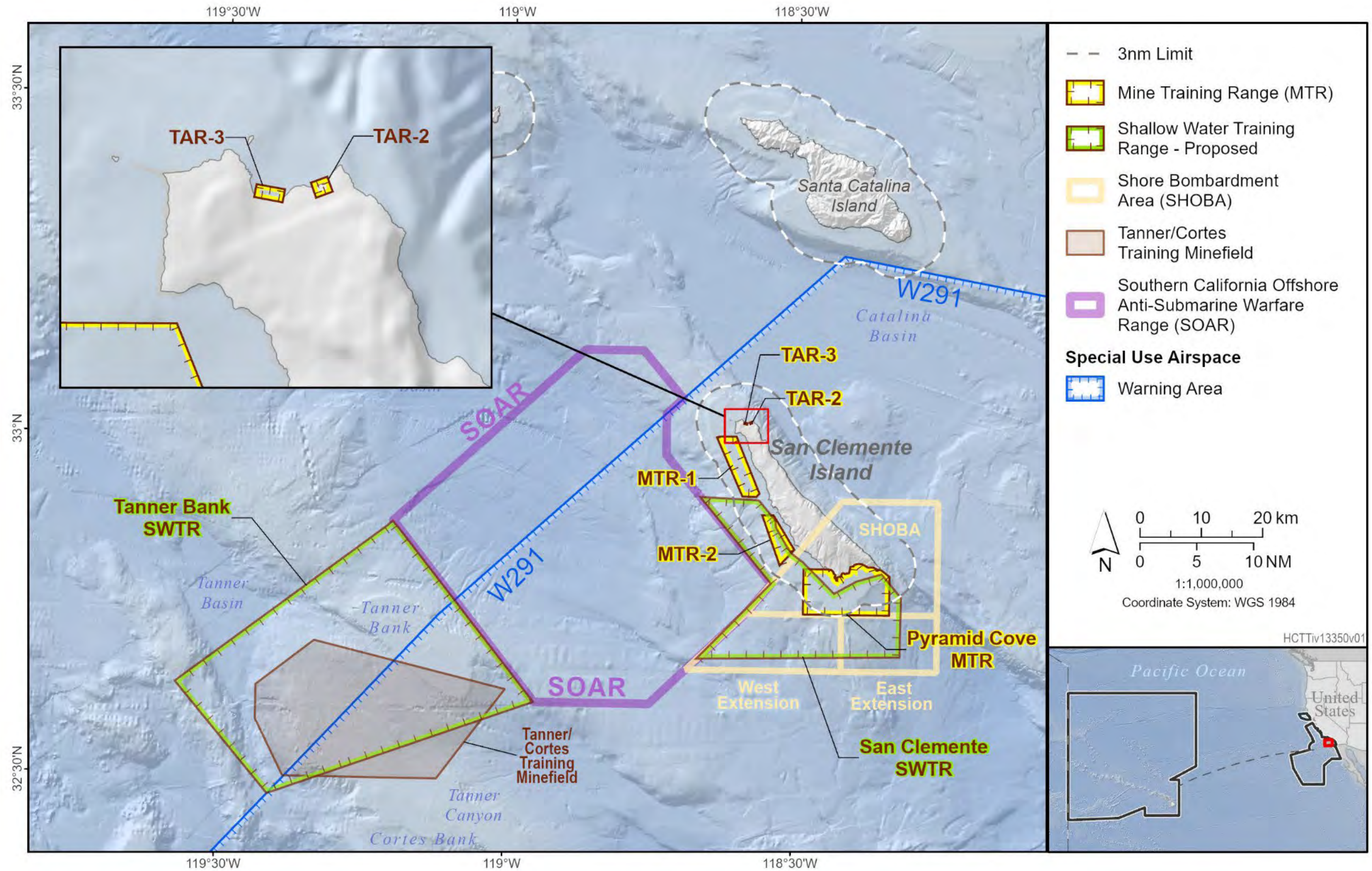
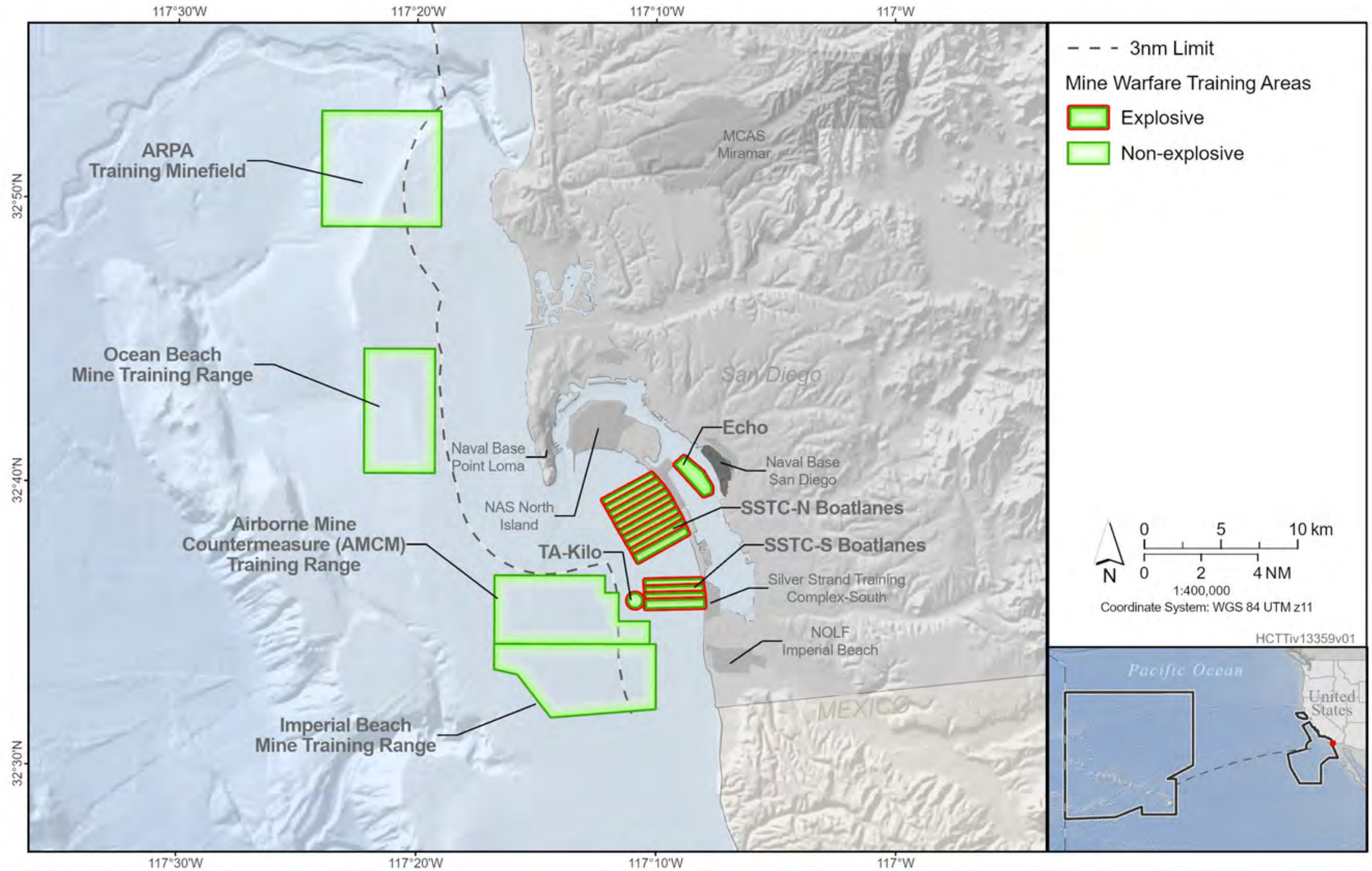


Figure 2-9: San Clemente Island Offshore Training and Testing Areas

Table 2-3: Silver Strand Training Complex Area Descriptions

Area Name	Area Description	In the Coastal Zone?
Imperial Beach Mine Training Range (MTR)	The Imperial Beach MTR, located off the coast of Imperial Beach, CA is primarily used for mine detection, identification, and neutralization and countermining of bottom and tethered mine shapes. Underwater explosives up to 20 pounds (lb.) net explosive weight (NEW) may be authorized. Area is laser certified for Class 4 laser (Airborne Laser Mine Detection Systems).	A portion of this area is in the coastal zone.
Airborne Mine Countermeasure (AMCM) Training Range	The AMCM Training Range, located off the coast of Imperial Beach, CA is used for mine countermeasure training and aerial minesweeping. Underwater explosives up to 3.5 lb. NEW may be authorized.	A portion of this area is in the coastal zone.
Lilly Ann Drop Zone	Within San Diego Bay, this area is used for a variety of Navy training, including insertion/extraction via parachute or helicopter.	This area is in the coastal zone.
Anchorages	Anchorages are numbered 101 through 178 and are 654 yards in diameter. They are grouped together in an area located primarily due west of Silver Strand Training Complex-North, east of Zuniga Jetty and the restricted areas on approach to the San Diego Bay entrance.	These areas are in the coastal zone.
Oceanside Boat Lanes	The 14 ocean training lanes are each 500 yards wide stretching 4,000 yards seaward and forming a 5,000-yard-long contiguous training area with the northern boat lanes and a 2,000-yard-long contiguous area with the southern boat lanes. Mine warfare activities, including underwater detonations, also occur here.	These areas are in the coastal zone.
Bayside Training Areas	Bayside training beaches consist of Alpha, Bravo, and Charlie to the south, Delta, Echo (I-III), Foxtrot, Golf, and Hotel to the north. This area also includes the piers and Lilly Ann Drop Zone. Underwater explosives up to 0.5 lb. NEW.	These areas are in the coastal zone.



Notes: TA = Training Area, NOLF = Naval Outlying Landing Field, NAS = Naval Air Station

Figure 2-10: The Silver Strand Training Complex In-Water and Nearby Training Areas

2.2.3.3 Point Mugu Sea Range

PMSR is the DoD's largest and most extensively instrumented over-water test range (Figure 2-11). PMSR is located along the Pacific Coast of Central and Southern California and includes 27,000 NM^2 of air and sea space. The 27,000 NM^2 of PMSR-controlled airspace consists of three Restricted Areas and 11 Warning Areas. PMSR supports training, testing, and evaluation of a wide variety of weapons, ships, aircraft, and specialized systems, as well as DoD, Homeland Defense, foreign military sales, and commercial/private sector programs. The test range also includes portions of NBVC Point Mugu, NBVC Port Hueneme, and SNI. National Environmental Policy Act coverage of these land areas is included in the 2022 PMSR EIS/OEIS and the associated CD with the exception of the launches from SNI, which are included in the Proposed Action, as noted in Section 2.2.3 (California Study Area). In addition, sea space in the southwestern portion of PMSR has been designated to facilitate testing activities by ONR. Testing activities conducted by ONR are described in Appendix A (Military Readiness Activities in the California Study Area).

Naval Base Ventura County Port Hueneme

NBVC Port Hueneme is located 60 miles northwest of Los Angeles and 4 miles south of the city of Oxnard. NBVC Port Hueneme provides port and docking facilities for PMSR support ships, target surface craft, the Navy's Self Defense Test Ship, Fleet units, Naval Facilities Engineering and Expeditionary Warfare Center test vessels, and Naval Sea Systems Command unmanned surface and underwater vehicles using PMSR for testing and combat system qualification trials. NBVC Port Hueneme is also home to Naval Construction Group 1, the Seabees, who conduct important pre-deployment training in waterfront and in-water construction methods. The Study Area for this CD includes the port where support vessels and targets are located and transit to and from PMSR. Figure 2-12 and Figure 2-13 show where within Port Hueneme Harbor the Navy would conduct pile driving activities as part of the Port Damage Repair training activity.

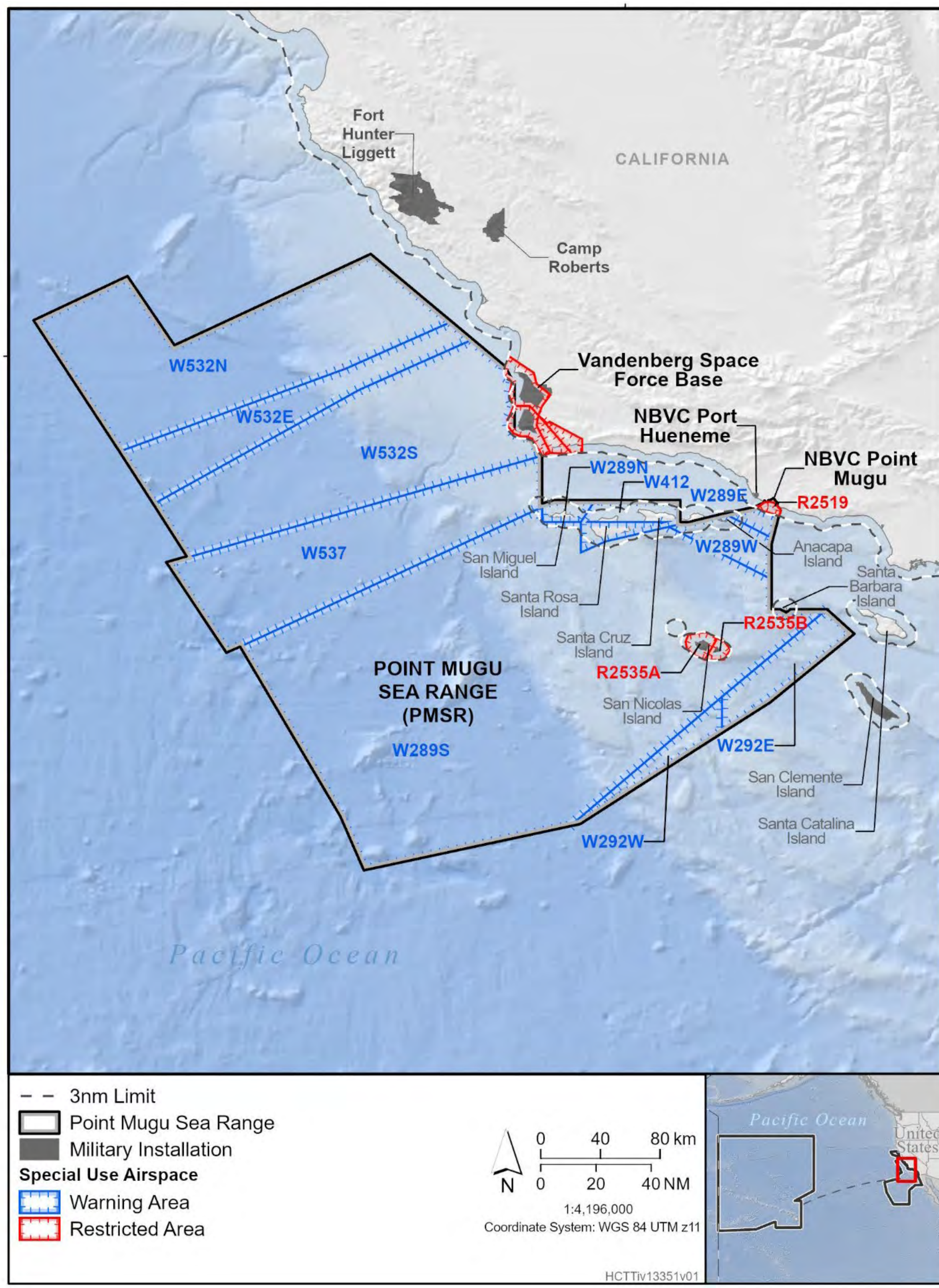


Figure 2-11: The Point Mugu Sea Range

Figure 2-12: Naval Base Ventura County Port Hueneme Harbor – Wharf 4

Figure 2-13: Naval Base Ventura County Port Hueneme Harbor – Wharf D

2.2.3.4 The Northern California Range Complex

The NOCAL Range Complex consists of two separate areas located offshore of central and northern California, one northwest of San Francisco and the other southwest of Monterey Bay (Figure 2-14). Each area includes special use airspace and the underlying sea space. The southern area includes approximately 10,000 NM^2 of airspace within Warning Area 283 (W283) and W285A/B/C/D. The northern area includes approximately 6,000 NM^2 of airspace within W260 and W513. These areas extend from the ocean surface to at least 45,000 feet (ft.) altitude. W260, W283, and W513 have a ceiling of 60,000 ft. Both components of the NOCAL Range Complex are located at least 12 NM from shore and are not within the coastal zone.

These areas' proximity to Naval Air Station Lemoore, where the Navy's Pacific Fleet Strike Fighter squadrons are based, is particularly important for the support of critical Strike Fighter Wing training. These areas also provide air and sea space for Carrier Strike Groups[3] and Amphibious Ready Groups[4] to conduct training, certifications, and testing. As evolving naval tactics and new weapon systems strain the capacity of the SOCAL Range Complex, both PMSR and the NOCAL Range Complex give air and surface platforms the freedom to maneuver and position themselves optimally for large-scale at-sea training scenarios.

2.2.3.5 Amphibious Approach Lanes

Amphibious Approach Lanes (Figure 2-15) extend the Study Area from PMSR and the NOCAL Range Complex to the shore to facilitate amphibious training at these locations. Amphibious approach lanes are used by amphibious assault landing craft to approach and land on a beach to move personnel and equipment from ship to shore. Unlike the warning areas previously discussed, only vessel movement from sea to land would occur in the proposed amphibious approach lanes. In this CD, only the at-sea components of amphibious warfare activities utilizing the amphibious approach lanes (e.g., amphibious assault) are analyzed. The land areas associated with the lanes will be covered under separate environmental analyses and use agreements as planning for future activities matures. Figure 2-15 illustrates locations that could serve as future landing locations for amphibious training activities. Coordination with and authorization with landowners would be required before actual use.

2.2.4 Differences from Previous Consistency Determinations

There are three differences between this action and the prior action considered in the 2018 HCTT CD and the 2020 PMSR CD: (1) types and levels of activities to be conducted, (2) proposed mitigation areas, and (3) changes to the California Study Area as discussed previously in Section 2.2.3 (California Study Area) of this CD.

2.2.4.1 Types and Levels of Activities to be Conducted

The 2018 HSTT EIS/OEIS (for the Southern California portion of the HSTT Study Area) and the 2018 CD, and the 2022 PMSR EIS/OEIS and the 2020 CD, analyzed at-sea military readiness activities (ongoing activities) that are the baseline for this CD. In the 2022 PMSR EIS/OEIS, no sonar or underwater

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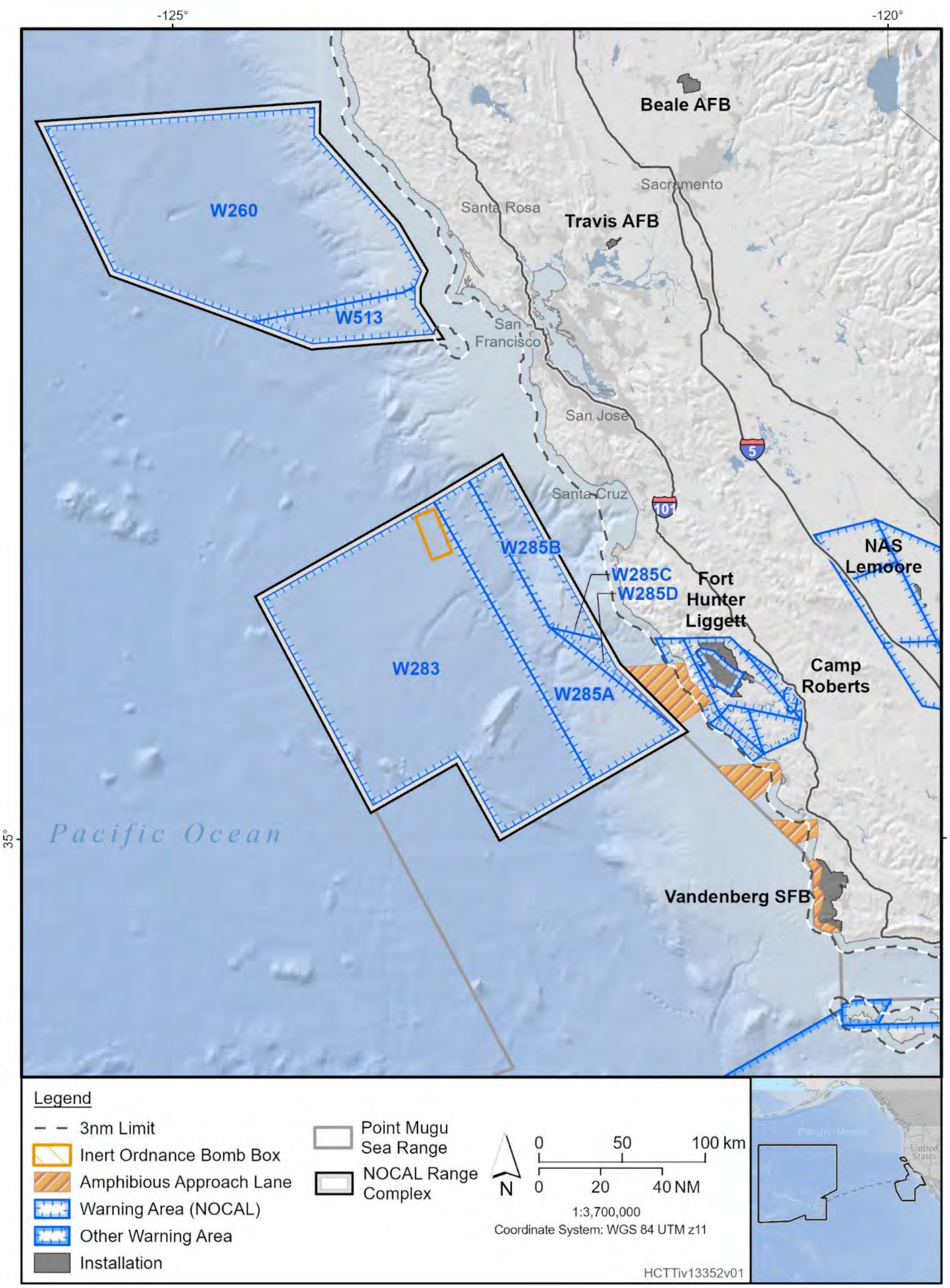
[3] A Carrier Strike Group is an operational composition of combat ships and aircraft, centered around an aircraft carrier.

[4] An Amphibious Ready Group is an operational composition of combat ships, aircraft, and Marines, centered around several amphibious ships.

explosives were proposed to be used during military readiness activities within PMSR. However, some of the proposed activities within PMSR covered in the 2024 HCTT Draft EIS/OEIS do include the use sonar and in-water explosives. A comparison between the level of proposed activities analyzed in this CD and ongoing activities is provided in Appendix A (Military Readiness Activities in the California Study Area), Tables A-1 through A-7. As described in those tables, some activities have increased, some have decreased, and some have remained consistent. In addition, some activities have been discontinued or combined with other activities and some new activities are proposed.

Some military readiness activities analyzed in this CD may appear as new activities. Within PMSR and the NOCAL Range Complex, there are some newly proposed military readiness activities that have not been conducted there before. However, most of these activities are very similar to activities that have been conducted in Southern California for decades.



Notes: NOCAL = Northern California, SFB = Space Force Base, AFB = Air Force Base, NAS = Naval Air Station

Figure 2-14: Northern California Range Complex

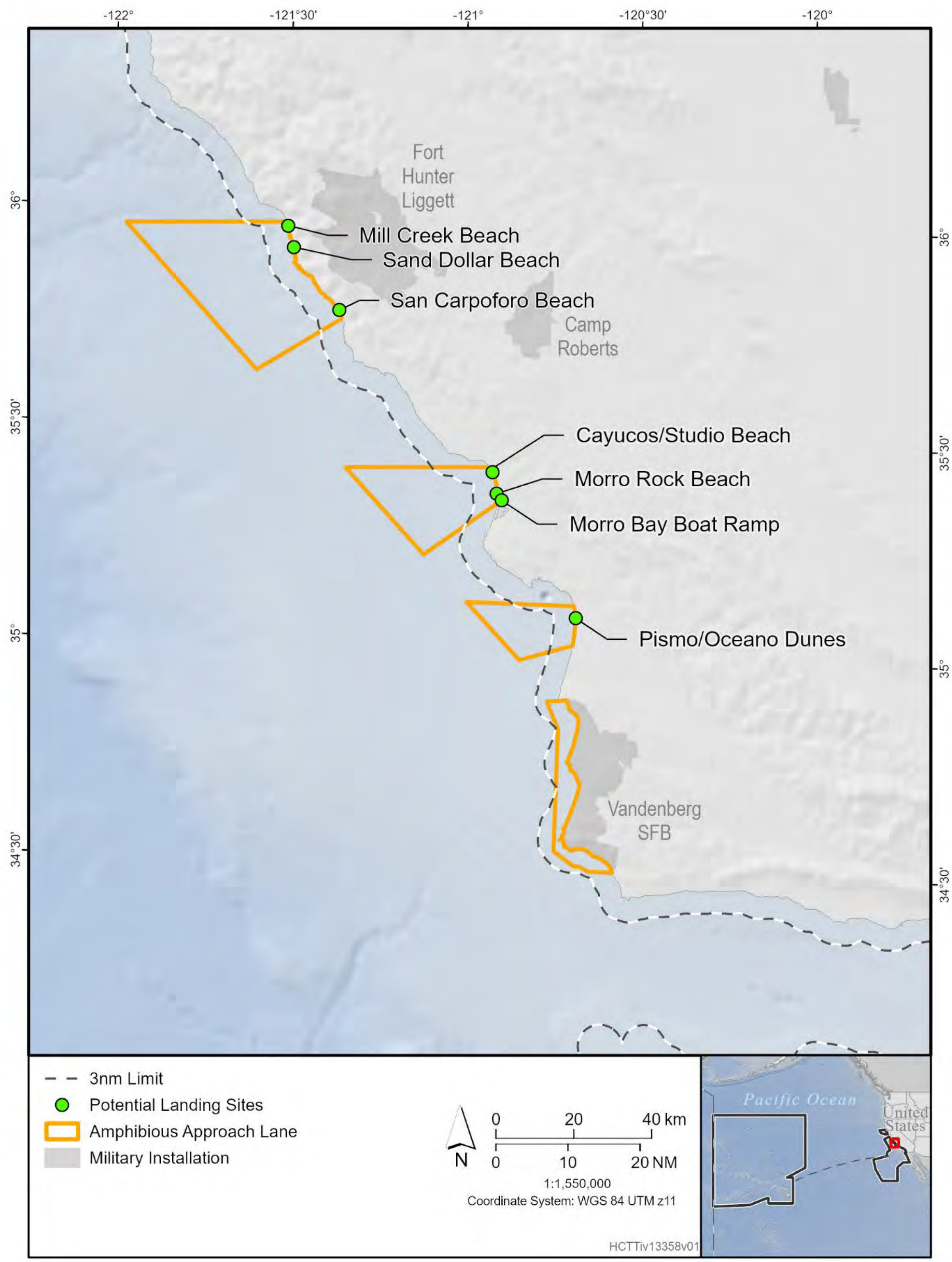


Figure 2-15: Amphibious Approach Lanes

2.2.4.2 Geographic Mitigation

The Navy has a robust and comprehensive suite of mitigation measures which help minimize impacts to a variety of environmental resources in support of military readiness activities. Mitigation was initially developed for Phase I of at-sea environmental planning (2009 to 2014) and subsequently revised for Phase II (2013 to 2018) and Phase III (2018 to 2025 for the HSTT EIS/OEIS, and 2022 to 2029 for the PMSR EIS/OEIS). This 2024 HCTT Draft EIS/OEIS (for activities from 2025 to 2032; Phase IV) uses mitigation from the 2018 HSTT and 2022 PMSR EIS/OEISs as the baseline for refining mitigation specific to the Proposed Action.

All proposed mitigation measures are described in Appendix C (Mitigation). As part of those measures, the Navy will implement mitigation within specific geographic mitigation areas to further avoid or reduce potential impacts on biological or cultural resources to the maximum extent practicable (Figure 2-16). For a full technical analysis (i.e., assessment of biologically important areas and practicability of implementation) of all mitigation areas that the Action Proponents considered for marine mammals, see Appendix K (Geographic Mitigation Assessment) of the 2024 HCTT Draft EIS/OEIS (U.S. Department of the Navy, 2024a). A summary of the geographic mitigation areas in the California Study Area that the Action Proponents will implement are provided in this section. Additionally, other regulatory processes are currently ongoing and further mitigation requirements may arise as a result of those processes.

Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Areas

Table 2-4 details geographic mitigation for explosives and physical disturbance and strike stressors near artificial reefs, hard bottom substrate, and shipwrecks. For mitigation, the term “hard bottom substrate” is defined as substrate in the marine environment which could support a covering of biotic features (e.g., seaweed, sponges, hard corals). Mitigation will also help avoid potential effects on organisms (e.g., invertebrates, fishes, sea turtles) that use these seafloor resources for sheltering, resting, feeding, or other important life processes. The mitigation is a continuation from the 2018 HSTT and 2022 HSTT Essential Fish Habitat consultation reinitiation, except for an extension of the precisely placed non-explosive seafloor device requirements to artificial reefs and shipwrecks. The overall effectiveness of the mitigation would be correlated with the quality (e.g., accuracy) of the underlying mapping data, as discussed in *Phase IV Hawaii California Training and Testing EIS/OEIS: Marine Benthic Habitat Database Technical Report* (U.S. Department of the Navy, 2025).

Table 2-4: Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Area Requirements

Category	***Mitigation Requirements***	***Mitigation Benefits***
Explosives	• The Action Proponents will not detonate explosives on or near the seafloor (e.g., explosive bottom-laid or moored mines) within a horizontal distance of 350 yd. from artificial reefs, hard bottom substrate, and shipwrecks (except in designated areas in the California OPAREA, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical).	• The 350 yd. mitigation area radius will prevent direct impacts (and some level of indirect impacts) from explosives on artificial reefs, hard bottom substrate, and shipwrecks for the reasons described in Section 5.7.1 (Shallow-Water Coral Reef and Precious Coral Bed Mitigation Areas) of the 2024 HCTT DEIS/OEIS.
Physical disturbance and strike	• The Action Proponents will not set vessel anchors within the anchor swing circle radius from artificial reefs, hard bottom substrate, and shipwrecks (except in designated anchorages).	• Mitigation ensures that vessel anchors do not come into contact with artificial reefs, hard bottom substrate, and shipwrecks, when factoring in environmental conditions that could affect anchoring position, such as winds, currents, and water depth.

Category	Mitigation Requirements	Mitigation Benefits
	• The Action Proponents will not place non-explosive seafloor devices (that are not precisely placed) within a horizontal distance of 350 yd. from artificial reefs, hard bottom substrate, and shipwrecks (except as described in the bullet above for vessel anchors, the bullet below for precisely placed seafloor devices, and in designated areas of the California OPAREA, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical). • The Action Proponents will not position precisely placed non-explosive seafloor devices directly on artificial reefs, hard bottom substrate, or shipwrecks. • The Action Proponents will avoid positioning precisely placed non-explosive seafloor devices near these resources by the largest distance that is practical to implement based on mission requirements.	• For ease of implementation, the 350 yd. mitigation area radius for explosives was also adopted for seafloor devices (that are not precisely placed), and is even more conservative when compared to the small impact footprints of non-explosive seafloor devices. • Mitigation specific to precisely placed seafloor devices was first developed and coordinated with NMFS for live hard bottom habitats during the 2022 HSTT Study Area's Essential Fish Habitat consultation reinitiation (U.S. Department of the Navy, 2022a). That mitigation is being included in this document, and applied to the whole mitigation area category of hard bottom substrate as well as artificial reefs and shipwrecks, for consistency and practicality of implementation. Because precisely placed seafloor devices are deployed with a high degree of placement accuracy, the original intent of the mitigation (i.e., preventing direct physical strike and disturbance) will continue to be achieved. Therefore, the mitigation for seafloor devices that are either precisely placed or not precisely placed will collectively prevent direct impacts (and some level of indirect impacts) from seafloor devices on artificial reefs, hard bottom substrate, and shipwrecks.

Mitigation Areas for Marine Mammals

The Action Proponents will add two new mitigation areas (Table 2-5 and Table 2-6) to the existing Phase III mitigation areas, as well as one existing mitigation area from the 2022 PMSR EIS/OEIS (Table 2-10) and one from the NMFS 2024 HSTT BO reinitiation (Table 2-9). In combination with activity-based mitigation, these geographic mitigation areas result in the least practical adverse impact on marine mammals, including ESA-listed marine mammal species, and their habitats.

Northern California Large Whale Mitigation Area

Table 2-5 details geographic mitigation related to the use of active sonar off the California coast, generally extending from Point Arena to an area west of The Farallon Islands. The mitigation is new for the 2024 HCTT Draft EIS/OEIS.

Table 2-5: Northern California Large Whale Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic	• From June 1 – October 31, the Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Central California Large Whale Mitigation Area, and the Southern California Blue Whale Mitigation Area.	• Mitigation to limit use of MF1 active sonar is designed to reduce exposure of blue whales, fin whales, gray whales, and humpback whales in important seasonal foraging, migratory, and calving habitats to levels of sound that have the potential to cause injurious or behavioral impacts.

Central California Large Whale Mitigation Area

Table 2-6 details geographic mitigation related to the use of active sonar off the California coast, generally extending from Monterey Bay to San Miguel Island. The mitigation is new for the 2024 HCTT Draft EIS/OEIS.

Table 2-6: Central California Large Whale Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Acoustic	• From June 1 to October 31, the Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Northern California Large Whale Mitigation Area, and the Southern California Blue Whale Mitigation Area.	• Mitigation to limit use of MF1 active sonar is designed to reduce exposure of blue whales, fin whales, gray whales, and humpback whales in important seasonal foraging, migratory, and calving habitats to levels of sound that have the potential to cause injurious or behavioral impacts.

Southern California Blue Whale Mitigation Area

Table 2-7 details geographic mitigation related to the use of active sonar and explosives off San Diego, California. The mitigation is a continuation from the 2018 HSTT EIS/OEIS with a modified geographic extent based on best available science.

Table 2-7: Southern California Blue Whale Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Acoustic	• From June 1 to October 31, the Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Northern California Large Whale Mitigation Area, and the Central California Large Whale Mitigation Area.	• Mitigation to limit use of MF1 active sonar is designed to reduce exposure of blue whales within important seasonal foraging habitats to levels of sound that have the potential to cause injurious or behavioral impacts.
Explosives	• From June 1 to October 31, the Action Proponents will not detonate in-water explosives (including underwater explosives and explosives deployed against surface targets) during large-caliber gunnery, torpedo, bombing, and missile (including 2.75” rockets) training and testing.	• Mitigation to limit the use of in-water explosives is designed to reduce exposure of blue whales within important seasonal foraging habitats to explosives that have the potential to cause injury, mortality, or behavioral disturbance.

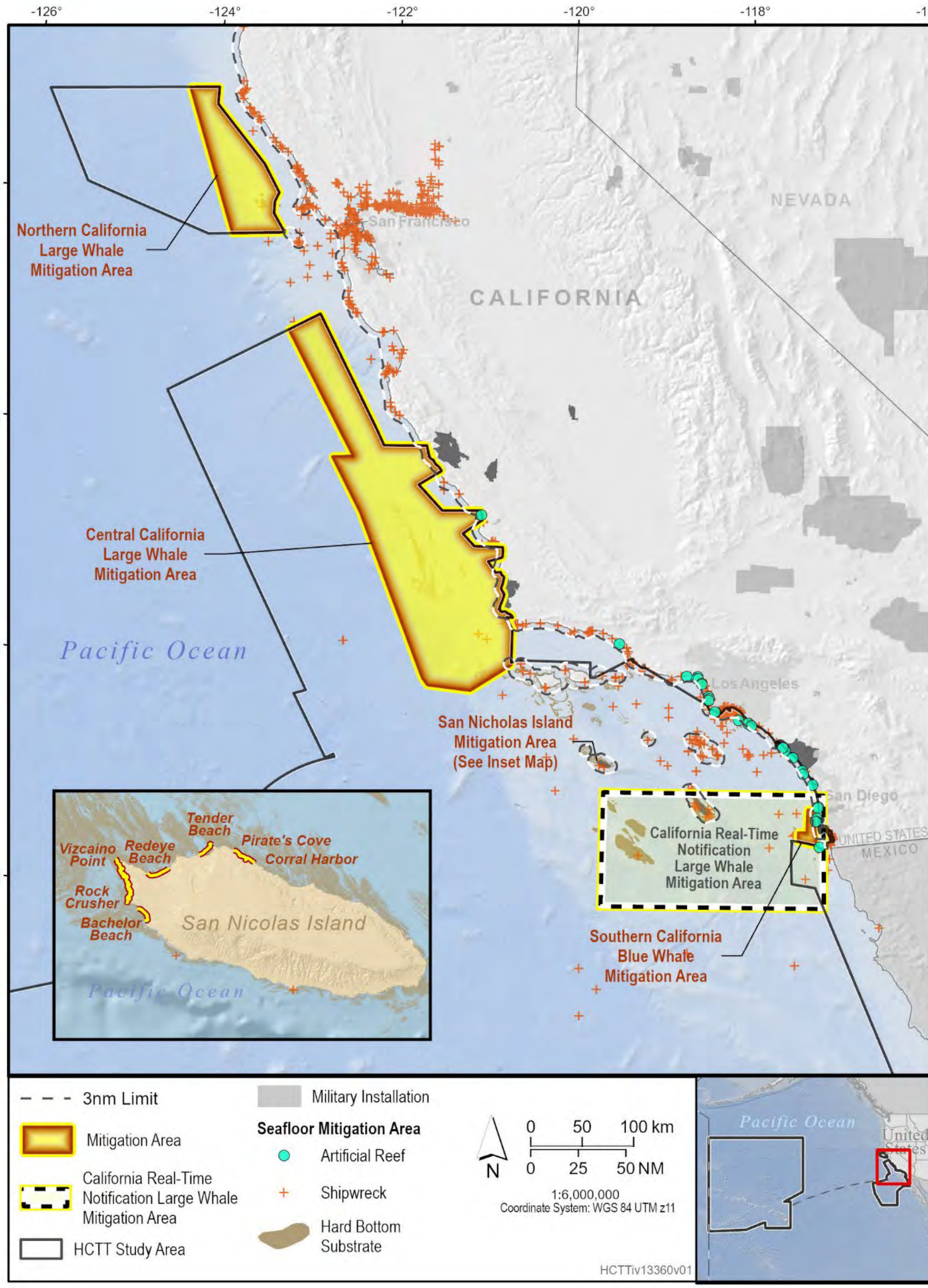


Figure 2-16: Geographic Mitigation Areas in the California Study Area

California Large Whale Awareness Messages

Table 2-8 details awareness message requirements for the California Study Area. The mitigation is a continuation from the 2018 HSTT EIS/OEIS with an updated geographic extent consistent with the expanded California Study Area.

Table 2-8: California Large Whale Awareness Message Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Acoustic, Explosives, Physical disturbance and strike	• The Action Proponents will broadcast awareness messages to alert applicable assets (and their Lookouts) transiting and training or testing off the U.S. West Coast to the possible presence of concentrations of large whales, including gray whales (November–March), fin whales (November–May), and mixed concentrations of blue, humpback, and fin whales that may occur based on predicted oceanographic conditions for a given year (e.g., May–November, April–November). Awareness messages may provide the following types of information which could vary annually: – While blue whales tend to be more transitory, some fin whales are year-round residents that can be expected in nearshore waters within 10 NM of the California mainland and offshore operating areas at any time. – Fin whales occur in groups of one to three individuals, 90 percent of the time, and in groups of four or more individuals, 10 percent of the time. – Unique to fin whales offshore southern California (including the Santa Barbara Channel and PMSR area), there could be multiple individuals and/or separate groups scattered within a relatively small area (1–2 NM) due to foraging or social interactions. – When a large whale is observed, this may be an indicator that additional marine mammals are present and nearby, and the vessel should take this into consideration when transiting. – Lookouts will use that knowledge to help inform their visual observations during military readiness activities that involve vessel movements, active sonar, in-water explosives (including underwater explosives and explosives deployed against surface targets), or the deployment of non-explosive ordnance against surface targets in the California Study Area.	• Mitigation to broadcast awareness messages to applicable assets, and to use that information to inform visual observations, is designed to minimize potential blue whale, gray whale, and fin whale vessel interactions and exposure to acoustic stressors, explosives, and physical disturbance and strike stressors that have the potential to cause mortality, injury, or behavioral disturbance during the foraging and migration seasons, and to resident whales.

California Real-Time Notification Large Whale Mitigation Area

Table 2-9 details real-time notification requirements for a designated area within the SOCAL Range Complex. The mitigation is a continuation from the NMFS 2024 HSTT BO Reinitiation.

Table 2-9: California Real-Time Notification Large Whale Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Physical disturbance and strike	• The Action Proponents will issue real-time notifications to alert Action Proponent vessels operating in the vicinity of large whale aggregations (four or more whales) sighted within 1 NM of an Action Proponent vessel within an area of the Southern California Range Complex (between 32–33 degrees North and 117.2–119.5 degrees West). – The four whales that make up a defined "aggregation" would not all need to be from the same species, and the aggregation could consist either of a single group of four (or more) whales, or any combination of smaller groups totaling four (e.g., two groups of two whales each or a group of three whales and a solitary whale) within the 1 NM zone.	• The real-time notification area encompasses the locations of recent (2009, 2021) vessel strikes, and historic strikes where precise latitude and longitude were known.

Category	Mitigation Requirements	Mitigation Benefits
	– Lookouts will use the information from the real-time notifications to inform their visual observations of applicable mitigation zones. If Lookouts observe a large whale aggregation within 1 NM of the event vicinity within the area between 32–33 degrees North and 117.2–119.5 degrees West, the watch station will initiate communication with the designated point of contact to contribute to the Navy's real-time sighting notification system.	

San Nicolas Island Pinniped Haulout Mitigation Area

Table 2-10 details geographic mitigation related to in-air vehicle launch noise and associated monitoring for pinniped haulout locations on San Nicolas Island, California. The mitigation is an adaptation of procedural mitigation from the 2022 PMSR EIS/OEIS.

Table 2-10: San Nicolas Island Pinniped Haulout Mitigation Area

Category	Mitigation Requirements	Mitigation Benefits
In-air vehicle launch noise	• Navy personnel shall not enter pinniped haulout or rookery areas. Personnel may be adjacent to pinniped haulouts and rookery prior to and following a launch for monitoring purposes. • Missiles shall not cross over pinniped haulout areas at altitudes less than 305 m (1,000 ft.). • The Navy may not conduct more than 10 launch events at night annually. • Launch events shall be scheduled to avoid the peak pinniped pupping seasons from January through July, to the maximum extent practicable. • The Navy shall implement a monitoring plan using video and acoustic monitoring of up to three pinniped haulout areas and rookeries during launch events that include missiles or targets that have not been previously monitored for at least three launch events.	• Mitigation is designed to minimize in-air launch noise and physical disturbance to pinnipeds hauled out on beaches, as well as to continue assessing baseline pinniped distribution/abundance and potential changes in pinniped use of these beaches after launch events.

2.2.5 California Coastal Zone and Coastal Zone Uses or Resources

The California Coastal Commission plans and regulates the use of land and water in the coastal zone, and to ensure that coastal zone resources are effectively protected. While the coastal zone is clearly defined as extending seaward to the state's outer limit of jurisdiction (3 NM) coastal resources are not as clearly defined. Coastal zone resources include both resources permanently located in the coastal zone (e.g., benthic organisms) and mobile resources (e.g., marine mammals and sea turtles) that typically move into and out of the coastal zone as part of a natural cycle.

For that reason, this CD examines the potential effects of all of the Action Proponents' activities proposed for the California Study Area, whether those activities occur within the coastal zone or not.

2.2.6 Effects Test

The effects test is the procedure followed by the Action Proponents to determine what process to follow for federal consistency compliance under Section 307 (16 U.S.C. section 1456) and its implementing regulations (15 CFR Part 930). Proposed Action activities must be evaluated for consistency with the State of California (State) coastal zone policies if it is determined they have reasonably foreseeable effects on coastal zone uses or resources of the State. Thus, elements of the Proposed Action must first be examined to determine whether they have any reasonably foreseeable direct, indirect, or cumulative effects on coastal zone uses or resources of the State before determining whether those effects, if any, are consistent with the State's enforceable policies.

The Action Proponents identified and evaluated aspects of its Proposed Action that could stress (i.e., stimuli that affect part of the environment) environmental resources. Table 2-11 lists the stressors identified for analysis. The stressors indicate potential effects on physical, biological, and human resources that are considered California’s coastal zone resources. Coastal zone uses and resources are included within the policies described in Chapter 3 of the CA Coastal Act (or CZMP).

The effects test for the Proposed Action is based on the locations of military readiness activities relative to the coastal zone and the potential effects of stressors on coastal zone uses or resources. Appendix A (Military Readiness Activities in the California Study Area) lists and describes each military readiness activity under the Proposed Action; identifies whether the activity occurs in the coastal zone; and identifies the annual number and location of ongoing activities as well as those proposed for this current CD. The effects test first identifies stressors associated with each military readiness activity, and then identifies the stressors that could affect any coastal use or resource (e.g., sediments and water quality, marine mammals, fishes, and socioeconomics). If a coastal resource could be affected by a stressor, then the Proposed Action has reasonably foreseeable effects on that coastal zone resource.

In addition to the military readiness activities that occur in California’s coastal zone, activities that occur outside of California’s coastal zone were also examined to determine if they could potentially impact coastal zone uses or resources. Based on this analysis, the Action Proponents have determined that the following elements of military readiness activities, which typically occur outside of the coastal zone, may affect coastal zone uses and resources:

- activities using sonar (e.g., ASW tracking training events and tests),
- activities using high-explosive ordnance (e.g., air-to-surface missile training events and tests),
- mine warfare activities using high explosives (e.g., mine neutralization tests),
- torpedo training events and tests, and
- unmanned vehicle training events and tests.

Military Readiness activities would typically occur in portions of the California Study Area where they have historically occurred. Various factors such as water depth, distance from land, and instrumentation determine where specific activities occur. Based on these factors, some activities would not occur within the coastal zone. However, some activities will occur within the coastal zone, and other activities outside of the coastal zone could have reasonably foreseeable effects on coastal zone uses and resources. Therefore, the Proposed Action has been reviewed for consistency with the enforceable policies of the California Coastal Zone Management Program.

Table 2-11: Stressors Analyzed for Reasonably Foreseeable Effects on Coastal Zone Uses or Resources

Stressors and Components by Resource	
Physical Resources	**Stressors and Substressors**
Sediments and Water Quality	• Explosives (in-water explosions) • Metals • Chemicals (other than explosives) • Other materials
Air Quality	• Criteria air pollutants

Stressors and Components by Resource	
Biological Resources	**Stressors and Substressors**
Vegetation, Invertebrates, Habitats, Fishes, Marine Mammals, Reptiles, and Birds.	**Acoustic Stressors** • Sonar and other transducers • Pile driving • Vessel noise • Aircraft noise • Weapons noise • Air guns
	Explosives Stressors • In-air explosions • In-water explosions
	Energy Stressors • In-air electromagnetic devices • In-water electromagnetic devices • High-energy lasers and high-power microwaves
	Physical Disturbance and Strike Stressors • Vessels and in-water device strike • Aircraft and aerial target strike • MEM • Seafloor devices • Pile driving
	Entanglement Stressors • Wires and cables • Decelerators/parachutes • Deployment of nets
	Ingestion Stressors • MEM – munitions • MEM other than munitions
	Secondary Stressors • Impacts on Habitat • Impacts on Prey Availability
Human Resources	**Stressors and Substressors**
Cultural Resources	• Explosive Stressors (explosives – shock [pressure] waves from underwater explosions; explosives – cratering) • Physical disturbance and strike stressors (in-water devices, MEM, seafloor devices, and vibration from sonic booms)
Socioeconomic Resources	• Accessibility (availability of access on the ocean and in the air) • Airborne acoustic (weapons firing, aircraft, and vessel noise) • Physical disturbance and strike stressors (aircraft, vessels and in-water devices, MEM) • Secondary stressors (impacts on habitat, prey availability)
Public Health and Safety	• Underwater energy (sonar and underwater explosives) • In-air energy (radar and lasers) • Physical interactions (aircraft, vessels, in-water devices/targets, munitions, seafloor devices) • Secondary stressors (impacts on habitat, prey availability)

3 ENFORCEABLE POLICIES OF THE CALIFORNIA COASTAL MANAGEMENT PROGRAM

3.1 ENFORCEABLE POLICIES NOT APPLICABLE TO THE PROPOSED ACTION

The Action Proponents reviewed the CCMP to identify enforceable and approved policies relevant to the Proposed Action. The CCMP Enforceable Policies (California Coastal Act Section 30000-30265.5) that are not applicable to the Proposed Action are identified and discussed in Table 3-1. The Proposed Action is analyzed for consistency with applicable CCMP objectives in Section 3.2 (Enforceable Policies of the California Coastal Act Applicable to the Proposed Action).

Table 3-1: Enforceable Policies of the California Coastal Act Not Applicable to the Proposed Action

Article	Section	State Enforceable Policy	Explanation of Non-Applicability
Article 2: Public Access	30211	Development not to interfere with access	The Proposed Action does not include any development within the coastal zone.
	30212	New development projects: provision for access; exceptions	The Proposed Action does not include any new development projects within the coastal zone.
	30212.5	Public facilities; distribution	The Proposed Action does not include public facilities.
	30213	Lower cost visitor and recreational facilities; encouragement and provision; overnight room rentals	The Proposed Action does not include any visitor or recreational facilities.
	30214	Implementation of public access policies; legislative intent	This section explains the legislative intent applicable to the foregoing public access policies, and does not constitute a separate public access policy.
Article 3: Recreation	30221	Oceanfront land; protection for recreational use and development	The Proposed Action does not include any development of oceanfront land that would reduce available areas for public use.
	30222	Private lands; priority of development purposes	The Proposed Action does not include any development of private lands within the California portion of the HCTT Study Area.
	30222.5	Oceanfront land; protection for aquaculture use and development	The Proposed Action does not affect coastal zone lands suitable for aquaculture.
	30223	Upland areas	The Proposed Action does not occur on any upland areas within the coastal zone.

Article	Section	State Enforceable Policy	Explanation of Non-Applicability
	30224	Recreational boating use; encouragement; facilities	The Proposed Action does not include any development of recreational boating facilities.
Article 4: Marine Environment	30232	Oil and hazardous substance spills	The Proposed Action does not include transportation or development of petroleum products or hazardous substances.
	30233	Diking, filling, or dredging continued movement of sediment and nutrients	The Proposed Action does not include any diking, filling, or dredging of sediment within the coastal zone.
	30234	Commercial fishing and recreational boating facilities	The Proposed Action does not include changes in commercial fishing or recreational boating facilities.
	30235	Construction altering natural shoreline	The Proposed Action does not include construction associated with structures that would alter the natural shoreline.
	30236	Water supply and flood control	The Proposed Action does not alter any rivers or streams.
Article 5: Land Resources	30240	Environmentally sensitive habitat areas; adjacent developments	The Proposed Action does not include development of environmentally sensitive habitat areas within the coastal zone.
	30241	Prime agricultural land; maintenance in agricultural production	The Proposed Action does not include any prime agricultural lands within the coastal zone.
	30241.5	Agricultural lands; determination of viability of uses; economic feasibility evaluation	The Proposed Action does not include any agricultural land within the coastal zone.
	30242	Lands suitable for agricultural use; conversion	The Proposed Action does not convert any agricultural lands.
	30243	Productivity of soils and timberlands; conversions	The Proposed Action does not include any timberlands within the coastal zone.
	30244	Archaeological or paleontological resources	The Proposed Action does not include any development in areas of known significant archaeological or paleontological resources within the coastal zone.
Article 6: Development	30250	Location, existing developed areas	The Proposed Action does not include any development within the coastal zone.
	30251	Scenic and visual qualities	The Proposed Action does not include any development within the coastal zone.

Article	Section	State Enforceable Policy	Explanation of Non-Applicability
	30252	Maintenance and enhancement of public areas	The Proposed Action does not include any development within the coastal zone.
	30253	Safety, stability, pollution, energy conservation, visitors	The Proposed Action does not include any development within the coastal zone.
	30254	Public works facilities	The Proposed Action does not include any development within the coastal zone.
	30254.5	Sewage treatment plants and conditions	The Proposed Action does not include any development within the coastal zone.
	30255	Priority of coastal-dependent developments	The Proposed Action does not include any development within the coastal zone.
Article 7: Industrial Development	30260	Location or expansion	The Proposed Action does not include any industrial development.
	30261	Use of tanker facilities; liquified natural gas terminals	The Proposed Action does not include any industrial development.
	30262	Oil and gas development	The Proposed Action does not include any industrial development.
	30263	Refineries or petrochemical facilities	The Proposed Action does not include any industrial development.
	30264	Thermal electric generating plants	The Proposed Action does not include any industrial development.
	30265	Legislative findings and declarations; offshore oil transport and refining	The Proposed Action does not include any industrial development.
	30265.5	Governor or designee; coordination of activities concerning offshore oil transport and refining; duties	The Proposed Action does not include any industrial development.

3.2 Enforceable Policies of the California Coastal Act Applicable to the Proposed Action

The following enforceable policies of the California Coastal Act are relevant to the Proposed Action because one or more of the proposed activities could affect a coastal zone resource or use addressed by the policy. The California Coastal Act Enforceable Policies that are applicable to the Proposed Action are identified in Table 3-2. The analysis of the policies below is only for those parts of the policies that are relevant to the Proposed Action.

Table 3-2: Enforceable Policies of the California Coastal Act Applicable to the Proposed Action

Article	Section	State Enforceable Policy
Article 2: Public Access[1]	30210	Access; recreational opportunities; posting
Article 3: Recreation	30220	Protection of certain water-oriented activities
Article 4: Marine Environment	30230	Marine resources; maintenance
	30231	Biological productivity; waste water
	30234.5	Economic, commercial, and recreational importance of fishing

[1]Potential effects on coastal zone uses or resources from amphibious landing activities within the amphibious approach lanes shown in Figure 2-15 will be addressed in future CZMA documentation.

3.2.1 Article 2, Section 30210 – Access; Recreational Opportunities; Posting

3.2.1.1 Policy

Maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.

3.2.1.2 Consistency Review

Military readiness activities could temporarily limit access to ocean areas within California's coastal zone for a variety of human activities associated with commercial transportation and shipping, commercial recreation and fishing, subsistence use, and tourism in the California Study Area. Temporary closures of portions of the California Study Area, including the coastal zone, for security and safety do not limit public access to adjacent areas. Areas are only closed for the duration of the activity and are re-opened at the completion of the activity.

The Action Proponents strive to operate in a manner that is compatible with other ocean users by minimizing access restrictions. Published notices allow recreational users to adjust their routes to avoid temporary restricted areas. If civilian vessels are within a training or testing area at the time of a scheduled operation, military personnel would continue operations only where and when it is safe and possible to avoid the civilian vessels. If avoidance is not safe or possible, the activity would be halted and may be relocated or delayed. In some instances where safety requires exclusive use of a specific area, nonparticipants in the area are asked to relocate to a safer area for the duration of the operation.

Accessibility, or restrictions in the availability of ocean space, would be a temporary condition. While mariners have a responsibility to be aware of conditions on the ocean, it is not expected that direct conflicts in accessibility would occur. The locations of restricted areas are published and available to mariners, who typically review such information before boating in any area. Restricted areas are typically avoided by experienced mariners. Prior to initiating a military readiness activity, the Action Proponents would follow standard operating procedures to visually scan an area to ensure that nonparticipants are not present. If nonparticipants are present, the Action Proponents would delay, move, or cancel their activity.

As described in Section 2.2.3 (California Study Area), the Phase IV California Study Area differs from the Phase III California Study Area in that it includes the following:

- an expanded SOCAL Range Complex (W-293 and W-294 and the sea space beneath)

- new testing sea space between W-293 and PMSR
- the inclusion of two existing training and testing at-sea ranges (PMSR and the NOCAL Range Complex)
- inclusion of areas along the Southern California coastline from approximately Dana Point to Port Hueneme
- four amphibious approach lanes providing California land access from NOCAL and PMSR (Figure 2-15)

Military, commercial, institutional, and recreational activities have taken place simultaneously in the California Study Area, including California's coastal zone, and have coexisted safely for decades. Implementation of the same or similar standard operating procedures implemented under Phase III, activities which have coexisted safely because of these established standard operating procedures, would lead to safe use of the waterways and airspace within California's coastal zone and throughout the Phase IV California Study Area. The following sections briefly discuss the standard operating procedures for recreational, commercial, and military use in sea surfaces areas and airspace. See Section 3.0.4 (Standard Operating Procedures) of the 2024 HCTT Draft EIS/OEIS for more information.

Sea Space

Most of the sea space in the California Study Area is accessible for recreational and commercial activities; however, some activities are prohibited or restricted in certain areas (e.g., danger zones and restricted areas).

In accordance with Title 33 CFR part 165 (Regulated Navigation Areas and Limited Access Areas), these restrictions can be permanent or temporary. Nautical charts issued by the National Oceanic and Atmospheric Administration include these federally designated zones and areas. Operators of recreational and commercial vessels have a duty to abide by maritime regulations administered by the USCG.

In accordance with Title 33 CFR part 72 (Aids to Navigation), the USCG informs private and commercial vessels about temporary closures via Notices to Mariners (NOTMARs). These notices provide information about durations and locations of closures because of activities that are potentially hazardous to surface vessels. Broadcast notices on maritime frequency radio, weekly publications by the appropriate USCG Navigation Center, and global positioning system navigation charts disseminate these navigational warnings. These notices also allow the public to select an alternate destination without an appreciable effect on their activities. In addition, the Navy maintains a website that notifies the public about closures in the areas surrounding San Clemente Island (http://www.scisland.org/).

Airspace

Most of the airspace in the California Study Area is accessible to general aviation (recreational, private, corporate) and commercial aircraft; however, some areas, like waterways, are temporarily off-limits to civilian and commercial use. The Federal Aviation Administration (FAA) has established special use airspace, which is airspace of defined dimensions wherein activities must be confined because of their nature or wherein limitations may be imposed upon aircraft operations that are not part of those activities (Federal Aviation Administration, 2023). Special use airspace in the Study Area includes the following:

- Restricted airspace: Areas where aircraft are subject to restriction due to the existence of unusual (often invisible) hazards to aircraft (e.g., release of munitions). Some areas are under strict control of the DoD, and some are shared with nonmilitary agencies (FAA Order 7400.2P, Chapter 23).

- Warning areas: Areas of defined dimensions, extending from 3 NM outward from the coast of the United States, that serve to warn non-participating aircraft of potential danger (FAA Order 7400.2P, Chapter 24).

Additionally, Air Traffic Control Assigned Airspace is airspace of defined vertical/lateral limits, implemented by Letter of Agreement between the user and the concerned Air Route Traffic Control Center, and assigned by Air Traffic Control for the purpose of providing air traffic segregation between the specified activity being conducted within the assigned airspace and other instrument flight rules traffic.

Notices to Air Missions (NOTAMs) are created and transmitted by government agencies and airport operators to alert aircrews of any hazards en route to or at a specific location. The FAA issues NOTAMs to disseminate information on upcoming or ongoing military exercises with resulting airspace restrictions. Civilian aircraft operators are responsible for being aware of restricted areas in airspace and any NOTAMs in effect. Pilots have a duty to abide by aviation rules as administered by the FAA.

3.2.1.3 Conclusion

The vast majority of areas where military readiness activities currently occur or are proposed to occur are outside of California's coastal zone. However, military readiness activities have the potential to temporarily limit access to areas of the ocean for a variety of human activities associated with commercial transportation and shipping, commercial and recreational fishing, and tourism and recreation in the California Study Area.

When military readiness activities are scheduled that require specific areas to be free of non-participating vessels and aircraft due to public safety concerns, the Action Proponents request that the USCG and FAA issue NOTMARs and NOTAMs, respectively, to warn the public of upcoming activities and allow them to plan accordingly. Additionally, boundary boats and range air surveillance are used to clear ranges prior to operations. These temporary clearance procedures are established and implemented for the safety of the public and have been employed regularly over time without substantial socioeconomic effects on commercial shipping activities.

Limits on accessibility in most areas of the California Study Area due to military readiness activities would essentially remain unchanged from the current conditions, with the exception of the proposed special use airspace (W-293 and W-294), installation of training minefields, seafloor cables, and seafloor sensors, and four amphibious approach lanes providing access between PMSR and the NOCAL Range Complex. Since these lanes would be in proximity to publicly accessed areas, accessibility would be occasionally limited in these areas. However, accessibility, or restrictions to the availability of air and ocean space, throughout the California Study Area, including the proposed airspace and amphibious approach lanes, and areas where the installation of training minefields, seafloor cables, and seafloor sensors occur, would be a temporary condition. Inaccessibility to areas of co-use would be temporary and of short duration, lasting until an activity (e.g., installation of cables) concludes. Other areas not in use or temporarily restricted would remain accessible and available for use. While mariners and pilots have a responsibility to be aware of conditions on the ocean and in the air, it is not expected that direct conflicts in accessibility would occur. The locations of restricted areas are published and available to mariners and pilots, who typically review such information before boating or flying in any area.

Therefore, based on the analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.11 (Socioeconomic Resources), specifically Section 3.11.3.1.1 (Effects on Accessibility) and, as summarized earlier, minimal impacts on public use or tourism within the coastal zone are anticipated because inaccessibility to areas of co-use would be temporary and of short duration. Based on the Action Proponents' standard operating procedures and the large expanse of the California Study Area that would be available to the public for use, the Action Proponents are providing public access within the California Study Area to the maximum extent practicable. Thus, the Proposed Action would be consistent to the maximum extent practicable with Section 30210 of the California Coastal Act.

3.2.2 Article 3, Section 30220 – Protection of Certain Water-Oriented Activities

3.2.2.1 Policy

Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

3.2.2.2 Consistency Review

Temporary range clearance procedures in the California Study Area, for safety purposes, would not adversely affect recreational activities that cannot readily be provided at inland water areas because displacement is of short duration, and are in areas where recreational activities do not typically occur. Inaccessibility to areas of co-use would be temporary and of short duration, lasting until an activity concludes. Other areas not in use or temporarily restricted would remain accessible and available for use. Published notices (i.e., LNMS) would allow recreational users to adjust their routes to avoid temporary restricted areas. If civilian vessels are within an activity area at the time of a scheduled operation, military personnel would continue operations only where and when it is safe and possible to avoid the civilian vessels. If avoidance is not safe or possible, the operation would be halted and may relocate or be delayed.

In addition, military readiness activities have been occurring in the same areas within the California Study Area for decades, and there is no indication that military readiness activities have impacted recreational activities or whale watching activities.

3.2.2.3 Conclusion

Therefore, based on the analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.11 (Socioeconomic Resources), specifically Section 3.11.3 (Environmental Consequences) and, as summarized earlier, the Proposed Action would be carried out in a manner that would not have long-term or permanent effects on coastal areas suited for water-oriented recreational activities that cannot be readily provided at inland water areas due to the Action Proponents' temporary range clearance procedures and because displacement of recreational users would be temporary and of short duration. Thus, the Proposed Action is consistent to the maximum extent practicable with Section 30220 of the California Coastal Act.

3.2.3 Article 4, Section 30230 – Marine Resources, Maintenance

3.2.3.1 Policy

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

3.2.3.2 Consistency Review

The Action Proponents have reviewed Article 4, Section 30230 and have implemented mitigation measures to be consistent with this policy, to the maximum extent practicable. Navy meets this enforceable policy by implementing mitigation measures that are intended to completely avoid, partially reduce, or minimize the potential for a stressor to impact a resource. Special considerations have been provided in areas of special biological or economic significance, including biologically important areas, areas of hardbottom substrates, and areas with marine vegetation such as eel grass and kelp beds. The Action Proponents have committed to the maximum amount of mitigation that is both beneficial and practical to implement with Navy mission requirements.

Mitigation is designed to achieve one or more of the following overarching benefits:

- ensure that the Proposed Action has a negligible impact on marine mammal species and stocks, and effects the least practicable adverse impact on marine mammal species or stocks and their habitat (as required under the MMPA)
- ensure that the Proposed Action does not jeopardize the continued existence of endangered or threatened species, or result in destruction or adverse modification of critical habitat (as required under the ESA)
- avoid or minimize adverse effects on Essential Fish Habitat and habitats that provide critical ecosystem functions (as required under the Magnuson-Stevens Fishery Conservation and Management Act)

These mitigations ensure that activities are carried out in a manner that sustains the biological productivity of coastal waters and maintains healthy populations of all species for commercial, recreational, scientific, and educational purposes.

The Proposed Action includes activities that could affect coastal uses or resources. Marine resources that could be affected by the Proposed Action include sensitive habitats (e.g., eelgrass and kelp), commercial and recreational fish stocks, and protected marine species (i.e., sea turtles, marine mammals, and abalones). In addition, the Action Proponents initiated formal consultation with NMFS on ESA-listed species in the California Study Area, as well as designated critical habitat for those ESA-listed species (Table 3-3). The Action Proponents also initiated informal consultation with USFWS on ESA-listed species, including the southern sea otter, California least tern (*Sternula antillarum browni*), short-tailed albatross (*Phoebastria albatrus*), and the marbled murrelet (*Brachyramphus marmoratus*), as well as designated critical habitat for the marbled murrelet (Table 3-3). The Action Proponents have also applied to NMFS for a letter of authorization under the MMPA. Compliance with the ESA and MMPA will support the Navy's position that the Proposed Action is consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.

Table 3-3: Endangered Species Act-Listed Species and Critical Habitat in the California Study Area

Common Name *Scientific Name*	ESA Status	*Distinct Population Segment (DPS)/ Evolutionarily Significant Unit (ESU)*	Critical Habitat
Invertebrates			
Black abalone *Haliotis cracherodii*	Endangered	n/a	n/a
White abalone *Haliotis sorenseni*	Endangered	n/a	n/a
Sunflower sea star *Pycnopodia helianthoides*	Proposed Threatened	n/a	n/a
Fishes			
Chinook salmon *Oncorhynchus tshawytscha*	Threatened	California Coastal ESU	X
	Threatened	Central Valley Spring-Run ESU	X
	Endangered	Sacramento River Winter-Run ESU	X
Coho salmon *Oncorhynchus kisutch*	Threatened	Oregon Coast ESU	X
	Threatened	Southern Oregon/Northern California Coast ESU	X
	Endangered	Central California Coast ESU	X
Steelhead *Oncorhynchus mykiss*	Threatened	Northern California DPS	X
	Threatened	California Central Valley DPS	X
	Threatened	Central California Coast DPS	X
	Threatened	South-Central California Coast DPS	X
	Endangered	Southern California DPS	X
Green sturgeon *Acipenser medirostris*	Threatened	Southern DPS	X
Eulachon *Thaleichthys pacificus*	Threatened	Southern DPS	X
Scalloped hammerhead shark *Sphyrna lewini*	Endangered	Eastern Pacific	n/a
Giant manta ray *Manta birostris*	Threatened	n/a	n/a
Oceanic whitetip shark *Carcharhinus longimanus*	Threatened	n/a	n/a
Sea Turtles			
Green turtle *Chelonia mydas*	Threatened	East Pacific	Proposed
Leatherback turtle *Dermochelys coriacea*	Endangered	n/a	X
Loggerhead turtle *Caretta caretta*	Endangered	n/a	n/a
Olive ridley turtle *Lepidochelys olivacea*	Endangered	Mexico's Pacific coast breeding colonies	n/a
Marine Mammals			
Blue whale *Balaenoptera musculus*	Endangered	n/a	n/a
Fin whale *Balaenoptera physalus*	Endangered	n/a	n/a

Common Name ***Scientific Name***	**ESA Status**	***Distinct Population Segment (DPS)/ Evolutionarily Significant Unit (ESU)***	**Critical Habitat**
Gray whale *Eschrichtius robustus*	Endangered	Western North Pacific	n/a
Humpback whale *Megaptera novaeangliae*	Endangered	Central American	X
	Threatened	Mexico	X
Sei whale *Balaenoptera borealis*	Endangered	n/a	n/a
Sperm whale *Physeter macrocephalus*	Endangered	n/a	n/a
Killer whale *Orcinus orca ater*	Endangered	Eastern North Pacific Southern Resident	X
Guadalupe fur seal *Arctocephalus townsendi*	Threatened	n/a	n/a
Southern Sea Otter *Enhydra lutris nereis*	Threatened	n/a	n/a
Seabirds			
California Least Tern *Sternula antillarum browni*	Endangered	n/a	n/a
Short-tailed Albatross *Phoebastria albatrus*	Endangered	n/a	n/a
Marbled Murrelet *Brachyramphus marmoratus*	Threatened	n/a	n/a

Notes: n/a = not applicable, X = critical habitat is present in the California Study Area

Based upon the analysis provided for each resource in this section, the Action Proponents have determined that there would be no long-term consequences for populations of any species of biological or economic significance as a result of the Proposed Action. Therefore, the Proposed Action would be carried out in a manner that would maintain, enhance, and, where feasible, restore marine resources, sustain the biological productivity of coastal waters, and maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

3.2.3.2.1 Sea Turtles

The following sections summarize the analysis and conclusions of potential effects on sea turtles from stressors associated with the Action Proponents' proposed military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8 (Reptiles).

All four species of sea turtles (green [*Chelonia mydas*], loggerhead [*Caretta caretta*], olive ridley [*Lepidochelys olivacea*], and leatherback [*Dermochelys coriacea*]) that may occur off California are listed as endangered or threatened under the ESA.

Sea turtles are highly migratory, long-lived reptiles that occur throughout the open-ocean and coastal regions of the California Study Area. Generally, sea turtles are distributed throughout tropical to subtropical latitudes, with some species extending into temperate seasonal foraging grounds. Leatherback sea turtles are partially endothermic, and can tolerate colder waters relative to other sea turtle species. This allows for a much greater range at higher latitudes than other sea turtles, which are generally exothermic and therefore less tolerant of colder waters. In general, sea turtles spend most of their time at sea, with female turtles returning to land to nest.

Stressors associated with the Proposed Action that could affect sea turtles include the following:

- Acoustic (sonar and other transducers; air guns; pile driving; vessel noise; aircraft noise; and weapons noise)
- Explosive (explosions in-air; explosions in-water)
- Energy (in-water electromagnetic devices; high-energy lasers; high-power microwave devices)
- Physical disturbance and strikes (vessels and in-water devices; military expended materials [MEM]; seafloor devices)
- Entanglement (wires and cables; decelerators/parachutes)
- Ingestion (MEM – munitions; MEM other than munitions)
- Secondary (e.g., effects on habitat, effects on prey availability)

SEA TURTLES: SPECIAL PROTECTIONS

Military readiness activities include standard operating procedures and mitigation measures to protect sea turtles.

As a standard operating procedure during pile driving, the Action Proponents perform soft starts at reduced energy during an initial set of strikes from an impact hammer. Soft starts may “warn” sea turtles and cause them to move away from the sound source before impact pile driving increases to full operating capacity. In addition, the Action Proponents would have a lookout 5 yd. from the piles being driven or removed 15 minutes prior to the initial start of the pile driving or pile removal, and during the pile driving or pile removal, observing for sea turtles.

During weapons firing, the Action Proponents visually clear the weapons firing range of all non-participating vessels. This standard operating procedure benefits sea turtles by increasing the effectiveness of visual observations in daylight hours, thereby reducing the potential for interaction of sea turtles with explosive weapons firing activities. In addition, weapons firing that involves the deployment or retrieval of targets is typically conducted during daylight hours in low sea states. This standard operating procedure also increases the effectiveness of visual observation in avoiding sea turtles.

During activities that involve recoverable targets (e.g., aerial drones), the Action Proponents recover the target and any associated decelerators/parachutes to the maximum extent practicable, consistent with personnel and equipment safety. Recovery of these items helps minimize the amount of remaining materials. This standard operating procedure benefits sea turtles by reducing the potential for physical disturbance and strike, ingestion, and entanglement of applicable targets and any associated decelerators/parachutes.

As a standard collision avoidance procedure during the use of towed in-water devices, the Action Proponents search the intended path of the device for any floating debris, objects, or animals (e.g., driftwood, concentrations of floating vegetation, sea turtles) that have the potential to obstruct or damage the device. This standard operating procedure benefits sea turtles by reducing the potential for physical disturbance and strike by a towed in-water device.

For more information on the Action Proponents’ standard operating procedures applied during its proposed activities, see the 2024 HCTT Draft EIS/OEIS, Section 3.0.4 (Standard Operating Procedures).

To further avoid the potential for impacts on sea turtles, the Action Proponents will continue to implement mitigation measures. These measures include the following:

- power down or cease sonar (for sources below 2 kilohertz [kHz]) if a sea turtle is observed in the mitigation zone;
- ceasing air gun use if a sea turtle is observed in the mitigation zone;
- ceasing impact pile driving and vibratory pile extraction if a sea turtle is observed in the mitigation zone;
- ceasing non-explosive gunnery, missile, and bombing activities if a sea turtle is observed in the mitigation zone;
- ceasing explosive activities (e.g., deployment of an explosive bomb, explosive missile firing, explosive torpedo firing, explosive mine countermeasure and neutralization activities, underwater demolitions) if a sea turtle is observed in the mitigation zone; and
- avoiding sea turtles during all activities that include vessel movement or towed in-water devices.

When nets are deployed for testing of an Unmanned Underwater Vehicle, one lookout will be stationed on a support vessel. For 15 minutes prior to the deployment of the nets, and while the nets are deployed, the lookouts would observe for sea turtles. If a sea turtle is sighted within 500 yd. of the deployment location, the support vessel will delay the deployment of nets until the mitigation zone has been clear for 15 minutes. Additionally, nets will only be deployed during daylight hours and will be recovered if deployed.

For more information on the Action Proponents' mitigation measures applied during the proposed activities, see Appendix C (Mitigation).

SEA TURTLES: ACOUSTIC STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sea turtles due to acoustic stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8.3.1 (Acoustic Stressors).

Sea Turtles: Effects from Sonar and Other Transducers

Low-frequency sonars are operated less often than mid- or high-frequency sources throughout the California Study Area. Military readiness activities using sonar would generally occur outside of the coastal zone within Navy range complexes and on Navy testing ranges, as well as around inshore locations, and at specified ports and piers identified in Section 2.2.3 (California Study Area) of this CD. Within the California Study Area, most military readiness activities using sonar would occur in the SOCAL Range Complex, as compared to PMSR and the NOCAL Range Complex where fewer military readiness activities using sonar would occur. Activities using sonar range from single-source, limited duration events to multi-day events with multiple sound sources on different platforms. The types of sonars and the way they are used differ between primary mission areas. This in turn influences the potential for effects on exposed sea turtles.

Sonar-induced acoustic resonance and bubble formation phenomena are very unlikely to occur under realistic conditions, as discussed in Appendix D (Acoustic and Explosive Impacts Supporting Information) of the 2024 HCTT Draft EIS/OEIS. Non-auditory injury and mortality from sonar are unlikely under realistic exposure conditions. Any effect on hearing could reduce the distance over which a sea turtle detects environmental cues, such as the sound of waves, or the presence of a vessel or predator. A sea turtle could respond to sounds detected within its limited hearing range if it is close enough to the source. Use of sonar would typically be transient and temporary, and there is no evidence to suggest that any behavioral response would persist after a sound exposure. In addition, a stress response could accompany any behavioral response. Although masking of biologically relevant sounds by the limited number of sonars operated in sea turtle hearing range is possible, this may only occur in certain circumstances. Sea turtles most likely use sound to detect nearby broadband, continuous environmental signals, such as the sounds of waves crashing on the beach. Sea turtles may rely on senses other than hearing, such as vision or magnetic orientation, and could potentially reduce any effects of masking caused by sonar use. The use characteristics of most low-frequency sonars, including limited band width, beam directionality, relatively low source levels, low duty cycle, and limited duration of use, would both greatly limit the potential for a sea turtle to detect these sources and limit the potential for masking of broadband, continuous environmental sounds.

Based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.1.1 (Effects from Sonar and Other Transducers) in the 2024 HCTT Draft EIS/OEIS, effects from sonar on sea turtles would likely be limited to temporary or short-term effects, including stress, startle, and behavioral responses; and temporary threshold shift (TTS), which would not result in substantial changes to behavior, growth, survival, annual reproductive success, lifetime reproductive success, or species recruitment for an individual and would not result in population-level effects. While long-term effects would include auditory injuries from sonar, which may have deleterious effects on the fitness of an individual turtle, the occurrence of auditory injuries is estimated to be low and is not expected to impact the fitness of enough individuals to cause population-level effects.

Sea Turtles: Effects from Air Guns

Air guns use bursts of pressurized air to create broadband, impulsive sounds. Any use of air guns would typically be transient and temporary. Air guns would not be used during training activities. During testing activities, small air guns would be fired over a limited period within a single day. Air gun use would only occur in two testing activities: Acoustic and Oceanographic Research; and Intelligence, Surveillance, Reconnaissance. Air gun use during Intelligence, Surveillance, Reconnaissance may occur in the SOCAL Range Complex and air gun use during Acoustic and Oceanographic Research may occur offshore in the NOCAL Range Complex and SOCAL Range Complex beyond the coastal zone.

Potential effects from exposures to air guns include hearing loss and AINJ within a short distance, behavioral reactions, and physiological response. Based on the few studies of sea turtle reactions to air guns, behavioral reactions to air gun firings would likely be to increase swim speed or avoid the air gun. McCauley et al. (2000) estimated that sea turtles would begin to exhibit avoidance behavior when the received level of air gun firings was around 175 decibels referenced to 1 micropascal (dB re 1 µPa), based on several studies of sea turtle exposures to air guns. For the air guns used in Navy testing, the range to 175 dB re 1 µPa would be about 100–200 meters (m).

Sea turtles most likely use sound to detect nearby broadband, continuous environmental sounds, such as the sounds of waves crashing on the beach. Due to the low duration of an individual air gun shot (approximately 0.1 second) and the low duty cycle of sequential shots, the potential for masking from air guns would be low. The use of air guns in offshore waters would not interfere with the detection of environmental cues in nearshore environments, such as the sound of waves crashing on the beach.

Based on the updated background and analysis for military readiness activities, as discussed in Section 3.8.3.1.2 (Effects from Air Guns) in the 2024 HCTT Draft EIS/OEIS, effects from Air Guns on sea turtles would be limited to temporary or short-term effects including TTS, which would not result in substantial changes to behavior, growth, survival, annual reproductive success, lifetime reproductive success, or species recruitment for an individual and would not result in population-level effects.

Sea Turtles: Effects from Pile Driving

Pile driving would occur as part of Port Damage Repair activities in Port Hueneme, California. Impact and vibratory pile driving during Port Damage Repair activities can occur over a period of 14 days during each training event, and up to 12 times per year. Pile-driving activities would occur intermittently in very limited areas and would be of temporary duration. The activity location is in a highly urbanized, all quay wall port. Sea turtles would not be affected by pile driving activities in Port Hueneme, California, due to a lack of geographic overlap.

Sea Turtles: Effects from Vessel Noise

Navy vessels make up a very small percentage of the overall traffic, and, because most Navy ships are quieter than similar-sized commercial vessels, naval vessel noise contributes a very small portion of radiated noise in Navy operation areas (Mintz, 2012; Mintz, 2016; Mintz & Filadelfo, 2011). Even during major training activities, when a higher number of Navy vessels are at sea, the Navy vessel contribution to overall ship radiated noise is very small. On average, in the West Coast exclusive economic zone, Navy vessels contribute about 1 percent of overall ship-radiated noise energy (Mintz & Filadelfo, 2011).

Vessel movements involve transits to and from ports to various locations within Southern California, and many ongoing and proposed activities within the California Study Area involve maneuvers by various types of surface ships, boats, and submarines (collectively referred to as vessels), as well as unmanned vehicles. Activities involving vessel movements occur intermittently and are variable in duration, ranging from a few hours up to two weeks. Navy vessel traffic could occur anywhere within the California Study Area but would be concentrated near Navy ports such as San Diego. A study of Navy vessel traffic found that traffic was heaviest in the easternmost part of Southern California (Starcovic & Mintz, 2021).

Surface combatant ships (e.g., destroyers, guided missile cruisers, and littoral combat ships) and submarines especially are designed to be quiet to evade enemy detection. Sea turtles exposed to these Navy vessels may not respond at all or they may exhibit brief startle dive reactions, if, for example, they are basking on the surface near a passing vessel. Even if a sea turtle is exposed to loud noise from a Navy vessel, it is not clear that sea turtles would typically exhibit any reaction other than a brief startle and avoidance reaction, if they react at all. Any of these short-term reactions to vessels are not likely to disrupt important behavioral patterns more than for a brief moment.

Acoustic masking, especially from larger, non-combatant Navy vessels, is possible. Vessels produce continuous broadband noise, with larger vessels producing sound that is dominant in the lower frequencies where reptile hearing is most sensitive. Smaller vessels (less than 18 m in length) emit more energy in higher frequencies, much of which would not be detectable by sea turtles. Sea turtles most likely use sound to detect nearby broadband, continuous low-frequency environmental sounds, such as the sounds of waves crashing on the beach, so vessel noise in those habitats may cause more meaningful masking. However, most vessel use would be in harbors or in transit to offshore areas, limiting masking impacts on sea turtles in many shore areas. Existing high ambient noise levels in ports and harbors with non-Navy vessel traffic and in shipping lanes with large commercial vessel traffic would limit the potential for masking by naval vessels in those areas. In offshore areas with lower ambient noise, the duration of any masking effects in a particular location would depend on the time in transit by a vessel through an area. Because sea turtles appear to rely on senses other than hearing for foraging and navigation, any effect of temporary masking is likely minor or inconsequential.

Based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.1.4 (Effects from Vessel Noise) in the 2024 HCTT Draft EIS/OEIS, effects from vessel noise on sea turtles would be limited to short-term behavioral reactions, physiological response, masking, or no response. Effects from vessel noise would be temporary and localized, and such responses would not be expected to compromise the general health or condition of individual sea turtles.

Sea Turtles: Effects from Aircraft Noise

Fixed and rotary-wing aircraft are used during a variety of military readiness activities throughout the California Study Area. Aircraft produce extensive airborne noise from either turbofan or turbojet engines. Rotary-wing aircraft (e.g., helicopters) produce low-frequency sound and vibration (Pepper et al., 2003). An infrequent type of aircraft and missile overflight noise is the sonic boom, produced when the aircraft exceeds the speed of sound. Fixed-wing aircraft and missiles would pass quickly overhead, while rotary-wing aircraft (e.g., helicopters) may hover at lower altitudes for longer durations.

Most in-air sound would be reflected at the air-water interface. Depending on atmospheric conditions, in-air sound can refract upwards, limiting the sound energy that reaches the water surface. This is especially true for sounds produced at higher altitudes. Underwater sounds from aircraft would be strongest just below the surface and directly under the aircraft. Any sound that does enter the water only does so within a narrow cone below the sound source that would move with the aircraft. For the common situation of a hovering helicopter, the sound pressure level in water would be about 125 dB re 1 µPa for an H-60 helicopter hovering at 50 ft. For an example fixed-wing flight, the sound pressure underwater would be about 128 dB re 1 µPa for an F/A-18 traveling at 250 knots at 3,000 ft. altitude. Most air combat maneuver activities would occur at higher altitudes. Supersonic aircraft and missiles, if flying at low altitudes, could generate an airborne sonic boom that may be sensed by reptiles at the surface, or as a low-level impulsive sound underwater.

Sea turtles may respond to both the physical presence and to the noise generated by aircraft, making it difficult to attribute causation to one or the other stimulus. In addition to noise produced, all low-flying aircraft make shadows, which can cause animals at the surface to react. Helicopters may also produce strong downdrafts, a vertical flow of air that becomes a surface wind, which can also affect an animal’s behavior at or near the surface.

In most cases, exposure of a reptile to fixed-wing or rotary-wing aircraft presence and noise would be brief as the aircraft quickly passes overhead. Animals would have to be at or near the surface at the time of an overflight to be exposed to appreciable sound levels. Supersonic flight at-sea is typically conducted at altitudes exceeding 30,000 ft., limiting the number of occurrences of supersonic flight being audible at the water surface.

Due to the low sound levels in water, it is unlikely that sea turtles would respond to most fixed-wing aircraft, transiting helicopters, or missile overflights. Because overflight exposure would be brief and aircraft noise would be at low received levels, only startle reactions, if any, would be expected in response to low altitude flights. Similarly, the brief duration of most overflight exposures would greatly limit any potential for masking of relevant sounds. Low flight altitudes of helicopters during some activities, which often occur under 100 ft. altitude, may elicit a stronger startle response due to the proximity of a helicopter to the water, the slower airspeed, and associated longer exposure duration, and the downdraft created by a helicopter's rotor. It is unlikely that an individual would be exposed repeatedly for long periods of time as overflight events are typically dispersed over open ocean areas.

Based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.1.5 (Effects from Aircraft Noise) in the 2024 HCTT Draft EIS/OEIS, the amount of sound entering the ocean from aircraft would be very limited in duration, sound level, and affected area. If sea turtles were to respond to aircraft noise, only short-term behavioral or physiological response would be expected. Therefore, effects on individuals would be unlikely, and long-term consequences for sea turtle populations are not expected.

Sea Turtles: Effects from Weapons Noise

Sea turtles may be exposed to sounds caused by the firing of weapons, objects in flight, and inert impact of non-explosive munitions on the water surface. Military readiness activities using weapons and deterrents would be conducted as described in Appendix A (Military Readiness Activities in the California Study Area) of this CD. Most weapons noise is attributable to gunnery activities. Most activities involving large caliber naval gunfire or other munitions fired or launched from a vessel are conducted more than 12 NM from shore. The Navy will implement mitigation to avoid or reduce potential impacts from weapon firing noise during large-caliber gunnery activities, as discussed in Appendix C (Mitigation). For explosive munitions, only associated firing noise is considered in the analysis of weapons noise. The noise produced by the detonation of explosive weapons is analyzed separately.

In general, weapons noise includes impulsive sounds generated in close vicinity to or at the water surface, except for items that are launched underwater, and are within the hearing range of sea turtles. Weapons noise would be brief, lasting from less than a second for a blast or inert impact, to a few seconds for other launch and object travel sounds.

Most incidents of impulsive sounds produced by weapon firing, launch, or inert object impacts would be single events. Activities that have multiple detonations such as some naval gunfire exercises could create some masking for sea turtles in the area over the short duration of the event. It is expected that these sounds may elicit brief startle reactions or diving, with avoidance being more likely with the repeated exposure to sounds during gunfire events. It is likely that sea turtle behavioral responses would cease following the exposure event, and the risk of a corresponding sustained stress response would be low. Similarly, exposures to impulsive noise caused by these activities would be so brief that risk of masking relevant sounds would be low. These activities would not typically occur in nearshore habitats where sea turtles may use their limited hearing to sense broadband, coastal sounds. Behavioral reactions, startle reactions, and physiological response due to weapons noise are likely to be brief and minor, if they occur at all due to the low probability of co-occurrence between weapon activity and individual sea turtles.

Based on the updated background and analysis for military readiness activities, as discussed in Section 3.8.3.1.6 (Effects from Weapons Noise) in the 2024 HCTT Draft EIS/OEIS, and due to the short-term and transient nature of weapons noise, sea turtles would likely exhibit short-term (lasting minutes) behavioral reactions that are unlikely to lead to long-term consequences for individuals or species.

SEA TURTLES: EXPLOSIVE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sea turtles due to in-water and in-air explosives that would be used during military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8.3.2 (Explosive Stressors).

Sea Turtles: Effects from Explosives

Most explosive activities would occur in the SOCAL Range Complex and PMSR, although activities with explosives would also occur in other areas as described in Appendix A (Military Readiness Activities in the California Study Area). Activities involving in-water explosives from medium- and large-caliber naval gunfire, missiles, bombs, or other munitions are conducted more than 12 NM from shore. Certain activities with explosives may be conducted closer to shore at locations identified in Appendix A (Military Readiness Activities in the California Study Area), including the training activity (Mine Neutralization Explosive Ordnance Disposal) and the testing activity (Semi-Stationary Equipment Testing).

A sea turtle's behavioral response to a single detonation or explosive cluster is expected to be limited to a short-term startle response or other behavioral responses, as the duration of noise from these events is very brief. Limited research and observations from air gun studies in Appendix D (Acoustic and Explosive Impacts Supporting Information) of the 2024 HCTT Draft EIS/OEIS, suggest that if sea turtles are exposed to nearby repetitive impulsive sounds (analogous to impulsive sounds from explosives), they may react by increasing swim speed, avoiding the source, or changing their position in the water column. There is no evidence to suggest that any behavioral response would persist beyond the sound exposure. In addition, a stress response could accompany any behavioral response. Because the duration of most explosive events is brief, the potential for masking is low. Effects, including TTS, auditory injury, and non-auditory injury, could reduce the fitness of an individual animal, causing a reduction in foraging success and reproduction, or increased susceptibility to predators. This reduction in fitness would be temporary for recoverable effects, such as TTS. Full recovery from a TTS is expected to take a few minutes to a few days, depending on the severity of the initial shift.

Considering these factors, and the low number of overall estimated impacts from explosive stressors, long-term consequences for the population would not be expected.

SEA TURTLES: ENERGY STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sea turtles due to energy stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8.3.3 (Energy Stressors).

Sea Turtles: Effects from In-Water Electromagnetic Devices

In-water electromagnetic devices are used primarily during mine neutralization activities, and, in most cases, the devices simply mimic the magnetic signature of a vessel passing through the water. None of the devices include any type of electromagnetic "pulse." The in-water devices producing an electromagnetic field (EMF) are towed or unmanned mine countermeasure systems. The EMF is produced to simulate a vessel's magnetic field. In an actual mine-clearing operation, the intent is that the EMF would trigger an enemy mine designed to sense a vessel's magnetic field. In-water electromagnetic energy associated with the Proposed Action would only produce a strong enough field for effects on sea turtles within one meter of their source.

The distance between a sea turtle and an in-water electromagnetic device would need to be small (within one meter) for a sea turtle to experience adverse physiological and behavioral effects. In-water electromagnetic devices generate a maximum field of 2,300 microteslas. At 4 m distance, that field decreases to approximately 50 microteslas, which is within the range of the Earth's magnetic field (25 to 65 microteslas). Sea turtles would have to be exposed to strong distorted magnetic fields for extended periods (days to weeks) of time in early life stages to experience long-term effects described by Fuxjager et al. (2014). These effects would not occur in short-duration exposures (minutes to hours) to man-made magnetic fields (Nyqvist et al., 2020). At 24 m, the field strength is approximately 20 microteslas. At a distance of 200 m, the field strength is estimated to be 0.2 microtesla, which is less than 1 percent of the Earth's magnetic field. The 200 m distance is used as a conservative estimate of how far an in-water electromagnetic device would need to be from sea turtle to not affect migration and orientation (U.S. Department of the Navy, 2005).

If located in the immediate area (within about 200 m) where electromagnetic devices are being used, adult, sub-adult, and hatchling sea turtles could deviate from their original movements, but the extent of this disturbance is likely to be inconsequential because of the low likelihood of a sea turtle occurring within 200 m of the device and the movement through the area of both the turtle and the device. In addition, potential impacts on sea turtles are not anticipated because any potential effects are likely limited to a few minor disturbances, which would be similar to natural stressors regularly occurring in the animal's life cycle. The electromagnetic devices used in military readiness activities are not expected to cause more than a short-term behavioral disturbance to sea turtles because of the (1) relatively low intensity of the magnetic fields generated (0.2 microteslas at 200 m from the source), (2) very localized potential impact area, and (3) temporary duration of the activities (hours).

Cables deployed on the seafloor during SOAR Modernization, the installation of two SWTRs, and the Maritime Test Bed Expansion all generate an EMF. The EMF produced by the cable is less than that of the natural background magnetic force of the earth at distances beyond 0.6 cm (0.25 in) from the cable. As electromagnetic energy dissipates exponentially by distance from the energy source, the magnetic field from the cable would be equal to 0.1 percent of the earth's at a distance of 6 m (20 ft.). The cables and nodes would be installed at the bottom of the ocean floor, in most cases at a minimum depth of 37 m (120 ft.). Given this depth, sea turtles are unlikely to come into extended contact with cables or nodes and it is extremely unlikely that they would be affected by the magnetic field.

Therefore, potential effects of exposure to electromagnetic stressors are not expected to result in substantial changes in 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.

Sea Turtles: Effects from High-Energy Lasers and High-Power Microwave Devices

Military readiness activities utilizing high-energy lasers and high-power microwave devices would occur offshore beyond California's coastal zone. High-energy lasers and high-power microwave devices are precision-targeted systems directed at surface targets and would only potentially affect sea turtles very near the surface, and only if the weapon missed its target. Sea turtles could be struck by a high-energy laser beam or microwave energy if the targeting systems missed its intended target, and the sea turtle was at the exact location at the end of laser beam's point at or near the water's surface. If a sea turtle was inadvertently struck, injury or death would likely occur from catastrophic burns. A high-energy laser strike is unlikely because of the precision targeting ability of high-energy laser systems used during military readiness activities.

Sea turtles could be exposed to a laser only if the beam missed the target; however, high-energy lasers shut down once contact with the target is lost further decreasing the likelihood of exposure. Should the laser strike the sea surface, individual sea turtles at or near the surface could be exposed. The potential for exposure to a high-energy laser beam decreases as the water depth increases. Because laser and microwave platforms are typically helicopters and ships, sea turtles would likely move away or submerge in response to other stressors, such as ship or aircraft noise, although some sea turtles would not exhibit a response to an oncoming vessel or aircraft, increasing the risk of contact with the laser beam or microwave exposure.

Appendix I (Military Expended Materials, Direct Strike, and Ship Strike Effects Analysis) of the 2024 HCTT Draft EIS/OEIS includes a conservative approach for estimating the probability of a direct laser strike on a sea turtle during testing and training activities. The Navy analysis assumes: (1) that all sea turtles would be at or near the surface 100 percent of the time, and would not account for the duration of time a sea turtle would be diving; and (2) that sea turtles are stationary, which does not account for any movement or any potential avoidance of the training or testing activity in response to other stressors (e.g., vessel noise). The Navy's modeling results show a probability of 0.000064 strikes per year on a sea turtle. Based on the assumptions used in the statistical probability analysis, there is a high level of certainty in the conclusion that no sea turtle that occurs in the California Study Area would be struck by a high-energy laser or high-powered microwave device.

Because of the low probability of a sea turtle strike by a high-energy laser or high-power microwave device, no long-term consequences to individuals are expected. Accordingly, there would be no consequences to any sea turtle populations from energy stressors.

