Mariana Islands Training and Testing

Draft Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement

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Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement Mariana Islands Training and Testing

Lead Agency:	United States Department of the Navy
Joint Lead Agencies:	United States Air Force, United States Army, United States Coast Guard
Cooperating Agency:	National Marine Fisheries Service
Title of the Proposed Action:	Mariana Islands Training and Testing

Abstract

The United States Department of the Navy (Navy) (including both the U.S. Navy and the U.S. Marine Corps) jointly with the U.S. Air Force, U.S. Army, and U.S. Coast Guard (collectively referred to as the Action Proponents) prepared this Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement (SEIS/OEIS) to comply with the National Environmental Policy Act and Executive Order 12114. This SEIS/OEIS evaluates the potential environmental impacts of conducting training, testing, and range modernization and sustainment activities (referred to as military readiness activities) in the Mariana Islands Training and Testing Study Area (Study Area). The Study Area includes the at-sea areas of the Mariana Islands Range Complex (MIRC); additional areas on the high seas north and west of the MIRC; the transit corridor between the MIRC and the Hawaii Range Complex; pierside locations on Guam in Apra Harbor; nearshore areas of Guam and the Commonwealth of the Northern Mariana Islands; and the land-based training area on Farallon de Medinilla. This SEIS/OEIS analyzes three alternatives:

- Under the No Action Alternative, the Action Proponents would not conduct the military readiness activities associated with the Proposed Action within the Study Area.
- Alternative 1 (Preferred Alternative) reflects a representative level of training, testing, and range modernization and sustainment activities to account for the fluctuation of training and testing cycles and deployment schedules that generally limit the maximum level of activities from occurring year after year in any seven-year period.
- Alternative 2 reflects the maximum number of training, testing, and range modernization and sustainment activities that could occur within a given year and assumes that the maximum level of activity would occur every year over a seven-year period. This allows for the greatest flexibility for the Action Proponents to maintain readiness.

The resources evaluated include sediments and water quality, air resources, marine habitats, marine mammals, sea turtles, sea birds, marine vegetation, marine invertebrates, fishes, terrestrial species and habitats, cultural resources, socioeconomic resources, and public health and safety.

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ES.1 Introduction

The United States (U.S.) Department of the Navy (Navy) (including both the U.S. Navy and the U.S. Marine Corps) jointly with the U.S. Air Force, U.S. Army, and U.S. Coast Guard , has prepared this Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement (SEIS/OEIS) pursuant to the National Environmental Policy Act (NEPA) and the Department of Defense Implementing Procedures. For this SEIS/OEIS, Action Proponents within the Navy include Commander, U.S. Pacific Fleet, the U.S. Marine Corps, Naval Air Systems Command, Naval Sea Systems Command, and the Office of Naval Research. As the lead federal agency, the Navy has coordinated closely with the joint lead agencies, and any commitments made in this SEIS/OEIS are applicable to the joint lead agencies.

ES.1.1 Proposed Action

The Proposed Action is to continue military readiness activities, comprised of training, testing, and modernization and sustainment in the Mariana Islands Training and Testing (MITT) Study Area, as represented in Figure ES-1. The National Marine Fisheries Service's (NMFS') Proposed Action is to promulgate regulations and issue a Letter of Authorization under the Marine Mammal Protection Act (MMPA) authorizing take of marine mammals incidental to proposed military readiness activities.

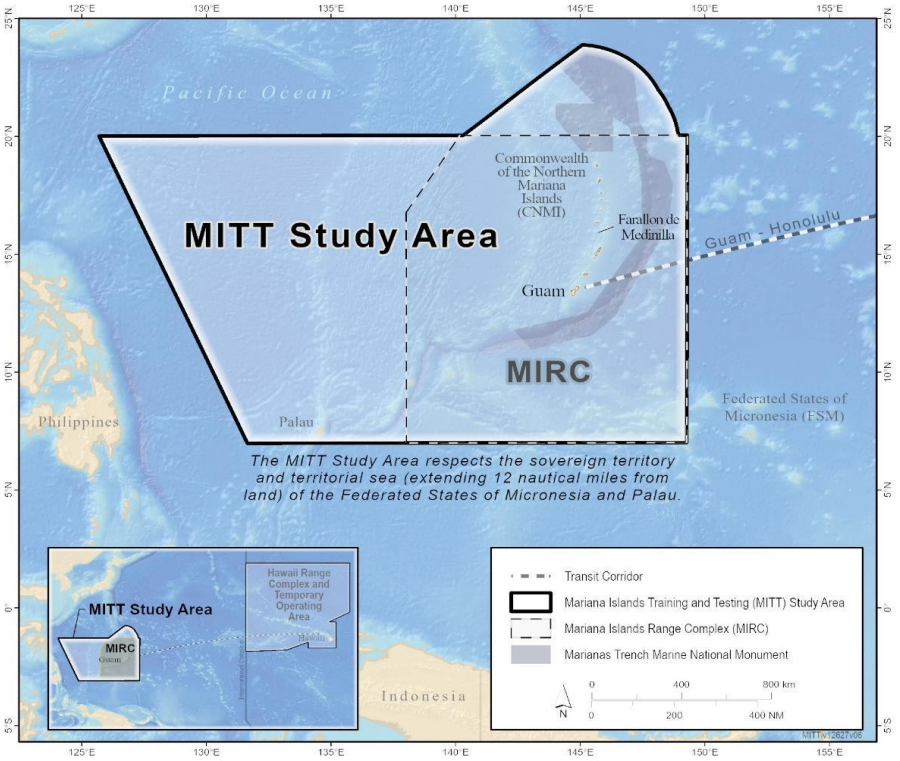

Figure ES-1: Mariana Islands Training and Testing Study Area

ES.1.2 Purpose and Need

The purpose of the Proposed Action is to conduct military readiness activities within the MITT Study Area to ensure the Action Proponents are organized, trained, and equipped to meet their Congressionally mandated national defense missions (10 United States Code [U.S.C.] sections 7062, 8062, 8063, 9062; 14 U.S.C. sections 101, 102). In alignment with the National Defense Strategy, these activities are essential for maintaining a continuous presence in the Indo-Pacific and ensuring U.S. forces can respond to contingencies ranging from humanitarian assistance to armed conflict.

The need for the Proposed Action is driven by the requirement for realistic training and rigorous testing in a marine environment. The MITT Study Area—incorporating the Mariana Islands Range Complex—provides the unique sea space, airspace, and island infrastructure necessary for joint and combined activities in the Western Pacific. This SEIS/OEIS builds upon the foundational analysis of the MITT 2015 EIS/OEIS and 2020 SEIS/OEIS to ensure personnel remain proficient in current tactics and advanced technological systems.

Complementary to the Action Proponents' mission, NMFS must render a decision on the request for reauthorization of marine mammal "takes" under the MMPA (16 U.S.C. section 1371(a)(5)(A)). The purpose of NMFS' action is to evaluate whether the proposed activities meet statutory mandates for mitigation and monitoring. This document analyzes the efficacy and practicability of mitigation measures to support the requirements of a potential Incidental Take Authorization.

ES.2 Scope And Content of the Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement

The Action Proponents analyzed military readiness activities that could potentially impact human (e.g., socioeconomic) and natural resources, including marine mammals, sea turtles, and fishes, and other marine and human resources. The range of alternatives includes the No Action Alternative and two action alternatives. In this SEIS/OEIS, the Action Proponents revaluated potential effects, only carrying forward those stressors that are reasonably foreseeable and sufficiently likely to occur such that a person or ordinary prudence would take it into account in reaching a decision. This SEIS/OEIS supplements from prior 2015 and 2020 MITT documents to focus analysis on changes to effects on stressors from continuing activities (both which may increase or decrease) as per Executive Order 12114 and, more specifically, new activities that require authorization to take marine mammals.

ES.3 Proposed Action and Alternatives

As the lead agency, the Navy proposes to continue military readiness activities in the Study Area. Military readiness activities prepare the Action Proponents to fulfill their missions to protect and defend the United States and its allies but have the potential to affect the environment. Proposed activities remain fundamentally consistent with at-sea and Farallon de Medinilla activities analyzed in both the 2015 EIS/OEIS and 2020 SEIS/OEIS and are representative of activities that the Action Proponents have conducted off Guam and the Commonwealth of the Northern Mariana Islands for decades. This SEIS/OEIS updates the types, frequency, duration, and intensity of military readiness activities from previous MITT documents.

ES.3.1 No Action Alternative

Under the No Action Alternative, the Action Proponents would not conduct the proposed training and testing activities or the modernization and sustainment in the Study Area. The No Action Alternative is inherently unreasonable in that it does not meet the purpose and need. However, the No Action Alternative is carried forward to serve as a baseline for comparing the potential effects on the action alternatives. For NMFS, denial of the Action Proponent's application for incidental take authorization constitutes the NMFS No Action Alternative.

ES.3.2 Alternative 1

Alternative 1 is the Preferred Alternative. In addition to implementation of 10 new proposed military readiness activities, Alternative 1 reflects a representative year of training and testing activity that accounts for natural fluctuations in deployment schedules and testing programs. The majority of training and testing activities that would be conducted are the same as, or similar to, those conducted currently or in the past.

ES.3.3 Alternative 2

Similar to Alternative 1, Alternative 2 encompasses both new and ongoing activities but assumes a higher annual tempo of systems evaluation to meet the highest levels of military readiness activities. Alternative 2 reflects the maximum number of training activities that could occur within a given year and assumes the maximum level of activity would occur every year over a seven-year period.

ES.4 Summary of Environmental Effects

Environmental effects which might result from implementing the Proposed Action or alternatives have been analyzed in this SEIS/OEIS. Resource areas analyzed include sediments and water quality, air resources, marine habitats, marine mammals, sea turtles, seabirds, marine vegetation, marine invertebrates, fishes, terrestrial species and habitats, cultural resources, socioeconomic resources, and public health and safety. Table ES-1 provides a comparison of the potential environmental impacts of the No Action Alternative, Alternative 1 (Preferred Alternative), and Alternative 2.

ES.5 Mitigation

For over two decades, the Action Proponents have mitigated the environmental impacts of military readiness activities through a comprehensive suite of activity-based and geographic measures. These protections, detailed in Chapter 4, are designed to reduce the overlap between stressors—such as acoustic, explosive, and physical disturbance and strike—and sensitive marine species, specifically aiming to prevent injury to marine mammals and sea turtles.

Activity-based measures utilize observational mitigation zones to protect species in real-time during training and testing activities. These protocols, specified in Tables 4.6-1 through 4.6-4, include requirements for power-downs or shutdowns of active sonar, cease-fire zones for explosive and non-explosive ordnance, and strict vessel following distances. While these measures are fundamentally consistent, they include activity-specific variations to account for different platform configurations and stressor types. Complementing activity-based protocols, the Action Proponents implement year-round and seasonal geographic mitigation areas to protect high-value seafloor habitats and critical biological regions, as detailed in Tables 4.7-1 through 4.7-5. Should national security requirements necessitate an exception to these geographic constraints, a formal approval process through the chain of command and advance notification to NMFS is required.

