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5 MITIGATION

5.1 Introduction

The terms “mitigation” and “mitigation measures” mean actions taken to completely avoid, partially reduce, or minimize the potential for a stressor to impact a resource. This chapter describes and assesses mitigation the Action Proponents will implement under Alternatives 1 or 2 of the Proposed Action. The Action Proponents developed mitigation separate from, and after, the NEPA alternatives development process described in Chapter 2. Mitigation was designed to be implemented under every action alternative carried forward. Additionally, the Action Proponents developed mitigation in coordination with regulators and cooperating agencies, including the NMFS. Mitigation is designed to achieve one or more of the following overarching benefits:

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

For requirements under the MMPA, NMFS has supported the position that the reduction of impacts on marine mammal stocks and species (e.g., impacts on reproductive success or survivorship) may accrue through the application of mitigation that limits impacts on individual animals (National Marine Fisheries Service, 2023). Mitigation developed for the following types of impacts is thought to have greater value in reducing the likelihood or severity of adverse effects on marine mammal populations (National Marine Fisheries Service, 2023):

- avoiding injury or mortality
- limiting interruption of known feeding, breeding, mother/young, or resting behaviors
- minimizing abandonment of important habitat (temporally and spatially)
- minimizing the number of individuals subjected to these types of disruptions
- limiting degradation of habitat

NMFS has also described species-correlated factors that may (alone, or in combination) result in mitigation having a greater benefit towards reducing potential impacts on marine mammal species or stocks: (1) the stock is known to be decreasing or status is unknown, but believed to be declining; (2) the known annual mortality (from any source) is approaching or exceeding the potential biological removal level (as defined in section 3(20) of the MMPA); (3) the species or stock is a small, resident population; or (4) the stock is involved in an unusual mortality event or has other known vulnerabilities, such as recovering from an oil spill. Activity-based mitigation and geographic mitigation (which can include year-round or seasonal measures to reduce impacts on marine mammals or their prey and physical habitat), particularly within feeding, breeding, mother/young, migration, and resting areas (National Marine Fisheries Service, 2023), are relevant to achieving the mitigation goals described above. Using this

guidance from NMFS, the Action Proponents considered the potential benefits of mitigation for marine mammals in terms of the degree, likelihood, and context of the anticipated avoidance of impacts to individuals (and how many individuals), and within the context of the species-correlated factors. Similar considerations were applied to mitigation developed for ESA-listed species, including sea turtles, fishes, birds, and corals.

The Navy standardizes its mitigation across the Atlantic, Hawaii-California, Mariana Islands, Northwest, and Gulf of Alaska Study Areas to the maximum extent practical. Mitigation is tailored to each Study Area as needed and appropriate based on the following:

- the Proposed Action
- best available science on species occurrence and potential impacts from the Proposed Action
- expected mitigation benefits
- operational practicality assessments
- consultations and coordination with regulatory agencies or departments, such as NMFS, NOAA, USFWS, state Coastal Zone Management program offices, and State Historic Preservation Offices
- consultations and coordination with Alaska Native federally recognized tribes, Native Hawaiian organizations, and Native American Tribes, nations, and tribal organizations
- suggestions received through public comments during scoping and on the Draft EIS/OEIS

Mitigation was initially developed for Phase I of at-sea environmental planning (2009 to 2014) and subsequently revised for Phase II (2013 to 2018) and Phase III (2018 to 2025 for the HSTT EIS/OEIS, and 2022 to 2029 for the PMSR EIS/OEIS). This EIS/OEIS (which represents Phase IV) uses mitigation from the 2018 HSTT and 2022 PMSR EIS/OEISs as the baseline for refining mitigation specific to the Proposed Action. For additional information about the at-sea environmental planning process, see Chapter 1.

The Action Proponents analyzed potential mitigation measures individually and then collectively as a holistic mitigation package to determine if mitigation would meet the appropriate balance between being environmentally beneficial and practical to implement. Mitigation measures are expected to have some degree of impact on the military readiness activities that implement them. The Action Proponents are willing to accept a certain level of impact on their military readiness activities to implement mitigation that is expected to be sufficiently beneficial (i.e., effective) at avoiding specific impacts from the Proposed Action. To determine if mitigation measures would be practical to implement, operational communities from each Action Proponent conducted a comprehensive assessment to determine how and to what degree each individual measure and the iterative and cumulative impact of all potential measures would be compatible with planning, scheduling, and conducting military readiness activities under the Proposed Action. Mitigation was considered practical to implement if it met all three criteria discussed in Table 5-1.

Table 5-1: Practicality Assessment Criterion

Criterion	Description of Practicality Assessment Criterion
Criterion 1. Safety: Implementing mitigation must be safe	- Assessments considered if mitigation would increase safety risks to personnel, equipment, or the public through: - increased fatigue of pilots or other personnel - accelerated fatigue-life of vessels, aircraft, and other systems or platforms - increased distance to aircraft emergency landing fields, critical medical facilities, and search and rescue capabilities - exceedance of aircraft fuel restrictions (e.g., lengthened event duration, increased distance to refueling stations) - exceedance of space restrictions on visual observation platforms - decreased ability to de-conflict sea space or airspace conflicts (e.g., ensuring military readiness activities do not impact each other, avoiding interaction with established commercial air traffic routes, commercial vessel shipping lanes, and areas used for energy exploration or alternative energy development) - decreased ability for Lookouts to safely and effectively maintain situational awareness while observing the mitigation zones during typical activity conditions - decreased ability for Lookouts to safely perform other assigned job responsibilities - decreased proficiency in the use of sensors and weapon systems, or reduced ability to complete shipboard maintenance, repairs, or testing prior to at-sea use (which would result in a significant risk to personnel or equipment safety during training, testing, and real-world missions) - increased administrative burden that would significantly distract from safe conduct of primary mission objectives
Criterion 2. Sustainability: Implementing mitigation must be sustainable for the duration of the Proposed Action	- Assessments considered if mitigation would be unsustainable for the duration of the Proposed Action by: - requiring personnel to spend an inordinate amount of time on station or away from their homeport - requiring the use or obligation of additional resources (i.e., personnel and equipment) in excess of what is available - requiring expenditure of additional funding for increased operational costs associated with higher fuel consumption, additional maintenance of existing equipment, or acquisition of new equipment - reducing efficiency in travel time and associated costs by increasing distance between activities and homeports, home bases, associated training ranges, testing facilities, air squadrons, and existing infrastructure (e.g., instrumented underwater ranges)
Criterion 3. Mission: Implementing mitigation must allow for the Action Proponents to continue meeting mission objectives and statutory mandates	- Assessments considered if mitigation would modify military readiness activities in a way that would prevent them from meeting mission objectives, and the implications for the ability to continue meeting statutory mandates. Example barriers to meeting mission objectives and statutory mandates include: - degraded training or testing realism - decreased ready access to ranges, operating areas (OPAREAs), airspace, or sea space with a variety of realistic tactical oceanographic and environmental conditions (e.g., variations in bathymetry, topography, surface fronts, and sea surface temperatures) that are extensive enough to allow for completion of activities without physical or logistical obstructions, to provide personnel the ability to develop competence and confidence in their capabilities across multiple types of weapons and sensors, and the ability to train to communicate and operate in a coordinated fashion as required during real-world missions and to avoid observation by potential adversaries - decreased proficiency, erosion of capabilities, or reduction in perishable skills related to the use of sensors or weapon systems - decreased ready access to facilities, range support structures, or systems command support facilities that provide critical infrastructure support and technical expertise necessary to conduct testing - reduced ability to meet individual training and testing schedules, pre-deployment certification requirements, deployment schedules, and to deploy on time (factoring in variables such as maintenance and weather when scheduling event locations and timing) with the required level of skill and flexibility to accomplish any tasking by Combatant Commanders, national command authorities, or other national security tasking, including responding to national emergencies or emerging national security challenges - reduced ability to conduct accurate oceanographic or acoustic research to meet research objectives, validate acoustic models, and conduct accurate engineering tests of acoustic sources, signal processing algorithms, and acoustic interactions - reduced ability to ensure the safety, functionality, and accuracy of systems, platforms, and components through maintenance, repairs, or testing prior to use at sea as needed or required by acquisition milestones - reduced ability to effectively test systems, platforms, and components before full-scale production or delivery in order to validate whether they perform as expected and determine whether they are operationally effective, suitable, survivable, and safe for their intended use by the fleet - increased administrative burden that would significantly distract from efficient and effective conduct of primary mission objectives - increased national security concerns related to providing advance notification of specific times and locations of platforms, such as those using active sonar - measures that extend outside of the Action Proponents' legal authority to implement

The Action Proponents' Senior Leadership has reviewed, determined the practicality of, and approved all mitigation measures included in this EIS/OEIS. Through the mitigation development and assessment processes, the Action Proponents will ultimately commit to the maximum level of mitigation that is both beneficial and practical to implement under the Proposed Action. The Records of Decision, MMPA Regulations and Letters of Authorization, ESA Biological Opinion, and other associated consultation documents will detail the mitigation to be implemented under the Proposed Action. Should the Action Proponents require a change in how they implement mitigation based on national security concerns, evolving readiness requirements, or other factors (e.g., significant changes in best available science), they will engage the appropriate agencies and reevaluate their mitigation or verify that potential impacts are adequately addressed in the EIS/OEIS and consultation documents through the appropriate consultations or Adaptive Management (as described in Section 5.5). Mitigation measures that were considered but eliminated because they did not meet the appropriate balance between being environmentally beneficial and practical to implement are discussed in Section 5.9.

5.2 Mitigation Dissemination

The Action Proponents will publish, broadcast, disseminate, or distribute mitigation instructions through pre-event briefs, governing instructions, broadcast messages, the Protective Measures Assessment Protocol, or other established internal processes. The Protective Measures Assessment Protocol is a software program accessed by appointed personnel during pre-event planning (see Figure 5-1). The program provides operators with notification of the required mitigation measures applicable to a particular training or testing event, as well as a visual display of the planned event location overlaid with relevant environmental data. Its text and mapping data will be updated to align with best available science and the final mitigation that results from this EIS/OEIS and associated consultation documents.

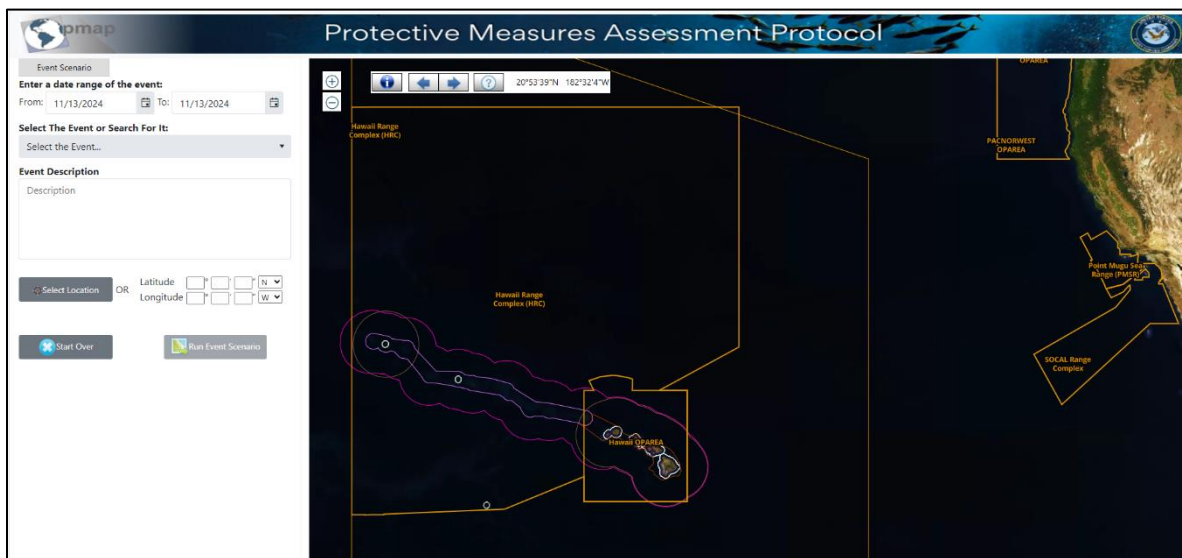


Figure 5-1: Protective Measures Assessment Protocol Home Screen

Mitigation requirements are mandatory for the Action Proponents when conducting activities under the Proposed Action. In furtherance of national security objectives, foreign militaries may participate in multinational training and testing events in the Study Area. See Section 2.3.1 for a discussion of foreign military activities that would be considered as part of the Proposed Action. During U.S.-led training events within the U.S. territorial seas (0 to 12 NM from shore), the Action Proponents will request a

foreign military unit's voluntary compliance with the applicable mitigations. When a foreign military unit participates in a training event with the Action Proponents beyond the U.S. territorial seas but within the U.S. Exclusive Economic Zone (12 to 200 NM from shore), the Action Proponents will encourage that unit's voluntary compliance with the mitigation when practical.

5.3 Personnel Training

As described in Section 3.0.4, underway surface ships operated by or for the Action Proponents have personnel assigned to stand watch at all times (day and night) for safety of navigation, collision avoidance, range clearance, and man-overboard precautions. Personnel on underway small boats (e.g., crewmembers responsible for navigation) fulfill similar watch standing responsibilities to those positioned on surface ships. To qualify to stand watch as a Lookout, personnel undertake a training program that includes computer-based training, on-the-job instruction, and a formal qualification program. Lookouts are trained in accordance with the *U.S. Navy Lookout Training Handbook* or equivalent to use correct scanning procedures while monitoring assigned sectors, to estimate the relative bearing, range, position angle, and target angle of sighted objects, and to rapidly communicate accurate sighting reports. The *U.S. Navy Lookout Training Handbook* was updated in 2022 to include a more robust chapter on environmental compliance, mitigation, and marine species observation tools and techniques (Naval Education and Training Command 12968-E). Environmental awareness and education training is also provided to personnel through the Afloat Environmental Compliance Training program (described below) or equivalent. Training is designed to help personnel gain an understanding of their personal environmental compliance roles and responsibilities (including mitigation implementation). Upon reporting aboard and annually thereafter, appointed personnel must complete training identified in their career path training plan.