SEA TURTLES: PHYSICAL DISTURBANCE AND STRIKE STESSORS

The following section summarizes the analysis and conclusions of potential effects on sea turtles due to physical disturbance and strike stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8.3.4 (Physical Disturbance and Strike Stressors).

This section analyzes the potential effects of the various types of physical disturbance and strike stressors used during military readiness activities within California Study Area. The physical disturbance and strike stressors that may affect sea turtles include (1) vessels and in-water devices, (2) MEM, and (3) seafloor devices.

The way a physical disturbance may affect a sea turtle would depend in part on the relative size of the object, the speed of the object, the location of the sea turtle in the water column, and the behavioral reaction of the animal. It is not known at what point or through what combination of stimuli (visual, acoustic, or through detection in pressure changes) a sea turtle becomes aware of a vessel or other potential physical disturbances prior to reacting or being struck.

Like marine mammals, if a sea turtle reacts to physical disturbance, the individual must stop its activity and divert its attention in response to the stressor. The energetic costs of reacting to a stressor will depend on the specific situation, but one can assume that the caloric requirements of a response may reduce the amount of energy available for other biological functions. For sea turtles who have resident home ranges near military readiness activities, the relative concentration of Navy vessels would cause sea turtles to respond repeatedly to the exposures. These repeated responses would interrupt normal daily routines (e.g., foraging activities) more often than resident nearshore turtles not near military installations or in open ocean areas where Navy and USCG vessel traffic is less concentrated, though animals may become habituated to repeated stimuli. If a strike does occur, the cost to the individual could range from slight injury to death.

Sea Turtles: Effects from Vessels and In-Water Devices

The concentration of vessel and in-water device use and the manner in which the military trains and tests would remain consistent with the levels and types of activity undertaken in the HSTT and PMSR Study Areas over the last decade. The addition of PMSR and the NOCAL Complex to the California Study Area does not result in an overall increase in the numbers of activities. Consequently, the military does not foresee any appreciable changes in the levels or frequency where vessels have been used over the last decade. Therefore, the level which physical disturbance and strikes are expected to occur is likely to remain consistent with the previous decade.

The potential for vessel strikes to sea turtles are not associated with any specific military readiness activity but rather a limited, sporadic, and accidental result of Navy and USCG ship movement within the California Study Area. Vessel movement can be widely dispersed throughout the California Study Area but is more concentrated near naval ports, piers, and range areas. Navy training vessel traffic would especially be concentrated near San Diego Bay. Smaller support craft usage would also be more concentrated in the coastal areas near naval installations, ports, and ranges.

Although the likelihood is low, a harmful interaction with a vessel or in-water device cannot be discounted, and sea turtle strikes in high vessel traffic areas (e.g., San Diego Bay) have been reported. Potential effects of exposure to vessels may result in substantial changes in an individual's behavior, growth, survival, annual reproductive success, lifetime reproductive success (fitness), or species recruitment. Any strike at high speed is likely to result in significant injury. Potential effects of exposure to vessels are not expected to result in population-level effects for all sea turtle species. Under the Proposed Action, the Action Proponents will continue to implement activity-based mitigation to avoid or reduce the potential for vessel and in-water device strike of sea turtles (Appendix C, Mitigation). Within a mitigation zone of a vessel or in-water device, trained observers will relay sea turtle locations to the operators, who are required to change course when practical. A mitigation zone size is not specified for sea turtles to allow flexibility based on vessel type and mission requirements (e.g., small boats operating in a narrow harbor).

Vessels used to deploy seafloor cables associated with the SOAR Modernization, SWTR installation, and the Maritime Test Bed Expansion would move very slowly during cable installment activities (0 to 3 knots) and would not pose a collision threat to sea turtles expected to be present in the vicinity. No in-water devices would be used during modernization and sustainment of ranges activities.

The Navy does not foresee any appreciable changes in the levels, frequency, or locations where vessels or in-water devices have been used over the last decade and therefore the level which physical disturbance and strikes are expected to occur is likely to remain consistent with the previous decade.

Based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.4.1 (Effects from Vessels and In-Water Devices) in the 2024 HCTT Draft EIS/OEIS, the effects of vessels and in-water devices used during military readiness activities on sea turtles are not expected to result in detectable changes to reptile habitat, reproduction, growth, or survival, and are not expected to result in population-level effects or affect the distribution or abundance of sea turtles because (1) decades of vessel and in-water device use in similar areas has not indicated a high likelihood of military vessel or in-water device strike of sea turtles; and (2) the Navy and Coast Guard will continue to implement activity-based mitigation to avoid or reduce the potential for vessel and in-water device strike of sea turtles.

Sea Turtles: Effects from Military Expended Materials

The primary concern is the potential for a sea turtle to be struck with a military expended material at or near the water's surface, which could result in injury or death. For sea turtles, although disturbance or strike from an item as it falls through the water column is possible, it is not likely because the objects generally sink through the water slowly and can be avoided by most sea turtles. Materials will slow in their velocity as they approach the bottom of the water and will likely be avoided by any juvenile or adult sea turtles (e.g., olive ridley, green, or loggerhead turtles) that happen to be in the vicinity foraging in benthic habitats.

There is a possibility that an individual turtle at or near the surface may be struck if they are in the target area at the point of physical impact at the time of non-explosive munitions delivery. Expended munitions may strike the water surface with sufficient force to cause injury or mortality. Adult sea turtles are generally at the surface for short periods, and spend most of their time submerged; however, hatchlings and juveniles spend more time at the surface while in ocean currents or at the surface while basking. The leatherback sea turtle is more likely to be foraging at or near the surface in the open ocean than other species, but the likelihood of being struck by a projectile remains very low because of the wide spatial distribution of leatherbacks relative to the point location of an activity. Furthermore, projectiles are aimed at targets, which will absorb the impact of the projectile.

While no strike from military expended materials has ever been reported or recorded on a reptile, the possibility of a strike still exists. Therefore, the potential for sea turtles to be struck by military expended materials was evaluated using statistical probability modeling to estimate potential direct strike exposures to a sea turtle. To estimate potential direct strike exposures, a worst-case scenario was calculated using the sea turtle with the highest average year-round density in areas with the highest military expended material expenditures in the California portion of the Study Area (see Appendix I, Military Expended Materials, Direct Strike, and Ship Strike Effects Analysis of the 2024 HCTT Draft EIS/OEIS). The green sea turtle was used as a proxy for all sea turtle species because this species has the highest density estimates, which would provide the most conservative modeling output results. For estimates of expended materials in all areas, see Section 3.0.3.3.4.2 (Military Expended Materials) of the 2024 HCTT Draft EIS/OEIS. Input values include munitions data (frequency, footprint and type), size of the training or testing area, sea turtle density data, and size of the animal. To estimate the potential of military expended materials to strike a sea turtle, the impact area of all military expended materials was totaled over one year in the area with the highest combined amounts of military expended materials for the Proposed Action. The analysis of the potential for a sea turtle strike is influenced by the following assumptions:

- The model is two-dimensional, assumes that all sea turtles would be at or near the surface 100 percent of the time, and does not consider any time a sea turtle would be submerged.
- The model also does not take into account the fact that most of the projectiles fired during military readiness activities are fired at targets, and that most projectiles hit those targets, so only a very small portion of those would hit the water with their maximum velocity and force.
- The model assumes the animal is stationary and does not account for any movement of the sea turtle or any potential avoidance of the training or testing activity.

The potential of fragments from high-explosive munitions or expended material other than munitions to strike a sea turtle is likely lower than for the worst-case scenario previously calculated because those events happen with much lower frequency. Fragments may include metallic fragments from the exploded target, as well as from the exploded munitions.

Direct munitions strike from non-explosive bombs, missiles, and rockets are potential stressors to some species. Some individuals at or near the surface may be struck directly if they are at the point of impact at the time of non-explosive practice munitions delivery. However, most missiles hit their target or are disabled before hitting the water. Thus, most of these missiles and aerial targets hit the water as fragments, which quickly dissipates their kinetic energy within a short distance of the surface.

Adult sea turtles are generally at the surface for short periods and spend most of their time submerged; however, hatchlings and juveniles of all sea turtle species spend more time at the surface while in ocean currents, and all sea turtle life stages bask on the surface. Leatherback sea turtles of all age classes are more likely to be foraging at or near the surface in the open ocean than other species, but the likelihood of being struck by a projectile remains very low because of the wide spatial distribution of leatherbacks relative to the point location of an activity. Furthermore, projectiles are aimed at targets, which will absorb the impact of the projectile. The Navy will implement mitigation (e.g., not conducting gunnery activities against a surface target when a specified distance from sea turtles) to avoid potential effects from military expended materials on sea turtles throughout the Study Area (see Appendix C, Mitigation).

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.4.2 (Effects from Military Expended Materials) in the 2024 HCTT Draft EIS/OEIS and the statistical analysis conducted in Appendix I (Military Expended Materials, Direct Strike, and Ship Strike Effects Analysis) of the 2024 HCTT Draft EIS/OEIS, MEM effects on sea turtles would be rare and limited to temporary or short-term behavioral and stress-startle responses to individual sea turtles found within localized areas. Accordingly, there would be no long-term consequences for individuals or species.

Sea Turtles: Effects from Seafloor Devices

The types of activities that use seafloor devices include items placed on, dropped on, or that move along the seafloor such as mine shapes, anchor blocks, anchors, bottom-placed instruments, seafloor cables and hydrophones (associated with range sustainment and modernization), bottom-crawling unmanned underwater vehicles, and bottom-placed targets that are not expended. The likelihood of any sea turtle species encountering seafloor devices is considered low because these items are either stationary or move very slowly along the bottom. A benthic-foraging sea turtle would likely avoid the seafloor device. In the unlikely event that a sea turtle is in the vicinity of a seafloor device, the slow movement and stationary characteristics of these devices would not be expected to physically disturb or alter natural behaviors of sea turtles. Moreover, objects falling through the water column will slow in velocity as they sink toward the bottom and could be avoided by most sea turtles. Therefore, these items do not pose a significant strike risk to sea turtles. The only seafloor device used during military readiness activities that has the potential to strike a sea turtle at or near the surface is an aircraft deployed mine shape, which is used during aerial mine laying activities.

Seafloor devices are not likely to interfere with sea turtles resident to, or engaging in migratory, reproductive, and feeding behaviors within the range complexes of the California Study Area. Further, seafloor devices would only affect sea turtle species that are foraging in benthic habitats (e.g., olive ridley, loggerhead, and green sea turtles). Sea turtles in coastal habitats can occur near the bottom when foraging or resting. Sea turtles encountering seafloor devices are likely to avoid them. Given the slow movement of seafloor devices, the effort expended by sea turtles to avoid them will be minimal, temporary, and not have fitness consequences.

New range modernization and sustainment activities include installation of undersea cables integrated with hydrophones and underwater telephones to sustain the capabilities of the SOAR. Deployment of fiber optic cables along the seafloor would occur in one location in the California Study Area: south and west of SCI. Installation would occur completely within the water; no land interface would be involved. Installation and maintenance of underwater platforms, mine warfare training areas, and installation of other training areas involve seafloor disturbance where those activities would take place. Each installation would occur on soft, typically sandy bottom, avoiding rocky substrates. As described previously, the likelihood of any sea turtle species encountering cables is considered low because these items are stationary on the seafloor once installed.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.4.2 (Effects from Military Expended Materials) in the 2024 HCTT Draft EIS/OEIS, military readiness activities that include the use of seafloor devices would not have reasonably foreseeable effects and are not expected to result in detectable changes to reptile habitat, reproduction, growth, or survival; and are not expected to result in population-level effects or affect the distribution or abundance of sea turtles because (1) the likelihood of a sea turtle encountering seafloor devices in benthic foraging habitats is considered low because these items are either stationary or move very slowly along the bottom, and (2) decades of seafloor device use in similar areas has not indicated a high likelihood of seafloor device strike of sea turtles.

SEA TURTLES: ENTANGLEMENT STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sea turtles due to entanglement stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8.3.5 (Entanglement Stressors). This analysis includes the potential impacts of three types of military expended materials, including (1) wires and cables, and (2) decelerators/parachutes.

Sea turtles at the surface, in the water column, or along the sea floor could encounter and potentially be entangled in these materials. Risk factors for entanglement of sea turtles include animal size (and life stage), sensory capabilities, and foraging methods. Most entanglements discussed in the literature are attributed to fishing gear or other non-military materials that float or are suspended at the surface. Entanglement events are difficult to detect from land or from a boat as they may occur at considerable distances from shore and typically take place underwater. Juvenile turtles are inherently less likely to be detected than larger adult sea turtles. The likelihood of witnessing an entanglement event is therefore typically low. However, the properties and size of these military expended materials makes entanglement unlikely.

Sea Turtles: Effects from Wires and Cables

Wires and cables include fiber-optic cables, torpedo guidance wires, wire associated with sonobuoys, and expendable bathythermograph wires.

Fiber optic cables are expended during military readiness activities associated with remotely operated mine neutralization activities. The length of the cable varies (up to about 3,000 m). The physical properties of the fiber optic cable would not allow the cable to loop before it breaks. Fiber optic cables are somewhat flexible, durable, and abrasion- or chemical-resistant. The physical characteristics of the fiber optic material render the cable easily broken when kinked, twisted, or bent sharply. The cables are often designed with controlled buoyancy to minimize the cable's effect on vehicle movement. The fiber optic cable would be suspended within the water column during the activity, and then be expended to sink to the seafloor.

Guidance wires are used during heavyweight torpedo firings to help the firing platform control and steer the torpedo. They trail behind the torpedo as it moves through the water. Finally, the guidance wire is released from both the firing platform and the torpedo and sinks to the ocean floor.

The torpedo guidance wire is a single-strand, thin-gauge, coated copper alloy. The tensile breaking strength of the wire is a maximum of 42 pounds (lb.) and can be broken by hand (Environmental Sciences Group, 2005), which minimizes the potential for entanglement of marine animals (National Marine Fisheries Service, 2008), in contrast with the rope or lines associated with commercial fishing towed gear (trawls), stationary gear (traps), or entanglement gear (gillnets) that use lines with substantially higher (up to 500–2,000 lb.) breaking strength as their “weak links.” The relatively low breaking strength and resistance to looping and coiling suggest that torpedo guidance wire does not have a high entanglement potential compared to other entanglement hazards (Swope & McDonald, 2013). Torpedo guidance wire sinks at a rate of 0.24 m per second (Swope & McDonald, 2013).

Sonobuoys consist of a surface antenna and float unit and a subsurface hydrophone assembly unit. The two units are attached through a thin-gauge, dual-conductor, and hard-draw copper strand wire, which is then wrapped by a hollow rubber tubing or bungee in a spiral configuration. The tensile breaking strength of the wire and rubber tubing is no more than 40 lb. The length of the wire is housed in a plastic canister dispenser, which remains attached upon deployment. The length of wire that extends out is no more than 1,500 ft. and is dependent on the water depth and type of sonobuoy. Attached to the wire is a kite-drogue and damper disk stabilizing system made of non-woven nylon fabric. The nylon fabric is very thin and can be broken by hand. The wire runs through the stabilizing system and leads to the hydrophone components. The hydrophone components may be covered by thin plastic netting depending on type of sonobuoy, but they pose no entanglement risk. Each sonobuoy has a saltwater activated polyurethane float that inflates when the sonobuoy is submerged and keeps the sonobuoy components floating vertically in the water column below it. Sonobuoys remain suspended in the water column for no more than 30 hours, after which they sink to the seafloor.

Additionally, cables are deployed on the seafloor during SOAR Modernization, the installation of two SWTRs, and the Maritime Test Bed Expansion. Entanglement of sea turtles is not likely because of the rigidity of the cable that is designed to lay extended on the sea floor vice coil easily. Anchor and cable lines would be taut, posing no risk of entanglement or interaction with sea turtles that may be swimming in the area. Once installed on the seabed, the new cable and communications instruments would be equivalent to other hard structures on the seabed, again posing no risk of adverse effect on sea turtles.

Based on the numbers and geographic locations of their use, wires and cables used during testing activities are analyzed for their potential to entangle sea turtles. Any species of sea turtle that occurs in the Study Area could at some time encounter expended cables or wires. The sink rates of cables and wires would rule out the possibility of these drifting great distances into nearshore and coastal areas where green, olive ridley, and loggerhead sea turtles are more likely to occur and feed on the bottom. The leatherback sea turtle is more likely to co-occur with these activities, given its preference for open-ocean habitats, but this species is known to forage on jellyfish at or near the surface. Under the

Proposed Action, exposure to cables and wires used in testing activities may cause short-term or long-term disturbance to an individual turtle because if a sea turtle were to become entangled in a cable or wire, it could free itself, or the entanglement could lead to injury or death. Potential effects of exposure to cable or wire may result in changes to an individual's behavior, growth, survival, annual reproductive success, lifetime reproductive success (fitness), or species recruitment. However, cables and wires are generally not expected to cause disturbance to sea turtles because of (1) the physical characteristics of the cables and wires, and (2) the behavior of the species, as sea turtles are unlikely to become entangled in an object that is resting on the seafloor. Potential effects of exposure to cables and wires are not expected to result in population-level effects.

Sea Turtles: Effects from Decelerators/Parachutes

Decelerators/parachutes used during the proposed activities range in size from 18 inches (in.) up to 19–82 ft. in diameter. The vast majority of expended decelerators/parachutes are small (18 in.), cruciform shaped, and used with sonobuoys. Illumination flares use large decelerators/parachutes, up to 19 ft. in diameter. Drones use a larger decelerator/parachute system, ranging from 30 ft. to 82 ft. in diameter. Decelerators/parachutes have short attachment cords and upon impact with water may remain at the surface for 5–15 seconds before sinking to the seafloor, where they flatten. Sonobuoy decelerators/parachutes are designed to sink within 15 minutes, but the rate of sinking depends upon sea conditions and the shape of the decelerator/parachute, and the duration of the descent would depend on the water depth. Unlike the small- and medium-sized decelerators/parachutes, drone decelerators/parachutes do not have weights attached and may remain at the surface or suspended in the water column for some time prior to eventual settlement on the seafloor.

While in the water column, a sea turtle is less likely to become entangled because the decelerator/parachute would have to land directly on the turtle, or the turtle would have to swim into the decelerator/parachute before it sank. Prior to reaching the seafloor, it could be carried along in a current, or snagged on a hard structure near the bottom. Conversely, it could settle to the bottom, where it would be buried by sediment in most soft-bottom areas or colonized by attaching and encrusting organisms, which would further stabilize the material and reduce the potential for reintroduction as an entanglement risk. Decelerators/parachutes or decelerator/parachute lines may be a risk for sea turtles to become entangled, particularly while at the surface. A sea turtle would have to surface to breathe or grab prey from under the decelerator/parachute and swim into the decelerator/parachute or its lines.

If bottom currents are present, the canopy may billow and pose an entanglement threat to sea turtles that feed in benthic habitats (i.e., green, olive ridley, and loggerhead sea turtles). Bottom-feeding sea turtles tend to forage in nearshore areas rather than offshore, where these decelerators/parachutes are used; therefore, sea turtles are not likely to encounter decelerators/parachutes once they reach the seafloor. The potential for a sea turtle to encounter an expended decelerator/parachute at the surface or in the water column is extremely low, and is even less probable at the seafloor, given the general improbability of a sea turtle being near the deployed decelerator/parachute, as well as the general behavior of sea turtles. Depending on how quickly the decelerator/parachute may degrade, the risk may increase with time if the decelerator/parachute remains intact or if underwater currents delay settling of the decelerator/parachute on the seafloor (where they would likely be covered by sediment and encrusted). Factors that may influence degradation times include exposure to ultraviolet radiation and the extent of physical damage of the decelerator/parachute on the water's surface, as well as water temperature and sinking depth. It should be noted that no known instances of sea turtle entanglement with a decelerator/parachute assembly have been reported.

Based on the numbers and geographic locations of their use, decelerators/parachutes pose a risk of entanglement for all sea turtle species considered in this analysis. Any species of sea turtle that occurs in the California Study Area could at some time encounter expended decelerator/parachute. The sink rates of a decelerator/parachute assembly would rule out the possibility of these drifting great distances into nearshore and coastal areas where green, olive ridley, and loggerhead sea turtles are more likely to occur and feed on the bottom. The leatherback is more likely to co-occur with these activities, given its preference for open-ocean habitats, but this species is known to forage on jellyfish at or near the surface. Early juveniles and hatchlings of other sea turtle species (e.g., green sea turtles and loggerheads) may also co-occur with these activities. Exposure to decelerators/parachutes used in training activities may cause short-term or long-term disturbance to an individual turtle, because if a sea turtle were to become entangled in a decelerator/parachute, it could free itself, or the entanglement could lead to injury or death. Potential effects of exposure to decelerator/parachute may result in changes to an individual’s behavior, growth, survival, annual reproductive success, lifetime reproductive success (fitness), or species recruitment. However, decelerators are generally not expected to cause disturbance to sea turtles because the decelerator/parachute would have to land directly on an animal, or an animal would have to swim into it before it sinks. Decelerators/parachutes have small footprints, which further reduce the potential for entanglement. It is possible, however, that a benthic feeding sea turtle could become entangled when foraging in areas where decelerators/parachutes have settled on the seafloor. For example, if bottom currents are present, the canopy may temporarily billow and pose a greater entanglement threat.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.5 (Entanglement Stressors) in the 2024 HCTT Draft EIS/OEIS, military readiness activities that include the use of decelerators/parachutes are not expected to result in detectable changes to sea turtle habitat, reproduction, growth, or survival, and are not expected to result in population-level effects or affect the distribution or abundance of sea turtles because (1) the likelihood of a sea turtle encountering decelerators/parachutes in benthic foraging habitats is considered low because of the sparse use of these throughout the California Study Area, and (2) decelerators/parachutes either sink or degrade quickly and are only temporarily in the water column.

SEA TURTLES: INGESTION STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sea turtles due to ingestion stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8.3.6 (Ingestion Stressors). This analysis includes the potential impacts from the following types of military expended materials: non-explosive practice munitions (small- and medium-caliber), fragments from high explosives, fragments from targets, chaff, flare casings (including plastic end caps and pistons), and decelerators/parachutes.

The potential impacts from ingesting these materials is dependent upon the probability of the animal encountering these items in their environment, which is primarily contingent on where the items are expended and how a sea turtle feeds. Sea turtles commonly mistake debris for prey. The risk is present throughout sea turtle habitats. Ingestion of expended materials by sea turtles could occur in all large marine ecosystems and open ocean areas and can occur at the surface, in the water column, or at the seafloor, depending on the size and buoyancy of the expended object and the feeding behavior of the turtle. Susceptibility of sea turtles to ingestion is a factor of the life-stage of the individual sea turtle, foraging habits of the species, the location of the item within the water column, and the type of debris. For example, floating material could be eaten by turtles such as leatherbacks and by juveniles and hatchlings of all species that feed at or near the water surface, while materials that sink to the seafloor pose a risk to bottom-feeding turtles such as loggerheads. Juvenile and hatchling sea turtles of all species and adult leatherbacks are more prone to ingesting non-prey items because of their feeding habits (Fujiwara & Caswell, 2001; Hardesty & Wilcox, 2017; Mitchelmore et al., 2017; Schuyler et al., 2014; Schuyler et al., 2016).

The consequences of ingestion could range from temporary and inconsequential to long-term physical stress or even death. Ingestion of these items may not be directly lethal; however, ingestion of plastic and other fragments can restrict food intake and have sublethal impacts caused by reduced nutrient intake (McCauley & Bjorndal, 1999). Poor nutrient intake can lead to decreased growth rates, depleted energy, reduced reproduction, and decreased survivorship. These long-term sublethal effects may lead to population-level impacts, but this is difficult to assess because the affected individuals remain at sea and the trends may only arise after several generations have passed. Schuyler et al. (2014) determined that most sea turtles at some point ingest some amount of debris. Because bottom feeding occurs in nearshore areas, materials that sink to the seafloor in the open ocean are less likely to be ingested due to their location. While these depths may be within the diving capabilities of most sea turtle species, especially leatherback sea turtles, bottom-foraging species (i.e., greens, olive ridleys, and loggerheads) are more likely to forage in the shallower waters less than 100 m in depth. This overlaps with only a small portion of the depth range at which military materials are expended.

Sea Turtles: Effects from Military Expended Materials – Munitions

Many different types of explosive and non-explosive practice munitions are expended at sea during military readiness activities. Types of non-explosive practice munitions generally include projectiles, missiles, and bombs. Of these, only small- or medium-caliber projectiles would be small enough for a sea turtle to ingest. Small- and medium-caliber projectiles include all sizes up to and including 2.25 in. (57 mm) in diameter. These solid metal materials would quickly move through the water column and settle to the seafloor. Ingestion of non-explosive practice munitions is not expected to occur in the water column because the munitions sink quickly. Instead, they are most likely to be encountered by species that forage on the bottom. Types of high-explosive munitions that can result in fragments include demolition charges, projectiles, missiles, and bombs. Fragments would result from fractures in the munitions casing and would vary in size depending on the size of the net explosive weight and munitions type; however, typical sizes of fragments are unknown. These solid metal materials would quickly move through the water column and settle to the seafloor; therefore, ingestion is not expected by most species. Fragments are primarily encountered by species that forage on the bottom. Other military expended materials such as targets, large-caliber projectiles, intact training and testing bombs, guidance wires, 55-gallon drums, sonobuoy tubes, and marine markers are too large for sea turtles to consume.

Sublethal effects due to ingestion of munitions used in training and testing activities may cause short-term or long-term disturbance to an individual turtle because (1) if a sea turtle were to incidentally ingest and swallow a projectile or solid metal high-explosive fragment, it could potentially disrupt its feeding behavior or digestive processes; and (2) if the item is particularly large in proportion to the turtle ingesting it, the item could become permanently encapsulated by the stomach lining, with a rare chance that this could impede the turtle’s ability to feed or take in nutrients. Potential effects of exposure to munitions may result in changes to an individual's behavior, growth, survival, annual reproductive success, lifetime reproductive success (fitness), or species recruitment. In open ocean environments, munitions used in training and testing activities are generally not expected to cause disturbance to sea turtles because (1) sea turtles are not expected to encounter most small- and medium-caliber projectiles or high-explosive fragments on the seafloor because of the depth at which these would be expended; and (2) in some cases, a turtle would likely pass the projectile through their digestive tract and expel the item without affecting the individual. Because green, loggerhead, and olive ridley sea turtles feed along the seafloor, they are more likely to encounter munitions of ingestible size that settle on the bottom than leatherbacks that primarily feed at the surface and in the water column. Furthermore, these four species typically use nearshore feeding areas, while leatherbacks are more likely to feed in the open ocean. Given the very low probability of a leatherback encountering and ingesting materials on the seafloor, this analysis will focus on green, loggerhead, and olive ridley sea turtles and ingestible materials expended in offshore waters.

In open ocean waters and nearshore habitats, the amount of non-explosive practice munitions and high-explosive munitions fragments that an individual sea turtle would encounter is generally low based on the patchy distribution of both the projectiles and sea turtle feeding habits. In addition, a sea turtle would not likely ingest every projectile it encountered. Furthermore, a sea turtle may attempt to ingest a projectile or fragment and then reject it when it realizes it is not a food item. Therefore, potential effects of non-explosive practice munitions and fragments ingestion would be limited to the unlikely event in which a sea turtle might suffer a negative response from ingesting an item that becomes embedded in tissue or is too large to be passed through the digestive system. The Navy considers the likelihood of ingestion of military expended materials by sea turtles to be very low.

The Navy will implement mitigation to avoid potential effects from military expended materials on seafloor resources in mitigation areas throughout the California Study Area. This mitigation will consequently help avoid potential effects on benthic foraging sea turtles.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.6 (Ingestion Stressors) in the 2024 HCTT Draft EIS/OEIS, military readiness activities that include the use of MEM-munitions are not expected to result in detectable changes to sea turtle habitat, reproduction, growth, or survival, and are not expected to result in population-level effects or affect the distribution or abundance of sea turtles because (1) an individual sea turtle would encounter a generally low amount of MEM based on the patchy distribution of both the MEM and sea turtle feeding habits; (2) a sea turtle would not likely ingest every item it encountered; (3) a sea turtle may attempt to ingest MEM and then reject it when it realizes it is not a food item; (4) these MEM would remain for a limited period of time in the water column and (5) it is unlikely that a sea turtle might encounter and swallow these items on the seafloor, particularly given that many of these items would be expended over deep, offshore waters.

Sea Turtles: Effects from Military Expended Materials Other Than Munitions

Several different types of materials other than munitions are expended during military readiness activities. The following military expended materials other than munitions have the potential to be ingested by sea turtles:

- target-related materials
- chaff (including fibers, end caps, and pistons)

- flares (including end caps and pistons)
- decelerators/parachutes (cloth, nylon, and metal weights)

Target-related material, chaff, flares, decelerators/parachutes (and their subcomponents), and biodegradable polymers have the potential to be ingested by a sea turtle, although that is considered unlikely since most of these materials would drop through the water column, settle on the seafloor, or in the case of biodegradable polymers, rapidly decay and not present an ingestion hazard. Some Styrofoam, plastic endcaps, chaff, and other small items may float for some time before sinking.

While the smaller items discussed here may pose a hazard to sea turtles, as discussed for non-explosive practice munitions ingestion, the impacts of ingesting these forms of expended materials on sea turtles would be minor because of the following factors:

- the limited geographic area where materials other than munitions are expended during a given event;
- the limited period of time these military expended materials would remain in the water column; and
- the unlikely chance that a sea turtle might encounter and swallow these items on the seafloor, particularly given that many of these items would be expended over deep, offshore waters.

The effects of ingesting military expended materials other than munitions would be limited to cases where an individual sea turtle might eat an indigestible item too large to be passed through the gut. The sea turtle would not be preferentially attracted to these military expended materials, with the possible exception of decelerators/parachutes that may appear similar to the prey of some sea turtle species and life stages that feed on jellyfish and similar organisms. For the most part, these military expended materials would most likely only be incidentally ingested by individuals feeding on the bottom in the precise location where these items were deposited. Non-munition military expended materials that would remain floating on the surface are too small to pose a risk of intestinal blockage to any sea turtle that happened to encounter it. Because leatherbacks and juveniles of some species (e.g., green sea turtles) are more likely to feed at or near the surface, they are more likely to encounter materials at the surface than are other species of turtles that primarily feed along the seafloor. Furthermore, leatherbacks typically feed in the open ocean, while other species are more likely to feed in nearshore areas. Though they are bottom-feeding species that generally feed nearshore, green, olive ridley, and loggerhead sea turtles may occur in the open ocean during migrations, as well as hatchling and juvenile stage turtles. Effects due to ingestion of military expended materials other than munitions used in military readiness activities may cause short-term or long-term disturbance to an individual turtle because (1) if a sea turtle were to incidentally ingest and swallow a decelerator/parachute, target fragment, chaff or flare component, it could potentially disrupt its feeding behavior or digestive processes; and (2) if the item is particularly large in proportion to the turtle ingesting it, the item could become permanently encapsulated by the stomach lining, with a rare chance that this could impede the turtle’s ability to feed or take in nutrients.

Sublethal effects due to ingestion of military expended materials other than munitions used in military readiness activities may cause short-term or long-term disturbance to an individual turtle because (1) if a sea turtle were to incidentally ingest and swallow a decelerator/parachute, target fragment, chaff or flare component, it could potentially disrupt its feeding behavior or digestive processes; and (2) if the item is particularly large in proportion to the turtle ingesting it, the item could become permanently encapsulated by the stomach lining, with a rare chance that this could impede the turtle's ability to feed or take in nutrients.

Potential effects of exposure to these items may result in changes to an individual's behavior, growth, survival, annual reproductive success, lifetime reproductive success (fitness), or species recruitment. However, decelerators/parachutes, target fragments, chaff, and flare components used in military readiness activities are generally not expected to cause disturbance to sea turtles because (1) leatherbacks are likely to forage further offshore than within range complexes, and other sea turtles primarily forage on the bottom in nearshore areas; (2) in some cases, a turtle would likely pass the item through its digestive tract and expel the item without affecting the individual; and (3) chaff, if ingested, would occur in very low concentration and is similar to spicules, which sea turtles (species and life stages that consume sponges and other organisms containing spicules) ingest without harm. Potential effects of exposure to military expended materials other than munitions are not expected to result in population-level effects.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.8.3.6 (Ingestion Stressors) in the 2024 HCTT Draft EIS/OEIS, military readiness activities that include the use of MEM-other than munitions are not expected to result in detectable changes to sea turtle habitat, reproduction, growth, or survival, and are not expected to result in population-level effects or affect the distribution or abundance of sea turtles because (1) an individual sea turtle would encounter a generally low amount of MEM based on the patchy distribution of both the MEM and sea turtle feeding habits; (2) a sea turtle would not likely ingest every item it encountered; (3) a sea turtle may attempt to ingest MEM and then reject it when it realizes it is not a food item; (4) these MEM would remain for a limited period of time in the water column and (5) it is unlikely that a sea turtle might encounter and swallow these items on the seafloor, particularly given that many of these items would be expended over deep, offshore waters.

SEA TURTLES: SECONDARY STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sea turtles due to secondary stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.8.3.7 (Secondary Stressors). Stressors from military readiness activities that could pose indirect impacts on sea turtles via habitat or prey include (1) explosives, (2) explosives byproducts and unexploded munitions, (3) metals, (4) chemicals, and (5) transmission of disease and parasites.

Navy activities that introduce explosives, metals, and chemicals into the marine environment have not demonstrated long-term impacts on habitat or prey availability for sea turtles. Bioaccumulation of metals from munitions in prey species has not been demonstrated, and no effects to prey availability from metals and chemicals are known to occur.

SEA TURTLES: CONCLUSION

Based on a detailed stressor analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.8 (Reptiles), specifically Section 3.8.3 (Environmental Consequences) and, as summarized earlier, the Action Proponents have determined that the Proposed Action would be carried out in a manner that would maintain, enhance, and, where feasible, restore marine resources, sustain the biological productivity of coastal waters, and maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes. No population-level impacts would be anticipated to sea turtles. As evident from the standard operating procedures and mitigation measures discussed earlier, the Action Proponents' Proposed Action provides special protection to sea turtles. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.

3.2.3.2.2 Sensitive Habitats

Marine ecosystems depend almost entirely on the energy produced by marine vegetation through photosynthesis (Castro & Huber, 2000), which is the transformation of the sun's energy into chemical energy. In the photic zone of the open-ocean and coastal waters, marine algae and flowering plants have the potential to provide oxygen and habitat for many organisms, in addition to forming the base of the marine food web (Dawes, 1998).

The affected environment comprises two major ecosystem types, the open ocean and coastal waters; and two major habitat types, the water column and bottom (benthic) habitat. Vegetation typically grows only in the sunlit portions of the open ocean and coastal waters, referred to as the "photic" or "euphotic" zone, which generally extends to maximum depths of roughly 660 ft. (Lalli & Parsons, 1993). Because depth in most of the open ocean exceeds the euphotic zone, benthic habitat for vegetation is limited primarily to the coastal waters.

The euphotic zones of the water column in the California Study Area are inhabited by phytoplankton, single-celled (sometimes filamentous or chain forming), free-floating algae primarily of four groups, including diatoms, blue-green algae, dinoflagellates, and coccolithophores, and non-free-floating algae, such as kelp and various species of benthic macroalgae. Microscopic algae can grow down to depths with only one percent of surface light penetration (Nybakken, 1993).

Vascular plants in the California Study Area include seagrasses, cordgrasses, and mangroves, all of which have more limited distributions than algae (which are non-vascular), and typically occur in intertidal or shallow (< 40 ft.) subtidal waters (Green & Short, 2003). The relative distribution of seagrasses is influenced by the availability of suitable substrate occurring in low-wave energy areas at depths that allow sufficient light exposure for growth. Seagrasses as a rule require more light than algae, generally 15–25 percent of surface incident light (Fonseca et al., 1998; Green & Short, 2003). Seagrass species distribution is also influenced by water temperatures (Spalding et al., 2003).

Emergent wetland vegetation of the Study Area is typically dominated by cordgrasses (*Spartina foliosa*), which form dense colonies in salt marshes that develop in temperate areas in protected, low-energy environments on soft substrate, along the intertidal portions of coastal lagoons, tidal creeks or rivers, or estuaries, wherever the sediment is adequate to support plant root development (Mitsch et al., 2009).

Abbott and Hollenberg (1976) reported 669 species of algae along the California coast, with one species of yellow-brown (*Chrysophyta*), 72 species of green (*Chlorophyta*), 137 species of brown (*Phaeophyta*), and 459 species of red algae (*Rhodophyta*). Marine vegetation along the California coast is currently represented by more than 700 species and varieties of seaweeds (such as corallines and other red algae, brown algae including kelp, and green algae), seagrasses (Leet et al., 2001; Wyllie-Echeverria & Ackerman, 2003), and canopy-forming kelp species (Wilson, 2002).

The following sections summarize the analysis and conclusions of potential effects on sensitive habitats from stressors associated with the proposed military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.3 (Vegetation) and Section 3.5 (Abiotic Habitats).

The stressors associated with the Proposed Action that could affect sensitive habitats include the following:

- Explosives (explosions in air, explosions in water)
- Physical disturbance and strikes (vessels and in-water devices, MEM, seafloor devices, pile driving)
- Secondary (impacts on habitat)

The analysis includes consideration of the mitigation that the Action Proponents will implement to avoid potential impacts on vegetation and habitats from explosives and from physical disturbance and strikes (Appendix C, Mitigation).

SENSITIVE HABITATS: SPECIAL PROTECTIONS

Military readiness activities, including range modernization and sustainment activities, include standard operating procedures and mitigation measures to protect sensitive habitats.

As a standard collision avoidance procedure during the use of towed in-water devices, the Action Proponents search the intended path of the device for any floating debris, objects, or animals (e.g., driftwood, concentrations of floating vegetation) that have the potential to obstruct or damage the device. This standard operating procedure benefits vegetation by reducing the potential for physical disturbance and strike by a towed in-water device.

For more information on the Action Proponents' standard operating procedures applied during its proposed activities, see the 2024 HCTT Draft EIS/OEIS, Section 3.0.4 (Standard Operating Procedures).

To further avoid the potential for impacts on vegetation and habitats, the Action Proponents will implement mitigation measures. These measures include the following:

- avoiding live hard bottom during precision anchoring activities;
- avoiding live hard bottom by 350 yd. during explosive mine countermeasure and neutralization activities or explosive mine neutralization activities involving Navy divers (except in designated areas in the Southern California portion of the HCTT Study Area, such as the nearshore areas of SCI and in the SSTC, where these features will be avoided to the maximum extent practicable);
- avoiding live hard bottom by 350 yd. during placement of mine shapes, anchors, or mooring devices on the seafloor (except in designated areas in the California Study Area, such as the nearshore areas of SCI and in the SSTC, where these features will be avoided to the maximum extent practicable);
- ceasing non-explosive gunnery, missile, and bombing activities if floating vegetation is observed in the mitigation zone;
- ceasing explosive activities (e.g., deployment of an explosive bomb, explosive missile firing, explosive torpedo firing, explosive mine countermeasure and neutralization activities, underwater demolitions) if floating vegetation is observed in the mitigation zone; and
- avoiding floating vegetation during all activities that include vessel movement or towed in-water devices.

For more information on the Action Proponents' mitigation measures applied during its proposed activities, see Appendix C (Mitigation).

SENSITIVE HABITATS: EXPLOSIVE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sensitive habitats due to explosives associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Sections 3.3.3.1 and 3.5.3.1 (Explosive Stressors).

Sensitive Habitats: Effects from Explosives

Vegetation

Various types of explosives are used during military readiness activities. In the California Study Area, underwater detonations would primarily occur in offshore areas, but could occur in San Diego Bay at the Echo location, and in nearshore areas within the SSTC training lanes and training areas surrounding SCI over sandy bottom.

The potential for an explosion to injure or destroy vegetation would depend on the amount of vegetation present, the number of munitions used, and their net explosive weight. In areas where vegetation and locations for explosions overlap, vegetation on the surface of the water, in the water column, or rooted in the seafloor may be affected.

Single-celled algae may overlap with underwater and sea surface explosion locations. If single-celled algae are in the immediate vicinity of an explosion, only a small number of individuals are likely to be affected relative to their total population level. Additionally, the extremely fast growth rate and ubiquitous distribution of phytoplankton (Caceres et al., 2013; Levinton, 2013) suggest no meaningful effect on the resource. The low number of explosions relative to the amount of single-celled algae in the California Study Area also decreases the potential for effects on these vegetation types. Based on these factors, the effect on these types of vegetation would not be detectable and they are not discussed further in this section.

Macroalgae and marine vascular plants that are attached to the seafloor may occur in locations where explosions are conducted and may be adversely affected for different reasons. Much of the attached macroalgae grows on live hard bottom that would be mostly protected in accordance with Navy mitigation measures. Activity-based mitigation occurs for explosive activities to observe for floating vegetation prior to commencing firing or an explosive detonation until the floating vegetation is clear from the mitigation zone. For mitigation, the term “floating vegetation” refers specifically to floating concentrations of detached kelp paddies or other floating vegetation. Many of these activities will not occur in seafloor resource mitigation areas, which would benefit vegetation that occurs there.

Attached macroalgae grow quickly and are resilient through high levels of wave action (Mach et al., 2007), which may aid in their ability to withstand underwater explosions that occur near them. Attached macroalgae typically need hard or artificial substrate in order to grow. The potential distribution of attached macroalgae can be inferred by the presence of hard or artificial substrate that occurs at depths of less than 200 m throughout the Study Area. See Section 3.2 (Sediments and Water Quality) of the 2024 HCTT Draft EIS/OEIS for information regarding the distribution of hard substrate in the California Study Area. If attached macroalgae are in the immediate vicinity of an explosion, only a small number of them are likely to be affected relative to their total population level. Only explosions occurring on or at shallow depth beneath the surface have the potential to affect floating macroalgae. Effects on algae near the surface would be localized and temporary and are unlikely to affect the abundance, distribution, or productivity of vegetation.

Sea surface or underwater explosions could uproot or damage marine vascular plants if activities overlap with areas where they are rooted. The potential for marine vascular plants (seagrass and eelgrass) to be affected by underwater and surface explosions is unlikely as seagrass and eelgrass may have very limited overlap with explosives training areas. Eelgrass are much less resilient to disturbance than marine algae; regrowth after uprooting can take up to 10 years (Dawes et al., 1997). Explosions may also temporarily increase the turbidity (sediment suspended in the water) of nearby waters, but the sediment would settle to pre-explosion conditions within a number of days. Sustained high levels of turbidity may reduce the amount of light that reaches vegetation. This scenario is not likely because seagrass and eelgrass do not overlap with explosives training areas.

In addition, most underwater explosions associated with mine warfare take place in soft bottom habitats, and most bottom-placed explosions are detonated in established soft bottom locations. As a result, explosions would have very limited and localized (if any) temporary effects consisting of damage to or the removal of individuals and relatively small patches of vegetation. Vegetation, if present in soft bottom areas where bottom explosives are placed is expected to regrow or recolonize within a fairly short time (less than one year), resulting in no long-term effects on the productivity or distribution of macroalgae or marine vascular plants in those areas. The effects from explosives during military readiness activities would be minimal disturbances of floating algal mats at the surface and negligible effects to macroalgae from bottom-placed explosives in soft bottom habitat.

Therefore, no long-term consequences to vegetation are expected.

Abiotic Habitats

In-water detonations are used during various mine warfare training activities, surface-to-surface gunnery exercises, air-to-surface gunnery, missile, and bombing exercises, as well as sinking exercises, in-water demolition, and other training activities. Likewise, air-to-surface gunnery, missile, and bombing tests, ASW tracking tests, mine warfare, detection, neutralization tests, and other testing activities also employ in-water explosives. The potential effects of in-water detonations on marine habitats are assessed according to size of charge (net explosive weight), charge radius, height above the bottom, substrate types in the area, and equations linking all these factors.

Most explosive detonations during military readiness activities involving the use of high-explosive munitions, including bombs, missiles, and projectile casings, would occur in the air or near the water’s surface. Explosives associated with torpedoes, explosive sonobuoys, and explosive mines would occur in the water column; demolition charges could occur near the surface, in the water column, or the ocean bottom. Most surface and water column detonations would occur in waters greater than 3 NM from shore at water depths greater than 100 ft. within the California Study Area and would not be expected to affect the bottom. However, mine warfare and demolition detonations could occur in shallow water within the California Study Area. This section only evaluates the effect of explosives placed on the bottom because the physical structure of the water column is not affected by explosions.

An explosive charge would produce percussive energy that would be absorbed and reflected by the bottom. Hard bottom would mostly reflect the energy (Berglind et al., 2009), whereas a crater would be formed in soft bottom (Gorodilov & Sukhotin, 1996). For a specific size of explosive charge, crater depths and widths would vary depending on depth of the charge and substrate type. There is a nonlinear relationship between crater size and depth of water, with relatively small crater sizes in the shallowest water, followed by a spike in size at some intermediate depth, and a decline to an average flat line (indicating similar crater size for all charge weights) at greater depth (Gorodilov & Sukhotin, 1996; O'Keeffe & Young, 1984). Radii of the craters reportedly vary little among unconsolidated substrate types (O'Keeffe & Young, 1984). On substrate types with nonadhesive particles (everything except clay), the effects should be temporary, whereas craters in clay may persist for years (O'Keeffe & Young, 1984). Soft substrate moves around with the tides and currents and depressions are only short-lived (days to weeks) unless they are maintained, and thus some would recover over time.

Most areas of hard bottom and other sensitive habitats would be avoided using the Protective Measures Assessment Protocol (PMAP) (Appendix C, Mitigation). Additionally, many in-water detonations would occur in the same areas, reducing effects on undisturbed areas. As such, effects from in-water explosions would be limited to minor and short-term effects and no long-term consequences to abiotic habitats are expected. Accordingly, there would be no consequences to sensitive habitats from explosive stressors.

SENSITIVE HABITATS: PHYSICAL DISTURBANCE AND STRIKE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sensitive habitats due to physical disturbance and strike stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.3.3.2 and 3.5.3.2 (Physical Disturbance and Strike Stressors). The physical disturbance and strike stressors that may impact abiotic habitat and marine vegetation include (1) vessels and in-water devices, (2) MEM, (3) seafloor devices, and (4) pile driving.

The evaluation of the effects from physical disturbance and strike stressors on abiotic habitat and vegetation focuses on proposed activities that may cause abiotic habitat and vegetation to be damaged by an object that is moving through the water (e.g., vessels and in-water devices), dropped into the water (e.g., MEM), or deployed on the seafloor (e.g., mine shapes, anchors, and fiber-optic cables). Not all activities are proposed throughout the California portion Study Area. Wherever appropriate, specific geographic areas of potential impact are identified.

Single-celled algae may overlap with physical disturbance or strike stressors, but the effect would be minimal relative to their total population level and extremely high growth rates (Caceres et al., 2013); therefore, they will not be discussed further in this section. Marine vascular plants and macroalgae on the seafloor and on the sea surface are the only types of vegetation that occur in locations where physical disturbance or strike stressors may be encountered. Therefore, only marine vascular plants and macroalgae are analyzed further for potential effects from physical disturbance or strike stressors.

Sensitive Habitats: Effects from Vessels and In-Water Devices

Vegetation

Several different types of vessels (ships, submarines, boats, amphibious vehicles) and in-water devices (e.g., towed devices, unmanned underwater vehicles) are used during military readiness activities throughout the Study Area, as described in Chapter 2 (Description of Proposed Action and Alternatives). Vessel and in water device movements occur intermittently, are variable in duration (ranging from a few hours to a few weeks) and are dispersed throughout the Study Area. Events involving large vessels are widely spread over offshore areas, while smaller vessels are more active in nearshore areas.

The potential effects from Navy vessels and in-water devices used during military readiness activities on vegetation are based on the vertical distribution of the vegetation. Vessels and in-water devices may affect vegetation by striking or disturbing vegetation on the sea surface or seafloor (Spalding et al., 2003). In the open ocean, marine algae on the sea surface such as kelp paddies have a patchy distribution. Marine algae could be temporarily disturbed if struck by moving vessels or by the propeller action of transiting vessels. These strikes could also injure the organisms that inhabit kelp paddies or other marine algal mat, such as sea turtles, seabirds, marine invertebrates, and fish. Marine algae are resilient to winds, waves, and severe weather that could sink the mat or break it into pieces. Effects on marine algae by strikes may collapse the pneumatocysts (air sacs) that keep the mats afloat. Evidence suggests that some floating marine algae will continue to float even when up to 80 percent of the pneumatocysts are removed (Zaitsev, 1971).

Vegetation on the seafloor, such as marine vascular plants and macroalgae, may be disturbed by amphibious combat vehicles, manned and unmanned underwater vehicles, and seabed crawlers. Seagrasses are resilient to the lower levels of wave action that occur in sheltered estuarine shorelines, but are susceptible to vessel propeller scarring (Sargent et al., 1995). Seagrasses could take up to 10 years to fully regrow and recover from propeller scars (Dawes et al., 1997). Seafloor macroalgae may be present in locations where these vessels occur, but the effects would be minimal because of their resilience, distribution, and biomass. Because seafloor macroalgae in coastal areas are adapted to natural disturbances, such as storms and wave action that can exceed 32.8 ft. (10 m) per second (Mach et al., 2007), macroalgae will quickly recover from vessel movements. Macroalgae that is floating in the area may be disturbed by amphibious combat vehicle activities, but the effect would not be detectable because of the small amount of macroalgae in areas where these activities occur and will not be considered further in this section.

Towed in-water devices include towed targets that are used during activities such as missile exercises and gun exercises. These devices are operated at low speeds either on the sea surface or below it. The analysis of in-water devices will focus on towed surface targets because of the potential for effects on marine algae.

Unmanned underwater vehicles and autonomous underwater vehicles are used in military readiness activities in the California Study Area. They are typically propeller driven and operate within the water column or crawl along the seafloor. The propellers of these devices are typically encased, eliminating the potential for seagrass propeller scarring. Although algae on the seafloor could be disturbed by these devices, unmanned underwater vehicles are not expected to compromise the health or condition of algae for the same reasons given for vessel disturbance.

In open ocean areas, vessel strikes of vegetation would be limited to floating marine algae. Vessel and in-water device movements may disperse or injure floating algal mats. However, because algal distribution is patchy, mats may re-form, and algal events would be on a small spatial scale military readiness activities involving vessel movement would not affect the general health of marine algae. Navy mitigation measures would ensure that vessels avoid large algal mats, such as detached kelp paddies, or other sensitive vegetation that other marine life depend on for food or habitat; these measures would safeguard this vegetation type from vessel strikes.

Therefore, no long-term consequences to vegetation are expected.

Abiotic Habitats

Vessels conducting military readiness activities in the California Study Area include large ocean-going ships and submarines typically operating in waters deeper than 100 m but also occasionally transiting inshore waters from ports and through the operating areas. military readiness activities also include smaller vessels operating in inshore waters, typically at higher speeds (greater than 10 knots). Vessels used for military readiness activities range in size from small boats (less than 40 ft.) to nuclear aircraft carriers (greater than 980 ft.) Towed mine warfare and unmanned devices are much smaller than other Navy vessels, but would also disturb the water column near the device. Some activities involve vessels towing in-water devices used in mine warfare activities. The towed devices attached to a vessel by cables are smaller than most vessels, and are not towed at high speeds. Some vessels, such as amphibious vehicles, would intentionally contact the seafloor in the surf zone.

Vessels, in-water devices, and towed in-water devices could either directly or indirectly affect any of the habitat types discussed in this section, including soft and intertidal shores, soft and hard bottoms, and artificial substrates. In addition, a vessel or device could disturb the water column enough to stir up bottom sediments, temporarily increasing the local turbidity. The shore and nearshore environment is typically very dynamic because of its constant exposure to wave action and cycles of erosion and deposition. Along high-energy shorelines like ocean beaches, these areas would be reworked by waves and tides shortly after the disturbance. Along low-energy shoreline in sheltered inshore waters, the force of vessel wakes can result in elevated erosion and resuspension of fine sediment (Zabawa & Ostrom, 1980). In deeper waters where the tide or wave action has little influence, sediments suspended into the water column would eventually settle. Sediment settlement rates are highly dependent on grain size. Disturbance of deeper bottom habitat by vessels or in-water devices is possible where the propeller wash interacts with the bottom. However, most vessel transiting in shallow, nearshore waters is confined to navigation channels where bottom disturbance only occurs with the largest vessels. An exception would be for military readiness activities that occur in shallow, nearshore environments. Turbidity caused by vessel operation in shallow water, propeller scarring, and vessel grounding could affect habitats in shallow-water areas. In addition, physical contact with hard bottom areas can cause structural damage to the substrate. However, direct effects on the substrate are typically avoided because they could slow or damage the vessel or in-water device. These disturbances would not alter the overall nature of the sediments to a degree that would impair their function as habitat.

With the exception of amphibious operations, which occur at predetermined locations, vessel disturbance and strikes affecting abiotic habitats would be extremely unlikely. Shallow-water vessels typically operate in defined boat lanes with sufficient depths to avoid propeller or hull strikes of bottom habitats. Amphibious landings would occur within one of the four amphibious approach lanes in the California Study Area. Landings would occur on designated lanes within the shallow water area that are naturally resilient to disturbance.

Therefore, no long-term consequences to abiotic habitats are expected.

Sensitive Habitats: Effects from Military Expended Material

Vegetation

This section analyzes the strike potential to vegetation of the following categories of MEM: (1) all sizes of non-explosive practice munitions; (2) fragments of high-explosive munitions; (3) expended targets; and (4) expended materials other than munitions, such as sonobuoys and miscellaneous accessories (e.g., canisters, endcaps, pistons).

The potential for effects on marine vegetation from MEM would depend on the presence and amount of vegetation and quantity of MEM. Most deposition of MEM occurs within the confines of established activity areas. These areas are largely away from the coastline, and the potential for effects on vegetation is low.

Depending on the size and type or composition of the expended materials and where they happen to strike vegetation, individuals could be killed, fragmented, covered, buried, sunk, or redistributed. This type of disturbance would not likely differ from conditions created by waves or rough weather. If enough MEM lands on algal mats, the mats could sink. The likelihood is low that mats would accumulate enough material to cause sinking from military activities, as MEMs are dispersed widely throughout an activity area. The few algal mats that would prematurely sink would not have an effect on populations. Strikes would have little effect and would not likely result in the mortality of floating algal mats or other algae, although these strikes may injure the organisms that inhabit marine algal mats, such as sea turtles, birds, fishes, and marine invertebrates, if such are inhabiting the mat at the time of strike.

Therefore, military expended materials used for military readiness activities are not expected to pose a risk to marine algae or marine vascular plants because (1) the affected area of MEM is very small relative to marine algae distribution, and (2) marine vascular plants overlap with areas where the stressor occurrence is very limited. Activity-based mitigation will be implemented prior to certain activities to observe floating vegetation. If floating vegetation is observed prior to the activity, that specific activity will either be relocated to an area where floating vegetation is not observed in concentrations, or the initial start of the activity will be ceased until the mitigation zone is clear of floating vegetation concentrations (Appendix C, Mitigation). Based on these factors, potential effects on marine algae and marine vascular plants from MEM are not expected to result in detectable changes in the growth, survival, or propagation of individuals, and are not expected to result in population-level effect.

Abiotic Habitats

Military readiness activities involving MEM would have the potential to effect marine substrates. To determine the percentage of a given substrate within the California Study Area that may potentially be impacted by MEM under a conservative scenario, the total affected area for the California Study Area was divided by the total amount of that particular substrate type within the California Study Area as provided in Appendix I (Military Expended Materials, Direct Strike, and Ship Strike Effects Analysis) of the 2024 HCTT Draft EIS/OEIS.

MEM is not expected to impact more than 0.01 percent of the available soft, 0.01 percent for mixed, and 0.01 percent for hard bottom habitats annually within the California Study Area. Even if MEM distribution is not uniform and some areas experience more MEM than other, the area of disturbance would still be small.

Additional analysis was conducted to determine the proportional impact of MEM from military readiness activities on marine habitats within the California Study Area. A total of approximately 116.6 acres in the California Study Area (which is approximately 220,400 acres in size) would be impacted. This represents less than a thousandth of one percent of available bottom habitat in any range complex in the HCTT Study Area. The distribution of the impact footprints among habitat types is described in Appendix I (Military Expended Materials, Direct Strike, and Ship Strike Effects Analysis) of the 2024 HCTT Draft EIS/OEIS.

Therefore, no long-term consequences to abiotic habitats are expected.

Sensitive Habitats: Effects from Seafloor Devices

Vegetation

Vegetation on the seafloor may be affected by stationary seafloor devices (e.g., mine shapes, anchors, bottom-placed instruments). In contrast, vegetation on the sea surface such as floating marine algal mats would not likely be affected by seafloor devices and therefore will not be discussed further in this section.

Seafloor devices operation during military readiness activities could affect marine vascular plants by physically removing vegetation (e.g., uprooting); crushing vegetation; temporarily increasing the turbidity (sediment suspended in the water) of waters nearby; or shading, which may interfere with photosynthesis. If marine vascular plants are not able to photosynthesize, their ability to produce energy is compromised. Precision anchoring would not occur in mapped eelgrass or kelp locations, which would avoid vegetation that occurs there.

Seafloor devices would be used throughout the California Study Area during military readiness activities. Seafloor devices use sandy substrates, devoid of marine vegetation, to the greatest extent practicable. Marine plant species found within the relatively shallow waters of the Study Area, including off SCI, are adapted to natural disturbance and recover quickly from storms, as well as from wave and surge action. Bayside marine plant species, such as eelgrass, are found in areas where wave action is minimal. Installation of seafloor devices may affect vegetation in benthic habitats, but the effects would be temporary and would be followed by rapid (i.e., within a few weeks) recovery, particularly in oceanside boat lanes in nearshore waters off San Diego and in designated training areas adjoining SCI. Eelgrass beds show signs of recovery after a cessation of physical disturbance; the rate of recovery is a function of the severity of the disturbance (Neckles et al., 2005). The main factors that contribute to eelgrass recovery include improving water quality and cessation of major disturbance activities (e.g., dredging) (Chavez, 2009). The Navy has used credits from the Navy Region Southwest San Diego Bay Eelgrass Mitigation Bank (Bank) to offset unavoidable eelgrass and other habitat effects from infrastructure projects and testing and training activities in San Diego Bay (U.S. Department of the Navy, 2023).

Seafloor device installation in shallow water habitats would pose a negligible risk to marine vegetation. Although some species would be expected to revegetate impacted areas within weeks to months, certain seagrass species could take 10 years to recover. Although marine vegetation growth near seafloor devices installed during military readiness activities would be inhibited during recovery, population-level effects are unlikely because of the small, locally affected areas and the low frequency of military readiness activities in these localized areas.

New range modernization and sustainment activities include installation of undersea cables integrated with hydrophones and underwater telephones to sustain the capabilities of the SOAR. Deployment of fiber optic cables along the seafloor would occur in one location in the California Study Area: south and west of SCI. In this location, the installations would occur completely within the water; no land interface would be involved. Cable-laying activities in the California Study Area could disturb marine vegetation when the cable crosses rocky substrate at depths between 65 and 196 ft. (20 and 60 m) for the SWTR Extension. However, it is anticipated that rocky substrate would be avoided to the greatest extent possible throughout the cable corridor to minimize these effects.

Installation and maintenance of underwater platforms, mine warfare training areas, and installation of other training areas involve seafloor disturbance where those activities would take place. Each installation would occur on soft, typically sandy bottom, avoiding rocky substrates.

Seafloor device installation in shallow water habitats would pose a negligible risk to marine vegetation. Any damage from seafloor devices would be followed by a recovery period lasting weeks to months for most species, but could take up to 10 years for certain seagrass species. Although marine vegetation growth near seafloor devices installed during military readiness activities would be inhibited during recovery, population-level impacts are unlikely because of the small, local impact areas; the frequency of military readiness activities; and the wider geographic distribution of seagrasses in and adjacent to training areas.

Therefore, no long-term consequences to vegetation are expected.

Abiotic Habitats

Seafloor devices would be used throughout the California Study Area during military readiness activities. The types of seafloor devices proposed under the Proposed Action would not vary significantly from what was analyzed in the 2018 HSTT EIS/OEIS. Seafloor devices would be used in previously disturbed soft bottom habitat, and hard bottom habitat would be avoided per mitigation measures.

The installation and maintenance of seafloor devices (cables, hydrophones, anchors, etc.) during implementation of modernization and range sustainment activities would disturb underlying abiotic habitat. Deployment of fiber optic cables along the seafloor would occur in one location in the California Study Area: south and west of SCI in the California Study Area. Installation and maintenance of underwater platforms, mine warfare training areas, and installation of other training areas also involve seafloor disturbance. These activities would occur offshore and on soft bottom habitat. Seafloor devices would cover underlying substrate and temporarily inhibit the substrates' ability to function as habitat. Where hardbottom habitat cannot be avoided, over time seafloor devices would not change the substrates' ability to function as a habitat. As such, effects would only be temporary and return to baseline conditions once modernization and range sustainment activities are complete.

Therefore, no long-term consequences to abiotic habitats are expected.

Sensitive Habitats: Effects from Pile Driving

Vegetation

Pile driving and removal would not affect vegetation on the sea surface, such as marine algal mats; therefore, floating vegetation will not be discussed further in this section. Pile driving for Port Damage Repair activities would occur in Port Hueneme harbor in the PMSR.

Pile driving and removal may, however, affect marine vascular plants and seafloor macroalgae at Port Hueneme by physically removing vegetation (e.g., uprooting); crushing vegetation; temporarily increasing the turbidity (sediment suspended in the water) of waters nearby; or shading, which may interfere with photosynthesis. If vegetation is not able to photosynthesize, its ability to produce energy is compromised. However, the intersection of marine macroalgae and marine vascular plants and pile driving is limited, and any suspended sediments would settle in a few days.

Recovery of marine vascular plants such as eelgrass from direct disturbance by pile driving would occur over longer timeframes. Eelgrass beds show signs of recovery after a cessation of physical disturbance; the rate of recovery is a function of the severity of the disturbance (Neckles et al., 2005). The main factors that contribute to eelgrass recovery include improved water quality and cessation of major disturbance activities (e.g., dredging) (Chavez, 2009). Pile driving, in contrast to dredging, has a minor effect that is limited to the area of the actual pile and footprint of the mooring.

Pile driving and removal may affect vegetation in benthic habitats, but the effects would be temporary and would be followed by rapid (i.e., within a few weeks) recovery, particularly in areas with sandy bottoms with limited or no benthic vegetation. The effects of pile driving on vegetation would be temporary resuspension of sediment and the possible removal of relatively small amounts of vegetation during pile installation and removal. Pile driving for pier maintenance typically occurs in soft-bottom habitats with unconsolidated sediments that would allow pile installation and removal at a fairly rapid pace. Although some species would be expected to revegetate impacted areas within weeks to months, certain species such as seagrasses could take 10 years to recover.

Therefore, no long-term consequences to vegetation are expected.

Abiotic Habitats

Pile driving would occur in Port Hueneme Harbor, a developed industrial harbor in the California Study Area. While pile driving may have the potential to effect soft bottom habitat, the effects would be extremely limited since the number of piles and size is relatively small (n = 20 concrete 24-in. piles), and the duration is short (20 days for assembly and 10 days for disassembly). Piles would remain in the water for up to 60 days. Since pile driving would occur in the harbor, the dynamic nature of the soft bottom habitat is likely to return to its previous state shortly following removal of the temporary piles.

Therefore, no long-term consequences to abiotic habitats are expected.

SENSITIVE HABITATS: SECONDARY STRESSORS

The following section summarizes the analysis and conclusions of potential effects on sensitive habitats due to secondary stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Sections 3.3.3.3 (Secondary Stressors).

Section 3.5 (Abiotic Habitats) of the 2024 HCTT Draft EIS/OEIS considers the effects on abiotic habitats and Section 3.2 (Sediments and Water Quality) of the 2024 HCTT Draft EIS/OEIS considers effects on sediments and water quality from explosives and explosion byproducts, metals, chemicals other than explosives, and other materials (e.g., marine markers, flares, chaff, targets, and miscellaneous components of other materials). An example from that analysis could be an increase in cyanobacteria associated with munitions deposits in marine sediments. Cyanobacteria may proliferate when iron is introduced to the marine environment. This proliferation can affect adjacent habitats by releasing toxins and can create hypoxic conditions. Introducing iron into the marine environment from munitions or infrastructure is not known to cause toxic red tide events; rather, these harmful events are more associated with natural causes (e.g., upwelling) and the effects of other human activities (e.g., agricultural runoff and other coastal pollution) (Hayes et al., 2007). High-order explosions consume most of the explosive material, leaving only small or residual amounts of explosives and combustion products. Many combustion products are common seawater constituents. Explosives byproducts from high-order detonations present no indirect stressors to marine vegetation through sediment or water.

The analysis included in Section 3.2 (Sediments and Water Quality) of the 2024 HCTT Draft EIS/OEIS determined that neither state nor federal standards or guidelines for sediments or water quality would be violated by the Proposed Action. Because standards for sediment and water quality would not be violated, population-level effects on marine vegetation are not likely to be detectable and are therefore inconsequential. Because these standards and guidelines are structured to protect human health and the environment, and the proposed activities do not violate them, no indirect effects are anticipated on vegetation from the proposed military readiness activities under the Proposed Action.

Other materials that are re-mobilized after their initial contact with the seafloor (e.g., by waves or currents) may continue to strike or abrade marine vegetation. Secondary physical strike and disturbances are relatively unlikely because most expended materials are denser than the surrounding sediments (e.g., metal) and are likely to remain in place as the surrounding sediment moves. Potential secondary physical strike and disturbance effects may cease when (1) the MEM is too massive to be mobilized by typical oceanographic processes, (2) the MEM becomes encrusted by natural processes and incorporated into the seafloor, or (3) the MEM becomes permanently buried. Although individual organisms could be affected by secondary physical strikes, the viability of populations or species would not be affected.

SENSITIVE HABITATS: CONCLUSION

Based on a detailed stressor analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.3 (Vegetation), specifically Section 3.3.3 (Environmental Consequences), and Section 3.5 (Abiotic Habitats), specifically Section 3.5.3 (Environmental Consequences) and, as summarized earlier, the Action Proponents have determined that the Proposed Action would be carried out in a manner that would maintain, enhance, and, where feasible, restore marine resources, sustain the biological productivity of coastal waters, and maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes. As evident from the standard operating procedures and mitigation measures discussed earlier, the Action Proponents' Proposed Action provides special protection to sensitive habitats. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.

3.2.3.2.3 Birds

Seabirds – birds that forage primarily on the open ocean - are of particular interest as the group of birds with the broadest distribution and exposure to Navy activities in the Study Area. Seabirds are a diverse group that are adapted to living in aquatic environments (Enticott & Tipling, 1997; North American Bird Conservation Initiative, 2022) and use coastal (nearshore) waters, offshore waters (continental shelf), or open ocean areas (Harrison, 1983). There are many biological, physical, and behavioral adaptations that are different for seabirds than for terrestrial birds. Seabirds typically live longer, breed later in life, and produce fewer young than other bird species (Onley & Scofield, 2007). The feeding habits of seabirds are related to their individual physical characteristics, such as body mass, bill shape, and wing area (Hertel & Ballance, 1999). 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 & Chovan, 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. However, many species are distributed nesters, and some seabirds are cavity nesters. Typical bird behavior to be encountered within the Study Area would include breeding, foraging, roosting, and migration. Beaches and wetlands within or bordering the Study Area may also be used as molting grounds by some species.

There are three species of birds listed as Endangered or Threatened under the ESA in the California Study Area: the California least tern (endangered), the short-tailed albatross (endangered), and the very rarely sighted marbled murrelet (threatened).

The following sections summarize the analysis and conclusions of potential effects to seabirds from stressors associated with the Action Proponents' proposed military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.9 (Birds).

The stressors associated with the Proposed Action that could affect birds include the following:

- Acoustics (sonar and other transducers; pile driving; vessel noise; aircraft noise; weapons noise; air guns)

- Explosives (explosions in-water; explosions in-air)
- Energy (in-air electromagnetic devices; in-water electromagnetic devices; high-energy lasers; high-power microwave devices)
- Physical disturbance and strikes (vessels and in-water devices; aircraft & aerial targets; MEM; seafloor devices; pile driving)
- Ingestion (MEM)
- Secondary (effects on habitat, effects on prey availability)

BIRDS: SPECIAL PROTECTION

Proposed military readiness activities include standard operating procedures, mitigation measures, or conservation measures to protect birds.

Pilots of Navy aircraft make every attempt to avoid large flocks of birds to reduce the safety risk involved with a potential bird strike. Since 2011, the Navy has required that all Navy flying units report all bird strikes through the Web-Enabled Safety System Aviation Mishap and Hazard Reporting System. The standard operating procedures for aircraft safety benefit birds by reducing the potential for aircraft strike.

During weapons firing, the Navy visually clears the weapons firing range of all non-participating vessels. This standard operating procedure benefits birds by increasing the effectiveness of visual observations in daylight hours, thereby reducing the potential for interaction of birds with explosive weapons firing activities. In addition, weapons firing that involves the deployment or retrieval of targets is typically conducted during daylight hours in low sea states. This standard operating procedure also increases the effectiveness of visual observation in avoiding birds.

For more information on the Navy’s standard operating procedures applied during its proposed activities, see the 2024 HCTT Draft EIS/OEIS, Section 3.0.4 (Standard Operating Procedures).

To further avoid the potential for impacts on birds, the Navy will cease explosive mine countermeasure and neutralization activities if concentrations of seabirds or individual foraging seabirds are observed in the mitigation zone.

Furthermore, the Navy will not conduct gunnery activities within a specified distance of live hard bottom, artificial reefs, and shipwrecks in order to avoid potential impacts from explosives and physical disturbance and strike stressors on seafloor resources in mitigation areas throughout the California Study Area (see Appendix C, Mitigation, of this CD). This mitigation will consequently help avoid potential impacts on bird prey that inhabits live hard bottom, artificial reefs, and shipwrecks.

For more information on the Navy’s mitigation measures applied during its proposed activities, see Appendix C (Mitigation) of this CD.

Finally, the Navy provides a number of protections for the snowy plover on SCI through the execution of its Wildland Fire Management Plan. Those protections include monitoring and surveys of snowy plovers, as well as numerous fire prevention and response measures to reduce the threat of fire to snowy plover nests.

BIRDS: ACOUSTIC STRESSORS

The following section summarizes the analysis and conclusions of potential effects on birds due to acoustic stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.9.3.1 (Acoustic Stressors).

The types of birds exposed to sound-producing activities depend on where military readiness activities occur. Birds in the study area can be divided into three groups based on breeding and foraging habitat: (1) those species such as albatrosses, petrels, frigatebirds, tropicbirds, boobies, alcids, and some terns that forage over the ocean and nest on oceanic islands; (2) species such as pelicans, cormorants, gulls, and some terns that nest along the coast and forage in nearshore areas; and (3) those few species such as skuas, jaegers, Franklin’s gull, Bonaparte’s gulls, ring-billed gulls, black terns, and ducks and loons that nest and forage in inland habitats and come to the coastal areas during nonbreeding seasons. In addition, birds that are typically found inland, such as songbirds, may be present flying in large numbers over open ocean areas during annual spring and fall migration periods.

Birds could be exposed to sounds from a variety of sources. While above the water surface, birds may be exposed to airborne sources such as pile driving, weapons noise, vessel noise, and aircraft noise. While foraging and diving, birds may be exposed to underwater sources such as sonar, pile driving, air guns, and vessel noise. While foraging birds will be present near the water surface, migrating birds may fly at various altitudes. Some species such as sea ducks and loons may be commonly seen flying just above the water's surface, but the same species can also be spotted flying high enough (5,800 ft.) that they are barely visible through binoculars (Lincoln et al., 1998). While there is considerable variation, the favored altitude for most small birds appears to be between 500 ft. (152 m) and 1,000 ft. (305 m). Radar studies have demonstrated that 95 percent of the migratory movements occur at less than 10,000 ft. (3,050 m), with the bulk of the movements occurring under 3,000 ft. (914 m) (Lincoln et al., 1998).

Seabirds use a variety of foraging behaviors that could expose them to underwater sound. Most seabirds plunge-dive from the air into the water or perform aerial dipping (the act of taking food from the water surface in flight); others surface-dip (swimming and then dipping to pick up items below the surface) or jump-plunge (swimming, then jumping upward and diving underwater). Birds that feed at the surface by surface or aerial dipping with limited to no underwater exposure include petrels, jaegers, and phalaropes. Birds that plunge-dive are typically submerged for short durations, and any exposure to underwater sound would be very brief. Birds that plunge-dive include albatrosses, some tern species, masked boobies, gannets, shearwaters, and tropicbirds. Some birds, such as cormorants, seaducks, alcids, and loons pursue prey under the surface, swimming deeper and staying underwater longer than other plunge-divers. Some of these birds may stay underwater for up to several minutes and reach depths between 50 ft. (15 m) and 550 ft. (168 m) (Alderfer, 2003; Durant et al., 2003; Jones, 2001; Lin, 2002; Ronconi, 2001). Birds that forage near the surface would be exposed to underwater sound for shorter periods of time than those that forage below the surface. Exposures of birds that forage below the surface may be reduced by destructive interference of reflected sound waves near the water surface. Sounds generated underwater during military readiness activities would be more likely to affect birds that pursue prey under the surface, although as previously stated, little is known about seabird hearing ability underwater.

Birds: Effects from Sonar and Other Transducers

Information regarding the effects of sonar on birds is unavailable, and little is known about the ability for birds to hear underwater. The limited information (Johansen et al., 2016) and data from other species suggest the range of best hearing may shift to lower frequencies in water (Dooling & Therrien, 2012a; Therrien, 2014). Because few birds can hear above 10 kHz in air, it is likely that the only sonar sources they may be able to detect are low and mid-frequency sources.

Other than pursuit diving species, the exposure to birds by these sounds is likely to be negligible because they spend only a very short time underwater (plunge-diving or surface-dipping) or forage only at the water surface. Pursuit divers may remain underwater for minutes, increasing the chance of underwater sound exposure.

Sonar and other transducers would not be regularly used in nearshore areas that could be used by foraging shorebirds, except during pierside maintenance activities or navigation in areas around ports. The Pacific current runs through the portion of the HCTT Study Area along the western U.S. coast and is an area of increased productivity that attracts formatting birds. Therefore, birds that forage in open ocean areas would have a greater chance of underwater sound exposure than birds that forage in coastal area.

Pursuit-diving birds could be exposed to low-, mid-, and high-frequency sonar and sound produced by sonar and other transducers during military readiness activities. The greatest potential for measurable effects would be near the sources of low-frequency and high-intensity sonar. For military readiness activities, this would occur mostly in the offshore marine environment. Sonar and other transducers would not be regularly used in nearshore areas that could be used by foraging shorebirds, except during maintenance and for navigation in areas around ports. Therefore, birds that forage in open-ocean areas would have a greater chance of underwater sound exposure than birds that forage in coastal areas. Exposure resulting in adverse effects are unlikely because of the bird would have to be underwater at the time of use of sonar and transducers in very close (within a few meters) proximity to the source.

The possibility of an ESA-listed bird species being exposed to sonar and other transducers depends on whether it submerges during foraging and whether it forages in areas where these sound sources may be used. Short-tailed albatrosses do not submerge while foraging; therefore, it is unlikely they would be exposed to underwater sound from sonar and other active acoustic sources. Least terns and marbled murrelets may briefly submerge while foraging, either during plunge-diving (terns) or pursuit diving (murrelet), so there is a chance that these species could be exposed to underwater sound from sonar and other transducers. However, their plunge dives are brief, so any chance of exposure would be inconsequential. Most other sonar use occurs farther offshore, however, so the chance for an exposure would be low.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no consequences to any bird populations.

Birds: Effects from Air Guns

Air guns can introduce brief, impulsive, broadband sounds into the marine environment. Impulses from air guns lack the strong shock wave and rapid pressure increases of explosions that can cause primary blast injury or barotraumas. Underwater impulses would be generated using small (approximately 60 cubic in.) air guns, which are essentially stainless steel tubes charged with high-pressure air via a compressor. An impulsive sound is generated when the air is almost instantaneously released into the surrounding water, an effect similar to popping a balloon in air. Generated impulses would have short durations, typically a few hundred milliseconds.

The exposure of birds to air gun noise during military readiness activities other than pursuit diving species, would be negligible because they spend only a very short time underwater (plunge-diving or surface-dipping) or forage only at the water surface. Pursuit divers may remain underwater for minutes, increasing the chance of underwater sound exposure. However, the short duration of an air gun pulse and its relatively low source level means that a bird would have to be very close to a small air gun used in military readiness activities at the moment of discharge to be exposed. In addition, air guns may be fired at greater depths than birds conduct their foraging dives. Because of these reasons, the likelihood of a diving bird experiencing an underwater exposure to an air gun that could result in an impact on hearing is negligible.

There is no evidence that diving birds rely on underwater acoustic communication for foraging; rather, they may depend more on vision/visual cues. Because the signal from an air gun is very brief, the masking of important acoustic signals underwater by an air gun is unlikely.

The possibility of an ESA-listed seabird species being exposed to sounds from an air gun depends on whether it submerges during foraging and whether it forages in areas where this sound source may be used. Short-tailed albatrosses do not submerge while foraging; therefore, it is unlikely they would be exposed to underwater sound from air guns. Least terns and marbled murrelets may briefly submerge while foraging, either during plunge-diving (terns) or pursuit diving (murrelet). The remote possibility of exposure to a brief air gun signal exists, but only for pursuit divers that may be underwater long enough to be exposed.

As discussed previously, effects on individual birds, if any, are expected to be minor and limited. Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no consequences to any bird populations.

Birds: Effects from Pile Driving

Pile driving would occur in Port Hueneme harbor in the California Study Area. Although some individual birds could be exposed to noise from pile driving, the activities would occur intermittently (one event occurring intermittently over approximately 30 days per year) in very limited areas and would be of short duration (maximum of 90 minutes per 24-hour period). The activity would occur in highly disturbed estuarine habitats that are generally similar to that which was analyzed in the 2018 HSTT and 2022 PMSR EIS/OEISs.

Noise from the installation and removal of piles has a potential to affect animals in the vicinity of the training event. Impact pile driving creates repetitive impulsive sound. An impact pile driver generally operates in the range of 36–50 blows per minute. Vibratory pile extraction creates a nearly continuous sound made up of a series of short duration rapid impulses at a much lower source level than impact pile driving. The sounds are emitted both in the air and in the water in nearshore areas where some birds forage. It is expected that most birds would exhibit avoidance behavior and leave the pile driving location. However, if prey species such as fish are killed or injured as a result of pile driving, some birds may continue to forage close to the construction area, or may be attracted to the area, and be exposed to associated noise. Behavioral responses and displacement from the area are expected to be temporary for the duration of the pile driving and extraction activities.

Impulses from the impact hammer are broadband and carry most of their energy in the lower frequencies. The underwater sound pressure levels produced by impact pile driving during Navy activities are below the conservatively estimated injury thresholds recommended for other small animals with similar sized air cavities (sea turtles and fish; see Popper et al. (2014)). Therefore, the risk of barotrauma to any diving birds is negligible. Impulses from the impact hammer attenuate more quickly in air than in water and birds are likely to avoid the area during impact driving. Therefore, the risk of barotrauma to birds in air or at the water surface is negligible.

Pursuit divers may remain underwater for minutes, increasing the chance of underwater sound exposure. However, the short duration of driving or extracting a single pile would limit the likelihood of exposure, especially since a bird that is disturbed by pile driving while underwater may respond by swimming to the surface. Although it is not known what duration or intensity of underwater sound exposure would put a bird at risk of hearing loss, birds are less susceptible to both TTS and permanent threshold shift (PTS) than mammals (Saunders & Dooling, 1974). Diving birds have adaptations to protect the middle ear and tympanum from pressure changes during diving that may affect hearing (Dooling & Therrien, 2012b). While some adaptions may exist to aid in underwater hearing, other adaptations to protect in-air hearing may limit aspects of underwater hearing (Hetherington, 2008). Because of these reasons, the likelihood of a diving bird experiencing an underwater exposure to impact pile driving that could affect hearing is considered low. Vibratory pile extraction sound levels are low and are not considered to pose a risk to bird hearing in air or in water.

Because diving birds may rely more on vision for foraging, there is no evidence that diving birds rely on underwater acoustic communication for foraging, and individual pile driving and extraction occurs only over a few minutes, the masking of important acoustic signals underwater by pile driving is unlikely. The potential for masking of calls in air would also likely be limited because of the short duration of individual pile driving and extraction and the likelihood that birds would avoid the area around pile driving activities.

Responses by birds to noise from pile driving would be short-term behavioral or physiological responses (e.g., alert response, startle response, and temporary increase in heart rate). Startle or alert reactions are not likely to disrupt major behavior patterns, such as migrating, breeding, feeding, and sheltering, or to result in serious injury to any birds. Some birds may be attracted to the area to forage for prey species killed or injured as a result of pile driving and be exposed to noise from pile driving temporarily. Birds may be temporarily displaced and there may be temporary increases in stress levels; however, behavior and use of habitat would return shortly after the training is complete.

Of the bird species under the ESA in the California Study Area, short-tailed albatrosses do not occur in Port Hueneme Harbor. Marbled murrelets and least terns would be expected to occur within the areas subject to pile driving. There are limited available data on non-auditory injury to birds from intense non-explosive sound sources. The 2022 PMSR EIS/OEIS cited a study for recommended auditory thresholds for murrelets. The study recommended the auditory injury threshold (point at which injury to the ear hair cells would occur) for underwater noise levels at 202 decibels (dB) referenced to 1 micropascal squared per second (re 1 μPa^2-sec) cumulative sound exposure level (SEL) and the non-auditory injury threshold (from barotrauma) at 208 dB re 1 μPa^2-sec SEL for marbled murrelets (Science Applications International Corporation, 2011). Birds in the vicinity of pile driving activities are expected to avoid the area, and exposures would result in less than significant effects.

As discussed above, impacts on individual birds, if any, are expected to be minor and limited and no long-term consequences to individuals are expected. Accordingly, there would be no consequences to any bird populations.

Birds: Effects from Vessel Noise

Proposed military readiness activities in the California Study Area involve maneuvers by various types of surface ships, boats, submarines, and unmanned vehicles (collectively referred to as vessels). Birds could be exposed to both in-air and underwater noise from vessels throughout the Study Area, but few exposures would occur based on the infrequency of operations and the low density of vessels within the Study Area at any given time. Potential for exposure to vessel noise due to military readiness activities would be greatest near Navy ports.

Birds respond to vessels in various ways. Some birds are commonly attracted to and follow vessels, including certain species of gulls, storm-petrels, and albatrosses (Hamilton, 1958; Hyrenbach, 2001, 2006a), while other species such as frigatebirds, sooty terns, and a variety of diving birds seem to avoid vessels (Borberg et al., 2005; Hyrenbach, 2006a; Schwemmer et al., 2011). Vessel noise could elicit short-term behavioral or physiological responses but is not likely to disrupt major behavior patterns, such as migrating, breeding, feeding, and sheltering, or to result in serious injury to any birds. Harmful bird/vessel interactions are commonly associated with commercial fishing vessels because birds are attracted to concentrated food sources around these vessels (Dietrich & Melvin, 2004; Melvin & Parrish, 2001a). The concentrated food sources (catch and bycatch) that attract birds to commercial fishing vessels are not present around Navy vessels.

Although loud sudden noises can startle and flush birds, vessels are not expected to result in major acoustic disturbance of birds in the Study Area. The continuous noise from Navy vessels has the potential to cause masking for birds, both in air and underwater. Due to the transient nature of Navy vessels, this masking is expected to be temporary. Birds near ports may experience increased masking and become habituated to this noise or attempt to compensate for the masking. Noises from Navy vessels are similar to or less than those of the general maritime environment. Birds may respond to the physical presence of a vessel, regardless of the associated noise.

The location and hours of Navy vessel usage for military readiness activities are dependent upon the locations of Navy ports, piers, and established at-sea training and testing areas. These areas (including the previously analyzed HSTT Study Area and new areas added to the HCTT Study Area) have not appreciably changed in decades and are not expected to change in the foreseeable future.

Vessel noise produced during military readiness activities may briefly impact some individuals, but exposures would be brief, localized, and intermittent and would not be expected to impact populations or to impact survival, growth, or reproduction. Birds in the open ocean, foraging or migrating, could be exposed to vessel noise as the vessel passes and may respond by avoiding areas of temporarily concentrated vessel noise. If a bird responds to vessel noise, only short-term behavioral responses such as startle, head turning, or avoidance would be expected. There is little likelihood of repeated exposures because of the transient nature of vessels and regular movement of birds. Because effects on individual birds are expected to be minor and limited, no long-term consequences to individuals or populations are expected.

Birds: Effects from Aircraft Noise

Military readiness activities proposed in the Study Area involve various types of aircraft, including fixed-wing and rotary-wing aircraft. Aircraft noise would be generated throughout the Study Area, contributing both airborne and underwater sound to the ocean environment. Most of the aircraft noise would be generated at air stations, which are outside the Study Area. Takeoffs and landings occur at established airfields as well as on vessels across the Study Area. Takeoffs and landings from Navy vessels produce in-water noise at a given location for a brief period as the aircraft climbs to cruising altitude. Some bird species, particularly waders and shorebirds, could have greater exposure to aircraft noise because of the proximity of habitats (e.g., wetlands, estuaries) to airfields. Seabirds in pelagic habitats would likely experience fewer exposures because of the brief overflight time and the high altitude of the aircraft relative to the lower altitudes maintained by foraging seabirds.

A bird offshore could be exposed to transient noise from aircraft passing overhead and may respond by avoiding areas where aircraft operations are temporarily concentrated. Aircraft activity would be dispersed, and exposures would be infrequent and brief. This is true of fixed- or rotary-winged aircraft, though helicopters could hover for longer periods and helicopter activities would also occur closer to the coast and inshore, and at times at lower altitudes than fixed wing aircraft, increasing the potential to expose birds to aircraft noise.

Exposures to aircraft noise, particularly those of longer duration, could result in behavioral responses and physiological stress. However, it is likely that birds present when aircraft noise exposure begins would leave the area to avoid further exposure to aircraft noise, human presence, and other military readiness activity-associated stressors. Any reactions are expected to be short term and minor. Repeated exposures of individuals would be unlikely.

Sonic booms would also be generated during military readiness activities. Supersonic aircraft flights are not intentionally generated below 30,000 ft. unless over water and more than 30 NM from inhabited coastal areas or islands. Deviation from these guidelines may be approved for tactical missions that require supersonic flight, phases of formal training requiring supersonic speeds, research and test flights that require supersonic speeds, and for flight demonstration purposes when authorized by the Chief of Naval Operations (U.S. Department of the Navy, 2016). Outside of these authorized tactical missions, sonic booms would not likely disturb seabirds in these pelagic environments.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no consequences to any bird populations.

Birds: Effects from Weapons Noise

Birds may be exposed to sounds caused by the weapons firing, objects in flight, and the impact of non-explosive projectiles on the water's surface. Other devices intentionally produce noise to serve as a non-lethal deterrent. Navy military readiness activities include firing or launching a variety of weapons, including missiles; rockets; and small-, medium-, and large-caliber projectiles. Most weapons firing activities occur far from shore, limiting most possible exposures to birds that forage or migrate greater than 3 NM offshore. In addition to noise from weapons firing and launching, birds could be briefly disturbed by the impact of non-explosive practice munitions at the water surface.

Sounds produced by weapons firing (muzzle blast), launch boosters, and projectile travel are potential stressors to birds. Sound generated by a muzzle blast is intense but very brief. A bird very close to a large weapons blast could be injured or experience hearing loss due to acoustic trauma or threshold shift. Sound generated by a projectile travelling at speeds greater than the speed of sound can produce a low amplitude bow shock wave in a narrow area around its flight path. Inert objects hitting the water surface would generate a splash and the noise may disturb nearby birds. Bird responses to weapons-firing and projectile travel noise may include short-term behavioral or physiological responses such as alert responses, startle responses, or temporary increases in heart rate. Studies of impacts of weapons noise on raptors show that these birds show little reaction (e.g., head turn) and do not alter behavior in the presence of noise from weapons testing (Brown et al., 1999; Schueck et al., 2001; Stalmaster & Kaiser, 1997). Once surface weapons firing activities begin, birds would likely disperse away from the area around the ship and the path of projectiles.

Other activities in the general area that precede these activities, such a vessel movement or target setting, could potentially disperse birds away from the area in which weapons-firing noise would occur; species such as frigatebirds and sooty terns seem to avoid vessels (Borberg et al., 2005; Hyrenbach, 2006b). Increased ship activity could drive these and other species from their natural habitat at a critical time or in an important foraging area (Borberg et al., 2005). On the other hand, some birds commonly follow vessels, including certain species of gulls, storm petrels, and albatrosses (Hamilton, 1958; Hyrenbach, 2001; Hyrenbach, 2006b). A number of bird species are attracted to ships because of the increased potential for foraging success (Dietrich & Melvin, 2004; Melvin et al., 2001). The propeller wake generated by all ships, but particularly larger ships, disrupts the water column, causing prey to be brought to the surface where it is more easily captured by a greater variety of bird species. Birds that are attracted to ships could be more likely to be exposed to weapons firing noise.

Airborne weapons firing at airborne targets typically occur at high altitudes of 15,000–25,000 ft. during air-to-air gunnery exercises. Noise generated by firing at such high altitudes is unlikely to generate a strong reaction in birds migrating at lower altitudes or foraging at the surface. The altitudes at which migrating birds fly can vary greatly based on the type of bird, where they are flying (over water or over land), and other factors such as weather. Approximately 95 percent of bird flight during migrations occurs below 10,000 ft. with the majority below 3,000 ft. (Lincoln et al., 1998). While there is considerable variation, the favored altitude for most small birds appears to be between 500 ft. and 1,000 ft.

If a bird does not avoid the area of Navy activity and is in the vicinity of a muzzle blast from a large caliber gun or the bow shock wave of a large supersonic projectile, the potential for auditory impacts exists. If in the immediate vicinity of large gun muzzle blasts, a bird could experience peak sound pressure levels that have been shown to cause a permanent reduction in hearing sensitivity over the low frequency portion of hearing range. Similarly, the bow shock waves of larger projectiles would create a zone around the path of the projectile where a bird could experience auditory effects due to the near-instantaneous passing of a high peak pressure wave (subjectively a “crack” sound). The estimated range to peak sound levels shown to cause permanent reduction in hearing sensitivity over a portion of a bird’s hearing range from the projectile path of a large caliber gun projectile travelling at supersonic speed is about 10 m. Data for onset of PTS is unavailable, but the range to onset of PTS can be assumed to extend beyond 10 m from a large caliber projectile path. The amplitude of the bow shock wave would increase with supersonic projectile size and speed. Because most projectiles spend all or part of their travel path at altitudes above 20 m, impacts on many low-flying seabirds would be minimal.

The impulsive sound caused by weapon firings would have limited potential to mask any important biological sound simply because the duration of the impulse is brief, even when multiple shots are fired in series.

Most sounds would be brief, lasting from less than a second for a blast or inert impact to few seconds for other launch and object travel sounds. Most incidents of impulsive sounds produced by weapons firing, launch, or inert object impacts would be single events, with the exception of gunfire activities.

California least terns would not be exposed to large-caliber weapons noise near the coast. All species could be exposed to small- and medium-caliber weapons noise that may occur closer to shore. If present in the open water areas where military readiness activities involving weapons use occur, short-tailed albatross and marbled murrelet could be temporarily disturbed while foraging or migrating.

Because weapon firing occurs at varying locations over a short time period and seabird presence changes seasonally and on a short-term basis, individual birds would not be expected to be repeatedly exposed to weapons firing, launch, or projectile noise. Any impacts on migratory or breeding seabirds related to startle reactions, displacement from a preferred area, or reduced foraging success in offshore waters would likely be short-term and infrequent.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no consequences to any bird populations.

BIRDS: EXPLOSIVE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on birds due to explosive stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.9.3.2 (Explosive Stressors).

Explosions in the water, near the water surface, and in the air can introduce loud, impulsive, broadband sounds into the marine environment. But, unlike other acoustic stressors, explosives release energy at a high rate, producing a shock wave that can be injurious and even deadly. Therefore, explosive impacts on birds are discussed separately from other acoustic stressors, even though the analysis of explosive impacts will rely on data for bird impacts due to impulsive sound exposure where appropriate.

A range of impacts could occur to a bird depending on the explosive source and context of the exposure. In addition to acoustic impacts including temporary or permanent hearing loss, auditory masking, physiological stress, or changes in behavior, potential impacts from an explosive exposure can include non-lethal injury and mortality.

Birds: Effects from Explosives

Sound and energy generated by most small underwater explosions are unlikely to disturb birds above the water surface. If a detonation is sufficiently large or is near the water surface, however, pressure will be released at the air-water interface. Birds above this pressure release could be injured or killed. Explosives detonated at or just above the water surface, such as those used in anti-surface warfare, would create blast waves that would propagate through both the water and air. Detonations in air could also injure birds while either in flight or at the water surface. Detonations in air during anti-air warfare training would typically occur at much higher altitudes (greater than 3,000 ft. above sea level) where seabirds and migrating birds are less likely to be present, although some events target incoming threats at lower altitudes. Detonations of bombs with larger net explosive weights, any event employing static targets, or multiple detonations could be more likely to cause seabird mortalities or injuries. If prey species, such as fish, are killed or injured as a result of detonations, some birds may continue to forage close to the area, or may be attracted to the area, and be exposed to subsequent detonations in the same area within a single event, such as firing exercises, which involves firing multiple high-explosive 5-in. rounds at a target area; bombing exercises, which could involve multiple bomb drops separated by several minutes; or underwater detonations, such as multiple explosive munitions disposal charges. However, a fleeing response to an initial explosion may reduce seabird exposure to any additional explosions that occur within a short timeframe.

Detonations either in air or underwater have the potential to cause a permanent or temporary threshold shift, which could affect the ability of a bird to communicate with conspecifics or detect biologically relevant sounds.

An explosive detonation would likely cause a startle reaction, as the exposure would be brief, and any reactions are expected to be short-term. Startle impacts range from altering behavior (e.g., stop feeding or preening), minor behavioral changes (e.g., head turning), or a flight response. The range of impacts could depend on the charge size, distance from the charge, and the animal's behavior at the time of the exposure. Any impacts related to startle reactions, displacement from a preferred area, or reduced foraging success in offshore waters would likely be short-term and infrequent.

Nearshore waters are the primary foraging habitat for many seabird species. Any small detonations close to shore could have a short-term adverse impact on nesting and nearshore foraging species. Larger detonations would typically occur near areas with the potential for relatively high concentrations of seabirds (upwelling areas associated with the Pacific Current; productive live/hard bottom habitats; and large algal mats); therefore, any impacts on seabirds are likely to be greater in these areas.