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Section 3.1 Sediments and Water Quality			
Explosives and explosives byproducts/Metals/Chemicals and other materials not associated with explosives	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.1 (Sediments and Water Quality) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from these stressors would not be reasonably foreseeable.	
Section 3.2 Air Resources			
Criteria air pollutants	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		The emission of criteria pollutants resulting from activities in the Study Area would not cause a violation or contribute to an ongoing violation of the National Ambient Air Quality Standards.	
Hazardous air pollutants	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Emissions from the action alternatives would produce ambient hazardous air pollutant effects that are not expected to cause any discernable increase to human health risks from HAP exposure in areas where public presence is expected.	
[1]As of April 11, 2025, the Council on Environmental Quality implementing regulations (40 Code of Federal Regulations 1500–1508) for the National Environmental Policy Act (NEPA) 42 United States Code 4321 et seq., are no longer in effect. In light of this change, the Navy's analyses of greenhouse gas emissions are included in this document to comply with applicable federal case law.			
Section 3.3 Marine Habitats			
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Most of the high-explosive MEM would detonate at or near the water surface. Seafloor detonations would be infrequent, and the surface area of bottom substrate affected would be marginal to the total training and testing area available in the Study Area. Any impacts to soft bottom habitat would be temporary to short-term.	
Physical Disturbances and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Most seafloor devices would be placed in areas that would result in minor and temporary bottom substrate effects. Once on the seafloor and over time, MEM would be buried by sediment, corroded from exposure to the marine environment, or colonized by benthic organisms. The surface area of bottom substrate affected over the short term would be a tiny fraction of the total Study Area.	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Section 3.4 Marine Mammals			
Acoustics	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Predicted effects from sonars on marine mammals vary depending on the species and stock, but would include auditory injuries, temporary hearing loss, masking, stress, and behavioral responses. Behaviors including communication, foraging, or breeding, are likely to be temporarily disrupted. Individuals or groups may avoid areas around sonar activities and be temporarily displaced from a preferred habitat, and other acoustic stressors such as vessel noise and weapons noise may contribute to behavioral responses. Displacement may be brief or extended during multi-day events. Sensitive species, like beaked whales, may avoid for farther distances and for longer durations. While effects vary for individuals and stocks, the overall degree of effect would be less than significant, because effects are not expected to interfere with biologically important functions such that the continued viability of the population or stock would be threatened.	
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Effects on individual marine mammals may be permanent (auditory or non-auditory injury) or temporary (temporary hearing loss, masking, stress, or behavioral response). The behavioral patterns of a limited number of individuals may be interrupted. Individuals or groups may temporarily avoid areas where multiple detonations occur. Activities using explosives would be relatively brief and occur over small areas relative to the ranges of most marine mammals. Permanent effects would be present in low enough numbers; total effects (including both temporary and permanent effects) are not expected to interfere with feeding, reproduction, or other biologically important functions such that the continued viability of the population would be threatened.	
Energy	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.4 (Marine Mammals) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from energy stressors would not be reasonably foreseeable.	
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		There have been no reported vessel strikes between Navy or U.S. Coast Guard vessels and marine mammals in the Study Area. Since vessel use would remain similar to vessel use over the past decade, the potential for striking a marine mammal remains similarly low. Behavioral reactions by marine mammals to physical disturbances from vessels and in-water devices and MEM would be brief, and could include alerting, temporary change in behavior, or no reaction. Long-term effects on an individual or population are not expected, because occasional responses to physical disturbance would not interfere with feeding, reproduction, or other biologically important functions such that the continued viability of the population	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
		would be threatened. Consistent with previous analyses, effects from seafloor devices are not reasonably foreseeable.	
Entanglement	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.4 (Marine Mammals) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from entanglement stressors would not be reasonably foreseeable.	
Ingestion	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.4 (Marine Mammals) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from ingestion stressors would not be reasonably foreseeable.	
Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.4 (Marine Mammals) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from secondary stressors would not be reasonably foreseeable.	
Section 3.5 Sea Turtles			
Acoustics	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Sea turtles could be affected by a limited number of acoustic stressors where frequencies overlap with sea turtles' lower frequency hearing. Exposures to sound-producing activities present risks that could include hearing loss, auditory masking, physiological stress, and changes in behavior; however, no effects from sonars were predicted by the Navy's acoustic effects model.	
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Explosions close to a sea turtle present a risk because the shock waves produced by explosives could cause injury or mortality. If farther away from the explosion, impulsive, broadband sounds introduced into the marine environment could cause hearing loss, masking, physiological stress, or behavioral responses. The Navy's acoustic effects model predicted 25 auditory and one non-auditory injury to sea turtles per year.	
Energy	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.5 (Sea Turtles) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from energy stressors would not be reasonably foreseeable.	
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Vessels and in-water devices present a risk for collision with sea turtles, particularly in coastal areas where densities are higher. Strike potential by expended materials is statistically small. Because of the low numbers of sea turtles potentially affected by activities that may cause a physical disturbance and strike, population-level effects are unlikely.	
Entanglement	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.5 (Sea Turtles) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from entanglement stressors would not be reasonably foreseeable.	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Ingestion	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.5 (Sea Turtles) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from ingestion stressors would not be reasonably foreseeable.	
Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.5 (Sea Turtles) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from secondary stressors would not be reasonably foreseeable.	
Section 3.6 Seabirds			
Acoustics	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Unless very close to an intense sound source, responses by birds to acoustic stressors would likely be limited to short-term behavioral responses. Some birds may be temporarily displaced, and there may be temporary increases in stress levels. Although individual birds may be affected, population-level effects would not occur.	
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Birds could be exposed to in-air explosions. Sounds generated by most small underwater explosions are unlikely to disturb birds above the water surface. However, if a detonation is sufficiently large or is near the water surface, birds above the water surface could be injured or killed. Detonations in air could injure birds either while in flight or at the water surface. An explosive detonation would likely cause a startle reaction, as the exposure would be brief, and any reactions are expected to be short term. Although a few individuals may experience long-term effects and potential mortality, population-level effects would not occur.	
Energy	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.6 (Seabirds) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from energy stressors would not be reasonably foreseeable.	
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.6 (Seabirds) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from physical disturbance and strike stressors would not be reasonably foreseeable.	
Entanglement	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Consistent with the analysis presented in Section 3.6 (Seabirds) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from entanglement stressors would not be reasonably foreseeable.	
Ingestion	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Consistent with the analysis presented in Section 3.6 (Seabirds) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from ingestion stressors would not be reasonably foreseeable.	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.6 (Seabirds) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from secondary stressors would not be reasonably foreseeable.	
Section 3.7 Marine Vegetation			
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Explosives could affect vegetation by destroying individuals or damaging parts of individuals; however, there would be no persistent or large-scale effects on the growth, survival, distribution, or structure of vegetation, primarily due to the avoidance of sensitive habitats and recovery of relatively small areas of disturbed vegetation.	
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Physical disturbance and strike could affect vegetation by destroying individuals or damaging parts of individuals; however, there would be no persistent or large-scale effects on the growth, survival, distribution, or structure of vegetation.	
Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.7 (Marine Vegetation) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from secondary stressors would not be reasonably foreseeable.	
Section 3.8 Marine Invertebrates			
Acoustics	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.8 (Marine Invertebrates) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from acoustic stressors would not be reasonably foreseeable.	
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Explosives produce pressure waves that can harm invertebrates in the vicinity of where they typically occur; mostly offshore surface waters where zooplankton, squid, and jellyfish are prevalent mostly at night when military readiness activities with explosives do not typically occur. Invertebrate populations are generally smaller offshore than inshore due to the scarcity of habitat structure and comparatively lower nutrient levels.	
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Most risk exists offshore where invertebrates are less abundant and near the surface during the day when actions are typically occurring, there is more interaction risk, but to smaller populations of invertebrates. Invertebrate communities in affected soft bottom areas are naturally resilient to occasional disturbances. Accordingly, population-level effects are unlikely.	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Entanglement	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.8 (Marine Invertebrates) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from entanglement stressors would not be reasonably foreseeable.	
Ingestion	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.8 (Marine Invertebrates) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from ingestion stressors would not be reasonably foreseeable.	
Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Secondary or indirect effects on marine invertebrates via habitat (e.g., sediment, and water quality) and prey availability could come from (1) explosives and explosion byproducts; (2) metals; (3) chemicals; and (4) other materials such as targets, chaff, and plastics. Effects on sediments and water quality (Section 3.1) were determined to not be reasonably foreseeable and therefore would not indirectly affects marine invertebrates.	
Section 3.9 Fishes			
Acoustics	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Some sonar, vessel and weapons noise could result in masking, physiological responses, or behavioral reactions. Aircraft noise would not likely result in effects other than brief, mild behavioral responses in fish that are close to the surface. Most effects are expected to be temporary and infrequent as most activities involving acoustic stressors would be temporary, localized, and infrequent resulting in short-term and mild to moderate effects. More severe effects (e.g., mortality) could lead to permanent effects for individuals but, overall, long-term consequences for fish populations are not expected.	
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Sound and energy from explosions can cause mortality, injury, hearing loss, masking, physiological stress, or behavioral responses. The time scale of individual explosions is very limited and repeated exposure of individuals is unlikely. Most effects such as hearing loss or behavioral responses are expected to be short term and localized. More severe effects (e.g., mortality) could lead to permanent effects for individuals but, overall, long-term consequences for fish populations are not expected.	
Energy	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Consistent with the analysis presented in Section 3.9 (Fishes) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from energy stressors would have reasonably foreseeable effects on fishes, but the degree of the effects would be less than significant. This is primarily because electromagnetic components of these activities are limited to simulating the electromagnetic signature of a vessel as it passes through the water and the electromagnetic signal is temporary, covering only a small spatial range during each activity in the Study Area.	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		The use of vessels, in-water devices, MEM, and seafloor devices poses a risk for collision, stress response, or effects caused by sediment disturbance, particularly near coastal areas and bathymetric features where fish densities are higher. Most fish are mobile and have sensory capabilities that enable them to detect and avoid vessels and other items.	
Entanglement	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.9 (Fishes) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from entanglement stressors would not be reasonably foreseeable.	
Ingestion	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Consistent with the analysis presented in Section 3.9 (Fishes) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from ingestion stressors would have reasonably foreseeable effects on fishes, but the degree of the effects would be less than significant. This is because the likelihood of ingestion is low based on the dispersed nature of the materials and the limited exposure of those items at the surface/water column or seafloor and if ingested, a fish would temporarily take the expended material into its mouth, then spit it out.	
Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.9 (Fishes) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from secondary stressors would not be reasonably foreseeable.	
Section 3.10 Terrestrial Species and Habitats			
Acoustics	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Effects of noise generated during military readiness activities on FDM will continue to be introduced into terrestrial habitats on the island. The long use of FDM by breeding seabirds, ESA megapodes, and fruit bats, and the apparent stable populations of seabirds, megapodes, and fruit bats on the island suggests that the targeting restrictions that have been developed over the past few decades have minimized risk to both breeding seabirds and the ESA-listed megapode, allowing for populations to persist on the island.	
Explosives	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Explosives effects on FDM, because of targeting restrictions, are limited to designated impact zones on the island. The long use of FDM by breeding seabirds and the apparent stable populations of seabirds on the island suggests that limiting explosive impacts to designated impact zones allows for continued use of nesting habitats by several regionally important seabird species. Continued systematic monitoring of terrestrial habitats outside of the impact zones suggests that ESA-listed megapode numbers are remaining steady.	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Physical disturbance and strike by seabirds and ESA-listed megapodes continues to be limited by targeting restrictions and impact zone use. Wildfires induced by munitions use continues to be a threat; however, the low successional state of vegetation within the impact zones limits the ability of wildfires to carry into habitats outside of the impact zones.	
Section 3.11 Cultural Resources			
Explosives	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.11 (Cultural Resources) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from explosive stressors would not be reasonably foreseeable.	
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Vessels and in-water devices are operated in a manner to avoid known obstructions, including submerged historic and cultural resources; and the Navy's seafloor devices are placed to avoid underwater obstructions, including submerged cultural resources. Most of the anticipated MEM would be small objects and fragments that lose velocity as they descend through the water column. In addition, minimization and best management measures would be implemented to reduce or avoid effects; therefore, physical disturbance and strike stressors resulting from in-water devices, MEM, and seafloor devices would not result in adverse effects on known cultural resources.	
Section 3.12 Socioeconomics			
Accessibility	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Areas of co-use in the Study Area may be temporarily inaccessible to the public due to military readiness activities; however, the military would notify the public of closures in advance, and effects would be short term and limited to the duration of the activity.	
Airborne Acoustics	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Airborne acoustics would be infrequent and short-term, lasting for the duration of the activity. Noise would not be expected to deter the public from participating in recreational activities in nearshore or offshore areas.	
Physical Disturbance and Strike	Unchanged or slightly improved from baseline conditions	**Less than significant effects**	**Less than significant effects**
		Physical disturbance and strike stressors (e.g., military expended materials) would not be expected to damage civilian equipment if encountered. The Action Proponents would continue to implement mitigation to avoid or reduce effects from physical disturbance and strike stressors on seafloor resources.	

Table ES-1: Summary of Environmental Impacts for the No Action Alternative, Alternative 1, and Alternative 2 (continued)

Stressor	No Action Alternative	Alternative 1 (Preferred Alternative)	Alternative 2
Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.12 (Socioeconomics) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from secondary stressors would not be reasonably foreseeable.	
Section 3.13 Public Health and Safety			
Underwater Energy/ In-air Energy/ Physical Interactions/ Secondary	Unchanged or slightly improved from baseline conditions	**No reasonably foreseeable effects**	**No reasonably foreseeable effects**
		Consistent with the analysis presented in Section 3.13 (Public Health and Safety) of the 2015 EIS/OEIS and 2020 SEIS/OEIS, effects from these stressors would not be reasonably foreseeable.	

Notes: ESA = Endangered Species Act, FDM = Farallon de Medinilla, MEM = Military Expended Material; SOP = Standard Operating Procedure

ES.6 Other Considerations

In accordance with NEPA, this SEIS/OEIS provides an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. The Proposed Action may result in both short- and long-term environmental effects. However, the Proposed Action would not be expected to result in any impacts that would reduce environmental productivity, permanently narrow the range of beneficial uses of the environment, or pose long-term risks to health, safety, or the general welfare of the public.

For both Alternative 1 and Alternative 2, most resource commitments are neither irreversible nor irretrievable. Most impacts are short term and temporary or, if long lasting, are negligible. No habitat associated with threatened or endangered species would be lost as result of implementation of the Proposed Action.

ES.7 Public Involvement

ES.7.1 Scoping Process

The Action Proponents held a public scoping period, from June 7 to July 22, 2025, to involve the public early in the process for the identification, definition, and prioritization of significant environmental and historic preservation issues related to the Proposed Action. Although not required for a supplemental EIS, the Action Proponents held a scoping period to promote public understanding of the proposal and receive input to bolster the accuracy and thoroughness of the analysis. Public notification was extensive, involving direct mailings to over 750 officials and individuals, newspaper advertisements, and traditional and social media engagement to ensure the public was well-informed on the project's purpose and how to provide meaningful input. The Action Proponents established a project website for the public to easily access project information, including public notices, project fact sheets, and a virtual presentation. The public was also able to request more information about participating in the National Historic Preservation Act Section 106 process.

ES.7.2 Scoping Comments

The public was able to submit comments during the scoping period by postal mail or electronically via the project website. Federal and local elected officials and government agencies, nongovernmental organizations, individuals, and community groups submitted a total of 19 comments. A detailed summary of scoping comments can be found in Appendix G. A sampling of specific concerns includes (1) military training and testing around the Mariana Islands; (2) activities that may harm or have long-lasting impacts on marine species and marine habitat; (3) impacts from training and testing with active sonar and explosives; (4) unexploded ordnance and other debris as a result of military activities; (5) potential impacts on submerged maritime heritage resources, such as aircraft and shipwrecks; (6) noise impacts on people, local communities, marine mammals, fishes, and seabirds in the Study Area.

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Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement Mariana Islands Training and Testing

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Acronyms and Abbreviations

Acronym	Definition	Acronym	Definition
°C	Degrees Celsius	EFH	Essential Fish Habitat
AAFB	Andersen Air Force Base	EIS	Environmental Impact Statement
AAQS	Ambient Air Quality Standards	EO	Executive Order
ac.	Acre(s)	ER-M	Effects Range – Medium
ACT	Annual Target Catch	ESA	Endangered Species Act
A-G	Air-to-Ground	FAA	Federal Aviation Administration
AINJ	Auditory Injury	FDM	Farallon de Medinilla
AMNS	Airborne Mine Neutralization System	FONSI	Finding of No Significant Impact
		ft.	Foot/feet
AMRAAM	Advanced Medium-Range Air-to-Air Missile	G-DODS	Guam Deep Ocean Disposal Site
		GDP	Gross Domestic Product
APPS	Act to Prevent Pollution from Ships	GHG	Greenhouse Gas(es)
		ha	Hectare(s)
Army	U.S. Army	HAP	Hazardous Air Pollutant
BDL	Below Detection Limits	HAPC	Habitat of Particular Concern
BMP	Best Management Practice	HARM	High-Speed Anti-Radiation
BMUS	Bottomfish Management Unit Species	HE-ET	High Explosive-Electronic Time
		HF	High Frequency
BNM	Broadcast Notice to Mariners	HRC	Hawaii Range Complex
BO	Biological Opinion	Hz	Hertz
CAA	Clean Air Act	INRMP	Integrated Natural Resources Management Plan
CD	Consistency Determination		
CFR	Code of Federal Regulations	ITA	Incidental Take Authorization
CFU	Coliform Forming Units	JRM	Joint Region Marianas
CH_4	Methane	kg	Kilogram
CJMT	CNMI Joint Military Training	kHz	kilohertz
CNA	Center for Naval Analyses	km^2	Square kilometer(s)
CNMI	Commonwealth of the Northern Mariana Islands	L	Liter
		lb.	Pound(s)
CO	Carbon monoxide	LF	Low Frequency
CO_2	Carbon dioxide	LFA	Low Frequency Active Sonar
CO_2 eq.	Carbon dioxide equivalent	LOA	Letter of Authorization
CV	Coefficient of Variation	m	Meter(s)
CWA	Clean Water Act	MA	May Affect
CZMA	Coastal Zone Management Act	MACS	Mariana Archipelago Cetacean Survey
dB	Decibel(s)		
dB re 1 μPa^2s	Decibels referenced to 1 micropascal squared seconds	MARPOL	International Convention for the Prevention of Pollution from Ships
dBA re 20 µPa	A-weighted decibel(s) referenced to 20 micropascals	MBTA	Migratory Bird Treaty Act
		MCM	Mine Countermeasure
DDTs	Dichlorodiphenyltrichloroethane	MEM	Military Expended Materials
DNT	2,6-dinitrotoluene	MF	Mid-Frequency
DO	Dissolved Oxygen	MIRC	Mariana Islands Range Complex
DoD	Department of Defense	MIRC Ops	Mariana Islands Range Complex Operations
DPS	Distinct Population Segment		
DZ	Danger Zone	MITT	Mariana Islands Training and Testing
EA	Environmental Assessment		
eDNA	Environmental DNA	mm	Millimeter(s)
EEZ	Exclusive Economic Zone		