- **Introduction to Afloat Environmental Compliance.** Developed in 2014, the introduction module provides information on at-sea environmental laws, regulations, and compliance roles.
- **Marine Species Awareness Training.** This module was developed by civilian marine biologists employed by the Navy and was reviewed and approved by NMFS. It provides information on marine species sighting cues, visual observation tools and techniques, and sighting notification procedures. It is a video-based complement to the *U.S. Navy Lookout Training Handbook* or equivalent. Since 2007, this module has been required for commanding officers, executive officers, equivalent civilian personnel, and personnel who will stand watch as a Lookout.
- **Protective Measures Assessment Protocol.** This module provides information on how personnel should access and operate the Protective Measures Assessment Protocol. Since 2014, this module has been required for personnel tasked with generating mitigation reports.
- **Sonar Positional Reporting System and Marine Mammal Incident Reporting.** This module provides information on sonar reporting requirements and marine mammal incident reporting procedures, which are described in Section 5.4. Since 2014, this module has been required for personnel tasked with preparing, approving, or submitting applicable reports.

5.4 Reporting

Reporting requirements are designed to track compliance with MMPA and ESA authorizations. They also provide the Action Proponents and regulators sufficient information to consider if changes to mitigation, monitoring, or reporting requirements might be appropriate. Report content and submission details will be included in the NMFS MMPA Regulations and Letters of Authorization. The Navy developed a classified data repository known as the Sonar Positional Reporting System to maintain internal records

of in-water sound source use and to facilitate reporting pursuant to its MMPA Regulations and Letters of Authorization. Applicable data is provided to the NMFS Office of Protected Resources with annual reports describing the level of training and testing conducted in the Study Area and the special reporting mitigation areas described in Section 5.7. The reports include additional information for major training exercises, and the SINKE, such as records of individual marine mammal sightings when mitigation was implemented during the events. The Action Proponents will also submit an annual report to NMFS on monitoring conducted under the U.S. Navy Marine Species Monitoring Program, which is described in Section 5.5. Unclassified reports submitted to NMFS are available on the NMFS Office of Protected Resources webpage (<https://www.fisheries.noaa.gov/about/office-protected-resources>).

5.4.1 Incident Reporting

As needed, the Action Proponents will follow established internal communication methods directed by Office of Chief of Naval Operations Instruction 3100.6 (series) if reportable incidents applicable to their activities are observed. Further, the Action Proponents will:

- Notify the appropriate regulatory agency, which may include NMFS or the USFWS, immediately (or as soon as operational security considerations allow) if a vessel strike, injury, or mortality of a marine mammal or sea turtle occurs that is (or may be) attributable to activities conducted under the Proposed Action. The notification will include relevant information pertaining to the incident, including, but not limited to, vessel speed or event type.
- Comply with the communication protocol for incidents involving marine mammals under NMFS' jurisdiction as outlined in the Notification and Reporting Plan, which will be publicly available on the NMFS Office of Protected Resources webpage.
- Comply with the reporting requirements for incidents involving ESA-listed species under NMFS' jurisdiction as outlined in the NMFS Biological Opinion.
- Comply with the reporting and response requirements for incidents involving ESA-listed species under USFWS' jurisdiction as outlined in the USFWS consultation documents.
- Commence consultation with the appropriate State Historic Preservation Officer or Tribal Historic Preservation Officer in accordance with 36 CFR section 800.13(b)(3) in the event a submerged historic property (e.g., archaeological resource) is found to have been incidentally impacted during a training or testing event.

5.5 Monitoring, Research, and Adaptive Management

The Navy is one of the nation's largest sponsors of scientific research on, and monitoring of, protected marine species (Marine Mammal Commission, 2023). Details about the U.S. Navy Marine Species Monitoring Program, Living Marine Resources Program, and U.S. Navy Office of Naval Research is provided in Section 3.0.1.1. Through the Action Proponents' environmental offices and programs, the U.S. Navy Marine Species Monitoring Program, the Living Marine Resources Program, and the Office of Naval Research, the Action Proponents have been sponsoring research and monitoring for over 30 years in areas where they conduct military readiness activities. Additionally, the Coast Guard spends tens of millions of dollars annually protecting living marine resources through its maritime response, prevention, and law enforcement missions, which have a direct and positive impact on the maritime environment.

Thanks in part to advancements in science from these programs, the understanding of military readiness activity impacts on protected marine species continues to evolve. The programs have also made significant advancements in research on and development of emergent mitigation technologies, such as

thermal detection systems, infrared systems, radar systems, passive acoustic range instrumentation, and autonomous and unmanned platforms with automated passive acoustic detection capabilities. Technological advancements are also being made through research conducted by private industry (e.g., commercial off-the-shelf products). While these technologies have not reached the level of performance needed for deployment during military readiness activities, the Action Proponents plan to continue researching, testing, and developing them. If mitigation technologies mature to the state where they are determined to be sufficiently effective at mitigating marine mammal impacts when considering the range of environmental conditions analogous to where the Action Proponents train and test, the species that could co-occur in space and time with the activities, and the characteristics of the sound sources and platforms used during the activities, then the Action Proponents will assess their compatibility with military readiness applications. This would include a practicality assessment of the budget and acquisition process (including costs associated with designing, building, installing, maintaining, and manning equipment), the logistical and physical considerations for retrofitting platforms with the appropriate equipment and their associated maintenance, repairs, or replacements (e.g., conducting engineering studies to ensure compatibility with existing shipboard systems), the resource considerations for training personnel to effectively operate the equipment, and the potential security and classification issues.

The Action Proponents will continue to host marine species monitoring technical review meetings with NMFS, to include researchers and the Marine Mammal Commission. Additionally, routine Adaptive Management meetings will continue to be held with NMFS and the Marine Mammal Commission as a systematic approach to help account for advancements in science and in technology made after the issuance of MMPA Regulations and Letters of Authorization. The Action Proponents will provide information about the status and findings of sponsored mitigation technology research and any associated practicality assessments at these meetings. Through Adaptive Management, decisions, policies, or actions can be adjusted as the science and outcomes from management actions become better understood over time (Williams et al., 2009).

5.5.1 Current Video and Audio Monitoring for San Nicolas Island during Vehicle Launch Events

The Navy shall continue to implement the current monitoring plan initially detailed in the 2022 PMSR EIS/OEIS for beaches exposed to launch noise with the goal of assessing baseline pinniped distribution/abundance and potential changes in pinniped use of these beaches after launch events. Marine mammal monitoring shall include multiple surveys (e.g., time-lapse photography) during the year that record the species, number of animals, general behavior, presence of pups, age class, gender and reactions to launch noise or other natural or human caused disturbances, in addition to environmental conditions that may include tide, wind speed, air temperature, and swell. In addition, video and acoustic monitoring of up to three pinniped haulout areas and rookeries will be conducted during launch events that include missiles or targets that have not been previously monitored using video and acoustic recorders for at least three launch events.

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.

5.6 Activity-based Mitigation

Activity-based mitigation was referred to as “Procedural Mitigation” in the 2018 HSTT and 2022 PMSR EIS/OEISs. Activity-based mitigations are fundamentally consistent across stressors; however, there are

activity-specific variations to account for differences in platform configurations, event characteristics, and stressor types. These mitigations have a primary objective of reducing overlap of individual marine mammals and sea turtles (and in some instances, ESA-listed fish and birds) in real time with stressors that have the potential to cause injury or mortality.

Observations for “indicator species” are also conducted to offer an additional layer of protection for marine mammals and sea turtles. Floating vegetation can be an indicator of potential marine mammal or sea turtle presence because these animals have been known to seek shelter in, feed on, or feed among concentrations of floating vegetation. For example, young sea turtles have been known to hide from predators and eat the algae associated with floating concentrations of floating vegetation. For mitigation purposes, the term “floating vegetation” refers to floating concentrations of detached kelp paddies or other floating vegetation. For events with the largest NEW, indicator species also include other prey species or co-feeding species, such as jellyfish aggregations, large schools of fish, or flocks of seabirds, depending on the event and observation platforms involved.

Visual observations will be conducted by trained Lookouts. For mitigation purposes, the minimum number of Lookouts required is provided in Table 5-2 through Table 5-5. Some events may have additional personnel (beyond the minimum number of required Lookouts) who are already standing watch in or on the platform conducting the event or additional participating platforms and would have eyes on the water for all or part of an event. For example, Bridge Watch Teams on underway surface ships typically include numerous personnel on the bridge, bridge wings, and aft deck. These additional personnel will serve as members of the “Lookout Team” for all acoustic, explosive, and physical disturbance and strike stressor mitigation categories. While performing their primary duties, the Lookout Team will perform ad hoc visual observations before, during, or after events as a secondary task when doing so is compatible with, and does not compromise, safety and primary duty performance.

Lookouts may be positioned on surface vessels, aircraft, piers, or the shore. Lookouts positioned on U.S. Navy surface vessels (including surfaced submarines) will be solely dedicated to visually observing their assigned sectors. Lookouts on vessels with limited crew may fulfill additional duties. For example, a Lookout on a small boat may also be responsible for navigation or personnel supervision. A Lookout in an aircraft is typically an existing crewmember such as a pilot or Flight Officer whose primary duty is navigation or other mission-essential tasks. Observation platforms will be positioned according to safety, mission, and environmental conditions. For example, small boats observing explosive mine events would always be positioned outside of the detonation plume and human safety zone.

Lookouts will employ standard visual search techniques using naked-eye scanning, potentially in combination with the use of handheld binoculars, high-powered “big-eye” binoculars mounted on the deck of a surface ship (depending on the event and observation platform), and night search techniques (e.g., the use of night vision devices) if events occur after sunset or prior to sunrise. Lookouts will be advised that personal use of polarized sunglasses, when available, may help reduce sea surface glare, which could improve the sightability of marine resources. Prior to the start of an event (or use of a stressor) and throughout the duration of the event (or stressor use), Lookouts will observe a “mitigation zone” and the sea space surrounding the mitigation zone; within the direct path of underway vessels, unmanned surface or underwater vehicles that are already being escorted and operated under positive control by manned surface vehicles, or towed in-water devices; and throughout the range of visibility (e.g., to the horizon, depending on weather and observation platform characteristics). Mitigation zones are distances from a stressor (typically a radius measured in yards [yd]), as specified in Table 5-2 through Table 5-5. The specified mitigation zones are the largest areas Lookouts can reasonably be expected to

observe during typical activity conditions and that are practical to implement from an operational standpoint. Lookouts may be responsible for observing multiple mitigation zones. For example, a Lookout positioned on a surface ship during an explosive large-caliber gunnery event may be responsible for observing both the weapon firing noise mitigation zone and the mitigation zone around the intended detonation location.

Lookouts will immediately relay relevant sightings information (e.g., animal or indicator species type, bearing, distance, direction of travel or drift, position relative to the mitigation zone) to the appropriate watch station through established communication methods. Lookouts will continue to observe for new sightings while maintaining situational awareness of the originally sighted animal or indicator species' position relative to the mitigation zone (to the extent possible). Lookouts will immediately relay any relevant new or updated information to the watch station. The watch station will disseminate relevant information to other participating assets as needed for their situational awareness. When passive acoustic devices are required for an event, or are already being used in an event, acoustic operators will relay information about any passive acoustic detections of marine mammals to Lookouts prior to or during an event (when applicable, as indicated in Table 5-2 and Table 5-3) using established communication methods. Lookouts will use the information received to help inform their visual observation of mitigation zones.

5.6.1 Mitigation Specific to Acoustic Stressors, Explosives, and Non-Explosive Ordnance

The mitigation measures described below will be implemented (as appropriate) in response to an applicable sighting within or entering the relevant mitigation zone for acoustic stressors, explosives, and non-explosive practice munitions:

- Prior to the initial start of an event (or stressor use), the Action Proponents will: (1) relocate the event to a location where applicable species are not observed, or (2) delay the initial start of the event (or stressor use) until one of the "Mitigation Zone All-Clear Conditions" has been met.
- During the event (i.e., during use of a stressor), the Action Proponents will (until one of the Mitigation Zone All-Clear Conditions has been met): (1) power down or shut down active acoustic transmissions, (2) cease air gun use, (3) cease pile driving or pile removal, (4) cease weapon firing or ordnance deployment, or (5) cease explosive detonations or fuse initiations.

Mitigation Zone All-Clear Conditions indicate that the mitigation zone is determined to be free of applicable species. The conditions include: (1) a Lookout observes the applicable species exiting the mitigation zone; (2) a Lookout determines the applicable species has exited the mitigation zone based on its observed course and speed relative to the mitigation zone; (3) a Lookout affirms the mitigation zone has been clear from additional sightings for an applicable "wait period"; or (4) for mobile events, the stressor has transited a distance equal to double the mitigation zone size beyond the location of the last sighting. Wait periods were established because events cannot be delayed or ceased indefinitely for the purpose of mitigation due to impacts on safety, sustainability, and the ability to meet mission requirements. Wait periods are designed to allow animals the maximum amount of time practical to resurface (i.e., become available to be observed) before activities resume. The assumption that mitigation may need to be implemented more than once was factored when developing wait period durations. Wait periods are 15 minutes for pile driving events, 10 minutes when events involve aircraft that are typically fuel constrained, or 30 minutes when events involve only vessels or aircraft that are not typically fuel constrained.

5.6.1.1 Additional Details for Acoustic Stressors

Additional details on the activity-based mitigation requirements for acoustic stressors are described in Table 5-2. Activity-based mitigation will not apply to:

- sources not operated under positive control
- sources used for safety of navigation
- sources used or deployed by aircraft operating at high altitudes
- sources used, deployed, or towed by unmanned platforms except when escort vessels are already participating in the event and have positive control over the source
- sources used by submerged submarines
- *de minimis* sources
- unattended sources, such as moored buoys used for acoustic and oceanographic research
- vessel-based, unmanned vehicle-based, or towed in-water sources when marine mammals (e.g., dolphins) are determined to be intentionally swimming at the bow or alongside or directly behind the vessel, vehicle, or device (e.g., to bow-ride or wake-ride)
- sources above 2 kHz for sea turtles (based on their hearing capabilities)

5.6.1.2 Additional Details for Explosives

Additional details on the activity-based mitigation requirements for explosives are described in Table 5-3. Activity-based mitigation will not apply to explosives (1) deployed by aircraft operating at high altitudes, (2) deployed by submerged submarines, except for explosive torpedoes, (3) deployed against aerial targets, (4) during vessel- or shore-launched missile or rocket events, (5) used at or below the *de minimis* threshold, and (6) deployed by unmanned platforms except when escort vessels are already participating in the event and have positive control over the explosive. Post-event observations are intended to aid incident reporting requirements for marine mammals and sea turtles. Practicality and the duration of post-event observations will be determined on site by fuel restrictions and mission-essential follow-on commitments.

