

**Environmental Impact Statement/
Overseas Environmental Impact Statement
Point Mugu Sea Range
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5 Standard Operating Procedures and Mitigation

5.1 Introduction

This chapter describes the mitigation measures that the United States (U.S.) Department of the Navy (Navy) will implement to avoid or minimize potential effects from the Point Mugu Sea Range (PMSR) Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) Proposed Action.

The Navy will also implement standard operating procedures specific to testing and training activities conducted under the Proposed Action. In many cases, standard operating procedures provide a secondary benefit to environmental and cultural resources, some of which have high socioeconomic value in the Study Area. Standard operating procedures differ from mitigation measures because standard operating procedures are designed to provide for safety and mission success, whereas mitigation measures are designed specifically to avoid or reduce potential environmental impacts resulting from an action or activity. An example of a standard operating procedure is that ships operated by or for the Navy have personnel assigned to stand watch at all times when underway. 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. In addition to standard operating procedures designed to avoid collision hazards for the safety of the ship and personnel on board the vessel, watch personnel also monitor for marine mammals that have the potential to be in the direct path of the ship. A full discussion of standard operating procedures is provided below in Section 5.1.1 (Standard Operating Procedures).

In addition to the mitigation measures and standard operating procedures specific to the Proposed Action, the Navy has existing routine operating instructions (e.g., training manuals) and local installation instructions (e.g., Integrated Natural Resource Management Plans) that were developed to meet other safety and environmental compliance requirements or initiatives. For example, the Naval Air Training and Operating Procedures Standardization General Flight and Operating Instructions Manual (CNAF M-3710.7) contains naval air training procedures pertaining to safe operations of aircraft, which includes requirements to minimize the disturbance of wildlife. Aviation units are required to avoid noise-sensitive areas, such as breeding farms, resorts, beaches, national parks, national monuments, and national recreational areas. They are also required to avoid disturbing wild fowl in their natural habitats and to avoid firing directly at large fish, whales, or other wildlife. These requirements are in addition to the measures identified for the Proposed Action. The Navy will continue complying with applicable operating instructions and local installation instructions within the Study Area, as appropriate.

5.1.1 Standard Operating Procedures

For testing or training to be effective, units must be able to use their sensors and weapon systems safely and as they are intended for use in military missions and combat operations and to their optimum capabilities. Navy publishes or broadcasts standard operating procedures via numerous naval instructions and manuals, including but not limited to the following:

- Ship, submarine, and aircraft safety manuals
- Ship, submarine, and aircraft standard operating manuals
- Fleet Area Control and Surveillance Facility range operating instructions
- Fleet exercise publications and instructions

- Naval Air Warfare Center Weapons Division (NAWCWD) and Naval Sea Systems Command test range safety and standard operating instructions
- Navy instrumented range operating procedures
- Naval shipyard sea trial agendas
- Research, development, test, and evaluation plans
- Naval gunfire safety instructions
- Navy planned maintenance system instructions and requirements
- Federal Aviation Administration regulations
- International Regulations for Preventing Collisions at Sea
- Range safety standard operating procedures and instructions for explosive munitions
- Ammunition and Explosive Operations standard operating procedures

Because they are essential to safety and mission success, standard operating procedures are part of the Proposed Action and considered in the Chapter 3 (Affected Environment and Environmental Consequences) environmental analysis for applicable resources.

5.1.1.1 De-Conflicting Sea Space and Airspace

The Navy schedules testing and training activities to minimize conflicts with the use of sea space and airspace within ranges and throughout the Study Area to ensure the safety of Navy personnel, the public, commercial aircraft, commercial and recreational vessels, and military assets. The Navy de-conflicts its own use of sea space and airspace to allow for the necessary separation of multiple Navy units to prevent interference with equipment sensors and avoid interaction with established commercial air traffic routes and commercial shipping lanes. These standard operating procedures benefit public health and safety (including persons participating in activities that have socioeconomic value, such as recreational or commercial fishing) reducing the potential for interactions with testing and training activities.

5.1.1.2 Vessel Safety

Navy vessels are required to operate in accordance with applicable navigation rules, including Inland Navigation Rules (33 Code of Federal Regulations [CFR] 83) and International Regulations for Preventing Collisions at Sea (72 COLREGS), which were 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 at all times proceed at a safe speed to avoid collision and maintain an appropriate distance from marine mammals and safety hazards under prevailing circumstances and conditions. Navy ships transit at speeds that are optimal for conserving fuel, maintaining ship schedules, and meeting 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. See Section 3.0.6.4.1 (Vessels) for more information about operating speeds of the vessels under the Proposed Action. The Navy also avoids known navigation hazards that appear on nautical charts, such as submerged wrecks and obstructions.

Ships operated by or for the Navy have personnel assigned to stand watch at all times, day and night, when moving through the water (underway) for safety of navigation, collision avoidance, range clearance, and man-overboard precautions. Watch personnel include officers, enlisted men and women, and civilians operating in similar capacities. To qualify to stand watch, personnel undertake extensive training that includes, but is not limited to, on-the-job instruction and a formal Personnel Qualification

Standard program (or equivalent program for civilians) to certify that they have demonstrated all necessary skills. While on watch, personnel employ visual search and reporting procedures in accordance with the U.S. Navy Lookout Training Handbook or civilian equivalent. Watch personnel are responsible for using correct scanning procedures while monitoring an assigned sector; estimating relative bearing, range, position angle, and target angle of sighted objects; and rapidly sending accurate reports of all visual information to the bridge and combat information center. After sunset and prior to sunrise, watch personnel employ night visual search techniques, which could include the use of night vision devices.

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. Watch personnel duties may perform other tasks or job responsibilities, such as navigating the ship or supervising other personnel. When anchored or moored to a buoy, a watch team is still maintained but with fewer personnel than when underway.

The standard operating procedures for vessel safety benefit public health and safety, marine mammals, cultural resources, and seafloor resources through a reduction in the potential for vessel strikes.

5.1.1.3 Aircraft Safety

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 through a reduction in the potential for aircraft strike.

5.1.1.4 High-Energy Laser Safety

The Navy operates laser systems approved for fielding by the Laser Safety Review Board or service equivalent. Only properly trained and authorized personnel operate high-energy lasers within designated Operating Areas (OPAREAs) and ranges. OPAREAs and ranges where lasers are used are required to have a Laser Range Safety Certification Report updated every three years. Prior to commencing activities involving high-energy lasers, the operator performs a search of the intended impact location to ensure that the area is clear of unauthorized persons and wildlife. These standard operating procedures benefit public health and safety by reducing the potential for interactions with high-energy lasers.

5.1.1.5 Weapons Firing Safety

In advance of gunnery activities, a Notice to Mariners alerts the public to stay clear of the area, except for small-caliber crew-served weapons training when the immediate area around the firing ship is cleared visually. Locations where explosive bombing activities occur often have a standing Notice to Mariners. In locations that do not already have a standing Notice to Mariners, a notice is issued in advance of explosive bombing activities conducted. Section 3.14.4.3 (Safety Procedures) for additional information on Notices to Mariners.

Most weapons firing activities that involve the use of explosive munitions are conducted during daylight hours. All missile and rocket firing activities are carefully planned in advance and conducted under strict procedures that place the ultimate responsibility for range safety on the Officer Conducting the Exercise

(training) or the Test Conductor (testing). The weapons firing hazard range must be clear of non-participating vessels and aircraft before firing activities commence. The size of the firing hazard range is based on the farthest firing range capability of the weapon being used. All weapons firing stops when the Range Safety Officer receives a cease-fire order or when the line of fire could endanger non-participating vessels or aircraft. Pilots of Navy aircraft are not authorized to expend munitions, fire missiles, or drop other airborne devices through extensive cloud cover where visual clearance for non-participating aircraft and vessels is not possible. The two exceptions to this requirement are: (1) when operating in the open ocean, clearance for non-participating aircraft and vessels through radar surveillance is acceptable; and (2) when the Test Conductor accepts responsibility for the safeguarding of airborne and surface traffic. These standard operating procedures benefit public health and safety, and marine mammals and sea turtles (by increasing the effectiveness of visual observations for mitigation in daylight hours), reducing the potential for interaction with explosive weapons firing activities.

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 materials that remain, which could potentially alert enemy forces to the presence of U.S. Navy assets during military missions and combat operations. This standard operating procedure benefits biological resources (e.g., marine mammals, sea turtles, fish) by reducing the potential for physical disturbance and strike, entanglement, and ingestion of target fragments and any associated decelerators/parachutes. Additional information about military expended materials (including which are recoverable) is presented in Section 3.0.6.4.2 (Military Expended Materials) and Appendix D (Military Expended Material and Direct Strike Impact Analyses).

5.1.1.6 Target Deployment and Retrieval Safety

The deployment and retrieval of targets is dependent upon environmental conditions. The Beaufort Sea State Scale is a standardized measurement of the weather conditions, based primarily on wind speed. The scale is divided into levels from 0 to 12, with 12 indicating the most severe weather conditions (e.g., hurricane force winds). At Beaufort Sea State number 4, wave heights typically range from 3.5 to 5 feet (ft.). Firing exercises involving the deployment and retrieval of targets from small boats are typically conducted in daylight hours in Beaufort Sea State number 4 conditions or better to ensure safe operating conditions during target deployment and recovery. These standard operating procedures benefit public health and safety, and marine mammals and sea turtles (by increasing the effectiveness of visual observations for mitigation), reducing the potential for interaction with the weapons firing activities associated with the use of targets.

5.1.1.7 Sonic Booms

As a general policy, aircraft do not intentionally generate sonic booms below 30,000 ft. of altitude unless over water and more than 30 miles from inhabited land areas or islands, with the exception where sonic booms may occur within 15 miles of San Nicolas Island (SNI). The Navy may authorize deviations from this policy for tactical mission, phases of formal training syllabus flights, or research, test, and operational suitability test flights. The standard operating procedures for sonic booms benefit public health and safety through a reduction in the potential for exposure to sonic booms.

5.1.1.8 Unmanned Aerial System and Surface Vehicle Safety

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

When necessary, Notices to Airmen and Notices to Mariners are issued to alert the public to stay clear of the area. Additional information is provided on Notices to Mariners in Section 3.14.4.3 (Safety Procedures) and Notices to Airmen in Section 3.14.4.2 (Public Access and Proximity). Unmanned aerial systems are operated in accordance with Federal Aviation Administration air traffic organization policy (under Title 14 CFR Part 91 Federal Aviation Regulations) as specified in Office of the Chief of Naval Operations Instructions 3710, 3750, and 4790. These standard operating procedures benefit public health and safety by reducing the potential for interaction with these unmanned systems and vehicles.

5.1.1.9 Towed Target Safety

As a standard collision avoidance procedure, prior to deploying a towed in-water device (e.g., surface target) from a manned platform, the Navy searches 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, sea turtles, and vegetation by reducing the potential for physical disturbance and strike by a towed target. Concentrations of floating vegetation can be indicators of potential marine mammal or sea turtle presence because marine mammals and sea turtles are known to seek shelter in, feed on, or feed among them. For example, young sea turtles are known to hide from predators and eat the algae associated with floating concentrations of kelp paddies or other marine vegetation.

5.1.1.10 Cultural Resources

As established in the Integrated Cultural Resources Management Plans for Naval Base Ventura County (NBVC) Point Mugu and SNI, the Navy will implement standard operating procedures in the case of an unanticipated discovery of cultural materials:

- The contractor, through the Facilities Engineering Acquisition Division (a component of the Public Works Department at NBVC), or other individual charged with contract execution, will immediately stop work in the vicinity of the discovery, secure the area, and notify the NBVC Cultural Resources Manager.
- The NBVC Cultural Resources Manager will notify Public Works Officer, State Historic Preservation Officer, Tribes, and other parties as appropriate; notification will include the nature of the discovery, steps being taken in response, and any time constraints, if applicable.
- The NBVC Cultural Resources Manager will consult with State Historic Properties Officer, Tribes, and other parties as appropriate to determine the appropriate actions.
- Those resources not meeting National Historic Properties Act eligibility criteria require no further management treatment, except under specific conditions in which construction monitoring has been recommended.
- If the inadvertent discovery is determined to include human remains or other materials pertinent to Native American Graves Protection and Repatriation Act (NAGPRA), then it will be handled according to the procedures outlined in 43 CFR 10, or according to procedures outlined in a Comprehensive Agreement or Plan of Action to be developed in consultation with Tribes.
- No further ground disturbance shall occur within 30 meters (100 ft.) of the discovery until consultation, as appropriate, has been completed.
- If underwater prehistoric archaeological resources are identified, the Navy will consult on any potential findings to develop a Standard Operating Procedure and appropriate mitigation.

In addition to the above standard operating procedures identified in the Integrated Cultural Resources Management Plans, the Navy has developed protective procedures to avoid or minimize potential

adverse effects to CA-SNI-168 at the Land Impact Site on SNI, as discussed in Section 3.10.6.2.1 (Physical Disturbance and Strike). These protective measures include the following:

- **Site Protection:** The Land Impact Site target pad covers CA-SNI-168 with approximately 5–20 ft. of fill material, which is refilled in and re-compacted after each impact activity. Signage is posted and access is restricted to the target pad; foot traffic in surrounding sensitive cultural resources is not allowed. Consistent with the Standard Operating Procedures, collection of artifacts is prohibited, and off-road travel is restricted.
- **Pre-activity procedures:** A pre-activity survey is completed up to one week prior for artifacts and NAGPRA items, and aircrew and ground crew briefings are conducted prior to each event.
- **Event procedures:** An Archaeologist is present for all impact activities.
- **Post-activity procedures:** A post-activity survey is completed immediately following an impact event by an Archaeologist. Debris located within sensitive resources areas are recovered by the Archaeologist and coordinated with range environmental representatives. In the event of a post-review discovery, unanticipated effect, or inadvertent discovery of NAGPRA cultural items, the Archaeologist on site will notify the NBVC Cultural Resources Manager, and the Navy will proceed consistent with 36 CFR part 800.13, as well as NAGPRA and its implementing regulations, as appropriate.

5.2 Mitigation

5.2.1 Benefits of Mitigation

The Chapter 3 (Affected Environment and Environmental Consequences) environmental analyses indicate that certain stressors have the potential to affect certain biological or cultural resources. The Navy developed mitigation measures to avoid or minimize the effects of those stressors. The Navy will implement the appropriate mitigation for either of the action alternatives. The Navy considered the benefits of mitigation in the environmental analyses for both Alternatives 1 and 2 of the Proposed Action in this EIS/OEIS. In addition to analyzing mitigation measures pursuant to the National Environmental Policy Act (NEPA), the Navy designed its mitigation measures to achieve one or more benefits in accordance with other environmental laws and regulations, such as the following:

- Effect the least practicable adverse impact on marine mammal species or stocks and their habitat, and have a negligible impact on marine mammal species and stocks (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 (as required under the Magnuson-Stevens Fishery Conservation and Management Act); and
- Avoid adversely impacting historic shipwrecks (as required under the Abandoned Shipwreck Act and National Historic Preservation Act).

The Navy is coordinating its mitigation with the appropriate regulatory agencies, including the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), through the consultation and permitting processes. The Navy and NMFS Records of Decision, MMPA Regulations and Letter of Authorization (LOA), and associated ESA Biological Opinion(s) will document the mitigation measures that the Navy will implement under the Proposed Action. Furthermore, the Navy will document additional commitments made through consultations in the Integrated Natural Resources Management Plan and Integrated Cultural Resource Management Plan for SNI. Should the Navy require a change in

how it implements mitigation based on national security concerns, evolving readiness requirements, or other factors (e.g., significant changes in the best available science), the Navy will engage the appropriate agencies and tribes to reevaluate its mitigation through adaptive management or the appropriate consultation processes. This approach will be coordinated with federally recognized tribes, NMFS and USFWS during the consultation and permitting processes, and may be included in the MMPA Regulations and LOA, associated Biological Opinions under ESA, or other relevant documents.

5.2.2 Compliance Initiatives

To disseminate its mitigation requirements to the appropriate personnel and meet other compliance requirements for the MMPA, ESA, and Magnuson-Stevens Fishery Conservation and Management Act (for managing Essential Fish Habitats), the Navy will continue using the Protective Measures Assessment Protocol for at-sea activities on the PMSR, as described in the section below.

5.2.2.1 Protective Measures Assessment Protocol

To disseminate requirements to the personnel who are required to implement mitigation during at-sea testing and training activities, the Navy will continue inputting at-sea mitigation measures into the Protective Measures Assessment Protocol and appropriate governing instructions. The Protective Measures Assessment Protocol is a software tool that serves as the Navy's comprehensive data source for at-sea mitigation applicable to testing and training. The software tool provides personnel with notification of the required mitigation measures and a visual display of the planned activity location overlaid with relevant environmental data (e.g., mapped locations of Marine Protected Areas). Navy policy requires all applicable personnel to access the Protective Measures Assessment Protocol during the event planning process. This helps ensure that personnel receive mitigation instructions prior to the start of Navy activities and implement mitigation appropriately.

5.2.2.2 Monitoring, Research, and Reporting Initiatives

Many of the Navy's monitoring programs, research programs, and reporting initiatives have been ongoing for more than a decade and will continue as a compliance requirement for the MMPA, ESA, or other relevant environmental regulations, such as the Magnuson-Stevens Fishery Conservation and Management Act. The Navy and NMFS will use the information contained within monitoring, research, activity, and incident reports when evaluating the effectiveness and practicality of mitigation and determining if adaptive adjustments to mitigation may be appropriate. These reports also facilitate better understandings of the biological resources that inhabit the Study Area and the potential impacts of the Proposed Action on those resources.

5.2.2.3 Marine Species Research and Monitoring Programs

Through its marine species research and monitoring programs, the Navy is one of the nation's largest sponsors of scientific research on and monitoring of marine species. Navy research programs focus on investments in basic and applied research that increase fundamental knowledge and advance naval technological capabilities. Navy monitoring programs focus on the potential impacts of testing and training activities on biological resources. Monitoring reports are typically made available to the public on the U.S. Navy Marine Species Monitoring webpage for most Navy testing and training activities (<https://www.navymarinespeciesmonitoring.us/>). Specific details regarding the content of the reports are coordinated with the appropriate agencies through the consultation and permitting processes.

5.2.2.3.1 Testing and Training Activity Reports

In an annual activity report to appropriate regulatory agencies or other entities, the Navy will describe the level of testing and training conducted during the reporting period. For example, the Navy will report the location and total counts and types of explosives used that potentially result in the incidental take of marine mammals, and an assessment if activities conducted in the Study Area exceeded levels of Navy activities analyzed in the MMPA authorization and ESA Biological Opinions. The Navy will also provide annual reports to the California Coastal Commission on any explosive or gunnery activities should they occur in the five designated coastal biologically important areas for cetaceans (blue and humpback whales and harbor porpoise). In addition, the Navy has committed to providing federally recognized tribes with annual reports of activities conducted on SNI.