Acronym	Definition
MMPA	Marine Mammal Protection Act
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards
NAEMO	Navy Acoustic Effects Model
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
Navy	U.S. Department of the Navy
NBG	Naval Base Guam
NCEI	National Center for Environmental Information
NE	No Effect
NEPA	National Environmental Policy Act
NEPM	Non-explosive Practice Munition
NEW	Net Explosive Weight
N_2O	Nitrous oxide
ng/L	Nanograms per liter
NHPA	National Historic Preservation Act
NM	Nautical Mile(s)
NM^2	Square Nautical Mile(s)
NMFS	National Marine Fisheries Service
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxide
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notice to Airmen
NTU	Nephelometric turbidity unit
NUWTAC	Navy Undersea Warfare Training Assessment Course
O_3	Ozone
OEIS	Overseas Environmental Impact Statement
ONR	Office of Naval Research
PA	Programmatic Agreement
PAHs	Polychlorinated aromatic hydrocarbons
PATT	Programmatic Agreement Training and Testing
Pb	Lead
PCBs	Polychlorinated biphenyls
PM_{10}	particulate matter with an aerodynamic size less than or equal to 10 microns
$PM_{2.5}$	particulate matter with an aerodynamic size less than or equal to 2.5 microns
ppb	Parts per billion
ppm	Parts per million
R	Restricted Area Airspace
ROD	Record of Decision
SCUBA	Self-Contained Underwater Breathing Apparatus
SEIS	Supplemental Environmental Impact Statement
SINKEX	Sinking Exercise
SO_2	Sulfur dioxide
SOP	Standard Operating Procedure
SO_x	Sulfur oxides
SPCS	Space Control Squadron
SUA	Special Use Airspace
SURTASS	Surveillance Towed Array Sensor System
SWATT	Surface Warfare Advanced Tactical Training
SYSCOM	Systems Command
TCP	Traditional Cultural Place
THAAD	Terminal High-Altitude Area Defense
tpy	Tons per year
TTS	Temporary Threshold Shift
U.S.	United States
U.S.C.	United States Code
UAV	Unmanned Vehicle
UNDET	Underwater Detonation
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USMC	U.S. Marine Corps
USV	Unmanned Surface Vehicle
UUV	Unmanned Underwater Vehicle
VHF	Very High Frequency
VLF	Very Low Frequency
VOC	Volatile Organic Compound
W	Warning Area
WWII	World War II
yd.	Yard(s)
$\mu g/m^3$	Micrograms per cubic meter

1 Purpose and Need

1.1 Introduction

The United States (U.S.) Department of the Navy (Navy) (including both the U.S. Navy and the U.S. Marine Corps [USMC]) jointly with the U.S. Air Force (USAF), U.S. Army (Army), and U.S. Coast Guard (USCG), collectively referred to as the Action Proponents, have prepared this Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement (SEIS/OEIS) to supplement the impact analysis contained in the 2015 Mariana Islands Training and Testing (MITT) Environmental Impact Statement (EIS)/OEIS (hereinafter referred to as the 2015 EIS/OEIS) and 2020 MITT SEIS/OEIS (hereinafter referred to as the 2020 SEIS/OEIS), consistent with the National Environmental Policy Act (NEPA), 42 U.S. Code [U.S.C.] Sections 4321 et seq, and Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*. The Navy is the lead agency for the Proposed Action and is responsible for the scope and content of this SEIS/OEIS. For this document, Action Proponents within the Navy include the Commander, U.S. Pacific Fleet, the USMC, the Office of Naval Research (ONR), the Naval Air Systems Command (NAVAIR), and Naval Sea Systems Command (NAVSEA). The latter two agencies will be referred to as the Systems Commands (SYSCOMs). In addition to the Navy Action Proponents, the USAF, Army, and USCG are participating as Joint Lead Agencies due to the inclusion of their training activities, which are similar to Navy training covered in this SEIS/OEIS. The National Marine Fisheries Service (NMFS) is also a cooperating agency.

The Action Proponents propose to continue to conduct at-sea military readiness activities in the MITT Study Area, as represented in Figure 1.1-1. Military readiness activities are comprised of training and testing activities that can include the use of active sonar and other acoustic sources, as well as the use of explosives, and range modernization and sustainment necessary to support these activities into the future.

The Study Area for the SEIS/OEIS includes the at-sea areas of the Mariana Islands Range Complex (MIRC); additional areas on the high seas north and west of the MIRC; the transit corridor between the MIRC and the Hawaii Range Complex (HRC); pierside locations on Guam in Apra Harbor; nearshore areas of Guam and the Commonwealth of the Northern Mariana Islands (CNMI); and the land-based training area on Farallon de Medinilla (traditionally called Noos in Chamorro, henceforth identified as FDM in this SEIS/OEIS). This SEIS/OEIS Study Area is consistent with the previous MITT analyses for at-sea and FDM study areas.

Military readiness activities prepare the Action Proponents to fulfill their missions to protect and defend the U.S. and its allies but have the potential to affect the environment. These proposed activities are generally consistent with those at-sea and FDM activities analyzed in previous MITT analyses and are representative of the military readiness activities that the Action Proponents have been conducting off Guam and CNMI for decades.

This SEIS/OEIS updates the types, frequency, duration, and intensity of military readiness activities from previous documents. This SEIS/OEIS's analysis focuses on those military readiness activities conducted at sea and on FDM (see Table 2.3-1 and Appendix A). For discussion and analysis of those land-based military activities conducted on the islands of Guam, Tinian, Saipan, and Rota, please refer to the 2015 EIS/OEIS and the 2025 CNMI Joint Military Training EIS.

This SEIS/OEIS considers ongoing and future activities conducted in the Study Area, updates training and testing requirements, considers range modernization and sustainment activity, incorporates new information from an updated acoustic effects model, updates marine mammal density data, and incorporates evolving and emergent best available science since the previous MITT environmental analysis. It also supports the reissuance of federal regulatory authorizations under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA), using the most current and best available science and analytical methods to assess potential environmental impacts on the species covered by these regulations.

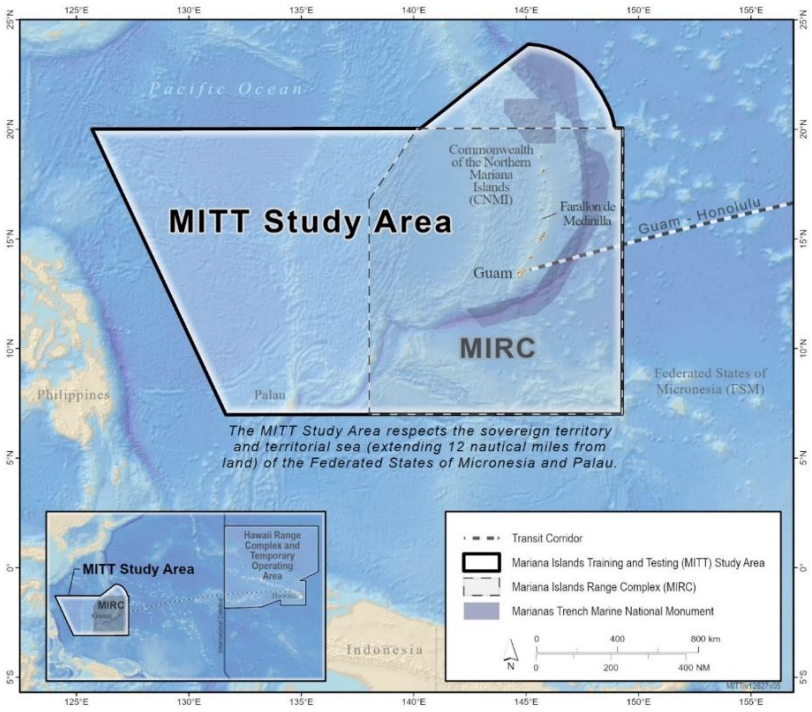

Figure 1.1-1: Mariana Islands Training and Testing Study Area

1.2 Overview and Strategic Importance of the Mariana Islands Range Complex

Building upon the foundational analysis in the 2015 EIS/OEIS and the 2020 SEIS/OEIS, the Navy continues to utilize the MIRC as a vital, controlled environment for realistic multi-domain training and systems testing. MIRC is strategically located and provides the expansive sea space, specialized airspace, and unique island infrastructure necessary to ensure U.S. and allied forces maintain readiness for Western Pacific contingencies.

1.3 Proposed Action

The Proposed Action is to continue to conduct military readiness activities, comprised of training, testing, and range modernization and sustainment in the MITT Study Area. NMFS's Proposed Action is to evaluate and decide whether to issue Letters of Authorization (LOA) under the MMPA of 1972, as amended (16 U.S.C. 1361 et seq.) in response to the Navy's request for an incidental take authorization (ITA).[1] A detailed description of the Proposed Action is provided in Chapter 2.

1.4 Purpose and Need

The purpose of the Proposed Action is to conduct military readiness activities in the MITT Study Area to ensure the Action Proponents, are able to organize, train, and equip service members

[1] NMFS's issuance of an MMPA ITA (i.e., Letter of Authorization [LOA]) is a major federal action (NMFS' Proposed Action) with a discrete purpose and need relative to NMFS's statutory and regulatory obligations. Consequently, NMFS has an independent responsibility to comply with NEPA. If NMFS makes the finding necessary to issue the requested LOA, it will rely on the information and analyses in this document. NMFS intends to adopt this SEIS/OEIS to fulfill its NEPA obligations and issue its own Record of Decision (ROD), if appropriate.

and personnel needed to meet their respective Congressionally-mandated national defense missions (10 U.S.C. sections 7062, 8062, 8063, 9062; 14 U.S.C. sections 101, 102). In alignment with the National Defense Strategy, these activities are essential for maintaining a continuous presence in the Indo-Pacific, enabling U.S. forces to respond to a wide range of contingencies, from full-scale armed conflict to humanitarian assistance.

Complementary to this, NMFS needs to render a decision regarding the request for reauthorization due to NMFS' responsibilities under the MMPA (16 U.S.C. 1371(a)(5)(A)) and its implementing regulations. The purpose of NMFS' action is to evaluate the Action Proponents' request for authorization to take marine mammals pursuant to the MMPA, ensuring that any authorized activities meet statutory mandates regarding mitigation and monitoring. This document analyzes the environmental impacts associated with proposed military readiness activities for which the Action Proponents are seeking authorization to "take" marine mammals. The analysis of mitigation measures includes the requirements for protection and management of marine resources, considers benefits to species or stocks and their habitat, and evaluates the practicability and efficacy of each measure. This analysis will support requirements pertaining to mitigation, monitoring, and reporting specified in the ITA, if issued.

The need for the Proposed Action is driven by the requirement for Action Proponents to maintain military readiness through realistic training and rigorous testing in a marine environment. Training ensures personnel are proficient in the tactics necessary to defend U.S. national interests (refer to Section 1.4.1 in the 2020 SEIS/OEIS for additional information on the Action Proponents' training), while testing allows for the development of advanced systems that maintain a technological edge (refer to Section 1.4.2 in the 2020 SEIS/OEIS for additional information on the Action Proponents' testing). Building upon the foundational analysis in the 2015 EIS/OEIS and the 2020 SEIS/OEIS, the Action Proponents continue to conduct training and testing within the MIRC (a vital dynamic range environment) and throughout the Study Area. The MITT Study Area provides the expansive sea space, specialized airspace, and unique island infrastructure necessary where U.S. and allied forces can conduct joint and combined activities in the Western Pacific.

1.5 The Environmental Planning Process

NEPA requires federal agencies to examine the environmental impacts of their proposed actions within the U.S. and its territories. An EIS is a detailed public document that assesses the potential effects that a major federal action might have on the human environment (including the natural and biological environment). Since NEPA does not apply outside of U.S. jurisdiction, President Carter issued EO 12114, *Environmental Effects Abroad of Major Federal Actions,* in 1979, furthering the purpose of NEPA by creating similar procedures for federal agency activities affecting the environment of the global commons outside U.S. jurisdiction. Based upon new information and science, and changes to the Proposed Action that are relevant to environmental concerns, the Action Proponents have chosen to prepare a supplement to the 2020 SEIS/OEIS.

1.6 Scope and Content

In this SEIS/OEIS, the Action Proponents reevaluated potential effects from the ongoing and new military readiness activities, at sea and on FDM, in the MITT Study Area in all the applicable resource areas evaluated in the previous MITT analyses, while determining what resources

could potentially be affected by the new or changed activities and new science or data. Resource areas include sediments and water quality, air quality, marine habitats, marine mammals, sea turtles, sea birds, marine vegetation, marine invertebrates, fishes, terrestrial species and habitats, cultural resources, socioeconomic resources, and public health and safety. Resource areas not carried forward for more detailed discussion include *Protection of Children from Environmental Health Risks and Safety Risks*, because the proposed activities occur where there are no children present; and *Environmental Justice*, because of rescission of this requirement via EO 14148.

NMFS is a cooperating agency because the scope of the Proposed Action and alternatives involves activities that have the potential to affect protected resources under the agency's jurisdiction and for which they have special expertise, including marine mammals, threatened and endangered species, and essential fish habitat (EFH). NMFS's special expertise and authority are based on its statutory responsibilities under the MMPA, as amended (16 U.S.C. section 1361 et seq.), the ESA (16 U.S.C. section 1531 et seq.), and the Magnuson-Stevens Fishery Conservation and Management Act. The Navy, as lead agency, has requested an ITA under the MMPA, as amended, to take marine mammals incidental to proposed military readiness activities. NMFS is required to evaluate the applicant's request pursuant to the specific requirements of the MMPA and, if appropriate, issue an ITA under the MMPA. In addition, NMFS has an independent responsibility to comply with NEPA and may adopt the Navy's Final EIS/OEIS after independent review to fulfill its NEPA obligations. NMFS may adopt this SEIS/OEIS and issue a separate ROD associated with its decision to grant or deny the Navy's request for an ITA pursuant to section 101(a)(5)(A) of the MMPA.

1.7 Incorporation by Reference

The SEIS/OEIS refers to other environmental documents that provide related information and analyses, which helps keep this document more concise. Cited references may provide additional information in support of this document's analysis. Therefore, documents listed in Table 1.7-1 are incorporated by reference.

Table 1.7-1: Documents Incorporated by Reference

Reference	Description
U.S. Department of the Navy (2015b)	Mariana Islands Training and Testing (MITT) Final EIS/OEIS
U.S. Department of the Navy (2020)	Mariana Islands Training and Testing (MITT) Final SEIS/OEIS

2 Description of Proposed Action and Alternatives

The Action Proponents propose continuing training activities (hereinafter referred to as "training"); research, development, testing, and evaluation activities (hereinafter referred to as "testing"); and range modernization and sustainment in the MITT Study Area, as represented in Figure 1.1-1. Training, testing, and range modernization and sustainment are collectively referred to as "military readiness activities." The Proposed Action in this SEIS/OEIS is generally consistent with the Proposed Action analyzed in the previous documents; for further details regarding specific military readiness activities, please see Appendix A.

In accordance with the MMPA, the Action Proponents submitted an application requesting NMFS authorization for the incidental take of marine mammals associated with the Proposed Action described in this SEIS/OEIS. NMFS' Proposed Action would be a direct outcome of responding to the Navy's request for an ITA pursuant to the MMPA.