5.6.1.3 Additional Details for Non-Explosive Ordnance

Additional details on the activity-based mitigation requirements for non-explosive ordnance are described in Table 5-4. Explosive aerial-deployed mines do not detonate upon contact with the water surface and are therefore considered non-explosive when mitigating the potential for a mine shape to strike a marine mammal or sea turtle at the water surface. Mitigation for the explosive component of aerial-deployed mines is described in Table 5-3. Activity-based mitigation will not apply to non-explosive ordnance deployed (1) by aircraft operating at high altitudes, (2) against aerial targets and land-based targets, (3) during vessel- or shore-launched missile or rocket events, and (4) by unmanned platforms except when escort vessels are already participating in the event and have positive control over ordnance deployment.

Table 5-2: Activity-Based Mitigations for Acoustic Stressors

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Active Acoustic Sources				
- Active acoustic sources with power down and shut down capabilities: - Low-frequency active sonar ≥ 200 dB - Mid-frequency active sonar sources that are hull mounted on a surface ship (including surfaced submarines) - Broadband and other active acoustic sources > 200 dB	200 yd from active acoustic sources (shut down) 500 yd from active acoustic sources (power down of 10 dB total) 1,000 yd from active acoustic sources (power down of 6 dB total)	- One Lookout in/on one of the following: - Aircraft - Pierside, moored, or anchored vessel - Underway vessel with space/crew restrictions (including small boats) - Underway vessel already participating in the event that is escorting (and has positive control over sources used, deployed, or towed by) an unmanned platform	- Immediately prior to the initial start of using active acoustic sources (e.g., while maneuvering on station), observe for: - Marine mammals - Sea turtles (for sources < 2 kHz) - Floating vegetation - During use of active acoustic sources, observe for: - Marine mammals - Sea turtles (for sources < 2 kHz)	10 or 30 minutes (depending on fuel constraints of the platform)
- Active acoustic sources with shut down (but not power down) capabilities: - Low-frequency active sonar < 200 dB - Mid-frequency active sonar sources that are not hull mounted on a surface ship (e.g., dipping sonar, towed arrays) - High-frequency active sonar - Air guns - Broadband and other active acoustic sources < 200 dB	200 yd from active acoustic sources (shut down)	- Two Lookouts on an underway vessel without space/crew restrictions - Lookouts would use information from passive acoustic detections to inform visual observations when passive acoustic devices are already being used in the event		
Pile Driving and Pile Removal				
Vibratory and impact pile driving and removal	5 yd from piles being driven or removed (cease pile driving or removal)	- One Lookout on one of the following: - Shore - Pier - Small boat	15 minutes prior to the initial start of pile driving or pile removal, observe for: - Marine mammals - Sea turtles - Floating vegetation - During pile driving or removal, observe for: - Marine mammals - Sea turtles	15 minutes
Explosive and non-explosive large-caliber gunnery firing noise (surface-to-surface and surface-to-air)	30 degrees on either side of the firing line out to 70 yd from the gun muzzle (cease fire)	One Lookout on a vessel	- Immediately prior to the initial start of large-caliber gun firing (e.g., during target deployment), observe for: - Marine mammals - Sea turtles - Floating vegetation - During large-caliber gun firing, observe for: - Marine mammals - Sea turtles	30 minutes

Table 5-3: Activity-Based Mitigations for Explosives

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Explosive Bombs				
Any NEW	2,500 yd from the intended target (cease fire)	One Lookout in an aircraft	- Immediately prior to the initial start of bomb delivery (e.g., when arriving on station), observe for: - Marine mammals - Sea turtles - Floating vegetation - During bomb delivery, observe for: - Marine mammals - Sea turtles - After the event, when practical, observe the detonation vicinity for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 minutes
Explosive Gunnery				
Air-to-surface medium-caliber ordnance	200 yd from the intended impact location (cease fire)	One Lookout on a vessel or in an aircraft	- Immediately prior to the initial start of gun firing (e.g., while maneuvering on station), observe for: - Marine mammals - Sea turtles - Floating vegetation - During gunnery firing, observe for: - Marine mammals - Sea turtles - After the event, when practical, observe the detonation vicinity for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 or 30 minutes (depending on fuel constraints of the platform)
Surface-to-surface medium-caliber ordnance	600 yd from the intended impact location (cease fire)			
Surface-to-surface large-caliber ordnance	1,000 yd from the intended impact location (cease fire)			

Table 5-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Explosive Underwater Demolition Multiple Charge – Mat Weave and Obstacle Loading				
Any NEW	700 yd from the detonation site (cease fire)	Two Lookouts: one on a small boat and one on shore from an elevated platform	- For 30 min. prior to the first detonation, the Lookout positioned on a small boat will observe for: - Marine mammals - Sea turtles - Floating vegetation - For 10 min. prior to the first detonation, the Lookout positioned on shore will use binoculars to observe for: - Marine mammals - Sea turtles - During detonations, both Lookouts will observe for: - Marine mammals - Sea turtles - After the event, observe the detonation vicinity for 30 minutes for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 minutes (determined by the shore observer)
Explosive Mine Countermeasure and Neutralization (No Divers)				
0.1–5 lb. NEW	600 yd from the detonation site (cease fire)	One Lookout on a vessel or in an aircraft	- Immediately prior to the initial start of detonations (e.g., while maneuvering on station; typically, 10 or 30 minutes depending on fuel constraints), observe for: - Marine mammals - Sea turtles - Floating vegetation - During detonations or fuse initiation, observe for: - Marine mammals - Sea turtles - Concentrations of seabirds or individual foraging seabirds - After the event, observe the detonation vicinity for 10 or 30 minutes (depending on fuel constraints), for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 or 30 minutes (depending on fuel constraints of the platform)
>5 lb. NEW	2,100 yd from the detonation site (cease fire)	Two Lookouts: one in a small boat and one in an aircraft	- Immediately prior to the initial start of detonations (e.g., while maneuvering on station; typically, 10 or 30 minutes depending on fuel constraints), observe for: - Marine mammals - Sea turtles - Floating vegetation - During detonations or fuse initiation, observe for: - Marine mammals - Sea turtles - Concentrations of seabirds or individual foraging seabirds - After the event, observe the detonation vicinity for 10 or 30 minutes (depending on fuel constraints), for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	

Table 5-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Explosive Mine Neutralization (With Divers)				
0.1–20 lb. NEW (positive control)	500 yd from the detonation site (cease fire)	Two Lookouts in two small boats (one Lookout per boat), or one small boat and one rotary-wing aircraft (with one Lookout each), and one Lookout on shore for shallow-water events	- Time-delay devices will be set not to exceed 10 minutes - Immediately prior to the initial start of detonations or fuse initiation for positive control events (e.g., while maneuvering on station) or for 30 minutes prior for time-delay events, observe for: - Marine mammals - Sea turtles - Floating vegetation - Manta rays - Hammerhead sharks - During detonations or fuse initiation, observe for: - Marine mammals - Sea turtles - Manta rays - Concentrations of seabirds or individual foraging seabirds in the water during shallow-water events: A shore-based Lookout will survey the mitigation zone with binoculars before and after each detonation. If events involve multiple detonations, the second (or third, etc.) detonation will occur immediately after the preceding detonation (i.e., within 10 seconds), or after 30 min. - Hammerhead sharks within the Southern California Range Complex: Divers will notify the support boat or Range Safety Officer of sightings (of any hammerhead, due to difficulty in differentiating species). Detonations will cease if divers sight a hammerhead when setting charges and will recommence when it is no longer observed. - When practical based on mission, safety, and environmental conditions: - Boats will observe from the mitigation zone radius mid-point - When two are used, boats will observe from opposite sides of the mine location - Platforms will travel a circular pattern around the mine location - Boats will have one Lookout observe inward toward the mine location and one observe outward toward the mitigation zone perimeter - Divers will be part of the Lookout Team - After the event, observe the detonation vicinity for 30 minutes for dead or injured: - Marine mammals - Sea turtles - Manta rays - Hammerhead sharks - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 or 30 minutes (depending on fuel constraints of the platform)
0.1–29 lb. NEW (time-delay) >20–60 lb. NEW (positive control)	1,000 yd from the detonation site (cease fire)	Four Lookouts in two small boats (two Lookouts per boat), and one additional Lookout in an aircraft if used in the event		

Table 5-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Explosive Missiles and Rockets				
0.6–20 lb. NEW (air-to-surface)	900 yd from the intended impact location (cease fire)	One Lookout in an aircraft	- Immediately prior to the initial start of missile or rocket delivery (e.g., during a fly-over of the mitigation zone), observe for: - Marine mammals - Sea turtles - Floating vegetation - During missile or rocket delivery, observe for: - Marine mammals - Sea turtles - After the event, when practical, observe the detonation vicinity for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 or 30 minutes (depending on fuel constraints of the platform)
>20–500 lb. NEW (air-to-surface)	2,000 yd from the intended impact location (cease fire)			
Explosive Sonobuoys and Research-Based Sub-Surface Explosives				
- Any NEW of sonobuoys 0.1–5 lb. NEW for other types of sub-surface explosives used in research applications	600 yd from the device or detonation site (cease fire)	- One Lookout on a small boat or in an aircraft - Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations	- Immediately prior to the initial start of detonations (e.g., during sonobuoy deployment, which typically lasts 20 to 30 minutes), observe for: - Marine mammals - Sea turtles - Floating vegetation - During detonations, observe for: - Marine mammals - Sea turtles - After the event, when practical, observe the detonation vicinity for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 or 30 minutes (depending on fuel constraints of the platform)

Table 5-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Explosive Torpedoes				
Any NEW	2,100 yd from the intended impact location (cease fire)	- One Lookout in an aircraft - Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations	- Immediately prior to the initial start of detonations (e.g., during target deployment), observe for: - Marine mammals - Sea turtles - Floating vegetation - Jellyfish aggregations - During torpedo launches, observe for: - Marine mammals - Sea turtles - Jellyfish aggregations - After the event, when practical, observe the detonation vicinity for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	10 or 30 minutes (depending on fuel constraints of the platform)
Ship Shock Trials				
Any NEW	3.5 NM from the target ship hull (cease fire)	On the day of the event, 10 observers (Lookouts and third-party observers combined), spread between aircraft or multiple vessels as specified in the event-specific mitigation plan	- The Navy would develop a detailed event-specific monitoring and mitigation plan in the year prior to the event and provide it to NMFS for review - Beginning at first light on days of detonation until the moment of detonation (as allowed by safety measures), observe for: - Marine mammals - Sea turtles - Floating vegetation - Jellyfish aggregations - Large schools of fish - Flocks of seabirds - If an incident involving a marine mammal or sea turtle is observed after an individual detonation, the Navy would follow established incident reporting procedures and halt any remaining detonations until the Navy can consult with NMFS and review or adapt the event-specific mitigation plan, if necessary - During the 2 days following the event at a minimum and up to 7 days at a maximum, and as specified in the event-specific mitigation plan, observe the detonation vicinity for dead or injured: - Marine mammals - Sea turtles	30 minutes

Table 5-3: Activity-Based Mitigations for Explosives (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
SINKEX				
Any NEW	2.5 NM from the target ship hull (cease fire)	- Two Lookouts: one on a vessel and one in an aircraft - Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations	- During aerial observations for 90 minutes prior to the initial start of weapon firing, observe for: - Marine mammals - Sea turtles - Floating vegetation - Jellyfish aggregations - From the vessel during weapon firing, and from the aircraft and vessel immediately after planned or unplanned breaks in weapon firing of more than 2 hours, observe for: - Marine mammals - Sea turtles - Observe the detonation vicinity for 2 hours after sinking the vessel or until sunset, whichever comes first, for dead or injured: - Marine mammals - Sea turtles - If a marine mammal is visibly injured or killed as a result of detonation, explosives use in the event would be suspended immediately, and established incident reporting procedures would be followed.	30 minutes

Table 5-4: Activity-Based Mitigations for Non-Explosive Ordnance

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Non-Explosive Aerial-Deployed Mines and Bombs				
- Non-explosive aerial-deployed mines - Non-explosive bombs	1,000 yd from the intended target (cease fire)	One Lookout in an aircraft	- Immediately prior to the initial start of mine or bomb delivery (e.g., when arriving on station), observe for: - Marine mammals - Sea turtles - Floating vegetation - During mine or bomb delivery, observe for: - Marine mammals - Sea turtles	10 minutes
Non-Explosive Gunnery				
- Non-explosive surface-to-surface large-caliber ordnance - Non-explosive surface-to-surface and air-to-surface medium-caliber ordnance - Non-explosive surface-to-surface and air-to-surface small-caliber ordnance	200 yd from the intended impact location (cease fire)	One Lookout on a vessel or in an aircraft	- Immediately prior to the initial start of gun firing (e.g., while maneuvering on station), observe for: - Marine mammals - Sea turtles - Floating vegetation - During gunnery firing, observe for: - Marine mammals - Sea turtles	10 or 30 minutes (depending on fuel constraints of the platform)
Non-Explosive Missiles and Rockets				
Non-explosives (air-to-surface)	900 yd from the intended impact location (cease fire)	One Lookout in an aircraft	- Immediately prior to the start of missile or rocket delivery (e.g., during a fly-over of the mitigation zone), observe for the following: - Marine mammals - Sea turtles - Floating vegetation - During missile or rocket delivery, observe for: - Marine mammals - Sea turtles	10 or 30 minutes (depending on fuel constraints of the platform)

5.6.2 Mitigation Specific to Vessels, Vehicles, Deployment of Nets, and Towed In-Water Devices

Additional details on the activity-based mitigation requirements for vessels, unmanned vehicles, deployment of nets, and towed in-water devices are described in Table 5-5. For ship classes required to maintain more than one Lookout, the specific requirement is subject to change over time in accordance with the applicable navigation instruction, such as the Surface Ship Navigation Department Organization and Regulations Manual (U.S. Department of the Navy, 2021). The Action Proponents will notify NMFS should their Lookout policies change, including in the Surface Ship Navigation Department Organization and Regulations Manual. Mitigation will be implemented to the maximum extent practical based on the prevailing circumstances, including consideration of safety of vessels, unmanned vehicles, towing platforms, and crews, as well as maneuverability restrictions. Mitigation will not be implemented (1) by submerged submarines, (2) by unmanned vehicles except when escort vessels are already participating in the event and have positive control over the unmanned vehicle movements, (3) when marine mammals (e.g., dolphins) are determined to be intentionally swimming at the bow, alongside the vessel or vehicle, or directly behind the vessel or vehicle (e.g., to bow-ride or wake-ride), (4) when pinnipeds are hauled out on man-made navigational structures, port structures, and vessels, (5) by manned surface vessels and towed in-water devices actively participating in cable laying during Modernization & Sustainment of Ranges activities, and (6) when impractical based on mission requirements (e.g., during certain aspects of amphibious exercises).