5.2.2.3.2 Incident Reports

The Navy's mitigation measures and many of its standard operating procedures prevent incidents involving biological and cultural resources, such as aircraft strikes, vessel strikes, and impacts on historic properties, and seafloor resources. To provide information on incidents involving biological or cultural resources, the Navy will submit reports to the appropriate management authorities, as described below:

- **Birds:** As described in Section 3.9 (Marine Birds) and Section 3.14 (Public Health and Safety), bird strikes present an aviation safety risk for aircrews and aircraft. The Navy will report all bird strikes per standard operating procedures.
- **Marine Mammals, Sea Turtles, and ESA-Listed Species:** The Navy will notify the appropriate regulatory agency, which may include NMFS (e.g., NMFS Stranding Network) or the USFWS, immediately or as soon as operational security considerations allow if it observes the following that is (or may be) attributable to Navy activities:
 - a vessel strike of a marine mammal, sea turtle, or ESA-listed species during testing or training;
 - a stranded, injured, or dead marine mammal, sea turtle, or ESA-listed species during testing or training; or
 - an injured or dead marine mammal, sea turtle or ESA-listed species during post-explosive event monitoring or in the event of a laser or other directed energy system lethally strikes a protected species.
- The Navy will provide relevant information pertaining to an incident (e.g., vessel speed). Additional details on these incident-reporting requirements will be included in a Notification and Reporting Plan, developed in coordination with the appropriate agency. The Navy will continue to provide the appropriate personnel with training on marine species incidents and their associated reporting requirements to aid the data collection and reporting processes (see Section 5.3.1, Environmental Awareness and Education).
- **Cultural Resources:** In the event the Navy impacts an historic property (e.g., archaeological resource), it will commence consultation with the State Historic Preservation Officer and Tribal Historic Preservation Officer in accordance with 36 CFR section 800.13(b)(3).

5.2.3 Mitigation Development Process

For this EIS/OEIS, the Navy will continue to work collaboratively with the appropriate regulatory agencies and other relevant entities to develop and finalize its mitigation through the consultation and permitting processes. The mitigation development process involves reanalyzing existing measures and analyzing new mitigation recommendations received from Navy, USFWS and NMFS scientists, other

governmental agencies, tribes, the public and non-governmental organizations during the NEPA, consultation, and permitting processes. When developing mitigation, the Navy conducts a detailed review and assessment of each potential mitigation measure individually and then all potential mitigation measures collectively to determine if, as a whole, mitigation will effectively avoid or reduce potential impacts from the Proposed Action and will be practical to implement. The Navy operational community (i.e., leadership from the aviation and surface communities; leadership and management from the research, development, test and acquisition community; and other subject matter experts), environmental planners, and scientific experts provide input on the effectiveness and practicality of implementing a mitigation. Navy Senior Leadership has reviewed and approved the full suite of mitigation measures proposed in this EIS/OEIS and determine whether it is the highest level of mitigation practical for the Navy to implement under the Proposed Action. The suite of final mitigation measures resulting from the ongoing planning, consulting, and permitting processes will then be documented in the Navy and NMFS's Records of Decision, the MMPA LOA, ESA Biological Opinion, and other applicable documents.

Section 5.3.6 (Measures Considered but Eliminated) contains information on measures that did not meet the appropriate balance between being effective and practical to implement, and therefore will not be implemented under the Proposed Action.

5.2.3.1 At-Sea Procedural Mitigation Development

Procedural mitigation is mitigation that the Navy will implement whenever and wherever testing and training activities involving applicable acoustic, explosive, and physical disturbance and strike stressors take place within the Study Area. At-sea procedural mitigation (implemented for activities that occur on or over the open ocean) generally involves: (1) the use of one or more trained Lookouts (trained observers) to observe for specific biological resources within a mitigation zone, (2) requirements for Lookouts to immediately communicate sightings of specific biological resources to the appropriate Test Conductor or watch station for information dissemination, and (3) requirements for the Test Conductor or watch station to implement appropriate mitigation or until an activity condition has been met.

At-sea procedural mitigation primarily involves Lookouts observing for marine mammals, sea turtles, and in some cases, sea birds. The Navy observes for these additional biological resources prior to the initial start or during the conduct of certain activities to protect ESA-listed or other protected species as an additional layer of protection for these species.

In developing at-sea procedural mitigation for avoiding or minimizing effects to marine resources, the Navy did not factor mitigation into its quantitative analysis process. In other words, for the Proposed Action for this EIS/OEIS using explosives detonating at or near the surface, a quantitative post-model analysis was not applied to reduce the potential impacts on marine resources. The Navy assumes that Lookouts will not be 100 percent effective at detecting all individual marine mammals and sea turtles within the mitigation zones for each activity. This is due to the inherent limitations of observing marine species and because the likelihood of sighting individual animals is largely dependent on observation conditions (e.g., time of day, sea state, mitigation zone size, observation platform) and animal behavior (e.g., the amount of time an animal spends at the surface of the water and group size). This is particularly true for sea turtles, small marine mammals, and marine mammals that display cryptic behaviors (e.g., surfacing to breathe with only a small portion of their body visible from the surface). Throughout Section 5.3 (Proposed At-Sea Procedural Mitigation), discussions about the likelihood that a Lookout would observe a marine mammal or sea turtle pertain specifically to animals that are available

to be observed (i.e., on, above, or just below the water's surface). A qualitative analysis process was also applied for other species (e.g., birds, fish) for determining the effectiveness of a mitigation for these species.

Operational data are also considered when assessing the practicality of implementing a mitigation as described in Section 5.2.4 (Practicality of Implementing Procedural Mitigation). The Navy also considers the best available science (discussed in Chapter 3, Affected Environment and Environmental Consequences), published literature, data on marine mammal and sea turtle impact ranges obtained through acoustic modeling, marine species monitoring and density data, and the most recent guidance from NMFS and the USFWS. Background information on the data used to develop the ranges to effect for marine mammals and sea turtles (such as hearing threshold metrics) is provided in Section 3.7 (Marine Mammals) and Section 3.8 (Sea Turtles).

5.2.3.2 Lookouts

Lookouts perform similar duties as standard watch personnel (e.g., personnel on the bridge watch team and personnel stationed for man-overboard precautions, as described in Section 5.1.1 (Standard Operating Procedures), but are designated the responsibility of helping meet the Navy's mitigation requirements by visually observing mitigation zones. The number of Lookouts designated for each testing and training activity is dependent upon the number of personnel involved in the activity (i.e., manning restrictions) and the number and type of assets available (i.e., equipment and space restrictions).

Depending on the activity, a Lookout may be positioned on a ship (i.e., surface ships), on a small boat (e.g., rigid-hull inflatable boat) or in an aircraft. Certain platforms, such as aircraft and small boats, have manning (staffing) or space restrictions; therefore, the Lookout on these platforms is typically an existing member of the aircraft or boat crew who is responsible for other essential tasks (e.g., a pilot who is also responsible for navigation). Some platforms (e.g., the Littoral Combat Ship) are minimally manned and are therefore either physically unable to accommodate more than one Lookout or divert personnel from mission-essential tasks, including safe and secure operation of propulsion, weapons, or damage control systems that ensure the safety of the ship and the personnel on board. The number of Lookouts specified for each activity in Section 5.3 (Proposed At-Sea Procedural Mitigation) represents the maximum number of Lookouts that can be designated for those activities without requiring additional personnel or reassigning duties. The Navy is unable to position Lookouts on unmanned surface vehicles, unmanned aerial systems, unmanned underwater vehicles, and submerged submarines, or have Lookouts observe during activities that use systems deployed from or towed by unmanned platforms. Additionally, the Navy is unable to position a vessel or aircraft for observation within the predefined impact zone or hazard pattern during some activities (e.g., surface-to-surface missile launch event) once the missile has been deployed against a target, for the safety and protection of personnel.

5.2.3.3 Mitigation Zones

Mitigation zones are areas at the surface of the water within which applicable testing or training activities will be ceased or modified to protect specific biological resources from an auditory injury (permanent threshold shift [PTS]), non-auditory injury (from impulsive sources), or direct strike (e.g., vessel strike) to the maximum extent practicable. Mitigation zones measure as the radius from a stressor. The Navy developed each mitigation zone to be the largest area Lookouts can reasonably be expected to observe during typical activity conditions (i.e., the most environmentally protective) and

within which the Navy can commit to implementing mitigation without impacting safety, sustainability, and the ability to meet mission requirements.

Mitigation zones are appropriately sized for each applicable testing and training activity category or stressor. The Navy designed the mitigation zones for most explosive stressors according to its source bins (i.e., sources by net explosive weight). Mitigation does not pertain to stressors that do not have the potential to impact biological resources (e.g., *de minimis* explosive sources that do not have the potential to affect marine species, resulting in take under MMPA and ESA).

The level of effect that will likely be mitigated are based on a comparison of the mitigation zone size to the predicted ranges of effect for the applicable source (see Appendix E, Underwater Range to Effects for Explosives at or Near the Surface in the Point Mugu Sea Range), with the longest average ranges to PTS or mortality, as discussed in Section 5.3 (Proposed At-Sea Procedural Mitigation). These conservative discussions represent the worst-case scenario for each activity category or stressor. The mitigation zones will oftentimes cover all or a larger portion of the predicted average ranges to PTS or mortality for other comparatively smaller sources with shorter impact ranges (e.g., explosives with a small explosive net weight). Depending on the activity category or stressor, the mitigation zones are oftentimes large enough to mitigate within a portion of the ranges to temporary threshold shift (TTS) which is recoverable. Background information on PTS, TTS, and marine mammal and sea turtle hearing groups is presented in the U.S. Department of the Navy (2017a) technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)*.

5.2.3.4 Implementing At-Sea Procedural Mitigation

The Navy takes several courses of action in response to a sighting of an applicable biological resource in a mitigation zone. First, a Lookout will communicate the sighting to the Test Conductor or watch station. Next, the Test Conductor or watch station will implement the prescribed mitigation, such as delaying the initial start of an activity, ceasing an explosive detonation, or maneuvering a vessel. For sightings of marine mammals, sea turtles, and other specified biological resources within a mitigation zone prior to the initial start of or during applicable activities, the Navy will continue mitigating until one of the four conditions listed below is met. The conditions allow a sighted animal to leave the mitigation zone before the initial start of an activity or before an activity resumes.

- The animal is observed exiting the mitigation zone;
- The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the stressor source;
- The mitigation zone has been clear from any additional sightings for a specific wait period; or
- For mobile activities, the stressor source has transited or has been relocated a distance equal to double the mitigation zone size beyond the location of the last sighting.

5.2.4 Practicality of Implementing Procedural Mitigation

Mitigation measures may have some degree of impact on the testing or training activities when implemented (e.g., modifying where and when activities occur, ceasing an activity in response to a sighting). The Navy is willing to accept a certain level of impact on its military readiness activities because of the substantial benefit that mitigation measures provide for avoiding or minimizing impacts on environmental and cultural resources. Mitigation measures must meet the appropriate balance between being effective and practical to implement. To evaluate practicality, the Navy conducted an extensive and comprehensive assessment to determine how and to what degree potential mitigation measures would be compatible with planning, scheduling, and conducting testing and training activities

under the Proposed Action in order to meet the Navy's Title 10 requirements. Specific, case-by-case, mission requirements, safety, and environmental conditions will also be considered when determining whether a mitigation measure is practicable to implement (e.g., mission-essential components, risk to personnel, equipment limitations and fuel constraints, adverse weather).

5.2.4.1 Mitigation Assessment Criteria

The purpose and need of the Proposed Action is to ensure that the Navy meets its mission to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas, as statutorily mandated in Title 10 section 5062 of the United States Code. The Navy's mission is achieved in part by conducting testing and training within the Study Area in accordance with established Navy military readiness requirements. Training requirements are developed through many years of iteration and adaptation and are designed to ensure that Sailors achieve the levels of readiness needed to properly respond to the multitude of contingencies they may face during military missions and combat operations.

To achieve the highest skill proficiency and most accurate results possible, the Navy conducts activities in a variety of realistic tactical oceanographic and environmental conditions. Such conditions include variations in bathymetry, topography, surface fronts, and sea surface temperatures. Training activities must be as realistic as possible to provide the experiences vital to success and survival during military missions and combat operations. Degraded training would result in units being unqualified to conduct the range of military operations required by operational Commanders. The inability of such Commanders to meet security objectives would result in not only the increased risk to life, but also the degradation of national security.

Testing activities must be conducted as realistic as possible for the Navy to effectively test systems and platforms (and components of these systems and platforms) 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. Testing before full-scale production or delivery to the fleet ensures functionality and accuracy in military mission and combat conditions.

As described in Chapter 2 (Description of Proposed Action and Alternatives), the Navy requires access to sea and air space throughout the PMSR. Each area plays a critical role in the Navy's ability to plan, schedule, and effectively execute military readiness activities, such as testing and training. The locations where testing and training may occur must be situated in a way that allows the Navy to complete its activities without physical or logistical obstructions. The Navy requires extensive sea and air space so that individual testing and training activities can occur at sufficient distances so they do not interfere with one another or with other users. Some activities require continuous access to large and unobstructed areas, consisting potentially of tens or thousands of square miles (as in the case of long-range weapons systems). This provides personnel the ability to develop competence and confidence in their capabilities across multiple types of weapons, and the ability to train to communicate and operate in a coordinated fashion as required during military missions and combat operations. Other activities may be smaller and more localized in scale, at discrete locations that are critical to certain aspects of military readiness.

The locations for testing and training activities maximize efficiency while supporting specific mission and safety requirements, de-conflicting sea space and airspace and minimizing the time personnel must spend away from home. Testing and training locations are typically selected based on their proximity to homeports, home bases, associated training ranges, testing facilities, air squadrons, and existing

infrastructure to reduce travel time and associated costs. Testing areas are typically located near systems command support facilities, which provide critical infrastructure support and technical expertise necessary to conduct testing. Testing is more efficient and effective when logistical support is co-located where the testing activities occur.

During its assessment, the Navy considered mitigation measures practical to implement if they met all criteria discussed below:

- **Implementing the mitigation is safe:** Mitigation measures must not increase safety risks to Navy personnel and equipment, or to the public. The Navy assessed the following safety factors: increased pilot fatigue; accelerated fatigue-life of aircraft; fuel restrictions of participating aircraft and locations of refueling stations; proximity to aircraft emergency landing fields, critical medical facilities, and search and rescue capabilities; spatial restrictions of observation platforms; and conflict with other Navy or non-Navy sea and airspace uses (e.g., established commercial air traffic routes, commercial vessel shipping lanes, and areas used for energy exploration or alternative energy development). In addition, Lookouts should safely and effectively maintain situational awareness while observing the mitigation zones during typical activity conditions, without increasing the safety risk for personnel. For example, the safety risk would increase if Lookouts were required to direct their attention away from essential mission requirements.
- **Implementing the mitigation is sustainable:** A primary factor that the Navy incorporates into the planning and scheduling of its testing and training activities is the amount and type of available resources, such as funding, personnel, and equipment. Mitigation measures must be sustainable over the life of the Proposed Action, meaning that they will not require the use of resources in excess of what is available. When assessing a mitigation measure as sustainable, the Navy considers the time away from homeport for Navy personnel, increases in personnel (i.e., manpower) or equipment (e.g., adding a small boat to serve as an additional observation platform), or results in additional operational costs (e.g., increases in fuel consumption, equipment maintenance, or acquisition of new equipment).
- **Implementing the mitigation allows the Navy to continue meeting its mission requirements:** The Navy considers if each individual measure and the iterative and cumulative impact of all potential measures would be within the Navy's legal authority to implement. The Navy also considers if mitigation would modify testing or training activities in a way that would prevent individual activities from meeting their mission objectives and prevent the Navy from meeting statutorily mandated Title 10 requirements, such as by:
 - Affecting testing or training realism or preventing ready access to ranges, operating areas, facilities, or range support structures (which would reduce realism and present sea space and airspace conflicts).
 - Affecting the ability for Sailors to train and become proficient in using weapon systems as would be required in areas analogous to where the military operates eroding capabilities or the loss of perishable skills (which would result in a significant risk to personnel or equipment safety during military missions and combat operations).
 - Affecting the ability for units to meet their individual training and certification requirements (which would affect the ability to deploy with the required level of readiness necessary to accomplish any tasking by Combatant Commanders).
 - Affecting the ability of researchers, program managers, and weapons system acquisition programs to meet research, development, test and evaluation objectives before full-scale production or delivery to the fleet.

- Reducing the Navy's ability to be ready, maintain deployment schedules, or respond to national emergencies or emerging national security challenges (which would present national security concerns).

5.2.4.2 Factors Affecting Practicality

Two of the factors that influence whether procedural mitigation measures meet practicality criteria were the number of times mitigation measures are likely be implemented and the duration over which the activity may likely be ceased. The number of times a mitigation is implemented is largely dependent on the size of the mitigation zone and the nature of the activity. As a mitigation zone size increases, the area of observation increases by an order of magnitude. This is because mitigation zones are measured as the radius (r) from a stressor but apply to circular area (A) around that stressor ($A = \pi * r^2$, where π is a constant that is approximately equal to 3.14). For example, a 100-yard (yd.) mitigation zone is equivalent to an area of 31,416 square yd. A 200 yd. mitigation zone is equivalent to an area of 125,664 square yd. Therefore, increasing a mitigation zone from 100 yd. to 200 yd. (i.e., doubling the mitigation zone radius) would quadruple the mitigation zone area (the area over which mitigation must be implemented). Similarly, increasing a mitigation zone from 1,000 yd. to 4,000 yd. (i.e., quadrupling the mitigation zone radius) would increase the mitigation zone area by a factor of 16. Increasing the mitigation area consequently increases the number of times mitigation is likely implemented during that activity.

The duration over which mitigation is implemented can differ considerably. Duration depends on the mitigation zone size, number of animal sightings, behavioral state of animals sighted (e.g., travelling at a fast pace on course to exit the mitigation zone, milling slowly in the center of the mitigation zone), and which pre-activity or during-activity conditions are met before the activity can commence or resume after each sighting. Extending the length of an activity may affect the safety, sustainability, or the Navy's ability to accomplish the activity's intended objectives and may vary by activity. This is one reason why the Navy tailors its mitigation zone sizes and mitigation requirements by activity category or stressor and the platforms involved.