2.1 Description of the Mariana Islands Training and Testing Study Area

The Study Area includes the at-sea areas of the MIRC; additional areas on the high seas north and west of the MIRC; the transit corridor between the MIRC and the HRC; pierside locations on Guam in Apra Harbor; nearshore areas of Guam and the CNMI; and the land-based training area on Farallon de Medinilla (Figure 1.1-1). The MIRC itself encompasses 501,873 square nautical miles (NM^2) of open ocean, including sea and undersea space from the surface to the ocean floor, as well as land training areas at FDM. Within the MIRC, approximately 40,000 NM^2 is designated as Special Use Airspace (SUA), which includes Warning Areas (W) W-517, W-12, W-11, and W-13 (Figure 2.1-1), and 2,463 NM^2 of restricted airspace (R; R-7201 and R-7201A) surrounding FDM.

For purposes of this SEIS/OEIS, pierside locations include channels and routes to and from the Navy port in Apra Harbor Naval Complex, and associated wharves and facilities within the Navy port (Figure 2.2-2). A more detailed description of these components and their geographic boundaries is provided in the 2020 SEIS/OEIS, Section 2.1 (Description of the Mariana Islands Training and Testing Study Area). While the MIRC contains portions of the Marianas Trench Marine National Monument, military activities remain exempt from monument prohibitions per the 2009 Presidential Proclamation.

2.2 Primary Mission Areas

The Action Proponents categorize at-sea activities into functional warfare areas called primary mission areas. As described in the 2020 SEIS/OEIS, training and testing activities are categorized into the following eight primary mission areas to reflect functional warfare requirements:

- Air warfare
- Amphibious warfare
- Anti-submarine warfare
- Electronic warfare
- Expeditionary warfare
- Mine warfare
- Strike warfare
- Surface warfare

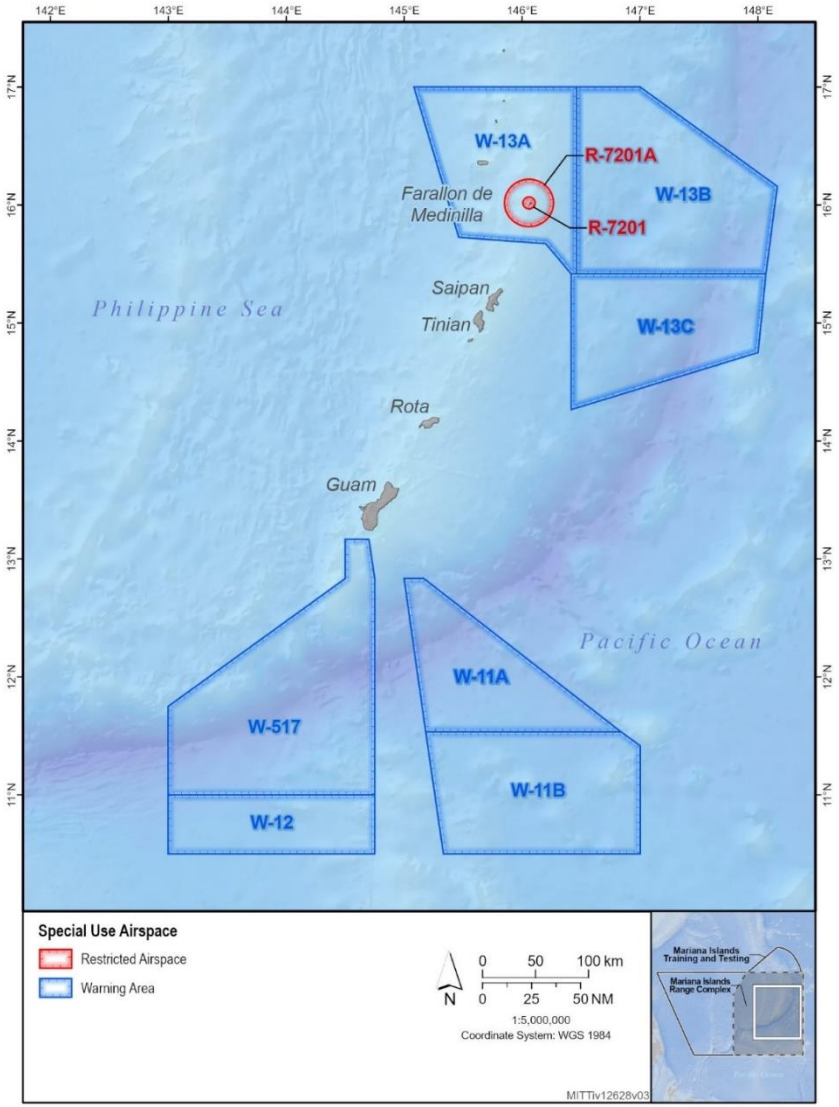

Figure 2.2-1: Mariana Islands Range Complex Airspace

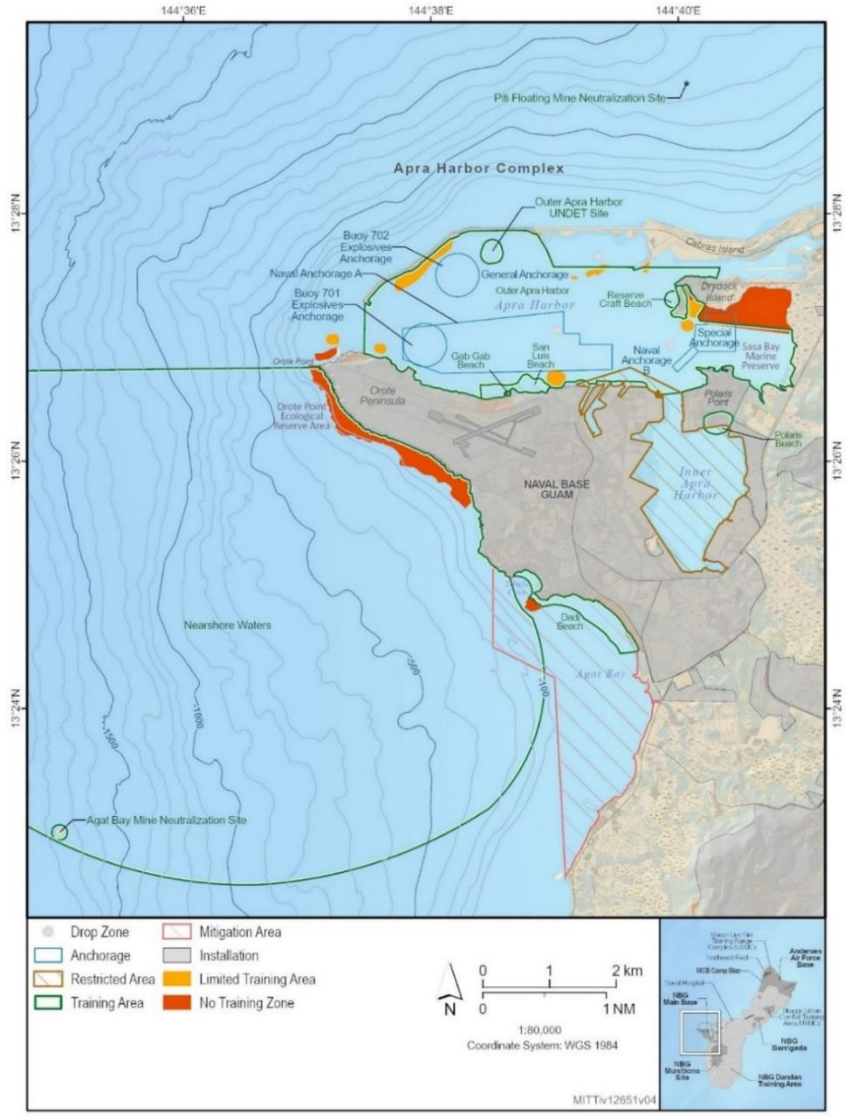

Figure 2.2-2: Apra Harbor Naval Complex (Main Base) and Main Base/Polaris Point

2.3 Proposed Action

The Action Proponents have been conducting military readiness activities in the Study Area for decades. The tempo and types of military readiness activities have fluctuated because of the introduction of new technologies, the evolving nature of international events, advances in warfighting doctrine and procedures, and changes in force structure (organization of ships, submarines, aircraft, weapons, and personnel). Such developments influence the frequency, duration, intensity, and location of required training and testing activities. This SEIS/OEIS includes the analysis of those at-sea and FDM activities necessary to meet readiness requirements beyond 2027 and into the reasonably foreseeable future, includes any changes to those activities analyzed in the previous MITT analyses, and reflects the most up-to-date compilation of training and testing activities deemed necessary to accomplish military readiness requirements. In addition to training of U.S. Navy, USMC, and USCG forces, this SEIS/OEIS includes an analysis of certain activities by USAF and U.S. Army when those activities within the Study Area are similar to U.S. Navy or USMC activities and are scheduled on U.S. Navy-controlled ranges.

For training and testing to be effective, units must be able to safely use their sensor and weapon systems, to their optimum capabilities, as they are intended to be used in military missions and combat operations. Standard operating procedures (SOPs) applicable to training and testing have been developed through years of experience, and their primary purpose is to provide for both safety (including public health and safety) and mission success. For a more detailed description of the SOPs, see the 2020 SEIS/OEIS, Section 2.3.3 (Standard Operating Procedures). Because they are essential to safety and mission success, SOPs are part of the Proposed Action and are considered in Chapter 3 environmental analyses for applicable resources.

Proposed activities remain fundamentally consistent with the types of military readiness activities that have been conducted in the Mariana Islands for decades. While the majority of these activities remain consistent with previous authorizations, and there are no proposed changes in land-based activities on Saipan, Tinian, and Rota (as previously analyzed in the 2015 EIS/OEIS), the Navy has identified 10 military readiness activities to be analyzed as “new” for this phase. As detailed in Table 2.3-1, these new at-sea activities largely represent the consolidation of existing environmental reviews, the reclassification of ongoing activities into standalone categories, or the inclusion of refined testing parameters to ensure a comprehensive and consistent analysis. More detailed information on proposed new activities is included in Appendix A.

Table 2.3-1: MITT Phase IV Proposed New Military Readiness Activity Descriptions

Activity Name	Activity Description	Representative Location
Dive and Salvage Operations*	Navy divers perform dive operations and salvage training. Divers will conduct a variety of salvage training to include debeaching operations, underwater repairs to ships, underwater survey operations, and other underwater training as required. As part of activities, a practice salvage platform can be sunk and then refloated and removed. No explosives are used.	CNMI Nearshore, Guam Nearshore, MIRC
Underwater Construction Team Training	Navy and U.S. Coast Guard (USCG) divers conduct underwater repair and construction. This consists of cutting, welding, assembly, and installation of deep-water structures, mooring systems,	CNMI Nearshore, Guam Nearshore; MIRC

Activity Name	Activity Description	Representative Location
	underwater instrumentation, clearing of hazards, and other training as needed. Platforms can include small boats and unmanned bottom crawlers. No explosives are used.	
Port Damage Repair	Navy Expeditionary forces train to repair critical port facilities. Training includes diving operations; salvage operations; and repairs to piers, quay walls, and other waterfront infrastructure. Platforms can include Small Boat, Support Craft, Fixed Structures, and Unmanned Bottom Crawlers. No dredging, no pile driving, and no explosives are used.	CNMI Nearshore, Guam Nearshore
Maritime Environmental Response	USCG conducts training on spill and hazmat response for oil or hazardous waste response identified in navigable waters. Training practices agency response to simulated scenarios such as oil sheens identified near ported vessels during fueling activities or that occur after ships run aground. Training includes deployment of oil booms using small boats. No explosives are used.	MITT Study Area
Waterborne Training	Personnel launch, operate, and recover a variety of small boats to achieve certifications such as coxswain, crewman, and safety observer. No explosives are used.	MITT Study Area, MIRC, CNMI Nearshore, Guam Nearshore
Pierside Sonar	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities and complete any required troubleshooting. Ships and submarines would activate mid- and high-frequency tactical sonars, underwater communications systems, and navigational devices to ensure they are fully functional prior to at-sea test events. Event duration varies, with average durations of three weeks with active sonar used intermittently over two days during the total event duration. This also includes pierside sonar testing during surface combatant sea trials. No explosives are used.	Inner Apra Harbor, Guam (does not occur within CNMI)
Unmanned Aerial Systems Testing	Unmanned aerial systems are launched from a platform (e.g., fixed platform or submerged submarine) to test the capability to extend the surveillance and communications range of unmanned underwater vehicles, manned and unmanned surface vehicles, and submarines. Platforms can include Submarine, Support Craft, Unmanned Aerial Vehicle - Fixed Wing, Unmanned Aerial Vehicle - Rotary Wing. No explosives are used.	MITT Study Area, MIRC
Unmanned Surface Vehicle (USV) Testing	Testing involves the production or upgrade of unmanned surface vehicles. This may include testing mine detection capabilities, evaluating the basic functions of individual platforms, or conducting complex events with multiple vehicles. USVs can include remotely operated craft (e.g., semi-submersible, plane hull, semi-plane hull) and test vehicles. During testing, they can operate autonomously, semi-autonomously, or non-autonomously. Non-autonomous or remotely controlled vehicles may be tethered like remotely operated vehicles or remotely controlled. USVs may have multiple test objectives or payloads (such as cameras, sonar, or explosives). USVs may be used in conjunction with unmanned underwater vehicles and unmanned aerial systems. USV launch and retrieval methods are highly variable. USV test vehicle launch	MITT Study Area, MIRC, activities involving explosives > 12 NM from land

Activity Name	Activity Description	Representative Location
	methods include lowering onto the water from a support craft or pier, deploying from another craft, or launching from a boat ramp. The vehicle will propel itself through the water to complete the test objectives, which could include deployment or recovery of a payload, sonar or other sensor use, or completion of a propulsion test. Occurs year round, daytime only. Explosives are used (E9). Activities involving explosives will occur > 12 NM from land.	
In-Port Maintenance Testing	Each system is tested to ensure it is functioning in a technically acceptable manner and is operationally ready to support in-port and at-sea maintenance capabilities, including Combat Systems testing. Testing includes general system maintenance capabilities (e.g., verifying that submarine tenders can perform resupply and replenishment capabilities). For Combat Systems, the ship's test plans and procedures, Maintenance Repair/Requirement Cards, and computerized planned maintenance system are used in establishing testing standards. No explosives are used.	Guam and CNMI Nearshore
Range Sustainment and Modernization	Support crews place, move, and remove mine countermeasures (MCM) targets. MCM targets could be inserted on the seafloor or tethered to anchors that are moored on the seafloor. Other temporary training areas can be established by installing instrumentation that could include hydrophones anchored to the seafloor similarly to anchored mine training shapes. Once training is completed, the temporary instrumentation is recovered and utilized elsewhere. No explosives are used.	MITT Study Area

*Use of the term "operations" throughout this EIS refers to training or testing

2.3.1 Foreign Military Participation

In furtherance of national security objectives, foreign militaries may participate in multinational training and testing events in the Study Area. Foreign military activities that are planned by and under the substantial control and responsibility of the Action Proponents are included in the Proposed Action. These participants could be in various training or testing events described in Appendix A, and their effects are analyzed in this EIS. However, when foreign military vessels and aircraft operate independently within the Study Area as sovereign vessels outside the planning, control, and responsibility of the APs, those activities are not considered part of the Proposed Action. There are many reasons why foreign military vessels may traverse U.S. waters or come into U.S. port, not all of which are at the request of any of the Action Proponents. Foreign military vessels and aircraft operate pursuant to their own national authorities and have independent rights under customary international law, embodied in the principle of sovereign immunity, to engage in various activities on the world's oceans and seas.