Least terns could startle in the vicinity of explosive detonations from training at the SSTC as they forage areas where near-shore detonations occur. Other ESA-listed species that forage offshore may be exposed to explosives used during military readiness activities; however, the short duration of an explosion and the dispersed presence of these birds means the potential for overlap would be small.

Because most events involving in-air explosions would consist of a limited number of detonations, exposures would not occur over long durations; and since events occur at varying locations, it is expected there would be an opportunity to recover from an incurred energetic cost, and individual birds would not be repeatedly exposed to explosive detonations.

The Navy will implement mitigation for seabirds during applicable explosive mine warfare activities throughout the Study Area (see Appendix C, Mitigation). The mitigation will help avoid or reduce potential effects on concentrations of seabirds and birds that have the ability to forage underwater.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no long-term consequences to bird populations.

BIRDS: ENERGY STRESSORS

The following section summarizes the analysis and conclusions of potential effects on birds due to energy stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.9.3.3 (Energy Stressors). This section includes analysis of the potential impacts from (1) in-water electromagnetic devices, (2) in-air electromagnetic devices, and (3) high-energy lasers and high-power microwaves.

Birds: Effects from In-Air Electromagnetic Devices

Several different types of in-air electromagnetic devices are used during military readiness activities, including an array of communications transmitters, radars, and electronic countermeasures transmitters.

Most of the transmissions from in-air electromagnetic devices (e.g., for routine surveillance, communications, and navigation) will be at low power. Based on human standards, high-power in-air electromagnetic devices are those that produce peak pulses of 200 kilovolts per m in a single pulse (U.S.

Department of Defense, 2009); there are no federal standards for electromagnetic radiation exposure on wildlife (Manville, 2016; U.S. Department of Defense, 2009). In-air electromagnetic devices can also be characterized as "near-field" or "far-field" (i.e., near to, or far from, the source of electromagnetic radiation).

In-air electromagnetic effects can be categorized as thermal (i.e., capable of causing damage by heating tissue) or non-thermal. Thermal effects are most likely to occur when near high-power systems. Should such effects occur, they would likely cause birds to temporarily avoid the area receiving the electromagnetic radiation until the stressor ceases (Manville, 2016).

Currently, uncertainties exist about far-field, non-thermal effects from low power, in-air electromagnetic devices. Manville (2016) performed a literature review of this topic. Although findings are not always consistent, several peer-reviewed studies have shown non-thermal effects can include (1) affecting behavior by preventing birds from using their magnetic compass, which may in turn affect migration; (2) fragmenting the DNA of reproductive cells, decreasing the reproductive capacity of living organisms; (3) increasing the permeability of the blood-brain barrier; (4) causing other behavioral effects; (5) causing other molecular, cellular, and metabolic changes; and (6) increasing cancer risk.

Cucurachi et al. (2013) also performed a literature review of 113 studies and reported that (1) few field studies were performed (the majority were conducted in a laboratory setting); (2) 65 percent of the studies reported ecological effects both at high as well as low dosages (i.e., those that are compatible with real field situations, at least on land); (3) no clear dose-effect relationship could be discerned, but studies finding an effect applied higher durations of exposure and focused more on mobile phone frequency ranges; and (4) a lack of standardization and a limited number of observations reduced the possibility of generalizing results from an organism to an ecosystem level.

Given the wide area where military readiness activities at sea could occur and the relatively low-level and dispersed use of these systems at sea, it is unlikely that birds would be affected by these activities, and population-level effects are not expected. Similarly, the potential to affect ESA-listed birds is low based on the low numbers of individuals and the transient and brief nature of the use of these devices.

Many bird species return to the same stopover, wintering, and breeding areas every year and often follow the exact same or very similar migration routes (U.S. Department of the Navy–Southwest Division, 2002). Ample evidence exists that displaced birds can successfully reorient and find their way when one or more cues are removed (U.S. Department of the Navy, 2009a). For example, Haftorn et al. (1988) found that after removal from their nests and release into a different area, snow petrels (*Pagodrama nivea*) were able to successfully navigate back to their nests even when their ability to smell was removed. Furthermore, Wiltschko and Wiltschko (2005) report that in-air electromagnetic pulses administered to birds during an experimental study on orientation do not deactivate the magnetite-based receptor mechanism in the upper beak altogether but instead cause the receptors to provide altered information, which in turn causes birds to orient in different directions. However, these impacts were temporary, and the ability of the birds to correctly orient themselves eventually returned. Similar results were found by a subsequent study by Wiltschko et al. (2011) on European robins (*Erithacus rubecula*) that tested the effects of exposure to specific wavelengths of visible light. Therefore, in the unlikely event that a bird is temporarily disoriented by an electromagnetic device, it is expected that it would still be able to re-orient using its internal magnetic compass to aid in navigation once the stressor ceases or the bird and stressor are separated by sufficient distance. Therefore, any temporary disorientation experienced by birds from electromagnetic changes caused by training and testing activities may be considered short-term and would not hinder bird navigation abilities. Furthermore, other orientation cues may include position of the sun and moon, visual cues, wind direction, infrasound, and scent; these cues would not be affected by in-air electromagnetic devices.

California least terns could be exposed to intermittent in-air electromagnetic stressors in nearshore areas where training activities occur. If present in the open water areas where training activities involving in-air electromagnetic stressors occur, short-tailed albatross and marbled murrelet could be temporarily disturbed while foraging or migrating.

Given the information provided above, the dispersed nature of Navy military readiness activities at sea, and the relatively low-level and dispersed use of these systems at sea, the chance that in-air electromagnetic devices would cause thermal damage to an individual bird is extremely low. It is possible, although unlikely, that some bird individuals would be exposed to levels of electromagnetic radiation that would cause discomfort, in which case they would likely avoid the immediate vicinity of military readiness activities. The strength of any avoidance response would decrease with increasing distance from the in-air electromagnetic device, and no long-term or population-level effects would occur.

Birds: Effects from In-Water Electromagnetic Devices

The in-water devices producing an electromagnetic field are towed or unmanned mine countermeasure systems. The electromagnetic field is produced to simulate a vessel's magnetic field. In an actual mine-clearing operation, the intent is that the electromagnetic field would trigger an enemy mine designed to sense a vessel's magnetic field.

The distribution of birds in these portions of the Study Area is patchy (Fauchald et al., 2002; Haney, 1986b; Nevitt & Veit, 1999; Savoca et al., 2016; Schneider & Duffy, 1985). Exposure of birds would be limited to those foraging at or below the surface (e.g., cormorants, loons, petrels, grebes) because that is where the devices are used. Birds that forage inshore could be exposed to these in-water electromagnetic stressors because their habitat overlaps with some of the activities that occur in the nearshore portions of the California Study Area. However, the in-water electromagnetic fields generated would be distributed over time and location near mine warfare ranges and harbors, and any influence on the surrounding environment would be temporary and localized. More importantly, the in-water electromagnetic devices used are typically towed by a helicopter, surface ship, or unmanned vehicle. It is likely that any birds in the vicinity of an approaching vehicle towing an in-water electromagnetic device would be dispersed by the noise and disturbance generated by the vehicles and therefore move away from the vehicle and device before any exposure could occur.

Cables deployed on the seafloor during SOAR modernization, the installation of two Shallow Water Training Ranges, and the Maritime Test Bed Expansion all generate an EMF. The EMF produced by the cable is less than that of the natural background magnetic force of the earth at distances beyond 0.6 cm (0.25 in) from the cable. As electromagnetic energy dissipates exponentially by distance from the energy source, the magnetic field from the cable would be equal to 0.1 percent of the earth's at a distance of 6 m. (20 ft.). The cables and nodes would be installed at the bottom of the ocean floor, in most cases at a minimum depth of 37 m. (120 ft.). Given this depth, birds are unlikely to come into extended contact with cables or nodes and it is extremely unlikely that they would be affected by the magnetic field.

Effects on birds from potential exposure to in-water electromagnetic devices would be temporary and inconsequential based on (1) relatively low intensity of the magnetic fields generated (0.2 microtesla at 600 ft. from the source), (2) very localized potential impact area, (3) temporary duration of the activities (hours), (4) occurrence only underwater, and (5) the likelihood that any birds in the vicinity of the approaching vehicles towing an in-water electromagnetic device would move away from the vehicle and device before any exposure could occur. No long-term or population-level effects are expected.

Birds: Effects from High-Energy Lasers and High-Power Microwaves

Pulsed-wave high-power microwave systems convert electrical or chemical energy into radiated energy and deliver high-power, short bursts of radiofrequency energy to neutralize a target. High-power microwave systems operate within a wide range of frequencies, from 1 megahertz to 100 gigahertz, and transmit energy to a target to degrade or destroy electrical components in the target. High-power microwave systems would be used only during testing activities off California, mainly outside of the coastal zone, and can be based on ships or aircraft and directed to engage air, land, or surface targets.

High-energy laser weapons testing involves the use of up to 30 kilowatts of directed energy as a weapon against small surface vessels and airborne targets. High-energy lasers would be employed from surface ships or aircraft and are designed to create small but critical failures in potential targets.

These types of weapons use precision targeting with high-fidelity optics and other sensors to ensure that a beam targets a specific object. The weapon is only engaged at that target, and if the tracking loses the target the weapon cycles off. These aspects of precision-targeted energy weapons provide for a negligible impact on birds in flight or on the water's surface. Further, high-energy laser use and microwave weapons testing would occur far from shore and away from islands where higher concentrations of birds would be expected. Accordingly, exposure to high-energy lasers or microwave weapons use would be exceedingly rare because of the targeting procedures in place for these types of weapons and the location where these weapons would be used. High-energy lasers have automatic shut off capability when a target is lost, so there is very little opportunity for a bird in flight or on the surface to be targeted by a laser. High-power microwave devices do not have automatic shutoff capability; however, they are closely monitored to ensure the beam remains on target and turned off when not targeting an object.

No long-term or population-level effects are expected because birds are not likely to be exposed to high energy lasers based on (1) relatively low number of activities, (2) very localized potential impact area of the laser beam, and (3) temporary duration of potential impact (seconds). The likelihood that an ESA-listed or any bird species would be struck by a high-energy laser beam is so small as to be discountable; no impacts on ESA-listed species are anticipated.

BIRDS: PHYSICAL DISTURBANCE AND STRIKE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on birds due to physical disturbance and strike stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.9.3.4 (Physical Disturbance and Strike Stressors). The evaluation of the effects from physical disturbance and strike stressors on birds focuses on proposed military readiness activities that may cause birds to be injured or killed by an object that is moving through the water (e.g., vessels and in-water devices), moving through the air (e.g., aircraft and aerial targets), dropped into the water (e.g., MEM), deployed on the seafloor (e.g., mine shapes and anchors), or propelled through the water column (e.g., explosive fragments).

Physical disturbance and strike risks, primarily from aircraft, have the potential to impact all taxonomic groups found within the California Study Area. In addition to the potential for injury and mortality, impacts of physical disturbance include behavioral responses such as temporary disorientation, collision, change in flight direction, and avoidance response behavior. Physical disturbances may elicit short-term behavioral or physiological responses such as alert response, startle response, cessation of feeding, fleeing the immediate area, and a temporary increase in heart rate. These disturbances can also result in abnormal behavioral, growth, or reproductive impacts in nesting birds and can cause foraging and nesting birds to flush from or abandon their habitats or nests (Andersen et al., 1989; Komenda-Zehnder et al., 2003). Aircraft strikes often result in bird mortalities or injuries (Dolbeer, 2006).

Although birds likely hear and see approaching vessels and aircraft, they cannot avoid all collisions. Nighttime lighting on vessels, specifically high-powered searchlights used for navigation in icy waters off of Greenland, has caused birds to become confused and collide with naval vessels, cargo vessels, and trawlers (Gehring et al., 2009; Merkel & Johansen, 2011; Poot et al., 2008). Collisions with vessels can result in bird mortalities or injuries. However, as explained in detail below, no long-term or population-level effects are expected for birds from physical disturbance or strike stressors.

Birds: Effects from Vessels and In-Water Devices

The majority of the military readiness activities involve vessels. Potential effects of those activities on birds are applicable to everywhere in the California Study Area that vessels are used, but is more concentrated near naval ports, piers, and range areas. Navy training vessel traffic would be especially concentrated near San Diego Bay. Smaller support craft usage would also be more concentrated in the coastal areas near naval installations, ports, and ranges. Military readiness activities involve maneuvers by various types of surface ships, boats, and submarines. The number of Navy ships and smaller vessels in the California Study Area varies based on training and testing schedules. Activities involving vessel movements occur intermittently, ranging from a few hours to a few weeks. Events involving large vessels are widely spread over the open ocean, while smaller vessels are more active and more concentrated in nearshore areas.

While some potential exists for birds to be struck by vessels as they are foraging, resting, or flying near the water surface, most birds would be expected to see or hear an oncoming vessel and to fly or swim away to avoid a potentially harmful encounter. Injury or mortality could occur if a bird were struck, but most bird encounters with vessels would be expected to result in a brief behavioral and physiological response as described above. It should be noted that such responses involve at the least a temporary displacement of birds from foraging areas, resulting in energetic costs to the birds (Velando & Munilla, 2011). Birds would be expected to return and resume foraging soon after the vessel passed through the area, or to forage elsewhere, and the fitness of individual birds would probably not be compromised.

Other harmful bird-vessel interactions are commonly associated with commercial fishing vessels because birds are attracted to concentrated food sources around these vessels (Dietrich & Melvin, 2004; Melvin & Parrish, 2001b). However, concentrated food sources are not associated with Navy vessels, so birds following Navy vessels would be very unlikely.

Amphibious vessel movements could elicit short-term behavioral or physiological responses such as alert response, startle response, cessation of feeding, fleeing the immediate area, nest abandonment, and a temporary increase in heart rate. There could be a slightly increased risk of impacts during the winter or fall/spring migrations and during nesting season, when migratory birds are concentrated in coastal areas where amphibious vessels have the potential to disturb nesting or foraging shorebirds such as the ESA-listed California least tern. The general health of individual birds would not be compromised, unless a direct strike occurred. However, it is highly unlikely that a bird would be struck in this scenario because most foraging shorebirds in the vicinity of the approaching amphibious vessel would likely be dispersed by the noise of its approach before it could come close enough to strike a bird.

Under a worst-case scenario, vessel movements could cause the localized, temporary movement of birds to areas that are less desirable, resulting in some energetic cost that may or may not be important to an individual's survival and reproduction. However, it is unlikely that impacts would occur to the point that birds would be permanently displaced from important habitats that were not already subject to heavy ongoing use. The USFWS concurred with the Navy's previous conclusions that the activities would not adversely affect the least tern.

In-water devices include surface and underwater unmanned vehicles, torpedoes and towed devices, and their use occurs virtually throughout the California Study Area.

Mine warfare devices that are towed through the water (or the aircraft and cables that connect the aircraft to the device) and remotely operated underwater vehicles used during mine neutralization training and testing could also strike seabirds. There are no documented instances of seabirds being struck by towed devices. Additionally, based on the low altitudes and relatively slow air speeds, seabirds would be able to detect and avoid the aircraft and cables that connect the aircraft to the towed device.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no long-term consequences to bird populations.

Birds: Effects from Aircraft and Aerial Targets

Bird strikes could occur during military readiness activities that use aircraft, particularly in nearshore areas, where birds are more concentrated in the Study Area. Bird strike potential is greatest in foraging or resting areas, in migration corridors at night, and at low altitudes during the periods around dawn and dusk. While wildlife strikes can occur anywhere aircraft are operated, Navy data indicate that they occur most often within the airfield environment (Pfeiffer et al., 2018). Unmanned drones could also strike birds; however, evidence from returned drones indicates the probability is low (Jha et al., 2019).

Bird-aircraft strikes are a serious concern for the Navy because these incidents can result in injury to aircrews and damage equipment as well as injure or kill birds (Bies et al., 2006). Standard operating procedures applied during proposed activities will reduce manned aircraft strike hazards from large flocks of birds.

As a result of standard operating procedures for aircraft safety, strikes of large flocks of birds by manned aircraft would be expected to occur infrequently. Strikes to individual birds could occur as a result of aircraft and aerial target use in the California Study Area, which would result in injury or mortality. However, no population-level effects are expected. ESA-listed species could be impacted due to disturbance by aircraft activities or by strike while in flight. However, this is considered unlikely given the scarcity of individuals, and the dispersed and temporary nature of these activities.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no long-term consequences to bird populations.

Birds: Effects from Military Expended Materials

MEM would occur throughout the California Study Area, and exposure of birds to MEM during military readiness activities could result in physical injury or behavioral disturbances to birds in air, at the surface, or underwater during foraging dives. Although a quantitative analysis is not possible due to the absence of bird density information in the California Study Area and the dispersed nature of military readiness activities, an assessment of the likelihood of exposure to MEM was conducted based on general bird distributions in the California Study Area and their abilities to avoid expended materials.

The potential impact of MEM on birds in the California Study Area is dependent on the probability that birds are present in areas where such materials are used as well as the ability of birds to detect and avoid foreign objects. The amount of materials expended over the vast area over which military readiness activities occur, combined with the ability of birds to flee disturbance, coupled with the often patchy distribution of seabirds (Fauchald et al., 2002; Haney, 1986a; Schneider & Duffy, 1985), would make direct strikes unlikely. Individual birds may be impacted, but strikes would have no impact on populations.

MEM effects on birds would be limited to temporary (lasting up to several hours) behavioral and stress-startle responses to individual birds found within localized areas. Human activity such as vessel movement, aircraft overflights, and target placement could cause birds to flee a target area before the onset of firing, thus avoiding harm. If birds were in the target area, they would likely flee the area prior to the release of MEM or just after the initial rounds strike the target area (assuming seabirds were not struck by the initial rounds). Additionally, the force of MEM fragments dissipates quickly once the pieces hit the water, so direct strikes on seabirds foraging below the surface would not be likely. Generally, munitions would not be used in shallow/nearshore areas (some anti-mine warfare activities could occur in some shallow water areas). The potential likelihood of individual seabirds being struck or disturbed by munitions is very low; thus, effects on seabird populations would not be expected.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no long-term consequences to bird populations.

Birds: Effects from Seafloor Devices

Seafloor devices are used during military readiness activities that are typically deployed onto the seafloor in shallow water and later recovered. Some seafloor devices may be deployed in deeper waters and some devices (e.g., anchors) are not always recovered. Because these devices are stationary or very slow moving, they do not pose a risk of physical disturbance or strike to birds, including ESA-listed species. Because of this, seafloor devices pose no threat of impact on birds and will not be discussed further.

Birds: Effects from Pile Driving

Human activity such as vessel or boat movement, and equipment setting and movement, is expected to cause birds to flee the activity area before the onset of pile driving. If birds were in the activity area, they would likely flee the area prior to, or just after, the initial strike of the pile at the beginning of the ramp-up procedure. Pile driving is, therefore, not considered a physical disturbance or strike stressor for birds.

BIRDS: INGESTION STRESSORS

The following section summarizes the analysis and conclusions of potential effects on birds due to ingestion stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.9.3.5 (Ingestion Stressors). It is not expected that birds would ingest munitions or target fragments, as these would be too large to be mistaken for a source of food and would also be inaccessible as they are dense enough to sink rapidly and bury in the bottom. The types of expended materials that are potential ingestion stressors include fragments from chaff, plastic end caps from chaff cartridges, plastic compression pads, and end caps from pistons and flares. Accordingly, this analysis will focus on MEM that could be ingested by birds.

Birds: Effects from Military Expended Materials

The use of chaff, flares, and targets would occur and could generate MEM constituting ingestion stressors throughout the California Study Area under the Proposed Action. Although chaff fibers are too small for birds to confuse with prey, there is some potential for chaff to be incidentally ingested along with other prey items. If ingested, chaff is not expected to impact birds due to the low concentration that would be ingested and the small size of the fibers.

The plastic materials associated with flare compression pads or pistons sink in saltwater (U.S. Department of the Navy, 1999), which reduces the likelihood of ingestion by seabirds. Although the overall concentration of MEM would be low, and Navy standard practice is to collect and remove as much debris as possible when retrieving a degraded target, MEM would not be evenly distributed. Similarly, seabirds are not evenly distributed in the Study Area (Fauchald et al., 2002; Haney, 1986b; Schneider & Duffy, 1985). As noted previously, there is some potential for expended materials that float (e.g., some types of target fragments or chaff end caps or flare compression pads and pistons) to become concentrated along frontal zones, along with food resources that tend to attract foraging seabirds, resulting in the incidental ingestion of such materials, most likely as very small fragments.

MEM would constitute a minute portion of the floating debris that seabirds would be exposed to and may accidentally consume in such situations but could nevertheless contribute to harmful effects of manmade debris on some seabirds. The overall likelihood that individual birds would be negatively affected by ingestion of MEM in the California Study Area is considered low, but not discountable. Population-level effects would be very unlikely given the relatively small quantities expended over large areas that overlap with potential foraging locations. This conclusion applies to ESA-listed bird species as well.

Because effects on individual birds, if any, are expected to be minor and limited, no long-term consequences to individuals are expected. Accordingly, there would be no long-term consequences to bird populations from ingestion stressors.

BIRDS: SECONDARY STRESSORS

The following section summarizes the analysis and conclusions of potential effects on birds due to indirect impacts on habitat and prey availability associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.9.3.6 (Secondary Stressors). Stressors from military readiness activities could pose secondary or indirect effects on birds via effects on habitat, sediment, or water quality. Disturbing sediment or affecting water quality could also impact the food chain, which in turn could largely impact vital seabird habitat and prey availability.

Effects on Habitat

The potential of water, air quality, and abiotic habitat stressors associated with military readiness activities to indirectly affect birds, as a secondary stressor, was analyzed. The assessment of potential water, air quality, and abiotic habitat stressors is discussed in the 2024 HCTT Draft EIS/OEIS (Section 3.1, Air Quality; and Section 3.2, Sediments and Water Quality). These analyses address specific activities in local environments that may affect bird habitats. At-sea activities that may affect water and air include general emissions, and at-sea activities that may affect habitats include explosives and physical disturbance and strike.

As noted in Section 3.1 (Air Quality), and Section 3.2 (Sediments and Water Quality), of the 2024 HCTT Draft EIS/OEIS, implementation of the Proposed Action would minimally affect sediments, water, air quality, or habitats, and therefore would not indirectly affect seabirds as secondary stressors. Furthermore, any physical effects on seabird habitats would be temporary and localized because military readiness activities would occur infrequently. These activities would not be expected to adversely affect seabirds or seabird habitats.

Indirect effects on sediments, water or air quality under the Proposed Action would have no effect on ESA-listed bird species due to: (1) the temporary nature of effects on sediments, water, or air quality, (2) the distribution of temporary sediments, water, or air quality effects, (3) the wide distribution of birds in the Study Area, and (4) the dispersed spatial and temporal nature of the military readiness activities that may have temporary sediments, water, or air quality effects. No long-term or population-level effects are expected.

Effects on Prey Availability

Implementation of the Proposed Action would not adversely affect populations of invertebrate or fish prey resources (e.g., crustaceans, bivalves, worms, sand lance, herring, etc.) of birds and therefore would not indirectly affect birds as secondary stressors. Any effects on seabird prey resources would be temporary and localized. Furthermore, as discussed above, these activities are expected to have minimal effects on bird habitats.

Effects on invertebrate prey availability resulting from explosives, explosives byproducts, unexploded munitions, metals, and chemicals would likely be negligible overall and population-level effects on marine invertebrates are not expected. Because individuals of many invertebrate taxa prey on other invertebrates, mortality resulting from explosions or exposure to metals or chemical materials would reduce the number of invertebrate prey items available. A few species prey upon fish, and explosions and exposure to metals and chemical materials could result in a minor reduction in the number of fish available. However, the effect is expected to be small and discountable. Any vertebrate or invertebrate animal killed or significantly impaired by Navy activities could potentially represent an increase in food availability for scavenging invertebrates. None of the effects described above would likely be detectable at the population or subpopulation level.

Prey species might exhibit a strong startle reaction to detonations that might include swimming to the surface or scattering away from the source. This startle and flight response is the most common secondary defense among animals (Hanlon & Messenger, 1996). The sound from underwater explosions might induce startle reactions and temporary dispersal of schooling fishes if they are within close proximity to an explosion (Popper et al., 2014; Wright, 1982), which in turn could make them more visible to predators (Kastelein et al., 2008). The abundances of fish and invertebrate prey species near the detonation point could be diminished for a short period of time before being repopulated by animals from adjacent waters. Alternatively, any prey species that would be directly injured or killed by the blast could draw in scavengers from the surrounding waters that would feed on those organisms, who in turn could be susceptible to becoming directly injured or killed by subsequent explosions. Any of these scenarios would be temporary, only occurring during activities involving explosives, and no lasting effect on prey availability or the food web would be expected. Indirect effects of underwater detonations and high explosive munitions use under the Proposed Action would not result in a decrease in the quantity or quality of fish populations in the California Study Area.

Project-related stressors would not affect populations of invertebrates and fishes that support birds in the Study Area. Therefore, no secondary effects associated with prey availability are expected.

BIRDS: CONCLUSION

Based on a detailed stressor analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.9 (Birds), specifically Section 3.9.3 (Environmental Consequences) and as summarized above, the Action Proponents have determined that the Proposed Action would be carried out in a manner that would maintain, enhance, and, where feasible, restore marine resources, sustain the biological productivity of coastal waters, and maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes. No population-level impacts would be anticipated to birds. As evident from the standard operating procedures and mitigation measures discussed above, the Action Proponents' Proposed Action provides special protection to birds. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.

3.2.3.2.4 Invertebrates

Invertebrates, which are animals without backbones, are the most abundant life form on Earth, with marine invertebrates representing a large, diverse group with approximately 367,000 species described worldwide to date (World Register of Marine Species Editorial Board, 2015). However, it is estimated that most existing species have not yet been described (Mora et al., 2011). The total number of invertebrate species that occur in the Study Area is unknown but is likely to be many thousands. The results of a research effort to estimate the number of marine invertebrate species in various areas identified nearly 6,000 species in the Hawaii Study Area and over 8,000 species in the California Current Large Marine Ecosystem (Fautin et al., 2010). The California Current Large Marine Ecosystem stretches from Baja California to Vancouver, British Columbia, and encompasses the shorelines and offshore ocean environments of Washington, Oregon, and California (Fautin et al., 2010). A large portion of this area is outside of the California Study Area and the coastal zone of California. Invertebrate species vary in their use of abiotic habitats. Some populations, especially endangered species, are threatened by human activities and other natural changes.

The stressors associated with the Proposed Action that could affect invertebrates include the following:

- Acoustics (sonar and other transducers)
- Explosives (explosions in-water)
- Physical disturbance and strikes (vessels and in-water devices, MEM, seafloor devices, pile driving, cable installation)
- Entanglement (wires and cables, decelerators/parachutes)
- Ingestion (MEM)
- Secondary (effects on habitat, effects on prey availability)

The analysis includes consideration of the mitigation that the Action Proponents will implement to avoid potential effects on invertebrates from explosives, and physical disturbance and strikes. Mitigation for invertebrates will be coordinated with NMFS through the ESA consultation process.

INVERTEBRATES: SPECIAL PROTECTIONS

Military readiness activities, including range modernization and sustainment activities, include standard operating procedures and mitigation measures to protect invertebrates.

During activities that involve recoverable targets (e.g., aerial drones), the Navy recovers the target and any associated decelerators/parachutes to the maximum extent practicable consistent with personnel and equipment safety. Recovery of these items helps minimize the amount of remaining materials. This standard operating procedure benefits biological resources such as marine invertebrates by reducing the potential for physical disturbance and strike and entanglement of applicable targets and any associated decelerators/parachutes.

Primarily for human safety, underwater detonation training takes place in designated areas that are located away from popular recreational dive sites. Recreational dive sites often include shallow-water live hard bottom, artificial reefs, and shipwrecks. This standard operating procedure benefits shallow-water live hard bottom, artificial reefs, and the biological resources that inhabit, shelter in, or feed among them, by reducing the potential for interaction with underwater detonation activities.

For more information on the Action Proponents' standard operating procedures applied during its proposed activities, see the 2024 HCTT Draft EIS/OEIS, Section 3.0.4 (Standard Operating Procedures).

As discussed in Appendix C (Mitigation) of this CD, the Action Proponents will implement mitigation to avoid impacts from explosives and military expended materials on seafloor resources in mitigation areas throughout the California Study Area. For example, the Navy will not conduct explosive mine countermeasure and neutralization activities within a specified distance of live hard bottom, artificial reefs, and shipwrecks. The mitigation will consequently also help avoid potential impacts on invertebrates that inhabit these areas, including several areas inhabited by white abalone and black abalone. Additionally, mitigation will be implemented to prevent the laying of mines or cables on invertebrates during range modernization and sustainment activities. For more information on the Action Proponent's mitigation measures, see Appendix C (Mitigation) of this CD.

The Navy will not conduct precision anchoring (except in designated anchorages such as areas adjoining boat lanes off SSTC and Naval Amphibious Base Coronado) within the anchor swing circle of live hard bottom, artificial reefs, and shipwrecks to avoid potential impacts from seafloor devices on seafloor resources in mitigation areas throughout the California Study Area. This mitigation will consequently help avoid potential impacts on invertebrates that inhabit these areas, including several areas inhabited by ESA-listed black abalone and white abalone.

INVERTEBRATES: ACOUSTIC STRESSORS

The following section summarizes the analysis and conclusions of potential effects on invertebrates due to acoustic stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.4.3.1 (Acoustic Stressors).

Invertebrates: Effects from Sonar and Other Transducers

Marine invertebrates would be exposed to low-, mid-, and high-frequency sonar and sound produced by other transducers during military readiness activities throughout the California Study Area.

Invertebrates would likely only sense low-frequency sonar or the low-frequency component of nearby sounds associated with other transducers. Sonar and other transducers are often operated in deep water, where effects would be more likely for pelagic species than for benthic species. Only individuals within a short distance (potentially a few feet) of the most intense sound levels would experience effects on sensory structures such as statocysts. Any marine invertebrate that detects low-frequency sound may alter its behavior (e.g., change swim speed, move away from the sound, or change the type or level of activity). Given the limited distance to which marine invertebrates are sensitive to sound, only a small number of individuals relative to overall population sizes would likely have the potential to be affected. Because the distance over which most marine invertebrates are expected to detect any sounds is limited and because most sound sources are transient or intermittent (or both), any physiological effects, masking, or behavioral responses would be short term and brief. Without prolonged exposures to nearby sound sources, adverse effects on individual invertebrates are not expected, and there would be no effects at the population level. Low-frequency sonar and other sounds may result in brief, intermittent effects on individual marine invertebrates and groups of marine invertebrates close to a sound source, but they are unlikely to affect survival, growth, recruitment, or reproduction of marine invertebrate populations or subpopulations.

Low frequency sonar and other transducers could expose some benthic invertebrates to higher intensity sounds, but the exposures from mobile platforms would be brief and intermittent and affect mostly pelagic invertebrates very close to the particle motion generated by the transducers. Military readiness activities could occur in designated black abalone critical habitat. However, sound associated with military readiness activities would not affect essential biological features of critical habitat, which consist of adequate substrate, food availability, and water quality and circulation patterns. Critical habitat is not designated for white abalone or sunflower sea stars under the ESA. Due to the limited range of sound detection and infrequent use of sonar in relatively shallow waters where these species occur, physiological or behavioral reactions due to sonar exposure are unlikely.

INVERTEBRATES: EXPLOSIVE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on invertebrates due to explosive stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.4.3.2 (Explosive Stressors).

Explosions produce pressure waves with the potential to cause injury or physical disturbance due to rapid pressure changes, as well as loud, impulsive, broadband sounds. Impulsive sounds are characterized by rapid pressure rise times and high peak pressures. When explosive munitions detonate, fragments of the weapon are thrown at high velocity from the detonation point, which can injure or kill invertebrates if they are struck. However, the friction of the water quickly slows these fragments to the point where they no longer pose a threat.

Invertebrates: Effects from Explosives

Mine warfare activities are typical examples of activities involving detonations on or near the bottom in nearshore waters. Invertebrates in these areas such as exposed coastlines, are adapted to frequent disturbance from storms and associated sediment redistribution. Studies of the effects of large-scale sediment disturbance, such as dredging and sediment borrow projects, have found recovery of benthic communities over a period of weeks to years (Posey & Alphin, 2002; U.S. Army Corps of Engineers, 2012). Recovery time is variable and may be influenced by multiple factors but is generally faster in areas dominated by sand and moderate to strong water movement. The area of bottom habitat disturbed by explosions would be less than that associated with dredging or other large projects and would occur mostly in soft-bottom areas that are regularly disturbed by natural processes such as water currents and waves. It is therefore expected that areas affected by detonations would rapidly be recolonized (potentially within weeks) by recruitment from the surrounding invertebrate community. Craters resulting from detonations in the soft bottom would be filled and smoothed by waves and long-shore currents over time, resulting in no permanent change to bottom profiles that could affect invertebrate species assemblages. The time required to fill craters would depend on the size and depth, with deeper craters likely requiring more time to fill (U.S. Army Corps of Engineers, 2001). The amount of bottom habitat affected by explosions would be a very small percentage of the habitat available in the California Study Area.

Explosives produce pressure waves that can harm invertebrates in the vicinity of where they typically occur: mostly offshore surface waters where only zooplankton, squid, and jellyfish are prevalent mostly at night when military readiness activities do not typically occur. Exceptions occur where explosives are used on the bottom within nearshore or inland waters on or near sensitive hard bottom communities that are currently not mapped or otherwise protected. Soft bottom communities are resilient to occasional disturbances. Accordingly, the overall impacts of explosions on widespread invertebrate populations would not likely be detectable. Although individual marine invertebrates would likely be injured or killed during an explosion, the number of invertebrates affected would be small relative to overall population sizes, and activities would be unlikely to impact survival, growth, recruitment, or reproduction of marine invertebrate populations or subpopulations.

As discussed in Appendix C (Mitigation) of this CD, mitigation to avoid effects from explosives on seafloor resources in mitigation areas would be implemented throughout the Study Area. For example, except for mine warfare ranges and locations previously used for underwater detonations, explosive mine countermeasure and neutralization activities would not be conducted within 350 yd. of artificial reefs and shipwrecks. The mitigation would consequently also help avoid potential effects on invertebrates that inhabit these areas. The Navy does not conduct underwater detonations near black and white abalone habitat based on established protocol which authorizes on select areas of a given range complex for explosive events. Underwater explosions would also not overlap with designated black abalone critical habitat.

No long-term consequences to invertebrates are expected. Accordingly, there would be no consequences to invertebrates from explosive stressors.

INVERTEBRATES: PHYSICAL DISTURBANCE AND STRIKE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on invertebrates due to physical disturbance and strike stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.4.3.3 (Physical Disturbance and Strike Stressors). Aspects of physical disturbance and strike stressors that may impact marine invertebrates include (1) vessels and in-water devices, (2) military expended materials, (3) seafloor devices, and (4) pile driving.

Invertebrates: Effects from Vessels and In-Water Devices

Vessel operation would be widely dispersed throughout the California Study Area, but would be more concentrated near ports, naval installations, and range complexes. Amphibious landings could occur at designated beaches adjacent to the Study Area (Figure 2-15).

Similar to vessel operation, activities involving in-water devices could be widely dispersed throughout the Study Area, but would be more concentrated near naval ports, piers, and ranges.

Invertebrates located at or near the surface could be struck or disturbed by vessels, and invertebrates throughout the water column could be similarly affected by in-water devices. There would be a higher likelihood of vessel and in-water device strikes over the continental shelf than in the open ocean portions of the Study Area because of the concentration of activities and comparatively higher abundances of invertebrates in areas closer to shore. However, direct strikes would generally be unlikely for most species. Exceptions would include amphibious landings, where vessels contact the bottom and may directly affect invertebrates. Organisms inhabiting these areas are expected to rapidly re-colonize disturbed areas. Other than during amphibious landings, purposeful contact with the bottom by vessels and in-water devices would be avoided. The potential to disturb invertebrates on or near the bottom would occur mostly during vessel nearshore and onshore training activities, and along dredged navigation channels. Invertebrates that typically occur in areas associated with nearshore or onshore activities, such as shorelines, are highly resilient to vessel disturbance. Propeller wash and turbulent water flow could damage or kill zooplankton and invertebrate gametes, eggs, embryonic stages, or larvae. Overall, the area exposed to vessel and in-water device disturbance would be a very small portion of the surface and water column in the Study Area, and only a small number of individuals would be affected compared to overall abundance. Therefore, the effect of vessels and in-water devices on marine invertebrates would be inconsequential. Activities are not expected to yield any lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level.

Species that do not occur near the surface within the Study Area, including ESA-listed black abalone and white abalone, as well as ESA-proposed sunflower sea stars, would not be exposed to vessel strikes. In addition, these ESA-listed species would not be affected by amphibious landings (amphibious assault, insertion, and extraction) because they inhabit rocky shores and hard bottom, which are not used for amphibious landings.

Vessels and in-water devices are associated with SOAR modernization; the installation, testing, and use of two SWTRs; sustainment of undersea ranges; Maritime Test Bed Expansion; Installation and Maintenance of Underwater Platforms, Mine Warfare, and Other Training Areas. Although invertebrates located at or near the surface could be struck or disturbed by vessels, in-water devices would be placed primarily in soft bottom areas and would have less than significant effects on benthic invertebrate species.

Invertebrates: Effects from Military Expended Materials

A potential strike to marine invertebrates comes from the following categories of MEM: (1) all sizes of non-explosive practice munitions; (2) fragments from high-explosive munitions; (3) expendable targets; and (4) expended materials other than munitions, such as sonobuoys or torpedo accessories.

Potential effects on marine invertebrates from MEM may include injury or mortality due to direct strike or burial, disturbance, and indirect effects such as increased turbidity. The potential for direct strikes of pelagic zooplankton and squid at the surface would be minimized by their decreased occurrence in surface waters during the day when training and testing activities typically occur.

The effect of MEM on marine invertebrates is likely to cause injury or mortality to individuals of soft-bodied species that are smaller than the MEM. Zooplankton could therefore be affected by most MEM. Effects on populations would likely be inconsequential because the number of individuals affected would be small relative to known population sizes, the area exposed to the stressor is extremely small relative to the area of both suitable and occupied habitats, the activities are dispersed such that few individuals would likely be exposed to more than one event, and exposures would be localized and would cease when the MEM becomes part of the bottom (e.g., buried or encrusted with sessile organisms). Activities involving MEM are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level.

As discussed in Appendix C (Mitigation) of this CD, mitigation to avoid effects from MEM on seafloor resources would be implemented in mitigation areas throughout the Study Area. In general, the Navy does not conduct training and testing activities that result in MEM in shallow, rocky areas where ESA-listed black abalones occur. In addition, significant amounts of MEM are not used at depths where white abalone are found, such as Tanner Bank. Some MEM may be expended in the nearshore waters off the southern part of SCI, the future Shallow Water Test Range, and explosive ordnance disposal areas near SSTC and southern SCI. Although most MEM typically sinks after use, it is conceivable a MEM item deployed offshore could drift into shallow water, although this would be infrequent and insignificant. Similarly, infrequent drifting MEM could be deposited near shallow white abalone habitat such as Tanner Bank. Given the low population of both abalone species, spatial distances between individuals, and very infrequent co-occurrence with MEM, while there could be potential effects any likely effect would be transitory and minimal. Overall, MEM effects on ESA-listed abalone species and ESA-proposed sunflower sea stars would be minimal due to relatively little overlap with MEM deployment.

Invertebrates: Effects from Seafloor Devices

Seafloor devices represent items used during military readiness activities that are deployed onto the seafloor and recovered. Effects on marine invertebrates may include injury or mortality due to direct strike, disturbance, smothering, and impairment of respiration or filter-feeding due to increased sedimentation and turbidity. Effects resulting from movement of the devices through the water column before they contact the bottom would likely consist of only temporary displacement as the object passes by.

Although intentional placement of seafloor devices on bottom structure is avoided, activities occurring at depths less than about 3,000 m may inadvertently affect deep-sea corals, other invertebrates associated with hard bottom, and other marine invertebrate assemblages. However, most activities involving seafloor devices (e.g., anchors for mine shapes such as concrete blocks) are typically conducted in nearshore areas far from deep-sea corals. Most seafloor devices are operated in the nearshore environment on bottom habitats suitable for deployment and retrieval (e.g., soft or mixed bottom). Hard substrate potentially supporting deep-sea corals and other invertebrate communities is present on the continental shelf break and slope. A low percentage of deep substrate on the continental shelf is suitable for hard bottom communities. Based on the results of limited investigation, a low percentage of available hard substrate may be inhabited by deep-sea corals or other invertebrate species (Watters et al., 2022), although the percentage of coverage may be higher in some areas, such as undersea banks associated with the Channel Islands. The number of organisms affected is not expected to result in effects on the viability of invertebrate populations.

During precision anchoring, the effect of the anchor on the bottom would likely crush a relatively small number of benthic invertebrates. Effects associated with turbidity and sedimentation would be temporary and localized. Precision anchoring would occur multiple times per year in the same general location. Therefore, although invertebrates in soft bottom areas are generally resilient to disturbance, community composition may be chronically disturbed at anchoring sites that are used repeatedly. However, the effect is likely to be inconsequential and not detectable at the population level for species occurring in the region near the anchoring locations.

Navy practice is to place seafloor devices on soft bottom areas not normally associated with abalone or sunflower sea star habitat. Proposed activities using seafloor devices would not overlap with black abalone critical habitat, and minimally overlap white abalone habitat at Tanner Banks. Therefore, potential effects from seafloor devices on ESA invertebrates would be negligible.

Mitigation that includes not conducting precision anchoring (except in designated anchorages) would be implemented within the anchor swing circle of artificial reefs and shipwrecks to avoid potential effects from seafloor devices on seafloor resources in mitigation areas throughout the Study Area (see Appendix C [Mitigation] of this CD). This mitigation would consequently help avoid potential effects on invertebrates that inhabit these areas.

New range modernization and sustainment activities include installation of undersea cables integrated with hydrophones and underwater telephones to sustain the capabilities of the SOAR. Deployment of fiber optic cables along the seafloor would occur in one location in the California Study Area: south and west of SCI. In this location the installations would occur completely within the water; no land interface would be involved. Cable-laying activities in the California Study Area could disturb white abalone and sunflower sea star bottom habitat when the cable crosses rocky substrate at depths between 65 to 196 ft (20 to 60 m) for the SWTR Extension. However, it is anticipated that rocky substrate would be avoided to the greatest extent possible throughout the cable corridor to minimize these effects.

Installation and maintenance of underwater platforms, mine warfare training areas, and installation of other training areas involve seafloor disturbance where those activities would take place. Each installation would occur on soft, typically sandy bottom, avoiding rocky substrates.

In summary, the effect of seafloor devices on mostly soft bottom invertebrates is likely to cause injury or mortality to some individuals, but effects on populations would be inconsequential because the area exposed to the stressor is extremely small relative to the area of both suitable and occupied habitats, and military readiness activities are generally dispersed such that few individuals would likely be exposed to more than one event (although seafloor device use is concentrated in some areas such as anchorages and mine ranges). In addition, exposures would be localized and temporary, and the organisms most frequently affected would be burrowing soft bottom invertebrates that are relatively resilient to localized sediment disturbance. Activities involving seafloor devices are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level.

Invertebrates: Effects from Pile Driving

Effects on invertebrates resulting from pile driving and vibratory pile extraction are considered in the context of injury, mortality, or displacement that may occur due to physical strikes and disturbance. Pile driving produces impulsive sound that may also affect invertebrates.

Impact pile driving and vibratory pile removal would occur during training for Port Damage Repair. Pile driving for the Port Damage Repair would occur in shallower water over soft substrates at Port Hueneme, California. Some benthic invertebrates could be crushed, injured, displaced, or react behaviorally because of pile installation and removal. In addition, turbidity could affect respiration and feeding in some individuals.

Pile installation and removal would only occur in one location (Port Hueneme) and a limited number of times. Although some slow-moving benthic invertebrates may be removed or crushed during pile installation and removal activities, the number of invertebrates affected would be extremely low and have no population level effects. Additionally, ESA-listed black and white abalone and ESA-proposed sunflower sea stars and black abalone critical habitat do not occur in Port Hueneme; therefore, there would be no effect on these species.

INVERTEBRATES: ENTANGLEMENT STRESSORS

The following section summarizes the analysis and conclusions of potential impacts on invertebrates due to entanglement stressors associated with Navy military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.4.3.4 (Entanglement Stressors). Included are potential impacts from wires and cables and decelerators/parachutes.

Invertebrates: Effects from Wires and Cables

Marine invertebrates may be affected by wires and cables such as fiber-optic cables, torpedo guidance wires, sonobuoy wires, and expendable bathythermograph wires expended during military readiness activities. These materials would be expended during sinking exercises, ASW activities, torpedo exercises, and various mine warfare and countermeasures exercises. Compared to sonobuoy wires, a low number of fiber-optic cables, guidance wires, and bathythermograph wires are expended in the Study Area. Most expended items would be sonobuoy wires, and most of the sonobuoy wires would be expended in the California Study Area.

The effect of wires and cables on marine invertebrates is not likely to cause injury or mortality to individuals because of the linear and somewhat rigid nature of the material. Effects on individuals and populations would be inconsequential because the area exposed to the stressor is extremely small relative to the distribution ranges of most marine invertebrates, the activities are dispersed such that few individuals would likely be exposed to more than one event, and exposures would be localized. In addition, marine invertebrates are not particularly susceptible to entanglement stressors, as most would avoid entanglement and simply be temporarily disturbed. Activities involving wires and cables are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at individual or population levels. All locations of wire and cable use potentially coincide with deep-sea corals and other invertebrates associated with hard bottom areas in water depths less than 3,000 m. The portion of suitable substrate occupied by corals is generally low, and coincidence with such low densities of linear materials is unlikely. However, in some areas, deep-sea corals may cover a greater portion of available hard substrate (Watters et al., 2022).

ESA-listed abalone species and ESA-proposed sunflower sea stars do not occur in offshore areas where torpedo launches; or other entanglement stressors would occur, and these species would not be entangled by fiber-optic cables or sonobuoy wires because they are sedentary invertebrates. There is no probable scenario in which an abalone or sunflower sea star would be ensnared by a fiber-optic cable on the bottom and suffer adverse effects.

Cables are deployed on the seafloor during SOAR refurbishment, the installation of two SWTRs, and the Maritime Test Bed Expansion. Entanglement of invertebrates is not likely because of the rigidity of the cable that is designed to lie extended on the sea floor vice coil easily. Once installed on the seabed, the new cable and communications instruments would be equivalent to other hard structures on the seabed, again posing no risk of adverse effect on invertebrates.

Invertebrates: Effects from Decelerators/Parachutes

Decelerator/parachute lines could temporarily displace invertebrates in the water column but would be unlikely to ensnare individuals. Decelerator/parachute mesh could envelop invertebrates as the item sinks through the water column. Envelopment would primarily be associated with zooplankton, although other relatively slow-moving invertebrates such as jellyfish and swimming crabs could be caught in a billowed decelerator/parachute. Ensnared individuals may be injured or killed or may eventually escape. Decelerators/parachutes on the bottom could cover benthic invertebrates, but some would likely be able to move away from the item. It is highly unlikely that an individual invertebrate would be ensnared by a decelerator/parachute on the bottom and suffer adverse effects. It is possible that decelerators/parachutes could break or abrade deep-sea corals.

Most marine invertebrates would not encounter a decelerator/parachute. The effect of decelerators/parachutes on marine invertebrates is not likely to cause injury or mortality to individuals, and effects would be inconsequential because the area exposed to the stressor is extremely small relative to most marine invertebrates' ranges, the activities are dispersed such that few individuals would likely be exposed to more than one event, and exposures would be localized. The surface area of decelerators/parachutes expended across the Study Area is extremely small compared to the relatively low percentage of suitable substrate inhabited by deep-sea coral species, resulting in a low risk of coincidence. In addition, marine invertebrates are not particularly susceptible to entanglement stressors, as most mobile invertebrates would be able to avoid entanglement and simply be temporarily disturbed. The number of individuals affected would be inconsequential compared to overall invertebrate population numbers. Activities involving decelerators/parachutes are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at individual or population levels.

Decelerators/parachutes are unlikely to drift into most areas where ESA-listed black abalone and white abalone or ESA-proposed sunflower sea stars are present due to the typical offshore locations of use (water depths of 600 ft. or more). Potential exceptions include offshore areas known to support these species (e.g., Tanner and Cortes Banks). It is not likely that a sedentary abalone could be ensnared by a decelerator/parachute cord. Effects would more likely be associated with covering or abrasion. An abalone that becomes covered by a decelerator/parachute could have reduced access to food items such as drifting or attached macroalgae until the animal moves away from the item. Respiration could also be affected if an abalone becomes covered by a decelerator/parachute to the extent that water flow is restricted. There is a remote possibility that abalone larvae could be caught in a decelerator/parachute as it sinks, although microscopic organisms may be able to pass through the mesh.

INVERTEBRATES: INGESTION STRESSORS

The following section summarizes the analysis and conclusions of potential effects on invertebrates due to ingestion stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.4.3.5 (Ingestion Stressors).

MEM from munitions associated with military readiness activities that could potentially be ingested by marine invertebrates include non-explosive practice munitions (small- and medium-caliber), small-caliber casings, fragments from high explosives, target fragments, chaff, canisters, and flare casings

Invertebrates: Effects from Military Expended Materials

It is possible, but unlikely, that invertebrates would ingest MEM. Some invertebrates could potentially ingest MEM fragments that have degraded to sediment size, chaff fibers, and particulate metals may be taken up by suspension feeders. In addition, small plastic pieces may be consumed by a wide variety of invertebrates with diverse feeding methods (detritivores, planktivores, deposit-feeders, filter-feeders, and suspension-feeders) in the water column or on the bottom. Adverse effects due to metal pieces on the bottom or in the water column are unlikely. Microplastic particles could affect individuals. Although the potential effects on invertebrate populations due to microplastic ingestion are currently uncertain, proposed activities would result in small amounts of plastic particles introduced to the marine environment compared to other sources. Effects on individuals are unlikely and effects on populations would probably not be detectable. Note the locations, types, and number of military expended materials that pose a risk of being ingested would be the same under both alternatives.

Mitigation would be implemented to avoid potential effects from MEM on seafloor resources in mitigation areas throughout the Study Area (see Appendix C, Mitigation of this CD).

ESA-listed abalone species occur in the California Study Area, but while possible, it is highly unlikely that ESA-proposed sunflower sea stars are present in the California Study Area. Potential effects on black abalone would be limited to individuals accidentally ingesting small fragments of exploded munitions as they scrape algae or biofilm (a thin layer of microorganisms) off hard substrates in shallow water. However, materials are primarily expended far from shore, in the open ocean where black abalone and sunflower sea stars do not occur. While the majority of MEM would be used in waters beyond white abalone habitat, there may be infrequent, rare use of select MEM in slightly shallower water. However, combined with very low numbers of white abalone, dispersion of individuals across various shallow water ridges, and low MEM use in white abalone habitat, the potential for ingestion and consequent effects would be low. However, due to the low overall abalone population density and the widely dispersed use of expendable materials, the potential for ingestion and consequent effects would be low.

INVERTEBRATES: SECONDARY STRESSORS

This section analyzes potential effects on marine invertebrates exposed to stressors indirectly through effects on their habitat (sediment or water quality) or prey. The terms “indirect” and “secondary” do not imply reduced severity of environmental consequences, but instead describe how the effect may occur in an organism or its ecosystem. Stressors from military readiness activities that could pose indirect effects on marine invertebrates via habitat or prey include: (1) explosives and explosive byproducts, (2) chemicals other than explosives, and (3) metals.

Invertebrates: Effects on Habitat

Effects on invertebrate habitat resulting from explosives and explosives byproducts, chemicals other than explosives, and metals would be minor overall and the possibility of population-level impacts on marine invertebrates is remote. Explosions would temporarily disturb soft bottom sediments and could potentially damage hard structures, but the effects would likely be undetectable at the population or subpopulation level. Individuals could be killed, injured, or experience physiological effects due to exposure to metals and chemical materials (including explosives materials) in the water column or on the bottom, but these effects would be very localized. The number of individuals affected would be small compared to overall population numbers.

Deposition of metal materials could provide new hard substrate that could be colonized by encrusting invertebrates (e.g., sponges, barnacles, hydrozoans, corals). The increased area of artificial hard habitat could therefore provide a benefit to some invertebrate species. However, invertebrate communities on artificial substrate may be different than those found in adjacent natural substrate.

Explosions would not occur on known hard bottom areas. Therefore, impacts on habitat potentially supporting ESA-listed black abalone and white abalone would be limited to activities that are inadvertently conducted on or near unknown habitat areas. Any impacts on hard structure could reduce the amount of adequate substrate available to the black abalone. Hard substrate is considered an essential physical feature of black abalone critical habitat. Although critical habitat is not designated for white abalone, hard structure is an important habitat feature for this species as well. Due to the possibility of inadvertent impacts on hard structure, explosions may affect ESA-listed black abalone and white abalone.

Invertebrates: Effects on Prey Availability

Effects on invertebrate prey availability (including vegetation and phytoplankton) resulting from explosives and explosives byproducts, chemicals other than explosives, and metals would likely be negligible overall and population-level impacts on marine invertebrates are not expected. Because individuals of many invertebrate taxa prey on other invertebrates, mortality resulting from explosions or exposure to metals or chemical materials would reduce the number of invertebrate prey items available. A few species prey upon fish, and explosions and exposure to metals and chemical materials could result in a minor reduction in the number of fish available. However, explosive materials, metals, and chemicals would have a negligible effect on fishes. Therefore, secondary effects on invertebrates due to reduced fish prey availability are unlikely. Any vertebrate or invertebrate animal killed or significantly impaired by military readiness activities could potentially represent an increase in food availability for scavenging invertebrates. None of the effects described previously would likely be detectable at the population or subpopulation level.

INVERTEBRATES: SPECIAL PROTECTIONS

Military readiness activities, including range modernization and sustainment activities, include standard operating procedures and mitigation measures to protect invertebrates.

During activities that involve recoverable targets (e.g., aerial drones), the Navy recovers the target and any associated decelerators/parachutes to the maximum extent practicable consistent with personnel and equipment safety. Recovery of these items helps minimize the amount of remaining materials. This standard operating procedure benefits biological resources such as marine invertebrates by reducing the potential for physical disturbance and strike and entanglement of applicable targets and any associated decelerators/parachutes.

Primarily for human safety, underwater detonation training takes place in designated areas that are located away from popular recreational dive sites. Recreational dive sites oftentimes include shallow-water live hard bottom, artificial reefs, and shipwrecks. This standard operating procedure benefits shallow-water live hard bottom, artificial reefs, and the biological resources that inhabit, shelter in, or feed among them, by reducing the potential for interaction with underwater detonation activities.

For more information on the Action Proponents' standard operating procedures applied during its proposed activities, see the 2024 HCTT Draft EIS/OEIS, Section 3.0.4 (Standard Operating Procedures).

As discussed in Appendix C (Mitigation) of this CD, the Action Proponents will implement mitigation to avoid impacts from explosives and military expended materials on seafloor resources in mitigation areas throughout the California Study Area. For example, the Navy will not conduct explosive mine countermeasure and neutralization activities within a specified distance of live hard bottom, artificial reefs, and shipwrecks. The mitigation will consequently also help avoid potential impacts on invertebrates that inhabit these areas, including several areas inhabited by white abalone and black abalone. Additionally, mitigation will be implemented to prevent the laying of mines or cables on invertebrates during range modernization and sustainment activities. For more information on the Action Proponent's mitigation measures, see Appendix C (Mitigation) of this CD.

The Navy will not conduct precision anchoring (except in designated anchorages such as areas adjoining boat lanes off SSTC and Naval Amphibious Base Coronado) within the anchor swing circle of live hard bottom, artificial reefs, and shipwrecks to avoid potential impacts from seafloor devices on seafloor resources in mitigation areas throughout the California Study Area. This mitigation will consequently help avoid potential impacts on invertebrates that inhabit these areas, including several areas inhabited by ESA-listed black abalone and white abalone.

INVERTEBRATES: CONCLUSION

Based on a detailed stressor analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.4 (Invertebrates), specifically Section 3.4.3 (Environmental Consequences) and, as summarized earlier, the Action Proponents have determined that the Proposed Action would be carried out in a manner that would maintain, enhance, and, where feasible, restore marine resources, sustain the biological productivity of coastal waters, and maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes. No population-level impacts would be anticipated to marine invertebrates. As evident from the standard operating procedures discussed earlier, the Action Proponents' Proposed Action provides special protection to marine invertebrates. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.

3.2.3.2.5 Commercial and Recreational Fish Stocks

Fishes are not distributed uniformly throughout the California Study Area but are closely associated with a variety of habitats. Some species, such as large sharks, salmon, tuna, and billfishes, range across thousands of square miles. Other species, such as gobies and most reef fish, generally have small home ranges and restricted distributions (Helfman et al., 2009). The early life stages (e.g., eggs and larvae) of many fish may be widely distributed even when the adults have relatively small ranges. The movements of some open-ocean species may never overlap with coastal fishes that spend their lives within several hundred feet of the shore. The distribution and specific habitats in which an individual of a single fish species occurs may be influenced by its life stage, size, sex, reproductive condition, and other factors. Approximately 78 percent of all marine fish species occur in waters less than 200 m deep and in close association with land, while 13 percent are associated with the open ocean (Moyle & Cech, 2004).

Each major habitat type in the California Study Area (e.g., hard bottom, soft bottom, and beds of submerged aquatic vegetation) supports an associated fish community with the number of species increasing with decreasing latitude (transition from north to south). However, this pattern is not as clearly defined for wide-ranging migratory open-ocean species (Macpherson, 2002).

Based on the general threats to fishes, the stressors applicable to fish species in the California Study Area and analyzed below include the following:

1. Acoustic (sonar and other transducers, air guns, pile driving, vessel noise, aircraft noise, and weapons noise)
2. Explosives (in-air explosions and in-water explosions)
3. Energy stressors (in-water electromagnetic devices and high-energy lasers)
4. Physical disturbance and strike (vessels and in-water devices, MEM, seafloor devices, cable installation)

5. Entanglement (wires and cables, decelerators/parachutes, and nets)
6. Ingestion (MEM)
7. Secondary stressors (habitat, prey availability)

The following sections summarize the analysis and conclusions of potential effects on fishes from stressors associated with the proposed military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6 (Fishes).

COMMERCIAL AND RECREATIONAL FISH STOCKS: SPECIAL PROTECTIONS

Proposed military readiness activities include standard operating procedures and mitigation measures which result in protection to fishes.

The Navy will implement mitigation measures that help avoid potential impacts on floating vegetation, live hard bottom, artificial reefs, and shipwrecks. These measures also help avoid impacts on fishes that inhabit, feed on, or shelter on these areas. The measures include the following:

- Within the anchor swing circle of live hard bottom, artificial reefs, and shipwrecks, the Action Proponents will not conduct precision anchoring (except in designated anchorages in the California Study Area); and
- Within a 350 yd. radius of precious live hard bottom, artificial reefs, and shipwrecks, the Action Proponents will not conduct explosive mine countermeasure and neutralization activities, or explosive mine neutralization activities involving divers except in designated areas in the California Study Area.

During military readiness activities that involve recoverable targets (e.g., aerial drones), the Navy recovers the target and any associated decelerators/parachutes to the maximum extent practicable consistent with personnel and equipment safety. Recovery of these items helps minimize materials that remain. This standard operating procedure benefits biological resources such as fish species through a reduction in the potential for physical disturbance and strike and entanglement of applicable targets and any associated decelerators/parachutes.

Underwater detonation training takes place in designated areas that are located away from popular recreational dive sites primarily for human safety. Recreational dive sites often include live hard bottom, artificial reefs, and shipwrecks. This standard operating procedure benefits environmental resources (e.g., shallow-water live hard bottom, artificial reefs, and the biological resources such as fish that inhabit, shelter in, or feed among them), through a reduction in the potential for interaction with underwater detonation activities.

For more information on the Navy's standard operating procedures applied during its proposed activities, see the 2024 HCTT Draft EIS/OEIS, Section 3.0.4 (Standard Operating Procedures).

COMMERCIAL AND RECREATIONAL FISH STOCKS: ACOUSTIC STRESSORS

The following section summarizes the analysis and conclusions of potential effects on fishes due to acoustic stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6.3.1 (Acoustic Stressors).

Commercial and Recreational Fish Stocks: Effects from Sonar and Other Transducers

Although some marine fishes are considered hearing specialists (e.g., shad) and could be impacted by mid- or high-frequency sources, sound from these systems do not propagate as far as other sonars limiting the range these sources would be detectable, and therefore minimize potential risk of effects. Most marine fishes (hearing generalists) would not detect most mid- or high-frequency sonars and therefore would not experience effects from these systems. Therefore, only sonars below 2 kHz, including low-frequency sonar, are analyzed for their effects on fishes. Potential effects from sonars could include TTS, behavioral reactions, physiological response, and masking.

All fishes can detect low frequencies; therefore, most effects would be limited to a subset of activities that utilize low-frequency (<2 kHz) sonars. Low-frequency sonars are operated less often than mid- or high-frequency sources throughout the Study Area. These systems could be used throughout the California Study Area in the locations identified in Chapter 2 (Description of Proposed Action and Alternatives) of the 2024 HCTT Draft EIS/OEIS but would be concentrated in the SOCAL Range Complex. Some low-frequency sonars could also be utilized in shallow water training ranges or nearshore areas (e.g., SCI nearshore under training activities), though these systems are typically operated farther offshore, in deeper waters. Generally, sonar is used more often during testing than training activities, resulting in slightly more potential effects from testing activities.

Fishes may only detect the most powerful low-frequency systems within a few kilometers, and most other, less powerful systems, at shorter ranges. Overall, TTS is not anticipated to occur in fishes exposed to low-frequency sonars as these systems generally lack the power necessary to generate hearing loss. Although unlikely, hearing specialists in proximity (tens of meters) to some mid-frequency systems may experience TTS. These individuals may experience a reduced ability to detect biologically relevant sounds until their hearing recovers (likely within a few minutes to hours depending on the amount of threshold shift).

Most sonars do not have the potential to substantially mask key environmental sounds due to the limited time of exposure resulting from the moving sound sources and variable duty cycles. Although available research has shown a lack of behavioral reactions to military sonar by hearing specialists (herring) (e.g.,Sivle et al. (2012), it is possible that fish exposed to sonar could show some physiological or behavioral responses, especially in fish or schools of fish located close to the source (hundreds of meters). However, these effects, if any, would be localized and infrequent, only lasting a few seconds or minutes due to the transient nature of most sonar operations.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.1.1 (Effects from Sonar and Other Transducers) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, sonar effects on fishes would be limited to brief (seconds to minutes) periods of physiological or behavioral reactions to individual fish found within localized areas. Therefore, sonar use is unlikely to impact individuals, and long-term consequences for fish populations would not be expected.

Commercial and Recreational Fish Stocks: Effects from Air Guns

The broadband impulses from air guns are within the hearing range of all fishes. Potential effects from air guns could include auditory injuries, TTS, behavioral reactions, physiological response, and masking.

Air guns would not be used during training activities. During testing activities, small air guns would be fired over a limited period within a single day. Air gun use would occur nearshore in the SOCAL Range Complex and greater than 3 NM from shore in the NOCAL and SOCAL Range Complexes.

A quantitative analysis was performed to estimate range to effects for fishes exposed to air guns. However, calculated ranges to effects indicate injury and hearing loss would only occur within a short distance (less than 5 m). Exposure to air guns could also result in masking, physiological response, or behavioral reactions. These effects are expected to be brief (seconds to minutes) due to the short pulse length (approximately 0.1 second) and intermittent use of air guns throughout the California Study Area.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.1.2 (Effects from Air Guns) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, air gun effects on fishes would be limited to temporary (minutes to hours) physiological and behavioral responses, and some instances of TTS or direct injury (though this would be rare) in individual fishes found within localized areas. Therefore, air gun use is unlikely to impact individuals, and long-term consequences for fish populations would not be expected.

Commercial and Recreational Fish Stocks: Effects from Pile Driving

Impact and vibratory pile driving would not occur during testing activities. Pile driving would occur as part of Port Damage Repair activities in Port Hueneme, California. Impact and vibratory pile driving during Port Damage Repair activities can occur over a period of 14 days during each training event, and up to 12 times per year. Pile driving activities would occur intermittently in very limited areas and would be of temporary duration. The activity location is in a highly urbanized all quay wall port.

A quantitative analysis was performed to estimate range to effects for fishes exposed to pile driving. Due to the static nature of pile driving activities, two exposure times were used when calculating potential range to effects for different types of fish (e.g., transient, or migratory species versus resident species or those with high site fidelity). The calculations for ranges to effects assumed that some transient fishes would likely move through the area during pile driving activities, resulting in low exposure durations. In contrast, calculations for ranges to effects assumed that resident fishes may remain in the area during pile driving activities and therefore would receive a higher cumulative exposure level.

Estimated ranges to mortality and injury for transient species from the largest pile type and size (i.e., up to 20-inch steel piles) was 10 m. Although it was estimated that TTS could occur within 131 m for some species, TTS would likely occur at shorter distances for other pile types and sizes, and for hearing generalists. In contrast, ranges to effects for resident species from the largest pile type and size was 50 and 93 m, respectively. Furthermore, it is anticipated that most hearing specialists present in the port for a full day may receive TTS as the estimated ranges would cover the entire footprint of Port Hueneme. However, the port is a highly disturbed environment with high existing ambient levels of noise so it is unlikely most fishes would remain in the port for long periods of time due to high amount of human disturbance and the lack of suitable habitat. Additionally, the standard operating procedure for soft starts may warn nearby fishes causing them to avoid the ensonified area. Available research suggest fishes are more likely to startle or avoid the immediate area surrounding a pile driving activity or, in some cases, would habituate and return to normal behaviors after initial exposure. In the rare event some individuals remain in the area for a full day and receive TTS, these fish may experience a reduced ability to detect biologically relevant sounds until their hearing recovers (likely within a few minutes to days depending on the amount of threshold shift).

Fishes exposed to vibratory extraction would not experience mortality, injury, or TTS based on the low source level and limited duration of these activities. Based on the predicted noise levels, fishes may exhibit other responses such as temporary masking, physiological response, or behavioral reactions such as increasing their swimming speed, moving away from the source, or not responding at all. Individual fish that avoid the pile driving location would likely find similar suitable habitat in adjacent areas or would return to the location after cessation of the noise, reducing the potential for long-term effects.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.1.3 (Pile Driving) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, pile driving effects on fishes could result in the death or injury of a small number of individual fish, as well as brief (seconds to minutes) periods of physiological or behavioral reactions of fish found within localized areas. Although some individuals may be affected, and long-term consequences for fish populations are not expected.

Commercial and Recreational Fish Stocks: Effects from Vessel Noise

An increase in background noise levels from military readiness activities have the potential to expose fishes to sound and general disturbance, potentially resulting in short-term physiological stress, masking, or behavioral reactions. Fishes are more likely to react to nearby vessel noise (i.e., within tens of meters) than to vessel noise emanating from a distance. Fishes may have physiological stress reactions to sounds they can hear but typically, responses would be brief and would not affect the overall fitness of the animal. Auditory masking due to vessel noise can potentially mask vocalizations and other biologically important sounds (e.g., sounds of prey or predators) that fish may rely on. The low-frequency sounds of large vessels or accelerating small vessels can cause avoidance responses by fishes.

Vessel noise would be produced during SOAR Modernization, SWTR Installation, Sustainment of Undersea Ranges, Deployment of Seafloor Cables and Instrumentation, Installation and Maintenance of Mine Warfare and Other Training Areas, and Installation and Maintenance of Underwater Platforms. Vessel noise may result in masking, physiological stress, or behavioral reactions. During installation activities, vessels would move slowly (0 to 3 knots) which would limit ship-radiated noise from propeller cavitation and water flow across the hull.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.1.4 (Vessel Noise) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, vessel noise effects on fishes would be limited to temporary (hours) behavioral and stress-startle responses to individual fish found within localized areas, and long-term consequences for populations are not expected.

Commercial and Recreational Fish Stocks: Effects from Aircraft Noise

Fishes may be exposed to aircraft-generated overflight noise throughout the California Study Area. Most of these sounds would be concentrated around airbases and fixed ranges within each of the range complexes. Aircraft produce extensive airborne noise from either turbofan or turbojet engines. A severe but infrequent type of aircraft noise is the sonic boom, produced when the aircraft exceeds the speed of sound, typically at high altitude (30,000 ft. or greater). Rotary-wing aircraft (e.g., helicopters) produce low-frequency sound and vibration (Pepper et al., 2003). Aircraft would pass quickly overhead and rotary-wing aircraft (e.g., helicopters) may hover for a few minutes at a time over the ocean.

Aircraft overflights have the potential to affect surface waters and, therefore, to expose fish occupying those upper portions of the water column to sound. Fish may be exposed to fixed-wing or rotary-wing aircraft-generated noise wherever aircraft overflights occur; however, sound is primarily transferred into the water from air in a narrow cone under the aircraft. Fish would have to be at or near the surface at the time of an overflight to be exposed to appreciable sound levels. Transmission of sound from a moving airborne source to a receptor underwater is influenced by numerous factors. These factors are discussed in detail in the 2024 HCTT Draft EIS/OEIS, Appendix D (Acoustic and Explosive Effects Supporting Information).

Direct injury and hearing loss in fishes because of exposure to aircraft overflight noise is highly unlikely to occur. Sounds from aircraft noise, including occasional sonic booms, lack the amplitude or duration to cause injury or hearing loss in fishes underwater. Due to the brief and dispersed nature of aircraft overflights, masking is also unlikely.

Fixed- and rotary-wing aircraft are used for a variety of military readiness activities throughout the California Study Area. While military readiness activities involving overflight noise are widely dispersed, certain locations, such as those near fleet concentration areas where planes are based, are used more heavily by military aircraft. Fishes near the activity and closer to the surface would have a higher probability of detecting these sounds, although exposure to aircraft overflight noise would likely only last while the object is directly overhead. If fish were to respond to aircraft noise, only short-term behavioral or physiological reactions (e.g., avoidance and increased heart rate) would be expected.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.1.5 (Aircraft Noise) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, aircraft noise effects on fishes would be limited to only short-term behavioral or physiological reactions, and long-term consequences for individuals and populations would be unlikely and are not expected.

Commercial and Recreational Fish Stocks: Effects from Weapons Noise

Fishes could be exposed to noise from weapons firing, launch, flight downrange, and from the impact of non-explosive munitions on the water’s surface. Reactions by fishes to these specific stressors have not been recorded; however, fishes would be expected to react to weapons noise, as they would other transient sounds.

Military readiness activities that produce in-water sound from weapons firing, launch, flight downrange, and non-explosive practice munitions impact with the water’s surface could occur throughout the range complexes in the California Study Area. Most activities involving large-caliber naval gunfire or the launching of targets, missiles, bombs, or other munitions are conducted more than 12 NM from shore. Effects from those military readiness activities would be highly localized and concentrated in space and duration.

Mortality, injury, hearing loss and masking in fishes because of exposure to weapons noise is highly unlikely to occur. Sound from these sources lack the duration and high intensity to cause injury or hearing loss. Due to the brief and dispersed nature of weapons noise, masking is also unlikely. Potential effects considered are short-term behavioral or physiological reactions (e.g., swimming away and increased heart rate).

Animals at the surface of the water, in a narrow footprint under a weapons trajectory, could be exposed to military gunfire sound and may exhibit brief behavioral reactions such as startle reactions or avoidance, or no reaction at all. Due to the short-term, transient nature of gunfire activities, animals may be exposed to multiple shots within a few seconds but are unlikely to be exposed multiple times within a short period (minutes or hours). Behavioral reactions would likely be short term (minutes) and are unlikely to lead to substantial costs or long-term consequences for individuals or populations.

Sound due to missile and target launches is typically at a maximum during initiation of the booster rocket and rapidly fades as the missile or target travels downrange. Many missiles and targets are launched from aircraft, which would produce minimal sound in the water due to the altitude of the aircraft at launch. Behavioral reactions would likely be short term (minutes) and are unlikely to lead to long-term consequences for individuals or populations.

Any objects that are dropped and impact the water with great force could produce a loud broadband sound at the water's surface. Large-caliber non-explosive projectiles, non-explosive bombs, and intact missiles and targets could produce a large impulse upon impact with the water surface (McLennan, 1997). Animals within the area may hear the impact of objects on the surface of the water and would likely alert, dive, or avoid the immediate area. Impact noise would not be expected to induce significant behavioral reactions from fishes, and long-term consequences for individuals and populations are unlikely.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.1.6 (Weapons Noise) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, weapons noise effects on fishes would be limited to only short-term behavioral or physiological reactions, and long-term consequences for individuals and populations would be unlikely and are not expected.

COMMERCIAL AND RECREATIONAL FISH STOCKS: EXPLOSIVE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on fishes due to explosive stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6.3.2 (Explosive Stressors).

Commercial and Recreational Fish Stocks: Effects from Explosives

Activities involving in-water explosives from medium- and large-caliber naval gunfire, missiles, bombs, or other munitions are conducted more than 12 NM from shore. This includes Small Ship Shock Trials that could occur in the SOCAL Range Complex. Sinking Exercises are conducted greater than 50 NM from shore. Certain activities with explosives may be conducted closer to shore at locations identified in Appendix A (Military Readiness Activities in the California Study Area), including the training activity Mine Neutralization Explosive Ordnance Disposal and testing activity Semi-Stationary Equipment Testing.

The death of a fish would eliminate them from the population and impact future reproductive potential. Exposures that result in non-auditory injuries may limit a fish's ability to find food, communicate with other fishes, interpret the surrounding environment, or detect and avoid predators. Impairment of these abilities can decrease an individual's chance of survival or affect its ability to reproduce depending on the severity of the effect. Though TTS can impair a fish's abilities, individuals may recover quickly with little significant effect depending on the amount of threshold shift.

Fishes may also experience brief periods of masking, physiological response, or behavioral reactions, depending on the level and duration of exposure. However, due to the short duration of single explosive detonations, these effects are expected to be brief (seconds to minutes). Although multiple shots conducted during large events could lead to prolonged or repeated exposures within a short period of time (hours), military readiness activities involving explosions are generally dispersed in space and time. Consequently, repeated exposures over the course of a day or multiple days are unlikely and most behavioral effects are expected to be brief (seconds or minutes) and localized, regardless of the size of the explosion, and fish would likely return to their natural behavior shortly after exposure.

Explosive effects on fishes could result in the death or injury of a small number of individual fish, as well as brief (seconds to minutes) periods of physiological or behavioral reactions of fish found within localized areas. However, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.2.1 (Effects from Explosives) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, only a small number of individuals would be harmed, which would have minimal effects on the overall population and abundance of a given species, and the limited to brief (seconds to minutes) periods of physiological or behavioral reactions to individual fish found within localized areas. Although some individuals may be impacted, long-term consequences for fish populations are not expected.

COMMERCIAL AND RECREATIONAL FISH STOCKS: ENERGY STRESSORS

The following section summarizes the analysis and conclusions of potential effects on fishes due to energy stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6.3.3 (Energy Stressors). This section includes analysis of the potential effects from (1) in-water electromagnetic devices and (2) high-energy lasers.

Commercial and Recreational Fish Stocks: Effects from In-Water Electromagnetic Devices

Exposure of fishes to electromagnetic energy from in-water electromagnetic devices is limited to those fish groups that can detect the electromagnetic properties in the water column (Bullock et al., 1983; Helfman et al., 2009) such as sharks and rays. The in-water electromagnetic devices used in military readiness activities would not be anticipated to result in more than minimal effects on fishes as individuals or populations because (1) the range of effect (i.e., greater than Earth's magnetic field) is small (0.2 microtesla at 200 m from the source), (2) the electromagnetic components of these activities are limited to simulating the electromagnetic signature of a vessel as it passes through the water, and (3) the electromagnetic signal is temporally variable and would cover only a small spatial range during each activity in the California Study Area. Some fishes could have a detectable response to electromagnetic exposure, but the fields generated are typically well below physiological and behavioral responses of magnetoreceptive fishes, and any effects would be temporary with no anticipated effect on an individual's growth, survival, annual reproductive success, lifetime reproductive success (i.e., fitness), or species recruitment, and are not expected to result in population-level effects. Electromagnetic exposure of eggs and larvae of sensitive bony fishes would be low relative to their total ichthyoplankton biomass (Able & Fahay, 1998); therefore, potential effects on recruitment would not be expected.

New range modernization and sustainment activities include installation of undersea cables and sensor nodes to sustain the capabilities of the SOAR. Undersea cables and sensor nodes would also be installed at the two new SWTRs as an extension to the SOAR. Deployment of fiber optic cables along the seafloor would occur in one location in the California Study Area: south and west of SCI. The EMF produced by these cables as electromagnetic energy dissipates exponentially by distance from the energy source, the magnetic field from the cable would be equal to 0.1 percent of the Earth's at a distance of 6 m (20 ft.). The cables and nodes would be installed at the bottom of the ocean floor, in most cases at a minimum depth of 37 m (120 ft.). Given this depth, fish are unlikely to come into extended contact with cables or nodes and it is extremely unlikely that they would be affected by the magnetic field.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.3.1 (In-Water Electromagnetic Devices) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, physiological and behavioral impacts effects on fishes would be unlikely at electromagnetic field strengths encountered, as supported in a recent review Copping et al. (2021)

demonstrating that the overall potential risk to the physiological and behavioral health of fishes from energized devices is relatively low.

Commercial and Recreational Fish Stocks: Effects from High-Energy Lasers

Fish could be exposed to a laser only if the beam missed the target; however, high-energy lasers shut down once contact with the target is lost, further decreasing the likelihood of exposure. Should the laser strike the sea surface, individual fish at the surface could be exposed. The potential for exposure to a high-energy laser beam decreases as the water depth increases. Most fish are unlikely to be exposed to laser activities because they primarily occur more than a few meters below the sea surface.

Fish species that are found in offshore locations and occur near the surface of the water column may be at higher risk of being exposed to high-energy lasers. However, it is very unlikely that an individual would surface at the exact moment in the exact place that the laser misses its target and hits the surface.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.3.2 (High-Energy Lasers) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, fishes are unlikely to be exposed to high-energy lasers based on (1) the relatively low number of events, (2) the unlikely occurrence of the laser missing its intended target, (3) the very localized potential impact area of the laser beam, and (4) the temporary duration of potential impact (seconds).

COMMERCIAL AND RECREATIONAL FISH STOCKS: PHYSICAL DISTURBANCE AND STRIKE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on fishes due to physical disturbance and strike stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6.3.4 (Physical Disturbance and Strike Stressors). Potential effects of the various types of physical disturbance and strike during military readiness activities within the California Study Area are from (1) vessels and in-water devices, (2) MEM, and (3) seafloor devices.

Commercial and Recreational Fish Stocks: Effects from Vessels and In-Water Devices

Vessels do not normally collide with adult fishes, most of which can detect and avoid them. There are a few notable exceptions to this assessment of potential vessel strikes on fish groups. Large slow-moving fishes such as whale sharks (Ramirez-Macias et al., 2012; Rowat et al., 2007; Speed et al., 2008; Stevens, 2007), basking sharks (Pacific Shark Research Center, 2017; The Shark Trust, 2017), and manta rays (Braun et al., 2015; Couturier et al., 2012; Deakos et al., 2011; Germanov & Marshall, 2014; Graham et al., 2012; Miller & Klimovich, 2016) may occur near the surface in open-ocean and coastal areas, thus making them more susceptible to ship strikes, which may result in blunt trauma, lacerations, fin damage, or mortality. Stevens (2007) noted that increases in the numbers and sizes of shipping vessels in the modern cargo fleets make it difficult to gather strike-related mortality data for whale sharks because personnel on large ships are often unaware of collisions; therefore, the occurrence of vessel strikes is likely much higher than has been documented by the few studies that have been conducted.

In-water devices do not normally collide with adult fishes, as most can detect and avoid them. Fish responses to in-water devices would be similar to those discussed previously for vessels. Fishes would likely show varying behavioral avoidance responses to in-water devices. Early life stages of most fishes could be displaced by in-water devices and not struck in the same manner as adults of larger species. Because in-water devices are continuously moving, most fishes are expected to move away from them or to follow behind them.

The risk of a strike from vessels and in-water devices such as remotely operated vehicles, unmanned surface vehicles, unmanned underwater vehicles, motorized autonomous targets, or towed mine warfare devices used in military readiness activities would be low because (1) most fishes can detect and avoid vessel and in-water device movements, and (2) the types of fish that are likely to be exposed to vessel and in-water device strikes are limited (such as whale sharks and manta rays) and occur in low concentrations where vessels and in-water devices are most frequently used. Potential effects from exposure to vessels and in-water devices are not expected to result in substantial changes to an individual's behavior, fitness, or species recruitment, and are not expected to result in population-level effects. In addition, best management practices would be implemented prior to deploying a towed in-water device to search the intended path of the in-water device for any floating debris (e.g., driftwood) or other potential obstructions (e.g., floating vegetation rafts and animals), since they have the potential to cause damage to the device. In addition, Navy personnel standing watch or serving as a lookout must complete Marine Species Awareness training, which includes detecting floating vegetation to minimize effects on the natural environment (U.S. Department of the Navy, 2021a). Therefore, the device would not be used in areas where pelagic (open ocean) fish naturally aggregate.

Vessels and in-water devices associated with SOAR Modernization; SWTR Installation; Sustainment of Undersea Ranges; Hawaii and California undersea cable projects; and Installation and Maintenance of Underwater Platforms, Mine Warfare, and Other Training Areas would move very slowly during installation activities (0–3 knots) and would not pose a collision threat to fishes.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.4.1 (Vessels and In-Water Devices) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, the use of vessels and in-water devices may result in short-term and local displacement of fish 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 effects.

Commercial and Recreational Fish Stocks: Effects from MEM

A potential strike to a fish comes from the following categories of MEM: (1) all sizes of non-explosive practice munitions; (2) fragments from high-explosive munitions; (3) expendable targets; and (4) expended materials other than munitions, such as sonobuoys or torpedo accessories. A discussion of the types of activities that use MEM is presented in Appendix B (Activity Stressor Matrices) of this CD.

While disturbance or strike from any of these objects as they sink through the water column is possible, it is not very likely for most expended materials because the objects generally sink through the water slowly and can be avoided by most, if not all fishes. Therefore, the analysis of MEM strikes focuses on strikes at the surface or in the upper water column from fragments of high-explosives and projectiles because those items have a greater potential for a fish strike as they hit the water, before slowing down as they move through the water column.

Major fish groups that are particularly susceptible to MEM strikes are those occurring at the surface, within the offshore and continental shelf portions of the California Study Area (where the strike would potentially occur). Those groups include salmonids, pelagic sharks, flyingfishes, jacks, tunas, mackerels, billfishes, ocean sunfishes, and other similar species. Additionally, certain deep-sea fishes would be exposed to strike risk as a ship hulk, expended during a sinking exercise, settles to the seafloor. These groups include hagfishes, dragonfishes, lanternfishes, anglerfishes, and oarfishes.

Projectiles, bombs, missiles, rockets, and associated fragments have the potential to directly strike fish as they hit the water surface and below the surface to the point where the projectile loses its forward momentum. Fishes at and just below the surface would be most susceptible to injury from strikes. Fishes that occur deeper in the water column would be less susceptible to injury because the velocity of these materials would rapidly decrease upon contact with the water and as they travel through the water column. Consequently, most water column fishes would have ample time to detect and avoid approaching munitions or fragments as they fall through the water column. The probability of strike based on the "footprint" analysis included in Appendix I (Military Expended Materials, Direct Strike, and Ship Strikes Effects Analysis) of the 2024 HCTT Draft EIS/OEIS indicates that even for an extreme case of expending all small-caliber projectiles within a single gunnery box, the probability of any of these items striking a fish (even as large as bluefin tuna or whale sharks) is extremely low. Therefore, since most fishes are smaller than bluefin tuna or whale sharks, and most MEM are less abundant than small-caliber projectiles, the risk of strike by these items is exceedingly low for fishes overall. A possibility exists that a small number of fish at or near the surface may be directly affected if they are in the target area and near the point of physical effect at the time of MEM strike, but population-level effects would not occur.

Sinking exercises could occur in open-ocean areas, outside of the coastal portions of the California Study Area. While serious injury or mortality to individual fish would be expected if they were present within range of high-explosive activities, sinking exercises would not result in effects on pelagic fish populations at the surface based on the low number of fish in the immediate area and the placement of these activities in deep ocean areas where fish abundance is low or widely dispersed. Also, these activities are very few (up to three events annually). Disturbances to benthic fishes from sinking exercises would be highly localized. Any deep-sea fishes located on the bottom where a ship hulk would settle could experience displacement, injury, or death. However, population-level effects on the deep-sea fish community would not occur because of the limited spatial extent of the effect and the wide dispersal of fishes in deep ocean areas.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.4.2 (Military Expended Materials) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, the effect of MEM strikes on fishes would be inconsequential due to (1) the greatest strike risk occurs at the surface, away from areas occupied by the majority of fishes, which occupy demersal and pelagic habitat; (2) only a small proportion of missile and projectiles hit the water, creating a risk; (3) MEM sinking in the water column would typically occur at a slow rate, with low potential to create a strike risk; and (4) few fishes on the seafloor would be affected by falling MEM. The potential effects of MEM strikes would be short-term (seconds) and localized disturbances of the water surface (and seafloor areas within sinking exercise boxes) and are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction at the population level.

Commercial and Recreational Fish Stocks: Effects from Seafloor Devices

Aircraft-deployed mine shapes deployed at the surface during aerial mine-laying activities has the greatest potential to strike a fish within the water column. While seafloor device use could overlap with some ESA-listed species distributions, the likelihood of a strike would be extremely low given the low abundance of these species in the California Study Area, the ability for these ESA-listed species to detect and avoid falling objects through the water below the surface, and the dispersed nature of the activity. However, there would be the potential for effect. In addition, the probability of a physical disturbance or strike on a fish during cable installation activities would be extremely low. Fish would be able to move away from disturbed areas and return when activities are completed.

Mitigation would be implemented that includes not conducting precision anchoring (except in designated anchorages) within the anchor swing circle of artificial reefs and shipwrecks to avoid potential effects from seafloor devices on seafloor resources in mitigation areas throughout the Study Area (Appendix C, Mitigation) of this CD. This mitigation would consequently help avoid potential effects on fishes that inhabit these areas.

Deployment and installation of fiber optic cables along the seafloor would occur in one location in the California Study Area: south and west of SCI. In this location, the installations would occur completely within the water; no land interface would be involved. These activities would occur far offshore of where most ESA-listed fish species do not occur. Some ESA-listed fish species such as oceanic whitetip sharks could be present in the vicinity of the cable-laying vessel during installation activities. However, effects on these species would be discountable since the species spends little time at the bottom habitat where the disturbance from laying the cable would occur.

Installation and maintenance of underwater platforms, mine warfare training areas, and installation of other training areas involve seafloor disturbance where those activities would take place. Each installation would occur on soft, typically sandy bottom, avoiding rocky substrates.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.4.3 (Seafloor Devices) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, seafloor devices associated with military readiness activities would not have an adverse effect on fishes due to (1) a low probability of fish being struck during deployment of seafloor devices; and (2) fish would easily be able to avoid slow moving, bottom-crawling devices.

COMMERCIAL AND RECREATIONAL FISH STOCKS: ENTANGLEMENT STRESSORS

The following section summarizes the analysis and conclusions of potential effects on fishes due to entanglement stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6.3.5 (Entanglement Stressors). Two types of MEM are considered here: (1) wires and cables, (2) decelerators/parachutes, and (3) nets.

Commercial and Recreational Fish Stocks: Effects from Wires and Cables

Fiber optic cables are comprised of silicon and are somewhat flexible, durable, and abrasion or chemical resistant. When fiber optic cables are placed, they sink rapidly to the bottom. The physical characteristics of the fiber optic material render the cable easily broken when tightly kinked or bent at a sharp angle, but it is highly resistant to breaking when wrapped or looped around an object (U.S. Department of the Navy, 2001).

The likelihood of fish entanglement from wires and cables expended during military readiness activities is low because these species would be able to see and avoid cables and wires in the water column. In the rare instance where a fish did encounter a fiber optic cable, entanglement is unlikely because the cable is not strong enough to bind most fishes (U.S. Department of the Navy, 2001).

Guidance wire would only be expended in offshore areas and not within nearshore habitats in the California Study Area. Some fishes could potentially encounter guidance wire because they can occur in nearshore waters out to the shelf break, where many fish species feed near the bottom and could encounter a guidance wire while feeding. However, it would be rare for a fish to encounter guidance wires expended during military readiness activities. If a guidance wire were encountered, the most likely result would be that the fish ignores it, which is inconsequential and considered negligible. In the rare instance where an individual fish became entangled in guidance wire and could not break free, the individual could be affected by impaired feeding, bodily injury, or increased susceptibility to predators. However, this is an extremely unlikely scenario because the density of guidance wires would be very low.

Sonobuoy wires may be expended throughout the California Study Area; however, most are expended offshore. A sonobuoy wire runs through the stabilizing system and leads to the hydrophone components. The hydrophone components may be covered by thin plastic netting depending on type of sonobuoy but pose no entanglement risk. This is mainly due to the sonobuoy being made of a single wire that hangs vertically in the water column. Therefore, it would be highly unlikely that a fish would be entangled by a sonobuoy wire.

While individual fish susceptible to entanglement could encounter guidance wires, fiber optic cables, and sonobuoy wires, the long-term consequences of entanglement are unlikely for either individual or populations because (1) the encounter rate for cables and wires is low, (2) the types of fishes that are susceptible to these items is limited, (3) the restricted overlap with susceptible fishes, and (4) the physical characteristics of the cables and wires reduce entanglement risk to fishes compared to monofilament used for fishing gear. Potential effects from exposure to guidance wires and fiber optic cables are not expected to result in substantial changes to an individual's behavior, fitness, or species recruitment, and are not expected to result in population-level effects.

Cables are deployed on the seafloor during SOAR modernization, and the installation of two SWTRs. The Navy also proposes to deploy undersea fiber optic cables and connected instrumentation to existing undersea infrastructure along the seafloor in the California Study area (south and west of SCI). Entanglement of fishes is not likely because of the rigidity of the cable that is designed to lie extended on the sea floor. Once installed on the seabed, the new cable and communications instruments would be equivalent to other hard structures on the seabed, again posing no risk of adverse effect on fishes.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.5.1 (Wires and Cables) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, wires and cables associated with military readiness activities would not have an adverse effect on fishes due to (1) a very low entanglement risk from fiber optic cables and guidance wires, (2) a low encounter rate between fish and the fiber optic cables and guidance wires, and (3) the fact most sonobuoys are expended offshore and are made of a single wire that hangs vertically in the water column which poses no risk of entanglement.

Commercial and Recreational Fish Stocks: Effects from Decelerators/Parachutes

Military readiness activities involving decelerators/parachutes only occur in the open ocean portions of the California Study Area. Given the size of the California Study Area and the resulting widely scattered decelerators/parachutes, it would be very unlikely that a fish would encounter and become entangled in any decelerators/parachutes.

Some elasmobranchs (sharks and rays), swordfishes, and billfishes occurring within the offshore and continental shelf portions of the California Study Area may be more susceptible to entanglement in decelerators/parachutes than most fish species, due primarily to their unusual body shape or projections. However, due to the highly maneuverable swimming capabilities of these fishes, entanglement would be highly unlikely while the decelerators/parachutes are at the surface or sinking through the water column. If any of these ESA-listed sharks or rays were to become entangled in a decelerator/parachute, they would likely thrash to break free. If such an effort were unsuccessful, the individual could remain entangled, possibly resulting in injury or death, but this scenario is considered so unlikely that it would be discountable. Individual fish are not prone to be repeatedly exposed to decelerators/parachutes, so long-term consequences of entanglement risks from decelerators/parachutes are unlikely for either individuals or populations.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.5.2 (Decelerators/Parachutes) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, decelerators/parachutes associated with military readiness activities would not have an adverse effect on fishes due to (1) the decelerators/parachutes are relatively large, visible, and slow moving, making them easier to avoid; and (2) should a fish encounter a decelerator/parachute, it would likely display avoidance behavior and swim away.

Commercial and Recreational Fish Stocks: Nets

Nets would only be used during testing activities. The description for net deployments that occur during Extra Large Unmanned Underwater Vehicle (XLUUV) testing is described in Section 3.0.3.3.5.1 (Wires, cables, and Nets) of the 2024 HCTT Draft EIS/OEIS. Net dimensions are anticipated to be a maximum size of 300 ft. wide and 100 ft. deep, with a one-inch maximum mesh size. Areas where nets would be deployed would not overlap sensitive areas, and nets would not contact bottom substrates. Net deployment and retrieval are estimated to take approximately 30 minutes. Nets would be deployed four times for up to 4 hours per deployment (not to exceed 16 hours) during a given 48-hour period. Nets would only be deployed during daylight hours, would be tethered to one or two support vessel(s), and would be continuously monitored when in the water.

Larger pelagic fish (sharks, rays, dorado, steelhead, and tuna) would likely be able to detect this large net and avoid it (National Marine Fisheries Service, 2024a). Should they come in contact with the net, their risk of entanglement would be expected to be low due to their larger body size and the relatively small mesh size (National Marine Fisheries Service, 2024a). The potential for entanglement of demersal fish and fish associated with reef or kelp habitats is expected to be low because the net would avoid contact with the bottom and avoid these sensitive habitats.

Smaller pelagic fish (i.e., sardine, anchovy, mackerel) may also encounter the XLUUV nets, but are unlikely to experience bycatch levels consistent with commercial fisheries that utilize nets. The type of nets typically used to commercially harvest these species are of a round haul net or purse seine design, as opposed to a single pane of hanging mesh in gillnet fisheries. Fisheries for these species typically use a purse seine net that measure 1,110 ft. long, 132 ft. deep, and 165 ft. deep, and is comprised of 1.25 in. mesh (National Marine Fisheries Service, 2024b). Other commercial fisheries further offshore also deploy purse seines, but for larger species. Purse seine vessels capture non-target fish species within these fisheries (Duffy et al., 2019; Lennert-Cody et al., 2008). Much of the other net/seine deployed fisheries bycatch that occurs in waters that overlap with XLUUV testing activity that includes nets is either associated with trawl fisheries (Matthews et al., 2022; Pikitch et al., 1998) or large-mesh gillnet fisheries (Hahlbeck et al., 2017; Larese & Coan, 2008; Le Fol, 2016; Matthews et al., 2022; Shester & Micheli, 2011).