Table 5-5: Activity-Based Mitigations for Vessels, Vehicles, Towed In-Water Devices, and Net Deployment

Mitigation Category	Mitigation Requirements	Mitigation Zones and Requirements
Manned Surface Vessels		
Manned surface vessels, including surfaced submarines	One or more Lookouts on manned underway surface vessels in accordance with the most recent navigation safety instruction	- Immediately prior to manned surface vessels getting underway and while underway, the Lookout(s) will observe for: - Marine mammals - Sea turtles - Underway manned surface vessels will maneuver themselves (which may include reducing speed) to maintain the following distances as mission and circumstances allow: 500 yd from whales 200 yd from other marine mammals - Vicinity of sea turtles
Unmanned Vehicles		
Unmanned Surface Vehicles and Unmanned Underwater Vehicles already being escorted (and operated under positive control) by a manned surface support vessel	One Lookout on a surface support vessel that is already participating in the event, and has positive control over the unmanned vehicle	- Immediately prior to unmanned vehicles getting underway and while underway, the Lookout will observe for: - Marine mammals - Sea turtles - A surface support vessel that is already participating in the event, and has positive control over the unmanned vehicle, will maneuver the unmanned vehicle (which may include reducing its speed) to ensure it maintains the following distances as mission and circumstances allow: 500 yd from whales 200 yd from other marine mammals - Vicinity of sea turtles

Table 5-5: Activity-Based Mitigations for Vessels, Vehicles, Towed In-Water Devices, and Net Deployment (continued)

Mitigation Category	Mitigation Requirements	Mitigation Zones and Requirements
Towed In-Water Devices		
In-water devices towed by an aircraft, a manned surface support vessel, or an Unmanned Surface Vehicle or Unmanned Underwater Vehicle already being escorted (and operated under positive control) by a manned surface vessel	One Lookout on the manned towing vessel or aircraft, or on a surface support vessel that is already participating in the event and has positive control over an unmanned vehicle that is towing an in-water device	- Immediately prior to and while in-water devices are being towed, the Lookout will observe for: - Marine mammals - Sea turtles - Manned towing platforms, or surface support vessels already participating in the event that have positive control over an unmanned vehicle that is towing an in-water device, will maneuver itself or the unmanned vehicle (which may include reducing speed) to ensure towed in-water devices maintain the following distances as mission and circumstances allow: 250 yd from marine mammals - Vicinity of sea turtles
Net Deployment		
Nets deployed for testing of an Unmanned Underwater Vehicle	One Lookout on the support vessel	- For 15 min prior to the deployment of nets and while nets are deployed, the Lookout will observe for: - Marine mammals - Sea turtles - If a marine mammal or sea turtle is sighted within 500 yd of the deployment location, the support vessel will: - Delay deployment of nets until the mitigation zone has been clear for 15 minutes - Recover nets if they are deployed - Nets will be deployed during daylight hours only

5.6.3 Visual Observation Effectiveness

Oedekoven and Thomas (2022) evaluated the effectiveness of Navy Lookout Teams at detecting marine mammals before they entered a defined set of mitigation zones (i.e., 200, 500, and 1,000 yd). The study analyzed sighting data collected by the Navy over 27 embarks from 2010 to 2019. Results indicated that the effectiveness of Navy Lookout Teams was generally less than that of trained biologist observer teams, and varied by sighted species, group size, and distance. The Navy reviewed the same dataset used by Oedekoven and Thomas (2022), plus sonar use data, and found that sonar status (i.e., on versus off) was an important factor in evaluating how species availability may influence the prevalence of marine mammal sightings for Navy Lookouts and biologists alike. Sighting rates near vessels using hull-mounted active sonar were lower when sonar was on versus off, suggesting that a portion of marine mammals were not available to be sighted when the sonar was on (due to changed surfacing behavior or avoiding close exposures to sonar) (U.S. Department of the Navy, 2023). Table 5-6 provides a summary of the factors that could potentially influence the real-time effectiveness of the Action Proponents' visual observations (Barlow, 2015; Jefferson et al., 2015; Oedekoven & Thomas, 2022; U.S. Department of the Navy, 2023). As described in Appendix E (Acoustic and Explosives Impacts Analysis), the quantitative analysis for this EIS/OEIS does not reduce model-estimated impacts to account for activity-based mitigation.

Table 5-6: Potential Factors Influencing Visual Observation Effectiveness

Factor	Description of Influence on Sightability
Species dive behavior	Long-duration and deep-diving species are not at the surface often or for long periods of time, which limits the amount of time they are available to be seen by Lookouts. Group size also influences sightability. Species that travel in groups or large pods (e.g., dolphins, sperm whales, fin whales) are generally easier to detect than solitary individuals or pairs. Information on dive behaviors and group sizes for species that occur in the Study Area is provided in the technical reports titled <i>Dive Distribution for Marine Species Occurring in the U.S. Navy's Atlantic and Hawaii and California Training and Testing Study Areas</i> and the <i>U.S. Navy Marine Species Density Database Phase IV for the Atlantic Fleet Training and Testing Study Area</i> .
Species group size	
Species physical traits and surface behaviors	Larger-bodied species (e.g., baleen and sperm whales) or species with tall dorsal fins (e.g., killer whales) would generally be easier to detect relative to small-bodied species and species without dorsal fins (e.g., pinnipeds, sea turtles). Similarly, species with highly conspicuous surface-active behaviors (e.g., breaching, leaping, bow-riding) are generally easier to detect than cryptic species. For example, whales that fluke regularly (e.g., humpback and North Atlantic right whales) or variably (e.g., blue and fin whales) before they dive may be easier to detect than those that fluke rarely (e.g., sei, common minke, and Bryde's whales). Similarly, species that are active at the surface (e.g., bottlenose and spinner dolphins) or remain at the surface for extended periods of time as they forage or socialize (e.g., sperm and North Atlantic right whales) would be easier to detect than cryptic species that surface inconspicuously (e.g., harbor porpoises, beaked whales, dwarf and pygmy sperm whales, sea turtles). Prominent blows, such as those exhibited by many species of baleen whales (e.g., humpback whales) are easier to detect than small or less visible blows (e.g., Bryde's and common minke whales). Some species do not exhibit a blow when they surface to breathe (e.g., pinnipeds, sea turtles).
Observation conditions	Weather conditions, such as clear daytime skies, low sea states, low winds (i.e., low prevalence of white caps), and low glare are optimal for marine species observations. Animal sightability generally declines as viewing conditions decline.
Observation area and platform	Marine mammal and sea turtle sightability may be influenced by the mitigation zone size, observation platform, and distance between the two. Aircraft (when not operating at high altitudes) generally have the best vantage point for observing throughout an entire mitigation zone due to their height and speed over the water, and ability to conduct close-approach flyovers (depending on the event). Aircraft Lookouts are typically existing crewmembers responsible for other essential tasks (e.g., navigation), and some types of aircraft may have windows that are small or positioned in a way that partially obstruct views of the sea space directly beneath the aircraft. Due to their low vantage point on the water, Lookouts in small boats may be more likely to detect animals in close proximity to the boat or that display conspicuous visual cues (e.g., blows, splashes, flukes, travel in groups) than animals at further distances (e.g., near a mitigation zone perimeter) or that display inconspicuous visual cues (e.g., solitary sea turtles surfacing without a splash). The bridges of surface ships offer a higher vantage point relative to small boats. For certain events, such as hull-mounted active sonar, the mitigation zone is located directly around the hull of the ship on which the Lookout is positioned. Species sightability would generally decrease with distance, particularly for mitigation zones located far from the observation platform (e.g., a gunnery mitigation zone several NM down range). The use of hand-held or big-eye binoculars can help compensate for the difficulty of sighting animals at distance (depending on the event).

5.7 Geographic Mitigation

Designated portions of the Study Area where the Action Proponents will implement geographic mitigation for physical habitats, marine species habitats, or cultural resources are referred to as “mitigation areas” (see Figure 5-2 and Figure 5-3). As described in Chapter 2, Section 2.1, the HCTT Study Area includes additional areas including the PMSR and the NOCAL Range Complex. Due to the addition of these areas and the consideration of best available science, there will be new mitigation areas evaluated and implemented, which is detailed in Appendix K. The remainder of this section provides the geographic mitigation requirements and a qualitative discussion of their environmental benefits. Mitigation areas apply year-round unless specified otherwise, and do not apply to *de minimis* sources. Detailed descriptions of important seafloor habitats (e.g., for corals), marine mammal habitats, and cultural resources (e.g., shipwrecks), as well as maps depicting how these features overlap the mitigation areas, are provided in Appendix H or Sections 3.5, 3.7, and 3.10.

Should national security require the Action Proponents to exceed the limit of a mitigation area (e.g., sonar hours), personnel conducting the activity would be required to obtain approval through the chain of command prior to commencement of the applicable event. The Action Proponents would provide NMFS with advance notification and include relevant information about the event (e.g., sonar hours, use of explosives) in their annual training and testing activity reports.



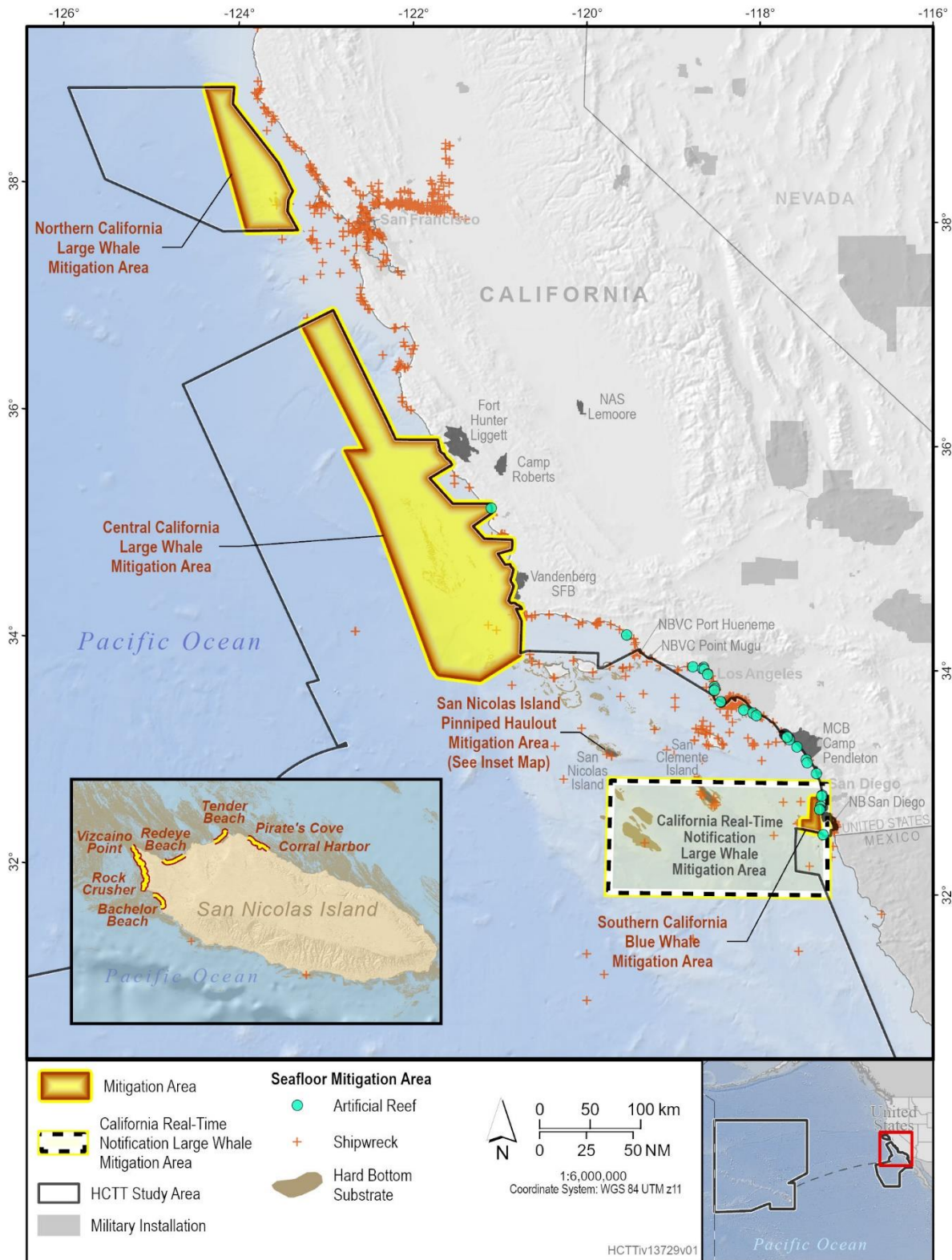


Figure 5-3: Mitigation Areas in the California Portion of the Study Area

5.7.1 Shallow-Water Coral Reef and Precious Coral Bed Mitigation Areas

Table 5-7 details geographic mitigation designed to avoid potential impacts from explosives and physical disturbance and strike stressors on shallow-water coral reefs and precious coral beds, as well as their critical ecosystem functions and socioeconomic value. Mitigation will also help avoid potential impacts on organisms (e.g., invertebrates, fishes, sea turtles) that use these habitats for sheltering, resting, feeding, or other important life processes. The mitigation is a continuation from the 2018 HSTT EIS/OEIS. The overall effectiveness of the mitigation areas would be correlated with the quality (e.g., accuracy) of the underlying mapping data, as discussed in *Phase IV Hawaii-California Training and Testing: Marine Benthic Habitat Database Technical Report* (U.S. Department of the Navy, 2024).