2.3.2 Proposed Changes to Training Activities, Platforms, and Systems

Proposed changes in training activities range from individual tasks to large-scale, integrated exercises. This SEIS/OEIS analyzes proposed changes in training activity levels, including major training exercises and other coordinated exercises supporting the Optimized Fleet Response Plan (U.S. Fleet Forces Command, 2025). The analysis also incorporates new platforms and

weapon systems—such as next-generation aircraft, amphibious vessels, unmanned vehicles, and advanced sensors—alongside unit-level activities required for joint military certification.

Detailed descriptions of major training exercises and integrated/coordinated anti-submarine warfare exercises are provided in the 2020 MITT SEIS/OEIS, Section 2.3.2 (Proposed Training and Testing Activities). Updated descriptions for all ongoing activities are provided in Appendix A. Although changes in training activity levels are proposed in this SEIS/OEIS, the proposed mid-frequency sonar usage—which accounts for the highest number of marine mammal exposures in Alternative 1 (Preferred Alternative)—is lower than what is currently authorized. Additionally, while general vessel movements like refueling or transiting are not listed as discrete training events in the activity tables, they are fully accounted for in Chapter 3 environmental analyses for potential air quality effects and marine mammal strikes.

2.3.3 Proposed Changes to Testing Activities, Platforms, and Systems

As described in the 2020 SEIS/OEIS, the Navy's research and acquisition community performs a wide range of testing activities to ensure military systems are effective, safe, and reliable for use by the fleet. This testing includes everything from basic scientific research and technology development to the evaluation and maintenance of advanced systems (such as missiles, radar, and sonar) and platforms (including ships, submarines, and aircraft). The Proposed Action includes updates to testing activity levels to reflect current technology needs and the introduction of new platforms. These adjustments ensure the Navy maintains a technological advantage while rigorously evaluating equipment under realistic conditions. Detailed descriptions for each testing activity are provided in Appendix A.

2.3.4 Proposed Range Modernization and Sustainment

The Navy's training and testing ranges provide the air, sea, and undersea space necessary for personnel to conduct live military readiness activities. As technology changes, weapons and systems evolve to provide improved capabilities. Often those new capabilities require modifications to the range to allow for full utilization of the new technology. Installation and Maintenance of Subsurface Targets and Instrumentation have been addressed in previous MITT analyses, and is being carried forward as a separate new military readiness activity in this SEIS/OEIS. The action is described in Table 2.3-1.

2.4 Action Alternatives Development

The identification, consideration, and analysis of alternatives are critical components of the NEPA process and contribute to the goal of informed decision-making. Per the Department of Defense's (DoD's) Implementing Procedures, an EIS must rigorously explore and objectively evaluate all reasonable alternatives for implementing the Proposed Action. Additionally, for alternatives eliminated from detailed study, an EIS must briefly discuss the reasons for their exclusion. To be reasonable, an alternative, except for the no action alternative, must be technically and economically feasible and meet the purpose and need for the proposed action.

The following screening criteria were developed to determine that a potential alternative is reasonable and meets the purpose and need if it supports (1)The conduct of realistic military readiness activities; (2) Unit-level to advanced training; (3) Requisite air, surface, and sub-surface

range tracking, instrumentation, and communications capabilities; (4) Variable training and testing schedules by allowing year-round training and testing; (5) The training tempo as required by the Optimized Fleet Response Plan; (6) the introduction of new weapon systems and platforms; (7) Training and testing in proximity to home ports in the Western Pacific region to ensure the United States and ally forces are capable of rapid deployment and response to crises and threats specific to the region; (8) Maximum access to and utilization of existing and future offshore and land-based range infrastructure resources and facilities; (9) Training and testing access to diverse and variable marine environments that replicate real-world conditions where service members would be expected to operate; (10) A continuous operating area large enough to test and train new weapons systems and platforms and the tactics to employ them.

The Action Alternatives, and in particular the mitigation measures that are incorporated in the Action Alternatives, were developed to meet both the Action Proponents' purpose and need to conduct military readiness activities and NMFS' independent purpose and need to evaluate the potential effects of the Action Proponents' activities. The Action Proponents will implement mitigation measures to avoid or reduce potential effects from the Proposed Action on environmental resources. Mitigation measures would be implemented under either Action Alternative and are detailed and analyzed in Chapter 4.

The Action Proponents developed the alternatives considered in this SEIS/OEIS after careful assessment by subject matter experts, including military commands that utilize the ranges, military range management professionals, and environmental managers and scientists.

2.4.1 Alternatives Eliminated from Further Consideration

This SEIS/OEIS serves as an update to the previous MITT analyses; therefore, alternatives eliminated from consideration in the 2020 SEIS/OEIS were reevaluated to determine if they should be considered for this SEIS/OEIS. After thorough consideration of each, the Action Proponents determined that the "Status Quo" Alternative, Alternative Training and Testing Locations, Reduced Training and Testing, Alternatives Including Geographic Mitigation Measures within the Study Area, and Simulated Training and Testing alternatives still did not meet the purpose and need for the Proposed Action. For further discussion on these alternatives please refer to the 2020 SEIS/OEIS, Section 2.4.1.

2.4.2 Alternatives Considered for Analysis

2.4.2.1 Previous MITT Alternatives

Three alternatives were analyzed in the previous MITT analyses: the No Action Alternative, Alternative 1, and Alternative 2. Refer to the 2015 EIS/OEIS and 2020 SEIS/OEIS for more details regarding alternatives.

2.4.2.2 Action Alternatives

For this SEIS/OEIS, three alternatives are analyzed: the No Action Alternative, Alternative 1 (the Preferred Alternative), and Alternative 2. Because the military's anticipated training and testing levels evolve based on operational needs, the Navy's ongoing sonar reporting program provides classified data used to accurately project future active sonar requirements. In addition to meeting the Action Proponents' purpose and need, the action alternatives and associated

mitigation measures were developed to meet NMFS' independent purpose and need to (1) evaluate the potential effects of the activities; (2) determine whether incidental take would have a negligible effect on affected marine mammal species and stocks; (3) prescribe measures to achieve the least practicable adverse impact on species, stocks, and their habitat; and (4) fulfill monitoring and reporting requirements.

2.4.2.2.1 No Action Alternative

The No Action Alternative for this SEIS/OEIS is the same as described in the 2020 SEIS/OEIS, Section 2.4.2.1 (No Action Alternative). Under this alternative, the Action Proponents would not conduct the proposed at-sea military readiness activities in the Study Area, and NMFS would deny the application for a Letter of Authorization. For FDM, the lease agreement would remain in place and the island would be maintained as a Navy range, though strike warfare training would cease.

As detailed in the 2020 SEIS/OEIS analyses, the No Action Alternative is inherently unreasonable because it fails to meet the purpose and need of the Proposed Action; specifically, the cessation of training would prevent the Action Proponents from meeting statutory readiness requirements and would result in an unacceptable increase in risk to personnel and national security. However, the No Action Alternative is carried forward in this SEIS/OEIS to serve as a baseline for comparing the potential environmental effects of the action alternatives.

2.4.2.2.2 Alternative 1 (Preferred Alternative)

Alternative 1 is the Preferred Alternative. In addition to implementation of proposed new military readiness activities as listed in Table 2.3-1, Alternative 1 reflects a representative year of activity that accounts for natural fluctuations in deployment schedules. Compared to previous years, training with hull-mounted mid-frequency sonar (MF1) would decrease annually. Conversely, some unit level activities, such as Underwater Construction Team Training and Dive and Salvage Operations, are now formalized as discrete activities. Testing activities focus on maintaining technological edges through systems evaluation. While many testing levels remain stable, Alternative 1 includes formalized testing for Unmanned Aerial and Surface Vehicles to reflect modern technological integration.

2.4.2.2.2.1 Training

Under Alternative 1, the Action Proponents propose to conduct military readiness activities into the reasonably foreseeable future, with adjustments from the previous MITT analyses that account for changes in the types and tempo (increases or decreases) of training activities, to meet current and future readiness requirements. These training activities include new activities, as well as activities subject to previous analyses that are currently ongoing and have historically occurred in the Study Area. The requirements for the types of activities, as well as the intensity at which they need to occur, have been validated by senior leadership. Specifically, training activities are based on changing world events, advances in technology, and U.S. tactical and strategic priorities. These activities account for force structure changes and include training with new aircraft, vessels, unmanned/autonomous systems, and weapon systems that will be introduced to the Fleets after July 2027. The numbers and locations of all proposed training activities are provided in Table 2.4-1.

2.4.2.2.2.2 Testing

Alternative 1 reflects a level of testing activities to be conducted into the reasonably foreseeable future, with adjustments from the previous MITT analyses that account for changes in the types and tempo (increases or decreases) of testing activities to meet current and future military readiness requirements. Most testing activities that would be conducted under this alternative are the same as or similar as those conducted currently or in the past. This alternative includes the testing of new systems using new technologies and considers inherent uncertainties in this type of testing. The numbers and locations of all proposed testing activities are listed in Table 2.4-2.

2.4.2.2.2.3 Range Modernization and Sustainment

Alternative 1 includes the installation and maintenance of subsurface targets and instrumentation as described in Table 2.3-1. Alternative 1 includes the nominal number of activities per year (1–2) in the Study Area, with a seven-year maximum range of 7–14 activities total.

2.4.2.2.3 Alternative 2

Similar to Alternative 1, Alternative 2 encompasses both new and ongoing activities but assumes a higher annual tempo of systems evaluation to meet the highest levels of military readiness activities

2.4.2.2.3.1 Training

Alternative 2 reflects the maximum number of training activities that could occur within a given year and assumes that the maximum level of activity would occur every year over a seven-year period. Training levels shown in Table 2.4-1 generally represent the upper bounds of activity, such as 7,760 Air Combat Maneuvers annually. This allows for the greatest flexibility for the Action Proponents to maintain readiness when considering potential changes in the national security environment, fluctuations in training and deployment schedules, and anticipated in-theater demands. The numbers and locations of all proposed training activities are provided in Table 2.4-1.

2.4.2.2.3.2 Testing

Under Alternative 2, the Action Proponents would be enabled to meet the highest levels of military readiness by assuming a greater level of testing efforts each year. Alternative 2 includes a higher tempo of systems evaluation compared to Alternative 1 to account for potential near-peer challenges. For example, Undersea Warfare Testing could reach up to 21 events annually, compared to a range of 6–21 in Alternative 1. This alternative includes the contingency for augmenting some weapon systems tests in response to potential increased world conflicts and changing Navy leadership priorities as the result of a direct challenge from a naval opponent that possesses near-peer capabilities. The numbers and locations of all proposed testing activities are listed in Table 2.4-2.

2.4.2.2.3.3 Range Modernization and Sustainment

Installation and maintenance of subsurface targets and instrumentation would be the same as described in Table 2.3-1. Alternative 2 includes the maximum number of activities per year (2) in the Study Area with a seven-year total of 14 activities.

Table 2.4-1: Action Proponents' Proposed Training Activities

Activity Name	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action		Location
	Annual # of Activities	Annual # of Activities	Annual # of Activities		
	Alt 1[1]	Alt 2[2]	Alt 1	Alt 2	
Major Training Exercises – Large Integrated Anti-Submarine Warfare Training					
Joint Multi-Strike Group Exercise	1	1	1	1	MITT Study Area > 3 NM from land
Joint Expeditionary Exercise*	1	1	0	0	MIRC; MITT Study Area
Small Integrated Anti-Submarine Warfare Training					
Surface Warfare Advanced Tactical Training[3] (SWATT)	0	3	1	1	MIRC; MITT Study Area > 3 NM from land
Small Integrated Anti-Submarine Warfare Training – Navy Undersea Warfare Training Assessment Course (NUWTAC)/Multi-Sail[3]	0	3	7	7	MIRC; MITT Study Area > 3 NM from land
Medium Coordinated Anti-Submarine Warfare Training					
Medium Coordinated Anti-Submarine Warfare Training[4]	0	3	5	5	MIRC; MITT Study Area > 3 NM from land
Small Coordinated Anti-Submarine Warfare Training					
Independent Deployer Certification Exercise/Tailored Surface Warfare Training[3]	20	3	5	5	MIRC; MITT Study Area > 3 NM from land
Air Warfare					
Air Combat Maneuvers[3]	9,600	8,900	7,280–7,760	7,760	MITT Study Area > 12 NM from land; SUA
Air Defense Exercise	100	100	642–1,122	1,122	MITT Study Area > 12 NM from land; SUA
Gunnery Exercise Air-to-Air Medium Caliber	36	36	32–48	48	MITT Study Area > 12 NM from land; SUA
Gunnery Exercise Surface-to-Air Large Caliber	5	9	14	14	MITT Study Area SUA > 12 NM from land
Gunnery Exercise Surface-to-Air Medium Caliber	12	19	23	23	MITT Study Area SUA > 12 NM from land
Missile Exercise Air-to-Air	18	18	16–18	18	MITT Study Area SUA > 12 NM from land
Missile Exercise Surface-to-Air	15	27	6–8	8	MITT Study Area SUA > 12 NM from land
Amphibious Warfare					
Amphibious Assault	6	6	12–24	24	CNMI Nearshore; Guam Nearshore**
Amphibious Raid	6	6	10–20	20	CNMI Nearshore; Guam Nearshore
Amphibious Vehicle Maneuvers/Rehearsals	12	12	13–28	28	MITT Study Area; Guam Nearshore; CNMI Nearshore; Apra Harbor
Naval Surface Fire Support – Land Based Target	10	15	5	5	FDM
Non-Combat Amphibious Operation[5]	10	10	5–15	15	CNMI Nearshore; Guam Nearshore
Unmanned Aerial Vehicle – Intelligence, Surveillance, and Reconnaissance	100	100	232–432	432	MIRC; MITT Study Area; SUA

Table 2.4-1: Action Proponents' Proposed Training Activities (continued)

Activity Name	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action		Location
	Annual # of Activities	Annual # of Activities	Annual # of Activities		
	Alt 1[1]	Alt 2[2]	Alt 1	Alt 2	
Marine Air Ground Task Force Exercise (Amphibious) – Battalion*	4	4	0	0	Study Area to Nearshore; MIRC; Tinian; Guam; Rota; Saipan; FDM
Special Purpose Marine Air Ground Task Force Exercise*	2	2	0	0	Study Area to Nearshore; MIRC; Tinian; Guam; Rota; Saipan
Anti-Submarine Warfare					
Anti-Submarine Warfare Torpedo Exercise – Helicopter	4	6	1	1	MITT Study Area > 3 NM from land
Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft	4	6	1–2	2	MITT Study Area > 3 NM from land
Anti-Submarine Warfare Torpedo Exercise – Ship	3	6	6–8	8	MITT Study Area > 3 NM from land
Anti-Submarine Warfare Torpedo Exercise – Submarine	10	4	1–2	2	MITT Study Area > 3 NM from land
Anti-Submarine Warfare Tracking Exercise – Helicopter	12	10	16	16	MITT Study Area > 3 NM from land; Transit Corridor
Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	34	36	45–60	60	MITT Study Area > 3 NM from land
Anti-Submarine Warfare Tracking Exercise – Ship	132	91	90	90	MITT Study Area > 3 NM from land
Anti-Submarine Warfare Tracking Exercise – Submarine	12	4	14	14	MITT Study Area > 3 NM from land; Transit Corridor
Electronic Warfare					
Counter Targeting Chaff Exercise – Ship	40	60	10	10	MITT Study Area > 12 NM from land
Counter Targeting Chaff Exercise – Aircraft	3,200	2,200	1,720–1,730	1,730	MITT Study Area > 12 NM from land
Counter Targeting Flare Exercise	3,200	2,200	1,720–1,730	1,730	MITT Study Area > 12 NM from land
Electronic Warfare Operations	480	522	655–1,160	1,160	MITT Study Area
Expeditionary Warfare					
Dive and Salvage Operations	0	0	250	250	CNMI Nearshore; Guam Nearshore
Personnel Insertion/Extraction – Air[6]	80	58	95	95	CNMI Nearshore; Guam Nearshore
Personnel Insertion/Extraction – Surface and Subsurface[6]	80	136	208–213	213	CNMI Nearshore; Guam Nearshore
Personnel Insertion/Extraction – Swimmer/Diver[6]	80	106	52	52	CNMI Nearshore; Guam Nearshore
Underwater Construction Team Training	0	0	50	50	CNMI Nearshore; Guam Nearshore
Port Damage Repair (No Dredging/No Pile Driving)	0	0	50	50	CNMI Nearshore; Guam Nearshore