As described in Section 5.3 (Proposed At-Sea Procedural Mitigation), the Navy will mitigate accordingly for each applicable sighting and will continue mitigating until one of four conditions is met. In some instances, such as if an animal dives underwater after a sighting, it may not be possible for a Lookout to verify visually if the animal has exited the mitigation zone. The Navy cannot delay or cease activities indefinitely for the purpose of mitigation due to impacts on safety, sustainability, and the Navy's ability to continue meeting its mission requirements. To account for this, a post-sighting wait period of 30 minutes or 10 minutes, based on the platforms involved, allows animals the maximum amount of time practical to resurface (i.e., and is observable) before activities resume. When developing the length of its wait periods, the Navy assumes a mitigation may be implemented more than once. For example, an activity may be delayed or ceased for more than one 30-minute or 10-minute period.

A 30-minute period covers the average dive times of most marine mammals and a portion of the dive times of sea turtles and deep-diving marine mammals (i.e., sperm whales and beaked whales). Information on diving behaviors of marine mammals and sea turtles is presented in the U.S. Department of the Navy technical report: *Dive Distribution and Group Size Parameters for Marine Species Occurring in the U.S. Navy's Atlantic and Hawaii-Southern California Testing Study Areas* (U.S. Department of the Navy, 2017b). The Navy determined that a 30-minute wait period is the maximum wait time that is practical to implement during activities involving vessels and aircraft that are not typically fuel constrained to allow the activities to continue meeting their intended objectives. Activities occur at

specific locations within specific timeframes based on range scheduling to de-conflict sea and airspace. Increasing the wait period, and consequently the amount of time the activity would need to be delayed or extended in order to accomplish its intended objective, could impact activity realism or cause sea space conflicts in a way that could impact the Navy's ability to continue meeting its mission requirements. For example, delaying an activity for multiple wait periods could result in personnel not being able to detonate an explosive before the participating platforms are required to depart the range due to range scheduling; therefore, the activity would not accomplish its intended objectives.

The Navy assigns a 10-minute wait period to activities involving aircraft that are typically fuel constrained (e.g., rotary-wing aircraft, fighter aircraft). A 10-minute period covers a portion, but not the average, dive times of marine mammals and sea turtles (U.S. Department of the Navy, 2017b). The Navy determined that a 10-minute wait period is the maximum wait time that is practical to implement during activities involving aircraft that are typically fuel constrained. Increasing the wait period, and consequently the amount of time needed in order to accomplish an activity's intended objective, may require aircraft to depart the activity area to refuel and complete the event safely. If implementing the wait period multiple times, the aircraft could be required to depart the activity area to refuel multiple times. Refueling events would vary in duration, depending on the activity location and proximity to the nearest refueling station. Multiple refueling events decreases the ability for Lookouts to safely and effectively maintain situational awareness of the activity area, and could increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. Delaying an activity for multiple wait periods could result in personnel not being able to conduct the activity due to range scheduling; therefore, the activity would not accomplish its intended objectives.

5.3 Proposed At-Sea Procedural Mitigation

Environmental Awareness and Education is designed to aid Lookouts and other personnel with observation, environmental compliance, and reporting responsibilities. Procedural mitigation measures are organized by stressor type and training or testing activity category.

5.3.1 Environmental Awareness and Education

The Navy requires Lookouts and other personnel to complete their assigned environmental compliance responsibilities (e.g., mitigation, reporting requirements) before, during, and after testing and training activities. Marine Species Awareness Training was first developed in 2007 and has since undergone numerous updates to ensure that the content remains current. The most recent product was approved by NMFS and released by the Navy in 2018. The Navy developed a series of educational training modules, known as the Afloat Environmental Compliance Training program, to ensure Navy-wide compliance with environmental requirements. The Afloat Environmental Compliance Training program, including the updated Marine Species Awareness Training, helps Navy personnel from the most junior Sailors to Commanding Officers gain a better understanding of their personal environmental compliance roles and responsibilities. The Navy will provide environmental awareness and education to the appropriate personnel to aid visual observation, environmental compliance, and reporting responsibilities. Appropriate personnel (including civilian personnel) involved in mitigation and training or testing activity reporting under the Proposed Action shall complete one or more modules of the U.S. Navy Afloat Environmental Compliance Training Series, as identified in their career path training plan. Modules include:

- **Introduction to the U.S. Navy Afloat Environmental Compliance Training Series:** The introductory module provides information on environmental laws (e.g., ESA, MMPA) and the

corresponding responsibilities that are relevant to Navy testing and training activities. The material explains why environmental compliance is important in supporting the Navy's commitment to environmental stewardship.

- **Marine Species Awareness Training:** All bridge watch personnel, Commanding Officers, Executive Officers, maritime patrol aircraft aircrews, anti-submarine warfare and mine warfare rotary-wing aircrews, Lookouts, and equivalent civilian personnel must successfully complete the Marine Species Awareness Training prior to standing watch or serving as a Lookout. The Marine Species Awareness Training provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures. Navy biologists developed Marine Species Awareness Training to improve the effectiveness of visual observations for biological resources, focusing on marine mammals and sea turtles, and including floating vegetation, jellyfish aggregations, and flocks of seabirds.
- **U.S. Navy Protective Measures Assessment Protocol:** This module provides the necessary instruction for accessing mitigation requirements during the event planning phase using the Protective Measures Assessment Protocol software tool.

Additional information on the Protective Measures Assessment Protocol is provided in Section 5.2.2.1 (Protective Measures Assessment Protocol), and additional information on testing and training activity and incident reports is provided in Section 5.2.2.2 (Monitoring, Research, and Reporting Initiatives).

From an operational perspective, the interactive web-based format of the U.S. Navy Afloat Environmental Compliance Training Series is ideal for providing engaging and educational content that is cost effective and convenient to access by personnel who oftentimes face rotating job assignments. Overall, the U.S. Navy Afloat Environmental Compliance Training Series has improved the quality and accuracy of testing and training activity reports and incident reports across the Navy. Improved reporting quality indicates that the U.S. Navy Afloat Environmental Compliance Training Series is helping to facilitate Navy-wide environmental compliance as intended.

Lookouts and members of the operational community have demonstrated enhanced knowledge and understanding of the Navy's environmental compliance responsibilities since the development of the U.S. Navy Afloat Environmental Compliance Training Series. It is likely that the implementation of the Marine Species Awareness Training starting in 2007, and the additional U.S. Navy Afloat Environmental Compliance Training Series modules starting in 2014, has contributed to overall reduction in Navy vessel strikes of marine mammals. This indicates that the environmental awareness and education program is helping to improve the effectiveness of mitigation implementation. A more detailed analysis of marine mammal vessel strikes is presented in Section 3.7.5.3 (Assessing Vessels and MEM as Physical Disturbance and Strike Stressors).

5.3.2 Acoustic Stressors

The Navy will implement procedural mitigation to avoid or reduce potential impacts on biological resources from the acoustic stressors or activities discussed in the sections below.

5.3.2.1 Weapons Firing Noise

The Navy will implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from weapons firing noise, as outlined in Table 5.3-1.

The Navy determined that the proposed mitigation zone is the largest area within which it is practical to implement mitigation for this activity. The Navy will verify that the mitigation zone is visually clear prior to conducting weapons firing activities. In addition, the Navy will follow the incident reporting

procedures outlined in Section 5.2.2.3.2 (Incident Reports) if an incident is detected at any time during or after the event.

The small mitigation zone size and proximity to the observation platform will result in a high likelihood that Lookouts will be able to detect marine mammals and sea turtles throughout the mitigation zone. Observing for indicators of marine mammal and sea turtle presence will further avoid or reduce potential impacts on these resources within the mitigation zone.

As described in Section 3.0.6.1.5 (Weapons Noise), underwater sounds would be strongest just below the surface and directly under the firing point. Any sound that enters the water only does so within a narrow cone below the firing point or path of the projectile. The mitigation zone extends beyond the distance to which marine mammals and sea turtles would likely experience PTS or TTS from weapons firing noise; therefore, mitigation will help avoid or reduce the potential for exposure to this stressor.

Large-caliber gunnery training activities may involve a single ship firing or may be conducted as part of a larger exercise involving multiple ships. Surface ship crews learn to track targets (e.g., with radar), engage targets, practice defensive marksmanship, and coordinate their efforts within the context of larger activities. Increasing the number of times that the Navy must cease weapons firing during training decreases activity realism and could impact the ability for Navy Sailors to become proficient in using large-caliber guns as required during military missions and combat operations.

For example, ceasing of the activity multiple times would reduce the crew's ability to react to changes in the tactical situation or response to an incoming threat, which could potentially result in a delay to the ship's training schedule. When training is undertaken in the context of a coordinated exercise involving multiple ships, degrading the value of one training element may result in a degradation of the training value of other training elements. These factors could ultimately impact the ability for units to meet their individual training and certification requirements, and the Navy's ability to certify forces to deploy to meet national security tasking.

Table 5.3-1: Procedural Mitigation for Weapons Firing Noise

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Weapons firing noise associated with large-caliber gunnery activities
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout positioned on the ship conducting the firing <ul style="list-style-type: none"> – Depending on the activity, the Lookout could be the same one described in Section 5.3.3.1 (Explosive Medium- and Large-Caliber Projectiles) or Section 5.3.4.2 (Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions).
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zone: <ul style="list-style-type: none"> – 30° on either side of the firing line out to 70 yd. from the muzzle of the weapon being fired • Prior to the initial start of the activity: <ul style="list-style-type: none"> – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of weapons firing. • During the activity: <ul style="list-style-type: none"> – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease weapons firing. • Conditions for commencing/recommencing the activity after a marine mammal or sea turtle sighting before or during the activity: <ul style="list-style-type: none"> – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing weapons firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the firing ship; (3) the mitigation zone has been clear from any additional sightings for 30 min.; or (4) for mobile activities, the firing ship has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Increasing the number of times that the Navy must cease weapons firing during testing activities could result in similar consequences to activity realism and could 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. This would impact the ability to effectively test large-caliber guns before full-scale production or delivery to the fleet to ensure functionality, safety, and accuracy in military mission and combat conditions.

In summary, the Navy determined that implementing procedural mitigation for weapons firing noise beyond what is detailed in Table 5.3-1 would be incompatible with the practicality assessment criteria for safety and mission requirements.

5.3.3 Explosive Stressors

The Navy will implement procedural mitigation to avoid or reduce potential impacts on biological resources from the explosive stressors or activities discussed in the sections below. Section 3.7.5.2 (Stressor Assessment) and Section 3.8.5.2 (Assessment of Acoustic Stressors) provide a full analysis of potential impacts of explosives on marine mammals and sea turtles, respectively, including the distances of a predicted range to a potential effect.

5.3.3.1 Explosive Medium- and Large-Caliber Projectiles

The Navy will implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive gunnery activities, as outlined in Table 5.3-2. The mitigation zones for explosive medium- and large-caliber projectile are based on the range to effect for the stressor by activity and as the largest areas within which it is practical to implement mitigation.

Large-caliber gunnery activities may involve vessels firing projectiles at targets located up to 6 nautical miles (NM) down range. Medium-caliber gunnery activities involve vessels or aircraft firing projectiles at targets located up to 4,000 yd. down range, although typically much closer. As described in Section 5.3 (Proposed At-Sea Procedural Mitigation), certain platforms, such as small boats and aircraft used during explosive medium-caliber gunnery exercises, have manning or space restrictions; therefore, the Lookout for these activities is typically an existing member of the aircraft or boat crew who is responsible for other essential tasks (e.g., navigation). Due to their relatively lower vantage point, Lookouts on vessels (during medium- or large-caliber gunnery exercises) will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles when observing around targets located at the furthest firing distances.

The Navy will implement larger mitigation zones for large-caliber gunnery activities than for medium-caliber gunnery activities due to the nature of how the activities are conducted. For example, large-caliber gunnery activities are conducted from surface combatants, so Lookouts can observe a larger mitigation zone because they typically have access to high-powered binoculars mounted on the ship deck. This will enable observation of the distant mitigation zone in combination with hand-held binoculars and naked-eye scanning. Lookouts in aircraft (during medium-caliber gunnery exercises), have a relatively higher vantage point for observing the mitigation zones but will still be more likely to detect individual marine mammals and sea turtles when observing mitigation zones located close to the firing platform than at the furthest firing distances. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

The mitigation applies only to activities using surface targets. Most airborne targets are recoverable aerial drones that are not intended to be hit by ordnance. Given the speed of the projectiles and mobile target, and the long ranges that projectiles typically travel, it is not possible to definitively predict or to effectively observe where the projectile fragments will fall. For gunnery activities using explosive medium- and large-caliber projectiles, the potential military expended material fall zone (hazard pattern) can only be predicted within thousands of yards, which can be up to 6 NM from the firing location. These areas are too large to be effectively observed for marine mammals and sea turtles with the number of personnel and platforms available for this activity. The potential risk to marine mammals and sea turtles during events using airborne targets is limited to the animal being directly struck by falling military expended materials.

Table 5.3-2: Procedural Mitigation for Explosive Medium- and Large-Caliber Projectiles

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Gunnery activities using explosive medium-caliber and large-caliber projectiles <ul style="list-style-type: none"> – Mitigation applies to activities using a maritime surface target
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout on the vessel or aircraft conducting the activity <ul style="list-style-type: none"> – For activities using explosive large-caliber projectiles, depending on the activity, the Lookout could be the same as the one described in Section 5.3.2.1 (Weapons Firing Noise). • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zones: <ul style="list-style-type: none"> – 200 yd. around the intended impact location for air-to-surface activities using explosive medium-caliber projectiles – 600 yd. around the intended impact location for surface-to-surface activities using explosive medium-caliber projectiles – 1,000 yd. around the intended impact location for surface-to-surface activities using explosive large-caliber projectiles • Prior to the initial start of the activity (e.g., when maneuvering on station): <ul style="list-style-type: none"> – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: <ul style="list-style-type: none"> – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Conditions for commencing/recommencing the activity after a marine mammal or sea turtle sighting before or during the activity: <ul style="list-style-type: none"> – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: <ul style="list-style-type: none"> (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-based firing or 30 min. for vessel-based firing; or (4) for activities using mobile targets, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • After completion of the activity (e.g., prior to maneuvering off station): <ul style="list-style-type: none"> – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

There is no potential for direct impact from the explosives because the detonations occur in air. Based on the extremely low potential for projectile fragments to co-occur in space and time with a marine mammal or sea turtle at or near the surface of the water, the potential for a direct strike is negligible; therefore, mitigation for gunnery activities using airborne targets would not be effective at avoiding or reducing potential impacts. Additional information on military expended materials is provided in Appendix D (Military Expended Material and Direct Strike Impact Analyses). Explosive bin 5 (E5) (e.g., large-caliber projectiles with net explosive weight >5–10 lbs.; see Table 3.0-16) have the longest

predicted impact ranges for explosive projectiles applying to the 1,000 yd. mitigation zone. Bin E2 (e.g., large-caliber projectiles with net explosive weight >0.5–2.5 lbs.) has the longest predicted impact ranges for explosive projectiles that apply to the 600 yd. and 200 yd. mitigation zones. The 1,000 yd., 600 yd., and 200 yd. mitigation zones extend beyond the respective ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The 1,000 yd. mitigation zone extends beyond the average ranges to PTS for sea turtles, mid-frequency cetaceans, and otariids, and into a portion of the average ranges to PTS for high-frequency cetaceans, low-frequency cetaceans, and phocids. The 600 yd. and 200 yd. mitigation zones extend beyond the respective average ranges to PTS for sea turtles, mid-frequency cetaceans, low-frequency cetaceans, otariids, and phocids, and into a portion of the average range to PTS for high-frequency cetaceans. The mitigation zones also extend into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E5 and bin E2.

Explosives in smaller source bins (e.g., E1; medium-caliber projectiles with net explosive weight 0.1–0.25 lbs.) have shorter predicted impact ranges; therefore, the mitigation zones extend beyond or cover a greater portion of the impact ranges for these explosives.

It would not be practical to increase these mitigation zones because observing from within the margin of increase would be unsafe and ineffective. Mission-essential safety protocols for explosive gunnery activities require event participants (including Lookouts) to maintain focus on the activity area to ensure safety of Navy personnel and equipment, and the public. For example, when air-to-surface medium-caliber gunnery exercises 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 attention on the activity area is paramount to aircraft safety. The typical activity areas for medium- and large-caliber gunnery activities are such that Lookouts can safely and effectively observe the mitigation zones for biological resources while simultaneously maintaining focus on the activity area.

Lookouts would need to redirect their attention to observe beyond the activity area if mitigation zones sizes were to be increased, and thereby would not meet the safety criteria since personnel would be required to direct attention away from mission requirements. Alternatively, the Navy would need to add personnel to serve as additional Lookouts on the existing observation platforms or allocate additional platforms to the activity to observe for biological resources. These actions would not be safe or sustainable due to limitations of manpower, resources, and space restrictions for these activities. Similarly, positioning platforms closer to the intended impact location would increase safety risks related to proximity to the detonation location and path of the explosive projectile.

Increasing the mitigation zone sizes could also result in larger areas over which detonations would need to be ceased in response to a sighting, and therefore would likely increase the number of times firing would be ceased, extending the length of the activity. This could diminish event realism in a way that would prevent activities from meeting their intended objectives. For example, the Navy must train its gun crews to coordinate with other participating platforms (e.g., small boats launching a target, other firing platforms), locate and engage surface targets (e.g., high speed maneuverable surface targets), and practice precise defensive marksmanship to disable threats.

Depending on the type of target being used, ceasing the activity multiple times could result in the target needing to be recovered and relaunched, which could then cause a significant loss of training or testing time. For activities that involve aircraft, extending the length of the activity could require aircraft to

depart the area to refuel. If multiple refueling events were required, the length of the activity could be extended by two to five times or more, decreasing the ability for Lookouts to safely and effectively maintain situational awareness of the activity area while increasing safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. This could also reduce the number of opportunities that gun crews have to fire on the target and cause delays to the training or testing schedule. Therefore, an increase in mitigation could impede the ability for gun crews to train and become proficient in using their weapons as required during military missions and combat operations, prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required 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. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for explosive medium-caliber and large-caliber projectiles beyond what is detailed in Table 5.3-2 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.2 Explosive Missiles and Rockets

The Navy will implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive missiles and rockets, as outlined in Table 5.3-3.