Table 5-7: Shallow-Water Coral Reef and Precious Coral Bed Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Explosives	The Action Proponents will not detonate any in-water explosives (including underwater explosives and explosives deployed against surface targets) within a horizontal distance of 350 yd from shallow-water coral reefs and precious coral beds (except in designated areas of the Hawaii Range Complex, such as Barbers Point Underwater Range, Ewa Training Minefield, and Puuloa Underwater Range, where these features will be avoided to the maximum extent practical).	The 350-yd mitigation area radius for in-water explosives was conservatively designed to be several times larger than the impact footprint (e.g., crater and expelled material radius) of the largest bottom-laid explosive used in the Study Area. As described in Appendix I, that explosive is a 650-lb. NEW mine with an estimated impact footprint radius of 22.7 yd. The 350-yd mitigation area radius is 11 times larger than the maximum estimated explosive impact footprint radius, and is even more conservatively sized when compared to the impact footprints of smaller explosives. Therefore, the mitigation will prevent direct impacts (and some level of indirect impacts) from explosives on shallow-water coral reefs and precious coral beds in the Study Area.
Physical disturbance and strike	- The Action Proponents will not set vessel anchors within the anchor swing circle radius from shallow-water coral reefs and precious coral beds (except in designated anchorages). - The Action Proponents will not place non-explosive seafloor devices or deploy non-explosive ordnance against surface targets (including aerial-deployed mine shapes) within a horizontal distance of 350 yd from shallow-water coral reefs and precious coral beds (except in designated areas in the Hawaii Range Complex, such as Barbers Point Underwater Range, Ewa Training Minefield, and Puuloa Underwater Range, where these features will be avoided to the maximum extent practical).	- The anchor swing circle mitigation will ensure that vessel anchors do not come into contact with shallow-water coral reefs and precious coral beds when factoring in environmental conditions that could affect anchoring position, such as winds, currents, and water depth. - For ease of implementation, the 350-yd mitigation area radius for explosives was also adopted for seafloor devices and non-explosive ordnance deployed against surface targets. This mitigation area radius is even more conservative when compared to the small impact footprints of these non-explosive stressors. Therefore, the mitigation will prevent direct impacts (and some level of indirect impacts) from seafloor devices and non-explosive ordnance deployed against surface targets on shallow-water coral reefs and precious coral beds.

5.7.2 Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Areas

Table 5-8 details geographic mitigation for explosives and physical disturbance and strike stressors near artificial reefs, hard bottom substrate, and shipwrecks. For mitigation, the term “hard bottom substrate” is defined as substrate in the marine environment which could support a covering of biotic features (e.g., seaweed, sponges, hard corals). Mitigation will also help avoid potential impacts on organisms (e.g., invertebrates, fishes, sea turtles) that use these seafloor resources for sheltering, resting, feeding, or other important life processes. The mitigation is a continuation from the 2018 HSTT and 2022 HSTT Essential Fish Habitat consultation reinitiation, except for an extension of the precisely placed non-explosive seafloor device requirements to artificial reefs and shipwrecks. The overall effectiveness of the mitigation would be correlated with the quality (e.g., accuracy) of the underlying mapping data, as discussed in *Phase IV Hawaii-California Training and Testing: Marine Benthic Habitat Database Technical Report* (U.S. Department of the Navy, 2024).

Table 5-8: Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Explosives	The Action Proponents will not detonate explosives on or near the seafloor (e.g., explosive bottom-laid or moored mines) within a horizontal distance of 350 yd from artificial reefs, hard bottom substrate, and shipwrecks (except in designated areas in the Hawaii California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical).	The 350-yd mitigation area radius will prevent direct impacts (and some level of indirect impacts) from explosives on artificial reefs, hard bottom substrate, and shipwrecks for the reasons described in Section 5.7.1 (Shallow-Water Coral Reef and Precious Coral Bed Mitigation Areas).
Physical disturbance and strike	- The Action Proponents will not set vessel anchors within the anchor swing circle radius from artificial reefs, hard bottom substrate, and shipwrecks (except in designated anchorages). - The Action Proponents will not place non-explosive seafloor devices (that are not precisely placed) within a horizontal distance of 350 yd from artificial reefs, hard bottom substrate, and shipwrecks (except as described in the bullet above for vessel anchors, the bullet below for precisely placed seafloor devices, and in designated areas of the Hawaii and California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical). - The Action Proponents will not position precisely placed non-explosive seafloor devices directly on artificial reefs, hard bottom substrate, or shipwrecks. - The Action Proponents will avoid positioning precisely placed non-explosive seafloor devices near these resources by the largest distance that is practical to implement based on mission requirements.	- Mitigation ensures that vessel anchors do not come into contact with artificial reefs, hard bottom substrate, and shipwrecks, when factoring in environmental conditions that could affect anchoring position, such as winds, currents, and water depth. - For ease of implementation, the 350-yd mitigation area radius for explosives was also adopted for seafloor devices (that are not precisely placed), and is even more conservative when compared to the small impact footprints of non-explosive seafloor devices. - Mitigation specific to precisely placed seafloor devices was first developed and coordinated with NMFS for live hard bottom habitats during the 2022 HSTT Study Area’s Essential Fish Habitat consultation reinitiation (U.S. Department of the Navy, 2022). That mitigation is being included in this document, and applied to the whole mitigation area category of hard bottom substrate as well as artificial reefs and shipwrecks, for consistency and practicality of implementation. Because precisely placed seafloor devices are deployed with a high degree of placement accuracy, the original intent of the mitigation (i.e., preventing direct physical strike and disturbance) will continue to be achieved. Therefore, the mitigation for seafloor devices that are either precisely placed or not precisely placed will collectively prevent direct impacts (and some level of indirect impacts) from seafloor devices on artificial reefs, hard bottom substrate, and shipwrecks.

5.7.3 Hawaii Island Marine Mammal Mitigation Area

Table 5-9 details geographic mitigation related to the use of active sonar and explosives off Hawaii Island. The mitigation is a continuation from the 2018 HSTT EIS/OEIS, with the addition of MF1C surface ship hull-mounted, mid-frequency sonar to the 300-hour annual restriction.

Table 5-9: Hawaii Island Marine Mammal Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic	The Action Proponents will not use more than 300 combined hours of MF1 and MF1C surface ship hull-mounted mid-frequency active sonar or 20 hours of helicopter dipping sonar (a mid-frequency active sonar source) total during training and testing annually within the mitigation area.	Mitigation is designed to reduce exposure of numerous small and resident marine mammal populations (including Blainville's beaked whales, bottlenose dolphins, Goose-beaked whales, dwarf sperm whales, false killer whales, melon-headed whales, pantropical spotted dolphins, pygmy killer whales, rough-toothed dolphins, short-finned pilot whales, and spinner dolphins), humpback whales within important seasonal reproductive habitat, and Hawaiian monk seals within critical habitat, to levels of sound that have the potential to cause injurious or behavioral impacts.
Explosives	The Action Proponents will not detonate in-water explosives that could potentially result in takes of marine mammals (including underwater explosives and explosives deployed against surface targets) within the mitigation area.	Mitigation is designed to prevent exposure of the species discussed above to explosives that have the potential to cause injury, mortality, or behavioral disturbance.

5.7.4 Hawaii 4-Islands Marine Mammal Mitigation Area

Table 5-10 details geographic mitigation related to the use of active sonar and explosives off Molokai, Maui, Lanai, and Kahoolawe Islands. The mitigation is a continuation from the 2018 HSTT EIS/OEIS, with the addition of MF1C surface ship hull-mounted, mid-frequency sonar to the seasonal prohibition; and a modified geographic extent based on best available science.

Table 5-10: Hawaii 4-Islands Marine Mammal Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic	From November 15 to April 15, the Action Proponents will not use MF1 or MF1C surface ship hull-mounted mid-frequency active sonar during training and testing within the mitigation area.	Mitigation is designed to minimize exposure of humpback whales in high-density seasonal reproductive habitats (e.g., north of Maui and Molokai) and Main Hawaiian Islands insular false killer whales in high seasonal occurrence areas to levels of sound that have the potential to cause injurious or behavioral impacts.
Explosives	The Action Proponents will not detonate in-water explosives that could potentially result in takes of marine mammals (including underwater explosives and explosives deployed against surface targets) within the mitigation area (year-round).	Mitigation is designed to prevent exposure of humpback whales in high-density seasonal reproductive habitats (e.g., north of Maui and Molokai), Main Hawaiian Islands insular false killer whales in high seasonal occurrence areas, and numerous small and resident marine mammal populations that occur year-round (including bottlenose dolphins, pantropical spotted dolphins, and spinner dolphins, and Hawaiian monk seals) to explosives that have the potential to cause injury, mortality, or behavioral disturbance.

5.7.5 Hawaii Humpback Whale Special Reporting Mitigation Area

Table 5-11 details special reporting requirements related to the use of active sonar off all eight main Hawaiian Islands as well as some submerged features (e.g., Middle Bank). The mitigation is a continuation from the 2018 HSTT EIS/OEIS with a modified geographic extent and date range based on best available science.

Table 5-11: Hawaii Humpback Whale Special Reporting Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic	The Action Proponents will report the total hours of MF1 and MF1C surface ship hull-mounted mid-frequency active sonar used from November through May in the mitigation area in their training and testing activity reports submitted to NMFS.	Special reporting requirements are designed to aid NMFS' and the Action Proponents' analysis of potential impacts in the mitigation area, which contains the Humpback Whale National Marine Sanctuary plus a 5-kilometer sanctuary buffer (excluding the Pacific Missile Range Facility).

5.7.6 Hawaii Humpback Whale Awareness Messages

Table 5-12 details awareness message requirements for the Hawaii Range Complex. The mitigation is a continuation from the 2018 HSTT EIS/OEIS with a modified date range based on best available science.

Table 5-12: Hawaii Humpback Whale Awareness Message Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic, Explosives, Physical disturbance and strike	- The Action Proponents will broadcast awareness messages to alert applicable assets (and their Lookouts) transiting and training or testing in the Hawaii Range Complex to the possible presence of concentrations of humpback whales from November through May. - Lookouts will use that knowledge to help inform their visual observations during military readiness activities that involve vessel movements, active sonar, in-water explosives (including underwater explosives and explosives deployed against surface targets), or the deployment of non-explosive ordnance against surface targets in the Hawaii Range Complex.	- Mitigation is designed to minimize potential humpback whale vessel interactions and exposure to acoustic, explosive, and physical disturbance and strike stressors that have the potential to cause mortality, injury, or behavioral disturbance during the reproductive season. - The Hawaii Humpback Whale Awareness Messages apply to the entire Hawaii Range Complex; therefore, the mitigation described in Table 5-9, Table 5-10, and Table 5-11 is in addition to the requirements described for this overlapping area.

5.7.7 Northern California Large Whale Mitigation Area

Table 5-13 details geographic mitigation related to the use of active sonar off the California coast, generally extending from Point Arena to an area west of The Farallon Islands. The mitigation is new for this EIS/OEIS.

Table 5-13: Northern California Large Whale Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic	From June 1 to October 31, the Action Proponents will not use more than 300 combined hours of MF1 and MF1C surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Central California Large Whale Mitigation Area, and the Southern California Blue Whale Mitigation Area.	Mitigation to limit use of MF1 and MF1C active sonar is designed to reduce exposure of blue whales, fin whales, gray whales, and humpback whales in important seasonal foraging, migratory, and calving habitats to levels of sound that have the potential to cause injurious or behavioral impacts.

5.7.8 Central California Large Whale Mitigation Area

Table 5-14 details geographic mitigation related to the use of active sonar off the California coast, generally extending from Monterey Bay to San Miguel Island. The mitigation is new for this EIS/OEIS.

Table 5-14: Central California Large Whale Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic	From June 1 to October 31, the Action Proponents will not use more than 300 combined hours of MF1 and MF1C surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Northern California Large Whale Mitigation Area, and the Southern California Blue Whale Mitigation Area.	Mitigation to limit use of MF1 and MF1C active sonar is designed to reduce exposure of blue whales, fin whales, gray whales, and humpback whales in important seasonal foraging, migratory, and calving habitats to levels of sound that have the potential to cause injurious or behavioral impacts.

5.7.9 Southern California Blue Whale Mitigation Area

Table 5-15 details geographic mitigation related to the use of active sonar and explosives off San Diego, California. The mitigation is a continuation from the 2018 HSTT EIS/OEIS with a modified geographic extent based on best available science.

Table 5-15: Southern California Blue Whale Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Acoustic	From June 1 to October 31, the Action Proponents will not use more than 300 combined hours of MF1 and MF1C surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this mitigation area, the Northern California Large Whale Mitigation Area, and the Central California Large Whale Mitigation Area.	Mitigation to limit use of MF1 and MF1C active sonar is designed to reduce exposure of blue whales within important seasonal foraging habitats to levels of sound that have the potential to cause injurious or behavioral impacts.
Explosives	From June 1 to October 31, the Action Proponents will not detonate in-water explosives (including underwater explosives and explosives deployed against surface targets) during large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) training and testing.	Mitigation to limit the use of in-water explosives is designed to reduce exposure of blue whales within important seasonal foraging habitats to explosives that have the potential to cause injury, mortality, or behavioral disturbance.

5.7.10 California Large Whale Awareness Messages

Table 5-16 details awareness message requirements for the California Study Area. The mitigation is a continuation from the 2018 HSTT EIS/OEIS with an updated geographic extent consistent with the expanded California Study Area.

Table 5-16: California Large Whale Awareness Message Requirements

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

5.7.11 California Real-Time Notification Large Whale Mitigation Area

Table 5-17 details real-time notification requirements for a designated area within the SOCAL Range Complex. The mitigation is a continuation from the NMFS 2024 HSTT Biological Opinion Reinitiation (National Marine Fisheries Service, 2024), with a reduction in large whale aggregation size from four or more whales to three or more whales.

Table 5-17: California Real-Time Notification Large Whale Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Physical disturbance and strike	- The Action Proponents will issue real-time notifications to alert Action Proponent vessels operating in the vicinity of large whale aggregations (three or more whales) sighted within 1 NM of an Action Proponent vessel within an area of the Southern California Range Complex (between 32–33 degrees North and 117.2–119.5 degrees West). - The three whales that make up a defined "aggregation" would not all need to be from the same species, and the aggregation could consist either of a single group of three (or more) whales, or any combination of smaller groups totaling three (e.g., a group of two whales and a solitary whale) within the 1 NM zone. - Lookouts will use the information from the real-time notifications to inform their visual observations of applicable mitigation zones. If Lookouts observe a large whale aggregation within 1 NM of the event vicinity within the area between 32–33 degrees North and 117.2–119.5 degrees West, the watch station will initiate communication with the designated point of contact to contribute to the Navy's real-time sighting notification system.	The real-time notification area encompasses the locations of recent (2009, 2021, 2023, 2025) vessel strikes, and historic strikes where precise latitude and longitude were known.