While fish in the water column have the potential to encounter the hanging net panel, the smaller mesh size (not to exceed 1 in.) largely limits the risk of exposure to smaller pelagic species of fish that would be small enough to become entangled in these nets. However, the nets deployed during the XLUUV testing would be single pane mesh and would not encircle or entrap schooling fish compared to commercial nets and seines that catch fish by encircling them. The nets proposed would only be deployed for short periods at a time (not to exceed 4 hours) and would be continuously monitored by the vessels attached to the nets.

Additionally, due to their relatively large body size relative to the net design and mesh size, the potential risk of entanglement for ESA-listed fish is considered discountable (i.e., extremely unlikely to occur) (National Marine Fisheries Service, 2024a).

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.5.3 (Nets) in the 2024 HCTT Draft EIS/OEIS and, as summarized earlier, nets associated with XLUUV testing would not have an adverse effect on fishes because (1) for many pelagic species, including oceanic whitetip sharks and scalloped hammerhead sharks, the risk of entanglement is unlikely given their body shape and ability to avoid materials that could entangle them in the water column; (2) most of the sufficiently large body size that they would not be susceptible to entanglement of their gills in the one-inch mesh size nets proposed for use; (3) larger fish that encounter a submerged net would recognize it as an obstruction and quickly change course to avoid the net; and (4) the nets would only be deployed during daylight hours for no more than 4 hours per deployment, would be tethered to one or two support vessel(s), and would be monitored at all times when in the water.

COMMERCIAL AND RECREATIONAL FISH STOCKS: INGESTION STRESSORS

This section summarizes the analysis and conclusions of potential effects on fishes due to ingestion stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6.3.6 (Ingestion Stressors).

Commercial and Recreational Fish Stocks: Effects from MEM

MEM from munitions associated with military readiness activities that could potentially be ingested by a fish include non-explosive practice munitions (small- and medium-caliber), small-caliber casings, and fragments from high explosives. These items could be expended throughout most of the California Study Area.

The potential effects of ingesting small-caliber projectiles, high-explosive fragments, or end caps/pistons with the chaff cartridges would be limited to individual cases where a fish might suffer a negative response; for example, by ingesting an item too large to be digested. While ingestion of munitions-related materials, or the other MEM identified here, could result in sublethal or lethal effects, the likelihood of ingestion is low based on the dispersed nature of the materials and the limited exposure of those items at the surface/water column or seafloor where certain fishes could be at risk of ingesting those items. Furthermore, a fish might taste an item then expel it before swallowing it (Felix et al., 1995), in the same manner that fish would temporarily take a lure into its mouth, then spit it out. Based on these factors, the number of fish potentially affected by ingestion of munitions-related materials would be low and population-level effects are not likely to occur.

Large, open-ocean predators (e.g., tunas, billfishes, pelagic sharks) have the potential to ingest self-protection flare end caps or pistons as they float on the water column for some time. A variety of plastic and other solid materials have been recovered from the stomachs of billfishes, mahi mahi (South Atlantic Fishery Management Council, 2011) and tuna (Hoss & Settle, 1990). Savoca et al. (2021) conducted a literature review of 129 studies investigating marine fish ingestion of plastics. They found that roughly two thirds (n= 386) of the marine fish investigated in these studies ingested plastics, while roughly one third (n= 148) did not. The potential to determine any statistically significant geographic trends across various bodies of water was limited by lack of data. Based on the low density of expended endcaps and pistons, the encounter rate would be extremely low, and the ingestion rate even lower. The number of fishes potentially affected by ingestion of end caps or pistons would be minimal based on the low environmental concentration. Population-level effects would not be expected.

Larger offshore species such as ESA-listed giant manta rays or oceanic whitetip sharks could mistake larger MEM other than munitions for prey, even though these species typically forage at or near the surface. It is likely that these species would “taste” and then spit it out if an item were accidentally ingested; if ingested, the item would most likely pass through the digestive tract without causing harm.

Mitigation would be implemented (e.g., not conducting gunnery activities within 350 yd. of artificial reefs and shipwrecks) to avoid potential effects from MEM on seafloor resources in mitigation areas throughout the California Study Area (Appendix C, Mitigation) of this CD. This mitigation would consequently help avoid potential ingestion effects on fishes that feed in the vicinity of artificial reefs, and shipwrecks.

Overall, the potential effects of ingesting munitions (whole or fragments) would be limited to individual fish that might suffer a negative response from a given ingestion event. While ingestion of munitions or fragments identified here could result in sublethal or lethal effects on a small number of individuals, the likelihood of a fish encountering an expended item is dependent on where that species feeds and the amount of material expended. Furthermore, an encounter may not lead to ingestion, as a fish might “taste” an item, then expel it (Felix et al., 1995). Therefore, the number of fishes potentially affected by ingestion of munitions or fragments from munitions would be assumed to be low, and population-level effects are not expected.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.6.1 (Military Expended Materials) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, MEM associated with military readiness activities would not have an adverse effect on fishes due to (1) the likelihood of ingestion is low based on the dispersed nature of the materials and the limited exposure of those items at the surface/water column or seafloor; and (2) if ingested, a fish would temporarily take the expended material into its mouth, then spit it out.

COMMERCIAL AND RECREATIONAL FISH STOCKS: SECONDARY STRESSORS

The following section summarizes the analysis and conclusions of potential effects on fishes due to secondary stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.6.3.7 (Secondary Stressors).

Stressors from military readiness activities could pose secondary or indirect effects on fishes via habitat (e.g., sediment, and water quality) and prey availability. These include (1) explosives and explosion byproducts; (2) metals; (3) chemicals; and (4) other materials such as targets, chaff, and plastics.

Commercial and Recreational Fish Stocks: Effects on Habitat

Fish habitat could become degraded during military readiness activities that would strike the seafloor or introduce MEM, bombs, projectiles, missiles, rockets, or fragments to the seafloor. During or following military readiness activities that affect benthic habitats, fish species may experience loss of available benthic prey at locations in the California Study Area where these items might be expended. Additionally, plankton and zooplankton that are eaten by fishes may also be negatively affected by these same expended materials. The spatial area of habitat effected by the proposed military readiness activities would be relatively small compared to the available habitat in the California Study Area. However, there would still be vast expanses of habitat adjacent to the areas of habitat effect that would remain undisturbed by the activities. Water quality effects from the use of munitions, expended material, or devices would be negligible, would have no long-term effect on water quality, and therefore would not constitute a secondary indirect stressor for fishes. Therefore, there would be no effects from explosives or explosion byproducts associated with secondary stressors.

Certain metals and metal-containing compounds at concentrations above background levels (e.g., cadmium, chromium, lead, mercury, zinc, copper, manganese, and many others) can be toxic to fishes (Wang & Rainbow, 2008). Metals are introduced into seawater and sediments as a result of military readiness activities involving vessel hulks, targets, munitions, batteries, and other MEM. Some metals bioaccumulate, and physiological impacts begin to occur only after several trophic transfers concentrate the toxic metals (U.S. Department of the Navy, 2012a). Indirect effects of metals on fish via sediment and water involve concentrations several orders of magnitude lower than concentrations achieved via bioaccumulation. Fishes may be exposed by contact with the metal, contact with contaminants in the sediment or water, and ingestion of contaminated sediments. Concentrations of metals in seawater are orders of magnitude lower than concentrations in marine sediments. It is extremely unlikely that fishes would experience indirect effects from toxic metals via the water.

The greatest risk to fishes from flares, missiles, and rocket propellants is perchlorate, which is highly soluble in water, persistent, and impacts metabolic processes in many plants and animals. Fishes may be exposed by contact with contaminated water or ingestion of re-suspended contaminated sediments. Since perchlorate is highly soluble, it does not readily adsorb to sediments. Therefore, missile and rocket fuels pose no risk of indirect effect on fishes via sediment. In contrast, the principal toxic components of torpedo fuel, propylene glycol dinitrate and nitrodiphenylamine, adsorbs to sediments, have relatively low toxicity, and are readily degraded by biological processes. It is conceivable that various life stages of fishes could be indirectly affected by propellants via sediment in the immediate vicinity of the object (e.g., within a few inches), but these potential effects would diminish rapidly as the propellant degrades.

Some MEM (e.g., decelerators/parachutes) could become remobilized after their initial contact with the seafloor (e.g., by waves or currents) and could pose an entanglement or ingestion hazard for fishes. For example, in some bottom types without strong currents, hard-packed sediments, and low biological productivity, items such as projectiles might remain intact for some time before becoming degraded or broken down by natural processes. These potential impacts may cease only (1) when MEM is too massive to be mobilized by typical oceanographic processes, (2) if MEM become encrusted by natural processes and incorporated into the seafloor, or (3) when MEM become permanently buried. In this scenario, a decelerator/parachute could initially sink to the seafloor, but then be transported laterally through the water column or along the seafloor, increasing the opportunity for entanglement. In the unlikely event that a fish would become entangled, injury or mortality could result. In contrast to large decelerators/parachutes, other devices with decelerators such as sonobuoys are typically used in deep open ocean areas. These areas are much lower in fish numbers and diversity, so entanglement hazards are greatly reduced for commercially and recreationally targeted species (e.g., tuna, swordfish), as well as mesopelagic prey of other species. The entanglement stressor would eventually cease to pose an entanglement risk as it becomes encrusted or buried.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.7.1 (Effects on Habitat) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, secondary effects on habitat associated with military readiness activities would not result in adverse effects on fishes.

Commercial and Recreational Fish Stocks: Effects on Prey Availability

Effects on fish prey availability resulting from explosives, explosives byproducts, unexploded munitions, metals, and chemicals would differ depending upon the type of prey species in the area but would likely be negligible overall and have no population-level effects on fishes. Fishes with swim bladders are more susceptible to blast injuries than fishes without swim bladders. During or following military readiness activities where these items might be expended that effect benthic habitats, fish species may experience loss of available benthic prey. Additionally, plankton and zooplankton that are eaten by fishes may also be negatively affected by these same expended materials. Some species of zooplankton that occur in the Pacific such as Pacific oyster (*Crassostrea gigas*) larvae have been found feeding on microplastics (Cole & Galloway, 2015).

In addition to physical effects of an underwater blast such as being stunned, prey might have behavioral reactions to underwater sound. For instance, prey species might exhibit a strong startle reaction to detonations that might include swimming to the surface or scattering away from the source. This startle and flight response is the most common secondary defense among animals (Hanlon & Messenger, 1996). The sound from underwater explosions might induce startle reactions and temporary dispersal of schooling fishes if they are within close proximity (Bowman et al., 2024; Jenkins et al., 2022; Jenkins et al., 2023; Popper et al., 2014; Smith et al., 2022; Wright, 1982).

The abundances of fish and invertebrate prey species near the detonation point could be diminished for a short period of time before being repopulated by animals from adjacent waters. The sound from underwater explosions might induce startle reactions and temporary dispersal of schooling fishes, potentially increasing visibility to predators, if they are within close proximity (Kastelein et al., 2008). Alternatively, any prey species that would be directly injured or killed by the blast could attract predators and scavengers from the surrounding waters that would feed on those organisms, and in turn could be susceptible to becoming directly injured or killed by subsequent explosions. Any of these scenarios would be temporary, only occurring during activities involving explosives, and no lasting effect on prey availability or the food web would be expected. Indirect effects of underwater detonations and high-explosive munitions use under the Proposed Action would not result in a decrease in the quantity or quality of fish populations in the California Study Area.

Therefore, based on the updated background and analysis for military readiness activities as discussed in Section 3.6.3.7.2 (Effects on Prey Availability) in the 2024 HCTT Draft EIS/OEIS and as summarized earlier, secondary effects on prey availability associated with military readiness activities would not result in adverse effects on fishes.

COMMERCIAL AND RECREATIONAL FISH STOCKS: CONCLUSION

Based on a detailed stressor analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.6 (Fishes), specifically Section 3.6.3 (Environmental Consequences) and as summarized earlier, the Action Proponents have determined that the Proposed Action would be carried out in a manner that would (1) protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems; and (2) promote the protection, use, and development of marine and coastal resources to assure their sustainability. As evident from the standard operating procedures and mitigation measures discussed earlier, the Proposed Action provides special protection to fishes.

Therefore, the Proposed Action is consistent to the maximum extent practicable with the Coastal Ecosystems and Marine Resources enforceable policies.

3.2.3.2.6 Marine Mammals

There are 35 marine mammal species known to exist in the California Study Area, including 7 mysticetes (baleen whales), 21 odontocetes (dolphins and toothed whales), 6 pinnipeds (seals and sea lions), and the southern sea otter. Among these species there are multiple stocks managed by NMFS, and one stock (southern sea otter) managed by the USFWS, in the U.S. Exclusive Economic Zone. These species and stocks are presented in Table 3-4.

This section evaluates how and to what degree the activities described in Chapter 2 (Proposed Federal Agency Action) potentially effect marine mammals known to occur within the California Study Area. Tables A-1 through A-7 in Appendix A (Military Readiness Activities in the California Study Area) of the CD present the proposed training and testing activity locations. The stressors vary in intensity, frequency, duration, and location within the California Study Area.

The stressors associated with the Proposed Action that could affect marine mammals include the following:

- Acoustic (sonar and other transducers, air guns, pile driving, vessel noise, aircraft noise, and weapons noise)
- Explosives (explosions in-water)
- Physical disturbance and strike (vessels and in-water devices; MEM; seafloor devices; and pile driving)
- Secondary (adverse effects on habitat, adverse effects on prey availability)

The analyses for the following stressors (i.e., energy, entanglement, and ingestion) and any associated sub-stressors are also derived from the 2018 HSTT and 2022 PMSR EIS/OEISs and were reevaluated for the Proposed Action. A summary of these stressors and their potential adverse effects is provided in Section 3.7.3 (Environmental Consequences) of the 2024 HCTT Draft EIS/OEIS, but a complete reanalysis under each alternative in the 2024 HCTT Draft EIS/OEIS was deemed unnecessary.

Energy, entanglement, and ingestion stressors have been analyzed by the Navy since 2001 in multiple study areas across the Pacific and Atlantic, and the analysis has repeatedly and consistently concluded that there would be no significant adverse effects from these stressors on marine mammals. Regulations and authorizations issued pursuant to the MMPA by NMFS, Biological Opinions from NMFS and findings from the USFWS issued pursuant to the ESA, and the review of applicable best available since those analyses were conducted have continued to support those conclusions. The Navy and NMFS have repeatedly determined in previous analyses pursuant to the MMPA spanning more than a decade that these stressors are not likely to result in incidental takes of marine mammals as defined by the MMPA and are likely to have only discountable, less than significant, or negligible effects on ESA-listed marine mammals (National Oceanic and Atmospheric Administration, 2022; U.S. Department of the Navy, 2002, 2008b, 2010a, 2010b, 2012b, 2013a, 2013b, 2013d, 2013f, 2014, 2018, 2021b, 2022b).

The Navy's analysis and conclusions for the 2018 HSTT and 2022 PMSR EIS/OEISs (U.S. Department of the Navy, 2018, 2022b), which comprise the majority of the HCTT Study Area, were found by NMFS to be complete and supportable. NMFS also determined that ESA-listed marine mammals in the HSTT Study Area and PMSR Study Area were not likely to be adversely affected by these same stressors (National Marine Fisheries Service, 2018, 2022).

There are no substantive differences in the way military readiness activities with these stressors are conducted in the HSTT Study Area or the PMSR Study Area compared to how they would be conducted under the Proposed Action in the HCTT Study Area. While the HCTT Study Area would be expanded off California compared to the size of the California portion of the HSTT Study Area, a large part of that expansion is the inclusion of the PMSR, and, as noted above, the analysis of effects on marine mammals from energy, entanglement, and ingestion stressors due to activities in the PMSR concluded that there would be no reasonably foreseeable adverse effects on marine mammals. Fewer activities potentially effecting marine mammals are conducted in the NOCAL Range Complex and the airspace extensions W-293 and W-294 compared with the level of activity in the PMSR and SOCAL Range Complex, so the potential for adverse effects is lower from activities in those areas, which are predominantly used for aircraft activities. In addition, all marine mammal species occurring in the HCTT Study Area were previously analyzed in either or both the 2018 HSTT and 2022 PMSR EIS/OEISs (U.S. Department of the Navy, 2018, 2022b).

Table 3-4: Marine Mammal Occurrence Within the California Study Area

Common Name	Scientific Name	Stock/DPS	Status		Seasonal Absence	Stock Abundance (CV)/Minimum Population
			MMPA	ESA		
Blue whale	*Balaenoptera musculus*	Eastern North Pacific	Depleted	Endangered	-	1,898 (0.085)/ 1,767
Bryde's whale	*Balaenoptera edeni*	Eastern Tropical Pacific	-	-	-	Unknown
Fin whale	*Balaenoptera physalus*	California, Oregon, and Washington	Depleted	Endangered	-	11,065 (0.405)/7,970
Gray whale	*Eschrichtius robustus*	Eastern North Pacific stock/DPS	-	-	-	29,960 (0.05)/25,849
		Western North Pacific stock/DPS	Depleted	Endangered	-	290 (271-311)/271
Humpback whale	*Megaptera novaeangliae*	Central America / Southern Mexico - California-Oregon-Washington Stock[1]	Depleted	Endangered	-	1,496 (0.171)/ 1,284
		Mainland Mexico - California-Oregon-Washington Stock[1]	Depleted	Threatened	-	3,477 (0.101)/3,185
Minke whale	*Balaenoptera acutorostrata*	California, Oregon, and Washington	-	-	-	915 (0.792)/509
Sei whale	*Balaenoptera borealis*	Eastern North Pacific	Depleted	Endangered	-	864 (0.40)/625
Sperm whale	*Physeter macrocephalus*	California, Oregon, and Washington	Depleted	Endangered	-	2,606 (0.135)/2,011
Pygmy sperm whale	*Kogia breviceps*	California, Oregon, and Washington	-	-	-	4,111 (1.12)/1,924
Dwarf sperm whale	*Kogia sima*	California, Oregon, and Washington	-	-	-	Unknown
Baird's beaked whale	*Berardius bairdii*	California, Oregon, and Washington	-	-	-	1,363 (0.533)/894
Cuvier's beaked whale[3]	*Ziphius cavirostris*	California, Oregon, and Washington	-	-	-	5,454 (0.27)/4,214
Mesoplodont beaked whales[4]	*Mesoplodon spp.*	California, Oregon, and Washington	-	-	-	3,044 (0.54)/1,967
Common Bottlenose dolphin	*Tursiops truncatus*	California Coastal	-	-	-	453 (0.06)/346
		California, Oregon, and Washington Offshore	-	-	-	3,477 (0.696)/2,048
False killer whale	*Pseudorca crassidens*	Eastern Tropical Pacific[2,5]	-	-	-	2,962 (0.71)/NA
Fraser's dolphin	*Lagenodelphis hosei*					

Common Name	***Scientific Name***	***Stock/DPS***	***Status***		***Seasonal Absence***	***Stock Abundance (CV)/Minimum Population***
			MMPA	***ESA***		
Killer whale	*Orcinus orca*	Eastern North Pacific Offshore	-	-	-	300 (0.10)/276
	Orcinus rectipinnus	Eastern North Pacific Transient/West Coast Transient	-	-	-	349 (0)/349
	Orcinus ater	Eastern North Pacific Southern Resident stock/DPS	Depleted	Endangered	Summer & Fall	73 (0)/73
Long-beaked common dolphin	*Delphinus delphis bairdii*	California	-	-	-	83,379 (0.216)/ 69,636
Northern right whale dolphin	*Lissodelphis borealis*	California, Oregon, & Washington	-	-	-	29,285 (0.717)/17,024
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	California, Oregon, & Washington	-	-	-	34,999 (0.222)/29,090
Pantropical spotted dolphin	*Stenella attenuata*	Eastern Tropical Pacific[4, 7]	-	-	-	105,416 (0.46)/NA
Pygmy killer whale	*Feresa attenuata*	Eastern Tropical Pacific[5,8]	-	-	Winter & Spring	229 (1.11)/NA
Risso's dolphins	*Grampus griseus*	California, Oregon, & Washington	-	-	-	6,336 (0.32)/4,817
Short-beaked common dolphin	*Delphinus delphis delphis*	California, Oregon, and Washington	-	-	-	1,056,308 (0.207)/888,971
Short-finned pilot whale	*Globicephala macrorhynchus*	California, Oregon, & Washington	-	-	-	836 (0.79)/466
Striped dolphin	*Stenella coeruleoalba*	California, Oregon, and Washington	-	-	-	29,998 (0.299)/23,448
Dall's porpoise	*Phocoenoides dalli*	California, Oregon, and Washington	-	-	-	16,498 (0.608)/10,286
Harbor Porpoise	*Phocoena phocoena*	Northern California- Southern Oregon	-	-	-	15,303 (0.575)/9,759
		San Francisco- Russian River	-	-	-	7,777 (0.620)/4,811
		Monterrey Bay	-	-	-	3,760 (0.561)/2,421
		Morro Bay	-	-	-	4,191 (0.561)/2,698
Harbor seal	*Phoca vitulina*	California	-	-	-	30,968 (0.157)/27,348
Northern elephant seal	*Mirounga angustirostris*	California Breeding	-	-	-	187,386 (161,876–214,418)/85,369
California sea lion	*Zalophus californianus*	U.S.	-	-	-	257,606 (233,515—273,211)/233,515

Common Name	Scientific Name	Stock/DPS	Status		Seasonal Absence	Stock Abundance (CV)/Minimum Population
			MMPA	ESA		
Stellar sea lion	*Eumetopias jubatus*	Eastern[6]	-	-	Summer	Unknown/36,308
Guadalupe fur seal[7]	*Arctocephalus townsendi*	N/A	Depleted	Threatened	-	48,780 (NA)/37,940
Northern fur seal	*Callorhinus ursinus*	California	-	-	-	14,050 (NA)/7,524
		Eastern Pacific	Depleted	-	Summer	626,618 (0.2)/530,376
Southern sea otter	*Enhydra lutris nereis*	N/A	Depleted	Threatened	-	2,962 (NA)/2,962

Note: Unless otherwise noted, abundance estimates are from the 2022 Pacific stock assessment report (Carretta et al., 2024; Carretta et al., 2023), the draft 2023 Pacific stock assessment report (Carretta et al., 2024), or the Alaska stock assessment reports (Young, 2024). NA = Not Applicable

[1]Humpback whales in the Central America / Southern Mexico - California-Oregon-Washington Stock make up the endangered Central America DPS, and humpback whales in the Mainland Mexico - California-Oregon-Washington Stock are part of the threatened Mexico DPS, along with whales from the Mexico-North Pacific Stock, which do not occur in the Study Area.

[2]Abundance estimate is from Wade and Gerrodette (1993) derived specifically for waters off Southern California.

[3]Mesoplodont beaked whales are analyzed as a group in the California Study Area due to insufficient data available to estimate species-specific densities. The six species known to occur in the California Study Area are: Blainville's beaked whale (*M. densirostris*), Perrin's beaked whale (*M. perrini*), Lesser beaked whale (M. *peruvianus*), Stejneger's beaked whale (*M. stejnegeri*), Gingko-toothed beaked whale (*M. gingkodens*), and Hubbs' beaked whale (*M. carlhubbsi*).

[4]The Eastern Tropical Pacific populations of false killer whale, pantropical spotted dolphin, and pygmy killer whales are not recognized stocks in NMFS Pacific stock assessment report (Carretta et al., 2024), but separate density estimates were derived to support the Navy's analysis.

[5]The Alaska SARs (Young, 2024, 2023) do not provide an abundance estimate for the Eastern stock of Steller sea lions. However, the 2022 pup count for only the U.S. portion of the Eastern stock was 10,667 and the non-pup count was 26,158 for a total of 36,308 sea lions. The counts do not include sea lions at sea and therefore are not an accurate estimate of abundance but can be considered the minimum abundance.

[6]Unpublished abundance estimate provided by Norris (2022).

[7]Abundance estimate is from Ferguson and Barlow (2003), derived specifically for waters off the Baja California Peninsula, Mexico.

[8]Regular occurrence is only expected in waters off the Baja California Peninsula, Mexico.

[9]Abundance estimate for pygmy killer whale is from Wade and Gerrodette (1993) derived specifically for waters off Southern California.

In this analysis, marine mammal species may be grouped together based on similar biology (e.g., hearing sensitivity) or behaviors (e.g., feeding or expected reaction to stressors) when most appropriate for the analysis. For some stressors, species are grouped based on their taxonomic relationship and discussed as follows: mysticetes (baleen whales), odontocetes (toothed whales, dolphins, and porpoises), pinnipeds (seals, fur seals, and sea lions), and the southern sea otter. When adverse effects are expected to be similar for all species or when it is determined there would be no adverse effect on any species, the discussion will be general and not species-specific. However, when adverse effects are not the same to certain species or groups of species, the discussion will be as specific as the best available science allow. In addition, if military readiness activities only occur in or will be concentrated in certain areas, the discussion will be geographically focused. Based on acoustic thresholds and criteria developed with NMFS, adverse effects from sound sources as acoustic and explosive stressors will be quantified at the species or stock level as is required pursuant to authorization under the MMPA.

The analysis includes consideration of the mitigation that the Navy will implement to avoid potential impacts on marine mammals from acoustics, explosives, and physical disturbance and strike stressors. Mitigation measures for marine mammals are described in Appendix C (Mitigation) of this CD.

MARINE MAMMALS: SPECIAL PROTECTIONS

Proposed military readiness activities include standard operating procedures and mitigation measures to protect marine mammals.

Watch personnel monitor their assigned sectors for any indication of danger to the ship and the personnel on board, such as a floating or partially submerged object or piece of debris, periscope, surfaced submarine, wisp of smoke, flash of light, or surface disturbance. As a standard collision avoidance procedure, watch personnel also monitor for marine mammals that have the potential to be in the direct path of the ship. The standard operating procedure for vessel safety benefits marine mammals by reducing the potential for vessel strikes.

Most weapons-firing activities are conducted during daylight hours. During weapons firing, the Action Proponents visually clear the weapons firing range of all non-participating vessels. This standard operating procedure benefits marine mammals by increasing the effectiveness of visual observations in daylight hours, thereby reducing the potential for interaction of marine mammals with explosive weapons-firing activities. In addition, weapons firing that involve the deployment or retrieval of targets is typically conducted during daylight hours in low sea states. This standard operating procedure also increases the effectiveness of visual observation in avoiding marine mammals.

During activities that involve recoverable targets (e.g., aerial drones), the Action Proponents recover the target and any associated decelerators/parachutes to the maximum extent practicable consistent with personnel and equipment safety. Recovery of these items helps minimize the amount of remaining materials. This standard operating procedure benefits biological resources such as marine mammals by reducing the potential for physical disturbance and strike, ingestion, and entanglement of applicable targets and any associated decelerators/parachutes.

As a standard collision avoidance procedure during the use of towed in-water devices, the Action Proponents search the intended path of the device for any floating debris, objects, or animals (e.g., driftwood, concentrations of floating vegetation, marine mammals) that have the potential to obstruct or damage the device. This standard operating procedure benefits marine mammals by reducing the potential for physical disturbance and strike by a towed in-water device.

As a standard operating procedure during pile driving, the Action Proponents performs soft starts at reduced energy during an initial set of strikes from an impact hammer. Soft starts may "warn" marine mammals and cause them to move away from the sound source before impact pile driving increases to full operating capacity.

For more information on the Navy's standard operating procedures applied during its proposed activities, see the 2024 HCTT Draft EIS/OEIS, Section 3.0.4 (Standard Operating Procedures).

To further avoid the potential for impacts on marine mammals, the Action Proponents will implement mitigation measures. These measures include the following:

- power down or cease active sonar if a marine mammal is observed in the mitigation zone;
- ceasing air gun use if a marine mammal is observed in the mitigation zone;
- ceasing impact pile driving and vibratory pile extraction if a marine mammal is observed in the mitigation zone;
- ceasing gunnery, missile, and bombing activities if a marine mammal is observed in the mitigation zone;
- ceasing explosive activities (e.g., deployment of an explosive bomb, explosive missile firing, explosive sonobuoys, explosive torpedo firing, explosive mine countermeasure and neutralization activities, underwater demolitions) if a marine mammal is observed in the mitigation zone;
- avoiding marine mammals during all activities that include vessel movement or towed in-water devices; and
- establishing geographic mitigation for marine mammals, described previously in Section 2.2.4.2 of this CD and including the following:
    - Northern California Large Whale Mitigation Area
    - Central California Large Whale Mitigation Area
    - Southern California Blue Whale Mitigation Area
    - California Large Whale Awareness Messages
    - California Large Whale Real-Time Notification Mitigation Area
    - SNI Pinniped Haulout Mitigation Area

For more information on the Action Proponents' mitigation measures applied during its proposed activities, see Appendix C (Mitigation) of this CD.

MARINE MAMMAL RESEARCH AND MONITORING

The Navy has been conducting research and monitoring in the HCTT Study Area for over 20 years. This robust program has resulted in hundreds of technical reports and publications on marine mammals that have informed Navy and NMFS analysis in environmental planning documents, Rules, and Biological Opinions. The reports are made available to the public on the Navy's marine species monitoring website (www.navymarinespeciesmonitoring.us), and the data is available from the Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP) (www.seamap.env.duke.edu).

The Navy commits to continue monitoring the occurrence, exposure, response, and consequences of marine species to Navy military readiness activities and to further research the effectiveness of implemented mitigation measures. Taken together, mitigation and monitoring comprise the Navy's integrated approach for reducing environmental impacts from the Proposed Action. The Navy's overall monitoring approach seeks to leverage and build on existing research efforts whenever possible.

Consistent with the cooperating agency agreement with NMFS, monitoring measures presented here, as well as mitigations discussed in Appendix C (Mitigation), focus on the requirements for protection and management of marine resources. A well-designed monitoring program can provide important feedback for validating assumptions made in analyses and allow for adaptive management of marine resources. Monitoring is required for compliance with final rules issued under the MMPA, and details of the monitoring program have already been developed in coordination with NMFS through the regulatory process for previous Navy at-sea training and testing actions. No changes are anticipated to the monitoring program or reporting that has been conducted to date. However, discussions with resource agencies during the consultation and permitting processes under the Proposed Action may result in changes to the mitigation, as described in this document.

Monitoring, Research, and Reporting Initiatives

The Navy, NMFS, and the Marine Mammal Commission have held annual adaptive management meetings and additional meetings as needed. These meetings have provided both agencies with an opportunity to clarify information and provide feedback on progress as well as revise monitoring projects and goals within permit cycles.

Dynamic revisions to the monitoring program as a result of adaptive management review included the further development of the Strategic Planning Process (U.S. Department of the Navy, 2013e), which is a planning tool for selection of monitoring investments, and its incorporation into the Integrated Comprehensive Monitoring Program, which was used for subsequent monitoring. Recent monitoring efforts address the Integrated Comprehensive Monitoring Program top-level goals through a collection of specific regional and ocean basin studies based on scientific objectives. The adaptive management review process and reporting requirements serve as the basis for evaluating performance and compliance.

The adaptive management review process is anticipated to continue between the Navy, NMFS, the Marine Mammal Commission, and other experts in the scientific community through technical review meetings and ongoing discussions.

Integrated Comprehensive Monitoring Program

The Integrated Comprehensive Monitoring Program (U.S. Department of the Navy, 2010c) provides the overarching framework for coordination of the Navy's marine species monitoring efforts and serves as a planning tool to focus Navy monitoring priorities pursuant to ESA and MMPA requirements. The purpose of the Integrated Comprehensive Monitoring Program is to coordinate monitoring efforts across all regions and to allocate the most appropriate level and type of monitoring effort for each range complex based on a set of standardized objectives, regional expertise, and resource availability. Although the Integrated Comprehensive Monitoring Program does not identify specific field work or individual projects, it is designed to provide a flexible, scalable, and adaptable framework using adaptive management and strategic planning processes that periodically assess progress and reevaluate objectives.

The Integrated Comprehensive Monitoring Program is evaluated through the Adaptive Management Review process to (1) assess progress, (2) provide a matrix of goals and objectives, and (3) make recommendations for refinement and analysis of monitoring and mitigation techniques. This process includes conducting an annual adaptive management review meeting at which the Navy and NMFS jointly consider the prior-year goals, monitoring results, and related scientific advances to determine if monitoring plan modifications are warranted to more effectively address program goals. Modifications to the Integrated Comprehensive Monitoring Program that result from annual Adaptive Management Review discussions are incorporated by an addendum or revision to the Integrated Comprehensive Monitoring Program as needed.

Under the Integrated Comprehensive Monitoring Program, Navy-funded monitoring relating to the effects of Navy military readiness activities on protected marine species is designed to accomplish one or more top-level goals as described in the Integrated Comprehensive Monitoring Program charter (U.S. Department of the Navy, 2010c):

- An increase in the understanding of the likely occurrence of marine mammals and ESA-listed marine species in the vicinity of the action (e.g., presence, abundance, distribution, and density of species).
- An increase in the understanding of the nature, scope, or context of the likely exposure of marine mammals and ESA-listed species to any of the potential stressors associated with the action (e.g., sound, explosive detonation, or expended materials), through better understanding of one or more of the following: (1) the nature of the action and its surrounding environment (e.g., sound-source characterization, propagation, and ambient noise levels), (2) the affected species (e.g., life history or dive patterns), (3) the likely co-occurrence of marine mammals and ESA-listed marine species with the action (in whole or part), and (4) the likely biological or behavioral context of exposure to the stressor for the marine mammal and ESA-listed marine species (e.g., age class of exposed animals or known pupping, calving, or feeding areas).
- An increase in the understanding of how individual marine mammals or ESA-listed marine species respond (behaviorally or physiologically) to the specific stressors associated with the action (in specific contexts, where possible [e.g., at what distance or received level]).
- An increase in the understanding of how anticipated individual responses to individual stressors or anticipated combinations of stressors may impact either (1) the long-term fitness and survival of an individual; or (2) the population, species, or stock (e.g., through impacts on annual rates of recruitment or survival).
- An increase in the understanding of the effectiveness of mitigation and monitoring measures.
- A better understanding and record of the manner in which the authorized entity complies with the Incidental Take Authorization and Incidental Take Statement.
- An increase in the probability of detecting marine mammals (through improved technology or methods), both specifically within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general, to better achieve the above goals.
- A reduction in the adverse impact of activities to the least practicable level, as defined in the MMPA.

In 2011, a Scientific Advisory Group provided specific programmatic recommendations that continue to serve as guiding principles for the continued evolution of the Integrated Comprehensive Monitoring Program. Key recommendations include the following:

- Working within a conceptual framework of knowledge, from basic information on the occurrence of species within each range complex, to more specific matters of exposure, response, and consequences.
- Facilitating collaboration among researchers in each region, with the intent to develop a coherent and synergistic regional monitoring and research effort.

- Approaching the monitoring program holistically and selecting projects that offer the best opportunity to advance understanding of the issues, as opposed to establishing range-specific requirements.

Strategic Planning Process

The Strategic Planning Process (U.S. Department of the Navy, 2013e) serves to guide the investment of resources to most efficiently address Integrated Comprehensive Monitoring Program objectives and intermediate scientific objectives developed through this process.

The U.S. Navy marine species monitoring program has evolved and improved as a result of the adaptive management review process through changes that include:

- recognizing the limitations of effort-based compliance metrics;
- developing a conceptual framework based on recommendations from the Scientific Advisory Group (U.S. Department of the Navy, 2013e);
- shifting focus to projects based on scientific objectives that facilitate generation of statistically meaningful results upon which natural resources management decisions may be based;
- focusing on priority species or areas of interest as well as best opportunities to address specific monitoring objectives in order to maximize return on investment; and
- increasing transparency of the program and management standards, improving collaboration among participating researchers, and improving accessibility to data and information resulting from monitoring activities.

As a result, the Navy's marine species monitoring program has undergone a transition with the implementation of the Strategic Planning Process under MMPA authorizations. Under this process, Intermediate Scientific Objectives serve as the basis for developing and executing new monitoring projects across Navy training and testing areas in the Atlantic and Pacific Oceans. Implementation of the Strategic Planning Process involves coordination among fleets, system commands, Chief of Naval Operations Energy and Environmental Readiness Division, NMFS, and the Marine Mammal Commission with five primary steps:

- **Identify overarching intermediate scientific objectives.** Through the adaptive management process, the Navy coordinates with NMFS as well as the Marine Mammal Commission to review and revise the list of intermediate scientific objectives that are used to guide development of individual monitoring projects. Examples include addressing information gaps in species occurrence and density, evaluating behavioral responses of marine mammals to Navy military readiness activities, and developing tools and techniques for passive acoustic monitoring.
- **Develop individual monitoring project concepts.** This step generally takes the form of soliciting input from the scientific community in terms of potential monitoring projects that address one or more of the intermediate scientific objectives. This can be accomplished through a variety of forums, including professional societies, regional scientific advisory groups, and contractor support.
- **Evaluate, prioritize, and select monitoring projects.** Navy technical experts and program managers review and evaluate all monitoring project concepts and develop a prioritized ranking. The goal of this step is to establish a suite of monitoring projects that address a cross-section of intermediate scientific objectives spread over a variety of range complexes.

- **Execute and manage selected monitoring projects.** Individual projects are initiated through appropriate funding mechanisms and include clearly defined objectives and deliverables (e.g., data, reports, publications).
- **Report and evaluate progress and results.** Progress on individual monitoring projects is updated through the Navy Marine Species Monitoring Program website as well as annual monitoring reports submitted to NMFS. Both internal review and discussions with NMFS through the adaptive management process are used to evaluate progress toward addressing the primary objectives of the Integrated Comprehensive Monitoring Program and serve to periodically recalibrate the focus of the monitoring program.

These steps serve three primary purposes: (1) to facilitate the Navy in developing specific projects addressing one or more intermediate scientific objectives; (2) to establish a more structured and collaborative framework for developing, evaluating, and selecting monitoring projects across all areas where the Navy conducts military readiness activities; and (3) to maximize the opportunity for input and involvement across the research community, academia, and industry. Furthermore, this process is designed to integrate various elements, including the following:

- Integrated Comprehensive Monitoring Program top-level goals,
- Scientific Advisory Group recommendations,
- integration of regional scientific expert input,
- ongoing adaptive management review dialog between NMFS and the Navy,
- lessons learned from past and future monitoring at Navy training and testing ranges, and
- leveraging of research and lessons learned from other Navy-funded science programs.

The Strategic Planning Process will continue to shape the future of the U.S. Navy Marine Species Monitoring Program and serve as the primary decision-making tool for guiding investments. Information on monitoring projects currently underway in the Atlantic and Pacific Oceans, as well as results, reports, and publications can be accessed through the U.S. Navy Marine Species Monitoring Program website (www.navymarinespeciesmonitoring.us).

Monitoring Progress

The monitoring program has undergone significant changes that highlight its progress through adaptive management. The monitoring program developed for the first cycle of environmental compliance documents (e.g., (U.S. Department of the Navy, 2008a)) utilized effort-based compliance metrics that were somewhat limiting. Through adaptive management discussions the Navy designed and conducted monitoring studies according to scientific objectives, and eliminated specific effort requirements.

Progress has also been made on the conceptual framework categories from the Scientific Advisory Group for Navy Marine Species Monitoring (U.S. Department of the Navy, 2011), ranging from occurrence of animals, to their exposure, response, and population consequences. Lessons learned with Phase I monitoring in Hawaii Range Complex and SOCAL Range Complex suggested that “layering” multiple simultaneous components of monitoring could provide a way to leverage an increase in return of the progress toward answering scientific monitoring questions. For example, in later Phase I Hawaii Range Complex monitoring through Phase III HSTT monitoring, several monitoring efforts coincided on the instrumented Navy training range off Pacific Missile Range Facility during an actual ASW training exercise. The different layers included (1) deploying civilian marine mammal observers aboard a Navy destroyer employing mid-frequency active sonar, (2) a civilian marine mammal aerial survey aircraft orbiting the destroyer during the course of the exercise, (3) Navy acousticians monitoring the exercise participants and animals via the hydrophones of the instrumented range during the exercise, and (4) having satellite tagging of animals performed on the training range just prior to the exercise. This approach of layering different Navy marine species monitoring assets continues to the present day, and each component has grown more technically sophisticated in the pursuit of a monitoring study type known as opportunistic behavioral response study.

Numerous publications, dissertations and conference presentations have resulted from research conducted under the marine species monitoring program (https://www.navymarinespeciesmonitoring.us/reading-room/publications/), resulting in a significant contribution to the body of marine mammal science. Publications on occurrence, distribution and density have fed the modeling input, and publications on exposure and response have informed Navy and NMFS analysis of behavioral response and consideration of mitigation measures.

Furthermore, collaboration between the monitoring program and the Navy's research and development (e.g., Office of Naval Research) and demonstration-validation (e.g., Living Marine Resources) programs has been strengthened, leading to research tools and products that have already transitioned to the monitoring program. These include Marine Mammal Monitoring on Ranges, controlled exposure experiment behavioral response studies, acoustic sea glider surveys, and global positioning system-enabled satellite tags. Recent progress has been made with better integration with monitoring across all Navy at-sea study areas, including the HCTT Study Area in the Pacific Ocean, and various testing ranges. Publications from the Living Marine Resources and Office of Naval Research programs have also resulted in significant contributions to hearing, acoustic criteria used in effects modeling, exposure, and response, as well as in the development of tools to assess biological significance (e.g., consequences).

NMFS and Navy also consider data collected during activity-based mitigations as monitoring. Data are collected by shipboard personnel on hours spent training, hours of observation, hours of sonar, marine mammals observed within the mitigation zone during Major Training Exercises, mitigations implemented, and other activities. These data are provided to NMFS in both classified and unclassified annual exercise reports.

HCTT Navy-Funded Monitoring in California

The Navy has been funding various marine mammal studies and research within the HCTT Study Area for the past 20 years. Under permitting from NMFS starting in 2009, this effort has transitioned from a broader new research only approach, to a specific metric based approach (e.g., set number of visual surveys, specific number of passive acoustic recording devices), and more currently since 2014 a more regional (Hawaii or Southern California) species-specific study question design (e.g., what is distribution of species A within HCTT, what is response of species B to Navy activities). The Navy has spent a total of $20.3M on marine species monitoring within HCTT over the seven-year period from 2018 through 2024. This funding supported field surveys in California and Hawaii, data analysis, and final reporting. Representative projects currently either starting or ongoing within the California Study Area from 2018 through 2024 are listed below:

- A framework for cetacean density estimation using slow-moving underwater vehicles
- A population consequence of acoustic disturbance model for Cuvier's beaked whale in southern California: Photo-id and tag data components
- Auditory Masking in Odobenid and Otariid Carnivores (Project #LMR-61)
- Behavioral and physiological response studies with social delphinid cetaceans using operational and simulated military mid-frequency active sonar

- Behavioral context of blue and fin whale calling for density estimation
- Behavioral response evaluations employing robust baselines and actual Navy training
- Cetacean behavior in relation to oceanography, prey, and mid-frequency active sonar
- Cuvier's Beaked Whale and Fin Whale Behavior During Military Sonar Operations: Using Medium-term Tag Technology to Develop Empirical Risk Functions (Project #LMR-23)
- Dependence of TTS on Exposure Duration During Simulated Continuously Active Sonar (Project #LMR-51)
- Developing metrics of animal condition and their linkage to vital rates: Further development of the Potential Consequences of Disturbance model
- Development of an index to measure body condition of free-ranging cetaceans
- Dolphin Conditioned Hearing Attenuation (Project #LMR-55)
- Effect of Signal Duration on Perceived Loudness in Bottlenose Dolphins and California Sea Lions (Project #LMR-69)
- Environmental DNA (eDNA) metabarcoding for estimating haplotype diversity and population differentiation of social odontocetes
- Fin whale song evolution and cue rate drift over 12 years in the central and eastern North Pacific
- Fine-scale dive behavior of marine mammals in relation to oceanography, prey and mid-frequency active sonar
- Focused Next Steps for Behavioral and Physiological Response Studies with Social Delphinids off Southern California
- Identification of Navy-relevant oceanographic hotspots guided by ethical practices and experiential learning
- Improving estimates of Cuvier's beaked whale sonar response by linking satellite tag and range acoustic data
- Improved Tag Attachment System for Remotely-deployed Medium-term Cetacean Tags (Project #LMR-41)
- Integrating information on displacement caused by mid-frequency active sonar and measurements of prey field into a population consequences of disturbance model for beaked whales
- Integrating remote sensing methods to measure baseline behavior and responses of social delphinids to Navy sonar
- Integration and Field Evaluation of the Next Generation High-fidelity Sound and Movement Tags to Investigate Behavioral Response (Project #LMR-56)
- Long-term field validation and software integration for the SonarPoint underwater acoustic recording system
- Loudness Perception in Killer Whales (Orcinus orca); Effects of Temporal and Frequency Summation (Project #LMR-50)
- Measuring the Effect of Range on the Behavioral Response of Marine Mammals Through the Use of Navy Sonar (Project #LMR-30)
- Measuring stress hormone levels and reproductive rates in two species of common dolphins relative to mid-frequency
- Multi-spaced Measurement of Underwater Sound Fields from Explosive Sources (Project #LMR-35)
- Planning for a pilot global eDNA marine collection and analysis program (GEMCAP)
- Relationship between blue, fin, and beaked whales and their prey in Southern California
- SOARing for data: Assessing the body condition of Cuvier's beaked whales on a Navy sonar range using aerial photogrammetry

  - Standardizing Auditory Evoked Potential Hearing Thresholds with Behavioral Hearing Thresholds (Project #LMR-47)
  - Studying Marine Mammal Behavioral Response to Surveillance Towed Array Sensor System Low Frequency Active Sonar (Projects #LMR-52,53,54)
  - Targeted management approaches for minimizing Navy activity impacts on long-lived vertebrates
  - The use of Navy range bottom-mounted, bi-directional transducers for long-term, deep-ocean prey mapping
  - Using passive and active acoustics to examine relationships of cetacean and prey densities

In coordination with NMFS and based on over 24 years of monitoring on SNI during vehicle launch events on SNI, the Navy will continue the current monitoring protocols for pinnipeds. The monitoring requirements include the following:

- For missiles or targets not previously monitored for at least three launches, Navy staff shall place video cameras and autonomous audio recorders at up to three selected haulout sites to record pinniped reactions to the launches and received level sound.
- The Navy must use one autonomous audio recorder to make acoustical measurements near the launch site of missiles or targets not previously monitored for at least three launches.
- In consultation with NMFS, the Navy shall develop and implement a monitoring plan for beaches exposed to vehicle launch noise with the goal of assessing baseline pinniped distribution/abundance and potential changes in pinniped use of these beaches after launch events.

The Navy adheres to the following reporting and coordination requirements for activities within the PMSR:

- Monitoring and annual reporting on observations of pinniped reactions to target and missile launches from SNI Reports
- Annual training and testing activity reports for activities covered by the MMPA authorization
- Ship strike notification
- Stranding notification – marine mammal and sea turtles

The Navy will continue reporting requirements resulting from the MMPA and ESA consultations.

The National Defense Appropriation Act for Fiscal Year 2016 (Public Law 114-92, 10 U.S.C. Chapter 631 Section 7235) directed the Secretary of the Navy to establish Southern Sea Otter Military Readiness Areas at SNI and SCI. As required by Public Law 114-92, the Secretary of the Navy established Southern Sea Otter Military Readiness Areas around San Nicolas Island and San Clemente Island by Memorandum on April 13, 2016.

Public Law 114-92 also requires the Navy to conduct monitoring and research within Southern Sea Otter Military Readiness Areas to determine the effects of military readiness activities on the growth or decline of the southern sea otter population and on the nearshore ecosystem. Monitoring and research parameters and methods are determined in consultation with the USFWS. Reports to Congress and the public documenting this monitoring effort are required every 3 years.

The Secretary of the Navy established monitoring methods and research parameters in consultation with USFWS by memorandum on December 12, 2016. The agreed-upon Monitoring and Research Plan for Southern Sea Otter Readiness Areas has three tiers, using population status and changes in military readiness activities as triggers for the various levels of research and monitoring proposed. The Monitoring and Research Plan has several elements, including kelp forest ecosystem monitoring and analysis, analysis of sea otter population trends, analysis of subtidal benthic communities, and determination of factors affecting sea otter population change. Congress, through the Monitoring and Research Plan for Southern Sea Otter Readiness Areas, requires the Navy to submit a 3-year report to Congress on the results of the quarterly monitoring and other research efforts. The Navy submitted three reports to Congress in 2017, 2020, and 2023.

The ongoing regional species-specific study questions and results from recent efforts are publicly available on the Navy's Monitoring Program website. In adaptive management consultation with NMFS, some variation of these ongoing studies or proposed new studies will continue within HCTT for either the duration of any new regulations, or for a set period as specified in a given project's scope. Some projects may only require 1 or 2 years of field effort. Other projects could entail multi-year field efforts (2–5 years). Most current HCTT projects are multi-year ongoing studies such as odontocete tagging and behavioral response to sonar in Hawaii, and beaked whale distribution and response to sonar in California. The exact combination of final HCTT monitoring projects will be finalized with NMFS prior to the HCTT proposed rule and posted on the Navy's Monitoring Program website.

MARINE MAMMALS: ACOUSTIC STRESSORS

The following section summarizes the analysis and conclusions of potential effects on marine mammals due to acoustic stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.7.3.2 (Acoustic Stressors).

Marine Mammals: Effects from Sonar and Other Transducers

Sonar and other transducers (hereinafter inclusively referred to as sonar) have the potential to affect marine mammals by causing auditory injuries, TTS, masking, non-injurious physiological responses (such as stress), or behavioral reactions. Low- (less than 1 kHz), mid- (1 to 10 kHz), and some high (10 to 100 kHz) frequency sonars are within the hearing range of all marine mammals. Additionally, all high- and very high-frequency (100 to 200 kHz) sonars are in the hearing range of all odontocetes (HF and VLF hearing groups).

Sonars with higher source levels, longer durations, higher duty cycles, and frequencies near the best range of hearing are more likely to affect hearing. Due to their high source levels and low transmission loss (compared to higher frequency sources), ASW sonar sources, including hull-mounted sonar (MF1) and high duty cycle hull-mounted sonar (MF1C), have large zones of effects.

In general, the estimated number of predicted auditory effects have increased since the 2018 HSTT EIS/OEIS. While some increases may be attributable to changes in the Proposed Action and increase in action areas (e.g., inclusion of NOCAL Range Complex), many increases are due to changes in methodologies used to model effects that are listed in Section 3.7.3.1 (Mitigation Summary) of the 2024 HCTT Draft EIS/OEIS. Notably, the updated criteria for the HF cetacean auditory group, which includes delphinids and most other odontocetes, and the Phocid in Water (PCW) auditory group indicate increased susceptibility to auditory effects at low and mid-frequencies compared to the prior auditory criteria. Consequently, predicted auditory effects due to most ASW sonars are substantially higher for these groups than in prior analyses of the same activities. The change in susceptibility to auditory effects due to sonars is less pronounced for other auditory groups. For most auditory groups, the revision to the avoidance model, which assumes that some marine mammals may avoid sound levels that can cause auditory injury, has also resulted in increased estimates of auditory injuries for certain activities, particularly certain high duty cycle sources. The revised avoidance method bases the initiation of an avoidance response on the behavioral response criteria. The ability to avoid a sonar exposure that may cause auditory effects in the model depends on a species' susceptibility to auditory effects, a species' sensitivity to behavioral disturbance, and characteristics of the sonar source, including duty cycle, source level, and frequency. Thus, predicted auditory effects for species that are less sensitive to disturbance compared to susceptibility to auditory effects have increased.

Most ASW sonars are composed of individual sounds which are short, lasting up to a few seconds each. Systems typically operate with low-duty cycles (less frequent pulses with longer intervals between them) for most tactical sources, but some systems may operate nearly continuously or with higher duty cycles (more frequent pulses with shorter intervals between them). Some testing activities may also use sonars with high duty cycles. These higher duty cycle sources would pose a greater risk of masking than intermittent sources. Most ASW activities are geographically dispersed, have a limited duration, and intermittently use sonars with a narrow frequency band. These factors reduce the potential for significant or extended masking in marine mammals.

The number of predicted behavioral effects has changed for all stocks since the prior analysis. These changes are primarily due to revisions to the behavioral response functions. The updated behavioral response functions predict greater sensitivity for the pinniped behavioral group and lower sensitivity for the odontocete and mysticete behavioral groups compared to the previous behavioral response functions. The new function for the sensitive species behavioral group predicts greater sensitivity at lower received levels for beaked whales and harbor porpoises. In addition, the cut-off conditions for predicting behavioral responses have been revised. These factors interact in complex ways that make comparing the predicted behavioral responses in this analysis to the prior analyses challenging.

The Action Proponents will implement activity-based mitigation under the Proposed Action to reduce potential effects from sonar on marine mammals. While model-predicted effects are not reduced to account for activity-based mitigation, opportunities to mitigate model-predicted effects were identified by determining if the closest points of approach associated with predicted auditory injuries were also within the mitigation zone. This analysis is presented in Appendix E (Explosive and Acoustic Analysis Report) of the 2024 HCTT Draft EIS/OEIS. The Action Proponents will also implement geographic mitigation to reduce potential acoustic effects within important marine mammal habitats as identified in Appendix C (Mitigation) of this CD.

Under the Proposed Action, the overall use of sonar and other transducers would increase from the 2018 HSTT EIS/OEIS for both training and testing activities for most sources. For regular duty cycle (MF1) hull-mounted sonar, the maximum year of training and testing activities includes greater than 20 percent more hours in the California Study Area compared to the prior analysis. For high duty cycle (MF1C) hull-mounted sonar, the maximum year of training and testing activities includes approximately 50 percent more hours in the California Study Area compared to the prior analysis.

Depending on the stock, effects on individuals may be permanent (auditory injuries) or temporary (TTS, masking, stress, or behavioral response). Behavioral patterns of some individuals, which may include communication, foraging, or breeding, are likely to be temporarily disrupted. Individuals or groups may avoid areas around sonar activities and be temporarily displaced from a preferred habitat. Displacement may be brief for short duration activities or extended for multi-day events and would depend on the behavioral sensitivity of the species. Sensitive species, particularly beaked whales, may avoid for farther distances and for longer durations. Most activities do not occur for extended multi-day periods and would occur over small areas relative to population ranges. The average rate of predicted effects on individuals in most populations would range from less than once per year to several times per year. Individuals of some behaviorally sensitive species or in populations concentrated near range complexes in the Pacific may have higher repeated effects. These effects are not expected to interfere with feeding, reproduction, or other biologically important functions such that the continued viability of the population would be threatened.

Marine Mammals: Effects from Air Guns

Air guns create intermittent, broadband, impulsive sounds. The broadband impulses from air guns are within the hearing range of all marine mammals. Potential effects from air guns could include auditory injuries, TTS, behavioral reactions, physiological response, and masking. Single, small air guns lack the peak pressures that could cause auditory injuries for most auditory groups.

While studies have observed marine mammal responses to large, commercial air gun arrays, the small single air guns used in the Proposed Action would be used over a much shorter period and more limited area. Reactions to air gun use in the Proposed Action are less likely to occur or rise to the same level of severity as observed during seismic use.

Air guns would not be used during training activities. The proposed use of air guns increased for testing from the 2018 HSTT EIS/OEIS. Air gun use during military readiness activities is limited and unlike large-scale seismic surveys that use multiple large air guns. Air gun use would occur nearshore in the SOCAL Range Complex under Intelligence, Surveillance, and Reconnaissance activities, and greater than 3 NM from shore in the Hawaii, NOCAL, and SOCAL Range Complexes under Acoustic and Oceanographic Research.

Overall, the number of potential effects to marine mammals is very low. A small number of auditory effects are predicted for species in the most sensitive hearing group, the VHF cetaceans, which has a substantially lower threshold for auditory effects than other auditory groups for exposure to peak pressures from impulsive sounds. A small number of behavioral responses are also predicted for several species, especially those with large population abundances (e.g., short-beaked common dolphins, California sea lions).

Although air gun effects are limited, there is a potential for long-term effects on any individual with an auditory injury. Most effects, however, are expected to be TTS or temporary behavioral responses. The average risk of effect on individuals in any population is extremely low. Effects due to air guns are unlikely to affect survival, growth, recruitment, or reproduction of any marine mammal populations.

Marine Mammals: Effects from Pile Driving

Only the Port Damage Repair activity at Port Hueneme includes pile driving. The impact and vibratory pile driving hammers would expose marine mammals to impulsive and continuous non-impulsive broadband sounds, respectively. Potential effects could include auditory injuries, TTS, behavioral reactions, physiological responses (stress), and masking. This analysis applies NMFS' recommended thresholds for behavioral responses to impact and vibratory pile driving.

As discussed in Appendix C (Mitigation) of this CD, the Action Proponents will implement activity-based mitigation to reduce potential effects from pile driving on marine mammals.

Impact and vibratory pile driving would not occur during testing activities. Pile driving would occur as part of Port Damage Repair activities in Port Hueneme, California. Impact and vibratory pile driving during Port Damage Repair activities can occur over a period of 14 days during each event, and up to 12 times per year. Pile driving activities would occur intermittently in very limited areas and would be of temporary duration. The activity location is in a highly urbanized all quay wall port. Only two species are anticipated to be present in the nearshore waters by Port Hueneme: California sea lions and harbor seals.

The pile driving mitigation zone encompasses the relatively short ranges to auditory injuries and TTS for the Otariid in Water and PCW hearing groups and soft start procedures are employed. Auditory effects are unlikely, but masking, physiological responses, or behavioral reactions may occur over limited periods at farther distances. Pile driving would occur in an industrialized location with existing higher ambient noise levels. Depending on where the activity occurs at Port Hueneme, transmission of pile driving noise may be reduced by existing pier structures. Due to the low number of days the activity would occur and the intermittent use of pile driving hammers, effects are expected to be minor and temporary (lasting minutes to hours) or short-term (day).

Marine Mammals: Effects from Vessel Noise

Marine mammals may be exposed to noise from vessel movement. Vessel movements involve transits to and from ports to various locations within the California Study Area. At San Diego Bay for example, there are about 225 commercial ship transits per day, most during daylight hours, plus an unknown but potentially equal number of recreational vessels moving in and out of the bay (U.S. Department of the Navy, 2013c, 2015a). Many ongoing and proposed military readiness activities involve maneuvers by various types of surface ships, boats, and submarines (collectively referred to as vessels).

Noise from vessels generally lacks the amplitude and duration to cause any hearing loss in marine mammals under realistic conditions. Noise from vessels is generally low frequency (10 to hundreds Hz), although at close range or in shallow water it can extend above 100 kHz at received levels above 100 dB re 1 µPa (Hermannsen et al., 2014). Although periods of broadband noise tend to be brief, occurring only as a vessel is passing within a few hundred meters, vessel noise could lead to short-term masking for all marine mammal species. Vessel noise has been linked to behavioral responses, although it is difficult to separate responses to the noise from reactions to the physical presence of the vessel. Physiological stress has also been linked to chronic vessel noise, such as that in shipping lanes or heavily trafficked whale-watch areas. However, based on the generally short duration, relatively low source levels of many Navy vessels, and the transient nature of Navy vessel noise, behavioral, physiological stress and masking reactions, if they occur, are unlikely to have an effect on marine mammals.

Navy vessel traffic could occur anywhere within the California Study Area, but would be concentrated within the easternmost part of Southern California (Mintz, 2012; Mintz, 2016). Activities involving vessel movements are variable in duration, ranging from a few hours up to two weeks, but are typically episodic and related to training or testing. During military readiness activities, speeds generally range from 10 to 14 knots; however, vessels can and will, on occasion, operate within the entire spectrum of their specific operational capabilities. In addition, a variety of smaller craft will be operated. Small craft types, sizes, and speeds vary. In all cases, the vessels/craft will be operated in a safe manner consistent with the local conditions.

Vessel traffic related to the proposed activity would pass near marine mammals only on an incidental basis. Mitigation measures described in Appendix C (Mitigation) of this CD include several provisions to avoid approaching marine mammals, which would further reduce any potential impacts. Navy ports such as San Diego are heavily trafficked with private and commercial vessels in addition to naval vessels. Because Navy ships make up only a small proportion of the total ship traffic, even in the most concentrated port and inshore areas, proposed Navy vessel transits are unlikely to cause significant behavioral responses or long-term abandonment of habitat by a marine mammal.

Vessel noise can potentially mask vocalizations and other biologically important sounds (e.g., sounds of prey or predators) that marine mammals may rely on. Potential masking can vary depending on the ambient noise level within the environment, the received level and frequency of the vessel noise, and the received level and frequency of the sound of biological interest. In the open ocean, ambient noise levels are between about 60 and 80 dB re 1 µPa in the band between 10 Hz and 10 kHz due to a combination of natural (e.g., wind) and anthropogenic sources (Urick, 1983), while inshore noise levels, especially around busy ports, can exceed 120 dB re 1 µPa. When the noise level is above the sound of interest, and in a similar frequency band, masking could occur. This analysis assumes that any sound that is above ambient noise levels and within an animal's hearing range may potentially cause masking. However, the degree of masking increases with increasing noise levels; a noise that is just detectable over ambient levels is unlikely to cause any substantial masking. Masking by passing ships or other transiting sound sources would be short term and intermittent, and therefore unlikely to result in any substantial costs or consequences to individual animals or populations. Areas with increased levels of ambient noise from anthropogenic noise sources such as areas around busy shipping lanes and near harbors and ports may cause sustained levels of masking for marine mammals, which could reduce an animal's ability to find prey, find mates, socialize, avoid predators, or navigate. However, Navy vessels make up a very small percentage of the overall traffic (two orders of magnitude lower than commercial ship traffic in the California Study Area), and the rise of ambient noise levels in these areas is a problem related to all ocean users, including commercial and recreational vessels and shoreline development and industrialization.

Surface combatant ships (e.g., guided missile destroyer, guided missile cruiser, and Littoral Combat Ship) and submarines are designed to be very quiet to evade enemy detection and typically travel at speeds of 10 or more knots. Actual acoustic signatures and source levels of combatant ships and submarines are classified; however, they are quieter than most other motorized ships. Still, these surface combatants and submarines are likely to be detectable by marine mammals over open-ocean ambient noise levels at distances of up to a few kilometers, which could cause some masking to marine mammals for a few minutes as the vessel passes by. Other Navy ships and small vessels have higher source levels, similar to equivalently sized commercial ships and private vessels. Ship noise tends to be low frequency and broadband; therefore, it may have the largest potential to mask mysticetes that vocalize and hear at lower frequencies than other marine mammals. Noise from large vessels and outboard motors on small craft can produce source levels of 160 to over 200 dB re 1 µPa at 1 m. Therefore, in the open ocean, noise from noncombatant Navy vessels may be detectable over ambient levels for tens of kilometers, and some masking, especially for mysticetes, is possible. In noisier inshore areas around Navy ports and ranges, vessel noise may be detectable above ambient for only several hundred meters. Some masking to marine mammals is likely from noncombatant Navy vessels, on par with similar commercial and recreational vessels, especially in quieter, open-ocean environments.

Vessel noise has the potential to disturb marine mammals and elicit an alerting, avoidance, or other behavioral reaction. Most studies have reported that marine mammals react to vessel sounds and traffic with short-term interruption of feeding, resting, or social interactions (Magalhães et al., 2002;

Richardson et al., 1995; Watkins, 1981). Some species respond negatively by retreating or responding to the vessel antagonistically, while other animals seem to ignore vessel noises altogether or are attracted to the vessel (Watkins, 1986). Marine mammals are frequently exposed to vessels due to research, ecotourism, commercial and private vessel traffic, and government activities. It is difficult to differentiate between 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.

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. Kogia species and beaked whales have been observed avoiding 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. Overall, marine mammal reactions to vessel noise associated with military readiness activities are likely to be minor and short term, leading to no significant reactions and no long-term consequences.

Marine Mammals: Effects from Aircraft Noise

Marine mammals may be exposed to aircraft-generated noise throughout the California Study Area. Fixed- and rotary-wing aircraft are used for a variety of military readiness activities. Most of these sounds would be concentrated around airbases and fixed ranges within the range complex. Aircraft produce extensive airborne noise from either turbofan or turbojet engines. An infrequent type of aircraft noise is the sonic boom, produced when the aircraft exceeds the speed of sound. Rotary-wing aircraft (e.g., helicopters) produce low-frequency sound and vibration (Pepper et al., 2003).

Sound from aircraft noise, including occasional sonic booms, lack the amplitude or duration to cause any hearing loss in marine mammals underwater. Aircraft would pass quickly overhead and rotary-wing aircraft (e.g., helicopters) may hover for a few minutes at a time over the ocean. Due to the brief and dispersed nature of aircraft overflights, masking is also unlikely. Potential impacts from overflight noise are limited to brief behavioral and physiological stress reactions as aircraft passes overhead. Based on the short duration of potential exposure to overflight noise, behavioral and physiological stress reactions, if they did occur, are unlikely to result in long-term consequences.

Marine mammals may respond to both the physical presence and to the noise generated by aircraft, making it difficult to attribute causation to one or the other stimulus. In addition to noise produced, all low-flying aircraft make shadows, which can cause animals at the surface to react. Helicopters may also produce strong downdrafts, a vertical flow of air that becomes a surface wind, which can also affect an animal’s behavior at or near the surface.

Transmission of sound from a moving airborne source to a receptor underwater is influenced by numerous factors, but significant acoustic energy is primarily transmitted into the water directly below the craft in a narrow cone. Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft.

In most cases, exposure of a marine mammal to fixed- or rotary-wing aircraft presence and noise would last for only seconds as the aircraft quickly passes overhead. Animals would have to be at or near the surface at the time of an overflight to be exposed to appreciable sound levels. Takeoffs and landings occur at established airfields as well as on vessels at sea at unspecified locations across the California

Study Area. Takeoffs and landings from Navy vessels could startle marine mammals; however, these events only produce in-water noise at any given location for a brief period as the aircraft climbs to cruising altitude. Some sonic booms from aircraft could startle marine mammals, but these events are transient and happen infrequently at any given location within the California Study Area. Repeated exposure to most individuals over short periods (days) is extremely unlikely, except for animals that are resident in inshore areas around Navy ports, on Navy fixed ranges (e.g., the Southern California Offshore Anti-Submarine Warfare Range), or during major training exercises. These animals could be subjected to multiple overflights per day; however, aircraft would pass quickly overhead, typically at altitudes above 3,000 ft., which would make marine mammals unlikely to respond. No long-term consequences for individuals or populations would be expected.

Low flight altitudes of helicopters during some ASW and mine warfare activities, often under 100 ft., 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. Marine mammals would likely avoid the area under the helicopter. It is unlikely that an individual would be exposed repeatedly for long periods because these aircraft typically transit open ocean areas. The consensus of all the studies reviewed is that aircraft noise would cause only small temporary changes in the behavior of marine mammals. Specifically, marine mammals at or near the surface when an aircraft flies overhead at low altitude may startle, divert their attention to the aircraft, or avoid the immediate area by swimming away or diving. No more than short-term reactions are likely. No long-term consequences for individuals, species, or stocks would be expected.

Marine Mammals: Effects from Weapons Noise

Marine mammals may be exposed to sounds caused by the firing of weapons, objects in flight, and impact of non-explosive munitions on the water surface during activities conducted at sea. This incidental noise is collectively called weapons noise.

Firing of guns, vibrations from the hull of ships, items that impact the water's surface, and items launched from underwater may produce weapons noise and affect marine mammals in the water or underwater. Air vehicle and missile launches at SNI would result in in-air noise that may affect pinnipeds hauled out at SNI.

As discussed in Appendix C (Mitigation) of this CD, the Action Proponents will implement visual observation mitigation to reduce potential effects from weapons noise on marine mammals. The Action Proponents will also implement geographic mitigation to reduce potential acoustic effects within important marine mammal habitats.

Based on the updated background and previous analysis for military readiness activities under the Proposed Action, the effect of weapon noise on marine mammals would be limited to temporary behavioral responses. Marine mammals may startle or avoid the immediate area. Because firing of medium and large caliber gunnery would occur greater than 12 NM from shore, effects to coastal species are unlikely.

Based on observations made during monitoring launch events at SNI for almost two decades (Burke, 2017; Holst et al., 2011; Holst & Greene Jr., 2005) , the total estimated take of marine mammals (hauled out pinnipeds) per year and over the seven-year period is based on the total number of launches, the number of takes per launch, and the total annual potential Level B harassments under the Proposed Action. Under the Proposed Action, there are no more than 40 launch events per year from SNI involving various missiles and aerial targets. Consistent with the current NMFS authorization for the activity (84 FR

18809), the number of pinnipeds assumed to be taken by Level B harassment at SNI per launch is one elephant seal, 12 harbor seals, and 275 California sea lions per launch event.

For each launch, the species and number of pinnipeds affected is estimated using video recordings or time-lapse camera photos. When appropriate, extrapolations of the number of pinnipeds affected were made when the field of view of the camera did not include the entire beach being monitored.

Only pinnipeds that moved more than 10 m or entered the water were counted as being behaviorally “taken” for the purposes of the take authorization. Actual annual take number are assumed based on comparing the number of pinnipeds observed in images taken prior to the launch event to images taken immediately after the launch event. There is no evidence of pinniped injuries, fatalities or pup abandonment related to the monitored launches during any monitoring period since 2001. The predicted MMPA Level B behavioral harassments are not expected to result in long-term consequences for elephant seals, harbor seals, or California sea lions.

Therefore, no long-term consequences to marine mammal populations are expected as a result of the effects from weapons noise.

MARINE MAMMALS: EXPLOSIVE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on marine mammals due to explosive stressors associated with miliary readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.7.3.3 (Explosive Stressors).

Explosions produce loud, impulsive, broadband sounds with sharp pressure peaks that can be injurious. Potential effects from explosive energy and sound include non-auditory injury (including mortality), auditory effects (AINJ and TTS), behavioral reactions, physiological response, and masking.

Explosive noise is very brief and intermittent. Detonations usually occur in a limited area over a brief period rather than being widespread. The potential for masking is limited. Marine mammals may behaviorally respond, but responses to single detonations or clusters may be limited to startle responses.

As discussed in Appendix C (Mitigation) of this CD, the Action Proponents will continue to implement mitigation to reduce potential effects from explosives on marine mammals.

Marine Mammals: Effects from Explosives

The use of in-water explosives would increase from the 2018 HSTT EIS/OEIS for training activities and would decrease slightly for testing. There is an overall reduction in the use of most of the largest explosive bins (bin E8 [> 60–100 lb. net explosive weight (NEW)] and above) for training and a decrease in two of the largest explosive bins (bin E10 [> 250–500 lb. NEW] and E11 [> 500–650 lb. NEW]) under testing activities. There would be notable increases in the smaller explosive bins (E7 [> 20–60 lb. NEW] and below) under military readiness activities, except for bin E1 (0.1–0.25 lb. NEW) which would decrease under testing activities. Small ship shock trials (bin E16 [> 7,250–14,500 lb. NEW]) not previously analyzed are currently proposed under testing activities.

Most activities involving in-water (including surface) explosives associated with large caliber naval gunfire, missiles, bombs, or other munitions are conducted more than 12 NM from shore. This includes Small Ship Shock Trials that could occur in the SOCAL Range Complex. Sinking Exercises are conducted greater than 50 NM from shore. Certain activities with explosives may be conducted close to shore at locations identified in Appendix A (Activity Descriptions) and Appendix H (Description of Systems and

Ranges) of the 2024 HCTT Draft EIS/OEIS, including certain Mine Warfare and Expeditionary Warfare activities. In the SOCAL Range Complex, explosive activities could occur near San Clemente Island, in the SSTC, and in other designated mine training areas along the Southern California coast.

Nearly all predicted training mortalities and a portion of the testing mortalities are attributable to Mine Warfare. However, except for an incident a number of years ago within the SSTC, no mortalities to marine mammals resulting from Mine Warfare underwater detonations have been observed. Tables 3.7-15 (Effects Due to a Maximum Year of Explosive Testing and Training Activity Under Alternative 1 and 2) and 3.7-16 (Effects due to Seven Years of Explosive Testing and Training Activity Under Alternative 1 and 2) in the 2024 HCTT Draft EIS/OEIS provide all take numbers, including mortalities, for each species and stock in the HCTT Study Area. A large portion of the testing mortalities are attributable to Small Ship Shock Trial. Both activities have extensive pre- and during event activity-based mitigation requirements as described in Appendix C (Mitigation) of this CD that would reduce the risk that these mortalities would occur. The Action Proponents conduct passive acoustic monitoring and extensive visual observations for ship shock trials in accordance with NMFS-reviewed event-specific mitigation and monitoring plans (see Appendix C, Mitigation). Adherence to these plans increases the likelihood that Lookouts would sight surface active marine mammals within the ship shock trial mitigation zone. For other explosive activities, the Action Proponents will also implement mitigation to relocate, delay, or cease detonations when a marine mammal is detected or sighted within or entering a mitigation zone to avoid or reduce potential explosive effects.

Depending on the stock, effects to individuals may be permanent (auditory injuries or mortality) or temporary (non-auditory injury, TTS, masking, stress, or behavioral response). The behavioral patterns of a limited number of individuals may be interrupted. Individuals or groups may temporarily avoid areas around explosive activities if multiple detonations occur. Activities would be relatively brief and occur over small areas relative to population ranges. Permanent effects would be present in low enough numbers such that the continued viability of populations is not threatened. The total effects are not expected to interfere with feeding, reproduction, or other biologically important functions such that the continued viability of the population would be threatened.

Therefore, no long-term consequences to marine mammal populations are expected. Accordingly, there would be no consequences to marine mammal populations from explosive stressors.

MARINE MAMMALS: PHYSICAL DISTURBANCE AND STRIKE STRESSORS

The following section summarizes the analysis and conclusions of potential effects on marine mammals due to physical disturbance and strike stressors associated with military readiness activities. For additional background information and analysis, see the 2024 HCTT Draft EIS/OEIS, Section 3.7.3.5 (Physical Disturbance and Strike Stressors). Physical disturbance includes the potential for strike during military readiness activities within the Study Area from (1) vessels and in-water devices; (2) MEM, including non-explosive practice munitions and fragments from high-explosive munitions; (3) seafloor devices, including cables and equipment associated with range modernization; and (4) pile driving

The way a physical disturbance may affect a marine mammal would depend in part on the relative size of the object, the speed of the object, the location of the marine mammal in the water column, and reactions of marine mammals to anthropogenic activity, which may include avoidance or attraction. It is not known at what point or through what combination of stimuli (visual, acoustic, or through detection in pressure changes) an animal becomes aware of a vessel or other potential physical disturbances before reacting or being struck. A physical disturbance should be very rare and brief, the cost from the response is likely to be within the normal variation experienced by an animal in its daily routine unless the animal is struck. If a strike does occur, the cost to the individual could range from slight injury to mortality.

Marine Mammals: Effects from Vessels and In-Water Devices

Vessel strike to marine mammals is not associated with any specific training or testing activity but rather an inadvertent, limited, sporadic, and incidental result of Navy and USCG vessel movement within the Study Area. The Navy and Coast Guard do not anticipate vessel strikes to be a significant threat to marine mammal populations within the Study Area. This assessment is based on the probability of strike analysis presented in Appendix I (Military Expended Materials, Direct Strike, and Ship Strike Effects Analysis) of the 2024 HCTT Draft EIS/OEIS (and summarized below), the cumulative low recent history of Navy vessel strikes from 2017 to 2023, establishment and updates to the Navy's Marine Species Awareness Training, and adaptation of additional mitigation measures since 2018.

In-water devices could pose a collision risk to marine mammals when operated at high speeds or are unmanned. In-water devices, such as unmanned underwater vehicles, and in-water devices towed from unmanned platforms that move slowly through the water are highly unlikely to strike marine mammals because the mammal could easily avoid the object. In-water devices towed by manned platforms would have observers stationed on the towing platform to implement mitigation and standard safety measures employed when towing in-water devices (see Appendix C, Mitigation, of this CD). Torpedoes (a type of in-water device) are generally smaller (several inches to 111 ft.) than most vessels. The Navy reviewed torpedo design features and a large number of previous ASW torpedo exercises to assess the potential of torpedo strikes on marine mammals. The tactical software that guides U.S. Navy torpedoes is sophisticated and would not identify a marine mammal as a target. All non-explosive torpedoes are recovered after being fired and are reconfigured for re-use. In thousands of exercises in which torpedoes were fired or in-water devices used, there have been no recorded or reported instances of a marine mammal strike.

Since some in-water devices are identical to support craft, marine mammals could respond to the physical presence of the device similar to how they respond to the physical presence of a vessel. It is possible that marine mammal species that occur in areas that overlap with in-water device use and may experience some level of physical disturbance, but it is not expected to result in more than a momentary behavioral response.

The concentration of vessels in the California Study Area and the manner of military readiness activities would remain consistent with the levels and types of activities undertaken in the Study Area over the last decade even though the Study Area off California has been expanded to include the PMSR and NOCAL Range Complex. The analysis of adverse effects from in-water devices on marine mammals presented in the 2018 HSTT EIS/OEIS remains valid and is applicable to the NOCAL Range Complex, considering the limited number of activities using in-water devices occurring there, and expanded warning areas adjacent to the SOCAL Range Complex.

Physical disturbance and strike from large vessels and in-water devices would be more likely in waters over the continental shelf than in the open ocean farther from shore, because of the concentration of large vessel traffic and in-water device activities are greater as are marine mammal densities for most cetacean species (U.S. Department of the Navy, 2024b). Marine mammal species that tend to occur over the continental shelf would therefore have a greater potential to be adversely affected. Large vessels may occasionally be required to operate at speeds that are higher than average operating speeds, which may pose a greater strike risk to marine mammals, because there would be less time for the vessel crew to detect a marine mammal and maneuver to avoid a strike, and there would be less time over a given distance for the animal to react and avoid the vessel. Two of the three recent Navy vessel strikes of whales that occurred in the California Study Area were associated with vessels operating at higher speeds; however, the third strike in 2023 occurred when a vessel was traveling at a relatively low speed.

The use of small crafts traveling at higher speeds (i.e. greater than 10 knots) during military readiness activities occurs more frequently, although not exclusively, in nearshore waters, ports, and harbors than in offshore waters far from shore. One notable exception is the use of small range boats to recover torpedoes at SOAR. This range has both offshore and nearshore components. Nearshore waters in the Study Area are generally more confined waterways where species that prefer deep, offshore waters do not regularly occur. Odontocetes known to occur in nearshore waters, such as bottlenose dolphins and harbor porpoises, are not as susceptible to vessel strikes as mysticetes; although strikes are known to occur to these species. No vessel strikes of marine mammals have been reported due to vessel activities in nearshore waters and ports and harbors.

Physical disturbance from small crafts operating at higher speeds would be limited to areas where those vessels tend to operate on a regular basis, specifically, closer to shore, in ports and harbors, and at the offshore underwater ranges. Marine mammal species with the highest densities in these areas (e.g., bottlenose dolphins, harbor porpoises, and California sea lions off California) would have a higher potential for vessel strike by small craft.

Military readiness activities involving vessels and in-water devices may occur year-round; therefore, adverse effects from physical disturbance would depend on each species' seasonal patterns of occurrence or degree of residency, primarily in the continental shelf portions of the Study Area. As previously indicated, any physical disturbance from vessel movements and use of in-water devices is not expected to result in more than a brief behavioral response (e.g., avoidance).

Pinniped occurrence within the California Study Area varies seasonally for most species (U.S. Department of the Navy, 2024b). While it is possible that vessels could encounter pinnipeds in offshore waters of the Study Area, in particular migrating northern elephant seals and Guadalupe fur seals that distribute widely offshore following breeding and molting, pinnipeds are highly mobile in the water and would likely be able to avoid an oncoming large vessel moving in nearshore channels. Movements of large vessel in nearshore waters would be at relatively slow speeds and would have limited overlap with pinniped occurrence. High-speed small craft movements in nearshore waters, including San Diego Bay, would occur frequently; however, pinnipeds occurring in nearshore waters spend large amounts of time hauled out and display high maneuverability in the water, suggesting they could avoid interactions with small crafts as well. The only pinniped known to occur regularly in San Diego Bay is the California sea lion. Compared to cetaceans, pinnipeds are not as susceptible to vessel strikes; therefore, a pinniped strike is not anticipated during military readiness activities using vessels.

Encountering a sea otter during the use of vessels and in-water devices is not anticipated. Sea otters occur in a very limited portion of the Study Area, primarily close to shore off Central California and SNI in water depths less than 50 m, and there are few military readiness activities that may involve the use of vessels and in-water devices in these locations. The three amphibious landing areas used during selected training activities extend to shore in sea otter habitat and could pose a risk to sea otters, particularly if the lanes traverse kelp beds, a preferred habitat for sea otters. There have been no reported sea otter vessel strikes as a result of military readiness activities in the Study Area. With the implementation of mitigation measures, including surveying the amphibious assault lanes prior to an activity, a sea otter strike is not anticipated. Disturbance due to the physical presence of vessels and in-water devices is not expected to result in more than a temporary behavioral response, which could include leaving the area. Based on these considerations, there is a possibility that sea otters in the areas could be disturbed during amphibious landing events, including during preparations prior to the activity; however, sea otter strikes are not anticipated.

Vessels used to deploy seafloor cables associated with the SOAR modernization activities, SWTR installation, and the Maritime Test Bed Expansion would move very slowly during cable installment activities (0 to 3 knots) and would not pose a collision threat to marine mammals expected to be present in the vicinity. No in-water devices would be used during modernization and sustainment of ranges activities.

Therefore, long-term consequences on populations of marine mammals are not expected to result from vessel movement and in-water device use associated with the proposed military readiness activities. Navy mitigation measures described in Appendix C (Mitigation) will help the Navy avoid interactions with marine mammals, which would further reduce any potential physical disturbance and direct strike effects on marine mammals.

Marine Mammals: Effects from MEM

This section analyzes the strike potential to marine mammals from the following categories of MEM: (1) all sizes of non-explosive practice munitions, (2) fragments from high-explosive munitions, (3) expendable targets and target fragments, and (4) expended materials other than munitions, such as sonobuoys, expended bathythermographs, and torpedo accessories.

The primary concern is the potential for a marine mammal to be hit with a military expended material at or near the water's surface. While disturbance or strike from an item falling through the water column is possible, it is not very likely given the objects generally sink slowly through the water and can be avoided by marine mammals. Therefore, the discussion of MEM strikes focuses on the potential of a strike at the surface of the water.

While no strike from MEM has ever been reported or recorded, the possibility of a strike still exists. Therefore, the potential for marine mammals to be struck by MEM was evaluated using statistical probability modeling to estimate potential direct strike exposures.

To estimate potential direct strike exposures, four scenarios were developed using marine mammal densities, including the species with the highest average monthly density in the California Study Area, and the dimensions of an array of MEM types (e.g., bombs, targets). Estimates of impact probability and number of exposures for a given species of interest were made for areas with the highest annual number of MEM used. The number of predicted exposures in a single year for ESA listed marine mammals and the species with the highest average monthly density in the California Study Area is shown in Appendix I (Military Expended Materials, Direct Strike, and Ship Strike Effects Analysis) of the 2024 HCTT Draft EIS/OEIS.

Military readiness activities that involve MEM would occur in nearshore and offshore waters of the California Study Area. MEM are not expected to be used during activities in San Diego Bay or Port Hueneme.

In the California Study Area, the species with the highest average monthly density is short-beaked common dolphin, and the number of predicted exposures was 1.958 per year. Predicted exposures for all other species would be lower, in most cases several orders of magnitude lower, because species' densities are substantially lower. For ESA-listed species, fin whale had the highest number of predicted exposures at 0.08367 per year.

The analysis is likely an overestimation of the probability of a strike for the following reasons: (1) it calculates the probability of a single military item (of all the items expended over the course of the year) hitting a single animal at its species' highest seasonal density; (2) it does not take into account the possibility that an animal may avoid military activities; (3) it does not take into account the possibility that an animal may not be at the water surface; (4) it does not take into account that most projectiles fired during military readiness activities are fired at targets, and so only a very small portion of those projectiles that miss the target would hit the water with their maximum velocity and force; and (5) it does not quantitatively take into account the Navy avoiding animals that are sighted through the implementation of mitigation measures.

Therefore, no long-term consequences to marine mammal populations are expected.

Marine Mammals: Effects from Seafloor Devices

Seafloor devices include items placed on, dropped on, or moved along the seafloor such as mine shapes, anchor blocks, anchors, bottom-placed devices, and bottom-crawling unmanned underwater vehicles. The likelihood of any marine mammal species encountering seafloor devices is considered low even for species that interact with benthic habitat, including humpback whales, gray whales, and sea otters, because these devices are either stationary or move very slowly along the bottom. In the unlikely event that a marine mammal is in the vicinity of a seafloor device, the stationary or very slowly moving devices would not be expected to physically disturb or alter natural behaviors of marine mammals.

New range modernization and sustainment activities include installation of undersea cables integrated with hydrophones and underwater telephones to sustain the capabilities of the SOAR. Deployment of fiber optic cables along the seafloor would occur in one location in the California Study Area: south and west of SCI. In this location, the installation would occur completely within the water; no land interface would be involved.

The cables are deployed from a slow moving (0 to 3 knots) cable laying vessel, which operates continuously (day and night) until all cables are deployed and installed on the seafloor. While the duration the vessel is on site is dependent on the number and length of cables to be installed, the process is expected to be completed within a week for the installation of fiber option cables and over several weeks (less than 40 days) for undersea range cables, limiting the timeframe for a marine mammal to encounter the vessel or a cable in the water column. Mitigation to reduce the probability of physical disturbance or strike during cable laying activities would be implemented as part of the activity.

Fiber optic cables would be deployed and installed on the seafloor off SCI. Fiber optic cables are narrower and lighter than the armored cables installed on underwater ranges and are less likely to affect a marine mammal through physically disturbance or strike while in the water column. Deployment would also occur continuously (night and day) from a slow-moving vessel over a relatively short time period, limiting any potential for a marine mammal to encounter and potentially be disturbed by either the vessel or the cable as it is lowered through the water column prior to installation on the seafloor. Cable installation activities are not annual activities and would only occur once over days to weeks between 2025 and 2032.

Therefore, no long-term consequences to marine mammal populations are expected.

Marine Mammals: Effects from Pile Driving

Only California sea lions and harbor seals occur regularly in Port Hueneme. Port Hueneme is an active port with both commercial and military vessels transiting through the port exposing California sea lions and harbor seals to anthropogenic stressors similar to physical disturbance stressors associated with pile driving activities. While in the port, both the sea lions and harbor seals spend much of their time hauled out on floating docks and other structures, limiting the potential for disturbance or strike by pile driving activities occurring in the water. When in the water, it is likely that both pinniped species would avoid sites where pile driving is actively occurring due to the potentially disturbing acoustic stressors and pile driving equipment operating at and above the surface. Avoidance of pile driving sites minimizes the potential for direct strike by vessels, which are generally stationary or moving slowing within the harbor. Based on these factors, it is not likely that any marine mammal would be struck by a piling or pile driving equipment during installation. Mitigation measures discussed in Appendix C (Mitigation) of this CD would be conducted to further reduce any potential for adverse effects.

Therefore, no long-term consequences to marine mammal populations are expected.

MARINE MAMMALS: SECONDARY STRESSORS

The terms “indirect” and “secondary” do not imply reduced severity of environmental consequences but instead describe how a marine mammal may be exposed to the stressor. Potential indirect adverse effects on marine mammals would be through effects on their habitat or prey. Stressors from military readiness activities that could pose indirect effects on marine mammals via habitat or prey include (1) explosives, (2) explosives byproducts and unexploded munitions, (3) metals, (4) chemicals, and (5) transmission of disease and parasites (see Table 3-5).

Adverse effects on abiotic habitat, specifically sediments and water, are analyzed in Section 3.2 (Sediments and Water Quality) of the 2024 HCTT Draft EIS/OEIS. Indirect effects from explosive materials, byproducts, and unexploded munitions on marine mammals from chemical constituents in sediments are possible only if a marine mammal were to ingest the substantial amount of sediment. Section 3.7.3.7 (Ingestion Stressors) of the 2024 HCTT Draft EIS/OEIS explains why ingestion of MEM, which would include chemicals, in sediments is unlikely. Marine mammals as a group feed on a wide variety of prey ranging from small crustaceans, the primary prey for baleen whales, to other marine mammals (e.g., some killer whales prey on seals and even large whales). Appendix C (Biological Resources Supplemental Information) of the 2024 HCTT Draft EIS/OEIS describes foraging habitats and behaviors for marine mammals in the Study Area. For an adverse effect on prey to result in an indirect adverse effect on a marine mammal species, the population or a regional subpopulation of the prey (e.g., a fishery) would need to be significantly adversely affected. The analysis presented in Section 3.4 on invertebrates and Section 3.6 on fishes of the 2024 HCTT Draft EIS/OEIS, which have been summarized and discussed in previous sections of this CD, concluded that there would be no long-term consequences on those species. Therefore, there would be no potential for indirect adverse effects on marine mammals.

There are no reasonably foreseeable adverse effects from secondary stressors on marine mammals (Table 3-5); therefore, further analysis is not warranted.

Table 3-5: Secondary Stressors Summary Information

Sub-Stressor	Summary
Explosives	Underwater explosions could adversely affect other species in the food web, including prey species that marine mammals feed upon. • The adverse effects of explosions would differ depending on the type of prey species and proximity to the detonation site. • In addition to physical effects of an underwater blast, prey might have behavioral reactions to underwater sound. For instance, prey species might exhibit a strong startle reaction to explosions that might include swimming to the surface or scattering away from the source. • Any of these scenarios would be temporary, only occurring as a result of the explosion and would only affect a small number of prey species, not a regional population. No lasting effects on the abundance or availability prey or the pelagic food web would be expected.
Explosives byproducts and unexploded munitions	Explosives byproducts are the materials remaining after the explosives in a munition combust. With a high-order detonation, all explosives materials are consumed leaving mostly non-toxic gasses including nitrogen, carbon dioxide, hydrogen, and water vapor with small amounts of other gases. No secondary effects on marine mammals from high-order detonations of explosives would occur. • Low-order detonations and unexploded munitions have the potential to indirectly affect marine mammals by introducing unconsumed explosives into marine sediments that degraded into chemical constituents over time and remain in benthic habitat. • Previous studies have shown that concentrations of explosives degradation products remain in close proximity to the degrading munition. • Only those species that commonly forage at the seafloor have the potential to encounter degrading munitions that could be leaching chemical constituents from exposed explosives materials. • Most munitions are expended in deep, offshore waters below the photic zone and far from benthic foraging habitat, limiting potential exposure to marine mammal prey.
Metals	Several military readiness activities expend items composed of metals into the marine environment that are potentially harmful in higher concentrations. • Metals on the seafloor would degrade slowly over years to decades, limiting any potential for concentrations to reach toxic levels in sediments. • Most metals used in MEM occur naturally in sediments.
Chemicals	Several military readiness activities introduce chemicals into the marine environment that are potentially harmful in higher concentrations; however, rapid dilution would occur, and toxic concentrations are unlikely to be encountered. • Chemicals introduced are principally from flares and propellants for missiles and torpedoes. Properly functioning flares, missiles, and torpedoes combust nearly all of their propellants, leaving benign or readily diluted soluble combustion byproducts (e.g., hydrogen cyanide). • Operational failures may allow propellants and their degradation products to be released into the marine environment. Flares and missiles that operationally fail may release perchlorate, which is highly soluble in water, persistent, and affects metabolic processes in many plants and animals if in sufficient concentration. • Such concentrations are not likely to persist in the ocean. • Torpedoes are typically recovered along with any remaining fuel.
Transmission of Marine Mammal Diseases and Parasites	Selected Navy training activities may include trained marine mammals as part of the activity, and these marine mammals have the potential to interact with wild animals and potentially transmit diseases or parasites. As summarized below, the Navy takes extensive precautions to ensure this would not happen.

MARINE MAMMALS: CONCLUSION

Based on a detailed stressor analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.7 (Marine Mammals), specifically Section 3.7.3 (Environmental Consequences) and, as summarized earlier, the Action Proponents have determined that the Proposed Action would be carried out in a manner that would maintain, enhance, and, where feasible, restore marine resources, sustain the biological productivity of coastal waters, and maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes. No population-level impacts would be anticipated to marine mammals. As evident from the standard operating procedures and mitigation measures discussed earlier, the Action Proponents' Proposed Action provides special protection to marine mammals. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.

3.2.4 Article 4, Section 30231 – Biological Productivity; Waste Water

3.2.4.1 Policy

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

3.2.4.2 Consistency Review

The Action Proponents have performed military readiness activities within this area in the past and the chemical, physical, or biological changes in water quality would continue to be minimal for all activities, including those that have historically occurred or are similar to those that have historically occurred.

Modernization and sustain of ranges, which is new to the 2024 HCTT Draft EIS/OEIS, would include SOAR modernization activities in the California Study Area which involve releasing corrosion inhibitor solution from existing conduits. A Vapor Phase Corrosion Inhibitor (VpCl) solution is used in the conduits at a dilution up to 1.5 percent VpCl (98.5 percent potable water). The solution is in a concentrated liquid form and would be mixed with potable water to achieve the desired percent solution. To replace corrosion inhibitor solutions, divers would open the valve on the underwater termination point of each conduit. New corrosion inhibitor solution would be mixed onshore in a large tank and then pumped into the conduits at the cable vaults. The valve at the underwater termination point would be closed once the solution is pumped into the conduit. For three conduits with the solution, approximately 6,160 gallons of solution could be released up to three times in a seven-year permit cycle. For each event, it is estimated this work can be completed in approximately one week during daytime hours. Solutions are effective for approximately 24 months.

The corrosion inhibitor products selected for the Proposed Action are routinely used for this type of application in offshore areas because of their environmentally benign properties. Manufacturer hydrotests of the product as depicted in Holden et al. (2010) have yielded low toxicity levels and waters containing the product remain safe for many species, allowing the product to be discharged according to local specifications.

3.2.4.3 Conclusion

Based on a detailed stressor analysis presented in the 2024 HCTT Draft EIS/OEIS, Section 3.2 (Sediments and Water Quality), specifically Section 3.2.3 (Environmental Consequences) and, as summarized earlier, the Action Proponents have determined that the Proposed Action would be carried out in a manner that would maintain, and where feasible, restore, the biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health by minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30231 of the California Coastal Act.

3.2.5 Article 4, Section 30234.5 – Economic, Commercial, and Recreational Importance of Fishing

3.2.5.1 Policy

The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.