Table 2.4-1: Action Proponents' Proposed Training Activities (continued)

Activity Name	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action		Location
	Annual # of Activities	Annual # of Activities	Annual # of Activities		
	Alt 1[1]	Alt 2[2]	Alt 1	Alt 2	
Mine Warfare					
Mine Countermeasures –Mine Detection	4	4	8	8	CNMI Nearshore; Guam Nearshore
Mine Countermeasures – Towed Mine Neutralization	4	4	8	8	CNMI Nearshore; Guam Nearshore
Airborne Mine Laying	4	4	4	4	MIRC Warning Areas; MITT Study Area
Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises	1	1	1	1	CNMI Nearshore; Guam Nearshore
Limpet Mine Neutralization System	40	60	60	60	Apra Harbor; Agat Bay Mine Neutralization Site
Mine Neutralization Explosive Ordnance Disposal	20	20	20	20	Agat Bay Mine Neutralization Site; Outer Apra Harbor UNDET Site; Piti UNDET Site
Surface Ship Object Detection	0	6	20–30	30	CNMI nearshore; Guam Nearshore
Underwater Demolition Qualification and Certification	30	45	45	45	Agat Bay Mine Neutralization Site; Outer Apra Harbor UNDET Site: Piti UNDET Site
Underwater Mine Countermeasure – Raise, Tow, Beach, and Exploitation Operations	4	4	24	24	Apra Harbor
Strike Warfare					
Bombing Exercise Air-to-Ground	2,300	2,300	1,910–1,990	1,990	FDM
Gunnery Exercise Air-to-Ground	96	96	175–180	180	FDM
Missile Exercise Air-to-Ground	85	115	125–145	145	FDM
Surface Warfare					
Bombing Exercise Air-to-Surface	37	37	39	39	MITT Study Area > 50 NM from land
Fast Attack Craft and Fast Inshore Attack Craft[7]	018	27	22–33	33	MITT Study Area > 3 NM from land
Gunnery Exercise Air-to-Surface Medium Caliber	295	120	130	130	MITT Study Area SUA > 12 NM from land
Gunnery Exercise Air-to-Surface Small Caliber	242	321	349–418	418	MITT Study Area SUA > 3 NM from land
Gunnery Exercise Surface-to-Surface Boat Medium Caliber	10	20	9–24	24	MITT Study Area SUA > 12 NM from land
Gunnery Exercise Surface-to-Surface Boat Small Caliber	40	43	20–44	44	MITT Study Area SUA > 3 NM from land; Transit Corridor
Gunnery Exercise Surface-to-Surface Ship Large Caliber	140	255	180–257	257	MITT Study Area SUA > 12 NM from land; Transit Corridor

Table 2.4-1: Action Proponents' Proposed Training Activities (continued)

Activity Name	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action		Location
	Annual # of Activities	Annual # of Activities	Annual # of Activities		
	Alt 1[1]	Alt 2[2]	Alt 1	Alt 2	
Gunnery Exercise Surface-to-Surface Ship Medium Caliber[8]	50	117	104–150	150	MITT Study Area SUA > 12 NM from land
Gunnery Exercise Surface-to-Surface Ship Small Caliber[8]	50	117	173–230	230	MITT Study Area SUA > 12 NM from land
Laser Targeting – Aircraft[9]	600	600	310	310	MITT Study Area SUA
Laser Targeting – Ship[9]	600	600	1–5	5	MITT Study Area SUA
Maritime Security Operations	40	40	117–139	139	MITT Study Area > 12 NM from land; MIRC
Missile Exercise Air-to-Surface	20	10	38–50	50	MITT Study Area SUA > 12 NM from land
Missile Exercise Air-to-Surface – Rocket	3	111	35–47	47	MITT Study Area SUA > 12 NM from land
Missile Exercise Surface-to-Surface	12	28	8–9	9	MITT Study Area > 50 NM from land
Sinking Exercise	2	1	1–2	2	MITT Study Area > 50 NM from land
Small Boat Attack	18	27	6–8	8	MITT Study Area > 3 NM from land
Torpedo Exercise (Submarine-to-Surface)	5	0	1–5	5	MITT Study Area > 3 NM from land
Other Training Activities					
Direct Action (Tactical Air Control Party)	18	18	18	18	FDM
Precision Anchoring	18	18	20	20	Apra Harbor; Mariana Islands anchorages
Search and Rescue at Sea	40	45	50–52	52	MITT Study Area
Submarine Navigation	8	8	50	50	MITT Study Area; MIRC
Submarine Sonar Maintenance	48	86	92	92	MITT Study Area > 3 NM from land; Inner Apra Harbor; Transit Corridor
Surface Ship Sonar Maintenance	42	44	51	51	MITT Study Area > 3 NM from land; Inner Apra Harbor; Transit Corridor
Underwater Survey	16	32	76	76	MITT Study Area; Marianas Nearshore
Unmanned Aerial Vehicle Training and Certification	1,000	951	541–556	556	MITT Study Area; Marianas Nearshore; MIRC SUA
Unmanned Underwater Vehicle Training	0	64	65–70	70	MIRC; Marianas Nearshore, MITT Study Area
Maritime Environmental Response	0	0	1–2	2	MITT Study Area
Waterborne Training	0	0	50–75	75	MIRC; MITT Study Area; Marianas Nearshore

Table 2.4-1: Action Proponents' Proposed Training Activities (continued)

Activity Name	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action		Location
	Annual # of Activities	Annual # of Activities	Annual # of Activities		
	Alt 1[1]	Alt 2[2]	Alt 1	Alt 2	

*Activities are not analyzed in this SEIS/OEIS.
**For the purposes of this SEIS/OEIS, the nearshore environment is defined as the area extending from the mean high-water mark seaward to the 3-nautical mile (NM) limit of the territorial sea.
[1]The Department of the Navy selected Alternative 1, the Preferred Alternative, in the Record of Decision signed 28 August 2015. Activities only occur at sea and on FDM.
[2]The Department of the Navy selected Alternative 2, the Preferred Alternative, in the Record of Decision signed 29 July 2020 and only occur at sea and on FDM.
[3]Includes Air Intercept Control activities from 2020 Final SEIS/OEIS.
[4]Surface Warfare Advanced Tactical Training, Small Integrated Anti-Submarine Warfare Training, Medium Coordinated Anti-Submarine Training, and Independent Deployer Certification Exercise/Tailored Surface Warfare Training were not called out in the 2020 SEIS/OEIS, but the components of the exercises were covered under Combined Small Coordinated ASW Exercise (e.g., Multi-Sail/GUAMEX/SWATT).
[5]Includes Humanitarian Assistance Operations.
[6]Personnel Insertion/Extraction – Air, Surface and Subsurface, and Swimmer/Diver were not called out in the 2020 SEIS/OEIS, but the components of the activities were covered under Personnel Insertion/Extraction.
[7]Fast Attack Craft and Fast Inshore Attack Craft was not called out in the 2020 SEIS/OEIS, but the components of the activity were covered under Small Boat Attack.
[8]Gunnery Exercise Surface-to-Surface Ship Medium Caliber and Gunnery Exercise Surface-to-Surface Ship Small Caliber were not called out in the 2020 SEIS/OEIS, but the components of the activities were covered under Gunnery Exercise Surface-to-Surface Ship Small and Medium Caliber.
[9]Laser Targeting – Aircraft and Laser Targeting – Ship was not called out in the 2020 SEIS/OEIS, but the components of the activities were covered under Laser Targeting at Sea.
Notes: ***Bold Italicized*** = New Activity; SEIS/OEIS = Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement, MIRC = Mariana Islands Range Complex, FDM = Farallon de Medinilla, NM = nautical mile(s), SUA = Special Use Airspace, UNDET = Underwater Detonation, W = Warning Area

Table 2.4-2: Action Proponents' Proposed Testing Activities

Activity Name	2015 EIS/OEIS Annual # of Activities Alt 1[1]	2020 SEIS/OEIS Annual # of Activities Alt 2[2]	Proposed Action Annual # of Activities Alt 1	Proposed Action Annual # of Activities Alt 2	Location
Naval Air Systems Command					
Air Warfare					
Air Combat Maneuver Test[3]	See Footnote 3	See Footnote 3	7–8	8	MIRC; MITT Study Area > 12 NM from land
Intelligence, Surveillance, and Reconnaissance Test	10	20	20	20	MIRC: MITT Study Area > 3 NM from land
Anti-Submarine Warfare					
Anti-Submarine Warfare Torpedo Test (Aircraft)	40	20	10	10	MIRC; MITT Study Area > 3 NM from land
Anti-Submarine Warfare Tracking Test (Fixed-Wing)[4]	188	26	3	3	MIRC; MITT Study Area > 3 NM from land
Anti-Submarine Warfare Tracking Test (Rotary-Wing)[4]	See Footnote 4	See Footnote 4	5	5	MIRC: MITT Study Area > 3 NM from land
Surface Warfare					
Air-to-Surface Missile Test	8	4	6–7	7	MIRC; MITT Study Area > 12 NM from land
Naval Sea Systems Command					
Anti-Submarine Warfare					
Pierside Sonar Testing	0	0	6–12	12	Inner Apra Harbor
At-Sea Sonar Testing	20	7	6–12	12	MIRC; Study Area > 3 NM from land
Mine Warfare					
Mine Countermeasure and Neutralization Testing	32	3	3	3	Agat Bay Mine Neutralization; Piti Floating Mine Neutralization; Helicopter Laser Hazard Area
Unmanned Systems					
Unmanned Aerial System Testing	0	0	2–4	4	MITT Study Area
Unmanned Surface Vehicle System Testing	0	0	1	1	MITT Study Area
Vessel Evaluation					
Undersea Warfare Testing	2	1	6–21	21	MITT Study Area
In-Port Maintenance Testing	0	0	0–12	12	MITT Study Area
Submarine Sea Trials – Weapons System Testing	0	1	0–1	1	MITT Study Area
Vessel Signature Evaluation	17	0	8–12	12	MITT Study Area
Office of Naval Research					
Acoustic and Oceanographic Science and Technology					
Acoustic and Oceanographic Research	1	1	2–3	3	MITT Study Area

Table 2.4-2: Action Proponents' Proposed Testing Activities (continued)

Activity Name	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action		Location
	Annual # of Activities	Annual # of Activities	Annual # of Activities		
	Alt 1[1]	Alt 2[2]	Alt 1	Alt 2	

[1]The Department of the Navy selected Alternative 1, the Preferred Alternative, in the Record of Decision signed August 28, 2015. Activities only occur at sea and on FDM.
[2]The Department of the Navy selected Alternative 2, the Preferred Alternative, in the Record of Decision signed July 29, 2020 and only occur at sea and on FDM.
[3]Air Combat Maneuver Test was not called out in the previous MITT analyses, but the components of the testing were aligned with the training activity "Air Combat Maneuvers."
[4]Anti-Submarine Warfare Tracking Test (Fixed-Wing) was called Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft (Sonobuoys) in the previous MITT analyses. Anti-Submarine Warfare Tracking Test (Rotary-Wing) was not previously identified as an activity, but the components of the activity (e.g., sound sources and platform) were analyzed in the previous MITT analyses as part of other similar activities (e.g., Anti-Submarine Warfare Tracking Exercise – Helicopter) and are not new to the Study Area.
Notes: ***Bold Italicized*** = New Activity; SEIS/OEIS = Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement, MIRC = Mariana Islands Range Complex; MITT = Mariana Islands Training and Testing; NM = Nautical Miles

3 Affected Environment and Environmental Consequences

3.0 Introduction

Consistent with NEPA, federal agencies must analyze the potential environmental effects of their major actions. This chapter describes the existing environmental conditions in the MITT Study Area, as well as the analysis of resources potentially affected by the Proposed Action described in Chapter 2 and detailed in Appendix A. The Study Area is the same as previously analyzed in the 2020 SEIS/OEIS and is described in Section 2.1 and depicted in Figure 1.1-1.

3.0.1 Resources Carried Forward for Analysis

Resources carried forward for this analysis include physical resources (sediments and water quality, air quality); biological resources, including threatened and endangered species (marine habitats, marine mammals, sea turtles, sea birds, marine vegetation, marine invertebrates, fishes, and terrestrial species and habitats); and human resources (cultural resources, socioeconomic resources, and public health and safety). These resources each have unique stressors described in their respective sections of Chapter 3. Due to the offshore location of the Proposed Action, impacts on population demographics and children's health and safety are not anticipated and require no further analysis.

3.0.2 Regulatory Framework

The analysis for each resource is conducted within a consistent regulatory framework (see Appendix I); unless otherwise specified, no recent regulatory updates have occurred that would affect the current resource evaluations. In instances where the regulatory framework has changed since the previous environmental documentation, the specific resource section includes a detailed update to reflect those changes (Sections 3.2 and 3.11).

3.0.3 No Action Alternative

NEPA requires the analysis of a No Action Alternative to provide the baseline of which to analyze and compare Action Alternatives. As described in Section 2.4.2.2.1, none of the proposed military readiness activities would be conducted under the No Action Alternative. Therefore, baseline conditions of the existing environment for the resources described above would either remain unchanged or would improve slightly after cessation of ongoing military readiness activities. FDM would continue to be maintained as a Navy range, although military readiness activities would no longer continue on the island.

3.0.4 Effects Analysis Framework

The following section describes the framework under which effects from Alternative 1 and Alternative 2 of the Proposed Action, as described in Section 2.4.2.2.2 and Section 2.4.2.2.3, respectively, are analyzed. Pursuant to NEPA (as amended) and the DoD's implementing procedures issued on June 30, 2025, the following two-step framework (Figure 3.0-1) is applied to facilitate the analysis for this SEIS/OEIS:

1. ***Reasonably Foreseeable Effects***: First, the Action Proponent determines whether potential effects under each Action Alternative are "reasonably foreseeable." DoD NEPA Implementing Procedures define reasonably foreseeable as "sufficiently likely to occur

such that a person of ordinary prudence would take it into account in reaching a decision."