5.7.12 San Nicolas Island Pinniped Haulout Mitigation Area

Table 5-18 details geographic mitigation related to in-air vehicle launch noise and associated monitoring for pinniped haulout locations on San Nicolas Island, California. The mitigation is an adaptation of procedural mitigation from the 2022 PMSR EIS/OEIS.

Table 5-18: San Nicolas Island Pinniped Haulout Mitigation Area Requirements

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

5.8 Summary of New or Modified Mitigation Requirements

Table 5-19 summarizes new mitigation measures and substantive modifications to existing measures.

Table 5-19: Summary of New or Modified Mitigation Requirements

Category	Changes in Mitigation Requirements for this EIS/OEIS
Activity-Based Mitigation	
Lookout Teams	This EIS/OEIS includes a requirement for additional personnel on the platform conducting the event, or on additional participating platforms, to serve as part of the Lookout Team for all acoustic, explosive, and physical disturbance and strike stressor mitigation categories. In the 2018 HSTT and 2022 PMSR EIS/OEISs, additional personnel were required to assist Lookouts for explosive events only. The Action Proponents have also been, in practice, implementing this for active sonar and non-explosive events, and are now formalizing their current practice as a requirement. Additionally, the <i>U.S. Navy Lookout Training Handbook</i> was updated in 2022 to include a more robust chapter on environmental compliance, mitigation, and marine species observation tools and techniques (Naval Education and Training Command 12968-E). These changes are collectively designed to improve the effectiveness of activity-based mitigation.
Broadband and Other Active Acoustic Sources	For this EIS/OEIS, a 200-yd shut down mitigation zone would apply to broadband and other active acoustic sources less than 200 dB, while the tiered 1,000-yd power down/500-yd power down/200-yd shut down mitigation zones would apply to those sources greater than or equal to 200 dB. This requirement is meant to encompass new acoustic sources (e.g., sources used for oceanographic and acoustic research) that use a range of frequencies. Broadband source mitigation zones were not specified in the 2018 HSTT and 2022 PMSR EIS/OEISs.
Air Guns	For this EIS/OEIS, the air gun mitigation zone size has been increased from 150 yd to 200 yd for consistency with other active acoustic sources.
High-Altitude Aircraft	This EIS/OEIS clarifies that aircraft operating at high altitudes (e.g., Maritime Patrol Aircraft) are exempt from requirements to conduct activity-based mitigation. When operating at high altitudes, observations for marine mammals or sea turtles would not be effective.
Vessel Movements	This EIS/OEIS clarifies that one or more Lookouts will be posted in accordance with the most recent navigation guidance, which is subject to change over time. The 2018 HSTT and 2022 PMSR EIS/OEISs required one Lookout on underway vessels.

Table 5-19: Summary of New or Modified Mitigation Requirements (continued)

Category	Changes in Mitigation Requirements for this Final EIS/OEIS
Unmanned Vehicles	This EIS/OEIS includes new activity-based mitigation requirements for applicable events that involve Unmanned Surface Vehicles and Unmanned Underwater Vehicles (and the sources they use, tow, or deploy) that are already being escorted and operated under positive control by a manned surface vessel. In the 2018 HSTT and 2022 PMSR EIS/OEISs, activity-based mitigations were not required for unmanned vehicles or sources they used, towed, or deployed.
Research-Based Sub-Surface Explosives	This EIS/OEIS includes requirements for “research-based sub-surface explosives” to account for new explosive events with research applications e.g., (oceanographic and acoustic research) that would use 0.1 to 5-lb. NEW. These requirements are grouped within the explosive sonobuoy mitigation category because of their similarities between the charge sizes, detonation locations within the water column, and platforms that would be conducting activity-based mitigation.
Pile Driving	This EIS/OEIS includes updated requirements to account for site-specific conditions at the Port Hueneme training location covered under this document. The 30-minute wait period and 100-yard mitigation zone in the 2018 HSTT EIS/OEIS have been re-evaluated in terms of harbor specific conditions, local marine mammal occurrence patterns (pinnipeds), urbanization and noise habituation of pinnipeds within the harbor, and results from previous event monitoring. Adhering to the 2018 HSTT EIS/OEIS requirements in Port Hueneme would result in schedule delays, degraded realism of training, and impact the Navy’s ability to become proficient at this activity. The most practicable revised mitigation for the Navy to implement is to adjust to a 15-minute wait period and 5-yard mitigation zone for this EIS/OEIS.
Net Deployment	This EIS/OEIS includes requirements to account for new activities that involve the deployment and recovery of nets during Unmanned Underwater Vehicle testing. A 500 yd mitigation zone was established to delay deployment of and recover nets if a marine mammal or sea turtle is sighted by the Lookout on a support vessel.
Geographic Mitigation	
Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Areas	This EIS/OEIS includes new mitigation for precisely placed seafloor devices developed for hard bottom substrate during the 2022 Hawaii-Southern California Training and Testing Study Area’s Essential Fish Habitat consultation reinitiation (U.S. Department of the Navy, 2022). For this EIS/OEIS, that mitigation is being applied to the whole mitigation area category of hard bottom substrate as well as artificial reefs, submerged aquatic vegetation, and shipwrecks, for consistency and practicality of implementation.
San Nicolas Island Pinniped Haulout Mitigation Area	This EIS/OEIS includes a new mitigation area for in-air vehicle launch noise and associated monitoring of pinniped haulout locations which was adapted from procedural mitigations in the 2022 Point Mugu Sea Range EIS/OEIS.
Northern California Large Whale Mitigation Area	This EIS/OEIS includes a new mitigation area for blue whales, fin whales, gray whales, and humpback whales related to the use of active sonar off the northern California coast.
Central California Large Whale Mitigation Area	This EIS/OEIS includes a new mitigation area for blue whales, fin whales, gray whales, and humpback whales related to the use of active sonar off the central California coast.
Southern California Blue Whale Mitigation Area	This EIS/OEIS modifies the geographic extent of the 2018 HSTT EIS/OEIS California Blue Whale Mitigations Areas based on best available science. The mitigation area continues the requirements related to the use of active sonar and explosives.
California Large Whale Awareness Messages	This EIS/OEIS extends the date of the 2018 HSTT EIS/OEIS awareness message requirements based on best available science.
California Large Whale Real-Time Notification Mitigation Area	This EIS/OEIS includes a new mitigation area for issuing notifications about aggregations of large whales in an area that encompasses recent and historical vessel strikes.
Hawaii Island Marine Mammal Mitigation Area	This EIS/OEIS adds MF1C mid-frequency hull-mounted sonar, in addition to MF1 mid-frequency hull-mounted sonar, to the 300-hour annual cap from the 2018 HSTT EIS/OEIS,
Hawaii 4-Islands Marine Mammal Mitigation Area	This EIS/OEIS expands the geographic extent and includes a new mitigation for MF1C mid-frequency hull-mounted sonar, in addition to the prohibition on MF1 from the 2018 HSTT EIS/OEIS, during November 15–April 15.
Hawaii Humpback Whale Awareness Messages	This EIS/OEIS extends the date range of the 2018 HSTT EIS/OEIS Hawaii Humpback Whale Awareness Messages based on best available science.
Hawaii Humpback Whale Special Reporting Mitigation Area	This EIS/OEIS expands the geographic extent and extends the date range of the 2018 HSTT EIS/OEIS Hawaii Humpback Whale Special Reporting Mitigation Area based on best available science. The mitigation area continues the requirements related to reporting the total hours of MF1; and adds the reporting of total hours of MF1C, surface ship hull-mounted mid-frequency active sonar to NMFS.

Table 5-19: Summary of New or Modified Mitigation Requirements (continued)

Category	Changes in Mitigation Requirements for this Final EIS/OEIS
San Nicolas Island Mitigation Area	The San Nicolas Island Mitigation Area was developed for the HSTT Phase III EIS/OEIS Study Area where it overlapped the PMSR and was practicable to implement because the area was not required for sonar or in-water explosives, due to its location at that time within the HSTT Study Area. For this EIS/OEIS, this mitigation area is no longer practicable to implement because of the large area required for Anti-Submarine Warfare Training and Torpedo Testing Activities, which could include sonar and in-water explosives. Furthermore, due to the changes in the BIAs since Phase III, this small discrete portion of a much larger BIA provides limited marine mammal protection compared to the new, significantly larger, Central California Large Whale Mitigation Area.
Santa Monica/Long Beach Mitigation Area and Santa Barbara Island Mitigation Area	For this EIS/OEIS, based on updates to best available science, these two mitigation areas from the 2018 HSTT EIS/OEIS are not being carried forward. Additional geographic mitigation protection for blue whales is reflected in the Northern California Large Whale Mitigation Area, Central California Large Whale Mitigation Area, and Southern California Blue Whale Mitigation Area.

5.9 Mitigation Considered but Eliminated

Mitigation measures that were considered but eliminated for not meeting the appropriate balance between being environmentally beneficial and practical to implement are described in Table 5-20.

Table 5-20: Mitigation Considered but Eliminated

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
1. Mitigating for navigation sonar		X			Shutting down or powering down active sonar used for safety of navigation would present unacceptable safety risks to personnel and equipment.
2. Activity-based Mitigations for long-duration acoustic sources			X		Long-duration active sonar sources, such as the low-level sources used by the Office of Naval Research for acoustic and oceanographic research, are deployed in remote locations for long time spans (e.g., 1 year). Adding visual observers would require substantial additional resources (i.e., personnel and equipment) in excess of what is available, and associated increases in operational costs.
3. Activity-based Mitigations for acoustic sources not under positive control				X	Activity-based mitigations for active sonar sources not under positive control would not be effective because these types of sources could not be powered down or shut down in response to a sighting after they are deployed. Maintaining positive control throughout the duration of the training or testing activity could result in degraded realism or a reduced ability to meet pre-deployment certification requirements.
4. Activity-based Mitigations for high-altitude aircraft			X	X	Visual observations by Lookouts positioned in aircraft operating at high altitudes would not be effective due to the vertical distance between the mitigation zone and observation platform. Additional maneuvering to lower altitudes where visual observations are effective would degrade training or testing realism and result in increased operational cost associated with higher fuel consumption.
5. Activity-based Mitigations for manned escort vessels for all use of unmanned platforms			X		Unmanned platforms are remotely controlled or designed to operate independently, oftentimes in remote locations or for long time spans. Adding escort vessels (when they are not already participating in an event) for the purpose of activity-based mitigation would require substantial additional resources (i.e., personnel and equipment) in excess of what is available, and an associated increase in operational costs.
6. Adding third-party marine species observers to conduct visual observations that inform mitigations for additional event types		X	X	X	Adding third-party visual observers to observe additional event types (i.e., beyond ship shock trials) would require substantial additional resources in excess of what is available (i.e., berthing and space availability), and an associated increase in operational costs. The use of third-party observers presents security clearance issues, as well as national security concerns due to the requirement to provide advance notification of specific times and locations of platform movements and activities (e.g., vessels using active sonar). Events may occur simultaneously and in various locations throughout the Study Area, and some may last for a long period of time (e.g., weeks). Event timetables may be based on free-flow development of tactical situations and cannot be precisely fixed to accommodate arrival of third-party aircraft or vessels. Pre-event surveys to clear areas prior to an event begins would be ineffective for the purpose of real-time mitigation (e.g., the location of a moving animal in proximity to the mitigation zone would change, animals could move in or out of the event area after surveys have been completed). For offshore events, the length of time observers would spend on station would be limited due to aircraft fuel restrictions. Increased safety risks would be associated with offshore surveys and the presence of civilian aircraft or vessels in the vicinity of events (e.g., sea space conflicts, airspace conflicts, proximity to explosives).