3.2.5.2 Consistency Review

The Action Proponents have performed military readiness activities within this area in the past with limited interruption to fishing activities because of their knowledge and avoidance of popular fishing areas which minimize interactions between military readiness activities and fishing. Commercial and recreational interests such as fishing are only restricted temporarily for the duration of the activity. Temporary closing of areas within the California Study Area for security and safety would not limit public access to surrounding areas. Areas that would be temporarily closed are only closed for the duration of the activity and are re-opened at the completion of the activity.

These range clearance procedures for safety purposes would not adversely affect commercial and recreational fishing activities because displacement is temporary, only lasting for the duration of the military readiness activity. Limited military readiness activities are expected to occur within 3 NM of shore, where most commercial and recreational fishing is anticipated to occur. When a range clearance is required, the public is notified via NOTMARs issued by the USCG (Section 3.2.1.2, Sea Space).

Upon completion of a military readiness activities in the California Study Area, the safety zone would be reopened, and fishers would be able to return to the previously closed area. To help manage competing demands and maintain public access in the California Study Area, the Action Proponents conduct their offshore operations in a manner that minimizes restrictions to commercial and recreational fishers. Military ships, commercial fishers, and recreational users can operate within the area together while maintaining a safe separation distance. If necessary, the Action Proponents would relocate to avoid conflicts with civilians and maintain the safety of non-participants.

SCI, located in the California Study Area, is an area subject to frequent military readiness activities that may require closures of the area. SCI is also a popular area for fishing and recreational activities due to the presence of highly productive and valuable fisheries. Closures affecting waters around San Clemente Island are posted at https://www.scisland.org/. Refer to the 2018 HSTT EIS/OEIS for information regarding methods implemented by the Navy to avoid conflicts between civilian and military activities during potentially hazardous events off of SCI.

San Nicolas Island, 43 miles northwest from SCI in the California Study Area, is also subject to frequent closures due to military readiness activities. A naval restricted area extends from the shoreline to approximately 3 miles seaward; however, the restricted area is open to all vessels for activities such as recreational fishing when there are no closures. There is a requirement that all non-military vessels and personnel always remain 300 yd. from the shoreline when in the area.

The Action Proponents may also temporarily establish an exclusion zone for the duration of a specific activity (e.g., an activity involving the detonation of explosives) to prevent non-participating vessels and aircraft from entering an unsafe area. Establishment of an exclusion zone would temporarily limit commercial and recreational fishing in that specific area; however, other areas in the HCTT Study Area would remain open to commercial and recreational fishing (U.S. Department of the Navy, 2015b). The Action Proponents do not exclude fishing activities from occurring in areas of the HCTT Study Area that are not being used during military readiness activities.

Military readiness activities that are new for the 2024 HCTT Draft EIS/OEIS, such as the modernization and sustainment of ranges and amphibious landings in the NOCAL Range Complex are similar in nature to the activities that have been historically conducted in the Study Area. These activities would have minimal anticipated effects on commercial and recreational fishing because inaccessibility to areas of co-use for military readiness activities would be temporary and of short duration, lasting until an activity concludes. In addition, the Action Proponents have implemented standard operating procedures to improve communications between the military and fishers, both recreational and commercial, and reduce the number of instances when fishers must leave a temporarily closed area. Other areas not in use or temporarily restricted would remain accessible and available for use.

3.2.5.3 Conclusion

The Navy has been conducting military readiness activities within the California Study Area for decades and has taken and will continue to take measures to prevent interruption of commercial and recreational fishing activities. To minimize potential military/civilian interactions, the Navy will continue to publish scheduled operation times and locations on publicly accessible Navy websites and through USCG issued NOTMARs up to six months in advance. These efforts are intended to ensure that commercial and recreational users are aware of the Action Proponents' plans and allow users to plan their activities to avoid scheduled military readiness activities. Therefore, decreases in the availability of desirable fishing locations due to military readiness activities is not expected. Commercial and recreational fishing activities could occur in the area before and after the temporary restriction. Should the Action Proponents find nonparticipants present in an exclusion zone, the Action Proponents would halt or delay (and reschedule, if necessary) all potentially hazardous activity until the nonparticipants have exited the exclusion zone. Thus, the Proposed Action would be consistent to the maximum extent practicable with Section 30234.5 of the California Coastal Act.

4 STATEMENT OF CONSISTENCY

The Action Proponents have reviewed California's Coastal Management Program and determined that the policies identified in Section 3.1 (Enforceable Policies not Applicable to the Proposed Action) of this CD do not apply to the Proposed Action. The Action Proponents determined that all or parts of the policies reviewed in Section 3.2 (Enforceable Policies of the California Coastal Act Applicable to the Proposed Action) of this CD apply to the Proposed Action and are approved and enforceable on the Action Proponents.

The Action Proponents conducted an effects test to analyze how and to what degree the Proposed Action would affect California coastal zone uses and resources, as defined in the applicable, enforceable policies. Results of the effects test, which considered military readiness activities that could occur within the coastal zone and activities that occur outside the coastal zone but could affect coastal zone uses or resources, indicate that some activities could have temporary and local effects on California coastal zone uses and resources. Although some individual biological organisms may be affected, including behavioral responses or injury to individuals, no population-level effects would be expected as a result of the Proposed Action. The Action Proponents would reduce the potential impacts of its proposed activities on coastal zone uses and resources by adhering to standard operating procedures and continue implementing environmental mitigation measures, as described in Appendix C (Mitigation) of this CD. Therefore, the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of the CCMP.

4.1 CONSISTENCY WITH FEDERAL LAWS AND REGULATIONS

The Action Proponents are consulting with NMFS for ESA-listed marine mammals, sea turtles, fishes, abalones, and the sunflower sea star, and with USFWS for ESA-listed seabirds and the southern sea otter. The Action Proponents have also applied to NMFS for a letter of authorization under the MMPA. Consistent with the Section 106 process under the NHPA, the Action Proponents are consulting with the State Historic Preservation Officer, Advisory Council on Historic Preservation, federally recognized tribes, and other interested parties for potential effects on historic resources.

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Appendix A

Military Readiness Activities in the California Study Area

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APPENDIX A MILITARY READINESS ACTIVITIES IN THE CALIFORNIA STUDY AREA

Table A-1 through Table A-8 list the military readiness activities conducted within the California Study Area that could affect California's coastal zone uses or resources. These tables provide a brief description of each activity; indicate where the activity would take place in relation to the coastal zone; and, where applicable, compare the annual number of events of each proposed activity with the number of ongoing activities (described in the 2018 Consistency Determination).

Table A-1: Proposed and Ongoing Navy and U.S. Marine Corps Training Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Major Training Exercises – Large Integrated Anti-Submarine Warfare						
Composite Training Unit Exercise (Carrier Strike Group)	Aircraft carrier and carrier air wing integrate with surface and submarine units in a challenging multi-threat operational environment that certifies them ready to deploy.	NOCAL, SOCAL, PMSR	Yes	Some nearshore but mostly open ocean	2–3	1–2
Rim of the Pacific Exercise	A biennial multinational training exercise in which navies from Pacific Rim nations and other allies assemble in Pearl Harbor, Hawaii, to conduct training throughout the Hawaiian Islands in a number of warfare areas. Components of a Rim of the Pacific exercise may be conducted in the California Study Area.	PMSR, SOCAL	Yes	Some nearshore but mostly open ocean	0–1	0–1 (exercise occurs every other year)
Major Training Exercises – Medium Integrated Anti-Submarine Warfare						
Task Force/ Sustainment Exercise	Aircraft carrier and carrier air wing integrates with surface and submarine units in a challenging multi-threat operational environment to maintain ability to deploy.	NOCAL, SOCAL, PMSR	Yes	Some nearshore but mostly open ocean	5 (referred to as "Fleet Exercise/Sustainment Exercise" in Phase III)	0–1
Integrated/Coordinated Training						
Independent Deployer Certification Exercise/Tailored Surface Warfare Training	Multiple ships, aircraft, and submarines conduct integrated multi-warfare training with a surface warfare emphasis. Serves as a ready-to-deploy certification for individual surface ships tasked with surface warfare missions.	NOCAL, SOCAL, PMSR	Yes	Some nearshore but mostly open ocean	N/A	9–18
Medium Coordinated Anti-Submarine Warfare	Typically, a 3–10-day exercise with multiple ships, ASW aircraft, and submarines integrating the use of their sensors, including sonobuoys, to search, detect, and track threat submarines.	NOCAL, SOCAL, PMSR	Yes	Some nearshore but mostly open ocean	2	5–13

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Small Coordinated Anti-Submarine Warfare	Typically, a 2 to 5-day exercise with multiple ships, aircraft and submarines integrating the use of their sensors, including sonobuoys, to search, detect, and track threat submarines.	NOCAL, SOCAL, PMSR	Yes	Some nearshore but mostly open ocean	10–14	4–9
Integrated/Coordinated Training – Other						
Composite Training Unit Exercise (Amphibious Ready Group/Marine Expeditionary Unit)	The amphibious ready group and the Marine expeditionary unit integrate with surface and submarine units in a challenging multi-threat operational environment that certifies them ready to deploy.	NOCAL, SOCAL, PMSR, Amphibious Corridors 1-4	Yes	Some nearshore but mostly open ocean	N/A	1–2
Innovation and Demonstration Exercise	These exercises are conducted to demonstrate or test new capabilities, tactics, techniques, and procedures, and generate standardized, actionable data for evaluation.	NOCAL, SOCAL, PMSR, Amphibious Corridors 1-4	Yes	Some nearshore but mostly open ocean	N/A	3
Large-Scale Amphibious Exercise	The Large Scale Amphibious Exercise utilizes all elements of the Marine Air Ground Task Force (Amphibious) to secure the battlespace (air, land, and sea), maneuver to and seize the objective, and conduct self-sustaining operations ashore with logistic support of the Expeditionary Strike Group. This exercise could include activities in multiple warfare areas in support of at-sea operations such as in the littorals or during straits transits.	NOCAL, SOCAL, PMSR, Amphibious Corridors 1-4	Yes	Some nearshore but mostly open ocean	N/A	2–3
Multi-Warfare Exercise	Multi-Warfare Exercises are integrated events that include training in multiple warfare areas.	NOCAL, SOCAL, PMSR	Yes	Some nearshore but mostly open ocean	N/A	2
Air Warfare						
Medium Range Interceptor Capability	Ground personnel defend against threat missiles and aircraft with vehicle-launched ground-to-air missile systems.	SOCAL	Yes	Projectiles will impact > 12 NM from shore[2]	N/A	10

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Missile Exercise – Man Portable Air Defense System	Personnel employ a shoulder fired surface-to-air missile at air targets.	SOCAL	Yes	On land[2]	4	10
Air Combat Maneuver	Fixed-wing aircrews aggressively maneuver against threat aircraft to gain tactical advantage.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	6,000	10,400–11,400
Air Defense Exercise	Aircrew and ship crews conduct defensive measures against threat aircraft or simulated missiles.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	550	550
Gunnery Exercise Air-to-Air Medium Caliber	Fixed-wing aircrews fire medium-caliber guns at air targets.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	5	2
Gunnery Exercise Air-to-Air Small Caliber	Rotary-wing aircrews fire small-caliber guns at air targets.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	N/A	5
Gunnery Exercise Surface-to-Air Large-caliber	Surface ship crews fire large-caliber guns at air targets.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	165	55
Gunnery Exercise Surface-to-Air Medium-caliber	Surface ship crews fire medium-caliber guns at air targets.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	195	85
Missile Exercise Air-to-Air	Fixed-wing aircrews fire air-to-air missiles at air targets.	SOCAL, PMSR	No	> 12 NM from shore	4	123
Missile Exercise Surface-to-Air	Surface ship crews defend against threat missiles and aircraft with missiles.	SOCAL, PMSR	No	> 12 NM from shore	36	36

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Amphibious Warfare						
Amphibious Assault	Large unit forces move ashore from amphibious ships at sea for the immediate execution of inland objectives.	NOCAL, SOCAL (Camp Pendleton Amphibious Assault Area [CPAAA], San Clemente Island [SCI], Shore Bombardment Area [SHOBA]), PMSR, Amphibious Corridors 1-4	Yes	Mostly nearshore but some open ocean	18	21
Amphibious Operations in a Contested Environment	Navy and Marine Corps forces conduct operations in coastal and offshore waterways against air, surface, and subsurface threats.	SOCAL (CPAAA, SCI, SHOBA), PMSR, Amphibious Corridors 1-4	Yes	Mostly nearshore but some open ocean	N/A	10
Amphibious Raid	Small unit forces move from amphibious ships at sea for a specific short-term mission. These are quick operations with as few personnel as possible.	SOCAL (CPAAA, West Cove, SHOBA), PMSR, Amphibious Corridors 1-4, Silver Strand Training Complex (SSTC)	Yes	Some nearshore but mostly open ocean	2,426	2,404
Amphibious Vehicle Maneuvers	Small boat crews practice the employment of amphibious vehicles.	SOCAL (CPAAA, SCI, SHOBA), PMSR, Amphibious Corridors 1-4	Yes	Some nearshore but mostly open ocean	N/A	31–35

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Expeditionary Fires Exercise/Supporting Arms Coordination Exercise	Military units provide integrated and effective close air support, Naval Surface Fire Support fire, and Marine Corps artillery fire in support of amphibious operations.	SOCAL (SHOBA)	Yes	Mostly nearshore but some open ocean	8	8
Naval Surface Fire Support Exercise – Land-Based Target	Surface ship crews fire large-caliber guns at land-based targets in support of forces ashore.	SOCAL (SHOBA)	Yes	Mostly nearshore but some open ocean	55	67
Non-Combat Amphibious Operations	Amphibious vehicles move personnel and equipment from ships to shore and back. (Includes Humanitarian Assistance Operations activity from Phase III)	SOCAL (CPAAA, SCI, SHOBA), PMSR, Amphibious Corridors 1-4	Yes	Mostly nearshore but some open ocean	1 (referred to as "Humanitarian Assistance Operations" in Phase III)	1
Shore-to-Surface Artillery Exercise	Army and Marine Corps crews engaging surface targets at sea with their main battery cannons (typically 105mm and 155mm) and mortars (typically 120mm).	SOCAL	Yes	Projectiles will impact > 3 NM from shore	N/A	12
Shore-to-Surface Missile Exercise	Army and Marine Corps units launch missiles from shore at surface maritime targets.	SOCAL, PMSR	Yes	Missiles will impact > 12 NM from shore	N/A	15
Anti-Submarine Warfare						
Anti-Submarine Warfare Torpedo Exercise – Helicopter	Helicopter crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	SOCAL (Southern California Offshore Anti-Submarine Warfare Range [SOAR], Tanner Bank Shallow Water Training Range [SWTR], SCI SWTR), PMSR	Yes	Some nearshore but mostly open ocean	104	3–5

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR	Yes	Some nearshore but mostly open ocean	25	60–80
Anti-Submarine Warfare Torpedo Exercise –Ship	Surface ship crews search for, track, and detect submarines. Exercise torpedoes are used during this exercise.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR	Yes	Some nearshore but mostly open ocean	117	104
Anti-Submarine Warfare Torpedo Exercise – Submarine	Submarine crews search for, track, and detect submarines. Exercise torpedoes are used during this exercise.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR	Yes	Some nearshore but mostly open ocean	13	26
Anti-Submarine Warfare Tracking Exercise – Helicopter	Helicopter crews search for, track, and detect submarines.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	524	125–130
Anti-Submarine Warfare Tracking Exercise – Unmanned Surface Vessel	USVs search for, detect, and track a sub-surface target simulating a threat submarine with the goal of determining a firing solution that could be used to launch a torpedo.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	N/A	2
Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft crews search for, track, and detect submarines.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	56	200
Anti-Submarine Warfare Tracking Exercise –Ship	Surface ship crews search for, track, and detect submarines.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	423	240–480

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Anti-Submarine Warfare Tracking Exercise – Submarine	Submarine crews search for, track, and detect submarines.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR), PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	50	64
Training and End-to-End Mission Capability Verification – Torpedo	Air, surface, or submarine crews employ explosive torpedoes against virtual targets.	SOCAL (SOAR, Tanner Bank SWTR, SCI SWTR)	Yes	Some nearshore but mostly open ocean	N/A	1
Electronic Warfare						
Counter Targeting Chaff Exercise – Aircraft	Fixed-winged aircraft and helicopter aircrews deploy chaff to disrupt threat targeting and missile guidance radars.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	140	148–153
Counter Targeting Chaff Exercise – Ship	Surface ship crews deploy chaff to disrupt threat targeting and missile guidance radars.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	125	125
Counter Targeting Flare Exercise	Fixed-winged aircraft and helicopter aircrews deploy flares to disrupt threat infrared missile guidance systems.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	130	115–123
Electronic Warfare Operations	Aircraft and surface ship crews control portions of the electromagnetic spectrum used by enemy systems to degrade or deny the enemy's ability to take defensive actions.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	350	222–326
Expeditionary Warfare						
Dive and Salvage Operations	Navy divers perform dive operations and salvage training.	SOCAL, Port Hueneme Harbor	Yes	Mostly nearshore but some open ocean	N/A	6–8

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Gunnery Exercise Ship-to-Shore	Small boat crews fire small- and medium-caliber guns at land-based targets.	SOCAL (SHOBA)	Yes	Some nearshore but mostly open ocean	N/A	380–480
Obstacle Loading	Military personnel use explosive charges to destroy barriers or obstacles to amphibious vehicle access to beach areas.	SOCAL (TAR2, TAR3)	Yes	Mostly nearshore but some open ocean	N/A	106–156
Personnel Insertion/Extraction – Air	Personnel are inserted into and extracted from an objective area by fixed-wing aircraft or helicopters.	SOCAL, SSTC (Boat Lanes – North and South)	Yes	Only nearshore	N/A	1,354–1,554
Personnel Insertion/Extraction – Surface and Subsurface	Personnel are inserted into and extracted from an objective area by small boats or subsurface platforms.	SOCAL, SSTC (Boat Lanes – North and South)	Yes	Only nearshore	449	1,049–1,149
Personnel Insertion/Extraction – Swimmer/Diver	Divers and swimmer infiltrate harbors, beaches, or moored vessels and conduct a variety of tasks.	SOCAL, SSTC (Boat Lanes – North and South)	Yes	Only nearshore	330	1,080–1,280
Small Boat Attack	Afloat units defend against small boat or personal water craft attack.	SOCAL, PMSR, NOCAL	Yes	Mostly nearshore and some open ocean	115	115

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Mine Warfare						
Airborne Mine Countermeasure – Mine Detection	Helicopter aircrews detect mines using laser mine detection systems.	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Tanner Bank Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2), SSTC (AMCM Mine Training Range, Imperial Beach Mine Training Range)	Yes	Mostly nearshore and some open ocean	10	20
Airborne Mine Laying	Fixed-wing aircraft drop non-explosive mine shapes.	SOCAL (Mine Training Range – 1 and 2)	Yes	Mostly nearshore and some open ocean	18	4–6
Amphibious Breaching Operations	Amphibious forces use explosive clearing systems to clear simulated mines on beaches, shallow water, and surf zones for potential landing of personnel and vehicles.	SOCAL (CPAAA, Pyramid Cove Mine Training Range, SHOBA, TAR 2, TAR 3), SSTC (Boat Lanes – North and South)	Yes	Mostly nearshore and some open ocean	N/A	638–645

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercise	Maritime security personnel train to protect civilian ports and harbors against enemy efforts to interfere with access to those ports.	Port Hueneme Harbor, Naval Base San Diego, Seal Beach, and Los Angeles/Long Beach	Yes	Mostly nearshore and some open ocean	1–3	2–3
Mine Countermeasure Exercise – Ship Sonar	Ship crews detect and avoid mines while navigating restricted areas or channels using remotely operated active sonar systems.	SOCAL (Tanner Bank Minefield, Pyramid Cove Mine Training Range), SSTC (Imperial Beach Mine Training Range)	Yes	Mostly nearshore and some open ocean	92	256
Mine countermeasures Mine Neutralization Remotely Operated Vehicle Operations	Ship, boat, and helicopter crews locate and disable mines using remotely operated underwater vehicles.	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Tanner Bank Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2), SSTC (Boat Lanes – North and South, AMCM Mine Training Range, Imperial Beach Mine Training Range)	Yes	Mostly nearshore and some open ocean	372	30–33

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Mine Countermeasures – Towed Mine Neutralization	Helicopter aircrews and unmanned vehicles tow systems through the water, which are designed to disable or trigger mines.	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Tanner Bank Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2), SSTC (Boat Lanes – North and South, AMCM Mine Training Range, Imperial Beach Mine Training Range)	Yes	Mostly nearshore and some open ocean	340	30

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Mine Neutralization Explosive Ordnance Disposal	Personnel disable threat mines using explosive charges.	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Pyramid Cove Mine Training Range, TAR 2, TAR 3), SSTC (Boat Lanes – North and South, Echo, AMCM Mine Training Range, Imperial Beach Mine Training Range)	Yes	Mostly nearshore and some open ocean	194	400–431
Submarine Mine Avoidance Exercise	Submarine crews practice detecting mines in a designated area.	PMSR, SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Tanner Bank Minefield, Pyramid Cove Mine Training Range)	Yes	Some nearshore, but mostly open ocean	12	40

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Submarine Mobile Mine and Mine Laying Exercise	Submarine crews practice deploying submarine launched mines.	PMSR, SOCAL (Tanner Bank Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2)	Yes	Some nearshore but mostly open ocean	1	30
Surface Ship Object Detection	Cruiser and Destroyer crews detect and avoid mines while navigating restricted areas or channels using hull-mounted active sonar.	SOCAL (Tanner Bank Minefield, Pyramid Cove Mine Training Range), SSTC (Imperial Beach Mine Training Range)	Yes	Mostly nearshore and some open ocean	164	256
Training and End-to-End Mission Capability Verification – Mobile Mine and Mine Laying Exercise	Submarine crew launches mobile mine(s) to a planned location.	PMSR, SOCAL (Tanner Bank Minefield, Pyramid Cove Mine Training Range, Mine Training Range – 1 and 2)	Yes	Some nearshore but mostly open ocean	N/A	2

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	**In CZ?**	**Discussion**	**Ongoing Activities [1]**	**Proposed Activities**
Underwater Demolition Qualification and Certification	Navy divers conduct various levels of training and certification in placing underwater demolition charges.	SOCAL (ARPA Training Minefield, Ocean Beach Mine Training Area, Pyramid Cove Mine Training Range, TAR 2, TAR 3), SSTC (Boat Lanes – North and South, AMCM Mine Training Range, Imperial Beach Mine Training Range)	Yes	Only nearshore	120	34–44
Underwater Demolitions Multiple Charge – Large Area Clearance	Military personnel use explosive charges to destroy barriers or obstacles to amphibious vehicle access to beach areas.	SOCAL (TAR 2, TAR 3)	Yes	Only nearshore	18 (referred to as "Underwater Demolitions Multiple Charge – Mat Weave and Obstacle Loading" in Phase III)	6
Underwater Mine Countermeasure Raise, Tow, Beach, and Exploitation	Personnel locate mines, perform mine neutralization, raise and tow mines to the beach, and conduct exploitation operations for intelligence gathering.	SSTC (Boat Lanes – North and South), SOCAL (ARPA Training Minefield, TAR 2)	Yes	Only nearshore	N/A	372

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Surface Warfare						
Gunnery Exercise Air-to-Surface Medium-caliber	Fixed-wing and helicopter aircrews fire medium-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Nearshore and open ocean	363	469–479
Gunnery Exercise Air-to-Surface Small-caliber	Helicopter and tiltrotor aircrews, use small-caliber guns to engage surface targets.	SOCAL, PMSR, NOCAL	Yes	Nearshore and open ocean	2,040	490–690
Gunnery Exercise Surface-to-Surface Boat Medium Caliber	Small boat crews fire medium-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	14	14
Gunnery Exercise Surface-to-Surface Boat Small Caliber	Small boat crews fire small-caliber guns at surface targets.	SOCAL, PMSR, NOCAL, SSTC (Boat Lanes – North and South)	Yes	Some nearshore but mostly open ocean	200	345
Gunnery Exercise Surface-to-Surface Ship Medium Caliber	Surface ship crews fire medium-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	180	17–180
Gunnery Exercise Surface-to-Surface Ship Small Caliber	Surface ship crews fire small-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	355	355
Maritime Security Operations	Helicopter, surface ship, and small boat crews conduct a suite of maritime security operations at sea, to include visit, board, search and seizure; maritime interdiction operations; force protection; and anti-piracy operations.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	250	250
Surface Warfare Torpedo Exercise – Submarine	Submarine crews search for, detect, and track a surface ship simulating a threat surface ship with the goal of determining a firing solution that could be used to launch a torpedo with the intent to simulate destroying the targets.	SOCAL (SOAR, Tanner Bank SWTR, San Clemente Island SWTR), PMSR	Yes	Some nearshore but mostly open ocean	N/A	10

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Training and End-to-End Mission Capability Verification – Submarine Missile Maritime	Submarine crews launch missile(s) which may have an explosive warhead at a maritime target simulating an adversary surface ship with the goal of destroying or disabling adversary surface ship.	SOCAL	Yes	Some nearshore but mostly open ocean	N/A	3
Bombing Exercise Air-to-Surface	Fixed-wing aircrews and UASs deliver bombs against surface targets.	SOCAL, PMSR, NOCAL	No	> 3 NM from shore	640	663
Gunnery Exercise Surface-to-Surface Ship Large-caliber	Surface ship crews fire large-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	No	> 3 nm from shore	200	125
Laser Targeting – Aircraft	Fixed-wing and helicopter aircrews illuminate enemy targets with lasers.	SOCAL, PMSR, NOCAL	No	> 12 NM from shore	910	50–100
Laser Targeting – Ship	Surface ship crews illuminate air and surface targets with high-energy laser systems.	SOCAL, PMSR, NOCAL	No	> 12 NM from shore	N/A	4
Missile Exercise Air-to-Surface	Fixed-wing and helicopter aircrews and UASs fire air-to-surface missiles at surface targets.	SOCAL, PMSR	No	> 12 NM from shore	210	94–99
Missile Exercise Air-to-Surface – Rocket	Helicopter aircrews fire both precision-guided and unguided rockets at surface targets.	SOCAL, PMSR	No	> 12 NM from shore	246	251–271
Missile Exercise Surface-to-Surface	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles.	SOCAL, PMSR	No	> 12 NM from shore	10	10
Sinking Exercise	Aircraft, ship, and submarine crews deliberately sink a seaborne target, usually a decommissioned ship made environmentally safe for sinking according to U.S. Environmental Protection Agency standards, with a variety of ordnance.	SOCAL	No	> 12 NM from shore	0–1	0–1
Other Training Activities						
At-Sea Vessel Refueling Training	Crews would practice transferring fuel onto small vessels.	SOCAL	Yes	Some nearshore, but mostly open ocean	N/A	10

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Combat Swimmer/Diver Training and Certification	Navy personnel conduct combat swimming conditioning swims and surf passage to execute a variety of tasks in the open water and littoral waterways.	SSTC (Boat Lanes – North and South, Echo)	Yes	Only nearshore	N/A	320
Kilo Dip	Functional check of the dipping sonar prior to conducting a full test or training event on the dipping sonar.	NOCAL, PMSR, SSTC (AMCM Training Range, Imperial Beach Mine Training Range), SOCAL	Yes	Some nearshore, but mostly open ocean	2,400	30
Multi-Domain Unmanned Autonomous Systems	Multi-domain (surface, subsurface, and airborne) unmanned systems are launched from land, ships, and boats, in support of intelligence, surveillance, and reconnaissance operations, when necessary, employ weapon systems or electronic warfare systems to support intelligence or warfare objectives.	SOCAL (San Diego and San Diego Harbor, SCI)	Yes	Only nearshore	N/A	100–200
Ship-to-Shore Fuel Transfer Training	This activity trains personnel in the transfer of petroleum (though only sea water is used during training) from ship to shore.	SOCAL (SCI), SSTC (Boat Lanes – North and South)	Yes	Only nearshore	6 (referred to as "Offshore Petroleum Discharge System" in Phase III)	6
Port Damage Repair	Navy Expeditionary forces train to repair critical port facilities.	Port Hueneme Harbor	Yes	Only nearshore	N/A	6
Precision Anchoring	Releasing of anchors in designated locations.	SSTC (SSTC Anchorages)	Yes	Only nearshore	75	37–48

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Submarine and UUV Subsea and Seabed Warfare Exercise	Submarine crews and shore-based operators train to launch or recover and operate all classes of UUVs in the subsea and seabed environment in order to defend deep ocean and seabed infrastructure or take offensive action against a simulated adversary's subsea and seabed infrastructure.	SOCAL, PMSR, NOCAL	Yes	Some nearshore, but mostly open ocean	N/A	20
Submarine Navigation Exercise	Submarine crews operate sonar for navigation and detection while transiting into and out of port during reduced visibility	SOCAL	Yes	Only nearshore	80	80
Submarine Sonar Maintenance and Systems Checks	Maintenance of submarine sonar and other system checks are conducted pierside or at sea.	SOCAL, PMSR	Yes	Mostly nearshore and some open ocean	185	185
Surface Ship Sonar Maintenance and Systems Checks	Maintenance of surface ship sonar and other system checks are conducted pierside or at sea.	SOCAL, Naval Base San Diego	Yes	Mostly nearshore and some open ocean	500	500
Training and End-to-End Mission Capability Verification – Subsea and Seabed Warfare Kinetic Effectors	Submarine crews or shore-based operators employ UUV with munitions or non-munition systems on the sea floor or in the water column.	SOCAL, PMSR, NOCAL	Yes	Some nearshore, but mostly open ocean	N/A	20
Training and End-to-End Mission Capability Verification – UAV	Submarine crews or shore-based personnel controlling a UUV launch a capsule containing a UAV. The canister is deployed underwater and ascends to a programmed depth. The canister subsequently launches a UAV, and the canister sinks.	SOCAL, PMSR, NOCAL	Yes	Some nearshore, but mostly open ocean	N/A	10

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Underwater Survey	Navy divers train in survey of underwater conditions and features in preparation for insertion, extraction, or intelligence, surveillance, and reconnaissance activities.	SSTC (Boat Lanes – North and South), SOCAL (TAR 2), Amphibious Corridors 1-4	Yes	Only nearshore	N/A	260–360
Unmanned Aerial System Training	Surface ships and submarines launch unmanned aerial systems to conduct intelligence, surveillance, and reconnaissance (ISR) missions.	SOCAL, PMSR, NOCAL	Yes	Some nearshore and some open ocean> 12 NM from shore	10	120
Unmanned Underwater Vehicle Training - Certification and Development Exercises	Unmanned underwater vehicle certification involves training with unmanned platforms to ensure submarine crew proficiency. Tactical development involves training with various payloads, for multiple purposes to ensure that the systems can be employed effectively in an operational environment.	NOCAL, SSTC (Boat Lanes – North and South), SOCAL (SCI), PMSR	Yes	Some nearshore and some open ocean> 12 NM from shore	10	532–888
Waterborne Training	Small boat crews conduct a variety of training, including boat launch and recovery, operation of crew-served unmanned vehicles, mooring to buoys, anchoring, and maneuvering. Small boats include rigid hull inflatable boats, and riverine patrol, assault, and command boats up to approximately 50 feet in length.	SOCAL, SSTC (Boat Lanes – North and South)	Yes	Mostly nearshore and some open ocean	500	612–715
Aerial Firefighting	Helicopter aircrews conduct proficiency training in the use of airborne firefighting water baskets, dropping seawater on terrestrial targets on SCI or the Hawaii Range Complex.	SOCAL (SCI)	No	> 12 nm from the California Coast; however, would occur within the vicinity of SCI	N/A	4

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Submarine Under Ice Certification	Submarine crews operate sonar while transiting under ice. Ice conditions are simulated during training and certification events.	SOCAL	No	> 12 NM from shore	6	6

[1] Activities described in the 2018 HSTT Consistency Determination and the 2022 Point Mugu Sea Range Consistency Determination

[2] Land activities will be addressed in separate NEPA/CZMA documentation. This CZMA CD only considers impacts of munitions and targets in water.

Notes: PMSR = Point Mugu Sea Range, CPAAA = Camp Pendleton Amphibious Assault Area, SOCAL = Southern California [Range Complex], SWTR = Shallow Water Training Range, SSTC = Silver Strand Training Complex, SHOBA = Shore Bombardment Area, MTR = Mine Training Range, TAR = Training Area and Range, SOAR = Southern California Anti-submarine Warfare Range, SCI = San Clemente Island, CZ = Coastal Zone

Table A-2: Proposed Coast Guard Training Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities	Proposed Activities
Air Warfare						
Gunnery Exercise Surface-to-Air Large Caliber	Surface ship crews fire large-caliber guns at air targets.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	45	45
Gunnery Exercise Surface-to-Air Medium Caliber	Surface ship crews fire medium-caliber guns at air targets.	NOCAL, SOCAL, PMSR	No	> 12 NM from shore	70	70
Electronic Warfare						
Counter Targeting Chaff Exercise – Ship	Surface ship crews deploy chaff to disrupt threat targeting and missile guidance radars.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	20	20
Counter Targeting Flare Exercise	Fixed-winged aircraft and helicopter aircrews deploy flares to disrupt threat infrared missile guidance systems.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	10	10
Expeditionary Warfare						
Underwater Construction Team Training	Navy and Coast Guard divers conduct underwater repair and construction.	Port Hueneme Harbor, Naval Base San Diego	Yes	Only nearshore	1,048	1,048
Surface Warfare						
Gunnery Exercise Air-to-Surface Medium Caliber	Fixed-wing and helicopter aircrews fire medium-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Nearshore and open ocean	120	120
Gunnery Exercise Surface-to-Surface Boat Medium Caliber	Small boat crews fire medium-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	158	158

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities	Proposed Activities
Gunnery Exercise Surface-to-Surface Boat Small Caliber	Small boat crews fire small-caliber guns at surface targets.	SOCAL, PMSR, NOCAL, SSTC (Boat Lanes – North and South)	Yes	Some nearshore but mostly open ocean	188	188
Gunnery Exercise Surface-to-Surface Ship Medium Caliber	Surface ship crews fire medium-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	36	36
Gunnery Exercise Surface-to-Surface Ship Small Caliber	Surface ship crews fire small-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	220	220
Maritime Security Operations	Helicopter, surface ship, and small boat crews conduct a suite of maritime security operations at sea, to include visit, board, search and seizure; maritime interdiction operations; force protection; and anti-piracy operations.	SOCAL, PMSR, NOCAL	Yes	Some nearshore but mostly open ocean	887	887
Gunnery Exercise Surface-to-Surface Ship Large Caliber	Surface ship crews fire large-caliber guns at surface targets.	SOCAL, PMSR, NOCAL	No	> 3 nm from shore	24	24
Laser Targeting – Ship	Surface ship crews illuminate air and surface targets with high-energy laser systems.	SOCAL, PMSR, NOCAL	No	> 12 NM from shore	4	4
Other Testing Activities						
Precision Anchoring	Releasing of anchors in designated locations.	SSTC (SSTC Anchorages)	Yes	Only nearshore	950	950
Search and Rescue	Navy and Coast Guard helicopter, ship, and submarine crews practice the skills required to recover personnel lost at sea.	SOCAL, PMSR, NOCAL	Yes	Some nearshore and some open ocean	580	580

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities	Proposed Activities
Unmanned Aerial System Training	Surface ships and submarines launch unmanned aerial systems to conduct intelligence, surveillance, and reconnaissance (ISR) missions.	SOCAL, PMSR, NOCAL	Yes	Some nearshore and some open ocean	350	350
Unmanned Underwater Vehicle Training – Certification and Development Exercises	Unmanned underwater vehicle certification involves training with unmanned platforms to ensure submarine crew proficiency. Tactical development involves training with various payloads, for multiple purposes to ensure that the systems can be employed effectively in an operational environment.	NOCAL, SSTC (Boat Lanes – North and South), SOCAL (SCI), PMSR	Yes	Some nearshore and some open ocean	310	310
Waterborne Training	Small boat crews conduct a variety of training, including boat launch and recovery, operation of crew-served unmanned vehicles, mooring to buoys, anchoring, and maneuvering. Small boats include rigid hull inflatable boats, and riverine patrol, assault, and command boats up to approximately 50 feet in length.	SOCAL, SSTC (Boat Lanes – North and South)	Yes	Mostly nearshore and some open ocean	436	436

Notes: PMSR=Point Mugu Sea Range, SOCAL=Southern California [Range Complex], SSTC=Silver Strand Training Complex, SCI=San Clemente Island, CZ=Coastal Zone

Table A-3: Proposed and Ongoing Naval Air Systems Command Testing Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Air Warfare						
Intelligence, Surveillance, and Reconnaissance Test	Aircrews use all available sensors to collect data on threat vessels.	California Study Area	Yes	Some nearshore, but mostly open ocean	254	254–279
Large Force Test Event	U.S. Navy led Large Force Test Event focused on Interoperability Testing and Tactics of Near-Future capabilities in a Maritime environment across the DoD's Air, Sea, and Space domains.	California Study Area	Yes	Some nearshore, but mostly open ocean	6	6
Air Combat Maneuvers Test	Aircrews engage in flight maneuvers designed to gain a tactical advantage during combat. Fixed-wing aircrews aggressively maneuver against threat aircraft to gain tactical advantage.	California Study Area	No	> 12 NM from shore	110	310–321
Air Platform Vehicle Test	Testing performed to quantify the flying qualities, handling, airworthiness, stability, controllability, and integrity of an air platform or vehicle. No explosive weapons are released during an air platform/vehicle test.	California Study Area	No	> 12 NM from shore	35	50–54
Air Platform Weapons Integration Test	Testing performed to quantify the compatibility of weapons with the aircraft from which they would be launched or released. Non-explosive weapons or shapes are used.	California Study Area	No	> 12 NM from shore	10	10–11
Air-to-Air Missile Test	Test is performed to evaluate the effectiveness of air-launched missiles against designated airborne targets. Fixed-wing aircraft will be used.	California Study Area	No	> 12 NM from shore	49	49

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Surface-to-Air Gunnery Test – Large Caliber	Surface ship crews fire large-caliber guns at air targets.	California Study Area	No	> 12 NM from shore	12	12
Surface-to-Air Gunnery Test – Medium Caliber	Surface ship crews fire medium-caliber guns at air targets.	California Study Area	No	> 12 NM from shore	12	12
Surface-to-Air High-Energy Laser Test	High-energy laser tests would evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25-kilowatt high-energy laser. The laser is intended to be used as a weapon to disable small surface vessels.	California Study Area	No	> 12 NM from shore	50	50
Surface-to-Air High-Power Microwave Test	During a High-Power Microwave Test, energy is directed from a ship or land-based system to engage air targets.	California Study Area	No	> 12 NM from shore	75	75
Surface-to-Air Missile Test	Surface ship crews defend against threat missiles and aircraft with missiles.	California Study Area	No	> 12 NM from shore	155	155
Anti-Submarine Warfare						
Anti-Submarine Warfare Torpedo Test (Aircraft)	Test evaluates anti-submarine warfare systems onboard rotary-wing and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target.	California Study Area	Yes	Some nearshore but mostly open ocean	35–71	71–78
Anti-Submarine Warfare Tracking Test (Fixed-Wing)	The test evaluates the sensors and systems used by fixed-wing aircraft to detect and track submarines and to ensure that aircraft systems used to deploy the tracking systems perform to specifications and meet operational requirements	California Study Area	Yes	Some nearshore but mostly open ocean	58–68	68–75

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Anti-Submarine Warfare Tracking Test (Rotary Wing)	The test evaluates the sensors and systems used to detect and track submarines and to ensure that rotary-wing aircraft systems used to deploy the tracking systems perform to specifications.	California Study Area	Yes	Some nearshore but mostly open ocean	30–132	132–145
Kilo Dip Test	Functional check of a rotary-wing aircraft deployed dipping sonar system prior to conducting a testing or training event using the dipping sonar system.	California Study Area	Yes	Some nearshore but mostly open ocean	6–7	6–7
Sonobuoy Lot Acceptance Test	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a lot or group of sonobuoys in advance of delivery to the fleet for operational use.	California Study Area	Yes	Mostly nearshore but some open ocean	160	320–352
Electronic Warfare						
Chaff Test	Chaff tests evaluate newly developed or enhanced chaff, chaff dispensing equipment, or modified aircraft systems against chaff deployment. Tests may also train pilots and aircrews in the use of new chaff dispensing equipment. Chaff tests are often conducted with flare tests and air combat maneuver events, as well as other test events, and are not typically conducted as standalone tests.	California Study Area	No	> 3 NM from shore	19	29–31

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Electronic Systems Test	Test that evaluates the effectiveness of electronic systems to control, deny, or monitor critical portions of the electromagnetic spectrum. In general, electronic warfare testing will assess the performance of three types of electronic warfare systems: electronic attack, electronic protect, and electronic support.	California Study Area	No	> 3 NM from shore	204	204
Flare Test	Flare tests evaluate newly developed or enhanced flares, flare dispensing equipment, or modified aircraft systems against flare deployment. Tests may also train pilots and aircrew in the use of newly developed or modified flare deployment systems. Flare tests are often conducted with chaff tests and air combat maneuver events, as well as other test events, and are not typically conducted as standalone tests.	California Study Area	No	> 3 NM from shore	15	29–31
Mine Warfare						
Airborne Dipping Sonar Minehunting Test	A mine-hunting dipping sonar system that is deployed from a rotary-wing aircraft and uses high frequency sonar for the detection and classification of bottom and moored mines.	California Study Area	Yes	Mostly nearshore but some open ocean	0–12	18–20

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Airborne Laser Mine Detection System Test	An airborne mine hunting test of a laser-based mine detection system, that is operated from a rotary-wing aircraft and evaluates the system's ability to detect, classify, and fix the location of floating and near-surface, moored mines. The system uses a low-energy laser to locate mines.	California Study Area	Yes	Some nearshore but mostly open ocean	20	20–22
Airborne Mine Neutralization System Test	A test of the airborne mine neutralization system evaluates the system's ability to detect and destroy mines from an airborne mine countermeasures capable rotary-wing aircraft. The airborne mine neutralization system uses up to four unmanned underwater vehicles equipped with high-frequency sonar, video cameras, and explosive and non-explosive neutralizers.	California Study Area	Yes	Some nearshore but mostly open ocean	11–31	81–84
Airborne Sonobuoy Minehunting Test	A mine-hunting system made up of sonobuoys is deployed from a rotary-wing aircraft. A field of sonobuoys, using high-frequency sonar, is used for detection and classification of bottom and moored mines.	California Study Area	Yes	Some nearshore but mostly open ocean	3–9	9–10
Mine Laying Test	Fixed-wing aircraft evaluate the performance of mine laying equipment and software systems to lay mines. A mine test may also train aircrew in laying mines using a new or enhanced mine deployment system.	California Study Area	Yes	Mostly nearshore but some open ocean	2	2

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Surface Warfare						
Air-to-Surface Bombing Test	Fixed-wing aircraft test the delivery of bombs against surface maritime targets with the goal of evaluating the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced.	California Study Area	No	> 12 NM from shore	14	66–67
Air-to-Surface Gunnery Test	Fixed-wing and rotary-wing aircrews evaluate new or enhanced aircraft guns against surface maritime targets to test that the gun, gun ammunition, or associated systems meet required specifications or to train aircrew in the operation of a new or enhanced weapons system.	California Study Area	No	> 12 NM from shore	30–60	70–76
Air-to-Surface High-Energy Laser Test	High-energy laser tests would evaluate the specifications, integration, and performance of an aircraft mounted, approximately 25 kilowatt high-energy laser. The laser is intended to be used as a weapon to disable small surface vessels.	California Study Area	No	> 12 NM from shore	54	324–329
Air-to-Surface High-Power Microwave Test	A High-Power Microwave Test is where energy is directed from a ship or land-based system to engage a surface target, or energy is directed from a system mounted on an aircraft platform onto a surface target.	California Study Area	No	> 12 NM from shore	25	25
Air-to-Surface Laser Targeting Test	Aircrews illuminate enemy targets with lasers.	California Study Area	No	> 12 NM from shore	5	5–6

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Air-to-Surface Missile Test	Test may involve both fixed-wing and rotary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons system or as part of another systems integration test.	California Study Area	No	> 12 NM from shore	48–60	188–194
Long-Range Weapons Delivery Systems/Hypersonic Vehicle Test	The objective of the Hypersonic Vehicle Program is to develop and demonstrate key technologies to enable an air- or land-launched tactical range hypersonic vehicle for rapid response capabilities.	California Study Area	No	> 12 NM from shore	56	56
Rocket Test	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of guided and unguided rockets fired from a hovering or forward flying rotary-wing aircraft or tilt rotor aircraft.	California Study Area	No	> 12 NM from shore	18–22	30–32
Subsurface-to-Surface Missile Test	Submarines launch missiles at surface maritime targets with the goal of destroying or disabling enemy ships or boats.	California Study Area	No	>12 NM from shore	4	4
Surface-to-Surface Gunnery Test – Large-Caliber	Surface ship crews fire large-caliber guns at surface targets.	California Study Area	No	> 12 NM from shore	10	10
Surface-to-Surface Gunnery Test – Medium-Caliber	Surface ship crews fire medium-caliber guns at surface targets.	California Study Area	No	> 12 NM from shore	15	26
Surface-to-Surface Gunnery Test – Small-Caliber	Surface ship crews fire small-caliber guns at surface targets.	California Study Area	No	> 12 NM from shore	10	10

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Surface-to-Surface High-Energy Laser Test	High-energy laser weapons tests would evaluate the specifications, integration, and performance of a ship-mounted, approximately 25 kilowatt high-energy laser. The laser is intended to be used as a weapon to disable small surface vessels.	California Study Area	No	> 12 NM from shore	54	50
Surface-to-Surface High-Power Microwave Test	A High-Power Microwave Test where energy is directed from a ship or land-based system to engage a surface target, or energy is directed from a system mounted on an aircraft platform onto a surface target.	California Study Area	No	> 12 NM from shore	25	25
Surface-to-Surface Missile Test	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles.	California Study Area	No	> 12 NM from shore	44	44
Other Testing Activities						
Undersea Range System Test	Following installation of a Navy underwater warfare training and testing range, tests of the nodes (components of the range) will be conducted to include node surveys and testing of node transmission functionality.	California Study Area	Yes	Some nearshore and some open ocean	0	19–21
Acoustic and Oceanographic Research	Active transmissions within the band 10 hertz (Hz)-100 kilohertz (kHz) from sources deployed from ships and aircraft.	California Study Area	No	> 12 NM from shore	3	3

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Air Platform Shipboard Integration Test	Aircraft are tested to determine operability from shipboard platforms, performance of shipboard physical operations, and to verify and evaluate communications and tactical data links.	California Study Area	No	> 12 NM from shore	110	136–150

[1] Activities described in the 2018 HSTT Consistency Determination and the 2022 Point Mugu Sea Range Consistency Determination

Table A-4: Proposed and Ongoing Naval Facilities Engineering and Expeditionary Warfare Center Training Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Unmanned Systems						
Ocean Energy and Cable System Research	Testing of ocean and marine energy harvesting/producing systems, energy storage and distribution, and temporary subsea cable network deployment and interoperability.	SOCAL, PMSR	Yes	Some nearshore, but mostly open ocean	N/A	2–6
Other Testing Activities						
Undersea Range System Testing	This activity supports advanced ocean technology development for fixed ocean and seafloor systems, including deployment of free-fall penetrometers and gravity deployed anchors used to determine seafloor characteristics and seafloor interaction testing of anchors, small foundations and packages.	SOCAL, PMSR	Yes	Some nearshore, but mostly open ocean	N/A	8–12
Underwater Search, Deployment, and Recovery	Tests various systems associated with Remotely Operated Vehicles and Unmanned Underwater Vehicles, to include seafloor sampling, surveying, seafloor soil excavating, and subsea cable deployment.	SOCAL, PMSR	Yes	Some nearshore, but mostly open ocean	N/A	20–30

[1] Activities described in the 2018 HSTT Consistency Determination and the 2022 Point Mugu Sea Range Consistency Determination

Notes: SOCAL=Southern California [Range Complex], PSMR = Point Mugu Sea Range

Table A-5: Proposed and Ongoing Naval Sea Systems Command Testing Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Anti-Submarine Warfare						
Anti-Submarine Warfare Mission Package Testing	Ships and their supporting platforms (rotary-wing aircraft and unmanned aerial systems) detect, localize, and prosecute submarines.	SOCAL	Yes	Nearshore and open ocean	23	1
Pierside Sonar Testing	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.	Port Hueneme, Naval Base San Diego	Yes	Only nearshore	7	59–75
Surface Ship Sonar Testing/ Maintenance	Pierside and at-sea testing of ship systems occurs periodically following major maintenance periods and for routine maintenance.	SOCAL, Naval Base San Diego	Yes	Some nearshore and some open ocean	6	6
At-Sea Sonar Testing	At-sea testing to ensure systems are fully functional in an open ocean environment.	SOCAL (SOAR)	No	> 3 NM from shore	20–22	27–43
Torpedo (Explosive) Testing	Air, surface, or submarine crews employ explosive and non-explosive torpedoes against virtual targets.	SOCAL, PMSR	No	> 3 NM from shore	8–11	1–2
Torpedo (Non-Explosive) Testing	Air, surface, or submarine crews employ non-explosive torpedoes against targets, submarines, or surface vessels.	SOCAL (SCI), PMSR	No	> 3 NM from shore	8–17	7–9
Electronic Warfare						
Radar and Other System Testing	Test may include use of military or commercial radar, communication systems (or simulators), or high energy lasers. Testing may occur aboard a ship against drones, small boats, rockets, missiles, or other targets	SOCA, PMSR	No	> 3 NM from shore	40–53	22–44

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Mine Warfare						
Mine Countermeasure and Neutralization Testing	Air, surface, and subsurface vessels neutralize threat mines and mine-like objects.	SOCAL	Yes	Nearshore and open ocean	11	18–45
Mine Countermeasure Mission Package Testing	Vessels and associated aircraft conduct mine countermeasure operations.	SOCAL (CPAAA, Tanner Bank Minefield), SSTC (Imperial Beach Minefield), PMSR	Yes	Nearshore and open ocean	58	25–26
Mine Detection and Classification Testing	Air, surface, and subsurface vessels and systems detect and classify mines and mine-like objects. Vessels also assess their potential susceptibility to mines and mine-like objects.	SOCAL, PMSR, SSTC (Imperial Beach Minefield, Tanner Bank Minefield)	Yes	Nearshore and open ocean	11–13	10–20
Surface Warfare						
Gun Testing – Large-Caliber	Surface crews test large-caliber guns to defend against surface targets.	SOCAL, PMSR	Yes	Nearshore and open ocean	7–79	8–33
Gun Testing – Small-Caliber	Surface crews test small-caliber guns to defend against surface targets.	SOCAL	Yes	Nearshore and open ocean	2–26	0–5
Gun Testing – Medium-Caliber	Surface crews test medium-caliber guns to defend against surface targets.	SOCAL	No	> 12 NM from shore	4–52	9–14
Missile and Rocket Testing	Missile and rocket testing includes various missiles or rockets fired from submarines and surface combatants. Testing of the launching system and ship defense is performed.	SOCAL, PMSR	No	> 12 NM from shore	20–44	232–238

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Unmanned Systems						
Underwater Search, Deployment, and Recovery	Various underwater, bottom crawling, robotic, vehicles are utilized in underwater search, recovery, installation, and scanning activities.	Port Hueneme Harbor, Naval Base San Diego, PMSR, SOCAL, SSTC (Imperial Beach Minefield	Yes	Nearshore and open ocean	N/A	17–30
Unmanned Surface Vehicle System Testing	Unmanned surface vehicles are primarily autonomous systems designed to augment current and future platforms to help deter maritime threats. They employ a variety of sensors designed to extend the reach of manned ships.	SOCAL, PMSR, Port Hueneme Harbor	Yes	Nearshore and open ocean	4	4–10
Unmanned Underwater Vehicle Testing	Testing involves the production or upgrade of unmanned underwater vehicles and subsurface obstacle detection (i.e., deployment of fishing nets). This may include testing of mission capabilities (e.g., mine detection), evaluating the basic functions of individual platforms, or conducting complex events with multiple vehicles.	SOCAL, Port Hueneme Harbor	Yes	Nearshore and open ocean	291	680–685
Vessel Evaluation						
Signature Analysis Operations	Surface ship and submarine testing of electromagnetic, acoustic, optical, and radar signature measurements.	Naval Base San Diego	Yes	Only nearshore	1	0–1
Vessel Signature Evaluation	Surface ship, submarine, and auxiliary system signature assessments. This may include electronic, radar, acoustic, infrared and magnetic signatures.	SOCAL (SCI), PMSR	Yes	Nearshore and open ocean	24–60	2–6

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
In-Port Maintenance Testing	Each combat system is tested to ensure they are functioning in a technically acceptable manner and are operationally ready to support at-sea Combat System Ship Qualification Trial events.	Port Hueneme Harbor, Naval Base San Diego	Yes	Only nearshore	5–29	15
Propulsion Testing	Ship is run at high speeds in various formations and at various depths.	SOCAL	No	> 12 NM from shore	10–24	0–23
Air Defense Testing	Tests the ship's capability to detect, identify, track, and successfully engage live and simulated targets. Gun systems are tested using explosive and non-explosive projectiles.	SOCAL, PMSR	No	> 12 NM from shore	9	18–27
Small Ship Shock Trial	Underwater detonations are used to test new ships or major upgrades.	SOCAL	No	> 12 NM from shore	N/A	0–1
Submarine Sea Trials – Weapons System Testing	Submarine weapons and sonar systems are tested at-sea to meet the integrated combat system certification requirements.	SOCAL	No	> 12 NM from shore	1	2–4
Surface Warfare Testing	Tests the capabilities of shipboard sensors to detect, track, and engage surface targets. Testing may include ships defending against surface targets using explosive and non-explosive projectiles, gun system structural test firing and demonstration of the response to Call for Fire against land based targets (simulated by sea-based locations).	SOCAL, PMSR	No	> 12 NM from shore	14–79	18–53
Undersea Warfare Testing	Ships demonstrate capability of countermeasure systems and underwater surveillance, weapons engagement, and communications systems. This tests ships' ability to detect, track, and engage undersea targets.	SOCAL	No	> 12 NM from shore	11–27	25–60

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Other Testing Activities						
Acoustic and Oceanographic Research	Research using active transmissions from sources deployed from ships, aircraft, and unmanned underwater vehicles. Research sources can be used as proxies for current and future Navy systems.	PMSR, SOCAL	Yes	Some nearshore, but mostly open ocean	N/A	2
Insertion/ Extraction	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.	SOCAL	Yes	Nearshore and open ocean	5	2
Semi-Stationary Equipment Testing	Semi-stationary equipment (e.g., hydrophones) is deployed to determine functionality.	Naval Base San Diego	Yes	Only nearshore	N/A	4–8
Countermeasure Testing	Countermeasure testing involves the testing of systems that will detect, localize, and track incoming weapons, including marine vessel targets. Testing includes surface ship torpedo defense systems and marine vessel stopping payloads.	SOCAL	No	> 3 NM from shore	11–15	8–14
Non-Acoustic Component Testing	Testing of towed or floating buoys for communications through radio-frequencies or two-way optical communications between an aircraft and underwater system(s).	SOCAL	No	> 12 NM from shore	16–17	0–4
Simulant Testing	Chemical-biological agent simulants are deployed against surface ships.	SOCAL	No	> 3 NM from shore	220	0–5

[1] Activities described in the 2018 HSTT Consistency Determination and the 2022 Point Mugu Sea Range Consistency Determination

Notes: SOCAL=Southern California [Range Complex], PMSR = Point Mugu Sea Range, SCI = San Clemente Island, SSTC = Silver Strand Training Complex, SOAR = Southern California Offshore Anti-Submarine Warfare Range, CPAAA = Camp Pendleton Amphibious Assault Area

Table A-6: Proposed and Ongoing Office of Naval Research Testing Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Acoustic and Oceanographic Science and Technology						
Large Displacement Underwater Vehicle Testing	Autonomy testing and environmental data collection with Large Displacement Unmanned Undersea Vehicles.	SOCAL (SOCAL (Acoustic and Oceanographic Research Area), NOCAL	Yes	Nearshore and open ocean	2	6–8
Mine Countermeasure Technology Research	Test involves the use of broadband acoustic sources on unmanned underwater vehicles	SOCAL	Yes	Mostly nearshore and some open ocean	N/A	6–8
Acoustic and Oceanographic Research	Research involving passive acoustic and oceanographic sensing, as well as active transmissions from sources deployed from ships, aircraft, and unmanned underwater vehicles. Research sources serve as proxies for current and future Navy systems.	SOCAL (Acoustic and Oceanographic Research Area), NOCAL, PMSR	No	> 12 NM from shore	4	8–10

[1] Activities described in the 2018 HSTT Consistency Determination and the 2022 Point Mugu Sea Range Consistency Determination

Notes: SOCAL=Southern California [Range Complex], NOCAL = Northern California [Range Complex], PMSR = Point Mugu Sea Range

Table A-7: Proposed and Ongoing Naval Information Warfare Systems Command Testing Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events [1]	
		Location	In CZ?	Discussion	Ongoing Activities [1]	Proposed Activities
Acoustic and Oceanographic Science and Technology						
Acoustic, Oceanographic, and Energy Research	Research and testing utilizing the marine environment for acoustics, oceanographic research, novel techniques for energy generation, and research in support of marine mammal sciences.	PMSR, SOCAL, San Diego Bay	Yes	Some nearshore and some open ocean	N/A	145–180
Other Testing Activities						
Communications	Testing of underwater communications and networks below the ocean surface.	SOCAL	Yes	Nearshore and open ocean	10	8
Intelligence, Surveillance, and Reconnaissance	Testing deployable autonomous undersea technologies that may include mine detection and classification, detection and classification of targets of interest, sensors on the undersea systems testbed, sensor systems to detect mine shapes on ship hulls and pier structures, sensors for swimmer interdiction and other threats, and sensor systems that can detect explosive, radioactive, and other signatures of concern.	PMSR, SOCAL (CPAAA, SCI), Naval Base San Diego, SSTC (Boat Lanes – North and South)	Yes	Nearshore and open ocean	49–55	200–287
Vehicle Testing	Testing of surface and subsurface vehicles and sensor systems, which may involve Unmanned Underwater Vehicles, gliders, and Unmanned Surface Vehicles.	SOCAL	Yes	Nearshore and open ocean	166	42–51

[1] Activities described in the 2018 HSTT Consistency Determination and the 2022 Point Mugu Sea Range Consistency Determination

[2] Notes: SOCAL=Southern California [Range Complex], PMSR = Point Mugu Sea Range, CPAAA = Camp Pendleton Amphibious Assault Area, SCI = San Clemente Island, SSTC = Silver Strand Training Complex

Table A-8: Proposed Modernization and Sustainment of Ranges Activities in the California Study Area

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities[1]	Proposed Activities
Southern California Offshore Anti-Submarine Warfare Range (SOAR) Modernization and Sustainment	The Navy proposes to upgrade the existing, deep-water SOAR, located west of San Clemente Island (SCI), by installing new hydrophones and undersea cables. Maintenance and repair of the deep-water SOAR is needed to sustain the SOAR capabilities.	California Study Area (west of San Clemente Island)	Yes	Nearshore and open ocean	N/A	1
Shallow Water Training Ranges (SWTRs) Installation	The Navy would install, use, and maintain two new SWTRs as an extension to the existing SOAR. The proposed instrumentation would be in the form of undersea cables and sensor nodes, similar to instrumentation currently in place in SOAR.	California Study Area (south and west of San Clemente Island)	Yes	Nearshore and open ocean	N/A	1
Installation and Maintenance of Mine Warfare and Other Training Areas	Support crews install, move, and remove mine countermeasure (MCM) targets. MCM targets could be inserted on the seafloor (bottom targets) or tethered to anchors that are on the seafloor (moored). Other temporary training areas can be established by installing instrumentation that could include hydrophones anchored to the seafloor similarly to anchored mine training shapes.	California Study Area (near San Clemente Island and off the coast of San Diego County)	Yes	Nearshore and open ocean	N/A	Infrequent
Installation and Maintenance of Underwater Platforms	Underwater landing platforms would be installed to support underwater vehicle pilot proficiency training. One platform would be installed just west of the Silver Strand Training Complex boat lanes. Maintenance would include removal of the platform and transfer to a shipyard approximately every five years for in-depth inspection, repairs, and preservation.	California Study Area west of the Silver Strand Training Complex	Yes	Nearshore	N/A	Infrequent

Range Activity	Description of Activity	Distribution			Annual Number of Events	
		Location	In CZ?	Discussion	Ongoing Activities[1]	Proposed Activities
Special Use Airspace Modification	The Navy proposes to increase the Study Area in the Southern California Range Complex with a corresponding increase in special use airspace proximate to the current Warning Area 291 (W-291). The Navy is coordinating with the Federal Aviation Administration in its non-rulemaking action for establishing the two new airspace areas.	California Study Area	No	Airspace above the open ocean	N/A	1
Deployment of Seafloor Cables and Instrumentation	The Navy proposes to deploy undersea fiber optic cables and connected instrumentation such as communication units and sensor packages to existing undersea infrastructure along the seafloor south and west of San Clemente Island in the California Study Area (maritime test bed expansion).	California Study Area (south and west of San Clemente Island)	No	Open ocean	N/A	Infrequent

[1] Activities described in the 2018 HSTT Consistency Determination and the 2022 Point Mugu Sea Range Consistency Determination
Notes: CZ = Coastal Zone

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Appendix B
Activity Stressor Matrices

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APPENDIX B ACTIVITY STRESSOR MATRICES

This appendix contains four matrices. The first two matrices in this appendix list the training (Table B-1) and testing (Table B-2) activities that occur in the Hawaii-California Training and Testing Study Area and their associated stressors. The third matrix shows the stressors associated with the Modernization and Sustainment of Ranges activities (Table B-3). The fourth matrix lists the resources analyzed in the 2024 HCTT Draft Environmental Impact Statement/Overseas Environmental Impact Statement and the stressors they are potentially affected by (Table B-4).

Table B-1: Stressors by Training Activity

Hawaii-California Training Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
U.S. NAVY AND MARINE CORPS																																	
MAJOR TRAINING EXERCISES – LARGE INTEGRATED ANTI-SUBMARINE WARFARE																																	
Composite Training Unit Exercise (Strike Group)	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Rim of the Pacific Exercise	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
MAJOR TRAINING EXERCISES – MEDIUM INTEGRATED ANTI-SUBMARINE WARFARE																																	
Task Force/Sustainment Exercise	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
INTEGRATED/COORDINATED ANTI-SUBMARINE WARFARE TRAINING																																	
Independent Deployer Certification Exercise/Tailored Surface Warfare Training			✓	✓						✓		✓	✓								✓												
Medium Coordinated Anti-Submarine Warfare	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Small Coordinated Anti-Submarine Warfare	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
INTEGRATED/COORDINATED TRAINING - OTHER																																	
Composite Training Unit Exercise (ARG/MEU)	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Innovation and Demonstration Exercise	✓		✓	✓	✓		✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓								
Integrated Air Missile Defense Exercise			✓	✓	✓			✓		✓		✓	✓	✓				✓	✓		✓	✓	✓	✓	✓								
Large Amphibious Exercise			✓	✓						✓		✓	✓		✓						✓						✓	✓	✓	✓	✓	✓	✓
Multi-Warfare Exercise	✓		✓	✓	✓					✓		✓	✓	✓			✓	✓		✓	✓	✓	✓	✓	✓								
AIR WARFARE																																	
Air Combat Maneuvers				✓						✓			✓								✓							✓	✓	✓			
Air Defense Exercise			✓	✓						✓		✓	✓								✓							✓	✓	✓			
Gunnery Exercise Air-to-Air Medium and Small Caliber				✓	✓					✓			✓	✓					✓		✓		✓				✓	✓	✓	✓			✓
Gunnery Exercise Surface-to-Air Large and Medium Caliber			✓		✓					✓		✓		✓							✓		✓		✓								✓
High-Energy Laser Exercise (Surface-to-Air)			✓								✓	✓									✓												
Medium Range Interceptor Capability				✓	✓			✓					✓	✓					✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Missile Exercise (Air-to-Air)				✓	✓			✓		✓			✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
Missile Exercise – Man-Portable Air Defense System				✓	✓			✓					✓	✓	✓				✓		✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
Missile Exercise (Surface-to-Air)			✓	✓	✓			✓		✓		✓	✓	✓					✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓

Table B-1: Stressors by Training Activity (continued)

Hawaii California Training Activity	Biological Resources																				Physical Resources					Human Resources							
	Acoustic Stressors						Explosive Stressors		Energy Stressors			Physical Disturbance and Strike Stressors					Entanglement Stressors		Ingestion Stressors		Air Quality Stressors	Sediments and Water Quality Stressors				Cultural Resource Stressors		Socioeconomic Resource Stressors			Public Health & Safety Stressors		
	Sonar & Other Transducers	Pile Driving	Vessel Noise	Aircraft Noise	Weapons Noise	Air Guns	Explosions in Water	Explosions in Air	In-Water Electromagnetic Devices	In-Air Electromagnetic Devices	High-Energy Lasers	Vessels & In-water Device Strike	Aircraft & Aerial Target Strike	Military Expended Material	Seafloor Devices	Pile Driving	Wires & Cables	Decelerators/Parachutes	Military Expended Materials – Munitions	Military Expended Materials – Other than Munitions	Criteria Air Pollutants	Explosives	Metals	Chemicals (Not Explosives)	Other Materials	Explosives	Physical Disturbance & Strike	Accessibility	Airborne Acoustics	Physical Disturbance & Strike	Underwater Energy	In-Air Energy	Physical Interactions
AMPHIBIOUS WARFARE																																	
Amphibious Assault			✓	✓						✓		✓	✓								✓						✓	✓	✓	✓	✓	✓	✓
Amphibious Operations in a Contested Environment			✓	✓	✓			✓		✓		✓	✓	✓	✓				✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Amphibious Raid			✓	✓						✓		✓	✓								✓						✓	✓	✓	✓	✓	✓	✓
Amphibious Vehicle Maneuvers			✓									✓			✓						✓						✓	✓	✓	✓	✓	✓	✓
Expeditionary Fires Exercise/Supporting Arms Coordination Exercise			✓	✓						✓		✓	✓								✓						✓	✓	✓	✓	✓	✓	✓
Naval Surface Fire Support Exercise – At Sea			✓		✓		✓			✓		✓		✓					✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Naval Surface Fire Support Exercise – Land-Based Target			✓		✓					✓		✓		✓					✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓
Non-Combat Amphibious Operation			✓	✓						✓		✓	✓								✓						✓	✓	✓	✓	✓	✓	✓
Shore-to-Surface Artillery Exercise			✓		✓		✓	✓		✓		✓		✓					✓	✓	✓	✓	✓	✓		✓		✓	✓	✓			✓
Shore-to-Surface Missile Exercise			✓		✓		✓	✓		✓		✓		✓					✓	✓	✓	✓	✓	✓		✓		✓	✓	✓			✓
ANTI-SUBMARINE WARFARE																																	
Anti-Submarine Warfare Torpedo Exercise – Helicopter	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Anti-Submarine Warfare Torpedo Exercise – Ship	✓		✓							✓		✓		✓			✓			✓	✓		✓	✓	✓								
Anti-Submarine Warfare Torpedo Exercise – Submarine	✓		✓							✓		✓		✓			✓				✓		✓	✓	✓								
Anti-Submarine Warfare Tracking Exercise – Helicopter	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Anti-Submarine Warfare Tracking Exercise –Unmanned Surface Vessel	✓		✓		✓					✓		✓		✓			✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	✓		✓	✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Anti-Submarine Warfare Tracking Exercise – Ship	✓		✓							✓		✓		✓			✓				✓		✓	✓	✓								
Anti-Submarine Warfare Tracking Exercise – Submarine	✓		✓							✓		✓		✓			✓				✓		✓	✓	✓								
Training and End-to-End Mission Capability Verification – Torpedo	✓		✓				✓			✓		✓		✓	✓		✓		✓		✓	✓	✓	✓	✓								

Table B-1: Stressors by Training Activity (continued)

Hawaii California Training Activity	Biological Resources																				Physical Resources					Human Resources							
	Acoustic Stressors						Explosive Stressors		Energy Stressors			Physical Disturbance and Strike Stressors					Entanglement Stressors		Ingestion Stressors		Air Quality Stressors	Sediments and Water Quality Stressors				Cultural Resource Stressors		Socioeconomic Resource Stressors			Public Health & Safety Stressors		
	Sonar & Other Transducers	Pile Driving	Vessel Noise	Aircraft Noise	Weapons Noise	Air Guns	Explosions in Water	Explosions in Air	In-Water Electromagnetic Devices	In-Air Electromagnetic Devices	High-Energy Lasers	Vessels & In-water Device Strike	Aircraft & Aerial Target Strike	Military Expended Material	Seafloor Devices	Pile Driving	Wires & Cables	Decelerators/Parachutes	Military Expended Materials – Munitions	Military Expended Materials – Other than Munitions	Criteria Air Pollutants	Explosives	Metals	Chemicals (Not Explosives)	Other Materials	Explosives	Physical Disturbance & Strike	Accessibility	Airborne Acoustics	Physical Disturbance & Strike	Underwater Energy	In-Air Energy	Physical Interactions
ELECTRONIC WARFARE																																	
Counter Targeting Chaff Exercise – Aircraft				✓						✓			✓	✓						✓	✓		✓	✓	✓								
Counter Targeting Chaff Exercise – Ship			✓							✓		✓		✓						✓	✓		✓	✓	✓								
Counter Targeting Flare Exercise				✓						✓			✓	✓						✓	✓		✓	✓	✓								
Electronic Warfare Operations			✓	✓						✓		✓	✓								✓												
EXPEDITIONARY WARFARE																																	
Dive and Salvage Operations			✓							✓		✓									✓						✓	✓	✓	✓	✓	✓	✓
Gunnery Exercise Ship-to-Shore			✓		✓							✓		✓					✓		✓		✓				✓	✓	✓	✓	✓	✓	✓
Obstacle Loading			✓				✓					✓		✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Personnel Insertion/Extraction – Air			✓	✓	✓		✓			✓		✓	✓	✓					✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Personnel Insertion/Extraction – Surface and Subsurface			✓	✓	✓		✓					✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Personnel Insertion/Extraction – Swimmer/Diver			✓		✓		✓					✓		✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Port Damage Repair		✓	✓									✓			✓	✓					✓						✓	✓	✓	✓	✓	✓	✓
Small Boat Attack			✓		✓					✓		✓		✓					✓		✓		✓				✓	✓	✓	✓	✓	✓	✓
MINE WARFARE																																	
Airborne Mine Countermeasure – Mine Detection			✓	✓						✓		✓	✓	✓	✓		✓				✓		✓		✓		✓	✓	✓	✓	✓	✓	✓
Airborne Mine Laying			✓	✓						✓		✓	✓	✓			✓				✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Amphibious Breaching Operations			✓				✓			✓		✓		✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercise	✓		✓	✓			✓			✓		✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mine Countermeasure Exercise – Ship Sonar	✓		✓							✓		✓									✓						✓	✓	✓	✓	✓	✓	✓
Mine Countermeasures Mine Neutralization Remotely Operated Vehicle Operations	✓		✓	✓			✓			✓		✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mine Countermeasures – Towed Mine Neutralization			✓	✓					✓	✓		✓	✓								✓						✓	✓	✓	✓	✓	✓	✓
Mine Neutralization Explosive Ordnance Disposal			✓				✓			✓		✓		✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Submarine Mine Avoidance Exercise	✓		✓							✓		✓		✓			✓		✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓
Submarine Mobile Mine and Mine Laying Exercise	✓		✓							✓		✓		✓							✓		✓		✓		✓	✓	✓	✓	✓	✓	✓
Surface Ship Object Detection	✓		✓							✓		✓		✓	✓		✓				✓		✓		✓		✓	✓	✓	✓	✓	✓	✓

Table B-1: Stressors by Training Activity (continued)

Hawaii California Training Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
MINE WARFARE (cont.)																																	
Training and End-to-End Mission Capability Verification – Mobile Mine and Mine Laying Exercise			✓							✓		✓		✓			✓				✓		✓	✓	✓								
Underwater Demolition Qualification and Certification			✓				✓			✓		✓			✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Underwater Demolition Multiple Charge – Large Area Clearance			✓				✓					✓		✓	✓						✓	✓				✓	✓	✓	✓	✓	✓		✓
Underwater Mine Countermeasure Raise, Tow, Beach, and Exploitation			✓	✓						✓		✓	✓	✓	✓		✓				✓		✓		✓		✓	✓	✓	✓	✓	✓	✓
SURFACE WARFARE																																	
Bombing Exercise Air-to-Surface			✓	✓			✓			✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓								
Gunnery Exercise Air-to-Surface – Medium-Caliber			✓	✓	✓		✓			✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓								
Gunnery Exercise Air-to-Surface – Small-Caliber			✓	✓	✓					✓		✓	✓	✓					✓	✓	✓		✓	✓	✓								
Gunnery Exercise Surface-to-Surface Boat – Medium-Caliber			✓		✓		✓					✓		✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gunnery Exercise Surface-to-Surface Boat – Small-Caliber			✓		✓							✓		✓					✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Gunnery Exercise Surface-to-Surface Ship – Large Caliber			✓		✓		✓			✓		✓		✓					✓		✓	✓	✓		✓								
Gunnery Exercise Surface-to-Surface Ship – Medium Caliber			✓		✓		✓			✓		✓		✓					✓		✓	✓	✓	✓	✓								
Gunnery Exercise Surface-to-Surface Ship – Small-Caliber			✓		✓					✓		✓		✓					✓		✓		✓		✓								
Laser Targeting – Aircraft			✓	✓						✓	✓	✓	✓	✓							✓		✓	✓	✓								
Laser Targeting – Ship			✓	✓	✓					✓	✓	✓	✓	✓							✓												
Maritime Security Operations			✓	✓	✓					✓		✓	✓	✓					✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Missile Exercise Air-to-Surface			✓	✓	✓		✓			✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓								
Missile Exercise Air-to-Surface Rocket				✓			✓			✓			✓	✓					✓	✓	✓	✓	✓	✓	✓								
Missile Exercise Surface-to-Surface			✓		✓		✓			✓		✓		✓					✓	✓	✓	✓	✓	✓	✓								
Sinking Exercise	✓		✓	✓	✓		✓			✓		✓	✓	✓			✓		✓		✓	✓	✓	✓	✓								
Surface Warfare Torpedo Exercise – Submarine	✓		✓									✓		✓			✓				✓		✓	✓	✓								
Training and End-to-End Mission Capability Verification – Submarine Missile Maritime					✓		✓					✓		✓					✓	✓	✓	✓	✓	✓	✓								

Table B-1: Stressors by Training Activity (continued)

Hawaii California Training Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*	*Socioeconomic Resource Stressors*				*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
OTHER TRAINING EXERCISES																																	
Aerial Firefighting				✓					✓				✓								✓												
At-Sea Vessel Refueling Training			✓									✓									✓												
Combat Swimmer/Diver Training and Certification			✓									✓									✓						✓	✓	✓	✓	✓	✓	✓
Kilo Dip	✓			✓						✓			✓	✓			✓		✓		✓		✓		✓								
Multi-Domain Unmanned Autonomous Systems	✓		✓	✓			✓			✓		✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Precision Anchoring			✓							✓		✓			✓						✓		✓				✓	✓	✓	✓	✓	✓	✓
Ship-to-Shore Fuel Transfer Training			✓							✓		✓									✓						✓	✓	✓	✓	✓	✓	✓
Submarine and UUV Subsea and Seabed Warfare Exercise	✓		✓		✓		✓							✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Submarine Navigation Exercise	✓											✓									✓						✓	✓	✓	✓	✓	✓	✓
Submarine Sonar Maintenance and Systems Checks	✓											✓									✓						✓	✓	✓	✓	✓	✓	✓
Submarine Under Ice Training and Certification	✓											✓		✓			✓				✓		✓	✓	✓								
Surface Ship Sonar Maintenance and Systems Checks	✓		✓							✓		✓									✓						✓	✓	✓	✓	✓	✓	✓
Training and End-to-End Mission Capability Verification – Subsea and Seabed Warfare Kinetic Effectors			✓		✓		✓							✓			✓		✓		✓	✓	✓	✓	✓								
Training and End-to-End Mission Capability Verification – UAV			✓	✓	✓		✓						✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓								
Underwater Survey			✓									✓			✓						✓						✓	✓	✓	✓	✓	✓	✓
Unmanned Aerial System Training			✓	✓						✓		✓	✓	✓							✓		✓	✓	✓								
Unmanned Underwater Vehicle Training -Certification and Development Exercises	✓		✓	✓						✓		✓	✓	✓	✓		✓				✓												
Waterborne Training			✓									✓									✓						✓	✓	✓	✓	✓	✓	✓

Table B-1: Stressors by Training Activity (continued)

Hawaii California Training Activity	Biological Resources																				Physical Resources					Human Resources							
	Acoustic Stressors						Explosive Stressors		Energy Stressors			Physical Disturbance and Strike Stressors					Entanglement Stressors		Ingestion Stressors		Air Quality Stressors	Sediments and Water Quality Stressors				Cultural Resource Stressors		Socioeconomic Resource Stressors			Public Health & Safety Stressors		
	Sonar & Other Transducers	Pile Driving	Vessel Noise	Aircraft Noise	Weapons Noise	Air Guns	Explosions in Water	Explosions in Air	In-Water Electromagnetic Devices	In-Air Electromagnetic Devices	High-Energy Lasers	Vessels & In-water Device Strike	Aircraft & Aerial Target Strike	Military Expended Material	Seafloor Devices	Pile Driving	Wires & Cables	Decelerators/Parachutes	Military Expended Materials – Munitions	Military Expended Materials – Other than Munitions	Criteria Air Pollutants	Explosives	Metals	Chemicals (Not Explosives)	Other Materials	Explosives	Physical Disturbance & Strike	Accessibility	Airborne Acoustics	Physical Disturbance & Strike	Underwater Energy	In-Air Energy	Physical Interactions
U.S. COAST GUARD																																	
AIR WARFARE																																	
Gunnery Exercise Surface-to-Air Large Caliber			✓		✓					✓		✓		✓					✓		✓	✓	✓		✓								
Gunnery Exercise Surface-to-Air Medium Caliber			✓		✓					✓		✓		✓					✓		✓		✓		✓								
ELECTRONIC WARFARE																																	
Counter Targeting Chaff Exercise – Ship			✓							✓		✓		✓						✓	✓		✓	✓	✓								
Counter Targeting Flare Exercise			✓	✓						✓		✓	✓	✓						✓	✓		✓	✓	✓								
EXPEDITIONARY WARFARE																																	
Underwater Construction Team Training			✓									✓			✓						✓						✓	✓	✓	✓	✓	✓	✓
SURFACE WARFARE																																	
Gunnery Exercise Air-to-Surface Medium Caliber			✓	✓	✓		✓			✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓								
Gunnery Exercise Surface-to-Surface Boat Medium Caliber			✓		✓		✓					✓		✓					✓	✓	✓	✓	✓	✓	✓								
Gunnery Exercise Surface-to-Surface Boat Small Caliber			✓		✓							✓		✓					✓	✓	✓		✓	✓	✓								
Gunnery Exercise Surface-to-Surface Ship Large Caliber			✓		✓		✓			✓		✓		✓					✓		✓	✓	✓		✓								
Gunnery Exercise Surface-to-Surface Ship Medium Caliber			✓		✓		✓			✓		✓		✓					✓		✓	✓	✓	✓	✓								
Gunnery Exercise Surface-to-Surface Ship Small Caliber			✓		✓					✓		✓		✓					✓		✓		✓		✓								
Laser Targeting – Ship			✓							✓	✓	✓									✓												
Maritime Security Operations			✓	✓	✓					✓		✓	✓	✓					✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
OTHER TRAINING ACTIVITIES																																	
Precision Anchoring			✓							✓		✓			✓						✓		✓				✓	✓	✓	✓	✓	✓	✓
Search and Rescue			✓	✓						✓		✓	✓	✓						✓	✓						✓	✓	✓	✓		✓	✓
Unmanned Aerial System Training			✓	✓						✓		✓	✓	✓							✓		✓	✓	✓								
Unmanned Underwater Vehicle Training –Certification and Development Exercises	✓		✓	✓						✓		✓	✓	✓	✓		✓				✓												
Waterborne Training			✓									✓									✓						✓	✓	✓	✓	✓	✓	✓

Table B-1: Stressors by Training Activity (continued)

Hawaii California Training Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
U.S. ARMY																																	
AIR WARFARE																																	
Missile Exercise – Man Portable Air Defense System				✓	✓			✓					✓	✓					✓		✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓
AMPHIBIOUS WARFARE																																	
Shore-to-Surface Artillery Exercise			✓		✓		✓	✓		✓		✓		✓					✓	✓	✓	✓	✓	✓		✓		✓	✓	✓			✓
Shore-to-Surface Missile Exercise			✓		✓		✓	✓		✓		✓		✓					✓	✓	✓	✓	✓	✓		✓		✓	✓	✓			✓
SURFACE WARFARE																																	
Gunnery Exercise Surface-to-Surface Boat Medium Caliber			✓		✓		✓					✓		✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Gunnery Exercise Surface-to-Surface Boat Small Caliber			✓		✓							✓		✓					✓	✓	✓		✓				✓	✓	✓	✓			✓
U.S. AIR FORCE																																	
AIR WARFARE																																	
Air Combat Maneuvers				✓						✓			✓								✓		✓			✓		✓	✓	✓			✓
Gunnery Exercise (Air-to-Air) Medium Caliber				✓	✓					✓			✓	✓					✓		✓		✓				✓	✓	✓	✓			✓

Table B-2: Stressors by Testing Activity

Hawaii California Testing Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
NAVAL AIR SYSTEMS COMMAND																																	
AIR WARFARE																																	
Air Combat Maneuver Test				✓	✓			✓		✓			✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
Air Platform-Vehicle Test				✓						✓			✓								✓												
Air Platform Weapons Integration Test			✓	✓	✓					✓		✓	✓	✓				✓			✓		✓	✓	✓								
Air-to-Air Missile Test			✓	✓	✓		✓	✓		✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
Intelligence, Surveillance, and Reconnaissance Test				✓						✓			✓								✓						✓	✓	✓	✓		✓	✓
Large Force Test Event			✓	✓						✓		✓	✓	✓						✓	✓						✓	✓	✓	✓		✓	✓
Surface-to-Air Gunnery Test – Large Caliber			✓	✓	✓			✓		✓		✓	✓	✓				✓	✓		✓	✓	✓	✓	✓								
Surface-to-Air Gunnery Test – Medium Caliber			✓	✓	✓			✓		✓		✓	✓	✓				✓	✓		✓	✓	✓	✓	✓								
Surface-to-Air High-Energy Laser Test			✓	✓	✓					✓	✓	✓	✓	✓				✓		✓	✓		✓	✓	✓								
Surface-to-Air High-Power Microwave Test			✓	✓						✓	✓	✓	✓								✓												
Surface-to-Air Missile Test			✓	✓	✓		✓	✓		✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
ANTI-SUBMARINE WARFARE																																	
Anti-Submarine Warfare Torpedo Test (Aircraft)	✓			✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Anti-Submarine Warfare Tracking Test (Fixed-Wing)	✓			✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Anti-Submarine Warfare Tracking Test (Rotary-Wing)	✓			✓						✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓								
Kilo Dip Test	✓			✓						✓			✓								✓												
Sonobuoy Lot Acceptance Test	✓		✓	✓				✓		✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓								
ELECTRONIC WARFARE																																	
Chaff Test				✓						✓			✓	✓						✓	✓		✓	✓	✓								
Electronic Systems Test				✓						✓			✓	✓				✓			✓		✓	✓	✓		✓	✓	✓	✓		✓	✓
Flare Test				✓						✓			✓	✓						✓	✓		✓	✓	✓								

Table B-2: Stressors by Testing Activity (continued)

Hawaii California Testing Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
MINE WARFARE																																	
Airborne Dipping Sonar Minehunting Test	✓			✓						✓			✓								✓												
Airborne Laser Mine Detection System Test				✓						✓			✓								✓						✓	✓	✓	✓		✓	✓
Airborne Mine Neutralization System Test			✓	✓			✓			✓		✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓								
Airborne Minehunting Test – Sonobuoy	✓			✓						✓			✓	✓	✓		✓	✓		✓	✓		✓		✓								
Mine Laying Test				✓						✓			✓	✓	✓						✓		✓		✓		✓	✓	✓	✓			✓
SURFACE WARFARE																																	
Air-to-Surface Bombing Test			✓	✓			✓			✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓								
Air-to-Surface Gunnery Test			✓	✓	✓		✓			✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓								
Air-to-Surface High-Energy Laser Test			✓	✓						✓	✓	✓	✓	✓						✓	✓				✓								
Air-to-Surface High-Power Microwave Test			✓	✓						✓	✓	✓	✓	✓						✓	✓				✓								
Air-to-Surface Laser Targeting Test				✓						✓			✓	✓						✓	✓		✓	✓	✓								
Air-to-Surface Missile Test			✓	✓	✓		✓			✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
Long-Range Weapons Delivery Systems (Over-the-Horizon)/ Hypersonic Vehicle Test				✓	✓		✓			✓			✓	✓					✓		✓	✓	✓	✓	✓								
Rocket Test			✓	✓	✓		✓			✓		✓	✓	✓					✓	✓	✓	✓	✓	✓	✓								
Subsurface-to-Surface Missile Test					✓		✓					✓		✓					✓		✓	✓	✓	✓	✓								
Surface-to-Surface Gunnery Test – Large-Caliber			✓		✓		✓			✓		✓		✓					✓	✓	✓	✓	✓	✓	✓								
Surface-to-Surface Gunnery Test – Medium-Caliber			✓		✓		✓			✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
Surface-to-Surface Gunnery Test – Small-Caliber			✓		✓					✓		✓		✓					✓	✓	✓		✓	✓	✓								
Surface-to-Surface High-Energy Laser Test			✓	✓	✓					✓	✓	✓	✓	✓				✓		✓	✓		✓	✓	✓								
Surface-to-Surface High-Power Microwave Test			✓	✓						✓	✓	✓		✓						✓	✓				✓								
Surface-to-Surface Missile Test			✓		✓		✓			✓		✓		✓					✓	✓	✓	✓	✓	✓	✓								
OTHER TESTING ACTIVITIES																																	
Acoustic and Oceanographic Research			✓	✓						✓		✓	✓								✓				✓		✓	✓	✓	✓	✓	✓	✓
Air Platform Shipboard Integration Test			✓	✓						✓		✓	✓								✓						✓	✓	✓	✓		✓	✓
Undersea Range System Test	✓		✓							✓		✓		✓	✓						✓												

Table B-2: Stressors by Testing Activity (continued)

Hawaii California Testing Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes/Nets*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
NAVAL FACILITIES ENGINEERING AND EXPEDITIONARY WARFARE CENTER																																	
UNMANNED SYSTEMS																																	
Ocean Energy and Cable Systems Research			✓						✓			✓			✓		✓										✓				✓		
OTHER TESTING ACTIVITIES																																	
Undersea Range System Testing			✓									✓		✓	✓		✓								✓		✓			✓	✓		
Underwater Search, Deployment, and Recovery			✓						✓			✓		✓	✓		✓						✓		✓		✓			✓	✓		✓
NAVAL SEA SYSTEMS COMMAND																																	
ANTI-SUBMARINE WARFARE																																	
Anti-Submarine Warfare Mission Package Testing	✓		✓	✓	✓					✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
At-Sea Sonar Testing	✓		✓	✓					✓	✓		✓	✓	✓	✓		✓	✓		✓	✓		✓	✓	✓								
Pierside Sonar Testing	✓		✓							✓					✓						✓				✓			✓	✓		✓	✓	✓
Surface Ship Sonar Testing/Maintenance	✓		✓							✓		✓									✓						✓	✓	✓	✓	✓	✓	✓
Torpedo (Explosive) Testing	✓		✓	✓			✓			✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓								
Torpedo (Non-Explosive) Testing	✓		✓	✓						✓		✓	✓	✓	✓		✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
ELECTRONIC WARFARE																																	
Radar and Other System Testing			✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
MINE WARFARE																																	
Mine Countermeasure and Neutralization Testing			✓	✓			✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mine Countermeasure Mission Package Testing	✓		✓	✓			✓		✓	✓		✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mine Detection and Classification Testing	✓		✓	✓					✓	✓		✓	✓	✓	✓		✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
SURFACE WARFARE																																	
Gun Testing – Large Caliber	✓		✓	✓	✓		✓			✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
Gun Testing – Medium Caliber			✓	✓	✓			✓		✓		✓	✓	✓					✓		✓	✓	✓		✓								
Gun Testing – Small Caliber			✓		✓					✓		✓		✓					✓	✓	✓		✓	✓	✓								
Missile and Rocket Testing			✓		✓		✓	✓		✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓								
UNMANNED SYSTEMS																																	
Underwater Search, Deployment, and Recovery			✓	✓					✓	✓		✓	✓	✓							✓						✓	✓	✓	✓		✓	✓

Table B-2: Stressors by Testing Activity (continued)

Hawaii California Testing Activity	Biological Resources																				Physical Resources					Human Resources							
	Acoustic Stressors						Explosive Stressors		Energy Stressors			Physical Disturbance and Strike Stressors					Entanglement Stressors		Ingestion Stressors		Air Quality Stressors	Sediments and Water Quality Stressors				Cultural Resource Stressors		Socioeconomic Resource Stressors			Public Health & Safety Stressors		
	Sonar & Other Transducers	Pile Driving	Vessel Noise	Aircraft Noise	Weapons Noise	Air Guns	Explosions in Water	Explosions in Air	In-Water Electromagnetic Devices	In-Air Electromagnetic Devices	High-Energy Lasers	Vessels & In-water Device Strike	Aircraft & Aerial Target Strike	Military Expended Material	Seafloor Devices	Pile Driving	Wires & Cables	Decelerators/Parachutes/Nets	Military Expended Materials – Munitions	Military Expended Materials – Other than Munitions	Criteria Air Pollutants	Explosives	Metals	Chemicals (Not Explosives)	Other Materials	Explosives	Physical Disturbance & Strike	Accessibility	Airborne Acoustics	Physical Disturbance & Strike	Underwater Energy	In-Air Energy	Physical Interactions
Unmanned Surface Vehicle System Testing			✓							✓		✓		✓							✓				✓		✓	✓	✓	✓		✓	✓
Unmanned Underwater Vehicle Testing	✓		✓							✓		✓		✓	✓		✓			✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
VESSEL EVALUATION																																	
Air Defense Testing			✓	✓	✓			✓		✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓								
In-Port Maintenance Testing	✓		✓							✓		✓									✓						✓	✓	✓	✓	✓	✓	✓
Propulsion Testing			✓		✓					✓		✓			✓						✓						✓	✓	✓	✓		✓	✓
Signature Analysis Operations	✓		✓						✓	✓		✓		✓	✓		✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Small Ship Shock Trial			✓	✓			✓			✓		✓	✓								✓	✓	✓	✓	✓								
Submarine Sea Trials – Weapons System Testing	✓		✓							✓		✓		✓	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Surface Warfare Testing	✓		✓	✓	✓		✓	✓		✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓								
Undersea Warfare Testing	✓		✓	✓	✓			✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vessel Signature Evaluation			✓						✓			✓									✓						✓	✓	✓	✓		✓	✓
OTHER TESTING ACTIVITIES																																	
Acoustic and Oceanographic Research	✓		✓							✓		✓		✓							✓						✓	✓	✓	✓	✓	✓	✓
Countermeasure Testing	✓		✓	✓					✓	✓		✓	✓	✓			✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Insertion/Extraction	✓		✓							✓		✓		✓			✓	✓			✓		✓		✓		✓	✓	✓	✓	✓	✓	✓
Non-Acoustic Component Testing			✓	✓						✓		✓	✓								✓						✓	✓	✓	✓	✓	✓	✓
Semi-Stationary Equipment Testing	✓						✓			✓				✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Simulant Testing			✓	✓						✓		✓	✓								✓												
NAVAL INFORMATION WARFARE SYSTEMS COMMAND																																	
ACOUSTIC AND OCEANOGRAPHIC SCIENCE AND TECHNOLOGY																																	
Acoustic, Oceanographic, and Energy Research	✓		✓							✓		✓			✓						✓						✓	✓	✓	✓	✓	✓	✓
OTHER TESTING ACTIVITIES																																	
Communications	✓		✓	✓						✓		✓	✓		✓		✓				✓						✓	✓	✓	✓	✓	✓	✓
Intelligence, Surveillance, Reconnaissance	✓		✓	✓	✓	✓				✓		✓	✓	✓	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vehicle Testing	✓		✓							✓		✓	✓	✓	✓						✓		✓		✓		✓	✓	✓	✓	✓	✓	✓

Table B-2: Stressors by Testing Activity (continued)

Hawaii California Testing Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
OFFICE OF NAVAL RESEARCH																																	
ACOUSTIC AND OCEANOGRAPHIC SCIENCE AND TECHNOLOGY																																	
Acoustic and Oceanographic Research	✓		✓		✓	✓	✓			✓		✓		✓	✓				✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Large Displacement Unmanned Underwater Vehicle Testing														✓							✓						✓	✓		✓			✓
Long-Range Acoustic Communications	✓		✓									✓			✓						✓												
Mine Countermeasure Technology Research	✓		✓									✓									✓						✓	✓	✓	✓	✓	✓	✓

Table B-3: Stressors by Modernization and Sustainment of Ranges Action

Hawaii California Testing Activity	*Biological Resources*																				*Physical Resources*					*Human Resources*							
	Acoustic Stressors						*Explosive Stressors*		*Energy Stressors*			*Physical Disturbance and Strike Stressors*					*Entanglement Stressors*		*Ingestion Stressors*		*Air Quality Stressors*	*Sediments and Water Quality Stressors*				*Cultural Resource Stressors*		*Socioeconomic Resource Stressors*			*Public Health & Safety Stressors*		
	Sonar & Other Transducers	*Pile Driving*	*Vessel Noise*	*Aircraft Noise*	*Weapons Noise*	*Air Guns*	*Explosions in Water*	*Explosions in Air*	*In-Water Electromagnetic Devices*	*In-Air Electromagnetic Devices*	*High-Energy Lasers*	*Vessels & In-water Device Strike*	*Aircraft & Aerial Target Strike*	*Military Expended Material*	*Seafloor Devices*	*Pile Driving*	*Wires & Cables*	*Decelerators/Parachutes*	*Military Expended Materials – Munitions*	*Military Expended Materials – Other than Munitions*	*Criteria Air Pollutants*	*Explosives*	*Metals*	*Chemicals (Not Explosives)*	*Other Materials*	*Explosives*	*Physical Disturbance & Strike*	*Accessibility*	*Airborne Acoustics*	*Physical Disturbance & Strike*	*Underwater Energy*	*In-Air Energy*	*Physical Interactions*
AIRSPACE																																	
Special Use Airspace Modification				✓									✓																				
SEASPACE																																	
Southern California Offshore Anti-Submarine Warfare Range Modernization			✓						✓			✓			✓		✓				✓			✓			✓	✓		✓	✓		✓
Shallow Water Training Ranges Installation			✓						✓			✓			✓		✓				✓			✓			✓	✓		✓	✓		✓
Sustainment of Undersea Ranges			✓									✓			✓		✓				✓			✓				✓		✓			✓
Deployment of Seafloor Cables and Instrumentation			✓						✓			✓			✓		✓				✓						✓	✓		✓	✓		✓
Installation and Maintenance of Mine Warfare and Other Training Areas			✓									✓			✓		✓				✓						✓	✓		✓	✓		✓
Installation and Maintenance of Underwater Platforms			✓									✓			✓						✓						✓	✓		✓			✓

Table B-4: Stressors by Resource

Stressors vs. Resources																																		
			Biological Resources																			***Physical Resources***					***Human Resources***							
		Acoustic Stressors						***Explosive Stressors***		***Energy Stressors***			***Physical Disturbance and Strike Stressors***					***Entanglement Stressors***			***Ingestion Stressors***		***Air Quality Stressors***	***Habitat and Water Quality Stressors***				***Cultural Resource Stressors***		***Socioeconomic Resource Stressors***			***Public Health & Safety Stressors***	
		Sonar & Other Transducers	***Pile Driving***	***Vessel Noise***	***Aircraft Noise***	***Weapons Noise***	***Air Guns***	***Explosions in Water***	***Explosions in Air***	***In-Water Electromagnetic Devices***	***In-Air Electromagnetic Devices***	***High-Energy Lasers***	***Vessels & In-water Device Strike***	***Aircraft & Aerial Target Strike***	***Military Expended Material***	***Seafloor Devices***	***Pile Driving***	***Wires & Cables***	***Decelerators/Parachutes***	***Military Expended Materials – Munitions***	***Military Expended Materials – Other than Munitions***	***Criteria Air Pollutants***	***Explosives***	***Metals***	***Chemicals (Not Explosives)***	***Other Materials***	***Explosives***	***Physical Disturbance & Strike***	***Accessibility***	***Airborne Acoustics***	***Physical Disturbance & Strike***	***Underwater Energy***	***In-Air Energy***	***Physical Interactions***
Physical	Air Quality								✓												✓	✓												
	Sediments and Water Quality							✓															✓	✓	✓	✓								
Biological	Vegetation							✓					✓		✓	✓	✓						✓	✓	✓	✓								
	Invertebrates	✓	✓				✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓								
	Habitats							✓					✓		✓	✓	✓																	
	Fishes	✓	✓	✓		✓	✓	✓		✓		✓	✓		✓	✓		✓		✓			✓	✓	✓	✓								
	Marine Mammals	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		✓	✓		✓	✓	✓			✓	✓	✓	✓								
	Reptiles	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		✓	✓		✓	✓	✓			✓	✓	✓	✓								
	Birds	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓					✓	✓	✓												
Human	Cultural Resources				✓			✓							✓	✓											✓	✓						
	Socioeconomic Resources	✓		✓	✓	✓	✓	✓					✓	✓	✓			✓					✓	✓	✓	✓			✓	✓	✓			
	Public Health and Safety	✓				✓	✓	✓				✓	✓	✓	✓	✓																✓	✓	✓

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Appendix C
Mitigation

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APPENDIX C MITIGATION

C.1 INTRODUCTION

The terms "mitigation" and "mitigation measures" mean actions taken to completely avoid, partially reduce, or minimize the potential for a stressor to impact a resource. This appendix describes and assesses mitigation the Action Proponents will implement under the Proposed Action. The Action Proponents developed mitigation separate from, and after, the National Environmental Policy Act (NEPA) alternatives development process described in Chapter 2 (Description of the Proposed Action and Alternatives) in the 2024 HCTT Draft EIS/OEIS. Mitigation was designed to be implemented under every action alternative carried forward, an approach supported by NEPA regulations that allows agencies to "include appropriate mitigation measures not already included in the Proposed Action or alternatives" (40 Code of Federal Regulations [CFR] section 1502.14(e)). In addition to developing mitigation pursuant to NEPA, the Action Proponents developed mitigation in coordination with regulators and cooperating agencies, including the National Marine Fisheries Service (NMFS). Mitigation is designed to achieve one or more of the following overarching benefits:

- ensure that the Proposed Action has a negligible impact on marine mammal species and stocks, and effects the least practicable adverse impact on marine mammal species or stocks and their habitat (as required under the Marine Mammal Protection Act [MMPA])
- ensure that the Proposed Action does not jeopardize the continued existence of endangered or threatened species, or result in destruction or adverse modification of critical habitat (as required under the Endangered Species Act (ESA)
- avoid or minimize adverse effects on Essential Fish Habitat and habitats that provide critical ecosystem functions (as required under the Magnuson-Stevens Fishery Conservation and Management Act)
- avoid adversely impacting historic shipwrecks (as required under the Abandoned Shipwreck Act and National Historic Preservation Act)

For requirements under the MMPA, NMFS has supported the position that the reduction of impacts on marine mammal stocks and species (e.g., impacts on reproductive success or survivorship) may accrue through the application of mitigation that limits impacts on individual animals (National Marine Fisheries Service, 2023). Mitigation developed for the following types of impacts is thought to have greater value in reducing the likelihood or severity of adverse effects on marine mammal populations (National Marine Fisheries Service, 2023):

- avoiding injury or mortality
- limiting interruption of known feeding, breeding, mother/young, or resting behaviors
- minimizing abandonment of important habitat (temporally and spatially)
- minimizing the number of individuals subjected to these types of disruptions
- limiting degradation of habitat

NMFS has also described species-correlated factors that may (alone, or in combination) result in mitigation having a greater benefit towards reducing potential impacts on marine mammal species or stocks: (1) the stock is known to be decreasing or status is unknown, but believed to be declining; (2) the known annual mortality (from any source) is approaching or exceeding the potential biological removal level (as defined in section 3(20) of the MMPA); (3) the species or stock is a small, resident population; or (4) the stock is involved in an unusual mortality event or has other known vulnerabilities, such as recovering from an oil spill. Activity-based mitigation and geographic mitigation (which can include year-round or seasonal measures to reduce impacts on marine mammals or their prey and physical habitat), particularly within feeding, breeding, mother/young, migration, and resting areas (National Marine Fisheries Service, 2023), are relevant to achieving the mitigation goals described above. Using this guidance from NMFS, the Action Proponents considered the potential benefits of mitigation for marine mammals in terms of the degree, likelihood, and context of the anticipated avoidance of impacts to individuals (and how many individuals), and within the context of the species-correlated factors. Similar considerations were applied to mitigation developed for ESA-listed species, including sea turtles, fish, birds, and corals.