Missile and rocket exercises involve firing munitions at a maritime surface target typically located up to 15 NM down range, and infrequently up to 75 NM down range. Due to the distance between the mitigation zone and the observation platform, Lookouts will have a better likelihood of detecting marine mammals and sea turtles during close-range observations and are less likely to detect these resources once positioned at the firing location, particularly individual marine mammals, cryptic marine mammal species, and sea turtles. There is a chance that animals could enter the mitigation zone after the aircraft conducts its close-range mitigation zone observations and before firing begins (once the aircraft has transited to its firing position). Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

The Navy will implement larger mitigation zones (2,000 yds.) for missiles using 21–500 lb. net explosive weight than for missiles and rockets using 0.6–20 lb. net explosive weight (900 yds.) due to the nature of how these activities are conducted. During activities using missiles in the larger net explosive weight category, the firing aircraft (e.g., maritime patrol aircraft) have the capability of mitigating a larger area due to their larger fuel capacity. During activities using missiles or rockets in the smaller net explosive weight category, the firing aircraft (e.g., rotary-wing aircraft) are typically constrained by their fuel capacity. The mitigation only applies to aircraft-deployed missiles and rockets because aircraft can fly over the intended impact area prior to commencing firing. Mitigation would be ineffective for vessel-deployed missiles and rockets because of the inability for a Lookout to detect marine mammals or sea turtles from a vessel from the distant firing position. It would not be effective or practical to have a vessel conduct close-range observations of the mitigation zone prior to firing due to the length of time it would take to complete observations and transit back to the firing position, and the costs associated with increased fuel consumption.

The mitigation only applies to activities using surface targets. Most airborne targets are recoverable aerial drones that are not intended to be hit by ordnance. For example, telemetry-configured anti-air missiles used in training are designed to detonate or simulate a detonation near a target, but not as a result of a direct strike on a target. Given the speed of missiles and mobile targets, the high altitudes involved, and the long ranges that missiles typically travel, it is not possible to definitively predict or to effectively observe where the missile fragments will fall. The potential expended material fall zone can only be predicted within tens of miles for long range events, which can be 75 NM from the firing location; and thousands of yards for short range events, which can occur 15 NM from the firing location. These areas are too large to be effectively observed for marine mammals and sea turtles with the number of personnel and platforms available for this activity.

Table 5.3-3: Procedural Mitigation for Explosive Missiles and Rockets

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Aircraft-deployed explosive missiles and rockets <ul style="list-style-type: none"> – Mitigation applies to activities using a maritime surface target at ranges up to 75 NM
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout positioned in an aircraft • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zones: <ul style="list-style-type: none"> – 900 yd. around the intended impact location for missiles or rockets with 0.6–20 lb. net explosive weight – 2,000 yd. around the intended impact location for missiles with 21–500 lb. net explosive weight • Prior to the initial start of the activity (e.g., during a fly-over of the mitigation zone): <ul style="list-style-type: none"> – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: <ul style="list-style-type: none"> – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Conditions for commencing/recommencing the activity after a marine mammal or sea turtle sighting before or during the activity: <ul style="list-style-type: none"> – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: <ul style="list-style-type: none"> (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • After completion of the activity (e.g., prior to maneuvering off station): <ul style="list-style-type: none"> – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

The potential risk to marine mammals and sea turtles during events using airborne targets is limited to the animal being directly struck by falling military expended materials. There is no potential for direct impact from the explosives because the detonations occur in air. Based on the extremely low potential for military expended materials to co-occur in space and time with a marine mammal or sea turtle at or near the surface of the water, the potential for a direct strike is negligible; therefore, mitigation would not be effective at avoiding or reducing impacts.

Additional information on military expended materials is provided in Appendix D (Military Expended Material and Direct Strike Impact Analyses).

Bin E10 (e.g., Harpoon missiles), the largest explosive bin for this EIS/OEIS, has the longest predicted impact ranges for explosive missiles that apply to the 2,000 yd. mitigation zone. Bin E6 (e.g., Hellfire missiles) has the longest predicted impact ranges for explosive missiles and rockets that apply to the 900 yd. mitigation zone. The 2,000 yd. and 900 yd. mitigation zones extend beyond the respective ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals.

The mitigation zones extend beyond the respective average ranges to PTS for sea turtles and all marine mammal hearing groups except high-frequency cetaceans (the mitigation zones extend into a portion of the respective average ranges to PTS for this hearing group). The mitigation zones also extend into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E10 and bin E6. Explosives in smaller source bins (e.g., missiles in bin E9, rockets in bin E3) have shorter predicted impact ranges; therefore, the mitigation zones will cover a greater portion of the impact ranges for these explosives.

Mitigation zones are based on the largest areas within which it is practical for the Navy to implement mitigation. It is not practical to increase these mitigation zones because observing within the margin of increase would be unsafe and ineffective unless the Navy allocated additional platforms to the activity to observe for biological resources. The use of additional personnel and equipment (e.g., aircraft) would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants.

This would either require the aircraft conducting the activity to modify their flights plans reducing activity realism or at a safe distance away from the activity area and decreasing observation effectiveness. Similarly, positioning platforms closer to the intended impact location (as would be required if mitigation applied to vessel-deployed missiles and rockets) would increase safety risks related to proximity to the detonation location and path of the explosive missile or rocket.

Increasing the mitigation zone sizes would result in larger areas over which firing would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased which could extend the length of the activity. These impacts could significantly diminish event realism in a way that would prevent the activity from meeting its intended objectives. Explosive missile and rocket events require focused situational awareness of the activity area and continuous coordination between the participating platforms as required during military missions and combat operations. For activities using missiles in the larger net explosive weight category, the flyover distance between the mitigation zone and the firing location can extend upwards of 75 NM; therefore,

even aircraft with larger fuel capacities would need to depart the activity area to refuel if the length of the activity was extended. If the firing aircraft departed the activity location to refuel, the aircrew would lose the ability to maintain situational awareness of the activity area and effectively coordinate with other participating platforms. If multiple refueling events were required, the activity length could extend by two to five times or more, which would increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. These types of impacts could cause a significant loss of training or testing time, reduce the number of opportunities that aircrews have to fire on the target, and cause a significant delay to the training or testing schedule. Therefore, an increase in mitigation could impede the ability for aircrews to train and become proficient in using their weapons as required during military missions and combat operations, prevent units from meeting their individual training and certification requirements (which could prevent them from deploying with the required 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. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for explosive missiles and rockets beyond what is detailed in Table 5.3-3 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.3 Explosive Bombs

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive bombs, as outlined in Table 5.3-4.

The explosive bombing mitigation zone is based on net explosive weight and the associated average ranges to PTS. The Navy determined that the proposed mitigation zone for explosive bombs is the largest area within which it is practical to implement mitigation for this activity.

Bombing exercises involve an aircraft deploying munitions at a maritime surface target. Lookouts, by necessity for safety and mission success, primarily focus their attention on the water surface surrounding the intended detonation location (i.e., the mitigation zone). Being positioned in an aircraft gives the Lookout a good vantage point for observing marine mammals and sea turtles throughout the mitigation zone prior to launching ordnance. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone.

The mitigation zone extends beyond the average ranges to PTS for sea turtles and all marine mammal hearing groups except high-frequency cetaceans (the mitigation zones extend into a portion of the respective average ranges to PTS for this hearing group).

The mitigation zone also extends into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest bombs in bin E12 (which are not included in the Proposed Action); therefore, smaller bombs (e.g., 250 lb. bombs, 500 lb. bombs) used on the PMSR have shorter predicted impact ranges. The large mitigation zone extends beyond the impact ranges for these smaller explosives.

Table 5.3-4: Procedural Mitigation for Explosive Bombs

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Explosive bombs • Mitigation applies to activities using a maritime surface target at ranges up to 75 NM
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout positioned in the aircraft conducting the activity • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zone: <ul style="list-style-type: none"> – 2,500 yd. around the intended target • Prior to the initial start of the activity (e.g., when arriving on station): <ul style="list-style-type: none"> – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of bomb deployment. • During the activity (e.g., during target approach): <ul style="list-style-type: none"> – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease bomb deployment. • Conditions for commencing/recommencing of the activity after a marine mammal or sea turtle sighting before or during the activity: <ul style="list-style-type: none"> – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target; (3) the mitigation zone has been clear from any additional sightings for 10 min.; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • After completion of the activity (e.g., prior to maneuvering off station): <ul style="list-style-type: none"> – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

The use of additional personnel and aircraft would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft participating in the activity to modify their flights plans reducing activity realism or force the observing aircraft to position itself a safe distance away from the activity area and thereby decreasing observation effectiveness. Adding vessels to observe the mitigation zone would increase safety risks due to the presence of observation vessels within the vicinity of the intended explosive bomb detonation location.

Increasing the mitigation zone would result in a larger area over which explosive bomb deployment would need to be ceased in response to a sighting, and therefore could likely increase the number of times explosive bombing activities would be ceased and extend the length of the activity. These impacts could significantly diminish event realism in a way that could prevent the activity from meeting its intended objectives. For example, critical components of a Bombing Exercise Air-to-Surface training activity are the assembly, loading, delivery, and assessment of an explosive bomb. The activity requires focused situational awareness of the activity area and continuous coordination between multiple training components. The training exercise starts 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 loading 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. Extending the length of the activity could require aircraft to depart the area to refuel. If the firing aircraft departed the activity area to refuel, aircrew would lose the ability to maintain situational awareness of the activity area and the ability to effectively coordinate with other participating platforms. Disruption of the exercise could potentially affect the ability to complete all training components as required during military missions and combat operations. If multiple refueling events were required, the activity length could be extended by two to five times or more, which would cause a significant loss of training or testing time and could increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. This could also reduce the number of opportunities that aircrews have to approach targets and deploy bombs and reduce the Navy's ability to evaluate the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced, which could cause a significant delay to the training or testing schedules.

Therefore, an increase in mitigation could impede the ability for aircrews to train and become proficient in using their weapons, prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required 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. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption. In summary, the Navy determined that implementing procedural mitigation for explosive bombs beyond what is detailed in Table 5.3-4 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.4 Physical Disturbance and Strike Stressors

The Navy will implement procedural mitigation to avoid or reduce potential impacts on biological resources from the physical disturbance and strike stressors or activities discussed in the sections below. Section 3.7.5.3 (Assessing Vessels and MEM as Physical Disturbance and Strike Stressors) and Section 3.8.5.2.2 (Physical Disturbance and Strike) provide a full analysis of the potential impacts of physical disturbance and strikes on marine mammals and sea turtles, respectively. Appendix D (Military Expended Material and Direct Strike Impact Analyses) presents the impact footprints and direct strike calculations.

5.3.4.1 Vessel Movement

The Navy will implement procedural mitigation to avoid or reduce the potential for vessel strikes of marine mammals and sea turtles, as outlined in Table 5.3-5.

Table 5.3-5: Procedural Mitigation for Vessel Movement

Procedural Mitigation Description
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Vessel movement <ul style="list-style-type: none"> – The mitigation will not be applied if: (1) the vessel’s safety is threatened, (2) the vessel is restricted in its ability to maneuver (e.g., during launching and recovery of target, during towing activities, etc.), (3) the vessel is operated autonomously, or (4) when impractical based on mission requirements.
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout on the vessel that is underway
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zones: <ul style="list-style-type: none"> – 500 yd. around whales – 200 yd. around other marine mammals (except bow-riding dolphins and pinnipeds hauled out on man-made navigational structures, port structures, and vessels) – Within the vicinity of sea turtles • During the activity: <ul style="list-style-type: none"> – When underway, observe the mitigation zone for marine mammals and sea turtles; if observed, maneuver to maintain distance. • Additional requirements: <ul style="list-style-type: none"> – If a marine mammal or sea turtle vessel strike occurs, the Navy will follow the established incident reporting procedures.

The procedural mitigation measures for vessel movement are based on guidance from NMFS for vessel strike avoidance. Although the Navy is unable to position Lookouts on unmanned vessels, some vessels that operate autonomously have embedded sensors that aid in avoidance of large objects. The embedded sensors may help those unmanned vessels avoid marine mammal vessel strikes.

As discussed in Section 5.3.1 (Environmental Awareness and Education), it is likely that by implementing Marine Species Awareness Training starting in 2007, and the additional U.S. Navy Afloat Environmental Compliance Training Series modules starting in 2014, has contributed to reducing marine mammal vessel interactions and strikes. The Navy is able to detect if a whale is struck due to the diligence of standard watch personnel and Lookouts stationed specifically to observe for marine mammals while a vessel is underway. In the unlikely event that a marine mammal vessel strike occurs, the Navy will notify the appropriate regulatory agency immediately or as soon as operational security considerations allow per the established incident reporting procedures described in Section 5.2.2.3.2 (Incident Reports). The Navy’s incident reports include relevant information pertaining to the incident, including but not limited to vessel speed. The small mitigation zone sizes and close proximity to the observation platform will result in a high likelihood that Lookouts will be able to detect marine mammals throughout the mitigation zones while vessels are underway. A mitigation zone size is not specified for sea turtles to allow flexibility based on vessel type and mission requirements.

As described in Section 5.1.1.2 (Vessel Safety), Navy vessels are required to operate in accordance with applicable navigation rules, including Inland Navigation Rules (33 CFR 83) and International Regulations for Preventing Collisions at Sea (72 COLREGS), which were formalized in the Convention on the International Regulations for Preventing Collisions at Sea, 1972.

These rules require that vessels proceed at a safe speed so proper and effective action can be taken to avoid collision and so vessels can be stopped within a distance appropriate to the prevailing circumstances and conditions. In addition to complying with navigation requirements, Navy ships transit at speeds that are optimal for fuel conservation, to maintain ship 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.

As discussed in Section 3.0.6.4.1 (Vessels), large Navy ships typically operate at average speeds of between 10 and 15 knots, which for reference is slower than large commercial vessels, such as container ships that steam at approximately 24 knots during normal operations (Maloni et al., 2013). Operating vessels at speeds that are not optimal for fuel conservation or mission requirements would be unsustainable due to increased time on station and increased fuel consumption. Each ship has a limited amount of time that it can be underway based on target service requirements and ship schedules. Ship schedules are driven largely by training cycles, scheduled maintenance periods, certification schedules, and deployment requirements. Because of the complex logistical considerations involved with maintaining ship schedules, the Navy does not have the flexibility to extend the amount of time that ships are underway, which would result from vessel speed restriction mitigation.

Navy vessel operators need to train to proficiently operate vessels as they would during military missions and combat operations, 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. Implementing vessel speed restrictions would increase safety risks for Navy personnel and equipment and the public during the training event and would reduce skill proficiency in a way that would increase safety risks during military missions and combat operations. Furthermore, vessel speed restrictions would not allow the Navy to continue meeting its training requirements due to diminished realism of training exercises.

In summary, the Navy determined that implementing procedural mitigation for vessel movements beyond what is detailed in Table 5.3-5 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.4.2 Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions

The Navy will implement procedural mitigation to avoid or reduce the potential for strike of marine mammals and sea turtles from small-, medium-, and large-caliber non-explosive practice munitions, as outlined in Table 5.3-6.

The mitigation zone is conservatively designed to be several times larger than the impact footprint for large-caliber non-explosive practice munitions, which are the largest projectiles based on the military expended material impact footprints calculated in Appendix D (Military Expended Material and Direct Strike Impact Analyses). Small-caliber and medium-caliber non-explosive practice munitions have smaller impact footprints than large-caliber non-explosive practice munitions; therefore, the mitigation zone will extend even further beyond the impact footprints for these smaller projectiles.

Table 5.3-6: Procedural Mitigation for Small-, Medium-, and Large-Caliber Non- Explosive Practice Munitions

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Gunnery activities using small-, medium-, and large-caliber non-explosive practice munitions • Mitigation applies to activities using a maritime surface target
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout positioned on the platform conducting the activity • Depending on the activity, the Lookout could be the same as the one described in Section 5.3.2.1 (Weapons Firing Noise).
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zone: <ul style="list-style-type: none"> – 200 yd. around the intended impact location • Prior to the initial start of the activity (e.g., when maneuvering on station): <ul style="list-style-type: none"> – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: <ul style="list-style-type: none"> – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Conditions for commencing/recommencing the activity after a marine mammal or sea turtle sighting before or during the activity: <ul style="list-style-type: none"> – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: <ul style="list-style-type: none"> (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-based firing or 30 min. for vessel-based firing; or (4) for activities using a mobile target, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Large-caliber gunnery activities involve vessels firing projectiles at a target located up to 6 NM down range. Small- and medium-caliber gunnery activities involve vessels or aircraft firing projectiles at maritime surface targets located up to 4,000 yd. down range, although typically much closer. Lookouts will have a better likelihood of detecting marine mammals and sea turtles when observing mitigation zones around targets located close to the firing platform. When observing activities that use a target located far from the firing platform, Lookouts will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles.

Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone. Positioning additional observers closer to the targets would increase safety risks because these platforms would be located in the vicinity of an intended impact location or in the path of a projectile.

In summary, the operational community determined that implementing procedural mitigation for gunnery activities using small-, medium-, and large-caliber non-explosive practice munitions beyond what is detailed in Table 5.3-6 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.4.3 Non-Explosive Missiles and Rockets

The Navy will implement procedural mitigation to avoid or reduce the potential for strike of marine mammals and sea turtles from non-explosive missiles and rockets, as outlined in Table 5.3-7.

Table 5.3-7: Procedural Mitigation for Non-Explosive Missiles and Rockets

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Aircraft-deployed non-explosive missiles and rockets • Mitigation applies to activities using a maritime surface target at ranges up to 75 NM
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout positioned in an aircraft
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zone: <ul style="list-style-type: none"> – 900 yd. around the intended impact location • Prior to the initial start of the activity (e.g., during a fly-over of the mitigation zone): <ul style="list-style-type: none"> – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: <ul style="list-style-type: none"> – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Conditions for commencing/recommencing the activity after a marine mammal or sea turtle sighting prior to or during the activity: <ul style="list-style-type: none"> – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: <ul style="list-style-type: none"> (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained.

The mitigation zone for non-explosive missiles and rockets is conservatively designed to be several times larger than the impact footprint for the largest non-explosive missile, based on the military expended material impact footprints calculated in Appendix D (Military Expended Material and Direct Strike Impact Analyses). Smaller non-explosive missiles and non-explosive rockets have smaller impact footprints than the largest non-explosive missile used for these activities; therefore, the mitigation zone will extend even further beyond the impact footprints for these smaller projectiles.