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
7. Requiring active sonar mitigation for marine mammals swimming at the bow, alongside the vessel, or directly behind the vessel	X			X	Marine mammals (e.g., dolphins) intentionally bow-riding, swimming alongside to wake-ride, or pursuing underway vessels would be out of the main active sonar transmission axis. Furthermore, implementing mitigation for animals persistently located within an active sonar mitigation zone (due to their intentional pursuit of underway vessels) would have the same types of impacts on mission requirements as increasing the mitigation zone size, which is described in row 15 of this table.
8. Adding additional Lookouts or observation platforms		X	X	X	The number of required Lookouts and observation platforms is based on resource availability (i.e., crews, platforms, and equipment) safety considerations (i.e., space restrictions, sea space or airspace conflicts), and duty assignments (e.g., requiring additional personnel or reassigning duties). Adding vessels or aircraft to observe a mitigation zone would result in sea space or airspace conflicts with the event participants. For explosives, weapon firing, or ordnance deployment, this would increase safety risks due to the presence of additional vessels or aircraft within the vicinity of explosives, intended impact locations, or projectile paths. Sea space and airspace conflicts would either require participating platforms to modify their flight plans or vessel movement tracks (which would reduce event realism) or force the added observation platforms to position themselves a safe distance away from the activity area (which would not be effective). However, additional personnel on platforms conducting the events, or on additional participating platforms, will serve as part of the Lookout Team for all acoustic, explosive, and physical disturbance and strike stressor mitigation categories as described in Section 5.6 (Activity-based Mitigation).
9. Developing additional weapon firing mitigation zones	X				Weapon firing noise from weapon systems other than large caliber guns (which are deck-mounted on surface ships with a muzzle that extends over the water) would not expose marine mammals or sea turtles to potentially injurious levels of underwater sound.
10. Developing a mitigation zone for non-explosive vessel-deployed mines	X				Mitigation zones for non-explosive vessel-deployed mines is not warranted because of the extremely low potential for physical strike of a marine mammal or sea turtle from a mine deployed so close to the water surface (by vessels that are implementing vessel movement mitigation for marine mammals and sea turtles), or below the surface for submarine-deployed mines.
11. Developing mitigation zones around aerial targets	X				Mitigation zones for explosive and non-explosive weapon firing is not warranted for ordnance fired against air targets because there is no potential for direct impact because the detonations occur in air, and the potential for projectile fragments to co-occur in space and time with a marine mammal or sea turtle at or near the surface is extremely low.
12. Developing mitigation zones for surface-to-surface and shore-to-surface missiles and rockets	X		X	X	Mitigation zones apply to missiles and rockets deployed from aircraft because aircraft can fly over the intended impact area prior to commencing firing. Mitigation would not be effective for vessel- or shore-deployed missiles and rockets (without requiring additional observation platforms) because of the distance between the firing platform and target location. It would not be possible for vessels to conduct close-range observations due to the length of time (and associated operational costs and event delays) it would take to complete observations and then transit back to the firing position (typically around 15 or 75 NM each way, depending on the event).
13. Establishing a minimum pre-event or post-event observation duration for additional events			X	X	Some events have established minimum time requirements for observations prior to the initial start of an event or after completion of an event, while the time requirements for other events must remain more general to accommodate dynamic event schedules or other operational factors. Requiring minimum pre-event or post-event observation durations would have the same types of impacts on mission requirements as increasing the mitigation zone size as described in row 15 of this table.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
14. Using developmental mitigation technologies for mitigation	X				As described in Section 5.5 (Monitoring, Research, and Adaptive Management), the Action Proponents plan to continue investing in research on and development of mitigation technologies, such as infrared, thermal detection, unmanned aerial vehicles, passive acoustic range instrumentation, and automated detection software or sensors. The development of any associated mitigation measures will be undertaken in coordination with NMFS through the adaptive management process.
15. Increasing mitigation zone sizes, or extending the post-sighting wait periods beyond 10 or 30 minutes		X	X	X	Increasing mitigation zone sizes or post-sighting wait periods would potentially increase the number of instances and the total length of time activities would be ceased or delayed. This would significantly diminish realism in a way that would prevent activities from meeting intended objectives and decrease the ability to complete events as required and on time. This would have implications for fuel restrictions (e.g., need for aircraft to go off station to refuel), personnel fatigue, range scheduling (e.g., sea space and air space conflicts), and operational costs. Multiple refueling events could double (or more) event length, which would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the event area. For events with multiple participants, degrading the training or testing value of one event element degrades the value of all other elements. For active sonar events, requiring additional or lengthier power downs or shutdowns would create fundamental differences in how active sonar would be used in training versus real-world missions. For example, additional power downs or shutdowns would prevent sonar operators from developing and maintaining awareness of the tactical picture. Without realistic training in conditions analogous to real-world missions, sonar operators cannot become proficient in effectively operating active sonar. Sonar operators, vessel crews, and aircrews would be expected to operate sonar during real-world missions in a manner inconsistent with how they were trained. Diminishing proficiency or eroding capabilities presents significant risk to personnel safety during real-world missions and impacts the ability to deploy with required levels of readiness necessary to accomplish tasking by Combatant Commanders or other national security tasking. For events involving explosives, weapon firing, or ordnance deployment, requiring additional or lengthier delays or shut downs would cause a significant loss of training or testing time, reduce the number of opportunities crews have to fire or deploy ordnance on a target, decrease realism, impede the ability for crews to train and become proficient in using weapons or systems, prevent development of the ability to react to changes in the tactical situation or respond to incoming threats, cause significant delays to training or testing schedules, prevent units from meeting individual training and certification requirements, prevent units from deploying with the level of readiness necessary to accomplish their missions, and impede the ability of program managers and weapons system acquisition programs to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. For SINKEX, events involving explosive sonobuoys deployed in a large field, explosive torpedo events, and medium- or large caliber gunnery events, visual observations within the margin of increased mitigation zone size would be unsafe and ineffective unless additional observation platforms were allocated. Mission-essential safety protocols require all event participants (including Lookouts) to maintain focus on the activity area for safety of the public, personnel, and equipment. Mitigation zone sizes are correlated with the activity area; therefore, an increase in mitigation zone size would not meet the safety criteria. For example, when air-to-surface medium-caliber gunnery events involve fighter aircraft descending on a target, or rotary-wing aircraft flying a racetrack pattern and descending on a target using a forward-tilted firing angle, maintaining focused attention on the activity area is paramount to aircraft safety. Vessel movement mitigation for marine mammals is based on guidance from NMFS and the USFWS. A mitigation zone size is not specified for sea turtles to allow flexibility based on vessel type and mission requirements (e.g., small boats operating in a narrow harbor). For towed in-water devices, mission and safety requirements determine the operational parameters (e.g., course) for towing platforms. Because these devices are towed and not self-propelled, they generally have limited maneuverability and are unable to make immediate course corrections. For example, a high degree of pilot skill is required when rotary-wing aircraft are deploying in-water devices, safely towing them at relatively low speeds and altitudes, and recovering them. The aircraft can safely alter course to shift the route of the towed device in response to a sighted marine mammal or sea turtle up to a certain extent (i.e., up to the size of the mitigation zone) while still