The Navy standardizes its mitigation across the Atlantic, Hawaii-California, Mariana Islands, Northwest, and Gulf of Alaska Study Areas to the maximum extent practical. Mitigation is tailored to each Study Area as needed and appropriate based on the following:

- the Proposed Action
- best available science on species occurrence and potential impacts from the Proposed Action
- expected mitigation benefits
- operational practicality assessments
- consultations and coordination with regulatory agencies or departments, such as NMFS, the National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS), state Coastal Zone Management program offices, and State Historic Preservation Officers
- consultations and coordination with Alaska Native federally recognized tribes, Native Hawaiian organizations, and Native American Tribes, nations, and tribal organizations
- suggestions received through public comments during scoping and on the Draft EIS/OEIS

Mitigation was initially developed for Phase I of at-sea environmental planning (2009 to 2014) and subsequently revised for Phase II (2013 to 2018) and Phase III (2018 to 2025 for the HSTT EIS/OEIS, and 2022 to 2029 for the Point Mugu Sea Range [PMSR] EIS/OEIS). The Draft EIS/OEIS (which represents Phase IV) uses mitigation from the 2018 HSTT and 2022 PMSR EIS/OEISs as the baseline for refining mitigation specific to the Proposed Action. For additional information about the at-sea environmental planning process, see Chapter 1 (Purpose and Need) of the 2024 HCTT Draft EIS/OEIS.

The Action Proponents analyzed potential mitigation measures individually and then collectively as a holistic mitigation package to determine if mitigation would meet the appropriate balance between being environmentally beneficial and practical to implement. Mitigation measures are expected to have some degree of impact on the military readiness activities that implement them. The Action Proponents are willing to accept a certain level of impact on their military readiness activities to implement mitigation that is expected to be sufficiently beneficial (i.e., effective) at avoiding specific impacts from the Proposed Action. To determine if mitigation measures would be practical to implement, operational communities from each Action Proponent conducted a comprehensive assessment to determine how and to what degree each individual measure and the iterative and cumulative impact of all potential measures would be compatible with planning, scheduling, and conducting military readiness activities under the Proposed Action. Mitigation was considered practical to implement if it met all three criteria discussed in Table C-1.

Table C-1: Practicality Assessment Criterion

Criterion	*Description of Practicality Assessment Criterion*
Criterion 1. Safety: Implementing mitigation must be safe	• Assessments considered if mitigation would increase safety risks to personnel, equipment, or the public through: — increased fatigue of pilots or other personnel — accelerated fatigue-life of vessels, aircraft, and other systems or platforms — increased distance to aircraft emergency landing fields, critical medical facilities, and search and rescue capabilities — exceedance of aircraft fuel restrictions (e.g., lengthened event duration, increased distance to refueling stations) — exceedance of space restrictions on visual observation platforms — decreased ability to de-conflict sea space or airspace conflicts (e.g., ensuring military readiness activities do not impact each other, avoiding interaction with established commercial air traffic routes, commercial vessel shipping lanes, and areas used for energy exploration or alternative energy development) — decreased ability for Lookouts to safely and effectively maintain situational awareness while observing the mitigation zones during typical activity conditions — decreased ability for Lookouts to safely perform other assigned job responsibilities — decreased proficiency in the use of sensors and weapon systems, or reduced ability to complete shipboard maintenance, repairs, or testing prior to at-sea use (which would result in a significant risk to personnel or equipment safety during training, testing, and real-world missions) — increased administrative burden that would significantly distract from safe conduct of primary mission objectives
Criterion 2. Sustainability: Implementing mitigation must be sustainable for the duration of the Proposed Action	• Assessments considered if mitigation would be unsustainable for the duration of the Proposed Action by: — requiring personnel to spend an inordinate amount of time on station or away from their homeport — requiring the use or obligation of additional resources (e.g., personnel and equipment) in excess of what is available — requiring expenditure of additional funding for increased operational costs associated with higher fuel consumption, additional maintenance of existing equipment, or acquisition of new equipment — reducing efficiency in travel time and associated costs by increasing distance between activities and homeports, home bases, associated training ranges, testing facilities, air squadrons, and existing infrastructure (e.g., instrumented underwater ranges)
Criterion 3. Mission: Implementing mitigation must allow for the Action Proponents to continue meeting mission objectives and statutory mandates	• Assessments considered if mitigation would modify military readiness activities in a way that would prevent them from meeting mission objectives, and the implications for the ability to continue meeting statutory mandates. Example barriers to meeting mission objectives and statutory mandates include: — degraded training or testing realism — decreased ready access to ranges, operating areas (OPAREAs), airspace, or sea space with a variety of realistic tactical oceanographic and environmental conditions (e.g., variations in bathymetry, topography, surface fronts, and sea surface temperatures) that are extensive enough to allow for completion of activities without physical or logistical obstructions, to provide personnel the ability to develop competence and confidence in their capabilities across multiple types of weapons and sensors, and the ability to train to communicate and operate in a coordinated fashion as required during real-world missions and to avoid observation by potential adversaries — decreased proficiency, erosion of capabilities, or reduction in perishable skills related to the use of sensors or weapon systems — decreased ready access to facilities, range support structures, or systems command support facilities that provide critical infrastructure support and technical expertise necessary to conduct testing — reduced ability to meet individual training and testing schedules, pre-deployment certification requirements, deployment schedules, and to deploy on time (factoring in variables such as maintenance and weather when scheduling event locations and timing) with the required level of skill and flexibility to accomplish any tasking by Combatant Commanders, national command authorities, or other national security tasking, including responding to national emergencies or emerging national security challenges — reduced ability to conduct accurate oceanographic or acoustic research to meet research objectives, validate acoustic models, and conduct accurate engineering tests of acoustic sources, signal processing algorithms, and acoustic interactions — reduced ability to ensure the safety, functionality, and accuracy of systems, platforms, and components through maintenance, repairs, or testing prior to use at sea as needed or required by acquisition milestones — reduced ability to effectively test systems, platforms, and components before full-scale production or delivery in order to validate whether they perform as expected and determine whether they are operationally effective, suitable, survivable, and safe for their intended use by the fleet — increased administrative burden that would significantly distract from efficient and effective conduct of primary mission objectives — increased national security concerns related to providing advance notification of specific times and locations of platforms, such as those using active sonar — measures that extend outside of the Action Proponents' legal authority to implement

The Action Proponents' Senior Leadership has reviewed, determined the practicality of, and approved all mitigation measures included in the 2024 HCTT Draft EIS/OEIS. Through the mitigation development and assessment processes, the Action Proponents will ultimately commit to the maximum level of mitigation that is both beneficial and practical to implement under the Proposed Action. The Records of Decision, MMPA Regulations and Letters of Authorization, ESA Biological Opinion, and other associated consultation documents will detail the mitigation to be implemented under the Proposed Action. Should the Action Proponents require a change in how they implement mitigation based on national security concerns, evolving readiness requirements, or other factors (e.g., significant changes in best available science), they will engage the appropriate agencies and reevaluate their mitigation or verify that potential impacts are adequately addressed in the 2024 HCTT Draft EIS/OEIS and consultation documents through the appropriate consultations or Adaptive Management (as described in Section C.5, Monitoring, Research, and Adaptive Management). Mitigation measures that were considered but eliminated because they did not meet the appropriate balance between being environmentally beneficial and practical to implement are discussed in Section C.9 (Mitigation Considered but Eliminated).

C.2 Mitigation Dissemination

The Action Proponents will publish, broadcast, disseminate, or distribute mitigation instructions through pre-event briefs, governing instructions, broadcast messages, the Protective Measures Assessment Protocol, or other established internal processes. The Protective Measures Assessment Protocol is a software program accessed by appointed personnel during pre-event planning (see Figure C-1). The program provides operators with notification of the required mitigation measures applicable to a particular training or testing event, as well as a visual display of the planned event location overlaid with relevant environmental data. Its text and mapping data will be updated to align with best available science and the final mitigation that results from the 2024 HCTT Draft EIS/OEIS and associated consultation documents.

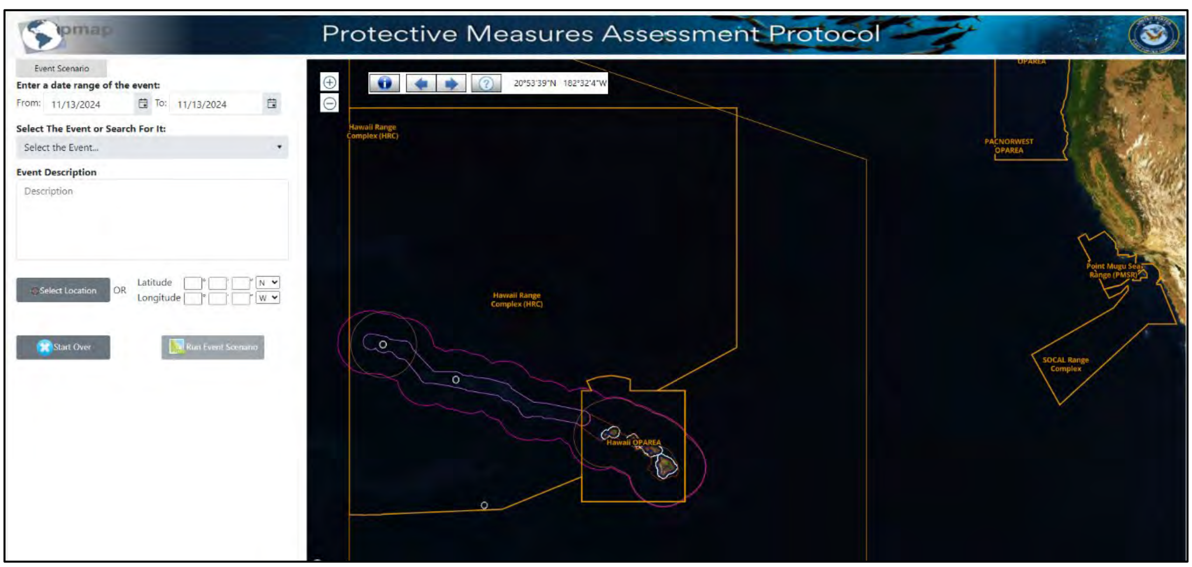

Figure C-1: Protective Measures Assessment Protocol Home Screen

Mitigation requirements are mandatory for the Action Proponents when conducting activities under the Proposed Action. In furtherance of national security objectives, foreign militaries may participate in multinational training and testing events in the Study Area. Foreign military participation is not part of the federal action unless the U.S. military exercises substantial control and responsibility over those foreign military activities. Foreign military vessels operate pursuant to their own national authorities and have independent rights under customary international law, embodied in the principle of sovereign immunity, to engage in various activities on the world's oceans and seas. During U.S.-led training events within the U.S. territorial seas (0–12 NM from shore), the Action Proponents will request a foreign military unit's voluntary compliance with the applicable mitigations. When a foreign military unit participates in a training event with the Action Proponents beyond the U.S. territorial seas but within the U.S. Exclusive Economic Zone (12–200 NM from shore), the Action Proponents will encourage that unit's voluntary compliance with the mitigation when practical.

C.3 Personnel Training

Underway surface ships operated by or for the Action Proponents have personnel assigned to stand watch at all times (day and night) for safety of navigation, collision avoidance, range clearance, and man-overboard precautions. Personnel on underway small boats (e.g., crewmembers responsible for navigation) fulfill similar watch standing responsibilities to those positioned on surface ships. To qualify to stand watch as a Lookout, personnel undertake a training program that includes computer-based training, on-the-job instruction, and a formal qualification program. Lookouts are trained in accordance with the *U.S. Navy Lookout Training Handbook* or equivalent to use correct scanning procedures while monitoring assigned sectors, to estimate the relative bearing, range, position angle, and target angle of sighted objects, and to rapidly communicate accurate sighting reports. The *U.S. Navy Lookout Training Handbook* was updated in 2022 to include a more robust chapter on environmental compliance, mitigation, and marine species observation tools and techniques (NAVEDTRA 12968-E). Environmental awareness and education training is also provided to personnel through the Afloat Environmental Compliance Training program (described below) or equivalent. Training is designed to help personnel gain an understanding of their personal environmental compliance roles and responsibilities (including mitigation implementation). Upon reporting aboard and annually thereafter, appointed personnel must complete training identified in their career path training plan.

- **Introduction to Afloat Environmental Compliance.** Developed in 2014, the introduction module provides information on at-sea environmental laws, regulations, and compliance roles.
- **Marine Species Awareness Training. This** module was developed by civilian marine biologists employed by the Navy and was reviewed and approved by NMFS. It provides information on marine species sighting cues, visual observation tools and techniques, and sighting notification procedures. It is a video-based complement to the *U.S. Navy Lookout Training Handbook* or equivalent. Since 2007, this module has been required for commanding officers, executive officers, equivalent civilian personnel, and personnel who will stand watch as a Lookout.
- **Protective Measures Assessment Protocol.** This module provides information on how personnel should access and operate the Protective Measures Assessment Protocol. Since 2014, this module has been required for personnel tasked with generating mitigation reports.
- **Sonar Positional Reporting System and Marine Mammal Incident Reporting.** This module provides information on sonar reporting requirements and marine mammal incident reporting procedures, which are described in Section C.4 (Reporting). Since 2014, this module has been required for personnel tasked with preparing, approving, or submitting applicable reports.

C.4 Reporting

Reporting requirements are designed to track compliance with MMPA and ESA authorizations. They also provide the Action Proponents and regulators sufficient information to consider if changes to mitigation, monitoring, or reporting requirements might be appropriate. Report content and submission details will be included in the NMFS MMPA Regulations and Letters of Authorization. The Navy developed a classified data repository known as the Sonar Positional Reporting System to maintain internal records of in-water sound source use and to facilitate reporting pursuant to its MMPA Regulations and Letters of Authorization. Applicable data will be provided to the NMFS Office of Protected Resources with annual reports describing the level of training and testing conducted in the Study Area and the special reporting mitigation areas described in Section C.7 (Geographic Mitigation). The reports will include additional information for major training exercises and the Sinking Exercise (SINKEX), such as records of individual marine mammal sightings for when mitigation was implemented during the events. The Action Proponents will also submit an annual report to NMFS on monitoring conducted under the U.S. Navy Marine Species Monitoring Program (described in Section C.5, Monitoring, Research, and Adaptive Management). Unclassified reports submitted to NMFS are available on the NMFS Office of Protected Resources (https://www.fisheries.noaa.gov/about/office-protected-resources) and U.S. Navy's Marine Species Monitoring Program (https://www.navymarinespeciesmonitoring.us) webpages.

As needed, the Action Proponents will follow established internal communication methods directed by Office of Chief of Naval Operations Instruction 3100.6 (series) if reportable incidents applicable to their activities are observed. Further, the Action Proponents will:

- Notify the appropriate regulatory agency, which may include NMFS or the USFWS, immediately (or as soon as operational security considerations allow) if a vessel strike, injury, or mortality of a marine mammal or sea turtle occurs that is (or may be) attributable to activities conducted under the Proposed Action. The notification will include relevant information pertaining to the incident, including, but not limited to, vessel speed or event type.
- Comply with the communication protocol for incidents involving marine mammals under NMFS' jurisdiction as outlined in the Notification and Reporting Plan, which will be publicly available on the NMFS Office of Protected Resources webpage.
- Comply with the reporting requirements for incidents involving ESA-listed species under NMFS' jurisdiction as outlined in the NMFS Biological Opinion.
- Comply with the reporting and response requirements for incidents involving ESA-listed species under USFWS' jurisdiction as outlined in the USFWS consultation documents.
- Commence consultation with the appropriate SHPO or Tribal Historic Preservation Officer in accordance with 36 CFR section 800.13(b)(3) in the event a submerged historic property (e.g., archaeological resource) is found to have been incidentally impacted during a training or testing event.

C.5 Monitoring, Research, and Adaptive Management

The Navy is one of the nation's largest sponsors of scientific research on, and monitoring of, protected marine species (Marine Mammal Commission, 2023). Details about the U.S. Navy Marine Species Monitoring Program, Living Marine Resources Program, and U.S. Navy Office of Naval Research (ONR) is provided in Section 3.0.1.1 (Marine Species Monitoring and Research Programs) of the 2024 HCTT Draft EIS/OEIS. Through the Action Proponents' environmental offices and programs, the U.S. Navy Marine Species Monitoring Program, the Living Marine Resources Program, and the ONR, the Action Proponents have been sponsoring research and monitoring for over 30 years in areas where they conduct military readiness activities. Additionally, the Coast Guard spends tens of millions of dollars annually protecting living marine resources through its maritime response, prevention, and law enforcement missions, which have a direct and positive impact on the maritime environment.

Thanks in part to advancements in science from these programs, the understanding of military readiness activity impacts on protected marine species continues to evolve. The programs have also made significant advancements in research on and development of emergent mitigation technologies, such as thermal detection systems, infrared systems, radar systems, passive acoustic range instrumentation, and autonomous and unmanned platforms with automated passive acoustic detection capabilities. Technological advancements are also being made through research conducted by private industry (e.g., commercial off-the-shelf products). While these technologies have not reached the level of performance needed for deployment during military readiness activities, the Action Proponents plan to continue researching, testing, and developing them. If mitigation technologies mature to the state where they are determined to be sufficiently effective at mitigating marine mammal impacts when considering the range of environmental conditions analogous to where the Action Proponents train and test, the species that could co-occur in space and time with the activities, and the characteristics of the sound sources and platforms used during the activities, then the Action Proponents will assess their compatibility with military readiness applications. This would include a practicality assessment of the budget and acquisition process (including costs associated with designing, building, installing, maintaining, and manning equipment), the logistical and physical considerations for retrofitting platforms with the appropriate equipment and their associated maintenance, repairs, or replacements (e.g., conducting engineering studies to ensure compatibility with existing shipboard systems), the resource considerations for training personnel to effectively operate the equipment, and the potential security and classification issues.

The Action Proponents will continue to host marine species monitoring technical review meetings with NMFS, to include researchers and the Marine Mammal Commission. Additionally, routine Adaptive Management meetings will continue to be held with NMFS and the Marine Mammal Commission as a systematic approach to help account for advancements in science and technology made after the issuance of MMPA Regulations and Letters of Authorization. The Action Proponents will provide information about the status and findings of sponsored mitigation technology research and any associated practicality assessments at these meetings. Through Adaptive Management, decisions, policies, or actions can be adjusted as the science and outcomes from management actions become better understood over time (Williams et al., 2009).

C.5.1 Current Video and Audio Monitoring for San Nicolas Island During Vehicle Launch Events

The Navy shall continue to implement the current monitoring plan initially detailed in the 2022 PMSR EIS/OEIS for beaches exposed to launch noise with the goal of assessing baseline pinniped distribution/abundance and potential changes in pinniped use of these beaches after launch events. Marine mammal monitoring shall include multiple surveys (e.g., time-lapse photography) during the year that record the species, number of animals, general behavior, presence of pups, age class, gender and reactions to launch noise or other natural or human caused disturbances, in addition to environmental conditions that may include tide, wind speed, air temperature, and swell. In addition, video and acoustic monitoring of up to three pinniped haulout areas and rookeries will be conducted during launch events that include missiles or targets that have not been previously monitored using video and acoustic recorders for at least three launch events.

In coordination with NMFS, the final full suite of mitigation measures and monitoring requirements for launch events on San Nicolas Island (SNI) will be determined during the MMPA consultation process. Monitoring will need to factor in the practicality and compatibility of implementing the monitoring procedures based on planning, scheduling, and conducting vehicle launch activities to meet mission objectives.

C.6 Activity-Based Mitigation

Activity-based mitigation was referred to as “Procedural Mitigation” in the 2018 HSTT and 2022 PMSR EIS/OEISs. Activity-based mitigations are fundamentally consistent across stressors; however, there are activity-specific variations to account for differences in platform configurations, event characteristics, and stressor types. These mitigations have a primary objective of reducing overlap of individual marine mammals and sea turtles (and in some instances, ESA-listed fish and birds) in real time with stressors that have the potential to cause injury or mortality.

Observations for “indicator species” are also conducted to offer an additional layer of protection for marine mammals and sea turtles. Floating vegetation can be an indicator of potential marine mammal or sea turtle presence because these animals have been known to seek shelter in, feed on, or feed among concentrations of floating vegetation. For example, young sea turtles have been known to hide from predators and eat the algae associated with floating concentrations of floating vegetation. For mitigation purposes, the term “floating vegetation” refers to floating concentrations of detached kelp paddies or other floating vegetation. For events with the largest net explosive weights (NEW; described in lb.), indicator species also include other prey species or co-feeding species, such as jellyfish aggregations, large schools of fish, or flocks of seabirds, depending on the event and observation platforms involved.

Visual observations will be conducted by trained Lookouts. For mitigation purposes, the minimum number of Lookouts required is provided in Table C-2 through Table C-5. Some events may have additional personnel (beyond the minimum number of required Lookouts) who are already standing watch in or on the platform conducting the event or additional participating platforms and would have eyes on the water for all or part of an event. For example, Bridge Watch Teams on underway surface ships typically include numerous personnel on the bridge, bridge wings, and aft deck. These additional personnel will serve as members of the “Lookout Team” for all acoustic, explosive, and physical disturbance and strike stressor mitigation categories. While performing their primary duties, the Lookout Team will perform ad hoc visual observations before, during, or after events as a secondary task when doing so is compatible with, and does not compromise, safety and primary duty performance.

Lookouts may be positioned on surface vessels, aircraft, piers, or the shore. Lookouts positioned on U.S. Navy surface vessels (including surfaced submarines) will be solely dedicated to visually observing their assigned sectors. Lookouts on vessels with limited crew may fulfill additional duties. For example, a Lookout on a small boat may also be responsible for navigation or personnel supervision. A Lookout in an aircraft is typically an existing crewmember such as a pilot or Flight Officer whose primary duty is navigation or other mission-essential tasks. Observation platforms will be positioned according to safety, mission, and environmental conditions. For example, small boats observing explosive mine events would always be positioned outside of the detonation plume and human safety zone.

Lookouts will employ standard visual search techniques using naked-eye scanning, potentially in combination with the use of handheld binoculars, high-powered “big-eye” binoculars mounted on the deck of a surface ship (depending on the event and observation platform), and night search techniques (e.g., the use of night vision devices) if events occur after sunset or prior to sunrise. Lookouts will be advised that personal use of polarized sunglasses, when available, may help reduce sea surface glare, which could improve the sightability of marine resources. Prior to the start of an event (or use of a stressor) and throughout the duration of the event (or stressor use), Lookouts will observe a "mitigation zone" and the sea space surrounding the mitigation zone; within the direct path of underway vessels, unmanned surface or underwater vehicles that are already being escorted and operated under positive control by manned surface vehicles, or towed in-water devices; and throughout the range of visibility (e.g., to the horizon, depending on weather and observation platform characteristics). Mitigation zones are distances from a stressor (typically a radius measured in yards [yd.]), as specified in Table C-2 through Table C-5. The specified mitigation zones are the largest areas Lookouts can reasonably be expected to observe during typical activity conditions and that are practical to implement from an operational standpoint. Lookouts may be responsible for observing multiple mitigation zones. For example, a Lookout positioned on a surface ship during an explosive large-caliber gunnery event may be responsible for observing both the weapon firing noise mitigation zone and the mitigation zone around the intended detonation location.

Lookouts will immediately relay relevant sightings information (e.g., animal or indicator species type, bearing, distance, direction of travel or drift, position relative to the mitigation zone) to the appropriate watch station through established communication methods. Lookouts will continue to observe for new sightings while maintaining situational awareness of the originally sighted animal or indicator species' position relative to the mitigation zone (to the extent possible). Lookouts will immediately relay any relevant new or updated information to the watch station. The watch station will disseminate relevant information to other participating assets as needed for their situational awareness. When passive acoustic devices are already being used in an event, sonar technicians will relay information about any passive acoustic detections of marine mammals to Lookouts prior to or during an event (when applicable, as indicated in Table C-2 and Table C-3) using established communication methods. Lookouts will use the information received to help inform their visual observation of mitigation zones.

C.6.1 MITIGATION SPECIFIC TO ACOUSTIC STRESSORS, EXPLOSIVES, AND NON-EXPLOSIVE ORDNANCE

The mitigation measures described below will be implemented (as appropriate) in response to an applicable sighting within or entering the relevant mitigation zone for acoustic stressors, explosives, and non-explosive practice munitions:

- Prior to the initial start of an event (or stressor use), the Action Proponents will: (1) relocate the event to a location where applicable species are not observed, or (2) delay the initial start of the event (or stressor use) until one of the "Mitigation Zone All-Clear Conditions" has been met.
- During the event (i.e., during use of a stressor), the Action Proponents will (until one of the Mitigation Zone All-Clear Conditions has been met): (1) power down or shut down active acoustic transmissions, (2) cease air gun use, (3) cease pile driving or pile removal, (4) cease weapon firing or ordnance deployment, or (5) cease explosive detonations or fuse initiations.

Mitigation Zone All-Clear Conditions indicate that the mitigation zone is determined to be free of applicable species. The conditions include: (1) a Lookout observes the applicable species exiting the mitigation zone, (2) a Lookout determines the applicable species has exited the mitigation zone based on its observed course and speed relative to the mitigation zone, (3) a Lookout affirms the mitigation zone has been clear from additional sightings for an applicable "wait period," or (4) for mobile events, the stressor has transited a distance equal to double the mitigation zone size beyond the location of the last sighting. Wait periods were established because events cannot be delayed or ceased indefinitely for the purpose of mitigation due to impacts on safety, sustainability, and the ability to meet mission requirements. Wait periods are designed to allow animals the maximum amount of time practical to resurface (i.e., become available to be observed) before activities resume. The assumption that mitigation may need to be implemented more than once was factored when developing wait period durations. Wait periods are 10 minutes, 15 minutes, or 30 minutes depending on the fuel constraints of the platform and feasibility of implementation as indicated in Table C-2 through Table C-4.

C.6.1.1 Additional Details for Acoustic Stressors

Additional details on the activity-based mitigation requirements for acoustic stressors are described in Table C-2. Activity-based mitigation will not apply to the following:

- sources not operated under positive control
- sources used for safety of navigation
- sources used or deployed by aircraft operating at high altitudes
- sources used, deployed, or towed by unmanned platforms except when escort vessels are already participating in the event and have positive control over the source
- sources used by submerged submarines
- *de minimis* sources
- long-duration sources, including those used for acoustic and oceanographic research
- vessel-based, unmanned vehicle-based, or towed in-water sources when marine mammals (e.g., dolphins) are determined to be intentionally swimming at the bow or alongside or directly behind the vessel, vehicle, or device (e.g., to bow-ride or wake-ride)
- sources above 2 kHz for sea turtles (based on their hearing capabilities)

C.6.1.2 Additional Details for Explosives

Additional details on the activity-based mitigation requirements for explosives are described in Table C-3 Mitigation will not apply to explosives that are (1) deployed by aircraft operating at high altitudes; (2) deployed by submerged submarines, except for explosive torpedoes; (3) deployed against aerial targets; (4) during vessel- or shore-launched missile or rocket events; (5) used at or below the *de minimis* threshold; and (6) deployed by unmanned platforms except when escort vessels are already participating in the event and have positive control over the explosive. Post-event observations are intended to aid incident reporting requirements for marine mammals and sea turtles. Practicality and the duration of post-event observations will be determined on site by fuel restrictions and mission-essential follow-on commitments.

C.6.1.3 Additional Details for Non-Explosive Ordnance

Additional details on the activity-based mitigation requirements for non-explosive ordnance are described in Table C-4. Explosive aerial-deployed mines do not detonate upon contact with the water surface and are therefore considered non-explosive when mitigating the potential for a mine shape to strike a marine mammal or sea turtle at the water surface. Mitigation for the explosive component of aerial-deployed mines is described in Table C-3. Mitigation does not apply to non-explosive ordnance deployed (1) by aircraft operating at high altitudes, (2) against aerial targets, (3) during vessel- or shore-launched missile or rocket events, and (4) by unmanned platforms except when escort vessels are already participating in the event and have positive control over ordnance deployment.

Table C-2: Activity-Based Mitigations for Acoustic Stressors

Mitigation Category	*Mitigation Zones*	*Mitigation Requirements*	*Mitigation Requirement Timing*	*Wait Period*
Active Acoustic Sources				
• Active acoustic sources with power down and shut down capabilities: — Low-frequency active sonar ≥200 dB — Mid-frequency active sonar sources that are hull mounted on a surface ship (including surfaced submarines) — Broadband and other active acoustic sources >200 dB	• 200 yd. from active acoustic sources (shut down) • 500 yd. from active acoustic sources (power down of 10 dB total) • 1,000 yd. from active acoustic sources (power down of 6 dB total)	• One Lookout in/on one of the following: — Aircraft — Pierside, moored, or anchored vessel — Underway vessel with space/crew restrictions (including small boats) — Underway vessel already participating in the event that is escorting (and has positive control over sources used, deployed, or towed by) an unmanned platform • Two Lookouts on an underway vessel without space/crew restrictions • Lookouts would use information from passive acoustic detections to inform visual observations when passive acoustic devices are already being used in the event	• Immediately prior to the initial start of using active acoustic sources (e.g., while maneuvering on station) for: — Marine mammals — Sea turtles (for sources <2 kHz) — Floating vegetation • During use of active acoustic sources for: — Marine mammals — Sea turtles (for sources <2 kHz)	• 10 or 30 minutes (depending on fuel constraints of the platform)
• Active acoustic sources with shut down (but not power down) capabilities: — Low-frequency active sonar <200 dB — Mid-frequency active sonar sources that are not hull mounted on a surface ship (e.g., dipping sonar, towed arrays) — High-frequency active sonar — Air guns — Broadband and other active acoustic sources >200 dB	• 200 yd. from active acoustic sources (shut down)			
Pile Driving and Pile Removal				
• Vibratory and impact pile driving and removal	• 5 yd. from piles being driven or removed (cease pile driving or removal)	• One Lookout on one of the following: — Shore — Pier — Small boat	• 15 minutes prior to the initial start of pile driving or pile removal for: — Marine mammals — Sea turtles — Floating vegetation • During pile driving or removal for: — Marine mammals — Sea turtles	• 15 minutes
Weapon Firing Noise				
• Explosive and non-explosive large-caliber gunnery firing noise (surface-to-surface and surface-to-air)	• 30 degrees on either side of the firing line out to 70 yd. from the gun muzzle (cease fire)	• One Lookout on a vessel	• Immediately prior to the initial start of large-caliber gun firing (e.g., during target deployment) for: — Marine mammals — Sea turtles — Floating vegetation • During large-caliber gun firing for: — Marine mammals — Sea turtles	• 30 minutes

Table C-3: Activity-Based Mitigations for Explosives

Mitigation Category	*Mitigation Zones*	*Mitigation Requirements*	*Mitigation Requirement Timing*	*Wait Period*
Explosive Bombs				
• Any NEW	• 2,500 yd. from the intended target (cease fire)	• One Lookout in an aircraft	• Immediately prior to the initial start of bomb delivery (e.g., when arriving on station) for: — Marine mammals — Sea turtles — Floating vegetation • During bomb delivery for: — Marine mammals — Sea turtles • After the event, when practical, observe the detonation vicinity for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 10 minutes
Explosive Gunnery				
• Air-to-surface medium-caliber	• 200 yd. from the intended impact location (cease fire)	• One Lookout on a vessel or in an aircraft	• Immediately prior to the initial start of gun firing (e.g., while maneuvering on station) for: — Marine mammals — Sea turtles — Floating vegetation • During gunnery firing for: — Marine mammals — Sea turtles • After the event, when practical, observe the detonation vicinity for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 10 or 30 minutes (depending on fuel constraints of the platform)
• Surface-to-surface medium-caliber	• 600 yd. from the intended impact location (cease fire)			
• Surface-to-surface large-caliber	• 1,000 yd. from the intended impact location (cease fire)			
Explosive Underwater Demolition Multiple Charge – Mat Weave and Obstacle Loading				
• Any NEW	• 700 yd. from the detonation site (cease fire)	• Two Lookouts: one on a small boat and one on shore from an elevated platform	• For 30 min. prior to the first detonation, the Lookout positioned on a small boat will observe for: — Marine mammals — Sea turtles — Floating vegetation • For 10 min. prior to the first detonation, the Lookout positioned on shore will use binoculars to observe for: — Marine mammals — Sea turtles • During detonations, both Lookouts will observe for: — Marine mammals — Sea turtles • After the event, observe the detonation vicinity for 30 minutes for injured or dead: — Marine mammals — Sea turtles • Follow established report procedures, as required.	• 10 minutes (determined by the shore observer)

Table C-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	*Mitigation Zones*	*Mitigation Requirements*	*Mitigation Requirement Timing*	*Wait Period*
Explosive Mine Countermeasure and Neutralization (No Divers)				
• 0.1–5 lb. NEW	• 600 yd. from the detonation site (cease fire)	• One Lookout on a vessel or in an aircraft	• Immediately prior to the initial start of detonations (e.g., while maneuvering on station; typically, 10 or 30 minutes depending on fuel constraints) for: — Marine mammals — Sea turtles — Floating vegetation • During detonations or fuse initiation for: — Marine mammals — Sea turtles — Concentrations of seabirds or individual foraging seabirds • After the event, observe the detonation vicinity for 10 or 30 minutes (depending on fuel constraints), for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 10 or 30 minutes (depending on fuel constraints of the platform)
• >5 lb. NEW	• 2,100 yd. from the detonation site (cease fire)	• Two Lookouts: one in a small boat and one in an aircraft		
Explosive Mine Neutralization (With Divers)				
• 0.1–20 lb. NEW (positive control)	• 500 yd. from the detonation site (cease fire)	• Two Lookouts in two small boats (one Lookout per boat), or one small boat and one rotary-wing aircraft (with one Lookout each), and one Lookout on shore for shallow-water events	• Time-delay devices will be set not to exceed 10 minutes • Immediately prior to the initial start of detonations or fuse initiation for positive control events (e.g., while maneuvering on station) or for 30 minutes prior for time-delay events for: — Marine mammals — Sea turtles — Floating vegetation • During detonations or fuse initiation for: — Marine mammals — Sea turtles — Concentrations of seabirds or individual foraging seabirds in the water during shallow-water events: A shore-based Lookout will survey the mitigation zone with binoculars before and after each detonation. If events involve multiple detonations, the second (or third, etc.) detonation will occur immediately after the preceding detonation (i.e., within 10 seconds), or after 30 min. — Hammerhead sharks within the Southern California Range Complex: Divers will notify the support boat or Range Safety Officer of sightings (of any hammerhead, due to difficulty in differentiating species). Detonations will cease if divers sight a hammerhead when setting charges and will recommence when it is no longer observed. • When practical based on mission, safety, and environmental conditions: — Boats will observe from the mitigation zone radius mid-point — When two are used, boats will observe from opposite sides of the mine location — Platforms will travel a circular pattern around the mine location — Boats will have one Lookout observe inward toward the mine location and one observe outward toward the mitigation zone perimeter — Divers will be part of the Lookout Team • After the event, observe the detonation vicinity for 30 minutes for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 10 or 30 minutes (depending on fuel constraints of the platform)
• 0.1–29 lb. NEW (time-delay) • >20–60 lb. NEW (positive control)	• 1,000 yd. from the detonation site (cease fire)	• Four Lookouts in two small boats (two Lookouts per boat), and one additional Lookout in an aircraft if used in the event		

Table C-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	*Mitigation Zones*	*Mitigation Requirements*	*Mitigation Requirement Timing*	*Wait Period*
Explosive Missiles and Rockets				
• 0.6–20 lb. NEW (air-to-surface)	• 900 yd. from the intended impact location (cease fire)	• One Lookout in an aircraft	• Immediately prior to the initial start of missile or rocket delivery (e.g., during a fly-over of the mitigation zone) for: — Marine mammals — Sea turtles — Floating vegetation • During missile or rocket delivery for: — Marine mammals — Sea turtles • After the event, when practical, observe the detonation vicinity for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 10 or 30 minutes (depending on fuel constraints of the platform)
• >20–500 lb. NEW (air-to-surface)	• 2,000 yd. from the intended impact location (cease fire)			
Explosive Sonobuoys and Research-Based Sub-Surface Explosives				
• Any NEW of sonobuoys • 0.1–5 lb. NEW for other types of sub-surface explosives used in research applications	• 600 yd. from the device or detonation site (cease fire)	• One Lookout on a small boat or in an aircraft • Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations	• Immediately prior to the initial start of detonations (e.g., during sonobuoy deployment, which typically lasts 20 to 30 minutes) for: — Marine mammals — Sea turtles — Floating vegetation • During detonations for: — Marine mammals — Sea turtles • After the event, when practical, observe the detonation vicinity for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 10 or 30 minutes (depending on fuel constraints of the platform)
Explosive Torpedoes				
• Any NEW	• 2,100 yd. from the intended impact location (cease fire)	• One Lookout in an aircraft • Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations	• Immediately prior to the initial start of detonations (e.g., during target deployment) for: — Marine mammals — Sea turtles — Floating vegetation — Jellyfish aggregations • During torpedo launches for: — Marine mammals — Sea turtles — Jellyfish aggregations • After the event, when practical, observe the detonation vicinity for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	10 or 30 minutes (depending on fuel constraints of the platform)

Table C-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	*Mitigation Zones*	*Mitigation Requirements*	*Mitigation Requirement Timing*	*Wait Period*
Ship Shock Trials				
• Any NEW	• 3.5 NM from the target ship hull (cease fire)	• On the day of the event, 10 observers (Lookouts and third-party observers combined), spread between aircraft or multiple vessels as specified in the event-specific mitigation plan	• The Navy will develop a detailed event-specific monitoring and mitigation plan in the year prior to the event and provide it to NMFS for review • Beginning at first light on days of detonation until the moment of detonation (as allowed by safety measures), for: — Marine mammals — Sea turtles — Floating vegetation — Jellyfish aggregations — Large schools of fish — Flocks of seabirds • If an incident involving a marine mammal or sea turtle is observed after an individual detonation, the Navy will follow established incident reporting procedures and halt any remaining detonations until the Navy can consult with NMFS and review or adapt the event-specific mitigation plan, if necessary • During the 2 days following the event at a minimum and up to 7 days at a maximum, and as specified in the event-specific mitigation plan, observe the detonation vicinity for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 30 minutes
SINKEX				
• Any NEW	• 2.5 NM from the target ship hull (cease fire)	• Two Lookouts: one on a vessel and one in an aircraft • Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations	• During aerial observations for 90 minutes prior to the initial start of weapon firing for: — Marine mammals — Sea turtles — Floating vegetation — Jellyfish aggregations • From the vessel during weapon firing, and from the aircraft and vessel immediately after planned or unplanned breaks in weapon firing of more than 2 hours for: — Marine mammals — Sea turtles • Observe the detonation vicinity for 2 hours after sinking the vessel or until sunset, whichever comes first, for injured or dead: — Marine mammals — Sea turtles • Follow established incident reporting procedures, as required.	• 30 minutes

Table C-4: Activity-Based Mitigations for Non-Explosive Ordnance

Mitigation Category	***Mitigation Zones***	***Mitigation Requirements***	***Mitigation Requirement Timing***	***Wait Period***
Non-Explosive Aerial-Deployed Mines and Bombs				
• Non-explosive aerial-deployed mines • Non-explosive bombs	• 1,000 yd. from the intended target (cease fire)	• One Lookout in an aircraft	• Immediately prior to the initial start of mine or bomb delivery (e.g., when arriving on station) for: — Marine mammals — Sea turtles — Floating vegetation • During mine or bomb delivery for: — Marine mammals — Sea turtles	• 10 minutes
Non-Explosive Gunnery				
• Non-explosive surface-to-surface large-caliber ordnance • Non-explosive surface-to-surface and air-to-surface medium-caliber ordnance • Non-explosive surface-to-surface and air-to-surface small-caliber ordnance	• 200 yd. from the intended impact location (cease fire)	• One Lookout on a vessel or in an aircraft	• Immediately prior to the initial start of gun firing (e.g., while maneuvering on station) for: — Marine mammals — Sea turtles — Floating vegetation • During gunnery firing for: — Marine mammals — Sea turtles	• 10 or 30 minutes (depending on fuel constraints of the platform)
Non-Explosive Missiles and Rockets				
• Non-explosives (air-to-surface)	• 900 yd. from the intended impact location (cease fire)	• One Lookout in an aircraft	• Immediately prior to the start of missile or rocket delivery (e.g., during a fly-over of the mitigation zone) for: — Marine mammals — Sea turtles — Floating vegetation • During missile or rocket delivery for: — Marine mammals — Sea turtles	• 10 or 30 minutes (depending on fuel constraints of the platform)

C.6.2 MITIGATION SPECIFIC TO VESSELS, VEHICLES, DEPLOYMENT OF NETS, AND TOWED IN-WATER DEVICES

Additional details on the activity-based mitigation requirements for vessels, unmanned vehicles, deployment of nets, and towed in-water devices are described in Table C-5. For ship classes required to maintain more than one Lookout, the specific requirement is subject to change over time in accordance with the applicable navigation instruction, such as the Surface Ship Navigation Department Organization and Regulations Manual (U.S. Department of the Navy, 2021). The Action Proponents will notify NMFS should their Lookout policies change, including in the Surface Ship Navigation Department Organization and Regulations Manual. Mitigation will be implemented to the maximum extent practical based on the prevailing circumstances, including consideration of safety of vessels, unmanned vehicles, towing platforms, and crews, as well as maneuverability restrictions. Mitigation will not be implemented (1) by submerged submarines, (2) by unmanned vehicles except when escort vessels are already participating in the event and have positive control over the unmanned vehicle movements, (3) when marine mammals (e.g., dolphins) are determined to be intentionally swimming at the bow, alongside the vessel or vehicle, or directly behind the vessel or vehicle (e.g., to bow-ride or wake-ride), (4) when pinnipeds are hauled out on man-made navigational structures, port structures, and vessels, (5) by manned surface vessels and towed in-water devices actively participating in cable laying during Modernization and Sustainment of Ranges activities, and (6) when impractical based on mission requirements (e.g., during certain aspects of amphibious exercises).

Table C-5: Activity-Based Mitigations for Vessels, Vehicles, Towed In-Water Devices, and Net Deployment

Mitigation Category	*Mitigation Requirements*	*Mitigation Zones and Requirement Timing*
Manned Surface Vessels		
• Manned surface vessels, including surfaced submarines	• One or more Lookouts on manned underway surface vessels in accordance with the most recent navigation safety instruction	• Immediately prior to manned surface vessels getting underway and while underway, the Lookout(s) will observe for: — Marine mammals — Sea turtles • Underway manned surface vessels will maneuver themselves (which may include reducing speed) to maintain the following distances as mission and circumstances allow: — 500 yd. from whales — 200 yd. from other marine mammals — Vicinity of sea turtles
Unmanned Vehicles		
• Unmanned Surface Vehicles and Unmanned Underwater Vehicles already being escorted (and operated under positive control) by a manned surface support vessel	• One Lookout on a surface support vessel that is already participating in the event, and has positive control over the unmanned vehicle	• Immediately prior to unmanned vehicles getting underway and while underway, the Lookout will observe for: — Marine mammals — Sea turtles • A surface support vessel that is already participating in the event, and has positive control over the unmanned vehicle, will maneuver the unmanned vehicle (which may include reducing its speed) to ensure it maintains the following distances as mission and circumstances allow: — 500 yd. from whales — 200 yd. from other marine mammals — Vicinity of sea turtles

Table C-5: Activity-Based Mitigations for Vessels, Vehicles, Towed In-Water Devices, and Net Deployment (continued)

Mitigation Category	*Mitigation Requirements*	*Mitigation Zones and Requirement Timing*
Towed In-Water Devices		
• In-water devices towed by an aircraft, a manned surface vessel, or an Unmanned Surface Vehicle or Unmanned Underwater Vehicle already being escorted (and operated under positive control) by a manned surface vessel	• One Lookout on the manned towing vessel, or on a surface support vessel that is already participating in the event and has positive control over an unmanned vehicle that is towing an in-water device	• Immediately prior to and while in-water devices are being towed, the Lookout will observe for: – Marine mammals – Sea turtles • Manned towing platforms, or surface support vessels already participating in the event that have positive control over an unmanned vehicle that is towing an in-water device, will maneuver itself or the unmanned vehicle (which may include reducing speed) to ensure towed in-water devices maintain the following distances as mission and circumstances allow: – 250 yd. from marine mammals – Vicinity of sea turtles
Net Deployment		
• Nets deployed for testing of an Unmanned Underwater Vehicle	• One Lookout on the surface support vessel	• For 15 min prior to the deployment of nets and while nets are deployed, the Lookout will observe for: – Marine mammals – Sea turtles • If a marine mammal or sea turtle is sighted within 500 yd. of the deployment location, the support vessel will: – Delay deployment of nets until the mitigation zone has been clear for 15 minutes – Recover nets if they are deployed • Nets will be deployed during daylight hours only

C.6.3 VISUAL OBSERVATION EFFECTIVENESS

Oedekoven and Thomas (2022) evaluated the effectiveness of Navy Lookout Teams at detecting marine mammals before they entered a defined set of mitigation zones (i.e., 200, 500, and 1,000 yd.). The study analyzed sighting data collected by the Navy over 27 embarks from 2010 to 2019. Results indicated that the effectiveness of Navy Lookout Teams was generally less than that of trained biologist observer teams, and varied by sighted species, group size, and distance. The Navy reviewed the same dataset used by Oedekoven and Thomas (2022), plus sonar use data, and found that sonar status (i.e., on versus off) was an important factor in evaluating how species availability may influence the prevalence of marine mammal sightings for Navy Lookouts and biologists alike. Sighting rates near vessels using hull-mounted active sonar were lower when sonar was on versus off, suggesting that a portion of marine mammals were not available to be sighted when the sonar was on (due to changed surfacing behavior or avoiding close exposures to sonar) (Navy, 2023). Table C-6 provides a summary of the factors that could potentially influence the real-time effectiveness of the Action Proponents' visual observations (Barlow, 2015; Jefferson et al., 2015; Navy, 2023; Oedekoven & Thomas, 2022). The quantitative analysis for the 2024 HCTT Draft EIS/OEIS does not reduce model-estimated impacts to account for activity-based mitigation.

Table C-6: Potential Factors Influencing Visual Observation Effectiveness

Factor	*Description of Influence on Sightability*
Species dive behavior	Long-duration and deep-diving species are not at the surface often or for long periods of time, which limits the amount of time they are available to be seen by Lookouts. Group size also influences sightability. Species that travel in groups or large pods (e.g., delphinids, sperm whales, fin whales) are generally easier to detect than solitary individuals or pairs. Information on dive behaviors and group sizes for species that occur in the Study Area is provided in the technical reports titled *Dive Distribution for Marine Species Occurring in the U.S. Navy's Atlantic and Hawaii and California Training and Testing Study Areas* and the *U.S. Navy Marine Species Density Database Phase IV for the Atlantic Fleet Training and Testing Study Area*.
Species group size	
Species physical traits and surface behaviors	Larger-bodied species (e.g., baleen and sperm whales) or species with tall dorsal fins (e.g., killer whales) would generally be easier to detect relative to small-bodied species and species without dorsal fins (e.g., pinnipeds, sea turtles). Similarly, species with highly conspicuous surface-active behaviors (e.g., breaching, leaping, bow-riding) are generally easier to detect than cryptic species. For example, whales that fluke regularly (e.g., humpback and North Atlantic right whales) or variably (e.g., blue and fin whales) before they dive may be easier to detect than those that fluke rarely (e.g., sei, common minke, and Bryde's whales). Similarly, species that are active at the surface (e.g., bottlenose and spinner dolphins) or remain at the surface for extended periods of time as they forage or socialize (e.g., sperm and North Atlantic right whales) would be easier to detect than cryptic species that surface inconspicuously (e.g., harbor porpoises, beaked whales, dwarf and pygmy sperm whales, sea turtles). Prominent blows, such as those exhibited by many species of baleen whales (e.g., humpback whales) are easier to detect than small or less visible blows (e.g., Bryde's and common minke whales). Some species do not exhibit a blow when they surface to breathe (e.g., pinnipeds, sea turtles).
Observation conditions	Weather conditions, such as clear daytime skies, low sea states, low winds (i.e., low prevalence of white caps), and low glare are optimal for marine species observations. Animal sightability generally declines as viewing conditions decline.
Observation area and platform	Marine mammal and sea turtle sightability may be influenced by the mitigation zone size, observation platform, and distance between the two. Aircraft (when not operating at high altitudes) generally have the best vantage point for observing throughout an entire mitigation zone due to their height and speed over the water, and ability to conduct close-approach flyovers (depending on the event). Aircraft Lookouts are typically existing crewmembers responsible for other essential tasks (e.g., navigation), and some types of aircraft may have windows that are small or positioned in a way that partially obstruct views of the sea space directly beneath the aircraft. Due to their low vantage point on the water, Lookouts in small boats may be more likely to detect animals in close proximity to the boat or that display conspicuous visual cues (e.g., blows, splashes, flukes, travel in groups) than animals at further distances (e.g., near a mitigation zone perimeter) or that display inconspicuous visual cues (e.g., solitary sea turtles surfacing without a splash). The bridges of surface ships offer a higher vantage point relative to small boats. For certain events, such as hull-mounted active sonar, the mitigation zone is located directly around the hull of the ship on which the Lookout is positioned. Species sightability would generally decrease with distance, particularly for mitigation zones located far from the observation platform (e.g., a gunnery mitigation zone several NM down range). The use of hand-held or big-eye binoculars can help compensate for the difficulty of sighting animals at distance (depending on the event).

C.7 Geographic Mitigation

Designated portions of the California Study Area where the Action Proponents will implement geographic mitigation for physical habitats, marine species habitats, or cultural resources are referred to as "mitigation areas" (see Figure C-2). As described in Section 2. 1 (Description of the Hawaii-California Training and Testing Study Area) of the 2024 HCTT Draft EIS/OEIS, the HCTT Study Area includes additional areas such as the PMSR. The addition of these areas and the consideration of best available science means new mitigation areas will be evaluated and implemented, which is detailed in Appendix K (Geographic Mitigation Assessement) of the 2024 HCTT Draft EIS/OEIS. The rest of this appendix provides the geographic mitigation requirements and a qualitative discussion of their environmental benefits. Mitigation areas apply year round unless specified otherwise and do not apply to *de minimis* sources.[1] Important seafloor habitats (e.g., for corals), marine mammal habitats, and cultural resources (e.g., shipwrecks), and maps depicting how these features overlap the mitigation areas are described in

[1] *de minimis* sources include those with low source level, narrow beamwidth, downward-directed transmission, short pulse lengths, frequencies above known hearing ranges of marine mammals and sea turtles, or some combination of these factors; as well as sources used for safety of navigation, which are not anticipated to result in takes of protected species.

Appendix H (Description of Systems and Ranges) or Sections 3.5 (Abiotic Habitats), 3.7 (Marine Mammals), and 3.10 (Cultural Resources) of the 2024 HCTT Draft EIS/OEIS.

If the geographic mitigation described in this section during the conduct of training or testing needs to be modified, event participants must obtain permission from the appropriate designated point of contact (e.g., Naval Command Authority) prior to starting the applicable event. The Action Proponents would provide NMFS with advance notification and include relevant information about the event (e.g., sonar hours, use of explosives) in their annual training and testing activity reports.

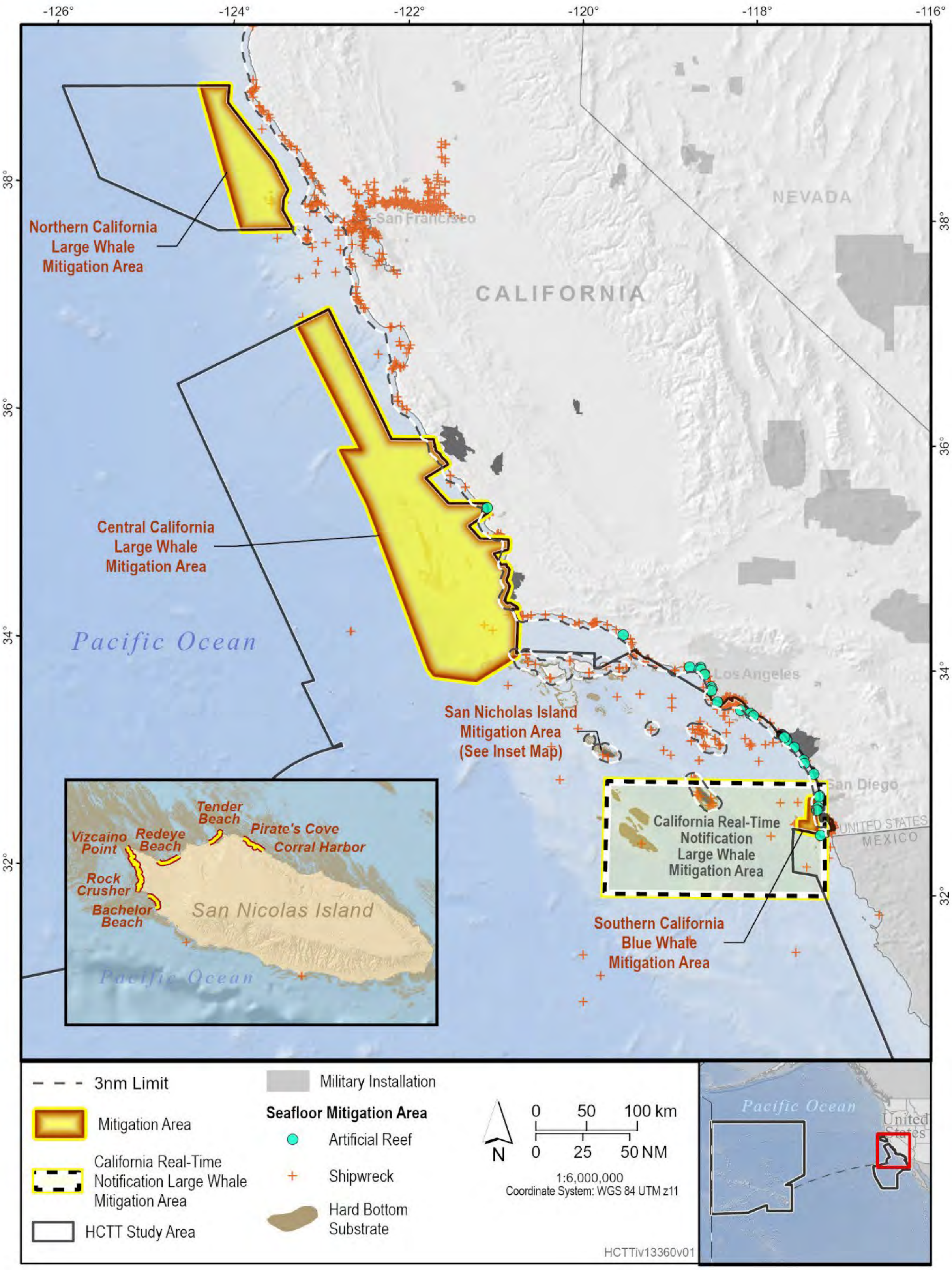

Figure C-2: Mitigation Areas In the California Study Area

C.7.1 ARTIFICIAL REEF, HARD BOTTOM SUBSTRATE, AND SHIPWRECK MITIGATION AREAS

Table C-7 details geographic mitigation for explosives and physical disturbance and strike stressors near artificial reefs, hard bottom substrate, and shipwrecks. For mitigation, the term "hard bottom substrate" is defined as substrate in the marine environment which could support a covering of biotic features (e.g., seaweed, sponges, hard corals). Mitigation will also help avoid potential impacts on organisms (e.g., invertebrates, fishes, sea turtles) that use these seafloor resources for sheltering, resting, feeding, or other important life processes. The mitigation is a continuation from the 2018 HSTT and 2022 HSTT Essential Fish Habitat consultation reinitiation, except for an extension of the precisely placed non-explosive seafloor device requirements to artificial reefs and shipwrecks. The overall effectiveness of the mitigation would be correlated with the quality (e.g., accuracy) of the underlying mapping data, as discussed in *Phase IV Hawaii California Training and Testing EIS/OEIS: Marine Benthic Habitat Database Technical Report* (U.S. Department of the Navy, 2024).

Table C-7: Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Explosives	• The Action Proponents will not detonate explosives on or near the seafloor (e.g., explosive bottom-laid or moored mines) within a horizontal distance of 350 yd. from artificial reefs, hard bottom substrate, and shipwrecks (except in designated areas in the Hawaii California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical).	• The 350 yd. mitigation area radius will prevent direct impacts (and some level of indirect impacts) from explosives on artificial reefs, hard bottom substrate, and shipwrecks for the reasons described in Section 5.7.1 (Shallow-Water Coral Reef and Precious Coral Bed Mitigation Areas) of the 2024 HCTT Draft EIS/OEIS. •
Physical disturbance and strike	• The Action Proponents will not set vessel anchors within the anchor swing circle radius from artificial reefs, hard bottom substrate, and shipwrecks (except in designated anchorages). • The Action Proponents will not place non-explosive seafloor devices (that are not precisely placed) within a horizontal distance of 350 yd. from artificial reefs, hard bottom substrate, and shipwrecks (except as described in the bullet above for vessel anchors, the bullet below for precisely placed seafloor devices, and in designated areas of the Hawaii and California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical). • The Action Proponents will not position precisely placed non-explosive seafloor devices directly on artificial reefs, hard bottom substrate, or shipwrecks. • The Action Proponents will avoid positioning precisely placed non-explosive seafloor devices near these resources by the largest distance that is practical to implement based on mission requirements.	• Mitigation ensures that vessel anchors do not come into contact with artificial reefs, hard bottom substrate, and shipwrecks, when factoring in environmental conditions that could affect anchoring position, such as winds, currents, and water depth. • For ease of implementation, the 350 yd. mitigation area radius for explosives was also adopted for seafloor devices (that are not precisely placed), and is even more conservative when compared to the small impact footprints of non-explosive seafloor devices. • Mitigation specific to precisely placed seafloor devices was first developed and coordinated with NMFS for live hard bottom habitats during the 2022 HSTT Study Area's Essential Fish Habitat consultation reinitiation (U.S. Department of the Navy, 2022). That mitigation is being included in this document, and applied to the whole mitigation area category of hard bottom substrate as well as artificial reefs and shipwrecks, for consistency and practicality of implementation. Because precisely placed seafloor devices are deployed with a high degree of placement accuracy, the original intent of the mitigation (i.e., preventing direct physical strike and disturbance) will continue to be achieved. Therefore, the mitigation for seafloor devices that are either precisely placed or not precisely placed will collectively prevent direct impacts (and some level of indirect impacts) from seafloor devices on artificial reefs, hard bottom substrate, and shipwrecks.

C.7.2 NORTHERN CALIFORNIA LARGE WHALE MITIGATION AREAS

Table C-8 details geographic mitigation related to the use of active sonar off the California coast generally extending from Point Arena to an area west of The Farallon Islands. The mitigation is new for the 2024 HCTT Draft EIS/OEIS.

Table C-8: Northern California Large Whale Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Acoustic	• From June 1 to October 31, the Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Central California Large Whale Mitigation Area, and the Southern California Blue Whale Mitigation Area.	• Mitigation to limit use of MF1 active sonar is designed to reduce exposure of blue whales, fin whales, gray whales, and humpback whales in important seasonal foraging, migratory, and calving habitats to levels of sound that have the potential to cause injurious or behavioral impacts.

C.7.3 CENTRAL CALIFORNIA LARGE WHALE MITIGATION AREA

Table C-9 details geographic mitigation related to the use of active sonar off the California coast, generally extending from Monterey Bay to San Miguel Island. The mitigation is new for the 2024 HCTT Draft EIS/OEIS.

Table C-9: Central California Large Whale Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Acoustic	• From June 1 – October 31, the Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Northern California Large Whale Mitigation Area, and the Southern California Blue Whale Mitigation Area.	• Mitigation to limit use of MF1 active sonar is designed to reduce exposure of blue whales, fin whales, gray whales, and humpback whales in important seasonal foraging, migratory, and calving habitats to levels of sound that have the potential to cause injurious or behavioral impacts.

C.7.4 SOUTHERN CALIFORNIA BLUE WHALE MITIGATION AREA

Table C-10 details geographic mitigation related to the use of active sonar and explosives off San Diego, California. The mitigation is a continuation from the 2018 HSTT EIS/OEIS with a modified geographic extent based on best available science.

Table C-10: Southern California Blue Whale Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Acoustic	• From June 1 to October 31, the Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Northern California Large Whale Mitigation Area, and the Central California Large Whale Mitigation Area.	• Mitigation to limit use of MF1 active sonar is designed to reduce exposure of blue whales within important seasonal foraging habitats to levels of sound that have the potential to cause injurious or behavioral impacts.
Explosives	• From June 1 to October 31, the Action Proponents will not detonate in-water explosives (including underwater explosives and explosives deployed against surface targets) during large-caliber gunnery, torpedo, bombing, and missile (including 2.75” rockets) training and testing.	• Mitigation to limit the use of in-water explosives is designed to reduce exposure of blue whales within important seasonal foraging habitats to explosives that have the potential to cause injury, mortality, or behavioral disturbance.

C.7.5 CALIFORNIA LARGE WHALE AWARENESS MESSAGES

Table C-11 details awareness message requirements for the California Study Area. The mitigation is a continuation from the 2018 HSTT EIS/OEIS with an updated geographic extent considered with the expanded California Study Area.

Table C-11: California Large Whale Awareness Message Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Acoustic, Explosives, Physical disturbance and strike	• The Action Proponents will broadcast awareness messages to alert applicable assets (and their Lookouts) transiting and training or testing off the U.S. West Coast to the possible presence of concentrations of large whales, including gray whales (November–March), fin whales (November–May), and mixed concentrations of blue, humpback, and fin whales that may occur based on predicted oceanographic conditions for a given year (e.g., May–November, April–November). Awareness messages may provide the following types of information which could vary annually: – While blue whales tend to be more transitory, some fin whales are year-round residents that can be expected in nearshore waters within 10 NM of the California mainland and offshore operating areas at any time. – Fin whales occur in groups of one to three individuals, 90 percent of the time, and in groups of four or more individuals, 10 percent of the time. – Unique to fin whales offshore southern California (including the Santa Barbara Channel and PMSR area), there could be multiple individuals and/or separate groups scattered within a relatively small area (1–2 NM) due to foraging or social interactions. – When a large whale is observed, this may be an indicator that additional marine mammals are present and nearby, and the vessel should take this into consideration when transiting. – Lookouts will use that knowledge to help inform their visual observations during military readiness activities that involve vessel movements, active sonar, in-water explosives (including underwater explosives and explosives deployed against surface targets), or the deployment of non-explosive ordnance against surface targets in the California Study Area.	• Mitigation to broadcast awareness messages to applicable assets, and to use that information to inform visual observations, is designed to minimize potential blue whale, gray whale, and fin whale vessel interactions and exposure to acoustic stressors, explosives, and physical disturbance and strike stressors that have the potential to cause mortality, injury, or behavioral disturbance during the foraging and migration seasons, and to resident whales.

C.7.6 California Real-Time Notification Large Whale Mitigation Area

Table C-12 details real-time notification requirements for a designated area within the SOCAL Range Complex. The mitigation is a continuation from (National Marine Fisheries Service, 2024).

Table C-12: California Real-Time Notification Large Whale Mitigation Area Requirements

Category	*Mitigation Requirements*	*Mitigation Benefits*
Physical disturbance and strike	• The Action Proponents will issue real-time notifications to alert Action Proponent vessels operating in the vicinity of large whale aggregations (four or more whales) sighted within 1 NM of an Action Proponent vessel within an area of the Southern California Range Complex (between 32–33 degrees North and 117.2–119.5 degrees West). – The four whales that make up a defined "aggregation" would not all need to be from the same species, and the aggregation could consist either of a single group of four (or more) whales, or any combination of smaller groups totaling four (e.g., two groups of two whales each or a group of three whales and a solitary whale) within the 1 NM zone. – Lookouts will use the information from the real-time notifications to inform their visual observations of applicable mitigation zones. If Lookouts observe a large whale aggregation within 1 NM of the event vicinity within the area between 32–33 degrees North and 117.2–119.5 degrees West, the watch station will initiate communication with the designated point of contact to contribute to the Navy's real-time sighting notification system.	• The real-time notification area encompasses the locations of recent (2009, 2021) vessel strikes, and historic strikes where precise latitude and longitude were known.

C.7.7 San Nicolas Island Pinniped Haulout Mitigation Area

Table C-13 details geographic mitigation related to in-air vehicle launch noise and associated monitoring for pinniped haulout locations on SNI, California. The mitigation is an adaptation of procedural mitigation from the 2022 PMSR EIS/OEIS.

Table C-13: San Nicolas Island Pinniped Haulout Mitigation Area

Category	*Mitigation Requirements*	*Mitigation Benefits*
In-air vehicle launch noise	• Navy personnel shall not enter pinniped haulout or rookery areas. Personnel may be adjacent to pinniped haulouts and rookery prior to and following a launch for monitoring purposes. • Missiles shall not cross over pinniped haulout areas at altitudes less than 305 m (1,000 ft.). • The Navy may not conduct more than 10 launch events at night annually. • Launch events shall be scheduled to avoid the peak pinniped pupping seasons from January through July to the maximum extent practicable. • The Navy shall implement a monitoring plan using video and acoustic monitoring of up to three pinniped haulout areas and rookeries during launch events that include missiles or targets that have not been previously monitored for at least three launch events.	• Mitigation is designed to minimize in-air launch noise and physical disturbance to pinnipeds hauled out on beaches, as well as to continue assessing baseline pinniped distribution/abundance and potential changes in pinniped use of these beaches after launch events.

C.8 SUMMARY OF NEW OR MODIFIED MITIGATION REQUIREMENTS

Table C-14 summarizes new mitigation measures and substantive modifications to existing measures.

Table C-14: Summary of New or Modified Mitigation Requirements

Category	*Changes in Mitigation Requirements for Phase IV*
Activity-Based Mitigation	
Lookout Teams	The 2024 HCTT Draft EIS/OEIS includes a requirement for additional personnel on the platform conducting the event, or on additional participating platforms, to serve as part of the Lookout Team for all acoustic, explosive, and physical disturbance and strike stressor mitigation categories. In the 2018 HSTT and 2022 PMSR EIS/OEISs, additional personnel were required to assist Lookouts for explosive events only. The Action Proponents have also been, in practice, implementing this for active sonar and non-explosive events, and are now formalizing their current practice as a requirement. Additionally, the *U.S. Navy Lookout Training Handbook was* updated in 2022 to include a more robust chapter on environmental compliance, mitigation, and marine species observation tools and techniques (NAVEDTRA 12968-E). These changes are collectively designed to improve the effectiveness of activity-based mitigation.
Broadband and Other Active Acoustic Sources	For the 2024 HCTT Draft EIS/OEIS, a 200 yd. shut down mitigation zone would apply to broadband and other active acoustic sources less than 200 dB, while the tiered 1,000 yd. power down/500 yd. power down/200 yd. shut down mitigation zones would apply to those sources greater than or equal to 200 dB. This requirement is meant to encompass new acoustic sources (e.g., sources used for oceanographic and acoustic research) that use a range of frequencies. Broadband source mitigation zones were not specified in the 2018 HSTT and 2022 PMSR EIS/OEISs.
Air Guns	For the 2024 HCTT Draft EIS/OEIS, the air gun mitigation zone size has been increased from 150 yd. to 200 yd. for consistency with other active acoustic sources.
High-Altitude Aircraft	The 2024 HCTT Draft EIS/OEIS clarifies that aircraft operating at high altitudes (e.g., Maritime Patrol Aircraft) are exempt from requirements to conduct activity-based mitigation. When operating at high altitudes, observations for marine mammals or sea turtles would not be effective.
Vessel Movements	The 2024 HCTT Draft EIS/OEIS clarifies that one or more Lookouts will be posted in accordance with the most recent navigation guidance, which is subject to change over time. The 2018 HSTT and 2022 PMSR EIS/OEISs required one Lookout on underway vessels.
Unmanned Vehicles	The 2024 HCTT Draft EIS/OEIS includes new activity-based mitigation requirements for applicable events that involve Unmanned Surface Vehicles and Unmanned Underwater Vehicles (and the sources they use, tow, or deploy) that are already being escorted and operated under positive control by a manned surface vessel. In the 2018 HSTT and 2022 PMSR EIS/OEISs, activity-based mitigation were not required for unmanned vehicles or sources they used, towed, or deployed.
Research-Based Sub-Surface Explosives	The 2024 HCTT Draft EIS/OEIS includes requirements for "research-based sub-surface explosives" to account for new explosive events with research applications (e.g., oceanographic and acoustic research) that would use 0.1 to 5-lb. NEW. These requirements are grouped within the explosive sonobuoy mitigation category because of their similarities between the charge sizes, detonation locations within the water column, and platforms that would be conducting activity-based mitigation.
Pile Driving	The 2024 HCTT Draft EIS/OEIS includes updated requirements to account for site-specific conditions at the Port Hueneme training location covered under the document. The 30- minute wait period and 100- yard mitigation zone in the 2018 HSTT EIS/OEIS have been re-evaluated in terms of harbor specific conditions, local marine mammal occurrence patterns (pinnipeds), urbanization and noise habituation of pinnipeds within the harbor, and results from previous event monitoring. Adhering to the 2018 HSTT EIS/OEIS requirements in Port Hueneme would result in schedule delays, degraded realism of training, and impact the Navy's ability to become proficient at this activity. The most practicable revised mitigation for the Navy to implement is to adjust to a 15- minute wait period and 5- yard mitigation zone for the 2024 HCTT Draft EIS/OEIS.
Net Deployment	The 2024 HCTT Draft EIS/OEIS includes requirements to account for new activities that involve the deployment and recovery of nets during Unmanned Underwater Vehicle testing. A 500 yd. mitigation zone was established to delay deployment and recovery of nets if a marine mammal or sea turtle is sighted by the Lookout on a support vessel.
Geographic Mitigation	
Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Areas	The 2024 HCTT Draft EIS/OEIS includes new mitigation for precisely placed seafloor devices developed for hard bottom substrate during the 2022 Hawaii-Southern California Training and Testing Study Area's Essential Fish Habitat consultation reinitiation (U.S. Department of the Navy, 2022). For the Draft EIS/OEIS, that mitigation is being applied to the whole mitigation area category of hard bottom substrate as well as artificial reefs, submerged aquatic vegetation, and shipwrecks, for consistency and practicality of implementation.

Category	*Changes in Mitigation Requirements for Phase IV*
San Nicolas Island Pinniped Haulout Mitigation Area	The 2024 HCTT Draft EIS/OEIS includes a new mitigation area for in-air vehicle launch noise and associated monitoring of pinniped haulout locations, which was adapted from procedural mitigations in the 2022 Point Mugu Sea Range EIS/OEIS.
Northern California Large Whale Mitigation Area	The 2024 HCTT Draft EIS/OEIS includes a new mitigation area for blue whales, fin whales, gray whales, and humpback whales related to the use of active sonar off the northern California coast.
Central California Large Whale Mitigation Area	The 2024 HCTT Draft EIS/OEIS includes a new mitigation area for blue whales, fin whales, gray whales, and humpback whales related to the use of active sonar off the central California coast.
Southern California Blue Whale Mitigation Area	The 2024 HCTT Draft EIS/OEIS modifies the geographic extent of the 2018 HSTT EIS/OEIS California Blue Whale Mitigations Areas based on best available science. The mitigation area continues the requirements related to the use of active sonar and explosives.
California Large Whale Real-Time Notification Mitigation Area	The 2024 HCTT Draft EIS/OEIS includes a new mitigation area for issuing notifications about aggregations of large whales in an area that encompasses recent and historical vessel strikes.

C.9 MITIGATION CONSIDERED BUT ELIMINATED

Mitigation measures that were considered but eliminated for not meeting the appropriate balance between being environmentally beneficial and practical to implement are described in Table C-15.

Table C-15: Mitigation Considered but Eliminated

Mitigation Considered	*Not Sufficiently Beneficial*	*Impractical*			*Assessment Summary*
		Criterion 1: Safety	*Criterion 2: Sustainability*	*Criterion 3: Mission*	
1. Mitigating for navigation sonar		X			Shutting down or powering down active sonar used for safety of navigation would present unacceptable safety risks to personnel and equipment.
2. Activity-based Mitigations for long-duration acoustic sources			X		Long-duration active sonar sources, such as the low-level sources used by the Office of Naval Research for acoustic and oceanographic research, are deployed in remote locations for long time spans (e.g., 1 year). Adding visual observers would require substantial additional resources (e.g., personnel and equipment) in excess of what is available, and associated increases in operational costs.
3. Activity-based Mitigations for acoustic sources not under positive control				X	Activity-based mitigations for active sonar sources not under positive control would not be effective because these types of sources could not be powered down or shut down in response to a sighting after they are deployed. Maintaining positive control throughout the duration of the training or testing activity could result in degraded realism or a reduced ability to meet pre-deployment certification requirements.
4. Activity-based Mitigations from high-altitude aircraft			X	X	Visual observations by Lookouts positioned in aircraft operating at high altitudes would not be effective due to the vertical distance between the mitigation zone and observation platform. Additional maneuvering to lower altitudes where visual observations are effective would degrade training or testing realism and result in increased operational cost associated with higher fuel consumption.
5. Activity-based Mitigations from manned escort vessels for all use of unmanned platforms			X		Unmanned platforms are remotely controlled or designed to operate independently, often in remote locations or for long time spans. Adding escort vessels (when they are not already participating in an event) for the purpose of activity-based mitigation would require substantial additional resources (e.g., personnel and equipment) in excess of what is available, and an associated increase in operational costs.
6. Adding third-party marine species observers to conduct visual observations that inform mitigations for additional event types		X	X	X	Adding third-party visual observers to observe additional event types (i.e., beyond ship shock trials) would require substantial additional resources in excess of what is available (e.g., berthing and space availability), and an associated increase in operational costs. The use of third-party observers presents security clearance issues, as well as national security concerns due to the requirement to provide advance notification of specific times and locations of platform movements and activities (e.g., vessels using active sonar). Events may occur simultaneously and in various locations throughout the Study Area, and some may last for a long period of time (e.g., weeks). Event timetables may be based on free-flow development of tactical situations and cannot be precisely fixed to accommodate arrival of third-party aircraft or vessels. Pre-event surveys to clear areas prior to an event begins would be ineffective for the purpose of real-time mitigation (e.g., the location of a moving animal in proximity to the mitigation zone would change, animals could move in or out of the event area after surveys have been completed). For offshore events, the length of time observers would spend on station would be limited due to aircraft fuel restrictions. Increased safety risks would be associated with offshore surveys and the presence of civilian aircraft or vessels in the vicinity of events (e.g., sea space conflicts, airspace conflicts, proximity to explosives).