Mitigation applies to activities using non-explosive missiles or rockets fired from aircraft at maritime surface targets that are typically located up to 15 NM down range, and infrequently up to 75 NM down range. This procedural mitigation does not apply to long-range delivery weapons systems. For reasons described in Section 5.2.4.1 (Mitigation Assessment Criteria) and Section 5.3.3.2 (Explosive Missiles and Rockets), the addition of marine mammal and sea turtles surveys for impact areas beyond 75 NM is not considered to be safe or effective for several reasons (e.g., fuel constraints, pilot fatigue, fatigue life of aircraft, proximity to emergency landing fields, search and rescue capabilities). Furthermore, the potential impact from non-explosive long-range weapons is limited to the direct strike of animals by falling military expended materials, including boosters. The probability of military expended materials to co-occur in space and time with a marine mammal or sea turtle at or near the surface of the water is negligible in all scenarios. Probability statistics for military expended materials striking representative marine mammal species within the PMSR are included in Appendix D (Military Expended Material and Direct Strike Impact Analyses). Additionally, the mitigation would be impracticable to implement under circumstances where a precise impact location of the munition or component hitting the surface of the ocean is unknown (e.g., weapon separation tests, rapidly shifting target areas).

For activities for which this mitigation applies, there is a chance that animals could enter the mitigation zone after the aircraft conducts its close-range mitigation zone observations and before firing begins (once the aircraft has transited to its firing position). Due to the distance between the mitigation zone and the observation platform, Lookouts will have a better likelihood of detecting marine mammals and sea turtles during the close-range observations and are less likely to detect these resources once positioned at the firing location, particularly individual marine mammals, cryptic marine mammal species, and sea turtles. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone during the close-range observations. The mitigation only applies to aircraft-deployed missiles and rockets for the reasons discussed in Section 5.3.3.2 (Explosive Missiles and Rockets). Positioning additional observers closer to the targets would increase safety risks because these platforms would be located in the vicinity of an intended impact location or in the path of a projectile.

In summary, the operational community determined that implementing procedural mitigation for non-explosive missiles and rockets beyond what is detailed in Table 5.3-7 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.4.4 Non-Explosive Bombs

The Navy will implement procedural mitigation to avoid or reduce the potential for strike of marine mammals and sea turtles from non-explosive bombs and mine shapes, as outlined in Table 5.3-8.

Table 5.3-8: Procedural Mitigation for Non-Explosive Bombs

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Non-explosive bombs • Mitigation applies to activities using a maritime surface target at ranges up to 75 NM
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Marine mammals • Sea turtles
<p><u>Number of Lookouts and Observation Platform</u></p> <ul style="list-style-type: none"> • 1 Lookout positioned in an aircraft
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Mitigation zone: <ul style="list-style-type: none"> – 1,000 yd. around the intended target • Prior to the start of the activity (e.g., when arriving on station): <ul style="list-style-type: none"> – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start of bomb deployment until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of bomb deployment. • During the activity (e.g., during approach of the target): <ul style="list-style-type: none"> – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease bomb deployment. • Conditions for commencing/recommencing the activity after a marine mammal or sea turtle sighting prior to or during the activity: <ul style="list-style-type: none"> – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment or mine laying) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target or minefield location; (3) the mitigation zone has been clear from any additional sightings for 10 min.; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

The mitigation zone for non-explosive bombs is conservatively designed to be several times larger than the impact footprint for the largest non-explosive bomb based on the military expended material impact footprints calculated in Appendix D (Military Expended Material and Direct Strike Impact Analyses). Smaller non-explosive bombs have smaller impact footprints than the largest non-explosive bomb used for these activities; therefore, the mitigation zone will extend even further beyond the impact footprints for these smaller military expended materials.

Due to the mitigation zone size, proximity to the observation platform, and the good vantage point from an aircraft, Lookouts will be able to observe the entire mitigation zone prior to launching the ordnance. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

In summary, the operational community determined that implementing procedural mitigation for non-explosive bombs beyond what is detailed in Table 5.3-8 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.5 Vehicle Launch Activities at San Nicolas Island

SNI is an important breeding, foraging and haulout habitat for several species of pinnipeds (seals and sea lions). The relative isolation of the island from the mainland coast, in conjunction with undisturbed sand beaches and rocky headlands, provide ideal habitat for pinniped rookeries. Productive nearshore waters surrounding SNI support robust populations of the California Sea Lion (*Zalophus californianus*), Northern Elephant Seal (*Mirounga angustirostris*), and Pacific Harbor Seal (*Phoca vitulina*).

NAWCWD currently holds an Incidental Harassment Authorization (IHA) for marine mammals incidentally harassed, by Level B harassment only, during target and missile launch (vehicle launches) activities on SNI. An IHA was issued June 12, 2019, under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 United States Code 1371(a)(5)(D)). This IHA was renewed through June 11, 2021 (See 84 Federal Register 28462, June 19, 2019; 85 Federal Register 38863, June 29, 2020). A new IHA was issued for one year to cover the period from June 12, 2021, to when a 7-year LOA is issued for the activities included in the Proposed Action for this EIS/OEIS (see 86 Federal Register 32372, June 21, 2021).

NMFS issued two previous IHAs in 2001 and 2002 and subsequent LOAs spanning the periods of October 2003 through June 2019 allowing non-lethal takes of pinnipeds incidental to the Navy's vehicle launch events on SNI. The incidental take authorizations allow for the "take by harassment" of small numbers of northern elephant seals, Pacific harbor seals, and California sea lions during routine launch events on SNI.

5.3.5.1 Proposed Mitigation Measures for Vehicle Launch Activities at SNI

In order to mitigate for the harassment caused by missile/target launch activities, the Navy is proposing to implement the measures shown in Table 5.3-9.

Table 5.3-9: Proposed Procedural Mitigation for Vehicle Launch Activities on SNI

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Vehicle launches from SNI
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Hauled out pinnipeds
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • 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; • Launch events shall be scheduled to avoid the peak pinniped pupping seasons between January through July, to the maximum extent practicable; • All manned aircraft must maintain a minimum distance of 305 m (1,000 ft.) from pinniped seal haulout areas and rookeries, except in emergencies or for real-time security incidents; • For unmanned aircraft systems (UAS), the following minimum altitudes must be maintained over pinniped haulout areas and rookeries: Class 0–2 UAS must maintain a minimum altitude of 300 ft.; Class 3 UAS must maintain a minimum altitude of 500 feet; Class 4 or 5 UAS must not be flown below 1,000 ft.; and If any incidents of injury or mortality of a pinniped are discovered during post-launch surveys, or if monitoring indicates possible effects to the distribution, size, or productivity of the affected pinniped populations as a result of the specified activities, launch procedure and monitoring methods must be reviewed, in cooperation with NMFS. If necessary, appropriate changes must be made through modification to this Authorization.

5.3.5.1.1 Current Monitoring Requirements for Vehicle Launch Activities at SNI

A Monitoring Plan was proposed in the Petition for Regulations under which the early LOAs were issued. The purpose of the monitoring was to characterize any effects of vehicle launch activities on Pacific harbor seals, northern elephant seals, and California sea lions hauled out at SNI. In June 2010, a revised Monitoring Plan was submitted to NMFS that proposed the discontinuation of monitoring for northern elephant seals, as this species had shown little reaction to most missile launches at SNI. NMFS accepted this proposed change to the Monitoring Plan (U.S. Department of the Navy, 2011); thus, elephant seals were not targeted for monitoring after December 2010, except when in the field of view of some cameras monitoring other species.

Similar to past monitoring efforts, under the current IHA the Navy must obtain visual, video, and acoustic data during each launch event, to the maximum extent practicable. However, the Navy, in coordination with NMFS, has proposed making some changes in the current monitoring protocols, which are discussed below.

5.3.5.1.2 Proposed Procedural Mitigation for Vehicle Launch Events at San Nicolas Island

Proposed Video and Audio Monitoring

The Navy shall implement a monitoring plan for beaches exposed to missile 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 must 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 full suite of final procedural mitigation measures and monitoring requirements for launch events on 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.

Figure 5.3-1 shows typical pinniped monitoring locations on SNI.

5.3.5.2 Proposed Procedural Mitigations for Land-Based Activities

In addition to consulting with NMFS, the Navy has previously consulted with the USFWS for ongoing activities at NBVC Point Mugu and SNI. As discussed in Section 1.6.1 (Related Environmental Documents) and elsewhere in this EIS/OEIS, the Navy has developed multiple environmental planning documents for activities conducted on the PMSR since 2002, including the 2002 Point Mugu Sea Range EIS/OEIS and environmental assessments for testing and training activities that help inform the environmental baseline for this EIS/OEIS.

As a result of those consultations, USFWS issued multiple Biological Opinions for ESA-listed species for those actions occurring at NBVC Point Mugu and SNI, which remain valid. The Navy proposes to continue to implement the conservation measures contained within the Biological Opinions relative to the Proposed Action in the EIS/OEIS.

5.3.5.3 2016 U.S. Fish and Wildlife Service Biological Opinion Mitigations for Activities at Naval Base Ventura County Point Mugu (8-8-15-F-5R)

This USFWS biological opinion supports ongoing activities at NBVC Point Mugu, and their effects on the federally endangered California least tern (*Sterna albifrons browni*), and light-footed Ridgway's rail (*Rallus obsoletus levipes*), and the federally threatened western snowy plover (*Charadrius nivosus nivosus*). The Navy determined that the Proposed Action will have no effect on least Bell's vireo (*Vireo bellii pusillus*), tidewater goby (*Eucyclogobius newberryi*), or federally endangered salt marshbird's-beak (*Cordylanthus maritimus ssp. maritimus*).

The Navy proposes to continue implementing measures to avoid or minimize the effects on California least tern, light-footed Ridgway's rail, and the western snowy plover outlined in the 2016 Biological Opinion and does not anticipate the effect of these activities from the Proposed Action will be different from those from the Biological Opinion.

Point Mugu Beach Launch Operations and Associated Activities

The Navy launches typically 50–70 missiles or targets annually from Building PM-55 and associated beach launch pads located just north of the Mugu Lagoon on NBVC Point Mugu. The majority of launches entail jet-assisted take-off (JATO) or rocket-assisted take-off (RATO) bottles to assist the launch of missiles. JATO/RATO bottles expend 1–2 seconds after the missile is airborne. These bottles primarily fall into the wetland immediately in front of the launch pad (the drop zone) and may fall into habitat supporting listed species if the event occurs at Building PM-55. If the launch occurs from an operational

pad adjacent to the beach (Pad Alpha, Pad Bravo, Pad Charlie, or Pad Nike Zeus), JATO/RATO bottles may expend into the near shore environment. The Navy has implemented a JATO/RATO bottle removal program for the salt marsh in front of Building PM-55. This program, which includes seasonal restrictions on recovery activities, provides a benefit to sensitive avian species and their habitat at Mugu Lagoon.

The beach launch pads are located directly inland of sandy beach habitat, which is habitat known to support nesting locations for the western snowy plover and California least terns. Other activities linked to missile launches may occur on or very close to the sandy beach habitat. These operations usually involve radar tracking, camera set-up, and installation of meteorological equipment in areas immediately adjacent to or, when required, within western snowy plover and least tern breeding habitat.

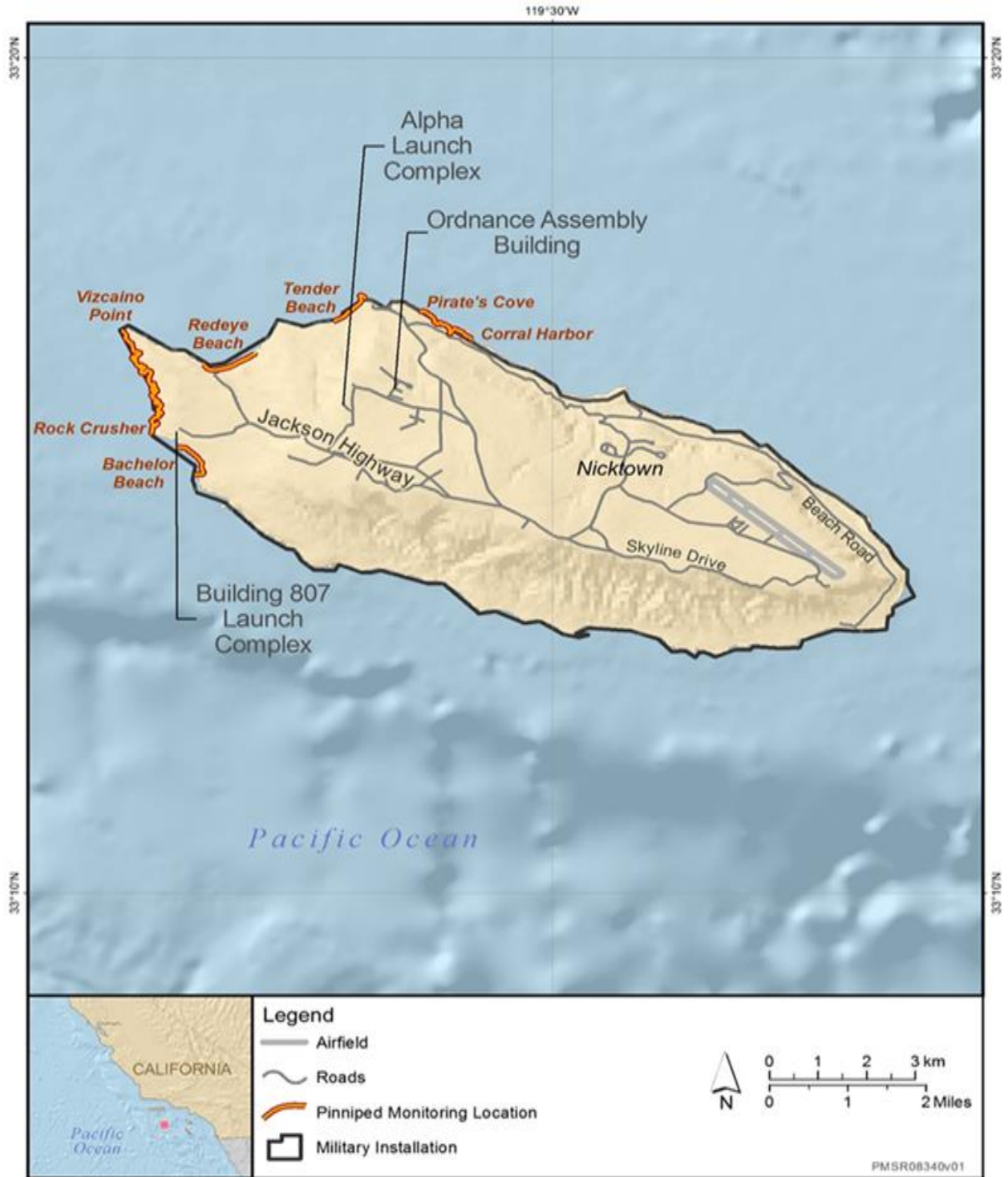


Figure 5.3-1: Typical Pinniped Haulout Monitoring Locations on SNI

Tracking Equipment

Operations involved with tracking equipment consist of radar and aircraft tracking devices, cameras, and meteorological equipment placed on operational areas and pads adjacent to beach or on sand beach habitat to support various military testing (not related to missile launches). The Navy uses tracking equipment approximately 5–10 times on operational pads and 1–3 times on adjacent beaches annually. Personnel typically set up the equipment and leave; therefore, disturbance usually occurs only during set up, maintenance visits, and equipment removal. Western snowy plovers have nested on the Bravo launch pad since 2008; California least terns also nest on beaches adjacent to the launch pads.

The Navy proposes to continue to implement the following measures to minimize the effects of missile launch operations and associated activities on federally listed species as shown in Table 5.3-10.

Table 5.3-10: Procedural Mitigation for Point Mugu Beach Launch Operations and Associated Activities

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Point Mugu Beach Launch Operations and Associated Activities
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Western snowy plovers • California least terns
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Launch Operations: <ul style="list-style-type: none"> – If a listed species nest is on or in close proximity (within 500 feet) to the launch, the Navy will utilize a different site; – The Navy will not allow operational personnel on the beach year-round unless authorized or escorted by Natural Resource personnel; and – Natural Resource personnel will coordinate placement of equipment on the beach to minimize any impacts on nesting birds and ensure equipment is a minimum of 100 feet away from active nests. • Tracking Equipment: <ul style="list-style-type: none"> – If an active nest is on an operation pad/area, the Navy will select a different pad location for the placement of tracking equipment; – If equipment is required to be on the beach, the Navy will place the equipment a minimum of 100 feet from active nests; – If equipment on the beach requires personnel continually at or visiting the site, the Navy will place equipment a minimum of 300 feet from active nests; – If beach equipment is in place longer than a week, the Navy will place spike stripping on equipment as needed if it acts as a perch for raptors; – The Navy will prohibit operational personnel from entering the beach unless authorized, or at times escorted by, Natural Resource personnel; and – The Navy will conduct bi-weekly nest monitoring to assess the location of active nests to reduce and/or avoid impacts from placing equipment.

Aircraft Operations and Support

Point Mugu supports nearly every type of aircraft in the Department of Defense aircraft inventory; other agencies such as the Federal Bureau of Investigation and the U.S. Coast Guard also operate out of NBVC Point Mugu. Aircraft at NBVC Point Mugu consist of propeller and jet aircraft, as well as rotorcraft. Sounds from aircraft range from 65 to 70 decibels during flyovers, and on approach and take-off the

sound of jets can reach up to 140 decibels at 25 ft. Air operations also include fleet-supported unmanned aerial vehicles, such as VX-30’s Integrator and Fire Scout, which can vary in size from hobby-model size to full size aircraft; the Navy does not anticipate any impacts on listed species resulting from air operations.

The Navy proposes to implement the following measures to minimize the effects of aircraft operations and support on federally listed species as shown in Table 5.3-11.

Table 5.3-11: Procedural Mitigation for Aircraft Operations and Support Activities

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Aircraft Operations and Support Activities
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • All federally protected bird species
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Outside of take-off and landing, the Navy will keep fixed-wing and rotorcraft at or above 500 feet above ground level over all listed species habitat; • The Navy will instruct any aircraft transiting Point Mugu to stay above 500 feet above ground level; • The Navy will forward the location of any western snowy plover nests found on the airfield to appropriate personnel that drive on the airfield to avoid accidentally crushing the nest; and • The Bird Air Strike Hazard (BASH) team, in coordination with the NBVC Environmental Division, will regularly monitor for the presence of western snowy plovers to ascertain whether the birds are nesting on the airfield. If nests are present, the BASH team will forward the location to appropriate personnel that drive on the airfield to avoid accidentally crushing the nest.