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
					maintaining the parameters needed for stable towing. However, the aircraft would be unable to further alter its course to more drastically course-correct the towed device without decreasing towing stability, which would have implications for safety of personnel and equipment.
16. Implementing mandatory vessel speed restrictions		X	X	X	As described in Section 5.6.2 (Mitigation Specific to Vessels, Vehicles, and Towed In-Water Devices), vessel movement mitigation involves maneuvering to maintain a specified distance from marine mammals and sea turtles, which may include reducing speed. As described in Section 3.0.4 (Standard Operating Procedures), vessels used under the Proposed Action are required to operate in accordance with applicable navigation rules. In addition, vessels transit at speeds that are optimal for fuel conservation, to maintain schedules, and to meet mission requirements. Vessel captains use the totality of the circumstances to ensure the vessel is traveling at appropriate speeds in accordance with navigation rules. Depending on the circumstances, this may involve adjusting speeds during periods of reduced visibility or in certain locations (e.g., locations with other vessel traffic). For training, mandatory vessel speed restrictions would be impractical to implement because vessel operators need to train to operate vessels safely and proficiently as they realistically would during real-world missions, including being able to react to changing tactical situations and evaluate system capabilities. For example, during training activities involving flight operations from an aircraft carrier, the vessel must maintain a certain wind speed over the deck to launch or recover aircraft. Depending on wind conditions, the aircraft carrier itself must travel at a certain speed to generate the wind required to launch or recover aircraft. Additionally, operating vessels at speeds that are not optimal for fuel conservation or mission requirements would be unsustainable due to increased time on station and operational costs. Seasonal vessel speed restrictions would result in vessels being unable to meet all of their requirements during their limited time available to be underway based on the complex logistical considerations involved with maintaining individual vessel and deployment schedules. For testing and research, the Action Proponents need to test the full range of their vessels and vessel-deployed system capabilities to ensure safety and functionality in conditions analogous to real-world missions, and before full-scale production or delivery to the fleet. For example, the Action Proponents conduct propulsion testing specifically to test the functionality of vessel propulsion systems, including maneuvering, full-power runs, and endurance runs. During this event, vessels must operate across the full spectrum of capable speeds to accomplish the primary testing objectives.
17. Additional geographic mitigation for active sonar in areas with certain bathymetric features				X	The Action Proponents select locations for certain active acoustic activities based on water depths that are ideal for acoustic propagation research, seafloor types, or bathymetric phenomena (e.g., seamounts) that are of particular interest for ocean acoustic research and realism of military readiness activities. Shifting events to alternative or sub-ideal locations to avoid certain bathymetric features (e.g., shelf breaks, underwater canyons) would preclude ready access to the environmental and oceanographic conditions needed to meet mission objectives.
18. Restrictions on the location or timing of major training exercises		X		X	Major training exercises may require large areas of the littorals, open ocean, and nearshore areas for realistic and safe anti-submarine warfare training. Exercise locations may have to change during an exercise or during exercise planning based on assessments of unit performance or other conditions, such as weather and mechanical issues, which precludes the ability to develop restrictions on event location or timing within the Study Area.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
19.Restricting training activities to certain established locations		X		X	Modern sensing technologies make training on a large scale without observation more difficult. A foreign military's continual observation of U.S. military training in predictable geographic areas and timeframes would enable foreign nations to gather intelligence and subsequently develop techniques, tactics, and procedures to potentially and effectively counter U.S. military operations. Other activities may be conducted on a smaller and more localized scale, with training or testing at discrete locations that are critical to certain aspects of readiness. Threats to national security are constantly evolving, and the Action Proponents require the ability to adapt training to meet these emerging threats. Restricting access to broad-scale areas of water would impact the ability for training to evolve as threats evolve. Eliminating opportunities to train in myriad at-sea conditions would put U.S. forces at a tactical disadvantage during real-world missions. This would also present a risk to national security if potential adversaries were to be alerted to the environmental conditions within which training has been prohibited.
20.Restrictions on explosives and non-explosive stressor use near additional types of seafloor resources				X	Implementing additional mitigation for other activities or types of seafloor resources would not allow the Action Proponents to continue meeting their mission requirements to successfully accomplish readiness objectives due to restrictions on ready access to a significant portion of the Study Area.
21.Prohibiting activities in areas with low historic use for training or testing				X	The frequency at which an area is used for training or testing does not necessarily equate to its level of importance for meeting an activity objective or collectively contributing to meeting mission requirements. Some infrequently used areas are critical for a particular event.
22.Additional seasonal restrictions for training and testing based on species occurrence or density		X	X	X	Training and testing schedules are based on national tasking, the Optimized Fleet Response Plan and other training plans, Department of Homeland Security strategic goals, evolving geopolitical world events, forecasting of future testing requirements, deployment schedules, maintenance schedules, acquisition schedules, and emerging requirements. The Action Proponents require flexibility in the timing of their use of active sonar and explosives in order to meet mission and deployment schedules. Vessels, aviation squadrons, and testing programs have a limited amount of time available for training and testing. Variables such as maintenance and weather must be accounted for when scheduling event locations and timing. Event locations may have to change during an event or during pre-event planning based on assessments of unit performance or other conditions, such as inclement weather (e.g., hurricanes) and mechanical issues. This precludes the ability to completely prohibit events from occurring seasonally within areas delineated by marine species occurrence or seasonal densities.
23.Restricting active sonar based on time of day or visibility (e.g., weather conditions)				X	Although the majority of active sonar use occurs during the day, the Action Proponents may have a nighttime training requirement for some systems. Training in both good visibility (e.g., daylight, favorable weather conditions) and low visibility (e.g., nighttime, inclement weather conditions) is vital because environmental differences between day and night and varying weather conditions affect sound propagation and the detection capabilities of sonar. Temperature layers that move up and down in the water column and ambient noise levels can vary significantly between night and day. This affects sound propagation and could affect how sonar systems function and are operated.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
24. Blanket geographic restrictions within certain regions or areas (e.g., distances from shore)		X	X	X	Blanket expansions on the scope or size of mitigation areas would encroach upon the primary water space where military readiness activities are scheduled to occur. The Action Proponents select locations for their events based on proximity to training ranges, available airspace, unobstructed sea space, aircraft emergency landing fields, target storage and deployment locations, systems command support facilities, and areas of historical use that provide critical known bathymetric features and consistency for comparative data collection. Requiring the Action Proponents to shift activities to alternative locations or farther offshore would have significant impacts on safety, sustainability, and the ability to meet mission requirements within limited available timeframes. For example, certain surface-to-surface and air-to-surface small, medium, and large caliber gunnery activities and missile and rocket activities, must be conducted in proximity to the target storage depots because the associated targets (e.g., remotely controlled jet ski targets) are limited by how far offshore they can safely be employed and controlled based on distance, weather, and sea state. Certain training activities, such as deployment certification exercises that involve integration with multiple warfare components, require large areas of the littorals and open ocean for realistic and safe training. Similarly, the testing community is required to install and test systems on platforms at the locations where those platforms are stationed. Testing associated with new construction ships must occur in locations close to the shipbuilder facilities for reasons associated with construction schedule, proximity to testing ranges and facilities, and safety. Additionally, the testing community has a need for rapid development to quickly resolve tactical deficiencies within locations supported by existing infrastructure and support facilities. Logistical support of range testing can only efficiently and effectively occur when the support is co-located with the testing activities. Some types of pierside and at-sea testing must occur in proximity to naval shipyards or contractor shipyards. Nearshore areas also serve as critical training and testing locations for certain explosive activities. For example, the explosive ordnance disposal training location at the Silver Strand Training Complex is vital due to its existing target setup, ideal bottom structure, and good bottom depth to safely train divers with explosives. Explosive ordnance disposal teams can be required to deploy with a 3-week notice, which presents a need to constantly train to maintain readiness for real-world missions. Relocating this activity to a location without these features would increase safety risks and diminish the effectiveness of training events.
25. Implementing active sonar ramp-up	X			X	Implementing active sonar ramp-up procedures during training or testing under the Proposed Action would not be representative of real-world missions and would significantly impact realism. For example, during an anti-submarine warfare exercise using active sonar, ramp-ups would alert opponents (e.g., target submarines) to the transmitting vessel's presence. This would defeat the purpose of the training by allowing the target submarine to detect the searching unit and take evasive measures, thereby denying the sonar operator the opportunity to learn how to locate the submarine. Additionally, based on the source levels, vessel speeds, and sonar transmission intervals that will be used during typical active sonar activities under the Proposed Action, ramp-up would likely be an ineffective mitigation measure for the active sonar activities conducted under the Proposed Action.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
26.Reducing annual active sonar hours, replacing active sonar with passive sonar, or modifying active sonar sources for training				X	Passive sonar and other available sensors are used in concert with active sonar to the maximum extent practical. Training with active sonar is essential to national security. Active sonar is the only reliable technology for detecting and tracking potential enemy diesel-electric submarines. Equipment power levels are set consistent with mission requirements. Active sonar signals are designed explicitly to provide optimum performance at detecting underwater objects (e.g., submarines) in a variety of acoustic environments. The ability to effectively operate active sonar is a highly perishable skill that must be repeatedly practiced during realistic training. The Action Proponents must train in the same mode and manner in which they conduct real-world missions. Anti-submarine warfare training typically involves the periodic use of active sonar to develop the “tactical picture,” or an understanding of the battle space (e.g., area searched or unsearched, identifying false contacts, and understanding the water conditions). This can take from several hours to multiple days and typically occurs over vast areas with varying physical and oceanographic conditions (e.g., bathymetry, topography, surface fronts, and variations in sea surface temperature). Sonar operators train to avoid interference and sound-reducing clutter from varying ocean floor topographies and environmental conditions, practice coordinating their efforts with other sonar operators in a strike group, develop skill proficiency in detecting and tracking submarines and other threats, and practice the focused endurance vital to effectively working as a team in shifts around the clock until the conclusion of the event. Active sonar signals are designed explicitly to provide optimum performance at detecting underwater objects (e.g., submarines) in a variety of acoustic environments. The action proponents train with various active sonar signals, including up-sweeps and down-sweeps, to accurately replicate operational scenarios. Reducing training realism by restricting the signal used would ultimately prevent units from deploying with the required level of readiness necessary to accomplish their missions and impede the Navy’s ability to certify forces to deploy to meet national security tasking. Likewise, testing program requirements include test parameters designed to accurately determine whether a system meets its operational and performance requirements. Reducing realism by restricting the signal used would impact the ability of researchers, program managers, and weapons system acquisition programs to effectively test systems and platforms (and components of these systems and platforms) before full-scale production or delivery to the fleet. For these reasons, modifying or limiting the sonar signal as mitigation is impractical to implement as it would result in degraded realism of training and testing. The Action Proponents use active sonar only when it is essential to the mission. For example, as described in Section 2.4.2.1 (Training), for this EIS/OEIS, the Action Proponents are using a representative level of activity (rather than a maximum tempo of training activity in every year), which has reduced the amount of mid-frequency active sonar hours estimated to be necessary to meet training requirements relative to the 2018 HSTT and 2022 PMSR EIS/OEISs.
27.Replacing active sonar training with synthetic activities (e.g., computer simulated training)				X	The Action Proponents currently use, and will continue to use, computer simulation to augment training whenever possible. Simulators and synthetic training are critical elements that provide early skill repetition and enhance teamwork; however, they cannot replicate the complexity and stresses faced during real-world missions to which the Action Proponents train under the Proposed Action (e.g., anti-submarine warfare training using surface ship hull-mounted mid-frequency active sonar). Just as a pilot would not be ready to fly solo after simulator training, operational Commanders cannot allow personnel to engage in real-world missions based merely on simulator training.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
28.Restricting active sonar training during surface ducting conditions				X	Surface ducting occurs when water conditions, such as temperature layers and lack of wave action, result in little sound energy penetrating beyond a narrow layer near the surface of the water. Submarines have long been known to take advantage of the phenomena associated with surface ducting to avoid being detected by active sonar. Training with active sonar in these conditions is a critical component of readiness because sonar operators need to learn how sonar transmissions are altered due to surface ducting, how submarines may take advantage of them, and how to operate sonar effectively under these conditions. Avoiding military readiness activities during surface ducting conditions, reducing power, shutting down active sonar based on environmental conditions, or implementing other sonar modification techniques (e.g., sound shielding) for the purpose of mitigation would affect a Commander's ability to develop the tactical picture. It would also prevent sonar operators from training in conditions analogous to those faced during real-world missions, which is described in row 15 of this table. The ocean conditions contributing to surface ducting change frequently, and surface ducts lack uniformity, may or may not extend over a large geographic area and can be of varying duration, making it difficult to determine where to reduce power and for how long. As noted by the U.S. Supreme Court in <i>Winter v. Natural Resources Defense Council Inc.</i> , 555 U.S. 7 (2008), because surface ducting conditions occur relatively rarely and are unpredictable, it is especially important for the Action Proponents to be able to train under these conditions when they occur.
29.Requiring use of active acoustic monitoring devices		X	X	X	During Surveillance Towed Array Sensor System low-frequency active sonar (which is not part of the Proposed Action), the Navy uses a specially designed adjunct high-frequency marine mammal monitoring active sonar, or "HF/M3." HF/M3 can only be towed at slow speeds and operates like fish finders used by fishermen. Installing the HF/M3 adjunct system on the tactical sonar ships used under the Proposed Action would have implications for safety and mission requirements due to impacts on speed and maneuverability, as well as excessive additional operating costs.
30.Requiring mitigation based on passive acoustic detections of marine mammals			X	X	When platforms with passive acoustic monitoring capabilities are already participating in an event, sonar technicians will alert Lookouts to passive acoustic detections of marine mammals as described in Section 5.6 (Activity-based Mitigation). Significant logistical constraints (e.g., personnel and equipment availability, operational costs) would make diverting equipped platforms or constructing and maintaining new passive acoustic monitoring systems impractical. The fluidity and nature of military readiness activities (e.g., fast-paced and mobile readiness evolutions) make it impractical for passive acoustic devices to be used as precise real-time indicators of marine mammal location for the purposes of implementing mitigation (e.g., active sonar power downs or shutdowns, ceasing use of explosives) without an accompanying visual sighting. Implementing mitigation for animals located outside of the mitigation zone (which could occur due to imprecise localizations or relative movements of animals and the mitigation zone) would have the same types of effects on mission requirements as increasing the mitigation zone size, which is described in row 15 of this table.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
31.Reducing explosive counts or NEW, or substituting with non-explosives				X	Activities that involve explosives are inherently different from those that involve non-explosive ordnance. For example, critical components of an explosive Bombing Exercise Air-to-Surface include the assembly, loading, delivery, and assessment of the explosive bomb. Explosive bombing training exercises start with ground personnel, who must practice the building and loading of explosive munitions. Training includes the safe handling of explosive material, configuring munitions to precise specifications, and the loading of munitions onto aircraft. Aircrew must then identify a target and safely deliver fused munitions, discern if the bomb was assembled correctly, and determine bomb damage assessments based on how and where the explosive detonated. An air-to-surface bombing exercise using non-explosive ordnance can train aircrews on valuable skills to locate and accurately deliver munitions on a target; however, it cannot effectively replicate the critical components of an explosive activity in terms of assembly, loading, delivery, and assessment of an explosive bomb. Reducing the counts or sizes of explosives would impede the ability for the Action Proponents to train and become proficient in using explosive weapon systems (which would result in a significant risk to personnel safety during real-world missions), and would ultimately prevent units from meeting individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish missions) and impede the ability to certify forces to deploy to meet national security tasking. For testing, the Action Proponents need to test the full range of their platforms, weapon systems, and components to ensure safety and functionality in conditions analogous to real-world missions, and before full-scale production or delivery to the fleet.
32.Adopting mitigation implemented by foreign military units				X	Mitigation is carefully developed for and assessed by each individual unit based on their own assessment of mitigation benefits and practicality of implementation. Readiness considerations differ based on each nation's strategic reach, global mission, country-specific legal requirements, and geographic considerations. The Action Proponents will implement mitigation that has been determined to be effective at avoiding impacts from the Proposed Action and practical to implement. Many of these measures are the same as, or comparable to, those implemented by foreign navies. For example, most navies implement some form of mitigation to cease certain activities if a marine mammal is visually observed in a mitigation zone (Dolman et al., 2009). Some navies also implement geographic mitigation. The Action Proponents will implement several mitigation measures and environmental compliance initiatives that are not implemented by foreign navies, such as providing extensive support for scientific monitoring and research and complying with stringent reporting requirements.
33.Additional reporting requirements		X	X	X	The Action Proponents developed their reporting requirements in conjunction with NMFS to be consistent with mission requirements and balance the usefulness of the information to be collected with the practicality of collecting it. The Action Proponents' activity reports and incident reports are designed to verify implementation of mitigation; comply with current permits, authorizations, and consultation requirements; and improve future environmental analyses. Additional reporting would be ineffective as mitigation because it would not result in modifications to training activities or further avoidance or reductions of potential impacts. Lookouts are not trained to make species-specific identification and would not be able to provide detailed scientific data if more detailed marine species observation reports were to be required. Furthermore, the Action Proponents do not currently maintain a record management system to collect, archive, analyze, and report every marine species observation or all vessel speed data for every event and all vessel movements. For example, the speed of Action Proponent vessels can fluctuate an unlimited number of times during training or testing events. Developing and implementing a record management system of this magnitude would be unduly cost prohibitive and place a significant administrative burden on vessel operators and activity participants. Burdening operational Commanders, vessel operators, and event participants with requirements to complete additional administrative reporting would distract them from focusing on mission-essential tasks. Additional reporting requirements would draw event participants' attention away from the complex tactical tasks they are primarily obligated to perform, such as driving a warship or engaging in a gunnery event, which would adversely impact personnel safety, public health and safety, and the ability to meet mission objectives.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
34. Developing mitigation outside the Action Proponent's legal authority				X	The Action Proponents did not develop mitigation outside their legal authority to implement. For example, the Action Proponents do not have legal authority to develop Marine Protected Areas to restrict commercial or recreational fishing, which is a recommendation received through public comments on previous EIS/OEISs.
35. Expansion of existing geographic mitigation to the full extent of newly identified biologically important areas			X	X	Updated science was recently published (Harrison et al. 2023, Calambokidis et al., 2024) describing areas in which biologically important life processes occur for marine mammals either year-round or for part of the year (depending on the species). The Action Proponents examined these areas and determined it would be impractical based on sustainability and mission requirements to expand certain species-specific existing geographic mitigation areas to the full extent of the newly identified areas. This analysis is detailed in Appendix K. The Action Proponents did however modify and expand existing geographic mitigation areas (e.g., California Blue Whale Mitigation Area, Hawaii Humpback Whale Special Reporting Area) from the HSTT 2018 EIS/OEIS. Some of the newly identified areas overlap with the majority of the SOCAL Range Complex. Requiring vessels to transit from their homeport to conduct training and testing activities while avoiding these areas as geographic mitigation (e.g., a prohibition on explosives, a limit on sonar use, etc.) would result in reduced efficiency in travel time and associated costs by increasing distance between activities and homeports, home bases, associated training ranges, testing facilities, air squadrons, and existing infrastructure (e.g., instrumented underwater ranges). It would also result in the expenditure of additional funding for increased operational costs associated with higher fuel consumption. Additionally, expanding geographic mitigation areas to match these extents would result in decreased ready access to ranges, operating areas, (OPAREAs), airspace, or sea space with a variety of realistic tactical oceanographic and environmental conditions (e.g., variations in bathymetry, topography, surface fronts, and sea surface temperatures) that are extensive enough to allow for completion of activities without physical or logistical obstructions, to provide personnel the ability to develop competence and confidence in their capabilities across multiple types of weapons and sensors, and the ability to train to communicate and operate in a coordinated fashion as required during real-world missions and to avoid observation by potential adversaries.
36. Additional pile driving mitigation				X	The Action Proponents determined it would be impractical based on mission requirements to implement visibility-based mitigation from the Incidental Harassment Authorization Incidental to Pile Driving Training Exercises at Naval Base Ventura County, Port Hueneme. Limiting activities in this EIS/OEIS due to weather conditions (e.g., rain, fog, snow, etc.) would degrade training realism and impact the Navy's ability to become proficient at this activity.
37. Vessel movement mitigation for cable laying vessels performing Modernization & Sustainment of Ranges activity		X		X	The Action Proponents determined it would be impractical based on safety and mission requirements to implement mitigation for manned surface vessels and towed in-water devices actively conducting cable laying during Modernization & Sustainment of Ranges activities. The vessels performing these activities move very slowly through the water column (e.g., 2-3 kts) to facilitate a gradual, controlled rate of descent to minimize risk of damage to the cable. Additionally, vessels are required to follow a prescribed route based on ROV surveys to ensure the cable is laid on its intended route, predominantly sandy bottom habitat avoiding rocky areas, to minimize damage to the cable. Deviating from this route or slowing to a near stop once cable laying has commenced would present risk of damage to cable laying equipment and personnel operating it.

Table 5-20: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
38. Geographic mitigation for hauled out Hawaiian monk seals at PMRF	X				In this EIS/OEIS, The Action Proponents are requesting behavioral takes for hauled-out Hawaiian monk seals on beaches adjacent to PMRF related to in-air noise from missile launches and artillery firing. As part of this process, a range-to-effects (RTE) analysis was performed to determine the range to injurious levels and these ranges were then used to inform the development of geographic mitigation. The ranges to injury that resulted from this analysis ultimately did not extend to any of the beaches from the established launch/firing sites. The RTE analysis is detailed in Appendix E.1. Since behavioral takes are being requested and injury is unlikely, the Action Proponents determined it is not sufficiently beneficial to develop geographic mitigation areas for these activities.
39. Requiring NMFS Protected Species Observer (PSO) certification for Navy Lookouts	X		X	X	Requiring NMFS PSO certification for Navy Lookouts is impractical and provides insufficient benefit. NOAA's PSO certification requires educational, experiential, and training qualifications, including a background in biological sciences, which are incompatible with the duties and training of a Navy Lookout. Lookouts perform numerous duties beyond observation, including maintaining proficiency in general seamanship and rate-specific skills. Mandating a biological sciences background would drastically reduce the pool of eligible personnel. Furthermore, PSO certification for all Lookouts would create a substantial administrative burden and severely challenge Lookout manning requirements. The Navy operates numerous large vessels (e.g., destroyers, aircraft carriers) and smaller support craft within the action area, each with rotating Lookout crews to manage watch rotations, mitigate fatigue, and ensure vigilance. This rotation, coupled with frequent personnel transfers, would necessitate certifying a large number of Lookouts, significantly complicating manning efforts. Additionally, relying on the NMFS PSO application process could create certification delays incompatible with Navy manning and readiness needs. Existing PSO training curricula vary considerably in frequency, cost, length, activity focus, and geographic scope, and are typically conducted by third-party providers. Establishing a separate Navy PSO training program for Lookouts would be unsustainable within the demanding Optimized Fleet Response Plan and negatively impact Navy readiness. Moreover, Navy Lookouts already must complete Lookout Training, which includes marine resource sighting cues and observation techniques, as well as the roles and responsibilities of Lookouts and the official in charge of an activity. In addition to this training, Lookouts complete NMFS-approved Marine Species Awareness Training. Furthermore, the Lookout Training Handbook was updated in 2022 with a thorough Marine Resources chapter covering topics from identifying indicator species to determining direction of travel. The goal of PSO certification is to ensure that PSOs have the appropriate training to safely and effectively perform their required duties to meet the needs of a particular project. The Navy's Lookout training and qualification program already achieves that goal for Navy's at-sea activities. Therefore, the Navy has determined that PSO certification and/or PSO-specific training would not provide sufficient benefit to outweigh the risk to Navy readiness.

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