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	***Not Sufficiently Beneficial***	***Impractical***			***Assessment Summary***
		Criterion 1: Safety	***Criterion 2: Sustainability***	***Criterion 3: Mission***	
7. Requiring active sonar mitigation for marine mammals swimming at the bow, alongside the vessel, or directly behind the vessel	X			X	Marine mammals (e.g., dolphins) intentionally bow-riding, swimming alongside to wake-ride, or pursuing underway vessels would be out of the main active sonar transmission axis. Furthermore, implementing mitigation for animals persistently located within an active sonar mitigation zone (due to their intentional pursuit of underway vessels) would have the same types of impacts on mission requirements as increasing the mitigation zone size, which is described in row 15 of this table.
8. Adding additional Lookouts or observation platforms		X	X	X	The number of required Lookouts and observation platforms is based on resource availability (e.g., crews, platforms, and equipment) safety considerations (e.g., space restrictions, sea space or airspace conflicts), and duty assignments (e.g., requiring additional personnel or reassigning duties). Adding vessels or aircraft to observe a mitigation zone would result in sea space or airspace conflicts with the event participants. For explosives, weapon firing, or ordnance deployment, this would increase safety risks due to the presence of additional vessels or aircraft within the vicinity of explosives, intended impact locations, or projectile paths. Sea space and airspace conflicts would either require participating platforms to modify their flight plans or vessel movement tracks (which would reduce event realism) or force the added observation platforms to position themselves a safe distance away from the activity area (which would not be effective). However, additional personnel on platforms conducting the events, or on additional participating platforms, would serve as part of the Lookout Team for all acoustic, explosive, and physical disturbance and strike stressor mitigation categories as described in Section 5.6 (Activity-based Mitigation) of the 2024 HCTT Draft EIS/OEIS.
9. Developing additional weapon firing mitigation zones	X				Weapon firing noise from weapon systems other than large-caliber guns (which are deck-mounted on surface ships with a muzzle that extends over the water) would not expose marine mammals or sea turtles to potentially injurious levels of underwater sound.
10. Developing a mitigation zone for non-explosive vessel-deployed mines	X				Mitigation zones for non-explosive vessel-deployed mines is not warranted because of the extremely low potential for physical strike of a marine mammal or sea turtle from a mine deployed so close to the water surface (by vessels that are implementing vessel movement mitigation for marine mammals and sea turtles), or below the surface for submarine-deployed mines.
11. Developing mitigation zones around aerial targets	X				Mitigation zones for explosive and non-explosive weapon firing is not warranted for ordnance fired against air targets because there is no potential for direct impact, as the detonations occur in air, and the potential for projectile fragments to co-occur in space and time with a marine mammal or sea turtle at or near the surface is extremely low.
12. Developing mitigation zones for surface-to-surface and shore-to-surface missiles and rockets	X		X	X	Mitigation zones apply to missiles and rockets deployed from aircraft because aircraft can fly over the intended impact area prior to commencing firing. Mitigation would not be effective for vessel- or shore-deployed missiles and rockets (without requiring additional observation platforms) because of the distance between the firing platform and target location. It would not be possible for vessels to conduct close-range observations due to the length of time (and associated operational costs and event delays) it would take to complete observations and then transit back to the firing position (typically around 15 or 75 nautical miles each way, depending on the event).
13. Establishing a minimum pre-event or post-event observation duration for additional events			X	X	Some events have established minimum time requirements for observations prior to the initial start of an event or after completion of an event, while the time requirements for other events must remain more general to accommodate dynamic event schedules or other operational factors. Requiring minimum pre-event or post-event observation durations would have the same types of impacts on mission requirements as increasing the mitigation zone size, as described in row 15 of this table.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	*Not Sufficiently Beneficial*	*Impractical* *Criterion 1: Safety*	*Impractical* *Criterion 2: Sustainability*	*Impractical* *Criterion 3: Mission*	*Assessment Summary*
14. Using developmental mitigation technologies for mitigation	X				As described in Section 5.5 (Monitoring, Research, and Adaptive Management) of the 2024 HCTT Draft EIS/OEIS, the Action Proponents plan to continue investing in research on and development of mitigation technologies, such as infrared, thermal detection, unmanned aerial vehicles, passive acoustic range instrumentation, and automated detection software or sensors. The development of any associated mitigation measures will be undertaken in coordination with the National Marine Fisheries Service (NMFS) through the adaptive management process.
15. Increasing mitigation zone sizes, or extending the post-sighting wait periods beyond 10 or 30 minutes		X	X	X	Increasing mitigation zone sizes or post-sighting wait periods would potentially increase the number of instances and the total length of time activities would be ceased or delayed. This would significantly diminish realism in a way that would prevent activities from meeting intended objectives and decrease the ability to complete events as required and on time. This would have implications for fuel restrictions (e.g., need for aircraft to go off station to refuel), personnel fatigue, range scheduling (e.g., sea space and air space conflicts), and operational costs. Multiple refueling events could double (or more) event length, which would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the event area. For events with multiple participants, degrading the training or testing value of one event element degrades the value of all other elements. For active sonar events, requiring additional or lengthier power downs or shutdowns would create fundamental differences in how active sonar would be used in training versus real-world missions. For example, additional power downs or shutdowns would prevent sonar operators from developing and maintaining awareness of the tactical picture. Without realistic training in conditions analogous to real-world missions, sonar operators cannot become proficient in effectively operating active sonar. Sonar operators, vessel crews, and aircrews would be expected to operate sonar during real-world missions in a manner inconsistent with how they were trained. Diminishing proficiency or eroding capabilities presents significant risk to personnel safety during real-world missions and impacts the ability to deploy with required levels of readiness necessary to accomplish tasking by Combatant Commanders or other national security tasking. For events involving explosives, weapon firing, or ordnance deployment, requiring additional or lengthier delays or shutdowns would cause a significant loss of training or testing time, reduce the number of opportunities crews have to fire or deploy ordnance on a target, decrease realism, impede the ability for crews to train and become proficient in using weapons or systems, prevent development of the ability to react to changes in the tactical situation or respond to incoming threats, cause significant delays to training or testing schedules, prevent units from meeting individual training and certification requirements, prevent units from deploying with the level of readiness necessary to accomplish their missions, and impede the ability of program managers and weapons system acquisition programs to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. For Sinking Exercises (SINKEX), events involving explosive sonobuoys deployed in a large field, explosive torpedo events, and medium- or large caliber gunnery events, visual observations within the margin of increased mitigation zone size would be unsafe and ineffective unless additional observation platforms were allocated. Mission-essential safety protocols require all event participants (including Lookouts) to maintain focus on the activity area for safety of the public, personnel, and equipment. Mitigation zone sizes are correlated with the activity area; therefore, an increase in mitigation zone size would not meet the safety criteria. For example, when air-to-surface medium-caliber gunnery events involve fighter aircraft descending on a target, or rotary-wing aircraft flying a racetrack pattern and descending on a target using a forward-tilted firing angle, maintaining focused attention on the activity area is paramount to aircraft safety. Vessel movement mitigation for marine mammals is based on guidance from NMFS and the U.S. Fish and Wildlife Service. A mitigation zone size is not specified for sea turtles to allow flexibility based on vessel type and mission requirements (e.g., small boats operating in a narrow harbor). For towed in-water devices, mission and safety requirements determine the operational parameters (e.g., course) for towing platforms. Because these devices are towed and not self-propelled, they generally have limited maneuverability and are unable to make immediate course corrections. For example, a high degree of pilot skill is required when rotary-wing aircraft are deploying in-water devices, safely towing them at relatively low speeds and altitudes, and recovering them. The aircraft can safely alter course to shift the route of the towed device in response to a sighted marine mammal or sea turtle up to a certain extent (i.e., up to the

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical: Criterion 1: Safety	Impractical: Criterion 2: Sustainability	Impractical: Criterion 3: Mission	Assessment Summary
					size of the mitigation zone) while still maintaining the parameters needed for stable towing. However, the aircraft would be unable to further alter its course to more drastically course-correct the towed device without decreasing towing stability, which would have implications for safety of personnel and equipment.
16. Implementing mandatory vessel speed restrictions		X	X	X	As described in Section C.6.2 (Mitigation Specific to Vessels, Vehicles, Deployment of Nets, and Towed In-Water Devices), vessel movement mitigation involves maneuvering to maintain a specified distance from marine mammals and sea turtles, which may include reducing speed. As described in Section 3.0.4 (Standard Operating Procedures) of the 2024 HCTT Draft EIS/OEIS, vessels used under the Proposed Action are required to operate in accordance with applicable navigation rules. In addition, vessels transit at speeds that are optimal for fuel conservation, to maintain schedules, and to meet mission requirements. Vessel captains use the totality of the circumstances to ensure the vessel is traveling at appropriate speeds in accordance with navigation rules. Depending on the circumstances, this may involve adjusting speeds during periods of reduced visibility or in certain locations (e.g., locations with other vessel traffic). For training, mandatory vessel speed restrictions would be impractical to implement because vessel operators need to train to operate vessels safely and proficiently as they realistically would during real-world missions, including being able to react to changing tactical situations and evaluate system capabilities. For example, during training activities involving flight operations from an aircraft carrier, the vessel must maintain a certain wind speed over the deck to launch or recover aircraft. Depending on wind conditions, the aircraft carrier itself must travel at a certain speed to generate the wind required to launch or recover aircraft. Additionally, operating vessels at speeds that are not optimal for fuel conservation or mission requirements would be unsustainable due to increased time on station and operational costs. Seasonal vessel speed restrictions would result in vessels being unable to meet all of their requirements during their limited time available to be underway based on the complex logistical considerations involved with maintaining individual vessel and deployment schedules. For testing and research, the Action Proponents need to test the full range of their vessels and vessel-deployed system capabilities to ensure safety and functionality in conditions analogous to real-world missions, and before full-scale production or delivery to the fleet. For example, the Action Proponents conduct propulsion testing specifically to test the functionality of vessel propulsion systems, including maneuvering, full-power runs, and endurance runs. During this event, vessels must operate across the full spectrum of capable speeds to accomplish the primary testing objectives.
17. Additional geographic mitigation for active sonar in areas with certain bathymetric features				X	The Action Proponents select locations for certain active acoustic activities based on water depths that are ideal for acoustic propagation research, seafloor types, or bathymetric phenomena (e.g., seamounts) that are of particular interest for ocean acoustic research and realism of military readiness activities. Shifting events to alternative or sub-ideal locations to avoid certain bathymetric features (e.g., shelf breaks, underwater canyons) would preclude ready access to the environmental and oceanographic conditions needed to meet mission objectives.
18. Restrictions on the location or timing of major training exercises		X		X	Major training exercises may require large areas of the littorals, open ocean, and nearshore areas for realistic and safe anti-submarine warfare training. Exercise locations may have to change during an exercise or during exercise planning based on assessments of unit performance or other conditions, such as weather and mechanical issues, which precludes the ability to develop restrictions on event location or timing within the Study Area.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical: Criterion 1: Safety	Impractical: Criterion 2: Sustainability	Impractical: Criterion 3: Mission	Assessment Summary
19. Restricting training activities to certain established locations		X		X	Modern sensing technologies make training on a large scale without observation more difficult. A foreign military's continual observation of U.S. military training in predictable geographic areas and timeframes would enable foreign nations to gather intelligence and subsequently develop techniques, tactics, and procedures to potentially and effectively counter U.S. military operations. Other activities may be conducted on a smaller and more localized scale, with training or testing at discrete locations that are critical to certain aspects of readiness. Threats to national security are constantly evolving, and the Action Proponents require the ability to adapt training to meet these emerging threats. Restricting access to broad-scale areas of water would impact the ability for training to evolve as threats evolve. Eliminating opportunities to train in myriad at-sea conditions would put U.S. forces at a tactical disadvantage during real-world missions. This would also present a risk to national security if potential adversaries were to be alerted to the environmental conditions within which training has been prohibited.
20. Restrictions on explosives and non-explosive stressor use near additional types of seafloor resources				X	Implementing additional mitigation for other activities or types of seafloor resources would not allow the Action Proponents to continue meeting their mission requirements to successfully accomplish readiness objectives due to restrictions on ready access to a significant portion of the Study Area.
21. Prohibiting activities in areas with low historic use for training or testing				X	The frequency at which an area is used for training or testing does not necessarily equate to its level of importance for meeting an activity objective or collectively contributing to meeting mission requirements. Some infrequently used areas are critical for a particular event.
22. Additional seasonal restrictions for training and testing based on species occurrence or density		X	X	X	Training and testing schedules are based on national tasking, the Optimized Fleet Response Plan and other training plans, Department of Homeland Security strategic goals, evolving geopolitical world events, forecasting of future testing requirements, deployment schedules, maintenance schedules, acquisition schedules, and emerging requirements. The Action Proponents require flexibility in the timing of their use of active sonar and explosives in order to meet mission and deployment schedules. Vessels, aviation squadrons, and testing programs have a limited amount of time available for training and testing. Variables such as maintenance and weather must be accounted for when scheduling event locations and timing. Event locations may have to change during an event or during pre-event planning based on assessments of unit performance or other conditions, such as inclement weather (e.g., hurricanes) and mechanical issues. This precludes the ability to completely prohibit events from occurring seasonally within areas delineated by marine species occurrence or seasonal densities.
23. Restricting active sonar based on time of day or visibility (e.g., weather conditions)				X	Although the majority of active sonar use occurs during the day, the Action Proponents may have a nighttime training requirement for some systems. Training in both good visibility (e.g., daylight, favorable weather conditions) and low visibility (e.g., nighttime, inclement weather conditions) is vital because environmental differences between day and night and varying weather conditions affect sound propagation and the detection capabilities of sonar. Temperature layers that move up and down in the water column and ambient noise levels can vary significantly between night and day. This affects sound propagation and could affect how sonar systems function and are operated.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical: Criterion 1: Safety	Impractical: Criterion 2: Sustainability	Impractical: Criterion 3: Mission	Assessment Summary
24. Blanket geographic restrictions within certain regions or areas (e.g., distances from shore)		X	X	X	Blanket expansions on the scope or size of mitigation areas would encroach upon the primary water space where military readiness activities are scheduled to occur. The Action Proponents select locations for their events based on proximity to training ranges, available airspace, unobstructed sea space, aircraft emergency landing fields, target storage and deployment locations, systems command support facilities, and areas of historical use that provide critical known bathymetric features and consistency for comparative data collection. Requiring the Action Proponents to shift activities to alternative locations or farther offshore would have significant impacts on safety, sustainability, and the ability to meet mission requirements within limited available timeframes. For example, certain surface-to-surface and air-to-surface small-, medium-, and large-caliber gunnery activities and missile and rocket activities, must be conducted in proximity to the target storage depots because the associated targets (e.g., remotely controlled jet ski targets) are limited by how far offshore they can safely be employed and controlled based on distance, weather, and sea state. Certain training activities, such as deployment certification exercises that involve integration with multiple warfare components, require large areas of the littorals and open ocean for realistic and safe training. Similarly, the testing community is required to install and test systems on platforms at the locations where those platforms are stationed. Testing associated with new construction ships must occur in locations close to the shipbuilder facilities for reasons associated with construction schedule, proximity to testing ranges and facilities, and safety. Additionally, the testing community has a need for rapid development to quickly resolve tactical deficiencies within locations supported by existing infrastructure and support facilities. Logistical support of range testing can only efficiently and effectively occur when the support is co-located with the testing activities. Some types of pierside and at-sea testing must occur in proximity to naval shipyards or contractor shipyards. Nearshore areas also serve as critical training and testing locations for certain explosive activities. For example, the explosive ordnance disposal training location at the Silver Strand Training Complex is vital due to its existing target setup, ideal bottom structure, and good bottom depth to safely train divers with explosives. Explosive ordnance disposal teams can be required to deploy with a 3-week notice, which presents a need to constantly train to maintain readiness for real-world missions. Relocating this activity to a location without these features would increase safety risks and diminish the effectiveness of training events.
25. Implementing active sonar ramp-up	X			X	Implementing active sonar ramp-up procedures during training or testing under the Proposed Action would not be representative of real-world missions and would significantly impact realism. For example, during an anti-submarine warfare exercise using active sonar, ramp-ups would alert opponents (e.g., target submarines) to the transmitting vessel's presence. This would defeat the purpose of the training by allowing the target submarine to detect the searching unit and take evasive measures, thereby denying the sonar operator the opportunity to learn how to locate the submarine. Additionally, based on the source levels, vessel speeds, and sonar transmission intervals that will be used during typical active sonar activities under the Proposed Action, ramp-up would likely be an ineffective mitigation measure for the active sonar activities conducted under the Proposed Action.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical: Criterion 1: Safety	Impractical: Criterion 2: Sustainability	Impractical: Criterion 3: Mission	Assessment Summary
26. Reducing annual active sonar hours, replacing active sonar with passive sonar, or modifying active sonar sources for training				X	Passive sonar and other available sensors are used in concert with active sonar to the maximum extent practical. Training with active sonar is essential to national security. Active sonar is the only reliable technology for detecting and tracking potential enemy diesel-electric submarines. Equipment power levels are set consistent with mission requirements. Active sonar signals are designed explicitly to provide optimum performance at detecting underwater objects (e.g., submarines) in a variety of acoustic environments. The ability to effectively operate active sonar is a highly perishable skill that must be repeatedly practiced during realistic training. The Action Proponents must train in the same mode and manner in which they conduct real-world missions. Anti-submarine warfare training typically involves the periodic use of active sonar to develop the "tactical picture," or an understanding of the battle space (e.g., area searched or unsearched, identifying false contacts, and understanding the water conditions). This can take from several hours to multiple days and typically occurs over vast areas with varying physical and oceanographic conditions (e.g., bathymetry, topography, surface fronts, and variations in sea surface temperature). Sonar operators train to avoid interference and sound-reducing clutter from varying ocean floor topographies and environmental conditions, practice coordinating their efforts with other sonar operators in a strike group, develop skill proficiency in detecting and tracking submarines and other threats, and practice the focused endurance vital to effectively working as a team in shifts around the clock until the conclusion of the event. Active sonar signals are designed explicitly to provide optimum performance at detecting underwater objects (e.g., submarines) in a variety of acoustic environments. The action proponents train with various active sonar signals, including up-sweeps and down-sweeps, to accurately replicate operational scenarios. Reducing training realism by restricting the signal used would ultimately prevent units from deploying with the required level of readiness necessary to accomplish their missions and impede the Navy's ability to certify forces to deploy to meet national security tasking. Likewise, testing program requirements include test parameters designed to accurately determine whether a system is meeting its operational and performance requirements. Reducing realism by restricting the signal used would impact the ability of researchers, program managers, and weapons system acquisition programs to effectively test systems and platforms (and components of these systems and platforms) before full-scale production or delivery to the fleet. For these reasons, modifying or limiting the sonar signal as mitigation is impractical to implement as it would result in degraded realism of training and testing. The Action Proponents use active sonar only when it is essential to the mission. For example, as described in Section 2.4.2.2.1 (Training) of the 2024 HCTT Draft EIS/OEIS, the Action Proponents are using a representative level of activity (rather than a maximum tempo of training activity in every year), which has reduced the amount of mid-frequency active sonar hours estimated to be necessary to meet training requirements relative to the 2018 HSTT and 2022 PMSR EIS/OEISs.
27. Replacing active sonar training with synthetic activities (e.g., computer simulated training)				X	The Action Proponents currently use, and will continue to use, computer simulation to augment training whenever possible. Simulators and synthetic training are critical elements that provide early skill repetition and enhance teamwork; however, they cannot replicate the complexity and stresses faced during real-world missions to which the Action Proponents train under the Proposed Action (e.g., anti-submarine warfare training using surface ship hull-mounted mid-frequency active sonar). Just as a pilot would not be ready to fly solo after simulator training, operational Commanders cannot allow personnel to engage in real-world missions based merely on simulator training.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
28. Restricting active sonar training during surface ducting conditions				X	Surface ducting occurs when water conditions, such as temperature layers and lack of wave action, result in little sound energy penetrating beyond a narrow layer near the surface of the water. Submarines have long been known to take advantage of the phenomena associated with surface ducting to avoid being detected by active sonar. Training with active sonar in these conditions is a critical component of readiness because sonar operators need to learn how sonar transmissions are altered due to surface ducting, how submarines may take advantage of them, and how to operate sonar effectively under these conditions. Avoiding military readiness activities during surface ducting conditions, reducing power, shutting down active sonar based on environmental conditions, or implementing other sonar modification techniques (e.g., sound shielding) for the purpose of mitigation would affect a Commander's ability to develop the tactical picture. It would also prevent sonar operators from training in conditions analogous to those faced during real-world missions, which is described in row 15 of this table. The ocean conditions contributing to surface ducting change frequently; in addition, surface ducts lack uniformity, may or may not extend over a large geographic area, and can be of varying duration, making it difficult to determine where to reduce power and for how long. As noted by the U.S. Supreme Court in *Winter v. Natural Resources Defense Council Inc.*, 555 U.S. 7 (2008), because surface ducting conditions occur relatively rarely and are unpredictable, it is especially important for the Action Proponents to be able to train under these conditions when they occur.
29. Requiring use of active acoustic monitoring devices		X	X	X	During Surveillance Towed Array Sensor System low-frequency active sonar (which is not part of the Proposed Action), the Navy uses a specially designed adjunct high-frequency marine mammal monitoring active sonar, or "HF/M3." HF/M3 can only be towed at slow speeds and operates like fish finders used by fishermen. Installing the HF/M3 adjunct system on the tactical sonar ships used under the Proposed Action would have implications for safety and mission requirements due to impacts on speed and maneuverability, as well as excessive additional operating costs.
30. Requiring mitigation based on passive acoustic detections of marine mammals			X	X	When platforms with passive acoustic monitoring capabilities are already participating in an event, sonar technicians will alert Lookouts to passive acoustic detections of marine mammals as described in Section 5.6 (Activity-based Mitigation) of the 2024 HCTT Draft EIS/OEIS. Significant logistical constraints (e.g., personnel and equipment availability, operational costs) would make diverting equipped platforms or constructing and maintaining new passive acoustic monitoring systems impractical. The fluidity and nature of military readiness activities (e.g., fast-paced and mobile readiness evolutions) make it impractical for passive acoustic devices to be used as precise real-time indicators of marine mammal location for the purposes of implementing mitigation (e.g., active sonar power downs or shutdowns, ceasing use of explosives) without an accompanying visual sighting. Implementing mitigation for animals located outside of the mitigation zone (which could occur due to imprecise localizations or relative movements of animals and the mitigation zone) would have the same types of effects on mission requirements as increasing the mitigation zone size, which is described in row 15 of this table.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	*Not Sufficiently Beneficial*	*Impractical*			*Assessment Summary*
		Criterion 1: Safety	*Criterion 2: Sustainability*	*Criterion 3: Mission*	
31. Reducing explosive counts or NEW, or substituting with non-explosives				X	Activities that involve explosives are inherently different from those that involve non-explosive ordnance. For example, critical components of an explosive Bombing Exercise Air-to-Surface include the assembly, loading, delivery, and assessment of the explosive bomb. Explosive bombing training exercises start with ground personnel, who must practice the building and loading of explosive munitions. Training includes the safe handling of explosive material, configuring munitions to precise specifications, and the loading of munitions onto aircraft. Aircrew must then identify a target and safely deliver fused munitions, discern if the bomb was assembled correctly, and determine bomb damage assessments based on how and where the explosive detonated. An air-to-surface bombing exercise using non-explosive ordnance can train aircrews on valuable skills to locate and accurately deliver munitions on a target; however, it cannot effectively replicate the critical components of an explosive activity in terms of assembly, loading, delivery, and assessment of an explosive bomb. Reducing the counts or sizes of explosives would impede the ability for the Action Proponents to train and become proficient in using explosive weapon systems (which would result in a significant risk to personnel safety during real-world missions), and would ultimately prevent units from meeting individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish missions) and impede the ability to certify forces to deploy to meet national security tasking. For testing, the Action Proponents need to test the full range of their platforms, weapon systems, and components to ensure safety and functionality in conditions analogous to real-world missions, and before full-scale production or delivery to the fleet.
32. Adopting mitigation implemented by foreign military units				X	Mitigation is carefully developed for and assessed by each individual unit based on their own assessment of mitigation benefits and practicality of implementation. Readiness considerations differ based on each nation's strategic reach, global mission, country-specific legal requirements, and geographic considerations. The Action Proponents will implement mitigation that has been determined to be effective at avoiding impacts from the Proposed Action and practical to implement. Many of these measures are the same as, or comparable to, those implemented by foreign navies. For example, most navies implement some form of mitigation to cease certain activities if a marine mammal is visually observed in a mitigation zone (Dolman et al., 2009). Some navies also implement geographic mitigation. The Action Proponents will implement several mitigation measures and environmental compliance initiatives that are not implemented by foreign navies, such as providing extensive support for scientific monitoring and research and complying with stringent reporting requirements.
33. Additional reporting requirements		X	X	X	The Action Proponents developed their reporting requirements in conjunction with NMFS to be consistent with mission requirements and balance the usefulness of the information to be collected with the practicality of collecting it. The Action Proponents' activity reports and incident reports are designed to verify implementation of mitigation; comply with current permits, authorizations, and consultation requirements; and improve future environmental analyses. Additional reporting would be ineffective as mitigation because it would not result in modifications to training activities or further avoidance or reductions of potential impacts. Lookouts are not trained to make species-specific identification and would not be able to provide detailed scientific data if more detailed marine species observation reports were to be required. Furthermore, the Action Proponents do not currently maintain a record management system to collect, archive, analyze, and report every marine species observation or all vessel speed data for every event and all vessel movements. For example, the speed of Action Proponent vessels can fluctuate an unlimited number of times during training or testing events. Developing and implementing a record management system of this magnitude would be unduly cost prohibitive and place a significant administrative burden on vessel operators and activity participants. Burdening operational Commanders, vessel operators, and event participants with requirements to complete additional administrative reporting would distract them from focusing on mission-essential tasks. Additional reporting requirements would draw event participants' attention away from the complex tactical tasks they are primarily obligated to perform, such as driving a warship or engaging in a gunnery event, which would adversely impact personnel safety, public health and safety, and the ability to meet mission objectives.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
34. Developing mitigation outside the Action Proponent's legal authority				X	The Action Proponents did not develop mitigation outside their legal authority to implement. For example, the Action Proponents do not have legal authority to develop Marine Protected Areas to restrict commercial or recreational fishing, which is a recommendation received through public comments on previous EIS/OEISs.
35. Expansion of existing geographic mitigation to the full extent of newly identified biologically important areas			X	X	Updated science was recently published (Calambokidis et al., 2024; Harrison et al., 2023) describing areas in which biologically important life processes occur for marine mammals either year round or for part of the year (depending on the species). The Action Proponents examined these areas and determined it would be impractical based on sustainability and mission requirements to expand certain species-specific existing geographic mitigation areas to the full extent of the newly identified areas. This analysis is detailed in Appendix K (Geographic Mitigation Assessment) of the 2024 HCTT Draft EIS/OEIS. The Action Proponents did however modify and expand existing geographic mitigation areas (e.g., California Blue Whale Mitigation Area, Hawaii Humpback Whale Special Reporting Area) from the HSTT 2018 EIS/OEIS. Some of the newly identified areas overlap with the majority of the Southern California Range Complex. Requiring vessels to transit from their homeport to conduct training and testing activities while avoiding these areas as geographic mitigation (e.g., a prohibition on explosives, a limit on sonar use) would result in reduced efficiency in travel time and associated costs by increasing distance between activities and homeports, home bases, associated training ranges, testing facilities, air squadrons, and existing infrastructure (e.g., instrumented underwater ranges). It would also result in the expenditure of additional funding for increased operational costs associated with higher fuel consumption. Additionally, expanding geographic mitigation areas to match these extents would result in decreased ready access to ranges, operating areas, airspace, or sea space with a variety of realistic tactical oceanographic and environmental conditions (e.g., variations in bathymetry, topography, surface fronts, and sea surface temperatures) that are extensive enough to allow for completion of activities without physical or logistical obstructions, to provide personnel the ability to develop competence and confidence in their capabilities across multiple types of weapons and sensors, and the ability to train to communicate and operate in a coordinated fashion as required during real-world missions and to avoid observation by potential adversaries.
36. Additional pile driving mitigation				X	The Action Proponents determined it would be impractical based on mission requirements to implement visibility-based mitigation from the Incidental Harassment Authorization Incidental to Pile Driving Training Exercises at Naval Base Ventura County, Port Hueneme. Limiting activities in the Draft EIS/OEIS due to weather conditions (e.g., rain, fog, snow) would degrade training realism and impact the Navy's ability to become proficient at this activity.
37. Vessel movement mitigation for cable laying vessels performing Modernization & Sustainment of Ranges activity		X		X	The Action Proponents determined it would be impractical based on safety and mission requirements to implement mitigation for manned surface vessels and towed in-water devices actively conducting cable laying during Modernization & Sustainment of Ranges activities. The vessels performing these activities move very slowly through the water column (e.g., 2–3 knots) to facilitate a gradual, controlled rate of descent to minimize risk of damage to the cable. Additionally, vessels are required to follow a prescribed route based on Remotely Operated Vehicle surveys to ensure the cable is laid on its intended route, predominantly sandy bottom habitat avoiding rocky areas, to minimize damage to the cable. Deviating from this route or slowing to a near stop once cable laying has commenced would present risk of damage to cable-laying equipment and personnel operating it.

Table C-15: Mitigation Considered but Eliminated (continued)

Mitigation Considered	*Not Sufficiently Beneficial*	*Impractical*			*Assessment Summary*
		Criterion 1: Safety	*Criterion 2: Sustainability*	*Criterion 3: Mission*	
38. Geographic mitigation for hauled out Hawaiian monk seals at PMRF	X				In the Draft EIS/OEIS, the Action Proponents are requesting behavioral takes for hauled-out Hawaiian monk seals on beaches adjacent to PMRF related to in-air noise from missile launches and artillery firing. As part of this process, a range-to-effects (RTE) analysis was performed to determine the range to injurious levels; these ranges were then used to inform the development of geographic mitigation. The ranges to injury that resulted from this analysis ultimately did not extend to any of the beaches from the established launch/firing sites. The RTE analysis is detailed in Appendix E.1 (In-Air Acoustic Effects on Pinnipeds from Weapons Firing Noise). Since behavioral takes are being requested and injury is unlikely, the Action Proponents determined it is not sufficiently beneficial to develop geographic mitigation areas for these activities.
39. Requiring NMFS Protected Species Observer (PSO) certification for Navy Lookouts	X		X	X	Requiring NMFS PSO certification for Navy Lookouts would be impractical and not sufficiently beneficial. To become a NMFS-certified PSO, NOAA states that one should meet educational, experiential, and training requirements, including a background in biological sciences. These requirements are very much at odds with those for being a Navy Lookout. Furthermore, serving as a Lookout is only one part of these individuals' responsibilities. They must maintain proficiency in both general seamanship and rate-specific skills. A requirement for a background in biological sciences would significantly limit the pool of personnel on Navy vessels who would be eligible for certification. Requiring Lookouts to hold PSO certification would present an administrative burden and significant challenges in meeting Lookout manning requirements. Within the action area, the Navy operates numerous large ships (e.g., destroyers, aircraft carriers) and other support craft and small vessels; Lookouts assigned to vessels are frequently rotating duty stations. Each vessel has a pool of lookouts to allow for normal watch rotation, reduce eye fatigue, and ensure vigilance, which would increase the number of personnel requiring certification and further complicate manning efforts. Similarly, reliance on the NMFS PSO application process may present delays in certification that are incompatible with Navy manning and readiness requirements. Current PSO training curricula varies in frequency, cost, length, focal activity, and focal geography. It is generally conducted by third-party providers. If Navy established an independent PSO training program for Lookouts, fitting this additional requirement into the challenging Optimized Fleet Response Plan would be unsustainable and have a direct effect on Navy readiness. Lastly, Navy Lookouts already must complete Lookout Training, which includes marine resource sighting cues and observation techniques, as well as the roles and responsibilities of Lookouts and the official in charge of an activity. In addition to this training, Lookouts complete NMFS-approved Marine Species Awareness Training. Finally, the Lookout Training Handbook was updated in 2022 with a thorough Marine Resources chapter covering topics from identifying indicator species to determining direction of travel. The goal of PSO certification is to ensure that PSOs have the appropriate training to safely and effectively perform their required duties to meet the needs of a particular project. The Navy's Lookout training and qualification program already achieves that goal for Navy's at-sea activities. Therefore, the Navy has determined that PSO certification or PSO-specific training would not provide sufficient benefit to outweigh the risk to Navy readiness.

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Appendix D

Agency Correspondence from the Previous Consistency Determination

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APPENDIX D AGENCY CORRESPONDENCE FROM THE PREVIOUS CONSISTENCY DETERMINATION

This appendix contains the correspondence between the Navy and the California Coastal Commission regarding the Navy's 2018 Consistency Determination for Proposed Military Readiness Activities in Southern California.

DEPARTMENT OF THE NAVY

COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
Ser N465/0431
March 12, 2018

Mr. John Ainsworth
Executive Director
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, California 94105-2219

Dear Mr. Ainsworth:

SUBJECT: CONSISTENCY DETERMINATION FOR PROPOSED MILITARY READINESS ACTIVITIES IN SOUTHERN CALIFORNIA

In accordance with 15 C.F.R. §930, the U.S. Navy, Commander, U.S. Pacific Fleet is submitting the enclosed Consistency Determination (CD) for proposed military readiness activities within the southern California portion of the Hawaii-Southern California Training and Testing (HSTT) Study Area. The Navy has determined the proposed action is consistent to the maximum extent practicable with the applicable enforceable policies of the California Coastal Management Program for the reasons identified in the enclosed CD. The Navy is requesting that the CD be considered by the Coastal Commission at the June 6-8, 2018 meeting in San Diego. These military readiness activities are a continuation of activities that have been conducted in the same areas for decades and have been the subject of prior consistency review by the Commission, most recently in 2013.

A separate CD addressing military readiness activities within the Hawaii Range Complex is being submitted to the Hawaii Department of Business, Economic Development & Tourism, Office of Planning for their consideration under the Hawaii Coastal Zone Management Program.

In addition to the Coastal Zone Management Act federal consistency requirements addressed by the submission of the enclosed CD, the Navy is addressing compliance with other environmental laws as follows:

a. National Environmental Policy Act and Executive Order 12114. Navy released the Draft Environmental Impact Statement (EIS)/Overseas EIS in October, 2017.

b. Marine Mammal Protection Act. Navy is seeking a Letter of Authorization (LOA) from the National Marine Fisheries Service (NMFS).

c. Endangered Species Act. Navy is consulting with NMFS and U.S. Fish and Wildlife Service under Section 7 of the ESA.

5090
Ser N465/0431
March 12, 2018

Information and reporting regarding on-going Navy training and testing activities in the study area, as well as Navy sponsored research and monitoring, is available at https://www.navymarinespeciesmonitoring.us/reporting/pacific/. The HSTT Draft EIS/OEIS and other supporting documents are available at https://hstteis.com/.

If you have any questions please contact Mr. Alex Stone, U.S. Pacific Fleet, (619) 545-8128, Alexander.Stone@navy.mil or Ms. Deborah McKay, Commander Navy Region Southwest, at (619) 532-2284, Deborah.Mckay@navy.mil.

Sincerely,

L. M. FOSTER
By direction

Enclosure: CD for the southern California portion of the HSTT Study Area

Copy to:
Chief of Naval Operations (N454) (w/o enclosure)
Commander, Navy, Region Southwest (N40) (w/o enclosure)
John Nakagawa, Hawaii Department of Business, Economic Development & Tourism, Office of Planning (w/enclosure)

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STATE OF CALIFORNIA—NATURAL RESOURCES AGENCY EDMUND G. BROWN, *GOVERNOR*

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

June 8, 2018

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

Re: **CD-0001-18,** Department of the Navy, Consistency Determination, Military Readiness Activities in the Southern California portion of the Hawaii-Southern California Training and Testing (HSTT) Study Area

Dear Mr. Foster:

On June 6, 2018, by a unanimous vote, the California Coastal Commission objected to the above-referenced consistency determination submitted by the Navy for the California portion of its Hawaii-Southern California Training and Testing Program for 2019-2023. The Commission's objection was based on its conclusion that the activities as proposed were not consistent to the maximum extent practicable with the marine resource protection policy (Section 30230) of the California Coastal Act, which is one of the enforceable policies under the California Coastal Management Program (CCMP) (attached). The Commission considered the conditional concurrence recommended by staff, but concluded that the approach was unwarranted, given the lack of agreement by the Navy to implement the measures Commission staff had proposed to protect marine resources, as outlined in the June 23, 2018, Commission staff recommendation on the proposal, or the measures recommended in the letter to the Commission submitted by the Natural Resources Defense Council (NRDC), dated May 24, 2018.

The Commission also encouraged the Navy to continue working with the Commission and to consider the additional measures described in the two documents referred to in the previous paragraph (and attached), as well as any other relevant information, before concluding that less environmentally damaging alternatives are not available, or that additional protective measures are not implementable. The Commission also stressed its support for the Navy's mission and appreciation of the Navy's willingness to work productively with the Commission on resource protection matters of mutual importance.

Evidentiary support for the Commission's action is contained in the staff recommendation (available at the link on page 3 of this letter); however please note that this report was not adopted by the Commission. Although the grounds for the objection under the enforceable policies of the CCMP are contained in the Staff Recommendation, because the Commission's action differed procedurally from that recommended in the Staff Recommendation, and because the Commission was requesting the Navy to consider measures recommended by NRDC which

-2-

were not contained in the Staff Recommendation, formal adoption of "Revised Findings" will be necessary to reflect those differences. Adoption of proposed revised findings will be scheduled for the August 8-10, 2018, Commission meeting in Southern California.

The federal consistency regulations provide:

§ 930.43 State agency objection.

(a) In the event the State agency objects to the Federal agency's consistency determination, the State agency shall accompany its response to the Federal agency with its reasons for the objection and supporting information. The State agency response shall describe:

(1) How the proposed activity will be inconsistent with specific enforceable policies of the management program; and

(2) The specific enforceable policies (including citations).

(3) The State agency should also describe alternative measures (if they exist) which, if adopted by the Federal agency, would allow the activity to proceed in a manner consistent to the maximum extent practicable with the enforceable policies of the management program. Failure to describe alternatives does not affect the validity of the State agency's objection.

...

(c) State agencies shall send to the Director a copy of objections to Federal agency consistency determinations.

(d) In the event of an objection, Federal and State agencies should use the remaining portion of the 90-day notice period (see § 930.36(b)) to attempt to resolve their differences. If resolution has not been reached at the end of the 90-day period, Federal agencies should consider using the dispute resolution mechanisms of this part and postponing final federal action until the problems have been resolved. At the end of the 90-day period the Federal agency shall not proceed with the activity over a State agency's objection unless:

(1) the Federal agency has concluded that under the "consistent to the maximum extent practicable" standard described in section 930.32 consistency with the enforceable policies of the management program is prohibited by existing law applicable to the Federal agency and the Federal agency has clearly described, in writing, to the State agency the legal impediments to full consistency (See §§ 930.32(a) and 930.39(a)), or

(2) the Federal agency has concluded that its proposed action is fully consistent with the enforceable policies of the management program, though the State agency objects.

-3-

(e) If a Federal agency decides to proceed with a Federal agency activity that is objected to by a State agency, or to follow an alternative suggested by the State agency, the Federal agency shall notify the State agency of its decision to proceed before the project commences.

If you have any questions, please feel free to call me at (415) 904-5289.

Sincerely,

Mark D

MARK DELAPLAINE
Manager, Energy, Ocean Resources, and Federal Consistency Division

Attachments:

(1) Coastal Act Section 30230
(2) CCC Staff Recommended Conditions
(3) Letter to CCC from NRDC (dated May 24, 2018)

Link to CCC Staff Recommendation and related documents:
https://www.coastal.ca.gov/meetings/agenda/#/2018/6

cc: Navy Region Southwest (Alex Stone, Suzanne Smith)
Office for Coastal Management (OCM) (David Kaiser, Kerry Kehoe)
NOAA Fisheries (Stephanie Egger)
Hawaii Coastal Management Program

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Deb McKay, AICP
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-4-

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Stephanie Egger
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National Marine Fisheries Service
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John Nakagawa, Justine Nihipali
Hawaii Coastal Zone Management Program
Office of Planning
P.O. Box 2359
Honolulu, HI 96804

Attachment 1

Coastal Act Section 30230

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

CD-0001-18 (Navy)

I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

The Department of the Navy has determined the project consistent to the maximum extent practicable with the California Coastal Management Program (CCMP).

II. MOTION AND RESOLUTION

Motion:

> *I move that the Commission conditionally concur with consistency determination CD-0001-18 by concluding that that the project would be fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the CCMP, provided the Navy agrees to modify the project consistent with the conditions specified below, as provided for in 15 CFR §930.4.*

Staff recommends a **YES** vote on the motion. Passage of this motion will result in a concurrence with the determination of consistency, provided the project is modified in accordance with the recommended conditions, and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

Resolution:

> *The Commission hereby conditionally concurs with consistency determination CD-0001-18 by the Navy on the grounds that the project would be fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the CCMP, provided the Navy agrees to modify the project consistent with the conditions specified below, as provided for in 15 CFR §930.4.*

III. CONDITIONS

1. Safety Zones. The Navy will cease sonar transmissions whenever a marine mammal or sea turtle is detected within a 2 km radius of the sonar dome, unless the sonar is being used at a critical point in the exercise such that the commanding officer determines certification or training effectiveness would be at risk.

2. Biologically Significant Areas. The Navy will avoid exposing the following areas to high intensity active sonar and in-water explosives. Avoidance will include a 4 km area around each of the following areas, for the MF1 Class Sonar (and for less intense sonars, a corresponding distance that would be the equivalent to the exposure level an MF1 Class would generate). For in-water explosives, avoidance means prohibiting all in-water explosives for (a) and (b) below, and prohibit explosives categories Bins E-6 thru E-13[1] for (c) thru (f) below:

(a) the Channel Island National Marine Sanctuary (including around Santa Barbara Island);

[1] See Exhibit 13, last page, for descriptions of explosives bins.

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(b) State and federal Marine Protected Areas (the offshore areas shown in red, light blue, and green in **Exhibit 5**);

(c) San Nicolas Basin fin whale and beaked whale high concentration area (the area shown in yellow in **Exhibit 5**);

(d) 1 km from shore (to protect coastal bottlenose dolphins);

(e) seasonally (June 1 – Oct. 31), all four blue whale areas sites designated as Biologically Important Areas (BIAs) (the areas shown in dark blue on **Exhibit 5**), and

(f) any future-NMFS-designated Biologically Important Area (BIA).

3. Night and low visibility conditions. Whenever the entire safety zone cannot be effectively monitored (e.g., due to nighttime, high sea state conditions (such as greater than Beaufort Stage 4 sea state), fog or other factors), the Navy will either avoid active sonar use, or will operate mid-frequency sonar under reduced power (i.e., a 6 dB[2] reduction). If the latter, the Navy will use additional detection measures to enhance marine mammal observer capabilities, such as infrared (IR) or enhanced passive acoustic detection.

4. Vessel Speeds. Except where higher speeds are critical to military training needs, in the areas listed in Condition 2 (and during the time periods for the ones that are seasonal), vessel speeds shall normally not exceed 10 knots.

5. **Marine Mammal Observers.** The Navy will, to the maximum extent feasible, commit to including at least two experienced, NMFS-certified marine mammal observers on all ships during the deployment of active sonar for training or testing purposes. These marine mammal observers will notify appropriate Navy personnel of all marine mammal detections and will assist in the enforcement of marine mammal safety zones.

IV. APPLICABLE LEGAL AUTHORITIES

Standard of Review

The federal Coastal Zone Management Act ("CZMA"), 16 U.S.C. § 1451-1464, requires that federal agency activities affecting coastal resources be "carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." Id. at § 1456(c)(1)(A). The implementing regulations for the CZMA ("federal consistency regulations"), at 15 C.F.R. § 930.32(a)(1), define the phrase "consistent to the maximum extent practicable" to mean:

[2] Decibel references in this report are underwater decibels (dB), described as decibels referenced to 1 micropascal, and usually shown as: dB re 1 μPa.

NRDC

Via Electronic Mail

May 24, 2018

Chair Dayna Bochco and
Members of the California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219
Email: cteufel@coastal.ca.gov

Re: Consistency Review of Navy Activities off Southern California, 2019-2023

Dear Chair Bochco and Members of the Commission:

On behalf of the Natural Resources Defense Council, the California Coastal Protection Network, and our millions of members and activists, hundreds of thousands of whom reside in the State of California, we submit comments regarding the U.S. Navy's federal consistency determination for proposed activities off Southern California. For the reasons set forth below, we respectfully recommend that the Commission object to the Navy's consistency determination, as it did in 2013, when the Navy last came for consistency review. To the extent that the Commission also identifies measures that might allow it to reach concurrence, we ask it to include conditions, as described in these comments, that protect important habitat and provide other mitigation for the most vulnerable marine mammal populations.

As it did in 2008, the Navy's consistency determination, along with other documents it has prepared to satisfy federal law, details extraordinary harm to California's marine resources. **That harm includes over 2,500 cases of permanent hearing loss and other injury in marine mammals; more than 1 million instances of temporary hearing loss, a significant impact for species dependent on their hearing for survival and reproduction; and more than 10 million additional cases of disruption of vital behaviors, such as calving and foraging.** In total, the Navy estimates that its activities—including high-intensity sonar exercises and underwater detonations—will cause 11,773,470 takes of marine mammals.[1]

Numerous commentators, including the National Oceanic and Atmospheric Administration ("NOAA"), have observed that such impacts, when experienced repeatedly and at the

[1] U.S. Department of the Navy, *Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for Hawaii-Southern California Training and Testing*, at App. E (2017) (Summation of estimated takes for Alternative 1 over the 5-year year period.)

NATURAL RESOURCES DEFENSE COUNCIL

1314 2ND STREET | SANTA MONICA, CA | 90401 | T 310.434.2300 | F 310.434.2399 | NRDC.ORG

Chair Bochco and Members of the Commission
May 24, 2018
Page 2

geographic scale of populations, can readily accumulate to population-level harm.[2] Indeed, such harm from Navy activities has already been documented on the Navy's AUTEC range, in the Southern Bahamas, where repeated exposure to active sonar has apparently created a "population sink" for beaked whales, who remain in the region yet are generally unable to reproduce.[3]

Since the Commission last reviewed the Navy's activities for consistency with the California Coastal Act, new research has added to the already substantial concern over the Navy's impacts on the state's marine mammals and other coastal resources. For example, monitoring of Navy exercises has shown that "dipping" sonar, which is deployed via cable from manned and unmanned aircraft, impacts at least some whale species to a much greater extent than previously thought. Beaked whales have been found to exhibit strong reactions to these sudden, unpredictable exposures, ceasing to forage and fleeing for tens of miles, even though the duration of use and source levels of these systems are generally well below those of hull-mounted mid-frequency active sonar.[4] The new science also includes studies, using a variety of methods (satellite telemetry, photo-identification, and long-term acoustic monitoring), indicating the presence of small, resident populations of beaked whales—particularly vulnerable to disturbance—in the Southern California Bight.[5] Finally, a rapidly expanded body of scientific literature now indicates the significant impacts of noise on ocean species beyond marine mammals—including fish and marine invertebrates, many of which represent important prey species or are of commercial importance.[6]

---

[2] *E.g.*, Convention on Biological Diversity, *Scientific synthesis on the impacts of underwater noise on marine and coastal biodiversity and habitats* (UN Doc. UNEP/CBD/SBSTTA/16/INF/12) (2012); Gedamke, J., Harrison, J., Hatch, L., Angliss, R., Barlow, J., Berchok, C., Caldow, C., Castellote, M., Cholewiak, D., De Angelis, M.L., Dziak, R., Garland, E., Guan, S., Hastings, S., Holt, M., Laws, B., Mellinger, D., Moore, S., Moore, T.J., Oleson, E., Pearson-Meyer, J., Piniak, W., Redfern, J., Rowles, T., Scholik-Schlomer, A., Smith, A., Soldevilla, M., Stadler, J., Van Parijs, S., and Wahle, C., *Ocean Noise Strategy Roadmap* (2016).

[3] Claridge, D.E., *Population ecology of Blainville's beaked whales (*Mesoplodon densirostris*)* (Ph.D. thesis) (2013); New, L.F., Moretti, D.J., Hooker, S.K., Costa, D.P., Simmons, S.E., Using energetic models to investigate the survival and reproduction of beaked whales (family *Ziphiidae*), *PLoS ONE*, 8(7), e68725 (2013).

[4] Falcone, E. A., Schorr, G.S., Watwood, S.L., DeRuiter, S.L., Zerbini, A.N., Andrews, R.D., Morrissey, R.P., and Moretti, D.J., Diving behavior of Cuvier's beaked whales exposed to two types of military sonar, *Royal Society Open Science*, 4(8), 170629 (2017); Falcone, E., Schorr, G., Watwood, S., DeRuiter, S., Zerbini, A., Andrews, R., Morrissey, R., and Moretti, D., *Go long! Behavioral changes in satellite-tagged Cuvier's beaked whales exposed to two types of military mid-frequency active sonar*, Oral Presentation. Society of Marine Mammalogy Biennial Conference, Halifax, Canada, (23 Oct, 2017).

[5] Falcone, E., Schorr, G., Douglas, A., Calambokidis, J., Henderson, E., McKenna, M. F., Hildebrand, J., and Moretti, D., Sighting characteristics and photo-identification of Cuvier's beaked whales (*Ziphius cavirostris*) near San Clemente Island, California: A key area for beaked whales and the military? *Marine Biology*, 156, 2631–2640 (2009); Baumann-Pickering, S., Roch, M.A., Brownell Jr., R.L., Simonis, A.E., McDonald, M.A., Solsona-Berga, A., Oleson, E.M., Wiggins, S.M., and Hildebrand, J.A., Spatio-temporal patterns of beaked whale echolocation signals in the North Pacific, *PLoS ONE*, 9(1), e86072 (2014); Baumann-Pickering, S., Trickey, J.S., Roch, M.A., and Wiggins, S.M., Spatio-temporal distribution of beaked whales in southern California waters, *The Journal of the Acoustical Society of America*, 136(4), 2073 (2014); Baumann-Pickering, S., Hildebrand, J.A., Yack, T., and Moore, J.E. *Modeling of Habitat and Foraging Behavior of Beaked Whales in the Southern California Bight*, Scripps Institution of Oceanography, University of California, San Diego La Jolla United States, (30 Sep, 2015); Falcone, E.A. and Schorr, G.S., *Distribution and demographics of marine mammals in SOCAL through photo-identification, genetics, and satellite telemetry*, Report prepared for CNO (45) under NPS Grant N00244-10-1-0050, pp. 75 (2014); Schorr, G.S., Falcone, E.A., Moretti, D.J. and Andrews, R.D., First long-term behavioral records from Cuvier's beaked whales (Ziphius cavirostris) reveal record-breaking dives, *PLoS ONE*, 9(3), e92633 (2014).

[6] *E.g.*, Solé, M., Lenoir, M., Durfort, M., López-Bejar, M., Lombarte, A., and André, M., Ultrastructural Damage of Loligo vulgaris and Illex coindetii statocysts after Low Frequency Sound Exposure, *PLoS ONE*, 8(10), 1–12 (2013); Solé, M., Lenoir,

Chair Bochco and Members of the Commission
May 24, 2018
Page 3

At the same time, the amount of sonar and explosives activity represented in the Navy's consistency determination remains enormous. While the Navy proposes to conduct fewer hours of training with hull-mounted, mid-frequency active sonar training than it did during its previous five-year review—apparently the result of a more accurate measurement of sonar activity rather than of any environmental or operational change (*see* Consistency Determination at 2-8, 2-9)—training with this sonar type still amounts to as many as 6,701 hours per year, or 28,808 hours of sonar use distributed over five years. Moreover, proposed levels of other harmful activities remain extremely high, representing an enormous concentration of activity off California's coast. These include 67,819 detonations of underwater explosives, 15,064 hours of low-frequency active sonar use, and 130,994 hours of training and testing with mid-frequency active sonar deployed by helicopters and other sources. Among the latter, these "dipping" sonars are the ones that, according to recent studies, have far wider impacts on beaked whales off Southern California than was previously supposed.

It is therefore paramount that the Navy take strong measures to mitigate or significantly reduce the level of impact of its activities. **Unfortunately, the Navy—rather than consider additional mitigation measures for its Southern California range, in line with current science—has proposed withdrawing measures that it has applied on the range for almost three years.**

I. The Navy's Proposed Roll-Back of Current Mitigation Measures

As you know, the California Coastal Act mandates that "[m]arine resources shall be maintained, enhanced, and where feasible, restored." Pub. Res. Code § 30230 (emphasis added). Under the Act, "[s]pecial protection shall be given to areas and species of special biological or economic significance, and "[u]ses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes." *Id.* Simply put, the Navy's activities are not consistent to the maximum extent practicable with these standards.

There is strong consensus—at NOAA and in the scientific community—that avoidance of high-value habitat represents the best available means to reduce the impacts of mid-frequency active sonar and certain other types of ocean noise on marine biota.[7] Indeed, in a 2010 memorandum

M. Durfort, M. López-Bejar, M., Lombarte, A., Van Der Schaar, M., and André, M., Does exposure to noise from human activities compromise sensory information from cephalopod statocysts? *Deep-Sea Research Part II: Topical Studies in Oceanography*, 95, 160–181 (2013); Sierra-Flores, R., Atack, T., Migaud, H., and Davie, A., Stress response to anthropogenic noise in Atlantic cod Gadus morhua L., *Aquacultural Engineering*, 67, 67–76, (2015); Simpson, S.D., Purser, J., and Radford, A.N., Anthropogenic noise compromises antipredator behaviour in European eels, *Global Change Biology*, 21(2), 586–593, (2015); Day, R.D., McCauley, RD., Fitzgibbon, Q.P., Hartmann, K., and Semmens, J.M., Exposure to seismic air gun signals causes physiological harm and alters behavior in the scallop Pecten fumatus, *PNAS*, 114, E8537-E8546 (2017); McCauley, R. D., Day, R.D., Swadling, K.M., Fitzgibbon, Q.P., Watson, R.A., and Semmens, J.M., Widely used marine seismic survey air gun operations negatively impact zooplankton, *Nature Ecology & Evolution*, 1, 0195, (2017).

[7] *See, e.g.*, Hatch, L.T., Wahle, C.M., Gedamke, J., Harrison, J., Laws, B., Moore, S.E., Stadler, J.H., and van Parijs, S.M., Can you hear me here? Managing acoustic habitat in U.S. waters, *Endangered Species Research* 30: 171-186 (2016).

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from Dr. Jane Lubchenco to the White House Council on Environmental Quality, NOAA recognized the need to improve its Navy mitigation and asserted the importance of time-area restrictions in biologically sensitive areas.[8] Consistent with this priority, NOAA has since made habitat protection a leading element of its Ocean Noise Strategy, an effort coordinated across the agency's various offices and departments to address the cumulative effects of ocean noise on marine wildlife.[9]

Accordingly, following a 2015 federal court ruling that found that the Navy and NOAA had violated multiple provisions of three environmental laws, the agencies voluntarily entered into a settlement agreement that imposed time and area restrictions on Navy activities off Southern California, as well as around the Hawaiian Islands. *Conservation Council for Hawai'i v. National Marine Fisheries Serv. and NRDC v. National Marine Fisheries Serv.*, 97 F. Supp. 3d 1210 (D. Haw. 2015) [hereinafter *Conservation Council*].[10] The areas protected were identified as biologically important to a number of marine mammal populations: blue whales and fin whales, both endangered species for which Southern California represents highly important seasonal habitat; gray whales, which migrate as a species along the California coast; and beaked whales, a family of deep-diving marine mammals whose extreme sensitivity to Navy sonar is well recognized from a long history of associated strandings.

Under the settlement agreement, which was incorporated into a judicial order by the parties' consent, the Navy agreed to exclude certain types of sonar activities, as well as activities involving underwater explosives, from important habitat; and to undertake measures to reduce ship-strikes of baleen whales.[11] In doing so, the Navy validated the feasibility of adopting time/area restrictions to reduce adverse impacts on marine mammals.

The proposal set forth in the Navy's consistency determination significantly rolls back the protections put in place under the terms of the settlement agreement. The weakening of these protections is cause for concern, as is the Navy's failure to consider additional protections in light of new science. In sum, the Navy:

- Eliminates refuges for small populations of Cuvier's beaked whales off Southern California. This is highly concerning as beaked whales have proven to be one of the most sensitive marine mammal species to mid-frequency active sonar and are at direct risk of mortality. Moreover, repeated exposure of these small, resident populations to harmful activities is likely to result in population-level impacts. Best available science indicates that the primary habitat of a small, resident population of Cuvier's beaked whales overlaps with the Southern California Anti-Submarine Warfare Range (SOAR) off San Clemente

[8] Memorandum from Dr. Jane Lubchenco, NOAA Administrator, to Ms. Nancy Sutley, CEQ Chair (Jan. 19, 2010).

[9] Gedamke, J., *et al.*, Ocean Noise Strategy Roadmap, *supra*.

[10] We have included a summary of the Court's findings as Attachment A.

[11] Stipulated Settlement Agreement and Order, *Conservation Council*, 97 F. Supp. 3d 1210 (D. Haw. 2015) (issued Sept. 14, 2015).

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Island, a smaller site within the Navy's larger range, and is continually impacted by the Navy's training and testing activities.[12]

- Ends protective measures for endangered blue whales related to sonar use and vessel collisions. Under the terms of the settlement agreement, the Navy was required to prohibit hull-mounted mid-frequency sonar and limit explosives for training and testing activities from June 1 to October 31 within two "Settlement Areas" located within the San Diego Planning Awareness and Cautionary Areas. Pursuant to its consistency determination, the Navy intends to remove this prohibition and carry out up to three major training exercises per season that deploy hull-mounted active sonar. Consistency Determination at C-45. The Navy also eliminates measures to minimize the risk of vessel collision from a high risk area southwest of SOAR, in the vicinity of the Tanner Bank Minefield. These actions may have population-level consequences for blue whales.

- Under-protects endangered fin whales from vessel collisions. The Navy proposes vessel collision awareness measures for fin whales within an area that extends from the California mainland out to 20 nautical miles offshore, from November 1 through May 31. This area does not, in fact, protect habitat of known higher relative importance for fin whales, which, according to NOAA's mapping of biologically important areas for cetaceans, generally comprises the waters between the 200 meter and 1000 meter isobaths, and particular areas of importance near Tanner and Cortez Bank, the San Clemente Basin, and the shelf edge west of San Nicolas Island.[13]

- Fails to extend mitigation measures to air-deployed mid-frequency active sonar (or "dipping sonar"). Due to it being deployed at depth and in an unpredictable pattern, dipping sonar has been shown to have a disproportionate level of impact on marine mammals, and specifically beaked whales, for which it has been shown to disrupt foraging activity.[14] For small, resident populations of beaked whales, these impacts have the potential to result in population-level consequences.

- Fails to extend mitigation to high-density beaked whale habitat south of the Channel Islands. Considering the sensitivity of beaked whales to mid-frequency active sonar and the potential for harm to occur at the population-level, it is imperative that the Navy extend mitigation measures to all areas identified as important habitat for beaked whales. According to Navy-sponsored research, these areas include the Northern Catalina Basin and San Clemente

[12] *E.g.*, DeRuiter, S.L., Southall, B.L., Calambokidis, J., Zimmer, W.M., Sadykova, D., Falcone, E.A., Friedlaender, A.S., Joseph, J.E., Moretti, D., Schorr, G.S. and Thomas, L., First direct measurements of behavioural responses by Cuvier's beaked whales to mid-frequency active sonar, *Biology Letters*, 9(4): p.20130223 (2013); Falcone, E. A., et al.., Diving behavior of Cuvier's beaked whales exposed to two types of military sonar, *supra*.

[13] Calambokidis, J., Steiger, G.H., Curtice, C., Harrison, J., Ferguson, M., Becker, E., DeAngelis, M., and Van Parijs, S.M., Biologically Important Areas for selected cetaceans within U.S. waters – West coast region, *Aquatic Mammals* (Special Issue) 41(1): 39-53 (2015).

[14] Falcone, E., *et al.*, Diving behavior of Cuvier's beaked whales exposed to two types of military sonar, *supra*.

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Basin, and the southernmost edge of the California Current, west of Tanner and Cortez Banks, in addition to areas further north.[15]

The Navy has not proposed to protect coastal resources to the maximum extent practicable, as required under the CZMA.

II. Information Necessary for Consistency Review

Under the Coastal Zone Management Act, the Commission can object to a consistency determination based on lack of sufficient information. Here the Navy has failed to provide basic information and analysis critical to the Commission's consistency review. To cite only a few examples:

- Estimates of impacts on Cuvier's beaked whale populations. The Navy's estimates of harm, or "take," for Cuvier's beaked whales (11,426 individual takes [training: 6965; testing: 4,461] for all sources)[16] are presented by the Navy as a single estimate for the California/ Oregon/ Washington stock. This is deeply problematic as the species is known to occur in small, resident populations within the Southern California Range Complex. These populations are acutely vulnerable to Navy sonar. Cuvier's beaked whales have repeatedly been associated with sonar-related pathology, is known to react strongly to sonar at distances up to 100 kilometers, and is universally regarded to be among the most sensitive of all marine mammals to anthropogenic noise.[17] Some populations, such as the one in San Nicholas Basin that coincides with the Navy's much-used Southern California ASW Range (SOAR), are repeatedly exposed to sonar, posing the same risk of population-wide harm documented on a Navy range in the Bahamas.[18] The broad take estimates provided by the Navy provide no insight into the specific impacts proposed for these small populations.

- Data supporting the Navy's claims of the effectiveness of its mitigation measures. The Navy makes a *post hoc* adjustment to its take estimates for injury and mortality based on "mitigation effectiveness." Unfortunately, neither the Commission nor the public has any meaningful way to evaluate the Navy's adjustment further, since the Navy does not provide the scores used to generate its effectiveness factor or provide pre-adjustment take numbers. This is the case even though most Navy activities would be allowed to occur in all sea conditions and hours of the day, making it highly unlikely that Navy visual surveys could approximate the sighting effectiveness of a large-vessel abundance survey. Moreover, Navy

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[15] Baumann-Pickering, S., *et al. Modeling of Habitat and Foraging Behavior of Beaked Whales in the Southern California Bight*, *supra*.

[16] Personal communication from M. Delaplaine, California Coastal Commission, to M. Jasny, NRDC (May 23, 2018).

[17] *See, e.g.*, Falcone, E., *et al.*, Diving behavior of Cuvier's beaked whales exposed to two types of military sonar, *supra*; Fernández, A., Edwards, J.F., Rodríguez, F., Espinosa de los Monteros, A., Herráez, P., Castro, P., Jaber, J.R., Martín, V., and Arbelo, M., 'Gas and fat embolic syndrome' involving a mass stranding of beaked whales (Family *Ziphiidae*) exposed to anthropogenic sonar signals, *Veterinary Pathology* 42: 446–57 (2005).

[18] Falcone, E.A. and Schorr, G.S., *Distribution and demographics of marine mammals in SOCAL through photo-identification, genetics, and satellite telemetry*, *supra*; Claridge, D.E., *Population ecology of Blainville's beaked whales (*Mesoplodon densirostris*)*, *supra*.

watchstanders charged with implementing the Navy's exclusion zones appear to fare much poorer in detecting marine mammals than do ordinary trained observers, who are generally not allowed aboard ship.[19] The Navy provides no data supporting its claims of effectiveness even though they significantly reduce its estimates of permanent injury and, especially, mortality from the levels anticipated in 2013, when it last came before the Commission on consistency review.[20]

- Locations of exercises and impacts. Unfortunately, while it provides more locational information than it did in previous consistency reviews, the Navy still fails to indicate, beyond (in some cases) its broad operations areas, where activities will occur within the Southern California Range Complex—an area roughly the size of the entire state of California—and where marine mammal injuries will take place within this expansive facility. *See* Consistency Determination at Appendix A, Tables A-1 to A-4. Nor does it break down its take numbers by activity type, other than by distinguishing between the broad categories of training and testing. *See id.* at Appendix E. Thus, there is no way to surmise, for example, which Navy action is responsible for the greatest harm to marine species. It is similarly impossible to evaluate whether the anticipated marine mammal injuries, foraging losses, and other impacts are concentrated either spatially or temporally.

- Analysis of population-level impacts. As with past analyses, the present DEIS tabulates exposures and takes of marine mammal species, then concludes, summarily, that estimated impacts will not harm resources at a population level. On the contrary, it assumes, without explanation, that the accumulated annual mortalities, injuries, energetic costs, temporary losses of hearing, chronic stress, and other impacts would not affect vital rates in individuals or populations, even though the Navy's activities would affect the same populations over time. Notably, this lack of analysis falls far short of the EIR prepared, in 2012, for PG&E's proposed Central Coastal California Seismic Imaging Project ("CCCSIP"), which used proxies to estimate population effects. If the Navy conducted a similar analysis here—adjusting for the fact that the proposed CCCSIP was a one-time activity, while the Navy's activities take place year after year indefinitely—we believe it would be likely to show that the impacts from its activities are significant at a population level.[21]

[19] *See, e.g.*, Watwood, S., Rider, S., Richlen, M., and Jefferson, T., *Cruise report: Marine species monitoring & lookout effectiveness study*, Submarine Commanders Course, February 2015, Hawaii Range Complex (2016) (prepared under Navy contract).

[20] Similarly, the Navy provides no data supporting its claim, made throughout its Consistency Determination, that 95 percent of marine mammals will effectively avoid permanent injury and mortality by fleeing the impact area. On the contrary, it is well established that marine mammals may remain in important habitat, and the most vulnerable individuals may linger in an area, notwithstanding the risk of harm. Furthermore, marine mammals cannot necessarily predict where an exercise will travel, and Navy vessels engaged in certain activities may move more rapidly than a marine mammal that is attempting to evacuate. Again, the Navy's assumptions, while unsupported by data, result in significant reductions in estimated numbers of mortalities and permanent injuries.

[21] *See* State Lands Commission, *Central Coastal California Seismic Imaging Project Environmental Impact Report*, Appendix H: Marine Mammal Technical Report (2012). For example, the Diablo Canyon EIR found a "high magnitude" of impact where at least 2.5% of an endangered species or population, or 25% of a non-endangered species or population, were estimated to suffer non-injurious take. It seems highly likely, based on its own take estimates, that the Navy's activities would exceed this threshold for several Southern California marine mammal species. In any case, the Navy has not undertaken or submitted an analysis of population-level impacts.

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Finally, in light of the Navy's failure to provide sufficient information, we want to make the Commission aware of a current Navy effort, on Capitol Hill, to weaken the provisions of the Marine Mammal Protection Act. If the Navy's proposal passes, the Act would no longer require the Navy, and other branches of the Defense Department, to periodically undergo environmental review and permitting for the harm its training activities cause marine mammals. Instead, the permits the Navy receives under the Act could last indefinitely, undermining a process that is intended to ensure continued oversight over uniquely vulnerable species. Moreover, since it is the Act's permitting process that triggers the Commission's consistency review of Navy activities, the Navy's bid to amend the Marine Mammal Protection Act could suppress Commission review in the future.

III. Recommendation and Proposed Mitigation

Again, we respectfully recommend that the Commission object to the Navy's consistency determination as inconsistent with the state's Coastal Zone Management Program. To the extent that the Commission also identifies measures that might allow it to reach concurrence, however, we recommend that it include the following conditions, which are aimed at protecting the most vulnerable marine mammal populations in the Southern California region. These conditions differ from some of those we have recommended previously, reflecting advances in our knowledge of marine mammal distribution and habitat use off Southern California, the mitigation measures established through the *Conservation Council* litigation, and new developments in the science of ocean noise impacts.

1. Protection of important habitat for beaked whales. The Navy will prohibit the use of hull-mounted, mid-frequency active sonar deployed on Navy surface vessels, of mid-frequency active sonar deployed from helicopters and fixed-wing aircraft, and of in-water explosives, for training and testing activities, in the beaked whale habitat areas east of San Nicholas Island and west of Santa Catalina Island, defined as "Figure A, "Figure B," and "Figure D" in Map 1.[22]

    Rationale: The three areas collectively represent "refuges" for two highly vulnerable populations of beaked whales, a family of deep-diving whales that are, as we noted above, among the most sensitive of marine mammals to anthropogenic noise.

    Satellite telemetry data and eight years of photo-identification and mark-recapture data indicate that the San Nicholas Basin represents an area of high site fidelity, and possible residency, for a small population of Cuvier's beaked whales associated with San Clemente Island.[23] Data also indicate that the population is relatively small, with abundance estimated at 235 individuals, with a sex ratio skewed towards adult females,

[22] The maps cited in this section appear under Attachment B to this letter.

[23] Falcone, E., *et al.*, Sighting characteristics and photo-identification of Cuvier's beaked whales (*Ziphius cavirostris*) near San Clemente Island, California: A key area for beaked whales and the military? *supra*; Falcone, E.A. and Schorr, G.S., *Distribution and demographics of marine mammals in SOCAL through photo-identification, genetics, and satellite telemetry, supra*; Schorr, G.S., et al., First long-term behavioral records from Cuvier's beaked whales (Ziphius cavirostris) reveal record-breaking dives, *supra*.

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including individuals with calves.[24] Eight Cuvier's beaked whales tagged off the Southern California coast for periods of up to three months were present within the San Nicholas Basin on 53% of the days transmitted; one individual occurred inside the San Nicholas Basin on 74% of days over three months the tag was active.[25] The area marked "Figures A" in Map 1 constitutes a "refuge" from sonar and explosives activities in a portion of the whales' secondary habitat, northwest of the instrumented Southern California ASW Range, which the Navy has implemented since September 2015 as part of the *Conservation Council* Settlement Agreement but did not include in its Consistency Determination. "Figure D" is an extension of that refuge area.

It is likely that a small, resident population of Cuvier's beaked whales also resides in the neighboring Santa Catalina Basin, to the east. Satellite telemetry data show that whales have a high degree of site fidelity to the Santa Catalina Basin, with little evidence of movement to the San Nicholas Basin, despite its close proximity—a distribution that is consistent with demographic isolation.[26] Similar to the approach taken for the San Nicholas population, Figure "B" in Map 1 establishes a refuge from sonar and explosives activities in the northern portion of the Santa Catalina Basin, which the Navy has implemented in accordance with *Conservation Council* but did not include in its Consistency Determination.

2. <u>Protection of important habitat for blue whales.</u>

(A) The Navy will prohibit the use of hull-mounted, mid-frequency active sonar deployed on Navy surface vessels, with the exception of system checks; of mid-frequency active sonar deployed from helicopters and fixed-wing aircraft; and of in-water explosives, for training and testing activities, within the San Diego Arc Planning Awareness and Cautionary Areas, defined in the Navy's Consistency Determination at Fig. 2-10, from June 1 through December 31 (reproduced as Map 2). With respect to system checks (i.e., the non-tactical use of mid-frequency sonar for pre-operational testing, preventive or corrective maintenance, or during inspections by the Board of Inspection and Survey), the Navy will advise Commanding Officers that the area is blue whale habitat and that they should avoid conducting system checks within the area whenever practicable.

(B) The Navy will observe a 10-knot speed restriction during transits of vessels, and notify all vessels to operate with increased awareness and additional vigilance, within the following seasonally important habitat areas, from June 1 through December 31: (1) the San Diego Arc Planning Awareness and Cautionary Areas defined in the Navy's Consistency Determination at Fig. 2-10, and (2) blue whale habitat at Tanner-Cortex Bank, defined as Figure "C" in Map 1.

[24] Falcone, E.A. and Schorr, G.S. (2014). *Distribution and demographics of marine mammals in SOCAL through photo-identification, genetics, and satellite telemetry*, *supra*

[25] Schorr, G.S., *et al.* (2014). First long-term behavioral records from Cuvier's beaked whales (*Ziphius cavirostris*) reveal record-breaking dives, *supra*.

[26] Falcone, E.A. and Schorr, G.S. (2014). *Distribution and demographics of marine mammals in SOCAL through photo-identification, genetics, and satellite telemetry*, *supra*.

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Rationale: This condition provides protection for endangered blue whales, which each year come to Southern California to feed, in some of the highest numbers for this species seen anywhere on the planet. Blue whales are highly vulnerable to both acoustic disturbance from sonar and vessel collision.

Multiple studies have now demonstrated significant changes in blue whale foraging behavior, seen repeatedly in response to controlled exposures using simulated mid-frequency active sonar.[27] If acoustic disturbance causes a cessation of deep-feeding or displacement to lower density prey patches, the energy efficiency of the individuals will decrease.[28] As deep-feeding blue whales are most likely to be affected by sound exposure, repeated behavioral responses to military sonar could have significant cumulative impacts.[29] In particular, disruption to foraging behavior or nursing of calves may result in an energetic net loss for the individual whale,[30] with possible ramifications on health and fitness, as well as calf survival.[31]

In addition, ship strikes are one of the primary anthropogenic factors impeding the recovery of blue whales. The most conservative model estimates that annual mortality from ship strikes, off the west coast, runs 7.8 times higher than the number that NOAA states this endangered species can tolerate.[32]

The San Diego Arc Planning and Cautionary Areas, and the area at Tanner-Cortez Bank identified as "Figure C" on Map 1, correspond to Biologically Important Areas for blue whales that NOAA identified as part of a systematic, multi-year effort to prioritize

[27] Goldbogen, J.A., Southall, B. L., DeRuiter, S. L., Calambokidis, J., Friedlaender, A. S., Hazen, E. L., Falcone, E. A., Schorr, G. S., Douglas, A., Moretti, D. J., Hyburg, C., McKenna, M. F., and Tyack, P. L., Blue whales respond to simulated mid-frequency military sonar, *Proceedings of the Royal Society B: Biological Sciences*, 280, 20130657 (2013); Friedlaender, A. S., Hazen, E. L., Goldbogen, J. A., Stumpert, A. K., Calambokidis, J., and Southall, B. L., Prey-mediated behavioral responses of feeding blue whales in controlled sound exposure experiments, *Ecological Applications*, 26(4), 1075-1085 (2016).

[28] Goldbogen, J. A., Calambokidis, J., Oleson E., Potvin, J., Pyenson, N. D., Schorr, G., and Shadwick, R. E., Mechanics, hydrodynamics and energetics of blue whale lunge feeding: efficiency dependence on krill density, *The Journal of Experimental Biology*, 214(1), 131-146 (2011).

[29] Friedlaender, A. S., et al., (2016). Prey-mediated behavioral responses of feeding blue whales in controlled sound exposure experiments, *supra*.

[30] Lockyer, C., *Growth and energy budgets of large baleen whales from Southern Hemisphere*. In J. G. Clark (Ed.) *FAO fisheries series 5: Mammals in the seas. Vol 3: General papers and large cetaceans* (pp. 379-487). Rome: Food and Agriculture Organization of the United Nations (1981); Goldbogen, J. A., *et al.*, Mechanics, hydrodynamics and energetics of blue whale lunge feeding: efficiency dependence on krill density, *supra.*; Smultea, M. A., Fertl, D., Bacon, C. E., Moore, M. R., James, V. R., and Wursig, B., Cetacean mother-calf behavior observed from a small aircraft off Southern California, *Animal Behavior and Cognition*, 4(1), 1-23 (2017).

[31] Weidenmann, J., Cresswell, K. A., Goldbogen, J., Potvin, J., and Mangel, M., Exploring the effects of reductions in krill biomass in the Southern Ocean on blue whales using a state-dependent foraging model, *Ecological Modeling*, 222, 3366-3379 (2011); Rolland, R.M., Schick, R.S., Pettis, H.M., Knowlton, A.R., Hamilton, P.K., Clark, J.S. and Kraus, S.D. Health of North Atlantic right whales *Eubalaena glacialis* over three decades: From individual health to demographic and population health trends, *Marine Ecology Progress Series*, 542, 265-282 (2016); Lomac-MacNair, K. and Smultea, M. A., Blue whale (*Balaenoptera musculus*) behavior and group dynamics as observed from an aircraft off Southern California, *Animal Behavior and Cognition*, 3(1), 1-21 (2016).

[32] Rockwood, R. C., Calambokidis, J., and Jahncke, J., High mortality of blue, humpback, and fin whales from modeling vessel collisions o the U.S. West Coast suggests population impacts and insufficient protection, *PLoS ONE*, 12(8), e0183052 (2017).

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habitat for ocean noise mitigation. The areas were identified based on more than 9,000 visual sightings of blue whales, primarily from small boats, and cross-validated with habitat-based density models derived from systematic line-transect surveys.[33] Since September 2015, the Navy provided more extensive protection for the San Diego areas, but reduced those protections in its Consistency Determination. The conditions above restore those protections and extend them to cover "dipping" sonar, based on the new evidence, noted above, showing heightened marine mammal responses to that unpredictable noise source.

Blue whale acoustic detections have been recorded in the region from spring to early winter. Relatively high song production rates were also found to persist late into the fall, with the majority of all detections occurring between September and late December. (Few acoustic detections were made between mid-January and mid-April.)[34] The time period of these detections contrasts with sightings data that indicates that aggregations of blue whales are most likely to be present off southern California in from June 1 to October 31, the time period used to delineate the Navy's proposed mitigation measures in the region. Taken together, however, sighting and acoustic data indicate that blue whales are present at higher densities from June 1 to December 31, recommending an extension of the protection period to include the months of November and December.

3. Protection of important habitat for fin whales. The Navy will require that all surface vessels use extreme caution and proceed at a safe speed, so that they can take effective action to avoid a collision with marine mammals, and can stop within a distance appropriate to the prevailing circumstances and conditions. This condition will apply to waters within the Southern California Portion of the HSTT Study Area, defined in the Navy's Consistency Determination at Fig. 1-1, falling between the 200 meter and 1000 meter isobaths, from November 1 to May 31.

Rationale: High-use habitat for endangered fin whales directly overlaps with the Navy training ranges in the Southern California Bight.[35] Since 2009, fin whales on the Southern California Range Complex have aggregated during the winter months in waters just off the mainland shelf, between the 200 m and 1000 m isobaths.[36] This population is at particular risk of ship-strike given their shallower-water foraging in

[33] Calambokidis, J., *et al.*, Biologically Important Areas for selected cetaceans within U.S. waters – West coast region, *supra*.

[34] *Id.*

[35] Scales, K.L., Schorr, G.S., Hazen, E.L., Bograd, S.J., Miller, P.I., Andrews, R.D., Zerbini, A.N. and Falcone, E.A., Should I stay or should I go? Modelling year□round habitat suitability and drivers of residency for fin whales in the California Current, *Diversity and Distributions*, *23*(10), 1204-1215 (2017).

[36] Falcone, E.A. and Schorr, G.S. *Distribution and demographics of marine mammals in SOCAL through photo-identification, genetics, and satellite telemetry*, *supra*; Debich, A.J., Baumann-Pickering, S., Širović, A., Hildebrand, J.A., Herbert, S.T., Johnson, S.C., Rice, A.C., Trickey, J.S. and Wiggins, S.M., *Passive Acoustic Monitoring for Marine Mammals in the SOCAL Range Complex January–July 2014* (2015); Širovic, A., Rice, A., Chou, E., Hildebrand, J.A., Wiggins, S.M., and Roch, M.A. Seven years of blue and fin whale call abundance in the Southern California Bight, *Endangered Species Research*, *28*(1), 61-76 (2015); G. Schorr, pers. comm. to M. Jasny (2015).

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relatively deep water,[37] and they have been known to be struck by vessels in the recent past. The most conservative model estimates mortality from ship strike off the U.S. west coast to be 2.7 times the NOAA-recommended limit for fin whales.[38]

4. Protection of the gray whale migration corridor. The Navy will observe a 10-knot speed restriction during transits of vessels, from December 1 through May 20, within 10 nautical miles of the California mainland.

   Rationale: Each year, virtually all gray whales migrate between their breeding lagoons of Baja California, Mexico, and their summer feeding grounds in the North Pacific and Arctic regions. This migration is comprised of virtually the entire population of California gray whales; a small sub-population of California gray whales called the Pacific Coast Feeding Group (thought to comprise only 200 animals); and at least some gray whales that feed in the western North Pacific and are listed under the federal Endangered Species Act.[39] Although the risk is very small, a lethal vessel strike of the Pacific Coast Feeding Group or of a western North Pacific gray whale could potentially jeopardize the survival of those populations.

   The Navy's Gray Whale Awareness Notification Message Area provides protection through requirements for increased awareness and additional vigilance for gray whales out to 10 nautical miles of the California mainland,[40] between November 1 and March 31. The width of this area is protective, as the majority of gray whales are thought to migrate within 10 km of the California mainland; however, the peak migration period for gray whales extends from December 1 through May 20 and does not establish a 10 knot speed restriction for transiting vessels. As such, the time period in which the Gray Whale Awareness Notification Message Area is in operation is under-protective and should be modified.

5. Protection of Marine Protected Areas. The Navy will exclude the following areas from all training and testing activities: (a) the Channel Islands National Marine Sanctuary, including the Channel Islands Sanctuary Cautionary Area (encompassing waters within 6 nautical miles of Santa Barbara Island); and (b) all State Marine Reserves falling within the Southern California Portion of the HSTT Study Area defined in the Navy's Consistency Determination at Fig. 1-1, including Begg Rock State Marine Reserve, Santa Barbara Island State Marine Reserve, Long Point State Marine Reserve, Laguna Beach State Marine

[37] Falcone, E.A. and Schorr, G.S., *Distribution and demographics of marine mammals in SOCAL through photo-identification, genetics, and satellite telemetry, supra*; Rockwood, R. C., Calambokidis, J., and Jahncke, J., High mortality of blue, humpback, and fin whales from modeling vessel collisions o the U.S. West Coast suggests population impacts and insufficient protection, *supra*.

[38] *Id.*

[39] Calambokidis, J., *et al.*, Biologically Important Areas for selected cetaceans within U.S. waters – West Coast Region, *supra*; Weller, D. W., Klimek, A., Bradford, A. L., Calambokidis, J., Lang, A. R., Gisborne, B., Burdin, A.M., Szaniszlo, W., Urban, J., Gomez-Gallardo Unzueta, A., Swartz, S., Brownell, R. L., Jr., Movements of gray whales between the western and eastern North Pacific, *Endangered Species Research, 18*, 193-199 (2012).

[40] U.S. Department of the Navy, *Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for Hawaii-Southern California Training and Testing*, at App. K (2017).

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Reserve, Matlahuayl State Marine Reserve, South La Jolla State Marine Reserve, and Cabrillo State Marine Reserve.

Rationale: State Marine Reserves are marine areas that are managed so as to achieve one or more of the following: (1) protect or restore rare, threatened or endangered native plants, animals or habitat in marine areas; (2) protect or restore outstanding, representative or imperiled marine species, communities, habitats and ecosystems; (3) protect or restore diverse marine gene pools; or (4) contribute to the understanding and management of marine resources and ecosystems by providing the opportunity for scientific research in outstanding, representative or imperiled marine habitats or ecosystems. The condition outlined above is designed, inter alia, to avoid take of any living marine resource, which is prohibited in State Marine Reserves under California law.

Similarly, the condition outlined for the Channel Island National Marine Sanctuary is designed to provide additional mitigation measures for all protected marine species and resources in the portion of the Channel Island National Marine Sanctuary that falls within the boundary of the HSTT Study Area (*i.e.*, the waters surrounding Santa Barbara Island out to 6 nautical miles).

6. Derogation. The Navy may conduct any testing or training activity otherwise prohibited or restricted under conditions 1 through 5 provided that the Navy, at the highest command authority, deems it necessary for national defense. This authority may be invoked only by the Commander, or Acting Commander, U.S. Pacific Fleet, for training activities; or the appropriate Commander, or Acting Commander, Systems Command (Naval Air Systems Command, Naval Sea Systems Command, Space and Naval Warfare Systems Command), or Chief of Naval Research, or Acting Chief, Office of Naval Research, for testing activities. For any invocation of the authority provided in this paragraph, the Navy will provide notification to the Commission.

   Rationale: This derogation provision, which the Navy has implemented since September 2015 under the *Conservation Council* agreement, affords flexibility in case of a genuine national defense need, while ensuring, through its involvement of high command authority, that the decision to exempt an activity is not made lightly. It also provides transparency of implementation through a reporting provision.

7. Avoidance of activities involving in-water detonations in low-visibility conditions. To the maximum extent practicable, the Navy will avoid conducting activities involving underwater detonations at night and in other low-visibility conditions (i.e., in fog or in sea-state conditions greater than Beaufort 4. The Navy will annually report any instances of non-compliance with this condition, including a supporting rationale, to the Commission.

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Rationale: At night and during periods of low-visibility, the Navy's ability to detect marine mammals within its safety zone declines significantly.[41] Additionally, some endangered species, such as the blue whale, engage in rest or shallow diving during the night, increasing their vulnerability to ship collision and to injury from explosives and ordnance.[42] Fortunately, many individual Navy exercises, tests, and maintenance activities last eight hours or fewer,[43] making avoidance of nighttime activity possible, at least in some cases. This measure takes account of Navy operational need (as, for example, during major certification exercises, where some training scenarios can take days to unfold) by incorporating a practicability standard.

8. Passive acoustic monitoring. For all activities taking place on the Southern California ASW Range (SOAR), the Navy will use its fixed passive acoustic range instrumentation to monitor for marine mammal vocalizations and report the detection of any marine mammal to any vessels, aircraft, or other platforms conducting sonar or in-water detonations activity on the Range.

    Rationale: The Navy has substantial capability, on its Southern California ASW Range, to detect, identify, localize, and track various cetacean species in real time. That capability, which is based in a large, on-range hydrophone network covering about 400 square miles, has been used extensively for years to support behavioral response studies of marine mammals to sonar. Indeed, the Marine Mammal Commission has summarized some of the more impressive recent work at a similar Navy facility in Hawaii, including real-time tracking of humpback whales with a localization error rate of 2 percent or less, and localizing of bottlenose dolphins within 100 meters of the animal's position. Yet the Navy claims that it lacks the capacity to monitor instrumented ranges in real time for mitigation purposes. As the U.S. Marine Mammal Commission has noted, the Navy's capacity to monitor its instrumented range for marine mammals, in real time, "clearly exists," and should be used during training and testing activities to avoid marine mammal interactions.[44]

9. Thermal monitoring systems. The Navy will establish a pilot program for the use of automated thermal detection systems in marine mammal mitigation. In conducting this program, the Navy will require selected surface vessels, and, if feasible, aircraft, to incorporate thermal detection systems into their protocols for detecting marine mammals

[41] *E.g.*, Barlow, J., Gerrodette, T. and Forcada, J., Factors affecting perpendicular sighting distances on shipboard line-transect surveys for cetaceans, *Journal of Cetacean Research and Management* 3: 201-212 (2001); Barlow, J., and Gisiner, R., Mitigation and monitoring of beaked whales during acoustic events, *Journal of Cetacean Research and Management* 7: 239-249 (2006).

[42] Goldbogen, J.A., *et al.*, Mechanics, hydrodynamics and energetic of blue whale lunge feeding: efficiency dependence on krill density, *supra*; *see also, e.g.*, Calambokidis, J., Schorr, G.S., Steiger, G.H., Francis, J., Bakhtiari, M., Marshal, G., Oleson, E.M., Gendron, D. and Robertson, K., Insights into the underwater diving, feeding, and calling behavior of blue whales from a suction-cup attached video-imaging tag (CRITTERCAM), *Marine Technology Society Journal* 41: 19-29 (2007).

[43] U.S. Department of the Navy, *Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for Hawaii-Southern California Training and Testing*, at App. A (2017).

[44] Comments of Rebecca Lent, Marine Mammal Commission, to Naval Facilities Engineering Command, Pacific (Nov. 13, 2017) (citing various combined cruise reports and lookout effectiveness studies from 2010 through 2014).

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and mitigating impacts during sonar and in-water detonation activity. The Navy will report annually to the Commission on the operations and results of the pilot program.

Rationale: Because mitigation measures based on visual observation, such as safety zone maintenance, results in highly limited risk reduction for most species and under most conditions,[45] we view alternative detection measures as a significant area for development. Thermal detection offers a supplement to visual detection measures and has been demonstrated to outperform observers in number of detected whale blows and ship-whale encounters due to its ability to continuously monitor a 360° field of view during both daylight and nighttime hours.[46] In addition, aerial-mounted infrared cameras have proven able to detect thermal 'trails' up to 300 m behind humpback whales, formed by the thermal mixing of the stratified water that persists for up to 2 minutes.[47] The emerging development of automated whale blow detection systems for infrared video[48] also indicate this technology can feasibly be used for real-time whale detection and mitigation.

According to the Draft Environmental Impact Statement that the Navy has prepared for the activities under consistency review, the Navy "plans to continue researching thermal detection systems to determine their effectiveness and compatibility with Navy applications."[49] A pilot program would be consistent with that interest, while allowing for trial use as a monitoring measure.

10. Research on sonar signal modification. The Navy will undertake research on sonar signal modification, to determine if certain modifications reduce the onset or severity of the behavioral response of marine mammals to the sonar signal. As part of this research effort, the Navy will incorporate in-field testing of modified sonar signals within its Southern California behavioral response studies and will include controlled exposures of beaked whales. The Navy will report to the Commission within three years on the findings from this research.

Rationale: As noted above, at least one small, resident population of beaked whales coincides with the Navy's instrumented Southern California ASW Range and is therefore continually exposed to high-intensity mid-frequency sonar. Since activities on

[45] *E.g.*, Leaper, R., Calderan, S. and Cooke, J., A simulation framework to evaluate the efficiency of using visual observers to reduce the risk of injury from loud sound sources, *Aquatic Mammals*, 41(4), 375 (2015).

[46] Burkhardt, E. Kindermann, L., Zitterbart, D., and Boebel, O., *Detection and tracking of whales using a shipborne, 360° thermal-imaging system, in* Popper, A.N., and Hawkins, A. (eds.), *The Effects of Noise on Aquatic Life* (2012); Zitterbart D.P., Kindermann, L., Burkhardt, E., and Boebel, O., Automatic round-the-clock detection of whales for mitigation from underwater noise impacts, *PLoS ONE*, 8, e71217 (2013); Peckham, J., O'Young, S.D., and Jacobs, J.T., Comparison of medium and long wave infrared imaging for ocean based sensing, *Journal of Ocean Technology*, 10, 113-128 (2015).

[47] Churnside, J., Ostrovsky, L., and Veenstra, T., Thermal footprints of whales, *Oceanography*, 22, 206-209 (2009).

[48] Santhaseelan, V., and Asari, V.K., Automated whale blow detection in infrared video, *in* Zhou, J. (ed.), *Computer Vision and Pattern Recognition in Environmental Informatics* 58-78 (2015); Zitterbart, D.P., *et al.*, Automatic round-the-clock detection of whales, *supra*.

[49] U.S. Department of the Navy, *Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for Hawaii-Southern California Training and Testing*, at 5-65.

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that Range cannot easily be reduced or prohibited, the habitat avoidance measures that NOAA and the scientific community have recognized as the most effective available mitigation for sonar training are largely unavailable. To reduce conflict and protect these species, it is necessary to find other effective approaches to mitigation.

Recent studies on harbor porpoise, a highly sensitive marine mammal, indicate that modifying the sonar signal could substantially reduce behavioral disruption of marine mammals without interfering with the effectiveness of Navy systems.[50] Those studies have found, for example, that replacing the Navy's conventional up-sweeps with down-sweeps—a modification that would not alter the system's spectral output in any way—substantially reduce the signal's disruptive effect on porpoises. These findings have tangible management implications and potentially broad benefits to multiple species, including those populations, like the Cuvier's beaked whale population in San Nicholas Basin, that have nowhere to go. Yet, to our knowledge, the Navy is not presently investigating signal modification as a potential mitigation measure. There is clearly a need to understand the extent to which results observed for harbor porpoise can be generalized across species, including beaked whales.

Southern California presents the best possible opportunity for advancing mitigation area in this area. Not only does the Navy maintain test pools at its SPAWAR facility in San Diego, but its multi-year Southern California behavioral response studies provide baseline data and a vehicle for testing the effects of sonar modifications in the field. Research on modified signals can be incorporated into those ongoing behavioral response studies as a variant on exposure experiments on tagged animals, for which there already exists data on blue whales, fin whales, Cuvier's beaked whales, and other species. We strongly recommend that the Commission include this research in any conditions it might identify for the Navy.

11. <u>Research to define additional important habitat for beaked whales</u>. The Navy will undertake research on three beaked whale hotspots necessary to determine the geographic extent and seasonality of the relatively high beaked whale concentrations detected there, for purposes of defining additional areas for potential mitigation. The Navy will report its findings to the Commission within three years. These three areas are defined as follows:

    (a) An area at the southernmost edge of California Current, west of Tanner and Cortez Banks, in the vicinity of the coordinates 32.75 N., -119.46 W. (location "E" in Panel A at Map 3);

[50] *E.g.*, Kastelein, R.A., Steen, N., Gransier, R., and de Jong, C.A.F., Threshold received sound pressure levels of single 1-2 kHz and 6-7 kHz up-sweeps and down-sweeps causing startle responses in a harbor porpoise (*Phocoena phocoena*), *Journal of the Acoustical Society of America*, 131, 2325-2333 (2012); Kastelein, R.A., Schop, J., Gransier, R., Steen, N., and Jennings, N., Effect of series of 1 to 2 kHz and 6 to 7 kHz up-sweeps and down-sweeps on the behavior of a harbor porpoise (*Phocoena phocoena*). *Aquatic Mammals*, 40, 232-242 (2014); Kastelein, R.A., van den Belt, I., Gransier, R., and Johansson, T., Behavioral response of a harbor porpoise (*Phocoena phocoena*) to 25.5- to 24.5-kHz sonar down-sweeps with and without side bands, *Aquatic Mammals*, 41, 400-411 (2015).

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(b) An area in the northern Santa Catalina Basin and the waters southeast of Santa Catalina Island, in the vicinity of the coordinates 33.28 N., -118.25 W. (location "A" in Panel B at Map 3); and

(c) An area in the San Clemente Basin, in the vicinity of the coordinates 32.52 N., -118.32 W. (location "S" in Panel B at Map 3).

Rationale: Evidence based on 28 years of acoustic data in the Southern California Bight[51] suggests that southern offshore waters, west of Tanner and Cortez Banks, represent important habitat areas for beaked whales, particularly for Cuvier's.[52] This area had the highest average daily detection rates of Cuvier's beaked whales relative to 16 other locations systematically sampled across the region, from Point Conception to an area south of San Diego.[53] The substantial majority of these calls were detected between November and June, suggesting seasonal concentrations.[54] This area is located at the southernmost edge of the California Current, where the Current meets the Ensenada Front, and the enhanced primary productivity resulting from the interaction between bathymetry and oceanography likely supports biologically important foraging habitat for this species.[55]

The same long-term passive acoustic study of the Southern California Bight[56] also indicates that southern-central waters represent biologically important habitat for Perrin's beaked whale. This species has been found nowhere outside California, with all but one identified whales occuring in the Southern California region.[57] Perrin's calls were detected primarily within the southern-central waters of the Bight, in the northern Catalina Basin, including south-east of Santa Catalina Island, and the San Clemente Basin. These areas are likely to be biologically important feeding habitat resulting from the influence of the Southern California Eddy, a surface counterclockwise gyre that carries water northward through the central Bight, increasing levels of primary productivity.[58]

[51] Baumann-Pickering, S., et al., Spatio-temporal patterns of beaked whale echolocation signals in the North Pacific, *supra*.

[52] Baumann-Pickering, S., et al., Spatio-temporal distribution of beaked whales in southern California waters, *supra*; Baumann-Pickering, S., *et al.*, *Modeling of Habitat and Foraging Behavior of Beaked Whales in the Southern California Bight*, *supra*.

[53] *Id.*

[54] *Id.*

[55] Venrick, E.L., Summer in the Ensenada Front: the distribution of phytoplankton species, July 1985 and September 1988. *Journal of Plankton Research*, 22, 813-841 (2000).

[56] Baumann-Pickering, S., et al. (2014) Spatio-temporal distribution of beaked whales in southern California waters, *supra*; Baumann-Pickering, S., et al. (2015). *Modeling of Habitat and Foraging Behavior of Beaked Whales in the Southern California Bight*, *supra*.

[57] Dalebout, M.L., Mead, J.G., Baker, C.S., Baker, A.N. and van Helden, A.L., A new species of beaked whale *Mesoplodon perrini* sp. n. (Cetacea: Ziphiidae) discovered through phylogenetic analyses of mitochondrial DNA sequences, *Marine Mammal Science*, 18(3), 577-608 (2002).

[58] National Research Council, *The Southern California Bight*. In: *Monitoring Southern California's Coastal Waters*, The National Academies Press, Washington, DC, pp. 1-15 (1990); Venrick, E.L., Summer in the Ensenada Front: the distribution of phytoplankton species, July 1985 and September 1988, *supra*; Baumann-Pickering, S., et al. (2015). *Modeling of Habitat and Foraging Behavior of Beaked Whales in the Southern California Bight*, *supra*.

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It is important that the boundaries of both these areas be better defined to inform the implementation of mitigation measures necessary to avoid population-level impacts.

IV. Conclusion

For these and other reasons, we respectfully recommend that the Commission object to the Navy's consistency determination, as the Navy's proposed activities are plainly not consistent to the maximum extent practicable with the state's coastal policies. To the extent that the Commission also identifies measures that might allow it to reach concurrence, we ask it to include conditions, as described in these comments, that protect important habitat and provide other mitigation for the most vulnerable marine mammal populations.

As the Navy recognizes, national security and environmental protection are not mutually exclusive. Minimizing impacts on Southern California wildlife is imperative given the extent of the Navy's activities. In that effort, we fully support the Commission's efforts to ensure the consistency of these activities with California's Coastal Zone Management Program, and we appreciate the opportunity to comment on this important determination.

Very truly yours,

Michael Jasny
Director, Marine Mammal Protection
Natural Resources Defense Council

Susan Jordan
Executive Director
California Coastal Protection Network

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ATTACHMENT A
The Court's Decision in *Conservation Council*

In March of 2015, the federal district court in Hawai'i held that the EIS for Hawai'i-Southern California Training and Testing ("HSTT") activities from December 2013 to December 2018 violated the National Environmental Policy Act ("NEPA"). *See Conservation Council for Hawai'i v. National Marine Fisheries Serv. and NRDC v. National Marine Fisheries Serv.*, 97 F. Supp. 3d 1210, 1236-38 (D. Haw. 2015) (hereinafter cited as "*Conservation Council*"). The court's findings in *Conservation Council* are, of course, highly relevant to the Navy's present environmental analysis.

The Hawai'i district court focused on the agencies' failure to discuss alternatives to the proposed training and testing, in compliance with NEPA. As noted, the regulations implementing NEPA identify the alternatives section as "the heart of the environmental impact statement." 40 C.F.R. § 1502.14. In this section, the agencies must "[r]igorously explore and objectively evaluate all reasonable alternatives," devoting "substantial treatment to each alternative considered in detail... so that reviewers may evaluate their comparative merits." *Id.* § 1502.14(a), (b); *see also Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 814 (9th Cir. 1999) ("viable but unexamined alternative renders [EIS] inadequate"); *'Īlio'ulaokalani Coalition v. Rumsfeld*, 464 F.3d 1083, 1101 (9th Cir. 2006) (failure to consider reasonable alternative "renders the Army's EISs inadequate"). Further, the regulations specify that the final EIS must "[i]nclude the alternative of no action." 40 C.F.R. § 1502.14(d).

The Ninth Circuit has explained:

> Congress wanted each federal agency spearheading a major federal project to put on the table, for the deciding agency's and for the public's view, a sufficiently detailed statement of environmental impacts and alternatives so as to permit informed decision making. The purpose of NEPA is to require disclosure of relevant environmental considerations that were given a "hard look" by the agency, and thereby to permit informed public comment on proposed action and any choices or alternatives that might be pursued with less environmental harm.

Lands Council v. Powell, 395 F.3d 1019, 1027 (9th Cir. 2005).

The Hawai'i district court held that, by limiting the range of action alternatives considered in detail to only (1) more training and testing and (2) yet more training and testing, the last EIS failed to present "any choices or alternatives that might be pursued with less environmental harm." *Lands Council*, 395 F.3d at 1027; *see Conservation Council*, 97 F. Supp. 3d at 1237-38. The court specifically faulted the Navy for refusing to consider alternatives that would reduce harm to marine mammals by prohibiting or restricting HSTT activities in specific areas identified as biologically important. The court rejected as "pure hyperbole" the Navy's claim

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that, "out of an ocean area bigger than the land mass occupied by the entire United States, it is simply not feasible to say that even a single square mile outside of the Humpback National Marine Sanctuary that the Navy could possibly avoid using for any period without reducing military readiness." *Conservation Council*, 97 F. Supp. 3d at 1238. It concluded that "the Navy's categorical and sweeping statements, which allow for no compromise at all as to space, time, species, or condition, do not constitute the 'hard look' required by NEPA." *Id.*

Following the court's summary judgment ruling, the Navy and NMFS voluntarily entered into a settlement agreement with Plaintiffs that imposed time and geographic restrictions on HSTT activities, with the aim of protecting marine areas identified as biologically important to various marine mammal populations. In so doing, the agencies acknowledged the feasibility of adopting time-area restrictions to reduce adverse impacts on marine mammals. In completing its present EIS, the Navy must thoroughly analyze a range of alternatives involving varying levels of restrictions in sensitive marine habitat, "to permit informed public comment on" not only the agencies' preferred course of action, but also "any choices or alternatives that might be pursued with less environmental harm." *Lands Council*, 395 F.3d at 1027.

In its March 2015 decision, the Hawai'i district court concluded that, in addition to violating NEPA, NMFS's authorization of the Navy's HSTT activities also violated the MMPA and the Endangered Species Act ("ESA"). NEPA's implementing regulations require agencies, "[t]o the fullest extent possible," to integrate the EIS process with the analysis required under the MMPA and the ESA. 40 C.F.R. § 1502.25(a). Accordingly, in completing their EIS for the present round of HSTT permitting, the agencies should include information that is essential to evaluate the compliance of the Navy's proposed activities with the MMPA and ESA. Such information includes, but is not limited to:

- Species- or stock-specific information supporting findings for each affected marine mammal species or stock, as NMFS may not conclude, under the Marine Mammal Protection Act, that an activity will have only a "negligible impact" on a particular species or stock if it has no information on which to do so, *see id.* at 1225;

- A comparison of levels of incidental mortality to each marine mammal stock's potential biological removal ("PBR") level and an evaluation of potentially non-negligible impacts where incidental mortality exceeds PBR, *see id.* at 1225-28;

- Thorough "analysis of ways to mitigate the negative effects of the Navy's activities on affected species and stocks," *id.* at 1229, including consideration of time/area restrictions or "measures of equivalent effect," *id.* at 1231; and

- The impact on endangered sea turtles of the levels of take for which the Navy seeks ESA authorization, *id.* at 1234-35.

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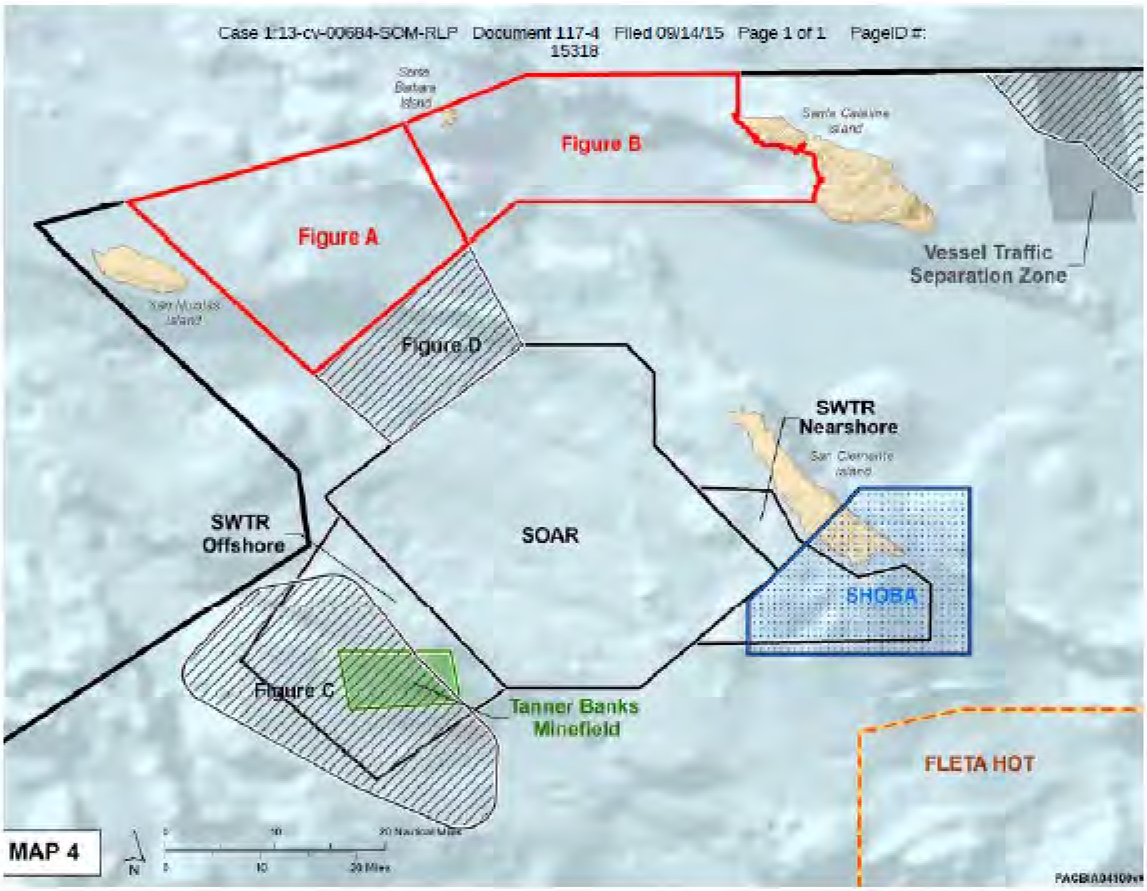
ATTACHMENT B
Supporting Maps

Map 1.



Map 1: Marine mammal mitigation areas around the Navy's Southern California ASW Range off San Clemente Island, with mitigation areas labeled as Figures A through D. These areas were established in September 2015 by a Settlement Agreement and Order in the Conservation Council *cases. Reproduced from the Settlement Agreement and Order.*

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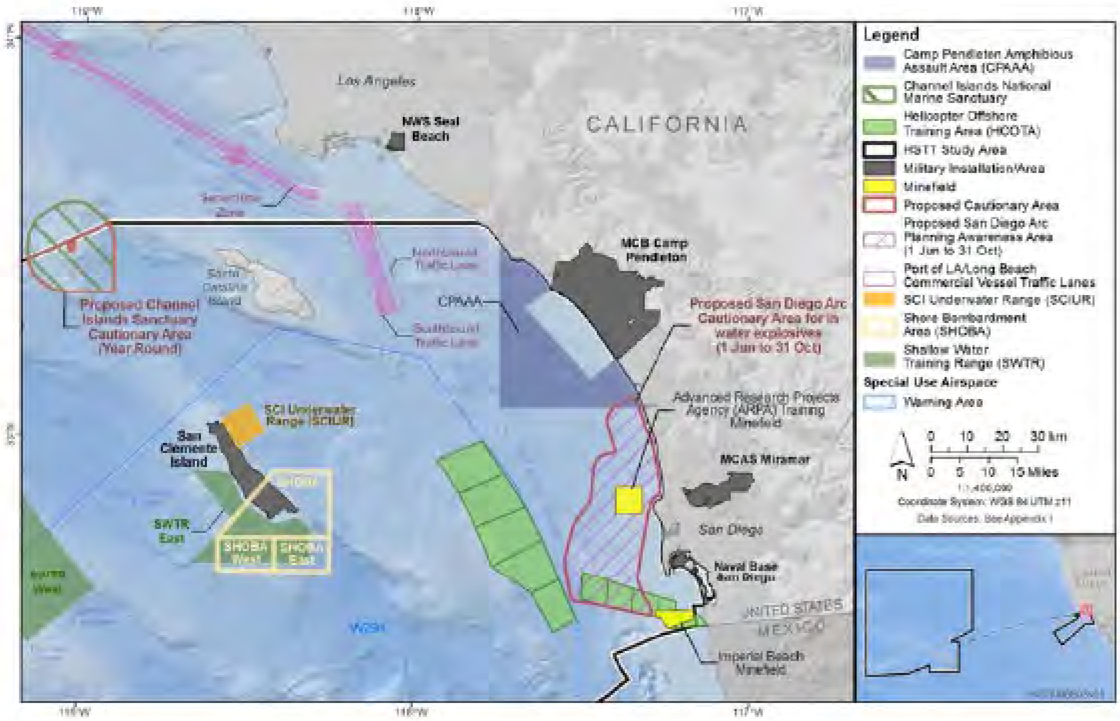
Map 2.