Unmanned Aircraft

The Navy utilizes a variety of types and sizes of unmanned aircraft from model-sized helicopters and planes to full-sized helicopters and planes. These aircraft consist of operational squadrons as well as support of the NAWCWD research, development, acquisition, test and evaluation program. Larger aircraft take off from the runway and some of the smaller unmanned aircraft are able to launch from beach operational pads or other operational areas. Sound exposure can range from 74 to 118 decibels at 1,000 ft. for large unmanned aircraft to well within range of ambient sound conditions (40–70 decibels at 500–1,000 ft.) for smaller unmanned aircraft. The number and types of aircraft used varies based on testing requirements.

The Navy proposes to implement the following measures to minimize the effects of unmanned aircraft on federally listed species as shown in Table 5.3-12. The Navy will continue to include results of biological monitoring in an annual report submitted to the USFWS.

Table 5.3-12: Procedural Mitigation for Unmanned Aircraft Operations

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Unmanned aircraft operations
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • All federally protected species
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • Unmanned aerial vehicles and supporting aircraft flights will be restricted to an altitude of 1,000 feet above ground level or greater. Lower-altitude flights will only involve small and quiet unmanned aerial vehicles. Active western snowy plover, California least tern, and light-footed Ridgway's rail nests and occupied pinniped rookeries during pupping/breeding seasons will not be overflown at lower than 500 feet by any unmanned aircraft. • Large unmanned aerial vehicles will follow established flight patterns at Point Mugu. • To eliminate the potential for new ground disturbance impacts, the Navy will launch and recover unmanned aerial vehicles solely on existing graded and/or paved areas, including airstrips, roadways, and pad sites. The Navy will restrict Group 3, 4, and 5 aerial vehicles (larger vehicles that require ground take-off) to any existing sites large enough to accommodate them without impacts. These aerial vehicles have redundant systems in place to prevent unplanned landings and will not be used on beach pads during sensitive bird species nesting seasons. The Navy may launch Group 1 and 2 aerial vehicles (smaller vehicles) from any existing site during sensitive bird nesting seasons, but only if no active western snowy plover, California least tern, or light-footed Ridgway's rail nests are within 300 feet of the flight path. • A designated observer will be present during all activities that involve weapons testing, firing, or launching to ensure that these activities will not result in adverse effects to marine mammals, sea turtles, or birds. The Navy will follow standard range clearance procedures, which include looking for marine mammals, birds, and sea turtles in predicted debris and impact areas. If marine mammals, birds, or sea turtles are observed in or near a predicted debris or impact area, activities will be suspended or moved. • The Navy will conduct Unmanned Systems operations during daylight hours, when possible. • Night testing will only occur if range scheduling prevents daylight testing or if operationally required. If night operations are required, the Navy will select a suitable location to minimize disturbance to wildlife. • Before a weapon (including lasers) can be fired, the Navy will require as standard procedure that no persons, wildlife, reflective surfaces, or non-target obstructions of any sort are present within the hazard area, which is specific to the type of weapon used, between the firing point and the target. Additionally, the path from the weapon firing point to the target will be monitored to ensure that weapons are not fired if and when wildlife are within the nominal hazard zone identified in the Risk Hazard Assessment.

5.3.5.4 2012 U.S. Fish and Wildlife Service Biological Opinion for the Construction and Operation of a Directed Energy Test Site at Naval Base Ventura County, San Nicolas Island, Ventura County, California (8-8-12-F-28)

This USFWS Biological Opinion is based on the Navy's proposed operation of a Directed Energy Test Site on SNI, and its effects on the federally threatened western snowy plover (*Charadrius nivosus nivosus*) (U.S. Fish and Wildlife Service, 2012). The Navy proposes to continue to implement measures to avoid or minimize the effects on the western snowy plover outlined in the 2012 Biological Opinion and does not anticipate the effect of directed energy activities from the Proposed Action will be different from those from the Biological Opinion.

Directed Energy

Measures to avoid and minimize effects on western snowy plovers during Directed Energy operation and maintenance activities are shown in Table 5.3-13.

Table 5.3-13: Procedural Mitigation for Directed Energy Activities on SNI

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> Directed Energy activities on SNI
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> Western snowy plover
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> Avoid activities when western snowy plovers are present, if feasible. During plover nesting season (March 1–September 15), a qualified biologist will (i) educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures, (ii) delineate any areas adjacent to the site that should be avoided, and (iii) attend operation-related meetings as needed. During plover nesting season, if plovers are present within 1,000 ft. of the action area, a qualified biologist will remain on site during activities (if safety constraints allow) to monitor movement and behavior of western snowy plovers. During plover nesting season, access to the test site will be restricted to operational activities only. Unless operationally necessary, personnel will not occupy the site between dusk and dawn. No artificial lighting will be used. Before directed energy systems are fired, the Navy will require that no persons, listed species (or other wildlife), reflective surfaces, or non-target obstructions of any sort are present within the hazard area (which is specific to the type of system being used) between the shooter site and the target or immediately behind the target. A qualified biologist will monitor the hazard area with binoculars or remote cameras as necessary to ensure that the countermeasures system is not fired if wildlife is within the expected debris pattern. If nighttime activities are necessary, lighting will be shielded. The project area will be kept free of trash. Routine maintenance will be conducted outside the breeding season. A Spill Prevention, Control, and Countermeasure Plan will be in place.

5.3.5.5 2014 U.S. Fish and Wildlife Service Biological Opinion for the Countermeasures Testing and Training Program at Naval Base Ventura County, California (Point Mugu and San Nicolas Island) (8-8-13-F-47)

This USFWS’ biological opinion supports the Navy’s proposed countermeasures testing and training at Naval Base Ventura County and its effects on the federally threatened western snowy plover (*Charadrius nivosus nivosus*), and the federally endangered California least tern (*Sterna antillarum browni*) and light-footed Ridgway's rail (*Rallus obsoletus levipes*) (U.S. Fish and Wildlife Service, 2014). The Navy proposes to continue to implement measures to avoid or minimize the effects on the western snowy plover, California least tern, and light-footed Ridgway's rail outlined in the 2014 Biological Opinion and does not anticipate the effect of countermeasure activities from the Proposed Action will be different from those from the Biological Opinion.

Countermeasures Operations (including Close-in Weapons Systems (CIWS), Small Arms Testing and Training and Lasers/Directed Energy Activities) at NBVC Point Mugu and SNI

The Navy proposes to continue to implement the conservation measures in Table 5.3-14 during CIWS and similar small arms firing operations as well as lasers and Directed Energy activities to avoid and minimize potential impacts on the western snowy plover, California least tern, and light-footed Ridgway's rail.

Table 5.3-14: Procedural Mitigation for Countermeasures Operations (including CIWS, Small Arms, and Lasers and Directed Energy) at NBVC Point Mugu and SNI

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> Countermeasures Operations (including Close-in weapons systems (CIWS), small arms, and Lasers and Directed Energy) at NBVC Point Mugu and SNI
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> Western snowy plover California least tern Light-footed Ridgway's rail
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> Biologists will monitor adjacent light-footed Ridgway's rail habitat when countermeasures with a potential to produce high decibel noise are utilized, to document any disturbance to Ridgway's rails. Project vehicles and equipment will be restricted to existing concrete pads, leveled surfaces, and access roads. At all nearshore testing and training sites, van placement for air-to-air testing of flares will be restricted to existing concrete pads, leveled surfaces, and paved or dirt access roads that lead to nearby beaches; vehicles would not be allowed to drive onto any beach. If nighttime operations are necessary, permanent outdoor lighting will include shielding designs to ensure light entering adjacent nesting habitat is minimized. At all times, trash collection containers would not be placed on site, and the area will be maintained trash free to reduce attracting predators. A Spill Prevention, Control, and Countermeasure Plan would be in place to minimize the potential for an oil or hazardous substance spill, to prevent any spill from leaving the confines of the area and impacting listed species habitat, and to ensure that the cause of any spill is corrected. Unless operationally necessary, personnel would not occupy the testing and training areas between dusk and dawn, and the area would remain dark (no artificial lighting) to reduce the potential for adverse impacts on listed species in adjacent natural habitat. All portable equipment brought to a test site is removed upon test completion. Within 24 hours of countermeasures testing or training that is planned to occur at Point Mugu when least terns are present (generally April 1 to September 15), a qualified biologist would identify locations where least terns are known or likely to forage in the nearshore area, and the Navy would ensure that targets are not deployed in or over those areas. Surface targets would not be located within intertidal zones of SNI or Point Mugu. Implementation of the Proposed Action will not result in any new construction, excavation, grading, or filling.

5.3.5.6 2001 U.S. Fish and Wildlife Service Biological Opinion for Activities on San Nicolas Island, California (1-8-01-F-14)

This USFWS biological opinion supports ongoing activities on SNI and the effects on the federally threatened western snowy plover (*Charadrius nivosus nivosus*) from those activities (U.S. Fish and Wildlife Service, 2001). The Navy proposes to continue to implement measures to avoid or minimize the effects on the western snowy plover outlined in the 2001 Biological Opinion and does not anticipate the effect of countermeasure activities from the Proposed Action will be different from those from the Biological Opinion.

Surface Missile and Target (Vehicle) Launches

As discussed above in Section 5.3.5 (Vehicle Launch Activities at San Nicolas Island), missiles and targets are currently launched from two locations on San Nicolas Island (see Figure 2-3). Alpha Complex is located approximately two miles from the western shoreline. The Coyote GQM-163A are launched from the Alpha Complex. The other launch facility is the Building 807 Launch Complex near Rock Crusher. Tactical Tomahawk, rolling airframe missiles, and Standard Missiles are some of the types of missiles launched from the Building 807 Launch Complex. These structures are located on the western end of the island near the shoreline (Figure 5.3-1). Missiles are launched westward, over the ocean, within a 60-degree azimuth. The Navy has constructed a 50K launcher and a vertical launcher near Rock Crusher. The 50K launcher, typically used three to five times per year, can launch missiles up to 50,000 pounds. The vertical launch system, near the existing Building 807 Launch Complex, is typically used three to five times per year to launch missiles.

The Navy proposes to continue to implement the following measures in Table 5.3-15 to minimize the effects on western snowy plover, in addition to those discussed above for pinnipeds in Section 5.3.5.3 (Proposed Procedural Mitigation for Vehicle Launch Events at SNI).

Table 5.3-15: Procedural Mitigation for Vehicle Launches on SNI

<i>Procedural Mitigation Description</i>
<p><u>Stressor or Activity</u></p> <ul style="list-style-type: none"> • Vehicle launches on SNI
<p><u>Resource Protection Focus</u></p> <ul style="list-style-type: none"> • Western snowy plover
<p><u>Mitigation Requirements</u></p> <ul style="list-style-type: none"> • The NBVC Environmental Division closes the south side of San Nicolas Island to all activities to protect the western snowy plover. This closure also provides protection for marine mammals and other sensitive wildlife species. • All western snowy plover nesting areas are closed for the duration of the breeding season. • Signs and barricades are erected to denote closures, and the environmental staff patrol the beaches periodically. • The trained biologists conduct consistent monitoring of listed species and their habitat to assess the potential for adverse effects from Navy activities. • All permanent and visiting personnel are required to attend an environmental briefing that emphasizes federal and Navy regulations pertaining to the protection of listed species and describes the beach closures and their enforcement. • Western snowy plover nests shall be monitored prior to and during missile or target launches.

5.3.6 Measures Considered but Eliminated

5.3.6.1 Limiting the Number and Size of Explosives

When assessing and developing mitigation, the Navy considered reducing the number and size of explosives. As discussed in Chapter 2 (Description of Proposed Action and Alternatives) and Section 5.2.4 (Practicality of Implementing Procedural Mitigation), the use of explosives varies throughout the Study Area based on range scheduling, mission requirements, testing program requirements, and standard operating procedures for safety and mission success.

Activities that involve explosive ordnance are inherently different from those that involve non-explosive practice munitions. While the Navy does use non-explosive practice munitions during some activities, it is critical that Sailors obtain experience handling explosive ordnance prior to deployment.

For example, critical components of an Air-to-Surface explosive bombing training exercise include the assembly, loading, delivery, and assessment of the explosive bomb. The explosive bombing training exercise starts 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 practice munitions 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 number and size of explosives or diminishing activity realism by implementing time of day or geographic restrictions for additional explosive training exercises would impede the ability for Navy Sailors to train and become proficient in using explosive weapon systems (which would result in a significant risk to personnel safety during military missions and combat operations), and would ultimately prevent units from meeting their individual training and certification requirements (which would prevent them 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.

Similar to training, the Navy is required to test its explosives to quantify the compatibility of weapons with the platform from which they will be launched or released in military missions and combat operations. Such testing requires the use of the actual explosive ordnance that will be used during training exercises, military missions, and combat operations. Reducing the number and size of explosives or diminishing activity realism by implementing time of day or geographic restrictions for additional explosive testing events 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). Such testing must be conducted before full-scale production or delivery to the fleet to ensure functionality and accuracy in military mission and combat conditions per required acquisition milestones or on an as-needed basis to meet operational requirements.

5.3.6.2 Geographic Mitigation

The Navy assessed the potential for geographic mitigation to avoid or reduce impacts from the Proposed Action on marine mammals in areas that the best available science suggests are important to one or more species of marine mammals for biologically important behavior, such as feeding (blue whales and humpback whales) or migration (gray whales), or the occurrence of a small or resident population (harbor porpoise). See Section 3.7 (Marine Mammals) for discussion on biologically important areas. In

addition, critical habitat for leatherback sea turtles overlaps a portion of the PMSR (see Section 3.8, Sea Turtles, for discussion on leatherback sea turtle critical habitat). On April 21, 2021, NMFS issued a final rule to designate critical habitat for the Western North Pacific Distinct Population Segments (DPS), Central America DPS, and the Mexico DPS of humpback whales pursuant to section 4 of the ESA (86 FR 21082). The humpback whale critical habitat areas identified in the proposed rule and overlapping with the PMSR are units (or areas) 17, 18, and 19. However, in finalizing the critical habitat, NMFS excluded unit 19, because avoiding likely economic and national security impacts outweighed the benefits of designating the unit as critical habitat. The final critical habitat for humpback whales in the vicinity of the PMSR is shown in Figure 3.7 5. The Navy determined that the Proposed Action would not destroy or adversely modify humpback whale critical habitat. See Section 3.7 (Marine Mammals) for more information on the designated critical habitat for humpback whales.

Blue Whale Feeding Areas

The Navy determined that it would be impractical to develop additional mitigation areas to limit the locations or types of explosive testing and training activities in the PMSR. As discussed in Section 3.7.5.5.1.1 (Explosives), there are two areas within the PMSR identified by Calambokidis et al. (2015) as blue whale feeding areas, with one area in close proximity to SNI (Figure 5.3-2). The SNI blue whale feeding area overlaps a primary testing and training area used for decades. The area is essential for testing and training given its proximity to SNI. The area is used during activities requiring an aerial target impact area, missile launches from SNI, aerial and ship-based gunnery events, and sea surface missile launches. Moving these activities farther from SNI and outside of the SNI Feeding Area would not be possible, because the added distance would substantially limit the capabilities of the extensive range support infrastructure, such as ground-based telemetry, radar, antenna, and other ground-based command transmitter systems that provide for the safe, controlled testing of unmanned targets, platforms and missiles.

Blue whales are known to spend relatively short time in these feeding areas as they move elsewhere in search of prey (Mate et al., 2017; Mate et al., 2015b). Blue whales are also known to return seasonally to the same general areas where they have previously foraged and also opportunistically feed on concentrations of krill or other prey. Specific locations where prey are concentrated can vary seasonally and inter-annually and are driven by dynamic ocean conditions (e.g., shifts in large-scale current systems like the California Current) and ocean-atmosphere interactions (e.g., the El Niño Southern Oscillation cycle) that can affect much of the North Pacific basin, as well as small-scale, short-term events including isolated storms and upwelling. Recently analyzed tagging data indicate that blue whales generally forage in relatively small geographic areas for relatively short time periods (Mate et al., 2015b). For these reasons, delimited areas where blue whales have been observed feeding in the past may not provide an accurate prediction of where blue whales are currently feeding. Blue whale tagging studies conducted in 2014 and 2015 (Mate et al., 2016) indicate blue whale feeding behavior was not limited to nor concentrated in designated blue whale feeding biologically important areas during those years. Published final results from continued tagging data collected between 2014 and 2017 indicate a similar pattern of broad area movement along the entire U.S. West Coast (Mate et al., 2018). A generalized feeding behavior of limited time in any one area and movements across relatively large distances (in comparison to the size of the areas designated as biologically important) between feeding areas suggests that blue whales are not wholly dependent on fixed, isolated foraging areas, rather their foraging behavior is better characterized as opportunistic and wide ranging, foraging on prey whenever and wherever concentrations are encountered.

Given it is unlikely that blue whales are always feeding in the most optimal location, and that these whales are highly mobile, feed over large ranges, and forage in bouts separated by many kilometers, any disturbed blue whales could temporarily move to alternative foraging sites if a disturbance causes a change in their prior foraging locale.

Evidence from tagged blue whales has indicated blue whale foraging is generally and widely dispersed across the offshore waters of Southern California (Mate et al., 2016). As a result, even temporary displacement from an initial foraging locality is not expected to impact the fitness of any individual animals given alternate foraging is likely to be available in close proximity (National Marine Fisheries Service, 2015).

The most current information suggests that the blue whale population in the Study Area may have recovered and has been at a stable level following the cessation of commercial whaling in 1971 despite the impacts of ship strikes, interactions with fishing gear, and increased levels of ambient sound in the Pacific Ocean (Campbell et al., 2015; Carretta et al., 2015; Monnahan, 2013; Monnahan et al., 2015; Monnahan et al., 2014).

The 2018 Hawaii-Southern California Training and Testing (HSTT) EIS/OEIS, developed a San Nicolas Island Mitigation Area that overlaps the PMSR and a small portion of the SNI blue whale feeding area to limit the amount of mid-frequency active sonar and explosives during training that may result in the incidental take of marine mammals (U.S. Department of the Navy, 2018). The restrictions on explosives during training do not apply to testing on the PMSR and there is no sonar use under the Proposed Action for this EIS/OEIS. The Navy, for the Proposed Action for this EIS/OEIS, determined that there is no evidence of adverse impacts on the population and predicted effects on individuals in the population are expected to be behavioral in response to Navy activities conducted within the SNI blue whale feeding area. Establishing a mitigation area within the feeding area would not be practical to implement as it is within areas of high use and in close proximity of critical infrastructure. In addition, shifting the impacts on blue whales from the feeding areas to another area would not necessarily be any more effective in reducing impacts. While there were some differences in data collected over a four-year period (2014–2017), Mate et al. (2018) indicated that the PMSR was the most heavily used Navy training area for tagged blue whales on the U.S. West Coast, with the San Nicolas Island biologically important area the least used. The Santa Barbara Channel and San Miguel biologically important area was the most heavily used of the two biologically important areas within the PMSR (Mate et al., 2018). Coincidentally, this is one of the least used areas for military readiness activities due to its close proximity to the Northern Channel Islands, the Channel Islands National Park/National Marine Sanctuary, and offshore oil production platforms on the eastern side of the Islands. Tagging data also showed that blue whales had wide tracked distributions extending from British Columbia to very close to the equator (Mate et al., 2018). The Point Conception/Arguello to Point Sal blue whale feeding area, located north of the Northern Channel Islands, is an area of historical low use for testing and training on the PMSR because the area is close to oil production platforms and major vessel routes leading to and from the ports of Los Angeles and Long Beach. Since this area is rarely, if ever used, there are no impacts anticipated for blue whales foraging in this biologically important area and seasonal geographic mitigations would not provide any additional benefit to these animals occurring within the area.