2. ***Determination of Significance***: If an effect is determined to be reasonably foreseeable, the DoD would consider the potentially affected environment and degree of the effect. In determining if the degree of effect is "significant" or "less than significant," the Action Proponent may consider, as appropriate to the specific action:
    - short-term and long-term effects
    - beneficial and adverse effects
    - effects on public health and safety
    - economic effects
    - effects on the quality of life of the American people

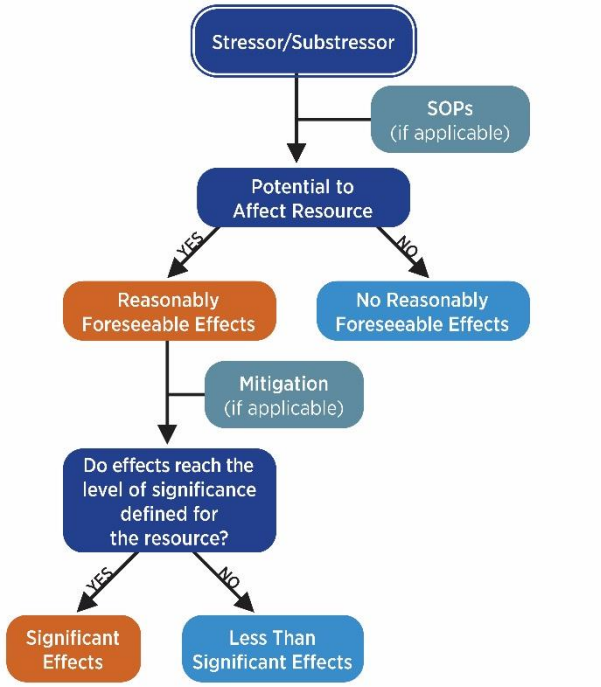

Figure 3.0-1: Analysis Approach Framework

Military readiness activities are assessed in this SEIS/OEIS by evaluating the effects of the various stressors associated with the activities. SOPs, which include existing activity-based mitigation measures established in past consultations, are considered as part of the Proposed Action when determining if effects associated with stressors are reasonably foreseeable.

In determining the degree of effect and significance for stressors that are reasonably foreseeable, the potential benefits of mitigation measures developed during SEIS/OEIS consultations are considered. The resulting significance determinations facilitate the comparison of environmental consequences among alternatives.

3.0.4.1 Identifying Stressors for Action Alternative Analysis

Military readiness activities that comprise the Proposed Action may produce one or more stimuli that cause stress on a resource. Each proposed activity was examined to determine its potential stressors. The term stressor is broadly used in this document to refer to an agent, condition, or other stimulus that potentially causes strain to an organism or alters physical, socioeconomic, or cultural resources. Not all stressors affect every resource, nor do all proposed activities produce all stressors. Refer to Appendix B to see the relationship of stressors to activities and stressors to resources. The stressors associated with the Proposed Action that are evaluated under this SEIS/OEIS are listed in Table 3.0-1. Stressors are often categorized into specific substressors to allow for a more detailed analysis of the potential effects on each resource. Additionally, some resources may be affected by secondary stressors, which are indirect effects that may result from the Proposed Action. Applicable substressors and secondary stressors are noted and analyzed within the respective resource sections.

Table 3.0-1: Stressors Carried Forward in this SEIS/OEIS

Biological Resources	Physical Resources	Human Resources
• Acoustic • Explosive • Energy • Physical Disturbance and Strike • Entanglement • Ingestion • Secondary Stressors	• Criteria air pollutants • Hazardous air pollutants • Explosives and explosive by-products • Metals • Chemicals other than explosives • Other materials	• Explosives • Physical disturbance and strike • Accessibility • Airborne acoustics • In-water energy • In-air energy • Physical interactions • Secondary Stressors (for socioeconomic resources and public health and safety)

The following subsections describe environmental stressors in more detail. Stressors for physical resources (sediments and water quality, air quality) and human resources (cultural resources, socioeconomic resources, and public health and safety) are described further in their respective sections of Chapter 3. Some, but not all, of the descriptions of the stressors identified for consideration in this SEIS/OEIS have been updated from those considered in previous MITT analyses. Only those stressors and substressors with updated descriptions from previous MITT analyses are described in the following sections of this chapter. Refer to Section 3.0.4 of the 2020 SEIS/OEIS and Section 3.0.5.2 in the 2015 EIS/OEIS for additional information on stressor descriptions.

3.0.4.1.1 Acoustic Stressors

Acoustic sources analyzed include sonar, other transducers, and noise from vessels, aircraft, and weapons. Detailed descriptions of these sources are provided in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025a).

To facilitate complex underwater sound analysis, sources are grouped into "bins" based on acoustic properties (frequency, source level, duty cycle, and beam patterns). Unlike previous phases, Phase IV bins are defined strictly by these acoustic properties rather than by the purpose of the source. Duty cycle is the percentage of time that a sonar system is emitting sound compared to the time it is off during an operational period. For example, if a sonar source produces a one-second ping once every 10 seconds, the duty cycle is 10 percent.

- **Sonar and Transducers:** Sources are categorized into six non-impulsive classes, plus broadband and hull-mounted sonar (Table 3.0-2).
- **Aircraft, Vessel, and Weapons Noise:** Characteristics have been updated where applicable. Refer to the 2020 SEIS/OEIS for legacy source levels.

Table 3.0-2: Sonar and Transducer Sources Quantitatively Analyzed

Source Class Category	Description	Unit	Training and Testing	
			Alternative 1*	Alternative 2
Broadband Sources				
LF to HF	<= 205 dB	C[1]	42–52	52
MF to HF		H	886–907	907
Low-Frequency Acoustic Sources				
LFM	185 dB to 205 dB	H	15	15

Source Class Category	Description	Unit	Training and Testing	
			Alternative 1*	Alternative 2
LFH	> 205 dB	C	243	243
Mid-Frequency Acoustic Sources Other Than Hull-Mounted				
MFM	185 dB to 205 dB	C	1,424–1,616	1,616
MFH	> 205 dB	H	536–686	686
Hull-Mounted Surface Ship Sonar				
MF1C	Hull-mounted surface ship sonar (previously MF11) with duty cycle >80%	H	256–258	258
MF1K	Hull-mounted surface ship sonar (previously MF1K) in Kingfisher mode	H	23–33	33
MF1	Hull-mounted surface ship sonar (previously MF1)	H	1,386–1,392	1,392
High-Frequency Acoustic Sources				
HFM	185 dB to 205 dB	H	208–235	235
HFH	> 205 dB	C	58–93	93
		H	1,518–1,628	1,628
Very High-Frequency Acoustic Sources				
VHFH	> 205 dB	H	130–140	140

*Preferred Alternative

[1] – Count = number of occurrences.

Notes: dB = decibel(s), H = hours; C = count; LF = low frequency; MF = mid frequency; HF = high frequency; VHF = very high frequency; the third letter following LF, MF, HF, and VHF corresponds to: L = low power, M = medium power, H = high power; when following "MF1" C = duty cycle > 80%, K = Kingfisher mode.

As part of the previous MITT analyses and the 2015 and 2020 MMPA LOAs, NMFS authorized the Action Proponents to use non-impulsive sound sources, including sonars and other transducers (hereinafter referred to as sonars). Sonars were grouped into classes that share one or more attributes, such as frequency range or purpose of use. The classes were further sorted into sound source bins.

The Action Proponents identified the type of sonar source that resulted in the highest number of exposures to marine mammals, which was hull-mounted mid-frequency active sonar in bin MF1/MF1-C/MF1-K. Table 3.0-3 provides a comparison between the hours associated with these sonars from the previous MITT analyses, and those proposed for Alternative 1 and Alternative 2 for this SEIS/OEIS.

Table 3.0-3: Comparison of Proposed Annual Total Hull-Mounted Mid-Frequency Sonar Hour Use Compared to the Number Authorized in the 2015–2020 and 2020–2027 NEPA Planning and MMPA Permits

Number of Mid-Frequency (MF1, MF1K, and MF1C) Sonar Hours				
Source Class Category	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
MF1C	324	304	256-258	258
MF1K	0	3	23-33	33
MF1	1,872	1,818	1,386-1,392	1,392

*Preferred Alternative

3.0.4.1.2 Explosive Stressors

Explosive stressors include both in-air and in-water detonations. While in-air descriptions remain unchanged from the 2020 SEIS/OEIS, the annual quantities for in-water explosions have been updated to reflect the current Proposed Action.

- **Explosive Binning:** Explosives are divided into bins E0–E12 based on Net Explosive Weight (NEW).
- **Quantitative Updates:** Table 3.0-4 summarizes the annual in-water detonations for each alternative.

As part of the previous MITT analyses and the 2015 and 2020 MMPA LOAs, NMFS authorized the Navy to use impulsive sources (i.e., explosives). As was the case in the previous MITT analyses, for this SEIS/OEIS munitions were divided into more appropriate bins based on current and anticipated weapon inventory. Bins used to sort explosive munitions are further defined and quantified in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025a).

Under Alternative 1 of this SEIS/OEIS, the minimum number of activities results in a 15 percent reduction of explosive sources from the currently authorized amounts. At the maximum, and the same for Alternative 2, there is a 38 percent increase of explosive sources from the currently authorized amounts. Table 3.0-4 provides a comparison between the number of explosives authorized for training and testing in the previous MITT analyses and proposed in this SEIS/OEIS.

Table 3.0-4: Comparison of Proposed Annual Explosives Use (Bins E1–E12) Compared to the Number Authorized in the 2015–2020 and 2020–2027 NEPA Planning and MMPA Permits

Bin	Net Explosive Weight (lb.)	Example Explosive Source	Number of Explosives			
			2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
					Alternative 1*	Alternative 2
E1	0.1–0.25	Medium-caliber projectiles	10,140	768	635–1,080	1,080
E2	> 0.25–0.5	Grenade	106	400	200	200
E3	> 0.5–2.5	57 mm projectiles; 2.75" rockets	932	683	870–1,896	1,896
E4	> 2.5–5	Mine Neutralization Charge	420	44	41	41
E5	> 5–10	5-inch projectiles	684	1,221	974–1,314	1,314
E6	> 10–20	Hellfire missile	76	29	86–116	116
E7	> 20–60	Air-to-Surface Missile	0	0	4–16	16
E8	> 60–100	250 lb. bomb; Lightweight torpedo	16	134	1–2	2
E9	> 100–250	500 lb. bomb	4	110	135–143	143
E10	> 250–500	1,000 lb. bomb	12	78	44	44
E11	> 500–650	Heavyweight torpedo	6	5	2–4	4
E12	> 650–1,000	2,000 lb. bomb	184	48	33–34	34

Notes: lb. = pound(s), mm = millimeter(s)
* Preferred Alternative

3.0.4.1.2.1 Explosive Utilization at Farallon de Medinilla

As the only U.S.-controlled, unrestricted live-fire range in the Western Pacific west of the international date line, FDM remains critical for maintaining high-level operational readiness in the Indo-Pacific theater. The island's unique and isolated geography provides a specialized environment that cannot be replicated elsewhere for complex training. To ensure the long-term sustainability of the island's unique ecosystem, the military is modernizing its training by integrating advanced precision technologies and digital simulations. This allows forces to achieve mission-essential proficiency with a strategic reduction in the annual use of explosives, favoring highly accurate training over high-volume ordnance delivery. As such, FDM is indispensable for validating the next generation of precision strike capabilities vital to national defense. In this SEIS/OEIS the Action Proponents are evaluating the potential effects associated with explosive utilization on FDM. Alternative 1 (Preferred Alternative) shows a roughly 35 percent reduction in explosive use on FDM from the previous MITT analyses. Alternative 2 also shows a 34 percent reduction of explosives utilized on FDM from the previous MITT analyses. Table 3.0-5 provides a comparison between the number of explosives authorized for training and testing in the 2015 EIS/OEIS, the 2020 SEIS/OEIS, and proposed in this SEIS/OEIS.

Table 3.0-5: Comparison of Proposed Annual Explosives Utilization on FDM

Bin	Net Explosive Weight (lb.)	Explosive Source	Number of Explosives			
			2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
					Alternative 1*	Alternative 2
E1	0.1–0.25	Medium-caliber projectiles	17,350	19,500	14,070	14,170
E2	> 0.25–0.5	Grenade/Mortar	1,000	1,000	1,000	1,000
E3	> 0.5–2.5	57mm projectiles; 2.75" rockets	600	2,000	1,240	1,260
E5	> 5–10	5-inch projectiles	1,200	4,400	459	459
E6	> 10–20	Hellfire missile	85	115	141	161
E-9–E-12	> 60–1,000	500 lb. bomb–2,000 lb. bomb	6,242	6,242	4,530	4,610

* Preferred Alternative
Note: lb. = pounds

3.0.4.1.3 Other Stressors (Energy, Physical Disturbance/Strike, and Entanglement/Ingestion)

Other stressors have been consolidated into three primary categories: Energy, Physical Disturbance/ Strike, and Entanglement/Ingestion. Detailed descriptions for these stressors remain unchanged from the 2020 SEIS/OEIS and are incorporated herein by reference. Specifically, refer to Section 3.0.4 of the 2020 SEIS/OEIS and Section 3.0.5.2 of the 2015 EIS/OEIS for further information on the nature of these stressors. For the purpose of analysis, historical and updated number of events, as well as physical parameters where applicable, are provided in Tables 3.0-6 through 3.0-19.