Map 2: Navy operations areas, with San Diego Arc Planning Awareness and Cautionary Areas identified by red-striped polygon. Reproduced from the Navy's Consistency Determination.

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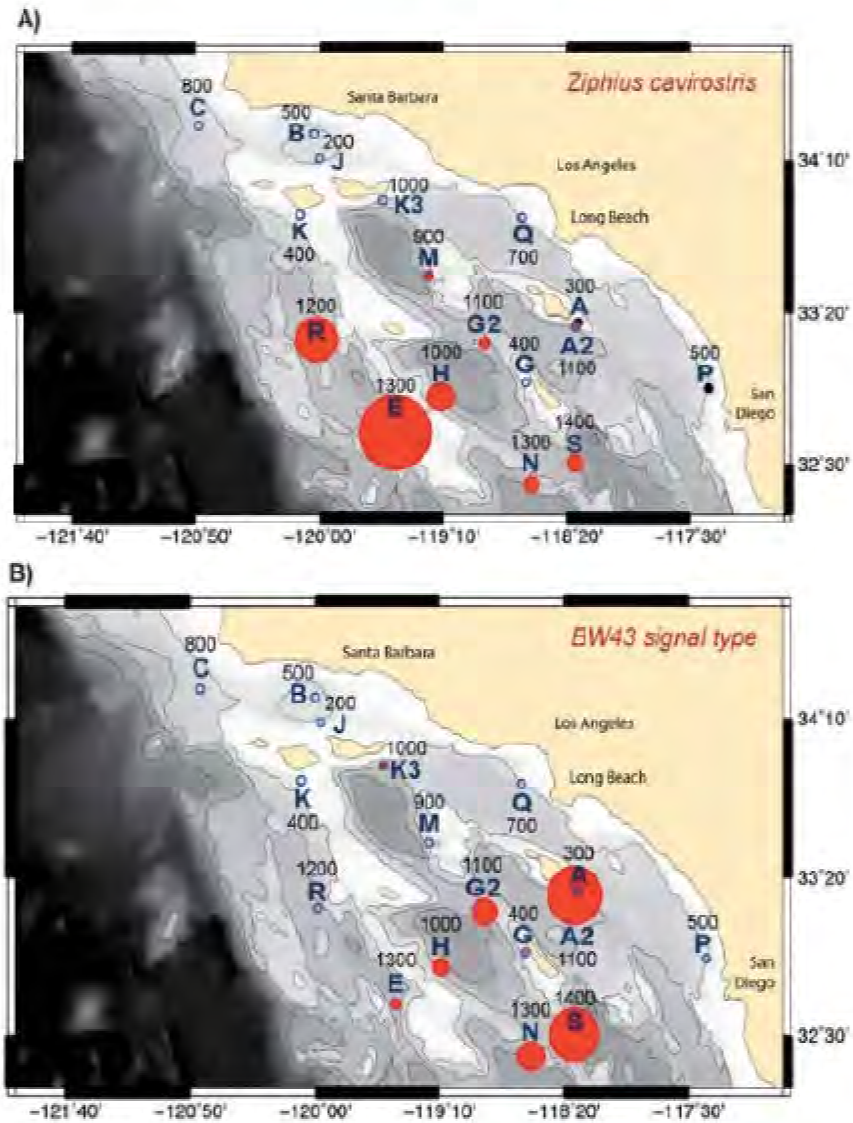
Map 3.



Map 3: Relative presence (comparison of average daily encounter duration) of A) Cuvier's beaked whale and B) BW43 signal type at 18 sites in Southern California. *Blue circles at sites indicate no acoustic encounters; black filled circles in A) indicate <1% relative presence. Adapted from Baumann-Pickering et al. (2015).*

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

IN REPLY REFER TO:
5090
Ser N465/1218
August 24, 2018

Mr. Mark Delaplaine
Manager, Energy, Ocean Resources,
and Federal Consistency Division
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, California 94105-2219

Dear Mr. Delaplaine:

SUBJECT: CONSISTENCY DETERMINATION FOR PROPOSED MILITARY READINESS ACTIVITIES IN SOUTHERN CALIFORNIA

The Navy received the Commission's August 8, 2018 adoption of findings regarding the Commission's objection at the June 6, 2018 hearing for the Navy's Consistency Determination (CD) for proposed military readiness activities within the southern California portion of the Hawaii-Southern California Training and Testing (HSTT) Study Area. The Navy maintains that the proposed activities are fully consistent with the enforceable policies of California's Coastal Management Program. However, as the Navy is committed to working with Commissioners and staff to resolve the Commission's objection, the Navy's team of biologists, marine mammal scientists, environmental protection specialists, and Naval operators and officers again thoroughly reviewed and considered the measures previously proposed by staff, along with the additional measures adopted on August 8.

As stated at the June hearing and in the Navy's 19 July 2018 letter, the Navy desires to resolve the differences relating to the specific measures that have now been adopted, in accordance with 15 C.F.R. §930.43 (d). To facilitate resolving these differences the Navy is submitting the enclosed responses to each of the measures in the adopted findings. The detail in these response offers discussion of the Navy's position on each measure and rationale on why the measure is not necessary for consistency, as well as an explanation of why the Navy is unable to implement some of these measures. With regard to the geographic mitigation measures, the Navy is thoroughly evaluating all the areas in the measures including subsequent Endangered Species Protection Act consultations with the National Marine Fisheries Service that occurred after the June 6, 2018 hearing. The enclosure offers, subject to final approval, new mitigation areas in Southern California for: (1) two additional blue whale Biologically Important Areas (BIA) in addition to the currently proposed San Diego Arc BIA, and (2) agreeing that training activities with active sonar or explosives are not conducted in specific state Marine Protected Areas – see the enclosure for detail. The Navy does not agree that additional new geographic mitigation areas other than those listed above are necessary for consistency.

The Navy carries out training and testing activities to be able to protect the United States against its potential adversaries, to protect and defend the rights of the United States and its allies to move freely on the oceans, and to provide humanitarian assistance. The purpose of the proposed action is to ensure that the Navy meets its statutory requirement under Title 10 United States Code Section 5062 to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and

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maintaining freedom of the seas. This mission is achieved in part by conducting training and testing within the Study Area in accordance with established Navy military readiness requirements. Failure to properly conduct training and testing unacceptably places Sailors' lives and the Nation's security at risk.

The Navy also takes pride in our stewardship of the environment, especially of our oceans where our Sailors work and live. The Navy's environmental stewardship programs contribute both to the success of the military mission and the preservation of the ocean environment for future generations. The Navy sponsors extensive marine species research and in Southern California. For instance, for key species such as beaked whales mentioned in many of the Commission's adopted findings, the Navy has been funding extensive occurrence, population, and effects studies in Southern California since 2006 with plans to continue this research and monitoring through 2022. The Navy is proud of our partnership with National Marine Fisheries Services, which includes an adaptive management program that analyzes and incorporates the latest developments in science on an annual basis into Navy's programs.

The Navy looks forward to continuing to work with the Commissioners and staff to resolve differences, and believe the enclosure is useful to that process. We appreciate the open dialogue as we work together and request consideration of these responses at the September Commission meeting. Specifically, we believe with this additional information you will find that the Navy's proposed action is fully consistent with the enforceable policies of California's Coastal Management Program.

Sincerely,

Larry M. Foster

L. M. FOSTER
By direction

Enclosure: Navy Responses to California Coastal Commission Adopted Findings of August 8, 2018

Copy to:
Chief of Naval Operations (N454)
Commander, Navy Region Southwest (N40)

Enclosure- U.S. Navy Responses To California Coastal Commission Adopted Findings of August 8, 2018
August 24, 2018

PROCEDURAL MITIGATION MEASURES

CCC Adopted Findings Measure	Counter Proposal/Position discussion
Safety Zones. (1) establishment of larger shutdown areas (up to 2 km) (i.e., shut down if a marine mammal or sea turtle is detected within 2 km of the mid-frequency sonar source)	**Navy Response [1].** The Navy is unable to incorporate the CCC proposed condition because it would prevent the Navy from meeting its statutory testing and training requirements. In addition, the measure provides no significant improvements over existing mitigation ranges. The Navy mitigation zones represent the maximum surface area the Navy can effectively observe based on the platform involved, number of personnel that will be involved, and the number and type of assets and resources available. As mitigation zone sizes increase, the potential for observing marine mammals and thus reducing impacts decreases, because the number of observers can't increase although the area to observe increases. For instance, if a mitigation zone increases from 1,000 to 2,000 yd., the area that must be observed increases four-fold. The Navy mitigation measures balance the need to reduce potential impacts with the ability to provide effective observations throughout a given mitigation zone. In this way, while it is technically feasible to instruct lookouts to attempt to cover double the range, it would not have mitigation value. Therefore, it does not advance Coastal Act Section 30230 to the maximum extent practical in CZMA terms. However, the following information is provided to elaborate on several key points supporting the Navy's position. As described in Chapter 5 of the EIS/OEIS, the Navy evaluated the effectiveness and practicability of a number of potential mitigation measures. Through careful exploration of mitigation measures to determine which were the most effective, the Navy has chosen the most appropriate measures that will mitigate potential impacts to marine mammals while still allowing the Navy to meet its statuary readiness requirement. The Navy's overall approach to assessing potential mitigation measures was based on two principles: (1) mitigation measures will be effective at reducing potential impacts on the resource; and (2) from an operational perspective, the mitigations are practical and executable while not compromising safety and readiness. Through extensive discussion, NMFS and Navy have identified mitigation measures that are practical and reasonably effective. The mitigation zones proposed will reduce the likelihood of physiological harm, the number of marine mammals exposed, and the intensity of those exposures. To implement these mitigation zones, Navy lookouts are trained to use a combination of unaided eye and optics as they search the surface around a vessel. In addition, the other Navy personnel on a given bridge watch in addition to designated lookouts are also constantly watching the water for safety of navigation and marine mammals. Sonar shutdowns or power down at longer mitigation ranges would degrade the Navy's ability to effectively meet its training and testing requirements. Furthermore, existing Navy mid-frequency active sonar

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	mitigation ranges (200-yard shutdown, 500-yard power down, 1000-yard power down) are already sufficiently protective of potential marine mammal impacts such as PTS or TTS (HSTT Chapter 5). For instance, for a hull-mounted surface ship sonar, range to PTS is 71 yards for low-frequency cetaceans such as baleen whales and 17 yards for mid-frequency cetaceans such as a beaked whales or dolphins. Range to TTS for low-frequency cetaceans is 987 yards and for mid-frequency cetaceans 230 yards.
Night and low visibility conditions. Reduction in sound intensity under low-visibility conditions. Whenever the entire safety zone cannot be effectively monitored (e.g., due to nighttime, high sea state conditions (such as greater than Beaufort Stage 4 sea state), fog or other factors), the Navy will either avoid active sonar use, or will operate mid-frequency sonar under reduced power (i.e., a 6 dB reduction). If the latter, the Navy will use additional detection measures to enhance marine mammal observer capabilities, such as infrared (IR) or enhanced passive acoustic detection.	**Navy Response [2].** The Navy is unable to incorporate the CCC proposed condition because it would prevent the Navy from meeting its statutory testing and training requirements. Training and testing must occur in a realistic manner under conditions similar to those that might be encountered in operations. Presently, no effective and practical thermal imaging equipment for marine mammal detection is available for Navy ship use, although the Navy has invested in significant research on such equipment. The Navy plans to continue researching thermal detection systems for marine mammal detection to determine their effectiveness and compatibility with Navy applications. If the technology matures to the state where thermal detection is determined to be an effective mitigation tool during training and testing, the Navy will assess the practicability of using the technology during training and testing events and retrofitting its observation platforms with thermal detection devices, if practical. Anti-submarine warfare training involving the use of mid-frequency active sonar typically involves the periodic use of active sonar to develop the "tactical picture," or an understanding of the battle space (e.g., area searched or unsearched, presence of false contacts, and an understanding of the water conditions). Developing the tactical picture can take several hours or days, and typically occurs over vast waters with varying environmental and oceanographic conditions. Training during both high visibility (e.g., daylight, favorable weather conditions) and low visibility (e.g., nighttime, inclement weather conditions) is vital because sonar operators must be able to understand the environmental differences between day and night and varying weather conditions and how they affect sound propagation and the detection capabilities of sonar. Temperature layers move up and down in the water column and ambient noise levels can vary significantly between night and day, affecting sound propagation and how sonar systems are operated. Reducing or securing power in low-visibility conditions as a mitigation would affect a commander's ability to develop the tactical picture and would prevent sonar operators from training in realistic conditions. Further, during integrated training multiple vessels and aircraft may participate in an exercise using different dimensions of warfare simultaneously (ex., submarine warfare, surface warfare, air warfare, etc.). If one of these training elements were adversely impacted (e.g., if sonar training reflecting military operations were not possible), the training value of other integrated elements would also be degraded. Additionally, failure to test such systems in realistic military operational scenarios increases the likelihood these systems could fail during military operations, thus unacceptably placing Sailors' lives and the Nation's

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	security at risk. Some systems have a nighttime testing requirement; therefore, these tests cannot occur only in daylight hours. Reducing or securing power in low visibility conditions would decrease the Navy's ability to determine whether systems are operationally effective, suitable, survivable, and safe for their intended use by the fleet even in reduced visibility or difficult weather conditions. In regard to new marine mammal detection technologies, the Navy has been investigating the use of thermal detection systems with automated marine mammal detection algorithms for future mitigation during training and testing, including on autonomous platforms. Thermal detection technology being researched by the Navy, which is largely based on existing foreign military grade hardware, is designed to allow observers and eventually automated software to detect the difference in temperature between a surfaced marine mammal (i.e., the body or blow of a whale) and the environment (i.e., the water and air). Although thermal detection may be reliable in some applications and environments, the current technologies are limited by their: (1) low sensor resolution and a narrow fields of view, (2) reduced performance in certain environmental conditions, (3) inability to detect certain animal characteristics and behaviors, and (4) high cost and uncertain long term reliability. Thermal detection systems for military applications are deployed on various Department of Defense (DoD) platforms. These systems were initially developed for night time targeting and object detection such as a boat, vehicle, or people. Existing specialized DoD infrared/thermal capabilities on Navy aircraft and surface ships are designed for fine-scale targeting. Viewing arcs of these thermal systems are narrow and focused on a target area. Furthermore, sensors are typically used only in select training events, not optimized for marine mammal detection, and have a limited lifespan before requiring expensive replacement. Some sensor elements can cost upward of \$300,000 to \$500,000 per device, so their use is predicated on a distinct military need. One example of trying to use existing DoD thermal system is being proposed by the U.S. Air Force. The Air Force agreed to attempt to use specialized U.S. Air Force aircraft with military thermal detection systems for marine mammal detection and mitigation during a limited at-sea testing events. It should be noted, however, these systems are specifically designed for and integrated into a small number of U.S. Air Force aircraft and cannot be added or effectively transferred universally to Navy aircraft. The effectiveness remains unknown in using a standard DoD thermal system for the detection of marine mammals without the addition of customized system-specific computer software to provide critical reliability (enhanced detection, cueing for an operator, reduced false positive, etc.) Finally, current DoD thermal sensor are not always optimized for marine mammal detections verse object detection, nor do these systems have the automated marine mammal detection algorithms the Navy is

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	testing via its ongoing research program. The combination of thermal technology and automated algorithms are still undergoing demonstration and validation under Navy funding. It would not be effective or practical for Navy lookouts to conduct observations over large swaths of water (i.e., throughout mitigation zones) using the Navy's current infrared targeting sensors due to their narrow fields of view and technological design specific to fine-scale targeting. In summary, thermal detection systems specifically for marine mammal detection have not been sufficiently studied both in terms of their effectiveness within the environmental conditions found in the Study Area and their compatibility with Navy training and testing (i.e., polar waters vs. temperate waters). As discussed below, the effectiveness of even the most advanced thermal detection systems with technological designs specific to marine mammal surveys is highly dependent on environmental conditions, animal characteristics, and animal behaviors. At this time, thermal detection systems have not been proven to be more effective than, or equally effective as, traditional techniques currently employed by the Navy to observe for marine mammals (i.e., naked-eye scanning, hand-held binoculars, high-powered binoculars mounted on a ship deck). The use of thermal detection systems would compromise the Navy's ability to observe for marine mammals within its mitigation zones in the range of environmental conditions found throughout the Study Area. Furthermore, thermal detection systems are designed to detect marine mammals and do not have the capability to detect other resources for which the Navy is required to implement mitigation, including sea turtles. Focusing on thermal detection systems could also provide a distraction from and compromise to the Navy's ability to implement its established observation and mitigation requirements. The mitigation measures discussed in Section 5.3 (Procedural Mitigation to be Implemented) of the Draft EIS include the maximum number of lookouts the Navy can assign to each activity based on available manpower and resources; therefore, it would be impractical to add personnel to serve as additional lookouts. For example, the Navy does not have available manpower to add lookouts to use thermal detection systems in tandem with existing Lookouts who are using traditional observation techniques. Thermal detection systems are more useful for detecting marine mammals in some marine environments than others. Current technologies have limitations regarding water temperature and survey conditions (e.g., rain, fog, sea state, glare, ambient brightness), for which further effectiveness studies are required. Thermal detection systems are generally thought to be most effective in cold environments, which have a large temperature differential between an animal's temperature and the environment. Current thermal detection systems have proven more effective at detecting large whale blows than the bodies of small animals, particularly at a distance. The effectiveness of current technologies has not been demonstrated for small marine mammals. Thermal detection systems exhibit varying degrees of false positive detections (i.e., incorrect notifications) due in part to their low sensor resolution and reduced

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	performance in certain environmental conditions. False positive detections may incorrectly identify other features (e.g., birds, waves, boats) as marine mammals. In one study, a false positive rate approaching one incorrect notification per 4 min. of observation was noted. The Defense Advanced Research Projects Agency funded six initial studies to test and evaluate infrared-based thermal detection technologies and algorithms to automatically detect marine mammals on an unmanned surface vehicle. Based on the outcome of these initial studies, follow-on efforts and testing are planned for 2018-2019. The Office of Naval Research Marine Mammals and Biology program funded a project (2013-2018) to test the thermal limits of infrared-based automatic whale detection technology. This project is focused on capturing whale spouts at two different locations featuring subtropical and tropical water temperatures, optimizing detector/classifier performance on the collected data, and testing system performance by comparing system detections with concurrent visual observations. The program is also funding studies that use unmanned aerial vehicles to assess marine mammal behaviors and body conditions. The Navy plans to continue researching thermal detection systems for marine mammal detection to determine their effectiveness and compatibility with Navy applications. If the technology matures to the state where thermal detection is determined to be an effective mitigation tool during training and testing, the Navy will assess the practicability of using the technology during training and testing events and retrofitting its observation platforms with thermal detection devices, if practical. The assessment will include an evaluation of the budget and acquisition process (including costs associated with designing, building, installing, maintaining, and manning equipment that is expensive and has a relatively short lifecycle before key system components need replacing); logistical and physical considerations for device installment, repair, and replacement (e.g., conducting engineering studies to ensure there is no electronic or power interference with existing shipboard systems); manpower and resource considerations for training personnel to effectively operate the equipment; and considerations of potential security and classification issues. New system integration on Navy assets can entail up to 5 to 10 years of effort to account for acquisition, engineering studies, and development and execution of systems training. The Navy will provide information to NMFS about the status and findings of Navy-funded thermal detection studies and any associated practicability assessments at the annual adaptive management meetings.

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Vessel Speeds. Limitations on typical vessel speeds in sensitive areas to 10 knots (unless higher speeds are critical to meet training needs); Except where higher speeds are critical to military training needs, in the areas listed in Condition 2 (and during the time periods for the ones that are seasonal), vessel speeds shall normally not exceed 10 knots.	**Navy Response [3].** The Navy is unable to incorporate the CCC proposed condition because it would not be practical for the Navy to implement preventing the Navy from meeting testing and training requirements. However, the following information is provided to elaborate on several key points supporting the Navy's position. A vessel speed restriction is not practical, because of the constraints of training, testing, and scheduling. Median speed of all Navy vessels within Southern California is typically already low, with median speeds between 5 and 12 knots. The main driver for ship speed reduction is the reducing the possibility and severity of ship strikes to large whales. However, even given the wide ranges of speeds from slow to fast that Navy ships must use to meet training and testing requirement, the Navy has a very low strike history to large whales in Southern California with no whales struck by the Navy from 2010-2018. Furthermore, no Navy ship strike of a marine mammal on record in Southern California has occurred in the coastal area (~40 nm from shore) which is where speed restrictions are most requested. Finally, the most recent model estimate of the potential for civilian ship strike risk to blue, humpback, and fin whales off California found the highest risk near San Francisco and Long Beach associated with commercial ship routes to and from those ports (Rockwood et al. 2018). There was no indication of a similar high risk to these species off San Diego, where the HSTT Study Area occurs. The Navy requires flexibility for use of variable ship speeds for training, testing, operational, safety, and engineering qualification requirements. Navy ships typically use the lowest speed practical given individual mission needs. Previously, the Navy commissioned a vessel density and speed report for based on an analysis of Navy ship traffic in the HSTT Study Area between 2011 and 2015. Median speed of all Navy vessels within Southern California is typically already low, with median speeds between 5 and 12 knots. Slowest speeds occurred closer to the coast including the general approaches to San Diego Bay and other coastal areas. Further, the presence and transits of commercial and recreational vessels, annually numbering in the thousands, poses a more significant risk to large whales than the presence of Navy vessels. [Draft EIS Section 3.7.3.4.1 (Impacts from Vessels and In-Water Devices) and Section K.4.1.6.2 (San Diego [Arc] Blue Whale Feeding Area Mitigation Considerations), state the important differences between most Navy vessels and their operation and commercial ships that individually make Navy vessels much less likely to strike a whale.] When developing Phase III mitigation measures, the Navy analyzed the potential for implementing additional types of mitigation, such as vessel speed restrictions within the HSTT Study Area. The Navy determined that based on how the training and testing activities will be conducted within the HSTT Study Area under the Proposed Action, vessel speed restrictions would be incompatible with practicability criteria for safety, sustainability, and training and testing missions, as described in Section 5.3.4.1 (Vessel

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	Movement). Navy vessels, like all commercial vessels, operate in accordance with the navigation rules established by the U.S. Coast Guard in accordance with international law formalized in the Convention on the International Regulations for Preventing Collisions at Sea, 1972. Applicable navigation requirements include, but are not limited to, Rule 5 (Lookouts) and Rule 6 (Safe Speed). These rules require that vessels proceed at a safe speed so that proper and effective action can be taken to avoid collision including collisions with marine mammals, and be stopped within a distance appropriate to the prevailing circumstances and conditions. The Navy will continue implementing practical mitigation to avoid interactions with marine mammals during activities that involve vessel movements with the intent to reduce strike to large whales to the maximum extent possible. Current Navy Standard Operating Procedures and mitigations require a minimum of at least one lookout on duty while underway (in addition to bridge watch personnel) and, so long as safety of navigation is maintained, to <u>keep 500 yards away from large whales and 200 yards away from other marine mammals</u> (except for bow-riding dolphins and pinnipeds hauled out on shore or structures).
<u>**Marine Mammal Observers**</u>. Improvement of observer effectiveness through the use of NMFS-certified marine mammal observers. The Navy will, to the maximum extent feasible, commit to including at least two experienced, NMFS-certified marine mammal observers on all ships during the deployment of active sonar for training or testing purposes. These marine mammal observers will notify appropriate Navy personnel of all marine mammal detections and will assist in the enforcement of marine mammal safety zones.	<u>**Navy Response [4].**</u> The Navy is unable to incorporate the CCC proposed measure because it would not be practical for the Navy to implement and is not necessary for consistency with Coastal Act Section 30230. The Navy currently requires at least 1 qualified lookout on watch at all times a vessel is underway. In addition, on surface ships with hull-mounted sonars during sonar events, the number increases with 2 additional lookouts on the forward portion of the vessel (i.e., total of 3 lookouts). Furthermore, unlike civilian commercial ships, there are additional bridge watch standers on Navy ships viewing the water during all activities. The Navy's Marine Species Awareness training that all bridge watchstanders including lookouts take has been reviewed and approved by NMFS. This training is conducted annually and prior to major training events. Note, Navy visual monitoring from lookouts and bridge watchstanders as well as unit-based passive acoustic detection when available and appropriate. Mandating NMFS-certified marine mammal observers on all ships would require setting up and administering a certification program, providing security clearance for certified people, ensuring that all platforms are furnished with these individuals, and housing these people on ships for extended times from weeks to months. This would be an extreme logistic burden on realistic training. The requirement for additional non-Navy observers would provide little additional benefit, especially at the near ship mitigation ranges for mid-frequency active sonars on surface ships (<1,000 yards), nor be significantly better than the current system developed by the Navy in consultation with NMFS. Therefore, the Navy's current system is already consistent to the maximum extent practical with Coastal Act Section 30230

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	However, the following information is provided to elaborate on several key points supporting the Navy's position. The purpose of Navy lookouts is to provide sighting information for other boats and vessels in the area, in-water debris, and other safety of navigation functions. During active sonar use, additional personnel are assigned for the duration of the sonar event. In addition, the other Navy personnel on a given bridge watch along with designated lookouts are also constantly watching the water for safety of navigation and marine mammals. Inclusion of additional non-Navy marine mammal observers (MMO) would have only limited benefit given the need for personnel to only reliably report marine mammal within discrete mitigation zones relatively close to the ship (<1000 yards). As mentioned previously, there is already adequate visual observation around the ship for safety and marine mammal mitigation purposes from existing lookouts and bridge watch standers. Furthermore, the logistics of extended ship deployments for civilian MMOs (from weeks to often months at sea), berthing space availability, security classification requirements, and numbers of observers needed for every sonar equipped ship in the Navy are very problematic. Navy training and testing activities often occur simultaneously and in various regions throughout the Study Area, with underway time that could last for days or multiple weeks at a time. The pool of certified marine mammal observers across the US West Coast is rather limited, with many already engaged in regional NMFS survey efforts. Relative to the number of dedicated MMOs that would be required to implement this condition, as of July 2018, there are approximately 22 sonar-equipped Navy ships (i.e., surface ships with hull-mounted active sonars) stationed in San Diego. Six additional vessels from the Pacific Northwest also transit to Southern California for training (28 ships times 2 observers per watch times 2 watches per day = minimum of 112 observers). Senior Navy commands in the Pacific continuously reemphasize the importance of lookout responsibilities to all ships. Further, the Navy has an ongoing study where certified Navy civilian scientist observers embark periodically on Navy ships in support of a comparative lookout effectiveness study. Results from this study will be used to make recommendations for further improvements to lookout training.

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GEOGRAPHIC MITIGATION

In developing the HSTT EIS/OEIS, the Navy reanalyzed existing mitigation areas and considered new habitat areas suggested by the public, NMFS, CCC, and other non-Navy organizations. The Navy worked collaboratively with NMFS to develop mitigation areas using inputs from the operational community, the best available science, published literature, predicted activity impact footprints, and marine species monitoring and density data. The Navy is continuing to work with NMFS to finalize its mitigation areas through the consultation processes. A detailed discussion of individual mitigation areas is provided in Section 5.4 (Mitigation Areas to be Implemented) of the HSTT EIS/OEIS. The Navy considered a mitigation area to be effective if it met the following criteria: (1) The mitigation area is a key area of biological or ecological importance or contains cultural resources, and (2) The mitigation would result in an avoidance or reduction of impacts. A full technical analysis of the mitigation areas that the Navy considered for marine mammals is provided in Appendix K (Geographic Mitigation Assessment for Areas under Consideration within the Hawaii-Southern California Training and Testing Study Area). The appendix includes background information and additional details for each of the areas considered, which include mitigation areas developed for Phase II, biologically important areas identified by Calambokis et al. (2015), provisional 2015 prohibited or restricted areas derived from the 2015 HSTT Phase II-related lawsuit, areas identified by the California Coastal Commission, and areas identified during the National Environmental Policy Act scoping process.

CCC Measure	Counter Proposal/Position discussion
Biologically Significant Areas. Prohibition on use of mid-frequency sonar and in-water explosives in sensitive areas, which would include Marine Protected Areas, the National Marine Sanctuary, seasonal (June thru October) blue whale areas shown on DEIS Figure K.1.2 (and Exhibit 6), year-round beaked and fin whale areas shown on Exhibit 5, nearshore areas, and any biologically sensitive area NMFS may designate at a future date;	**Navy Response [5].** Specific areas are addressed below and shown in **Figure 1**. Regarding a buffer around mitigation areas, the Navy is unable to incorporate a 4-km buffer because it would not be practical for the Navy to implement, preventing the Navy from meeting it statutory training and testing mission. Existing Navy mitigation measures for sonar and explosives are already protect against the more severe effects (mortality, PTS, TTS). These effects however are generally confined to areas much closer to the source than 4-km [i.e., <~200 yards for surface ship sonar (MF1)]. Behavioral effects at longer ranges are already accounted for in the Navy's DEIS analysis and have been determined to not cause significant individual or population level long-term effects.

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(a) the Channel Island National Marine Sanctuary (including around Santa Barbara Island);	**<u>Navy Response [6].</u>** The Navy's currently proposed mitigation area is consistent with the CCMP without any further changes or additions. BACKGROUND: The Navy's currently proposed HSTT Santa Barbara Island Mitigation Area (year-round) already covers the Channel Island National Marine Sanctuary within the HSTT Study area. The remaining parts of the Sanctuary are north of and outside of HSTT Study Area (See **Figure 1**). Only approximately 8 percent of the sanctuary, occurs within the Southern California portion of the Study Area. The Study Area overlaps with the sanctuary at Santa Barbara Island. To provide additional protective measures for all protected marine species in the Channel Islands National Marine Sanctuary, the Navy is proposing a Channel Islands Sanctuary Cautionary Area surrounding Santa Barbara Island out to 6 NM. This mitigation will be established to restrict the use of surface ship hull-mounted mid-frequency active sonar and in-water explosives used in gunnery (all caliber), torpedo, bombing, and missile exercises (including 2.75-inch rockets) during unit-level training, testing, and major training exercises year round. If a naval unit needs to use surface ship hull-mounted mid-frequency active sonar or in-water explosives in gunnery (all caliber), torpedo, bombing, and missile exercises (including 2.75-inch rockets) during unit level training and major training exercises in this area for national security, permission shall be required from the delegated Command authority, prior to their use in the Cautionary Area. The Navy will also provide NMFS with advance notification and include the information in the annual training and testing reports Existing conditions include: *"-The Navy will not use surface ship hull-mounted mid-frequency active sonar (MF1 only) and explosives used in small-, medium-, and large-caliber gunnery; torpedo; bombing; and missile (including 2.75" rockets) activities during unit-level training or major training exercises.* *– Should national security present a requirement for the use of mid-frequency active anti-submarine warfare sensor MF1 or explosives in small-, medium-, and large-caliber gunnery; torpedo; bombing; and missile (including 2.75" rockets) activities during unit-level training or major training exercises for national security, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include the information in its annual activity reports."*

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(b) State and federal Marine Protected Areas (the offshore areas shown in red, light blue, and green in Exhibit 5);	Navy Response [7]. As stated in the HSTT EIS, the Navy will avoid conducting sonar and explosive training and testing activities in the majority of the Southern California Marine Protected Areas (see Table 6.1-2 from the HSTT DEIS and **Table 1** and **Figure 1** of this document) within the HSTT Study Area. BACKGROUND: The Navy discusses Marine Protected Areas (MPA) in Section 6.1.2 of the HSTT DEIS, in which it analyzed potential overlap between Navy activities and MPAs. In accordance with Executive Order 13158, the Navy has considered the potential impacts of its proposed activities to the national system of marine protected areas that contain marine waters within the Study Area, factoring in Navy standard operating procedures and mitigation when applicable to the stressor and resource. Such mitigation efforts will, to the maximum extent practical, avoid or minimize harm to natural and cultural resources for which these marine protected areas were designated. Relative to potential effects to marine species, excluding marine mammals, most if not all MPA associated fish and invertebrates would not be able to hear mid- and high-frequency Navy sonar systems. Santa Barbara Island MPA This area is already encompassed by the Navy's new proposed Santa Barbara Island Mitigation Area which restricts all sonar (not just MF1) and explosives during unit-level training and major training exercises year-round. Catalina Island MPAs & Mainland California Coast MPAs (excluding any MPA portion in the proposed new San Diego Arc Mitigation Area and any in or adjacent to Silver Strand Training Complex)- As stated in the Table 6.1-2 there are no activities proposed in these areas that would include the use of sonar or explosives. Mainland California Coast MPAs In Or Adjacent to Silver Strand Training Complex- The Navy is unable to incorporate the CCC proposed condition for this area because it would not be practical for the Navy to implement because of the ongoing and proposed critical activities conducted in this area. The Navy is unable to commit to any further geographic mitigations to area in or immediately adjacent to the Silver Strand Training Complex. This area has significant training and testing requirements with a variety of systems and activities.

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(c) San Nicolas Basin fin whale and beaked whale high concentration area (the area shown in yellow in Exhibit 5);	**Navy Response [8].** The Navy is unable to incorporate the CCC proposed condition because it would not be practical for the Navy to implement, preventing the Navy from meeting testing and training requirements. This position is based on practicability and biological justifications discussed in detail in Appendix K, and mentioned briefly above. The Navy will include language about San Nicolas Basin fin whale occurrence within a proposed Fin Whale Awareness message to be distributed annually to all Navy units operating in Southern California. This message along with similar ones for blue whales and gray whales is intended to identify likely areas whales could be found, along with seasonality if applicable, and emphasize Navy unit adherence to existing mitigation measures and safe navigation. In addition, as discussed below, the Navy has formally committed to NMFS to continued beaked whale and fin whale research and monitoring within San Nicolas Basin as well as other areas of Southern California that have not be surveyed as frequently. The scope of this effort spans 2019-2023. BACKGROUND: San Nicolas Basin contains one of only two Navy instrumented ranges in the Pacific Ocean, and represents an extensive fiscal and logistic investment in infrastructure. The range consists of an array of 178 bottom-mounted hydrophones covering an area of about 1800 km^2. This area is a critical Navy focal area for in-water training and testing that cannot be duplicated or shifted anywhere else. A more detailed discussion of the importance of San Nicolas Basin to the Navy is contained in Appendix K. The concept of this one basin being the only area where fin whales occur is a misconception based on limited small boat surveys and medium duration satellite tracking (multiple days-multiple weeks). Fin whales are widely distributed along the US West Coast including numerous locations in Southern California. From recent Navy-funded fin whale satellite tracking (2014-2017) using long-term (multiple weeks-multiple months) tags, fin whales have been documented moving significant distances daily along the US West Coast (up to 20 miles or more per day). New US West Coast modeling used in a ship strike risk analysis also shows more fin whales north of Southern California. Therefore, San Nicolas Basin is shown with only a small potential fin whale abundance compared to the rest of their distribution (shown at the end of this discussion). Cuvier's beaked whales have been studied extensively by the Navy in San Nicolas Basin from 2004 through 2018. While there is a documented population of Cuvier's beaked whales that use parts of San Nicolas Basin, research to date has not demonstrated any population level effects even after some of the most extensive survey effort for any species. Navy field studies have documented many important population parameters including repeated sightings of the same individual, and observations of mother-calf pairs including repeated sightings of females with new calves after the first calf has weened. Furthermore, analysis of passive acoustic data from the Navy instrumented range is ongoing with approximately a decade of beaked whale echolocation detections (an indication of foraging for this species). In a new data review conducted in 2018, there has not been any significant change in Cuvier's beaked whale echolocation within San Nicolas Basin over an 8-year period from 2010-2017 in an area heavily used by the Navy. Finally, in a 2018 adaptive management meeting with the National Marine Fisheries Service, the Navy formally committed to continued beaked whale and fin whale research and monitoring within San Nicolas Basin as well as other areas of Southern California that have not be surveyed as frequently. The scope of

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	this effort spans 2019-2023. Past and future reports on this monitoring are or will be available on the Navy's public monitoring web page.

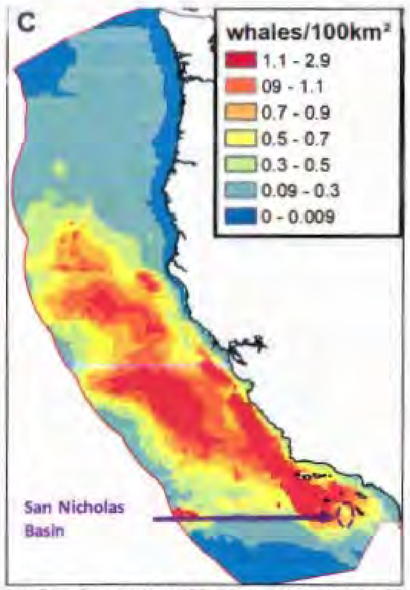

Figure C from Rockwood et al. (2018) shows modeled fin whale occurrence along the U.S. West Coast

Base figure from: Rockwood RC, Calambokidis J, Jahncke J,. 2017. High mortality of blue, humpback and fin whales from modeling of vessel collisions on the U.S. West Coast suggests population impacts and insufficient protection. PLoS ONE 12(8): e0183052. https://doi.org/10.1371/journal.pone.0183052 *
(Navy added small circle indicating approximate location of San Nicolas basin)

*** While title and paper suggests concerns for ship strikes to whales in California, locations of greatest concern are all non-Navy areas including shipping lanes off San Francisco and Los Angeles/Long Beach, with main stressor and risk being civilian commercial ship traffic. There have been no Navy ship strikes along the U.S. West Coast for the period 2010-2018. The last Navy strikes were in 2009 (far offshore, south of the circle shown in figure above), and the next previous ship strike in 2006 (again, far offshore).**

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(d) 1 km [0.5 nm] from shore (to protect coastal bottlenose dolphins);	**Navy Response [9].** This condition is not necessary for Navy consistency with California's enforceable policies. In addition, the Navy is unable to incorporate the CCC proposed condition. The California Coast stock of bottlenose dolphins does not appear to be in peril from any human factors including civilian and Navy coastal activities. Navy does not predict any significant effects to this stock in the HSTT DEIS, nor has there has been Navy caused mortality to this stock since Navy activities begin in Southern California over 40 years ago. Finally, the actual overlap between the stock and Navy small boat and mine warfare activities near Camp Pendleton and the Silver Strand Training Complex represents only a small fraction of the species total home range between central California and Baja Mexico. Therefore, additional geographic mitigations are unwarranted. The Navy already has existing mitigations in place and proposed in the HSTT DEIS which are based on activity specific conditions. These include the use of lookouts and observers before-during- and after an event, protective mitigation ranges where events can be paused while marine mammals transit, standoff distances where practical, etc. These measure are designed to be protective for all marine mammal species, including the California Coast stock of bottlenose dolphins. BACKGROUND: The California Coast stock of bottlenose dolphin, between 400-500 individuals, forages and transits within 1-km (0.5 nm) from the shoreline along the mainland coast of California and Baja Mexico (Marin County California to Ensenada, Mexico). NMFS' latest stock assessment report for the 2017 reporting year suggests the population may be growing. Annual mortality rate from civilian anthropogenic sources (ex., civilian fishery interaction) is very small. Further, there has not been any previous Navy caused death or injury to this stock. Base on acoustic impact modeling in the HSTT DEIS, the Navy does not predict any mortality or significant injury (lung injury, PTS) to this stock from sonar or explosives. The coastal range of this dolphin species would only interact with Navy training and testing activities in the nearshore waters of Camp Pendleton (mostly small boat maneuvering), and with a very limited subset of Navy small boat and unmanned underwater vehicle mine warfare activities in the Silver Strand Training Complex off of San Diego (**Figure 1**). Limited water depth where these dolphins typically transit at these locations (surface zone to < 0.5 nautical miles) precludes approach by larger Navy vessels such as surface ships with the more powerful sonar systems. The remainder of the stock's range between Point Loma and the southern boundary of Camp Pendleton, and from the northern boundary of Camp Pendleton to the northern boundary of the HSTT Study Area in addition to the depth limitations mentioned previously, are often bounded on the seaward side with extensive kelp beds through which Navy ships would not cross, as well as frequent civilian recreational use (pleasure boating, commercial and recreational fishing, paddleboarding and kayaking, swimming, etc.). Therefore, the probability for Navy activities in the non-Camp Pendleton and non-Silver Strand portions of their range through the HSTT Study Area is so low as to be discountable.

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(e) seasonally (June 1 – Oct. 31), all four blue whale areas sites designated as Biologically Important Areas (BIAs) (the areas shown in dark blue on Exhibit 5)	**Navy Response [10].** The Navy is unable to incorporate the CCC proposed condition for the Tanner Bank blue whale BIA because it would not be practical for the Navy to implement preventing the Navy from meeting training and testing missions. The Navy, in consultation with the NMFS and after review of new as yet unpublished blue whale data available to the Navy in the spring 2018, has reevaluated the Santa Monica to Long Beach and San Nicolas BIAs. The Navy will combine the Santa Monica to Long Beach and San Nicolas BIAs with the currently proposed San Diego Arc BIA. The Navy's intent would be to apply the current San Diego Arc mitigation language to all three areas combined with one exception BACKGROUND: There are two blue whale BIA that fall totally within HSTT SOCAL (San Diego and Tanner Bank) and two blue whale BIAs that only have a small extension into the northern portion of SOCAL (Santa Monica to Long Beach with only 14% of the full BIA in the HSTT Study Area and San Nicolas BIA with only 24% of the full BIA in the HSTT Study Area) (See **Figure 1**). As discussed in detail in Appendix K, during the Navy's practicability and biological review of the Tanner Bank BIA, it was concluded that implementation of a mitigation area was not practical for this species. The area in and around Tanner Banks is a core high priority training and testing venue for SOCAL combining unique bathymetry and existing infrastructure (see **Figure 1**). This includes an existing bottom training minefield adjacent to Tanner Banks, future Shallow Water Training Range (SWTR West) expansion as well as proximity to critical tactical maneuver areas to the south and the Navy's underwater instrumented range to the northeast. Furthermore, the general area is in or adjacent to critical Navy training areas that cannot be done at other locations due to available, existing infrastructure, operationally relevant bathymetry, sea space, proximity to San Clemente Island and San Diego, etc.). Furthermore, of all the blue whale BIAs designated, the Tanner Banks BIA had the fewest blue whale sighting records supporting its designation. New science since designation funded by the Navy further highlights how little Tanner Bank is used by blue whales as compared to the rest of their movements in SOCAL. Out of 73 blue whales tagged with satellite transmitters, only a few transits through Tanner Banks were documented during between 2014-2017. The longest cumulative time any individual whale stayed within the boundaries of the Tanner Banks BIA was less than one and a half days. Typical average blue whale daily movement along the U.S. West Coast is often up to 13-27 nautical miles a day (Oregon State University, unpublished data). Most blue whale area restricted foraging occurred around the northern Channel Islands, north of and outside of the HSTT SOCAL Study Area. a) **Tanner Bank BIA**: The Navy is unable to incorporate the CCC proposed condition for the Tanner Bank blue whale BIA because it would not be practical for the Navy to implement preventing the Navy from meeting training and testing missions. This position is based on practicability and biological justifications discussed in detail in Appendix K, and mentioned briefly above. The Navy already has a new proposed mitigation area for the San Diego blue whale BIA (San Diego Arc Mitigation Area, Seasonal June 1 – October 31), which is designed to limit sonar hours for the more impactful active sonar source (MF1) and explosives which will provide additional protections for the same blue whale stock that would transit Tanner Bank. In addition, the Navy will be adding similar protections to two other blue whale BIAs described in (b) below.

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	b) **<u>Santa Monica to Long Beach & San Nicolas BIAs</u>**: The Navy, in consultation with the NMFS and after review of new as yet unpublished blue whale data available to the Navy in the spring 2018, has reevaluated the Santa Monica to Long Beach and San Nicolas BIAs (**Figure 1**). The Navy will combine the Santa Monica to Long Beach and San Nicolas BIAs with the currently proposed San Diego Arc BIA for the purposes of limiting the number of hours of MF1 use in the BIAs and restrictions on specific explosives during some training and testing as described below. While the naming convention has yet to be promulgated (ex., San Diego-Santa Monica- San Nicolas Mitigation Area, SOCAL Blue Whale Mitigation Area, etc.), the Navy would apply the current San Diego Arc mitigation language to all three areas combined with one exception. Under this mitigation proposal: - The Navy would not exceed 200 hours of surface ship hull-mounted mid-frequency active sonar (MF1) from June 1 through October 31 in the combined *San Diego, Santa Monica to Long Beach and, San Nicolas Blue Whale BIAs* within the HSTT Study Area, excluding normal maintenance and systems checks. -The Navy will not use explosives during large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during <u>training and testing</u> within the *San Diego Arc BIA*. -The Navy will not use explosives during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during <u>training and testing</u> within the *Santa Monica to Long Beach BIA*. -The Navy will not use explosives during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during <u>training</u> within the *San Nicolas BIA*. (The Navy's Point Mugu Sea Range overlaps the HSTT Study Area in this area; based on potential future testing requirements, the Navy cannot agree to a total explosive exclusion for testing in this BIA). -Should national security present a requirement to conduct more than 200 hrs of MF1 sonar per year, with the exception of active sonar maintenance and systems checks, or use explosives during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities, from June 1 – October 31, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include the information (e.g., hours or items of usage) in its annual activity reports.
(f) any future-NMFS-designated Biologically Important Area (BIA)	**<u>Navy Response [11].</u>** The Navy can commit to continued interaction with NMFS on future BIA evaluation during the adaptive management process. BACKGROUND: The Navy and NMFS meet annually to discuss the state of the HSTT permit, new science if applicable, and other issues related to the HSTT consultation. If NMFS proposes new BIAs to the Navy during this process, the Navy will conduct the same detailed practicability and biological analysis that was done for other areas within HSTT including Southern California (see Appendix K). Once NMFS formally establishes a new BIA area, the Navy would reassess mitigation.

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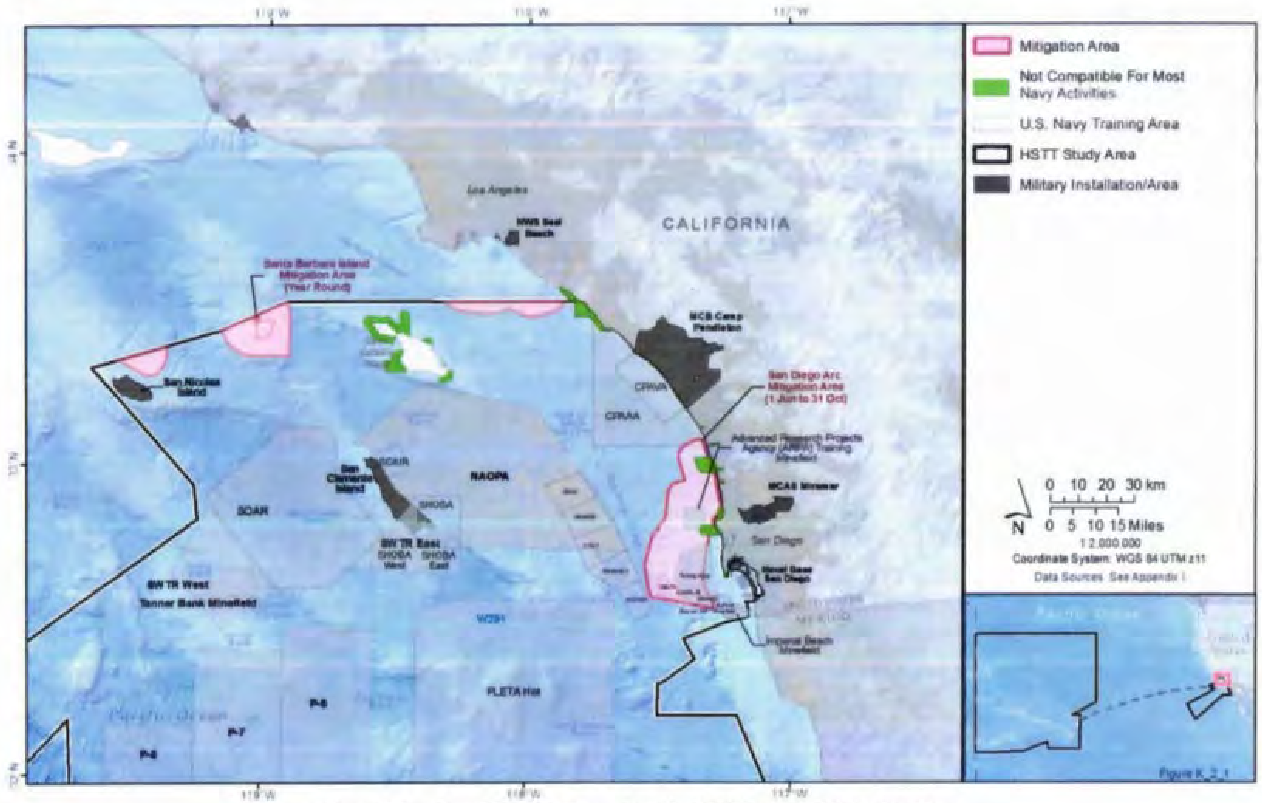

Figure 1. Southern California Range Complex With Proposed Mitigation Areas

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Table 1. Marine Protected Area Conclusions From HSTT DEIS Chapter 6

Marine Protected Area (Ecosystem Focus)	Summary of Relevant Regulations	Navy Proposed Activities And Marine Protected Area Considerations
Catalina Island MPAs		
Arrow Point to Lion Head Point State Marine Conservation Area (established 2012, 1.6 km2)	It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for commercial and/or recreational purposes. However, all commercial and recreational takes are allowed in accordance with current regulations, except the recreational take of invertebrates which is prohibited (California Department of Fish and Wildlife, 2016).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Arrow Point to Lion Head Point (Catalina Island) State Marine Conservation Area.
Blue Cavern State Marine Conservation Area (established 2012, 6.8 km2)	Take of all living marine resources is prohibited except for take pursuant to activities authorized under subsections of 14 California Code of Regulations 632(b)(124) (subsections 632[b][102][D] and 632[b][102][E]). Except as pursuant to Federal law, emergency caused by hazardous weather, or as provided in subsection 632(b)(102)(D), it is unlawful to anchor or moor a vessel in the Catalina Marine Science Center Marine Life Refuge (Section 10932, Fish and Game Code)(California Department of Fish and Game, 2012).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Blue Cavern State Marine Conservation Area.
Bird Rock State Marine Conservation Area (established 2012, 19.9 km2)	Take of all living marine resources is prohibited, except by fishing activities, which are restricted, (California Department of Fish and Game, 2012).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Bird Rock State Marine Conservation Area.
Long Point (Catalina Island) State Marine Reserve (established in 2012, 4.3 km2)	Take of all living marine resources is prohibited (California Department of Fish and Game, 2012).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Long Point State Marine Reserve.
Lover's Cove (Catalina Island) State Marine Conservation Area (established 2012, 0.2 km2)	Take of all living marine resources is prohibited except by fishing activities that are exempt of the prohibitions and maintenance of artificial structures, (California Department of Fish and Game, 2012).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Lover's Cove (Catalina Island) State Marine Conservation Area.
Northwest Santa Catalina Island Area of Special Biological Significance State Water Quality Protection Area (established 1974, 53.6 km2)	Waste discharges are prohibited.	The Navy does not discharge waste in or near this area. Sonar-related activities and other training and testing activities are not likely to harm the area's protected natural resources. No explosives are used in this marine protected area. A detailed analysis of Water Quality impacts in the Study Area is included in Section 3.2 (Sediments and Water Quality). Therefore, no impacts are expected within the Northwest Santa Catalina Island ASBS1 State Water Quality Protection Area.
Southeast Santa Catalina Island Area of Special Biological Significance State Water Quality Protection Area (established 1974, 11.2 km2)	Waste discharges are prohibited.	The Navy does not discharge waste in or near this area. Sonar-related activities and other training and testing activities are not likely to harm the area's protected natural resources. No explosives are used in this marine protected area. Therefore, no impacts are expected within

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		the Southeast Santa Catalina Island ASBS State Water Quality Protection Area
Western Santa Catalina Island Area of Special Biological Significance State Water Quality Protection Area (established 1974, 9.1 km2)	Waste discharges are prohibited .	The Navy does not discharge waste in or near this area. A detailed analysis of Water Quality impacts in the Study Area is included in Section 3.2 (Sediments and Water Quality). Therefore, no impacts are expected within the Western Santa Catalina Island ASBS State Water Quality Protection Area.
California Coast MPAs		
Cabrillo State Marine Reserve (established 2012, 1 km2)	It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource (California Department of Fish and Wildlife, 2016).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Cabrillo State Marine Reserve.
Laguna Beach State Marine Conservation Area (established 2012, 9 km2)	is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource (California Department of Fish and Wildlife, 2016).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Laguna Beach State Marine Reserve.
Matlahuayl State Marine Reserve (established 2012, 2.7 km2)	It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource. Boats may be launched and retrieved only in designated areas and may be anchored within the reserve only during daylight hours (California Department of Fish and Wildlife, 2016).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Matlahuayl State Marine Reserve.
San Diego-Scripps Area of Special Biological Significance State Water Quality Protection Area (established 1974, 0.4 km2)	Waste discharges are prohibited .	Sonar-related activities and other training and testing activities, are not likely to harm the area's protected natural resources in this marine protected area. Therefore, no impacts are expected within the San Diego-Scripps Coastal State Marine Conservation Area.
South La Jolla State Marine Conservation Area (established 2012, 6.4 km2)	It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for recreational and/or commercial purposes, unless following the specified exceptions (California Department of Fish and Wildlife, 2016).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the South La Jolla State Marine Conservation Area.
South La Jolla State Marine Reserve (established 2012, 13.1 km2)	It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource (California Department of Fish and Wildlife, 2016).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the South La Jolla State Marine Reserve.
Swami's State Marine Conservation Area (established 2012, 32.8 km2)	is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for recreational and/or commercial purposes, unless following the specified exceptions (California Department of Fish and Wildlife, 2016).	No proposed activities are expected to occur in the area. Therefore, no impacts are expected within the Swami's State Marine Conservation Area.
San Diego Bay National Wildlife Refuge (established 1988, 17.2 km2)	It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for recreational or commercial purposes. Swimming, operating personal watercraft (e.g., jet ski), and water skiing are not allowed on the refuge (U.S. Fish and Wildlife Service, 2014).	No activities are proposed within the San Diego Bay National Wildlife Refuge. Activities in the bay would not injure, damage, take, or possess any living, geological, or cultural marine resource in the Refuge. Therefore, no impacts are expected within the San Diego Bay National Wildlife Refuge.

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ADDITIONAL MITIGATION (from CCC adopted findings of 8 August 2018 – from NRDC)

Measure	Counter Proposal/Position discussion
(1) Beaked Whale Refuge Areas. Replace the Commission staff recommended exclusion area west of San Clemente Island with three beaked whale "refuge" areas to the north of the SOAR range.  Established through December 2018 on September 2015 Settlement Agreement and Order in the Conservation Council	**Navy Response [12].** The Navy is unable to incorporate the CCC proposed condition because it would prevent the Navy from meeting its statutory testing and training requirements. In addition, this condition is not required to further Navy consistency with CCMPs. The Navy received numerous comments recommending various geographic restrictions from a few non-governmental organizations and analyzed each one in the HSTT EIS/OEIS. Analysis of these areas in Southern California is contained in Appendix K of the HSTT DEIS/OEIS. The beaked whale species detected most frequently in Southern California is Cuvier's beaked whale. Beaked whales are not Endangered under the Endangered Species Act and have not been subject to large scale commercial hunting as was the case for many baleen species. Therefore, beaked whales likely are at and maintain stable populations at levels supportable by the current environment. Cuvier's beaked whales are widely distributed within Southern California and across the Pacific with almost all suitable deep water habitat >800 m conceivably containing Cuvier's beaked whales. In new unpublished Navy funded data, beaked whales have even been detected over deep water, open abyssal plains (>14,000 feet). Only limited population vital rates exist for beaked whales, covering numbers of animals, populations vs. subpopulations determination, and residency time for individual animals. All of this effort has been Navy funded in Southern California since 2004. The science of passive acoustic monitoring is positioned to answer some questions on occurrence and seasonality of beaked whales, but cannot as of yet address all fundamental population parameters including individual residency time. Furthermore, while Navy-funded passive acoustic monitoring within Southern California has been ongoing for 28 years, not all sites have been consecutively monitored every year. Deployment of single bottom-mounted passive acoustic devices have been the primary tools used to date and form the basis for erroneous claims of beaked whale refuges. For instance, these single devices have been deployed and removed from various locations with some sites having multiple years of data, others significantly less, perhaps just a few months out of a year. While Cuvier's beaked whales have been detected north and west of Tanner and Cortes Banks, as noted above this species is also detected in most all Southern California locations > 800 m in depth. Furthermore, the Navy has been training and testing in and around Tanner and Cortes Banks and San Nicolas Basin west of San Clemente Island with the same basic or similar activities for over 40 years, with no evidence of any adverse impacts having occurred. Further, there are no indications that Navy training and testing in the Southern California portion of the HSTT Study Area has had any adverse

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	impacts on populations of beaked whales in Southern California. In particular, a re-occurring population of Cuvier's beaked whales co-exists within San Nicolas Basin, an area with significantly more in-water sonar use than those proposed by the CCC condition. The Navy's Marine Mammal Monitoring on Navy Ranges (M3R) program has documented continual Cuvier's beaked whale presence on SOAR over 8-years from 2010-2017 with slight abundance increases through 2017 (DiMarzio et al. 2018[1]). The NGO text used to support this condition is correct when it states: *"Eight Cuvier's beaked whales tagged off the Southern California coast for periods of up to three months were present within the San Nicholas Basin on 53% of the days transmitted; one individual occurred inside the San Nicholas Basin on 74% of days over three months the tag was active"*. Data supporting this statement is from Navy-funded beaked whale efforts in Southern California from 2006 through 2014; similar Navy-funded effort has continued from 2015-2018 and planned through 2022]. A more up to date summary as of August 2018 from researchers conducting this work is provided below: "Navy-funded research on Cuvier's beaked whales within the Southern California (SoCal) Range Complex began in 2006. In 2008, researchers began deploying satellite tags as a part of this research. To date, 27 Low- Impact Minimally-Percutaneous External-electronics Transmitting (LIMPET) tags have been deployed within the complex. Twenty-five of those whales were tagged within the San Nicolas Basin and two were tagged in the Catalina Basin. Average transmission duration was 36.6 days (sd = 29.8), with the longest transmitting for 121.3 days. Movement data suggest that Cuvier's beaked whales have a high degree of site-fidelity to the Southern California Range Complex, and the San Nicolas basin in particular. Overall, there were 3,207 filtered location estimates from the 27 tagged whales, 91% of which were within the SoCal Range Complex. 54% of all location estimates were within the San Nicolas Basin, with twelve tagged whales spending more than 80% of their transmission duration within the basin. The two whales tagged in the Catalina Basin never entered the San Nicolas Basin. Only three whales tagged in the San Nicolas Basin crossed into the Catalina Basin (1.3% of all locations); two of those whales had just one Catalina Basin location each, though the remaining whale had 28% of its locations there. Five whales tagged in the San Nicolas Basin moved into the Santa Cruz Basin for anywhere from 1-62% of their time (6% of all locations). In contrast, 20 of 25 whales tagged in the San Nicolas Basin moved south of the basin at some point. Of these 20 whales, most remained within either Tanner Canyon or the San Clemente Basin immediately to the south, but one traveled north to near San Miguel Island and four traveled south towards Guadalupe Island. Three of these whales have not been documented in the San Nicolas basin since, though to date at least six whales tagged in the San Nicolas Basin have been re-sighted there a year or more after the deployment. Additionally, one of the whales that was south of San Nicolas when the tag stopped transmitting has since been sighted three times since."

[1] DiMarzio, N., Jones, B., Moretti, D., Thomas, L., Oedekoven, C. 2018. Marine Mammal Monitoring on Navy Ranges (M3R) on the Southern California Offshore Range (SOAR) and the Pacific Missile Range Facility (PMRF)- 2017. Naval Undersea Warfare Center, Newport RI. 34 pp.

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	In summary, the majority of satellite tagged Cuvier's beaked occurred on the instrumented range (SOAR) in San Nicolas Basin. The erroneous claim for refuge area north of San Nicolas Basin is not supported by the majority of these tracks. It is true some individuals traveled north into Santa Cruz basin ("A" in the figure) for a short period: 5 of the 27 tagged to date out of estimated population that probably numbers in the low hundreds (Moore et al. 2017)[2]. It should be remembered, this is a small sample sized (n=5 of 27), was based on medium term tags which only stay on for multiple weeks so therefore long term occurrence across multiple months to a year is not obtained, and should be taken in context that other individuals from those tagged at San Nicolas basin went south as well. There is no scientific information that the indicated northern areas are more or less important than San Nicolas basin. Movements in and around San Nicolas basin including forays north to Santa Cruz basin could be part of cyclic prey availability or other as yet unknown natural life history function. Additional satellite tagging information from the Navy's Cuvier's beaked whale population study from 2013 through the 2016-2017 field season information is shown in **Figure 2**. Given that there is no scientific evidence that Navy training and testing activities are having population level impacts to beaked whales anywhere in the Southern California portion of the HSTT Study Area, the uncertainty of current residence of Cuvier's beaked whales in the areas north and west of SOAR, the fact that general occurrence of beaked whales in Southern California may not necessarily equate to factors typically associated with biologically important areas (i.e., one area not more important than another), and consideration of the importance of Navy training and testing in the areas around SOAR and Tanner and Cortes Banks as discussed in Appendix K (Geographic Mitigation Assessment), additional geographic mitigation to create a "refuge" in the recommended area is not scientifically supported or warranted.
(2) Blue Whale Temporal Extension. Extend the blue whale exclusion season to the end of December, prohibit hull-mounted mid-frequency sonar (except for system checks), and prohibit helicopter/aircraft "dipping" sonar, within the San Diego Arc during the blue whale season.	**Navy Response [13].** The Navy is unable to incorporate the CCC proposed condition because it would prevent the Navy from meeting its statutory testing and training requirements. In addition, this condition is not required to further Navy consistency with CCMPs. However, the Navy does plan to implement additional mitigation within the San Diego Arc, as discussed below, to further avoid or reduce impacts on marine mammals from acoustic and explosive stressors and vessel strikes from Navy training and testing in this location

[2] Moore, J., J. Barlow, E. Falcone, G. Schorr, D. Morretti, K.A. Curtis. 2017. Final Report- A power analysis and recommended study design to directly detect population level consequences of acoustic disturbance. Prepared for: Office of Naval Research, Washington DC. Award Numbers: N0001415IP00088/ N0001415WX01764/ N000141512899

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	1) <u>Seasonality Extension to the end of Dec</u>. Analysis of the San Diego Arc and its consideration for additional geographic mitigation is provided in the EIS/OEIS in Appendix K, Section K.4.1.6 (San Diego (Arc) Blue Whale Feeding Area; Settlement Areas 3-A through 3-C, California Coastal Commission 3 NM Shore Area, and San Diego Arc Area), Section K.5.5 (Settlement Areas within the Southern California Portion of the HSTT Study Area), and Section K.6.2 (San Diego Arc: Area Parallel to the Coastline from the Gulf of California Border to just North of Del Mar). This analysis included consideration of seasonality and the potential effectiveness of restrictions to use of mid-frequency active sonar by Navy in the area. Based on the Appendix K analyses, the Navy plans to implement additional mitigation within the San Diego Arc, as detailed in Section 5.4.3 (Mitigation Areas for Marine Mammals in the Southern California Portion of the Study Area), to further avoid or reduce impacts on marine mammals from acoustic and explosive stressors and vessel strikes from Navy training and testing in this location. Regarding the proposed increase in seasonality to December 31, the San Diego Arc and current seasonality was established by NMFS during its Biologically Important Area designation process. While blue whale calls have been detected in Southern California through December (Rice et al., 2017, Lewis & Širović in press), given a large propagation range (10–50 km or more) for low-frequency blue whale vocalization, blue whale call detection from a Navy-funded single passive acoustic device near the San Diego Arc may not be a direct correlation with blue whale presence within the Arc from November through December. In addition, passive acoustic call detection data does not currently allow for direct abundance estimates. Calls may indicate some level of blue whale presence, but not abundance or individual residency time. In the most recent Navy-funded passive acoustic monitoring report including the one site in the northern San Diego Arc from June 2015 to April 2016, blue whale call detection frequency near the San Diego Arc starts declining in November after an October peak (Rice et al., 2017, Širović, personal communication). The newest Navy-funded research on blue whale movements from 2014 to 2017 along the U.S. West Coast based on satellite tagging has shown that individual blue whale movement is wide ranging with large distances covered daily (Mate et al., 2017). Nineteen (19) blue whales were tagged in 2016, the most recent reporting year available (Mate et al., 2017). Only 5 of the 19 blue whales spent time in the Southern California Range Complex portion of HSTT, and those 5 only spent a few days within the range complex (2–13 days). Average distance from shore for blue whales was 113 km. None of the 19 blue whales tagged in 2016 spent time within the San Diego Arc. From previous year efforts (2014–2015), only a few tagged blue whales passed through the San Diego Arc. In addition, Navy and non-Navy-funded blue whale satellite tagging studies started in the early 1990s and has continued irregularly through 2017. In general, most blue whales start a south-bound migration from the "summer foraging areas" in the mid- to late-fall time period, unless food has not been plentiful, which can lead to a much earlier migration south. Therefore, while blue whales have been documented within the San Diego Arc previously, individual use

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	of the area is variable, likely of short duration, and declining after October. Considering the newest passive acoustic and satellite tagging data, there is no scientific justification for extending the NMFS designated San Diego Arc period from October 31 to December 31. 2) Prohibit hull-mounted mid-frequency sonar and helicopter dipping sonar. The San Diego Arc is already part of a Navy proposed mitigation area where use of hull-mounted mid-frequency sonar is annually limited. Appendix K discusses the Navy's analysis of mid-frequency active sonar restrictions within the San Diego Arc. Other training mid-frequency active sonar (MFAS) systems are likely to be used less frequently in the vicinity of the San Diego Arc than surface ship mid-frequency active sonars. Given water depths, the San Diego Arc area is not conducive for large scale anti-submarine warfare exercises, nor near areas where other anti-submarine warfare training and testing occurs. Due to the presence of existing Navy subareas in the southern part of the San Diego Arc, a limited amount of helicopter dipping MFAS could occur. These designated range areas are required for proximity to airfields in San Diego such as Naval Air Station North Island and for airspace management. However, helicopters only used these areas in the Arc for a Kilo Dip. A Kilo Dip is a functional check of approximately 1-2 pings of active sonar to confirm the system is operational before the helicopter heads to more remote offshore training areas. This ensures proper system operation and avoids loss of limited training time, expenditure of fuel, and cumulative engine use in the event of equipment malfunction. The potential effects of dipping sonar have been accounted for in the Navy's analysis. Further, due to lower power settings for dipping sonar, potential impact ranges of dipping sonar are significantly lower than surface ship sonars. For example, the HSTT average modeled range to temporary threshold shift of dipping sonar for a 1-second ping on low-frequency cetacean (i.e., blue whale) is 77 m (HSTT Draft EIS/OEIS Table 3.7-7). This range is easily monitored for large whales by a hovering helicopter and is accounted for in the Navy's proposed mitigation ranges for dipping sonars. Limited ping time and lower power settings therefore would limit the impact from dipping sonar to any marine mammal species. During a Kilo Dip or any other use of MFAS, the Navy will implement the procedural mitigation as described in Section 5.3.2.1 (Active Sonar). It should be pointed out that the CCC condition is based on new Navy funded behavioral response research specific to beaked whales (Falcone et al., 2017). The Navy relied upon the best science that was available to develop behavioral response functions in consultation with NMFS for the Draft EIS/EIS. The article cited in the comment (Falcone et al., 2017) was not available at the time the Draft EIS/OEIS was published. The new information and data presented in the article has been thoroughly reviewed when it

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	became available, further considered in discussions with some of the paper's authors, and will be incorporated into the HSTT Final EIS/OEIS. Many of the confounding variables requiring further analysis for beaked whales and dipping sonar impact assessment are still being researched under continued Navy funding through 2019. The small portion of designated Kilo Dip areas that overlap the southern part of the San Diego Arc are not of sufficient depth for preferred habitat of beaked whales (see Figure 2.1-9 in the HSTT Draft EIS/OEIS). Furthermore, the research conducted by Falcone et al. (2017) was focused exclusively on beaked whales and cannot be scientifically extended to blue whales or any other species, whose reactions (or lack of reactions) to dipping sonar could be completely different. Finally, Navy-funded behavioral response studies of blue whales to simulated surface ship MFAS demonstrated there are distinct individual variations as well as strong behavioral state considerations that influence any response or lack of response (Goldbogen et al., 2013). Navy-funded satellite tracking of blue whales in Southern California and along the US West Coast from 2014-2017 documented extensive daily movements by individual blue whales (Oregon State University, personal communication). 83 blue whales were tagged during this project representing approximately 5% of the entire Eastern Pacific blue whale stock. While variable by year, average individual blue whale daily movement ranged from 25-44 miles per day. Use of the San Diego Arc by blue whales also varied by year. Out of 21 whales tagged in 2014, 14 traveled through the Arc. However, individuals stayed within the Arc <1 to no more than 3.4 days. Only 9 of 22 blue whales traveled through the Arc in 2015 (<1-3 days), no blue whales traveled through the Arc in 2016, and only one blue whale traveled through the Arc in 2017 (<0.3 days). In conclusion, given the infrequent use of and low residency within the Arc as well as high degree of daily movement, the increased sightability of these large baleen whales especially if foraging, less frequent use of the San Diego Arc by other lower-powered short-duration Navy MFAS systems, low use of the Arc for more intensive surface ship sonar events, existing Navy mitigations for all sonar systems, and proposed geographic limitations for the more impactful surface ship sonar, further MFAS restrictions in the San Diego Arc are not warranted.

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(3) Speed Restrictions. Observe 10 knot speed restrictions, seasonally, within the San Diego Arc and the blue whale habitat at Tanner-Cortez Bank	**Navy Response [14].** The Navy is unable to incorporate the CCC proposed condition because it would prevent the Navy from meeting its statutory testing and training requirements. In addition, this condition is not required to further Navy consistency with CCMPs. The rational for this determination is outlined more completely in **Navy Response #3**. In addition, as explained in **Navy Response #10**, Navy funded blue whale tracking has documented little blue whale residency at or transits of Tanner Banks. Previously, the Navy commissioned a vessel density and speed report for HSTT. Based on an analysis of Navy ship traffic in the HSTT Study Area between 2011 and 2015, median speed of all Navy vessels within Southern California is typically already low, with median speeds between 5 and 12 knots. Slowest speeds occurred closer to the coast including the general area of the San Diego Arc and approaches to San Diego Bay. The presence and transits of commercial and recreational vessels, numbering in the many hundreds, far outweighs the presence of Navy vessels. Furthermore, blue whale mortality and injuries attributed to commercial ship strikes in California waters was zero in the most recent reporting period between 2011 and 2015 as reported by the National Marine Fisheries Service. Section 3.7.3.4.1 (Impacts from Vessels and In-Water Devices) and Section K.4.1.6.2 (San Diego [Arc] Blue Whale Feeding Area Mitigation Considerations), state the important differences between most Navy vessels and their operation and commercial ships that individually make Navy vessels much less likely to strike a whale. Furthermore, the Navy has not had a ship strike to a blue whale in Southern California for over 14 years. In addition, there has never been a Navy ship strike to any marine mammal species including blue whales within the coastal zone (<10-20 n mi from shore) which includes the San Diego Arc area. Nor has there ever been a Navy ship strike to any marine mammal species at Tanner-Cortes Bank. In conclusion, additional speed restriction mitigation is not scientifically supported or warranted.
(4) Fin Whale Mitigation. Add seasonal fin whale cautionary measures within the 200 to 1000 meter isobaths, from November 1 to May 31	**Navy Response [15].** The Navy is unable to incorporate the CCC proposed condition because it would prevent the Navy from meeting its statutory testing and training requirements. In addition, this condition is not required to further Navy consistency with CCMPs. The rational for the Navy's need for speed flexibility is outlined more completely in **Navy Response #3.** This particular condition is also predicated on an over simplification of Navy funded fin whale research in Southern California. Based on years of NMFS and Navy monitoring in Southern California, there appears to be a constant presence of fin whales in the region across seasons and years. New research by Širović et al. (2017) supports a hypothesis that between the Gulf of California and Southern California, there could be up to four distinct sub-populations based on fin whale call types, including a Southern California

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	resident population. There is also evidence that there can be both sub-population shifts and overlap within Southern California (Širović et al. 2017). Scales et al. (2017) also postulated two Southern California sub-populations of fin whales based on satellite tagging and habitat modeling. Scales et al. (2017) stated that some fin whales may not fallow the typical baleen whale migration paradigm, with some individuals found in both warm, shallow nearshore waters < 500 m, and deeper cool waters over complex seafloor topographies. Collectively, the author's spatial habitat models with highest predicted occurrence for fin whales cover the entire core training and testing portion of the Southern California portion of HSTT, not just areas between 200-1000m. Results from Navy funded long-term satellite tagging of fin whales in Southern and Central California still shows some individual fin whales engage in wide-ranging movements along the US West Coast, as well as large daily movements well within subareas (Mate et al. 2017). In support of further refining the science on Southern California fin whales, Falcone and Schorr (2014) examined fin whale movements through photoID and short-to-medium term (days-to-several weeks) satellite tag tracking under funding from the Navy. The authors conducted small boat surveys from June 2010 through January 2014, approximately three and a half years. Of interest in terms of the 200-1000 m isobath occurrence, more fin whale tag locations were reported off the Palos Verdes Peninsula and off of the Los Angeles/Long Beach commercial shipping ports in fall, both areas north of and outside of the Navy's Southern California Range Complex. Compared to the above areas, there were not as many tag locations in the similar isobath region off San Diego associated with the Navy range area. Falcone and Schorr (2014) did document an apparent inshore-offshore distribution between winter-spring and summer-fall. Given the apparent resident nature of some fin whales in Southern California as discussed in Falcone and Schorr (2014), Scales et al. (2017), and Širović et al. (2017), it remains uncertain if the inshore-offshore seasonal pattern as well as sub-population occurrence will persist into the future, or if fin whales will change distribution based on oceanographic impacts on available prey (ex. El Nino, climate change, etc.). The efforts from Falcone and Schorr on fin whales began in 2010 and are planned to continue for the next several years (2010-2020) under Navy monitoring funding to further refine fin whale population structure and occurrence within Southern California. Furthermore, the Navy has not had a ship strike to a fin whale in Southern California for over nine years. In addition, there has never been a Navy ship strike to any marine mammal species including fin whales within the coastal zone (<10-20 n mi from shore). This range (<20 n mi) incorporates the proposed bathymetry in the proposed CCC condition due to the steep bathymetry gradient off the Southern California mainland coast. Therefore, although fin whales might be the more abundant large baleen whale species in Southern California, there is no current evidence of heightened risk from Navy ship movements.

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	In conclusion, speed restrictions within 200-1000m of the coast is unwarranted given the wide range of fin whale movements along the US West Coast including areas within and outside of 200-1000m contours, sometimes large scale daily movements within regional areas as documented from Navy funded satellite tagging, the current lack of ship strike risk from Navy vessels in Southern California (2010-2018), the already safe training and testing ship speeds Navy uses within HSTT, and existing Navy mitigation measures including provisions to avoid large whales by 500 yards where safe to do so.
(5) Gray Whale Speed Restriction. Increase protection for gray whales by limiting vessel transit speeds to 10 knots, within 10 n mi of the mainland, from December 1 to May 20	**Navy Response [16].** The Navy is unable to incorporate the CCC proposed condition because it would prevent the Navy from meeting its statutory testing and training requirements. In addition, this condition is not required to further Navy consistency with CCMPs. The rational for this determination is outlined more completely in **Navy Response #3**. Furthermore, as of this date there has not been any Navy ship strike to a gray whale for over 12 years along any of the gray whale migration corridors along the entire US West Coast. This includes nearshore zones associated with the proposed CCC condition, as well as offshore zones which the bulk of the gray whale population uses to transit across Navy areas in Southern California. In addition, there has never been a Navy ship strike to any large whale species including gray whales within the coastal zone (<10-20 n mi from shore). In conclusion, speed restrictions within 10 n mi of the coast is unwarranted given the short residency times for gray whales as they migrate along the US West Coast including areas within and outside of 10 n mi, the current lack of ship strike risk from Navy vessels in Southern California, the already safe training and testing ship speeds Navy uses within HSTT, and existing Navy mitigation measures including provisions to avoid large whales by 500 yards where safe to do so.
(6) Marine Sanctuary and MPAs. Exclude testing and training from all National Marine Sanctuaries and Marine Protected Areas	**Navy Response [17].** The Navy is already meeting significant portions of this condition as outlined in **Navy Responses #6** and **#7** (see also **Figure 1**). As discussed in **Navy Response #7**, most of the Southern California Marine Protected Areas adjacent to islands and the mainland coast within the HSTT Study Area are not used for sonar and explosive Navy activities. However, as discussed in Navy Response #7, excluding all testing and training activities from all Southern California Marine Protected Areas is not practicable and would prevent the Navy from meeting its statutory testing and training requirements.
(7) National Defense Command Authorization. Allow for "derogation" (i.e., provide for deviations from the marine species protection measures where the Navy determines, "at the highest command authority" that	**Navy Response [18].** The Navy's geographic mitigation measures discussed in the Consistency Determination and proposed new areas discussed above all include a provision to allow a restricted activity to occur in the area if there is a national security requirement. See **Navy Response #6** for example of this provision. NMFS would also be provided a notification if a restricted activity will take place due to a national security requirement.

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national defense needs necessitate such deviation, including a "transparency" procedure that would involve reporting to the Commission of any such deviation determinations)	
(8) Low Visibility Detonation Restrictions. Avoid in-water detonations in low-visibility conditions, and with annual reporting to the Commission of any non-compliance	**Navy Response [19].** The Navy avoids in-water detonations in low visibility conditions as a standard operating procedure, unless there is a specific training or testing requirement. Diver placed underwater explosive training and testing is generally exclusively a daytime, high visibility activity. Daytime bad weather and high sea states are also not safe for diver placed explosive training and testing which often use small boats, so events are not conducted in these conditions. For larger ordnance-associated explosive use such as 5-inch gun projectiles, rockets, missiles, and bombs, daytime use is always preferred and directed for the scheduling and safety reasons mentioned previously. This does not preclude infrequently using explosives at night, if needed for a national defense or critical unit certification and deployment requirement. Annual reporting of HSTT use by authorized explosive bins is provided by the Navy to the National Marine Fisheries Service, although the level of detail is confined to a cumulative summary by bin within a given reporting year.
(9) Use Of SOAR As Mitigation. Use SOAR passive acoustic instruments to monitor marine mammal vocalizations, with reporting to trainers/testers using sonar or in-water detonation activities	**Navy Response [20].** The Navy is unable to incorporate the CCC proposed condition because it would not be practical for the Navy to implement. However, the following information is provided to elaborate on several key points supporting the Navy's position. The use of real-time passive acoustic monitoring (PAM) for mitigation at SOAR exceeds the capability of current technology. The Navy has a significant research investment in the Marine Mammal Monitoring on Navy Ranges (M3R) system at three ocean locations including SOAR. However, this system was designed and intended to support marine mammal research for select species, and not as a mitigation tool. Marine mammal PAM using instrumented hydrophones is still under development and while it has produced meaningful results for marine species monitoring, abundance estimation and research, it was not developed for nor is it appropriate for real-time mitigation. The ability to detect, classify and develop an estimated position (and the associated area of uncertainty) differs across species, behavioral context, animal location vs. receiver geometry, source level, etc. Based on current capabilities, and given adequate time, vocalizing animals within an indeterminate radius around a particular hydrophone are detected, but obtaining an estimated position for all individual animals passing through a predetermined area is not assured. Detecting vocalizations on a phone does not determine whether vocalizing individuals would be

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	within the established mitigation zone in the timeframes required for mitigation. Since detection ranges are generally larger than current mitigation zones for many activities, this would unnecessarily delay events due to uncertainty in the animal's location and put at risk event realism. Furthermore, PAM at SOAR does not account for animals not vocalizing. For instance, there have been many documented occurrences during PAM verification testing at SOAR of small boats on the water coming across marine mammals such as baleen whales that were not vocalizing and therefore not detected by the range hydrophones. Animals must vocalize to be detected by PAM; the lack of detections on a hydrophone may give the false impression that the area is clear of marine mammals. The lack of vocalization detections is not a direct measure of the absence of marine mammals. If an event were to be moved based upon low-confidence localizations, it may inadvertently be moved to an area where non-vocalizing animals of undetermined species are present. To develop an estimated position for an individual, it must be vocalizing and its vocalizations must be detected on at least three hydrophones. The hydrophones must have the required bandwidth, and dynamic range to capture the signal. In addition, calls must be sufficiently loud so as to provide the required signal to noise ratio on the surrounding hydrophones. Typically, small odontocetes echolocate with a directed beam that makes detection of the call on multiple hydrophones difficult. Developing an estimated position of selected species requires the presence of whistles which may or may not be produced depending on the behavioral state. Beaked whales at SOAR vocalize only during deep foraging dives which occur at a rate of approximately 10 per day. They produce highly directed echolocation clicks that are difficult to simultaneously detect on multiple hydrophones. Current real-time systems cannot follow individuals and at best produce sparse positions with multiple false locations. The position estimation process must occur in an area with hydrophones spaced to allow the detection of the same echolocation click on at least three hydrophones. Typically, a spacing of less than 4 km in water depths of approximately 2 km is preferred. In the absence of localizations, the analyst can only determine with confidence if a group of beaked whales is somewhere within 6 km of a hydrophone. Beaked whales produce stereotypic click trains during deep (<500 m) foraging dives. The presence of a vocalizing group can be readily detected by an analyst by examining the click structure and repetition rate. However, estimating position is possible only if the same train of clicks is detected on multiple hydrophones which is often precluded by the animal's narrow beam pattern. Currently, this is not an automated routine. In summary, the analytical and technical capabilities required to use PAM such as M3R at SOAR as a required mitigation tool are not sufficiently robust to rely upon due to limitations with near real-time classification and determining estimated positions. The level of uncertainty as to a species presence or absence and location are too high to provide the accuracy required for real-time mitigation. Existing Navy

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	visual mitigation procedures and ranges as described in Chapter 5 of the HSTT EIS/OEIS when performed by individual units at-sea measures still remain the most practical means of protection for marine species.
(10) Thermal System Program. Establish a pilot "thermal monitoring" marine mammal detection program	**Navy Response [21].** The Navy is already meeting this condition. **Navy Response #2** provided above contains more details. In summary, the Navy's Office of Naval Research has been conduction extensive testing of thermal systems with associated computer programs for marine mammal detection since the late 2000s.
(11) Sonar Signal Research. Conduct research on sonar signal modifications having the potential to reduce the severity or onset of behavioral responses	**Navy Response [22].** Mid-frequency sonar signal properties, in particular those from hull-mounted surface ships, have proven to be effective in submarine detection since designed in the late 1950s. Sonar signals are designed explicitly to provide optimum performance at detecting underwater objects (e.g., submarines, mines, etc.) in a variety of acoustic environments. Although the Navy acknowledges that this very limited data set suggests up or down sweeps of the sonar signal may result in different animal reactions, this is a very small data sample, and this science requires further development. If future studies indicate this could be an effective approach, then Navy will investigate the feasibility and practicability to modify signals, based on tactical considerations and cost, to determine how it will affect the sonar's performance.

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(12) Additional Beaked Whale Research. Conduct research to further delineate beaked whale habitats	**Navy Response [23].** The Navy is already meeting this condition. The Navy has funded the majority of Southern California beaked whale occurrence research and monitoring since 2004. These efforts continue through the current 2018 monitoring year. To gain further knowledge on the presence of beaked whales in Southern California, the Navy continues to fund additional passive acoustic field monitoring, as well as research advancements for density derivation from passive acoustic data. For the five-year period from 2013 to 2017, U.S. Pacific Fleet on behalf of the U.S. Navy funded $14.2 million in marine species monitoring within Hawaii and Southern California. Specifically, in terms of beaked whales, the Navy has been funding beaked whale population dynamics, tagging, and passive acoustic studies within HSTT since 2004. Variations of these efforts are planned to continue through the duration of the next HSTT permit cycle using a variety of passive acoustic, visual, tagging, photo ID, and genetics research tools. At the Navy and National Marine Fisheries Service adaptive management monitoring meeting for HSTT in March 2018, the Navy committed to additional expanded beaked whale monitoring to further clarify the spatial extent of beaked whale occurrence in Southern California. In addition to ongoing Cuvier's beaked whale population research and surveys in San Nicolas basin (2004-2022), the Navy plans multi-month deployments in other Southern California locations of underwater gliders with passive acoustic detectors for improved beaked whale detection across larger areas. Concurrently, bottom-mounted passive acoustic devices for improved year-round beaked whale detection will be deployed at select sites, including areas not surveyed previously. In addition, a Navy-funded trial analysis of beaked whale towed-array passive acoustic detections obtained from California Cooperative Oceanic Fisheries Investigations (CalCOFI) is also planned starting in 2019. CalCOFI conducts quarterly surveys across a standardized set of Southern California tracklines. If successful, this data set would provide beaked whale seasonally related occurrence information across large swaths of Southern California.

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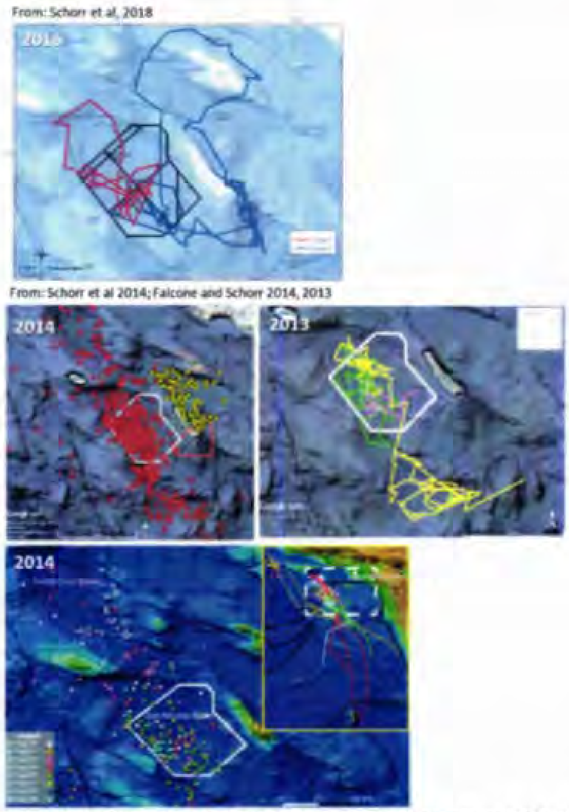

Figure 2. Navy-funded Cuvier's Beaked Whale Satellite Tracking 2013-2016

Jan-Jul 2016: ıring 40 days of tracking, 84% of location estimates were within the SOAR boundary(Schorr et al. 2018 [3]); Jun 2010 – Jan 2014: Daily p tions of tagged Cuvier's beaked whales, with animals tagged on SOAR denoted by red diamonds and animals tagged in the Catalina Basi y yellow circles; , 67.5% within the San Nicolas Basin (Falcone and Schorr 2014[4]); All eight whales were tagged within the Southern Cal rnia Anti-submarine Warfare Range (outlined in solid white). Tagged whales were within the San Nicolas Basin for 51% of all days tags t smitted, and within the SOAR boundaries for 71% of the days when in the basin, suggesting site fidelity to the MFA sonar training rang ıset map shows the entire track-line of each tagged whale with the primary map region indicated by a dashed box (Schorr et al. 2014[5], I cone and Schorr 2013[6]).

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[3] Schorr, G.S., I Falcone, B.K. Rone, and E.L. Keene. 2018. Distribution and demographics of Cuvier's beaked whales in the Southern California Bight. Interim Report he US Navy Pacific Fleet Integrated Comprehensive Monitoring Program, Award No. N66604-14-C-0145. Jan 2018. 24 pp.

[4] Falcone, E.A. I G.S. Schorr. 2014. Distribution and demographics of marine mammals in SOCAL through photoidentification, genetics, and satellite telem Prepared for: Chief of Naval Operations, Energy and Environmental Readiness Division, Washington DC. Prepared by: Cascadia Rese Collective and supported under Naval Postgraduate School Grant N00244-10-1-0050. Dec 2014. 74 pp.

[5] Schorr G.S., E Falcone D.J. Moretti, and R.D. Andrews. 2014. First Long-Term Behavioral Records from Cuvier's Beaked Whales (*Ziphius cavirostris*) Re Record-Breaking Dives. PLoS ONE 9(3): e92633. doi:10.1371/journal.pone.0092633

[6] Falcone, E.A. I G.S. Schorr. 2013. Distribution and demographics of marine mammals in SOCAL through photoidentification, genetics, and satellite telem summary of surveys conducted 1 July 2012 - 30 June 2013. Prepared for: Chief of Naval Operations, Energy and Environmental diness Division, Washington DC. Prepared by: Cascadia Research Collective and supported under Naval Postgraduate School Grant N00244- 1-0050. Aug 2013. 44 pp.

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DEPARTMENT OF THE NAVY
COMMANDER
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PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
Ser N46B/1455
October 16, 2018

Mr. Mark Delaplaine
Manager, Energy, Ocean Resources,
and Federal Consistency Division
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, California 94105-2219

Dear Mr. Delaplaine:

SUBJECT: CONSISTENCY DETERMINATION FOR PROPOSED MILITARY READINESS ACTIVITIES IN SOUTHERN CALIFORNIA

Thank you for thoroughly considering the Navy's responses to the Commission's objection to the Navy's Consistency Determination (CD) for proposed military readiness activities within the southern California portion of the Hawaii-Southern California Training and Testing (HSTT) Study Area. The Navy has reviewed the Commission staff letter of October 5, 2018 summarizing the discussions that have taken place. The Navy's letter of August 24, 2018 contains our detailed responses to the Commission's measures, including those offered by the Natural Resources Defense Council (NRDC), as determined necessary for the Commission to concur with the activity. The Navy appreciates the staff and Commissioners' review of these materials as well as the opportunity to present this information with an open discussion with the Commissioners at the status update in Fort Bragg on September 12, 2018.

The Navy recognizes that through the exchange of information, to include the HSTT NEPA process, the submission of the CD in April 2018, the June hearing in Chula Vista, the status update in Fort Bragg, and in working with the staff throughout the process, considerable progress has been made toward reaching agreement with the Commission that the Navy's proposed activities are fully consistent with the applicable enforceable policies of the California Coastal Management Plan (CCMP). Specifically, our August 24, 2018 submittal reflects a careful and thorough consideration of the Commission's findings by Navy scientists, planners, operational commanders, and leadership. The Navy agreed to additional geographic mitigation measures (beyond those already proposed) in response to the geographic measures contained in your July findings. The Navy also provided a detailed rationale for those geographic measures it was unable to implement. Similarly, for the procedural measures you requested, the Navy's August 24, 2018 letter explains that in many cases the Navy is complying either fully or partially with many of the measures. For those procedural measures that the Navy is unable to implement, such as larger shutdown zones and Navy vessel speed restrictions, a thorough explanation has been provided as to why the measures are not necessary or are not practical to implement.

The Navy also appreciates the Commission's agreement at the status update in Fort Bragg to a future presentation of the Navy's research and monitoring program to the Commission and public. The Navy is a leader in funding research on marine mammals worldwide, especially in Southern California. We look forward to this presentation and will work with staff to schedule it.

5090
Ser N46B/1455
October 16, 2018

Despite the considerable progress made toward resolving the differences and the Navy's willingness to continue dialogue, the Navy faces a need to complete the HSTT regulatory processes to support continued training and testing. The October 5, 2018 Commission staff letter states that there is not sufficient new information to recommend a change in the Commission's objection. Having therefore attempted, but been unable to resolve the differences, the Navy hereby provides notification, pursuant to 15 C.F.R. §930.43(e), that the Navy will proceed with the proposed HSTT activities. The Navy has determined that these activities are fully consistent with the applicable enforceable policies of the CCMP in accordance with 15 C.F.R. §930.43(d)(2). Also, as discussed in our August 24, 2018 letter, we note that the additional measures requested by the Commission, to which the Navy cannot agree, create a significant conflict with the Navy's Title 10 requirements to prepare naval forces for prompt and sustained combat operations at sea.

Concerning the two specific items on which the October 5, 2018 letter invites a Navy response:

1. The Navy continuously evaluates the efficacy of sonar systems and signals for their tactical applications. The Navy also continues funding of marine mammal behavioral response studies to determine if it is signal property or some other combination of variables (ex., distance from a source, signal strength, behavioral state) that leads to a response or a lack of response. To date, such research has shown perceived responses to be highly variable by species (where some species respond and others do not) and by individual (some individuals within a species may respond while some may not).

2. The Navy agrees to annually provide the Commission staff the instances where there was a national security requirement to deviate from the geographic mitigation measures for the California portion of the study area. This information will be provided to the staff in the annual exercise report prepared for the National Marine Fisheries Service.

The Navy values and protects the coast and the marine resources of California where our Sailors live, train, and defend our homeland. We are proud of the environmental stewardship of our installations and our testing and training activities. While this completes the Coastal Zone Management Act Federal Consistency process for the current HSTT effort, we look forward to continuing our close relationship with the Commission.

Sincerely,

T. C. LIBERATORE
Deputy Fleet Civil Engineer
By direction
of the Commander

Copy to:
Chief of Naval Operations (N454)
Commander, Navy Region Southwest (N40)

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