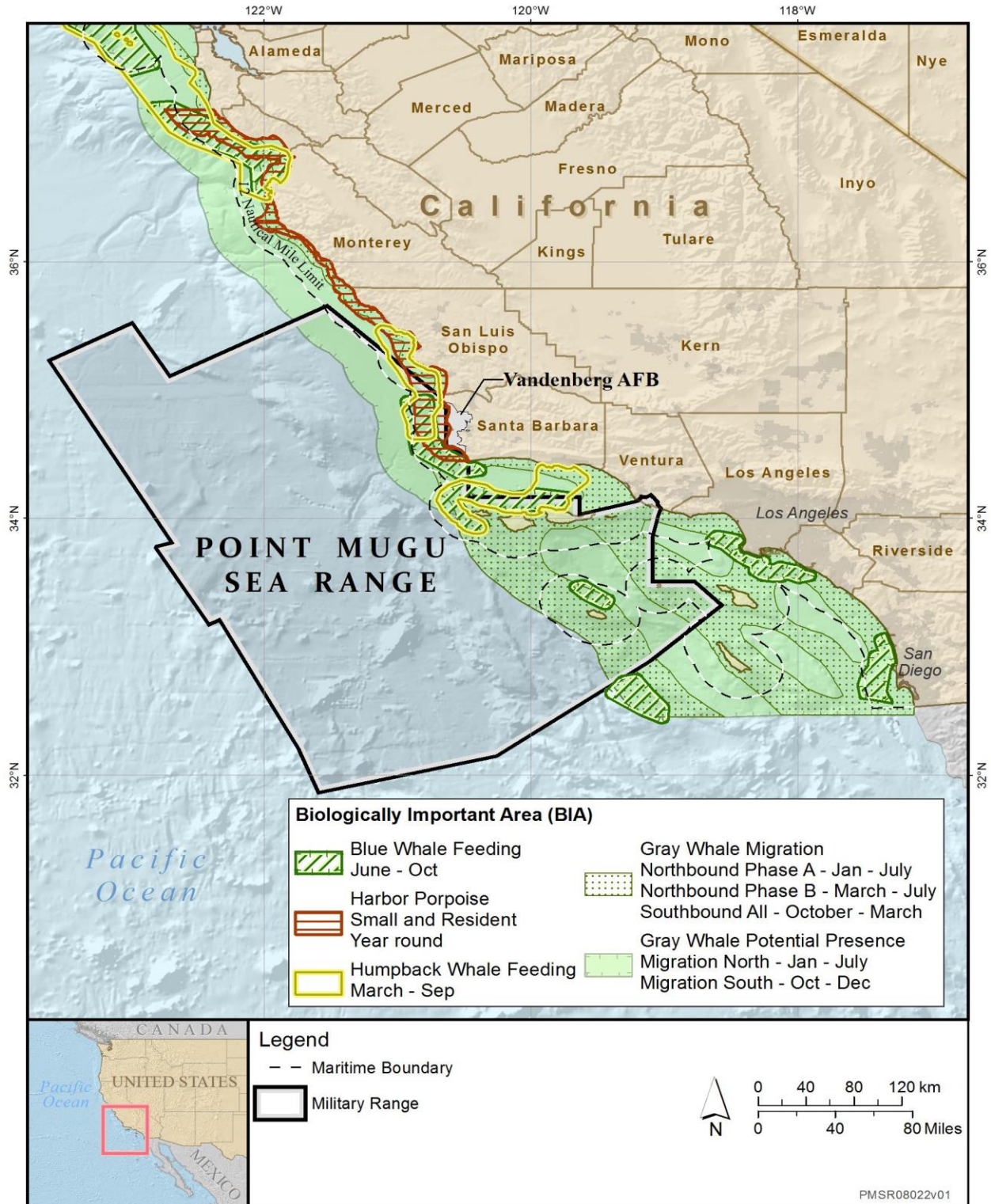


Figure 5.3-2: Biologically Important Areas for Marine Mammals in the Study Area

Furthermore, implementing a geographic-based mitigation approach within a static boundary grounded on an average multi-year occurrence trend may not be as effective in mitigating impacts particularly when prey availability in the area is low based on varying environmental factors. As discussed previously within this chapter, the Navy focuses on avoiding or reducing potential impacts on marine mammals by implementing mitigation wherever and whenever marine mammals are detected within the vicinity of a Navy activity. Therefore, the Navy determined that establishing geographic mitigation would not provide any additional benefits to blue whales foraging with the identified feeding areas.

Humpback Whale Feeding Areas

Calambokidis et al. (2015) also identified two feeding areas for humpback whales within the PMSR (see Figure 5.3-2). These feeding areas are identified as the Morro Bay to Point Sal Feeding Area (designated from April to November) and the Santa Barbara Channel–San Miguel Feeding Area (designated from March to September) (Calambokidis et al., 2015). Navy testing and training activities that use explosives could occur year round within the Study Area, although they generally would not occur in these relatively nearshore feeding areas, because both areas are close to the northern Channel Islands, the National Park/National Marine Sanctuary, oil production platforms, and major vessel routes leading to and from the ports of Los Angeles and Long Beach. Furthermore, the Navy is not proposing to use any explosives within the Channel Islands National Park/National Marine Sanctuary boundaries. It is unlikely that Navy activities involving the detonation of explosives at or near the surface in offshore areas away from the coast and these identified feeding areas would have any meaningful effect on humpback whale feeding behavior in the designated areas. Therefore, the Navy determined that establishing geographic mitigation would not provide any additional benefits to humpbacks foraging with the identified feeding areas.

Gray Whale Migration Areas

Calambokidis et al. (2015) identified a gray whale migration area off Southern California overlapping the Study Area (see Figure 5.3-2). Four migration areas for gray whales are located north of Point Conception, and a fifth area is located contiguous to and south of Point Conception (Calambokidis et al., 2015). Collectively, all five areas are active migration areas from October through July, although each individual area has its own specific date range depending on what portion of the northbound or southbound migration it is meant to cover. Based on an average speed of approximately 6.2 kilometers (km) per hour for migrating gray whales (Mate et al., 2015b), it would take approximately 65 hours for a gray whale moving continuously along a direct route to cross through the entirety of the PMSR Study Area (a distance of approximately 400 km). The whales would cross the PMSR twice a year during their annual southbound and northbound migrations. Navy testing and training activities that use explosives could occur year round within the PMSR, but generally they would occur farther offshore than the shallow-water, nearshore habitat preferred by gray whales during their migration.

Most gray whales occurring along the U.S. west coast are from the Eastern subpopulation, with only a few individuals from the Western subpopulation thought to migrate along the coast to Mexico. In general, gray whales found along the west coast of North America migrate annually from their winter breeding grounds in nearshore Mexican waters to their summer feeding grounds off northern California, Oregon, Washington, Canada, and Arctic waters including the Okhotsk Sea off the coast of Russia's Sakhalin Island).

Given the importance of the gray whale migration behavior to the species, areas along the U.S. west coast were deemed to be biologically important for gray whale migration and were designated as such

to help inform regulatory and management decisions and to minimize the impacts of anthropogenic activities on gray whale migration (Calambokidis et al., 2015; Ferguson et al., 2015). As presented by Calambokidis et al. (2015) the spatial and temporal parameters of the gray whale migratory corridor along the U.S. west coast (including Alaska and Canada) are relatively well defined based on tagging studies, dedicated line-transect ship and aerial surveys for marine mammals, land-based counts, and observations from whale-watching operations and recreational and commercial fishermen. The timing of the migration and the routes these gray whales take have been described as areas for the gray whales' migration "Southbound Phase," "Northbound Phase A," and "Northbound Phase B" and are shown Calambokidis et al. (2015) in Figure 3.7-3. Each of the three migration area corridors also include an additional migration area potential presence buffer that extends 47 km from the U.S. west coast (Calambokidis et al., 2015). The gray whale migration corridors (Southbound, Northbound Phase A, Northbound Phase B, and the potential presence area) are cumulatively in use from October through July (Calambokidis et al., 2015; Ferguson et al., 2015), 10 months annually spanning the entire U.S. west coast. The timing of migration along U.S. coast and when the whales are present in the lower migration area that overlaps with the Study Area is variable, and the three phases are not always distinct, with factors such as climate change and the amount of sea ice cover in northern latitudes influencing migration periods (Calambokidis et al., 2015; Salvadeo et al., 2015).

When characterizing the gray whale migration distance from the U.S. west coast, Bonnell and Dailey (2002) concluded that "about one-half" of all sightings occur within 15 km of the coast while Calambokidis et al. (2015) provide that "most gray whales" migrate within 10 km of the coast. This characterization and the designated separate migration corridors associated with phases of migration along the U.S. West Coast do not, however, apply to the ocean area consisting of the Southern California Bight south of Point Conception, which includes the Southern California portion of the HSTT Study Area. Gray whales have been observed migrating through the offshore portion of the Southern California Bight as far as 200 km offshore (Bonnell & Dailey, 2002) and far to the west of San Nicolas Island and San Clemente Island (Carretta et al., 2000; Jefferson et al., 2014; Sumich & Show, 2011). Calambokidis et al. (2015) cite Bonnell and Dailey (2002) for the Southern California Bight portion of the Identified migration area, which described the migration "pathway" in Study Area as "broad and rather diffuse." Sumich and Show (2011) note substantial year-to-year variability in the use of migration corridors in the Southern California Bight. Sumich and Show (2011) also report on unpublished data indicating "about 24 percent" of migrating gray whales use a nearshore migration route and indicated their survey results suggested an offshore preference by larger, presumably older whales, leaving fewer and apparently younger whales using that nearshore migration route.

While the identified migration area has a southern boundary ending at a line drawn seaward from the border with Mexico, Navy recognizes that gray migration routes extend beyond the currently identified areas and continue on outside of the U.S. Exclusive Economic Zone (Aquatic Mammals, 2015; Calambokidis et al., 2015; Ferguson et al., 2015; Van Parijs et al., 2015) regarding the limits to the designated biologically important areas). Survey data indicates that whales passing San Clemente Island head southeast in the direction of the mainland shore of Baja California in Mexican waters (Bonnell & Dailey, 2002; Sumich & Show, 2011). For the offshore migration corridors, Sumich and Show (2011) note substantial year-to-year variability between the number of whales using the offshore Santa Catalina corridor and the San Clemente corridor. Information provided by De Jesus et al. (2014) for waters off Ensenada, Mexico (approximately 40 NM south of the U.S./Mexico border) indicated the migration corridor extending beyond 20 km (during very limited sampling, gray whales were observed at 22 km) from the coast but that most gray whales traveled within approximately 10 km of the shore. Although

this suggests the migration corridor south of the border may be narrowing down from approximately 150 km in width to the south of San Clemente Island to as broad as 22 km in width at Ensenada, this is insufficient information to accurately determine where a representative migration corridor would be drawn. The migration areas were intended to be defined as “areas and times within a substantial portion of a species is known to migrate; the corridor is spatially restricted,” (Ferguson et al., 2015; Van Parijs et al., 2015). Since sufficient information is not known and a migration corridor has not been designated for waters south of the U.S./Mexico border within the Southern California portion of the HSTT Study Area, given the broad and rather diffuse lower migration area at the border lacking any spatially restriction, the year-to-year variability in the use of the corridors to the north, and absent any science to support further speculation, Navy cannot assume to create a spatially restricted corridor reflecting the areas and times within which a substantial portion of gray whales may migrate when south of the border.

For the gray whale migration corridors along the U.S. west coast, southbound whales are expected from October–March, northbound Phase A from January–July (peaking April–July), northbound Phase B from March–July, and the potential presence during the cumulative October–July period (Calambokidis et al., 2015). Bonnell and Dailey (2002) report that gray whales are not present in the Southern California Bight from August through November. More recent aerial surveys have encountered gray whales off Southern California as early as January (Carretta et al., 2000; Graham & Saunders, 2015; Jefferson et al., 2014) and as late as June (Graham & Saunders, 2015). Passive acoustic monitoring in offshore sites within the Southern California Range Complex have detected gray whale calls in the months of December through May (Debich et al., 2015; Hildebrand et al., 2011). Monitoring in waters off Ensenada, Mexico indicate gray whales are present migrating south from the beginning of December and overlapping (in February and March) with the start of the northbound migration in which ends in the third week of May (De Jesus et al., 2014). The National Oceanic and Atmospheric Administration’s website containing data records for marine mammals from the Cetacean Density and Distribution Mapping Working Group (Ferguson et al., 2015) shows the recorded presence of gray whales in the Southern California Bight in every month of the year except June, October and November. As a result of the Cetacean Density and Distribution Mapping Working Group records and area specific findings, Navy assumes that gray whales could be migrating through the Study Area between the months of December through September; 10 months of the year.

The Navy has sponsored numerous studies that have produced meaningful results on marine mammal occurrence, distribution, and behavior on Navy ranges through the U.S. Navy Marine Species Monitoring Program. For information on the U.S. Navy Marine Species Monitoring Program, see Section 5.2.2.3 (Marine Species Research and Monitoring Programs).

Analysis in Section 3.7.5.5.1.1 (Explosives), gray whales may be exposed to sound or energy from explosions associated with Navy activities throughout the year. Almost all gray whales moving through the PMSR are from the non-endangered Eastern North Pacific stock, and all of the predicted modeled impacts are for this stock. For the Eastern North Pacific stock of gray whales, the quantitative analysis using the number of explosives per year under the Proposed Action estimates behavioral reactions and TTS may occur (refer to Appendix C for the quantification of effects). Data from satellite tags have indicated that on rare occasions a few endangered Western North Pacific individual gray whales may be present in the Study Area as they migrate through on their way to Mexican waters (Mate et al., 2015a). For the Western North Pacific stock of gray whales, the quantitative analysis estimates no acoustic exposures resulting from Navy’s activities. Considering the factors presented above and the mitigation

measures that would be implemented as described elsewhere in this chapter, long-term consequences for the species or stocks would not be expected.

If a gray whale were to react to sound from an explosion, it may pause its migration until the noise ceases or moves, or it may choose an alternate route around the location of the sound source if the source was directly in the whale's migratory path. As with most other mysticetes, gray whale reactions to explosions are most likely to be short-term and mild to moderate if they occur at all and significant impacts on gray whale migration behaviors from testing and training activities at PMSR are unlikely to occur. There are no indications that Navy activities would significantly affect the migration behavior of individuals. The gray whale migration area covers the entire eastern portion of the Study Area, including the high use area around SNI. The Navy cannot avoid or reduce the use of this large portion without significant impact on Navy readiness. Therefore, the Navy determined that establishing geographic mitigation would not be practical to implement.

Morro Bay Harbor Porpoise Small and Resident Population Area

Aerial surveys that included the Morro Bay harbor porpoise population between 2002 and 2007 indicated a core area of higher density between Point Estero (north of Cayucos), and Point Arguello (north of Point Conception), with density decreasing toward the edges of their range (Calambokidis et al., 2015). It was argued that the small core range of this small and resident Morro Bay harbor porpoise population made it particularly vulnerable to anthropogenic impacts (Calambokidis et al., 2015). A small portion of the identified Morro Bay harbor porpoise small and resident population area identified in Calambokidis et al. (2015) overlaps with the nearshore boundary of waters within the northern portion of the PMSR Study Area (see Figure 5.3-2).

Harbor porpoise should only be present in the nearshore edge of the PMSR north of Point Conception, which is not where the Navy's use of explosives or other activities would be located. The quantitative analysis using the number of explosives per year under the Proposed Action estimates no acoustic exposures to the species. Considering the factors presented above for odontocetes and the mitigation measures that would be implemented as described above in this chapter, long-term consequences for the species or stock would not be expected.

As detailed in Section 3.7.4.3.8.2 (Habitat and Geographic Range), the designated Morro Bay harbor porpoise small and resident population area partially overlaps the northern nearshore portion of the PMSR Study Area. Navy activities that use explosives could occur year round within the Study Area, although generally they would not occur in the relatively nearshore location of the designated area given the location is encumbered by proximity to the coastline, oil production platforms, and commercial vessel traffic transiting along the California coast. The Navy's acoustic effects model predicts no exposures to harbor porpoise resulting from the use of explosives; therefore, the Navy determined that establishing geographic mitigation would not provide any additional benefits to the Morro Bay harbor porpoise population.

Leatherback Sea Turtle Critical Habitat

In 2012, NMFS designated critical habitat for the leatherback sea turtle in California waters (from Point Arena to Point Arguello) out to the 3,000 m isobaths. Critical habitat was also designated north of the Study Area from Cape Flattery, Washington, to Winchester Bay, Oregon, out to the 2,000 m isobaths (National Marine Fisheries Service, 2012). A portion of the California critical habitat designation overlaps the northeastern portion of the PMSR (Figure 5.3-3).

The primary constituent elements defining leatherback critical habitat are “the occurrence of prey species ... of sufficient condition, distribution, diversity, abundance, and density necessary to support individual as well as population growth, reproduction, and development of leatherbacks...” (50 CFR 226.207).

Indirect effects (secondary stressors) on leatherback sea turtles are mainly associated with the occurrence and availability of prey species. As discussed in Section 3.8.4.2.2 (Leatherback Sea Turtles [*Dermochelys coriacea*]), leatherback prey mainly on various types of jellyfish.

The occurrence and distribution of jellyfish and several other types of zooplankton (e.g., larval shrimp and crabs) preyed on by leatherback sea turtles are dependent on the physical oceanographic conditions in the California Current Ecosystem. Large-scale features of the habitat that determine prey distribution include the equatorward flowing California Current; the nearshore California countercurrent; bathymetric features such as the ridges, basins, and escarpments that form the continental borderland; upwelling; and prevailing winds.

See Section 3.3.4.1 (General Background) for a more detailed discussion on how the physical environment influences biological resources in the Study Area. Therefore, the availability of prey species within designated leatherback sea turtle critical habitat would not be impacted as a result of implementation of the Proposed Action.

Activities occurring in leatherback critical habitat may affect but are not likely to adversely affect leatherback sea turtle critical habitat through the use of military expended materials, explosive ordnance, and non-explosive ordnance. Navy activities may affect the occurrence of individual prey (which is the basis for the critical habitat designation for leatherback sea turtles); however, they would not affect the occurrence of prey of sufficient density and abundance. The areas of the PMSR that overlap leatherback critical habitat are rarely used for testing and training activities. On the occasions when the areas are used, activities typically occur in the offshore areas of W-532 S/E/N (see Figure 2-1).

The activities with the greatest potential to affect prey species are aerial gunnery activities, with most aerial gunnery activities typically taking place seaward of leatherback critical habitat. Even if projectiles or other items or materials were expended within leatherback critical habitat, they would quickly sink to the seafloor, where depths exceed 1,000 meters in most of the areas of the PMSR that would be used for testing and training. Therefore, establishing geographic mitigation would not provide any additional benefits to leatherback sea turtle populations or its designated critical habitat.

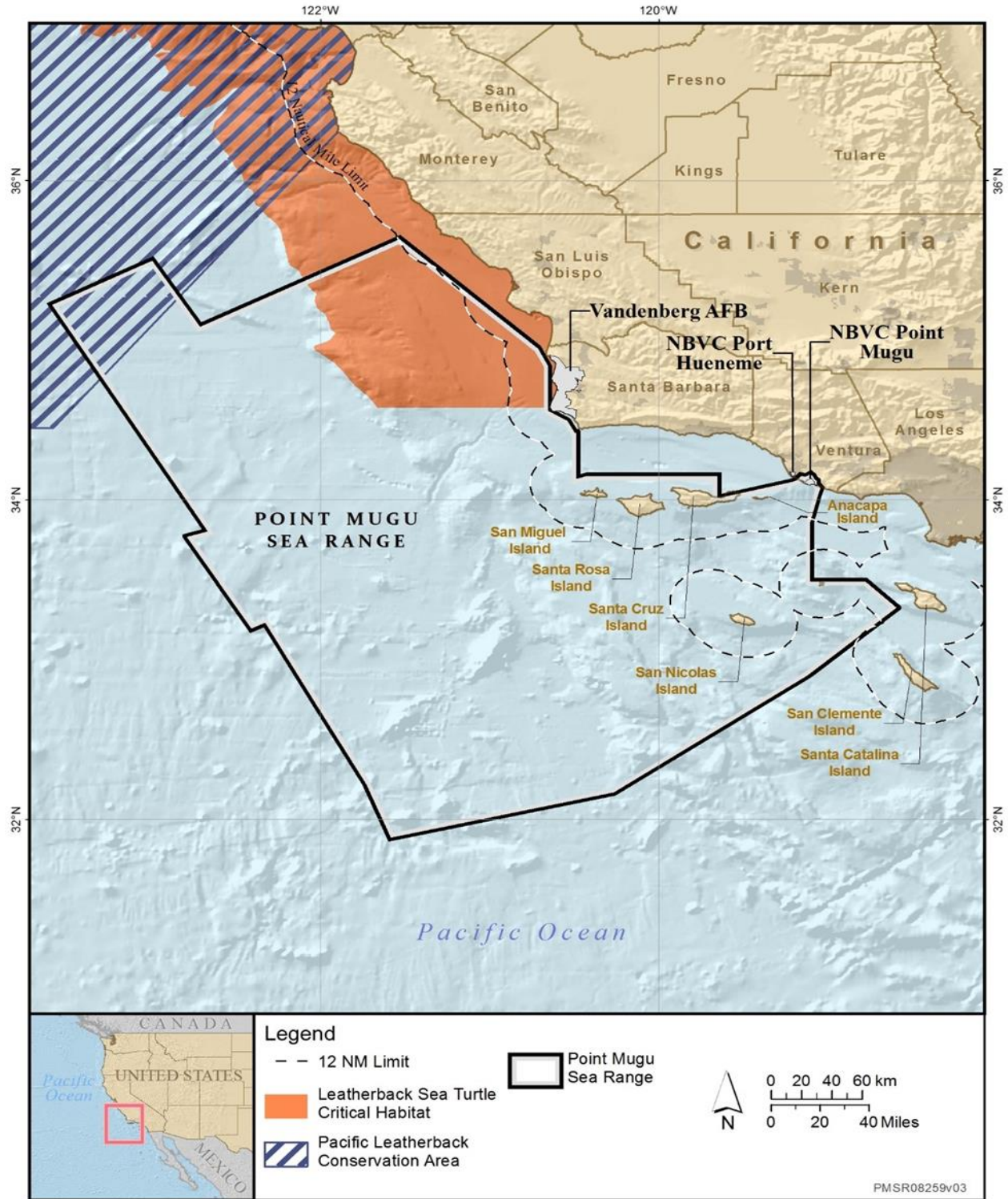


Figure 5.3-3: Leatherback Sea Turtle Critical Habitat Within the Study Area

5.3.6.3 Thermal Detection Systems

Thermal detection technology is designed to allow observers 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, current technologies are limited by their (1) reduced performance in certain environmental conditions, (2) inability to detect certain animal characteristics and behaviors, (3) low sensor resolution and narrow fields of view, and (4) high cost and low lifecycle (Boebel, 2017; Zitterbart et al., 2013).

Thermal detection systems can be effective at detecting some types of marine mammals in a limited range of marine environmental conditions. Current thermal detection systems have proven more effective at detecting large whale blows than the bodies of small animals, particularly at a distance (Zitterbart et al., 2013). 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 performance in certain environmental conditions. False positive detections may incorrectly identify other features (e.g., birds, waves, boats) as marine mammals. In one study, Zitterbart et al. (2013) reported a false positive rate approaching one incorrect notification per 4 minutes of observation.

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. Two studies that examined the effectiveness of thermal detection systems for marine mammal observations are Zitterbart et al. (2013), which tested a thermal detection system and automatic algorithm in polar waters between 34–50 degrees Fahrenheit, and a Navy-funded study in subtropical and tropical waters. Zitterbart et al. (2013) found that current technologies have limitations regarding temperature and survey conditions (e.g., rain, fog, sea state, glare, ambient brightness), for which further effectiveness studies are required. 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 Navy has also been investigating the use of thermal detection systems with automated marine mammal detection algorithms for future mitigation during testing and training, including on autonomous platforms. For example, 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.

Thermal detection systems are currently used by some specialized U.S. Air Force aircraft for marine mammal mitigation. These systems are specifically designed for and integrated into Air Force aircraft and cannot be added to Navy aircraft. Only certain Navy aircraft have specialized infrared capabilities, and these capabilities are only for fine-scale targeting within a narrow field of view. The only thermal imagery sensors aboard Navy surface ships are associated with specific weapons systems, and these sensors are not available on all vessels. These sensors are typically used only in select training events, have a limited lifespan before requiring expensive replacement, and are not optimized for marine mammal observations within the Navy's mitigation zones. For example, as described in Section 5.3.3.1 (Explosive Medium- and Large-Caliber Projectiles), Lookouts are required to observe a 1,000 yd. mitigation zone around the intended impact location during explosive large-caliber gunnery activities.

In addition to observing for marine mammals, one of the activity's mission-essential requirements is for event participants, including Lookouts, to maintain focus on the mitigation zone to ensure the safety of Navy personnel and equipment and the public. Lookouts would not be able to observe the 1,000 yd. mitigation zone using the Navy's thermal imagery sensors due to their narrow fields of view and technological design specific to fine-scale targeting. Such observations would be ineffective for marine mammals and would prevent Lookouts from effectively maintaining focus on the activity area and implementing mission-essential safety protocols.

The effectiveness of even the most advanced commercially available thermal detection systems with technological designs specific to marine mammal observations is highly dependent on environmental conditions, animal characteristics, and animal behaviors (Zitterbart et al., 2013). Considering the range of environmental conditions and diversity of marine mammal species found throughout the Study Area, the use of thermal detection systems would be less effective than the traditional techniques currently employed by the Navy, such as naked-eye scanning, hand-held binoculars, and high-powered binoculars mounted on a ship deck. Furthermore, high false positive rates of thermal detection systems could result in the Navy implementing mitigation for features incorrectly identified as marine mammals.

Increasing the instances of mitigation implementation based on incorrectly-identified features would have significant impacts on the ability for testing and training activities to accomplish their intended objectives, without providing any mitigation benefit to the species. In addition, 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. Requiring Lookouts to use thermal detection systems would prevent them from detecting and mitigating for sea turtles and other biological resources (e.g., floating vegetation, jellyfish aggregations, and large schools of fish).

As discussed in Section 5.3 (Proposed At-Sea Procedural Mitigation), the Navy's procedural mitigation measures include the maximum number of Lookouts the Navy can assign to each activity based on available manpower and resources. It would be impractical to add personnel to serve as additional Lookouts for the sole purpose of thermal detection system use. 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.

In summary, thermal detection systems 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 testing and training. The Navy plans to continue researching thermal detection systems 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 testing and training, the Navy will assess the practicality of using the technology during testing and training events and retrofitting its observation platforms with thermal detection devices. 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.

5.3.6.4 Additional Reporting Requirements

As discussed in Section 5.2.2.2 (Monitoring, Research, and Reporting Initiatives), the Navy will develop its reporting requirements in conjunction with NMFS pursuant to MMPA and ESA to be consistent with mission requirements and balance the usefulness of the information to be collected with the practicality of collecting it. The Navy's testing and training activity reports and incident reports are designed to verify mitigation implementation; comply with current permits, authorizations, and consultation requirements; and improve future environmental analyses. In the unlikely event that a marine mammal vessel strike occurs, the Navy provides NMFS with relevant information pertaining to the incident, including but not limited to vessel speed.

In consultation under the Coastal Zone Management Act, the Navy has agreed to provide the California Coastal Commission with reports of explosive or gunnery activities conducted within five coastal biologically important areas for blue whales, humpback whales, and harbor porpoises. As discussed above in Section 5.3.6.2 (Geographic Mitigation), the Navy determined that implementing seasonal geographic mitigation in the biologically important areas was not warranted since these are historically areas of little or no use by the Navy. Furthermore, the Navy has also agreed to provide federally recognized tribes with annual levels of activity conducted on SNI. These activity reports will be included as an appendix to the SNI Integrated Cultural Resources Management Plan and updated annually.

Any additional administrative reporting would be ineffective as mitigation because it would not result in modifications to training or testing activities or further avoidance or reductions of potential impacts. For example, additional administrative reporting of vessel speed data would not result in modifications to vessel speeds (e.g., speed restrictions) or reduce the already low potential for marine mammal vessel strikes. 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 Navy does not currently maintain a record management system to collect, archive, analyze, and report marine species observation or vessel speed data for every testing and training activity and all vessel movements. For example, the speed of Navy vessels can fluctuate an unlimited number of times during testing and training 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 participations with requirements to complete additional administrative reporting would distract them from preparing a ready force and 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 Navy personnel safety, public safety, and the effectiveness of training or testing.

5.4 Mitigation Summary

Table 5.4-1 summarizes the at-sea procedural mitigation measures that the Navy proposes to implement under either Alternative 1 or Alternative 2 of the Proposed Action.

Table 5.4-1: Summary of At-Sea Procedural Mitigation

Stressor or Activity	Mitigation Zone Sizes and Other Requirements	Protection Focus
Weapons Firing Noise	<ul style="list-style-type: none"> 30° on either side of the firing line out to 70 yd. 	Marine mammals; Sea turtles
Explosive Medium-Caliber and Large-Caliber Projectiles	<ul style="list-style-type: none"> 1,000 yd. around the intended impact location (large-caliber projectiles) 600 yd. around the intended impact location (medium-caliber projectiles during surface-to-surface activities) 200 yd. around the intended impact location (medium-caliber projectiles during air-to-surface activities) 	Marine mammals; Sea turtles
Explosive Missiles and Rockets	<ul style="list-style-type: none"> 2,000 yd. around the intended impact location (21–500 lb. net explosive weight) 900 yd. around the intended impact location (0.6–20 lb. net explosive weight) 	Marine mammals; Sea turtles
Explosive Bombs	<ul style="list-style-type: none"> 2,500 yd. around the intended impact location 	Marine mammals; Sea turtles
Vessel Movement	<ul style="list-style-type: none"> 500 yd. distance from the vessel (whales) 200 yd. distance from the vessel (other marine mammals) Vicinity of the vessel (sea turtles) 	Marine mammals; Sea turtles
Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions	<ul style="list-style-type: none"> 200 yd. around the intended impact location 	Marine mammals; Sea turtles
Non-Explosive Missiles and Rockets	<ul style="list-style-type: none"> 900 yd. around the intended impact location 	Marine mammals; Sea turtles
Non-Explosive Bombs	<ul style="list-style-type: none"> 1,000 yd. around the intended impact location 	Marine mammals; Sea turtles

In addition to the proposed at-sea procedural mitigations, the Navy is proposing to continue to implement measures identified in previous USFWS Biological Opinions as summarized in Table 5.4-2 for land-based activities under either Alternative 1 or Alternative 2 of the Proposed Action.

Table 5.4-2: Summary of Land-Based Procedural Mitigation

Stressor or Activity	Mitigation Requirements	Protection Focus
Vehicle Launches from San Nicolas Island (SNI)	<ul style="list-style-type: none"> • Navy personnel shall not enter pinniped haulouts. Personnel may be adjacent to pinniped haulouts prior to and following a launch for monitoring purposes. • Missiles and targets shall not cross over pinniped haulouts at elevations less than 305 meters (m) (1,000 ft.) unless necessary to meet test mission objectives. • The Navy may not conduct more than 10 launch events at night unless necessary to meet test mission objectives. • Launch events shall be scheduled to avoid the peak pinniped pupping seasons between January through July, to the maximum extent practicable. All manned aircraft and helicopter flight paths must maintain a minimum distance of 305 m (1,000 ft.) from recognized seal haulouts and rookeries, unless necessary to meet test mission objectives. • For unmanned aircraft system (UAS), the following minimum altitudes must be maintained over pinniped haulout areas and rookeries: Class 0–2 UAS must maintain a minimum altitude of 300 ft.; Class 3 UAS must maintain a minimum altitude of 500 ft.; Class 4 or 5 UAS must not be flown below 1,000 ft. 	Hauled-out pinnipeds
Vehicle Launches from SNI	<ul style="list-style-type: none"> • The Naval Base Ventura County (NBVC) Environmental Division closes the south side of SNI to all activities to protect the western snowy plover. • All western snowy plover nesting areas are closed for the duration of the breeding season. • Signs and barricades are erected to denote closures, and the environmental staff patrol the beaches periodically. • Western snowy plover nests shall be monitored prior to and during missile or target launches. 	Western snowy plover

Table 5.4-2: Summary of Land-Based Procedural Mitigation (continued)

Stressor or Activity	Mitigation Requirements	Protection Focus
Vehicle Launches from Point Mugu	<ul style="list-style-type: none"> • If a listed species nest is on or in close proximity (within 500 ft.) to the launch, the Navy will utilize a different site. • The Navy will not allow operational personnel on the beach year-round unless authorized or escorted by Natural Resource personnel. • Natural Resource personnel will coordinate placement of equipment on the beach to minimize any impacts to nesting birds and ensure equipment is a minimum of 100 ft. away from active nests. • If equipment on the beach requires personnel continually at or visiting the site, the Navy will place equipment a minimum of 300 ft. from active nests. • If beach equipment is in place longer than a week, the Navy will place spike stripping on equipment as needed if it acts as a perch for raptors. 	Western snowy plover; California least terns
Aircraft Operations and Support	<ul style="list-style-type: none"> • Outside of take-off and landing, the Navy will keep fixed-wing and rotorcraft at or above 500 ft. above ground level over all listed species habitat. • The Navy will instruct any aircraft transiting Point Mugu to stay above 500 ft. above ground level. 	All federally protected bird species
Unmanned Aircraft Operations	<ul style="list-style-type: none"> • Unmanned aerial vehicles and supporting aircraft flights will be restricted to an altitude of 1,000 ft. above ground level or greater. • A designated observer will be present during all activities that involve weapons testing, firing, or launching to ensure that these activities will not result in adverse effects to marine mammals, sea turtles, or birds. • Before a weapon (including lasers) can be fired, the Navy will require as standard procedure that no persons, wildlife, reflective surfaces, or non-target obstructions of any sort are present within the hazard area, which is specific to the type of weapon used, between the firing point and the target. 	All federally protected species

Table 5.4-2: Summary of Land-Based Procedural Mitigation (continued)

Stressor or Activity	Mitigation Requirements	Protection Focus
Directed Energy activities on SNI	<ul style="list-style-type: none"> • Avoid activities when western snowy plovers are present, if feasible. • During plover nesting season (March 1–September 15), a qualified biologist will (i) educate operational personnel about sensitive habitats and how to implement avoidance and minimization measures, (ii) delineate any areas adjacent to the site that should be avoided, and (iii) attend operation related meetings as needed. • During plover nesting season, if plovers are present within 1,000 ft. of the action area, a qualified biologist will remain on site during activities (if safety constraints allow) to monitor movement and behavior of western snowy plovers. • During plover nesting season, access to the test site will be restricted to operational activities only. • Unless operationally necessary, personnel will not occupy the site between dusk and dawn. No artificial lighting will be used. • Before directed energy systems are fired, the Navy will require that no persons, listed species (or other wildlife), reflective surfaces, or non-target obstructions of any sort are present within the hazard area (which is specific to the type of system being used) between the shooter site and the target or immediately behind the target. 	Western snowy plover
Close-in weapons systems (CIWS), small arms testing and training and other countermeasure testing and training at NBVC Point Mugu and SNI	<ul style="list-style-type: none"> • CIWS, small arms, and other countermeasures testing and training will not occur when snowy plover, least tern, or light-footed Ridgway's rail nests are within 500 ft. of the operational area. • Pre- and post- operation surveys for all listed species nesting within 1,000 ft. of the testing or training site will confirm no abandonment occurred due to testing or training. • The CIWS would only be fired at aerial targets flying at normal operating altitudes well above the horizon to reduce potential of striking typically low-flying birds. • Before the CIWS is fired, the Navy would require as standard procedure that no listed species or other wildlife are present between the shooter site and the target or immediately behind the target. A qualified biologist will monitor the hazard area with binoculars or remote cameras as necessary to ensure that the CIWS system is not fired if wildlife is within the expected debris pattern. 	Western snowy plover; California least terns; Light-footed Ridgway's rail

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