Table 3.0-6: Annual Number of Events in the Study Area that Include In-Water Electromagnetic Devices

Annual # of Events			
2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
		Alternative 1*	Alternative 2
5	4	8	8

*Preferred Alternative

Table 3.0-7: Events in the Study Area that Include High-Energy Lasers

Annual # of Events			
2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
		Alternative 1	Alternative 2
0	60	14–28	28

*Preferred Alternative

Table 3.0-8: Representative Vessel Types, Lengths, and Speeds

Type	Example(s)	Length	Typical Operating Speed
U.S. Navy Vessels			
Aircraft Carrier	Aircraft Carrier (CVN)	>1,000 ft.	10–15 knots
Surface Combatant	Cruisers (CG), Destroyers (DDG), Frigates (FFG), Littoral Combat Ships (LCS)	300–700 ft.	10–15 knots
Amphibious Warfare Ship	Amphibious Assault Ship (LHA, LHD), Amphibious Transport Dock (LPD), Dock Landing Ship (LSD), Medium Landing Ship (LSM), Stern Landing Vessel (SLV)	200–900 ft.	10–15 knots
Combat Logistics Force Ships	Fast Combat Support Ship (T-AOE), Dry Cargo/Ammunition Ship (T-AKE), Fleet Replenishment Oilers (T-AO)	600–750 ft.	8–12 knots
Support Craft/Other	Amphibious Assault Vehicle (AAV); Combat Rubber Raiding Craft (CRRC); Landing Craft, Mechanized (LCM); Landing Craft, Utility (LCU); Submarine Tenders (AS); Yard Patrol Craft (YP); Range Support; Torpedo Retrievers	15–140 ft.	0–20 knots
Support Craft/Other – Specialized High Speed	High Speed Ferry/Catamaran; Patrol Combatants (PC); Rigid Hull Inflatable Boat (RHIB); Expeditionary Fast Transport (EPF); Landing Craft, Air Cushion (LCAC)	33–320 ft.	0–50+ knots
Submarines	Fleet Ballistic Missile Submarines (SSBN), Attack Submarines (SSN), Guided Missile Submarines (SSGN)	300–600 ft.	8–13 knots

Table 3.0-9: Representative Types, Sizes, and Speeds of In-Water Devices

Type	Example(s)	Length	Typical Operating Speed
Towed Device	Minehunting Sonar Systems; Improved Surface Tow Target; Towed Sonar System; MK-103, MK-104 and MK-105 Minesweeping Systems	< 33 ft.	10–40 knots
Medium USV	Long Range USV, Common USV, MK-33 Seaborne Power Target Drone Boat, QST-35A Seaborne Powered Target, Ship Deployable Seaborne Target, Small Waterplane Area Twin Hull, Unmanned Influence Sweep System	< 190 ft.	Variable, up to 50+ knots
Large USV	Research and Development Surface Vessels, Patrol Boats, Ranger, USV, Nomad USV, Mariner, Vanguard USV	200–300 ft.	Typical 1–15 knots, sprint 25–50 knots
Unmanned Underwater Vehicle (UUV)	Acoustic Mine Targeting System, Airborne Mine Neutralization System, Archerfish Common Neutralizer, Crawlers, CURV 21, Deep Drone 8000, Deep Submergence Rescue Vehicle, Gliders, Expendable Mobile Anti-Submarine Warfare Training Targets, Magnum Remotely Operated Vehicle, Manned Portables, MK 30 Anti-Submarine Warfare Targets, Remote Multi-Mission Vehicle, Remote Minehunting System, Large Displacement UUV, Extra-Large UUV	< 100 ft.	1–15 knots
Torpedoes	Light-weight and Heavy-weight Torpedoes	< 33 ft.	20–30 knots

Note: ft. = feet, USV = Unmanned Surface Vehicle, UUV = Unmanned Underwater Vehicle

Table 3.0-10: Annual Number of Events that Include Vessels and In-Water Devices

Activity Area	Annual # of Events			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Vessels	6,173	6,890	2,936–3,837	3,825–3,837
In-Water Devices			1,581–1,787	1,775–1,787

*Preferred Alternative

Table 3.0-11: Annual Number of Events in the Study Area that Include Aircraft Movement

Annual # of Events			
2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
		Alternative 1	Alternative 2
22,397	20,094	13,008—14,987	14,987

*Preferred Alternative

Table 3.0-12: Annual Number of Non-Explosive Practice Munitions Expended At Sea in the Study Area

Non-Explosive Ordnance	Military Readiness Activities			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Bombs	848	152	154	1,078
Flechettes	Note 1	89	304–608	608
Large-Caliber Projectiles	6,918	22,268	4,164–6,354	6,354
Large-Caliber Projectile Casings	Note 1	4,200	272–444	444
Medium-Caliber Projectile	87,540	280,750	135,936–200,938	200,938
Medium-Caliber Projectile Casings	Note 1	Note 2	5,425–8,056	8,056
Missile	20	0	16–18	18
Rocket	0	1,697	304–608	608
Small-Caliber Projectile	88,140	354,318	1,885,794–2,400,496	2,400,496
Small-Caliber Projectile Casings	Note 1	348,306	387,959–491,300	491,300

*Preferred Alternative
Note 1: These items were not calculated in the 2015 EIS/OEIS.
Note 2: These items were not calculated in the 2020 SEIS/OEIS.

Table 3.0-13: Annual Number of Other Military Expended Materials Used At Sea in the Study Area

Other Military Expended Materials	Military Readiness Activities			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Acoustic Countermeasures	294	466	42–52	52
Anchor - Other	Note 1	28	0–441	441
Anchor (Mine)	Note 1	599	291-315	315
Chaff – Air Cartridge	Note 1	17,600	15,280–15,520	15,520
Chaff – Air Fibers	Note 1	Note 2	15,280–15,520	15,520
Chaff – Ship Fibers	Note 1	Note 2	60	60
Chaff- Ship Cartridge	314	360	60	60
Compression Pad or Plastic Pistons	Note 1	17,600	15,280–15,520	15,520

Other Military Expended Materials	Military Readiness Activities			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Decelerator/Parachute (Extra-Large)	Note 1	Note 2	22–32	32
Decelerator/Parachute (Large)	Note 1	10	3–5	5
Decelerator/Parachute (Medium)	Note 1	18	16–18	18
Decelerator/Parachute (Small)	Note 1	5,934	6,248–7,138	7,138
Endcap – Chaff and Flares	Note 1	35,218	30,576–31,058	31,058
Expended Bathythermograph	520	364	542–545	545
Fiber Optic Cannister	28	44	45	45
Flare	Note 1	17,600	15,280–15,520	15,520
Flare O-ring	Note 1	17,618	15,296–15,538	15,538
Heavyweight Torpedo Accessories	54	73	25–57	57
JATO Bottle	20	20	22-32	32
Lander	Note 1	Note 2	12-18	18
Lightweight Torpedo Accessories	72	66	33–36	36
Sabot – Kinetic Energy Projectile	Note 1	180	28,925–30,950	30,950
Sabot – Plastic	Note 1	180	30,925–40,550	40,550
Ship Hulk	Note 1	1	1–3	3
Sonobuoys (Non-Explosive)	11,912	5,876	6,334–7,239	7,239
Surface Device – Floating (Small)	Note 1	Note 2	44–46	46
Torpedoes	Note 1	7	4–6	6

*Preferred Alternative

Note 1: These items were not calculated in the 2015 EIS/OEIS.

Note 2: These items were not calculated in the 2020 SEIS/OEIS.

Table 3.0-14: Annual Number of Explosive Munitions Expended At Sea in the Study Area

Explosive Ordnance	Military Readiness Activities			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
AMNS Neutralizer	28	44	41	41
Grenades	Note 1	400	200	200
Torpedoes	10	7	2–4	4
Bombs	212	198	180–182	182
Rockets	114	323	546–666	666
Missiles	145	249	175–241	241
Large-Caliber Projectiles	12,220	1,658	1,259–2,505	2,505
Medium-Caliber Projectiles	10,190	22,480	19,417–26,128	26,128

*Preferred Alternative

Note 1: These items were not calculated in the 2015 EIS/OEIS.

Table 3.0-15: Annual Number of Targets Expended At Sea in the Study Area

Target	Military Readiness Activities			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Air Targets – Drone	Note 1	168	6–11	11
Air Targets – Other	Note 1	1	7–9	9
Land Targets	Note 1	Note 2	274	274
Mine Targets	Note 1	599	35–40	40

Target	Military Readiness Activities			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Ship Hulk	2	1	0–1	1
Subsurface Target - Maneuvering	Note 1	265	127–140	140
Surface Target - Floating	Note 1	1,581	472–588	588

*Preferred Alternative
Note 1: These items were not calculated in the 2015 EIS/OEIS.
Note 2: These items were not calculated in the 2020 SEIS/OEIS.

Table 3.0-16: Impact Area of Proposed Military Expended Materials

Explosive Ordnance	Area of Potential Impact (acre)			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Bombs (Explosive)	0.5495	0.5132	0.1336	0.1350
Bombs (Non-Explosive)	2.1980	0.940	0.0825	0.0825
Grenades (Explosive)	Note 1	0.0019	0.0001	0.0001
Kinetic Energy Rounds	Note 1	0.0042	0.9801	1.0487
Large-Caliber Projectiles (Explosive)	1.1330	0.1537	0.0634	0.1261
Large-Caliber Projectiles (Non-Explosive)	0.6414	2.0645	0.1411	0.2153
Large-Caliber Land-Based Casings	Note 1	0.0974	0.0092	0.0150
Medium-Caliber Projectiles (Explosive)	0.0524	0.1155	0.0284	0.0382
Medium-Caliber Projectiles (Non-Explosive)	0.4500	1.4431	0.1988	0.2938
Small-Caliber Projectiles	0.2460	0.9891	1.3048	1.6609
Small-Caliber Casing	Note 1	0.2407	0.2684	0.3399
Missiles (Explosive)	0.2487	0.4271	0.3023	0.4163
Missiles (Non-Explosive)	0.0285	0.0000	0.0104	0.0117
Rockets (Explosive)	0.0042	0.0118	0.0215	0.0263
Rockets (non-explosive)	0.0000	0.0622	0.0122	0.0243
Sabot	Note 1	0.0042	0.9801	1.0487
Air Target – Flare	Note 1	0.1082	0.0009	0.0010
Air Target – Towed	Note 1	0.0.1082	0.0950	0.1171
Air Target - Drone	Note 1	0.0044	0.0208	0.0349
Mine Shape (Non-Explosive)	Note 1	0.2233	0.0358	0.0393
Subsurface Targets (Mobile)	Note 1	0.0149	0.1034	0.1133
Surface Targets – Floating (Large)	Note 1	0.4175	2.1445	3.2221
Surface Targets – Floating (Medium)	Note 1	Note 2	0.0129	0.0141
Surface Targets – Floating (Small)	Note 1	Note 2	0.0143	0.0170
Acoustic Countermeasures	0.0084	0.0133	0.0091	0.0113
Chaff – Air Cartridge	0.0013	0.0009	0.0406	0.0412
Chaff – Ship Cartridge	0.0404	0.0331	0.0055	0.0055
Flares	2.9005	1.9710	0.0974	0.0990
Mine Neutralization System Neutralizers (Explosive)	0.0021	0.0033	0.0031	0.0031
Lightweight Torpedoes (Non-Explosive)	0.0009	0.0005	0.0007	0.0008
Lightweight Torpedo Accessories	0.0033	0.0031	0.0015	0.0017
Heavyweight Torpedo (Explosive)	0.0109	0.0091	0.0031	0.0061

Explosive Ordnance	Area of Potential Impact (acre)			
	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Heavyweight Torpedo (Non-Explosive)	Note 1	Note 2	0.0018	0.0040
Heavyweight Torpedo Accessories	0.0040	0.0054	0.0012	0.0026
Anchors (Other)	Note 1	0.0080	0.0347	0.5062
Compression Pad/Pistons	Note 1	0.0035	0.0097	0.0099
Endcaps	Note 1	0.0035	0.0195	0.0198
Flare O-rings	Note 1	0.0035	0.0098	0.0099
Sonobuoys (Non-Explosive)	0.6676	0.3293	0.3542	0.4048
Expended Bathythermograph	0.0066	0.0046	0.0069	0.0069
Fiber Optic Can	0.0000	0.0000	0.0001	0.0001
JATO Bottle	0.0033	0.0033	0.0011	0.0016
Decelerator/Parachute (Extra Large)	Note 1	Note 2	5.0196	7.3275
Decelerator/Parachute (Large)	1.8030	0.9105	0.2028	0.3831
Decelerator/Parachute (Medium)	0.4206	0.2103	0.1869	0.2103
Decelerator/Parachute (Small)	2.1959	2.4634	8.1097	9.2649
Ship Hulk	29.0299	14.5150	14.5092	29.0299
TOTAL	**49.31**	**32.80**	**34.72**	**55.47**

*Preferred Alternative

Note 1: These items were not calculated in the 2015 EIS/OEIS.

Note 2: These items were not calculated in the 2020 SEIS/OEIS.

Table 3.0-17: Annual Number of Events in the Study Area that Include Seafloor Devices

2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
		Alternative 1*	Alternative 2
200	182	596–654	642–654

*Preferred Alternative

Table 3.0-18: Annual Number of Events in the Study Area that Include the Potential for Personnel Disturbance

2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
		Alternative 1*	Alternative 2
272	272	377–404	404

*Preferred Alternative

Table 3.0-19: Annual Number of Wires and Cables Expended in the Study Area

Wires and Cables	2015 EIS/OEIS	2020 SEIS/OEIS	Proposed Action	
			Alternative 1*	Alternative 2
Expended Bathythermograph Wire	Note 1	364	542–545	545
Fiber Optic Cable	144	44	45	45
Guidance Wire	60	73	25–57	57
Sonobuoy Wires	Note 1	5,876	6,319–7,224	7,224

*Preferred Alternative

Note 1: These items were not calculated in the 2015 EIS/OEIS.

3.0.5 Navy's Quantitative Analysis to Determine Effects on Sea Turtles and Marine Mammals

To establish the environmental baseline and assess potential consequences, the Navy utilized the best available science and supported internal and independent research or monitoring to fill critical data gaps. The quantitative analysis of effects on marine mammals and sea turtles was conducted using the Navy Acoustic Effects Model (NAEMO) (U.S. Department of the Navy, 2024b). This modeling process integrates species-specific density data from the Navy Marine Species Density Database with updated acoustic and explosive criteria to estimate potential impacts from training and testing activities (U.S. Department of the Navy, 2024d, 2026b).

Several notable technical refinements were implemented for the Phase IV analysis to improve NAEMO accuracy. For a comprehensive explanation of these NAEMO refinements, as well as modeling parameters, density data sources, and the analytical framework used in this study, refer to the technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase IV Training and Testing* (U.S. Department of the Navy, 2024b). These updates further ensure a comprehensive estimation of auditory injury, temporary threshold shifts, and behavioral responses. Refer to the Acoustic and Explosive Impacts Supporting Information Technical Report (U.S. Department of the Navy, 2026b) for information regarding the categories of potential effects that could result from exposure to acoustic and explosive activities.

3.0.6 Effects Not Reasonably Foreseeable Effects by Resource Area

Consistent with previous MITT analyses and based on the framework presented in Section 3.0.4, the Navy concluded that, under the Proposed Action, effects from some stressors by resource area would not be reasonably foreseeable. Table 3.0-20 summarizes these findings and considers the analysis presented in the appropriate resource sections in the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area

Stressor with No Reasonably Foreseeable Effects	Rationale
Sediments and Water Quality	
Explosives and explosive byproducts	(1) most explosives would be consumed during detonations; (2) the frequency of low-order detonations (and direct release of explosives) is low; (3) the amounts of explosives used are small relative to the distribution area; (4) residual constituents would be degraded, diluted, and dispersed to undetectable levels by physical, chemical, and biological processes; and (5) concentrations at any single location would be a small fraction compared to decades of accumulation at World War II-era disposal sites and ranges, making them negligible.
Metals	(1) metals released through corrosion would be diluted by currents or sequestered in adjacent sediment; (2) elevated concentrations of metals in sediments would be limited to the immediate area around the expended material; (3) the distribution areas for munitions and other metal components are large and typically outside state coastal waters, reducing the potential to contribute to existing impairments in nearshore areas; and (4) anchors used during range sustainment would be buried or removed, and not expected to release measurable amounts of metals.
Chemicals Other than Explosives	(1) the distribution area for expended materials is large; (2) most propellant combustion byproducts are benign, and those of concern would be diluted to below detectable levels quickly; (3) most propellants are consumed during normal operations, and the failure rate of munitions using propellants is low; (4) most torpedoes are recovered (limiting fuel exposure), and the byproducts are predominantly naturally occurring; and (5) most constituents of concern are biodegradable by marine organisms or physical and chemical processes.
Other Metals	(1) materials released via breakdown would be diluted by currents or sequestered in adjacent sediment; (2) elevated concentrations in sediments would be limited to the immediate areas around the materials; and (3) materials are distributed across a large area outside the territorial waters of Guam and CNMI.
Marine Mammals	
Energy (In-Water Electromagnetic Devices)	(1) In-water devices designed to produce an electromagnetic field are towed behind a vessel or unmanned mine countermeasure systems in a controlled, closely monitored event; (2) the events are brief (lasting a few hours); (3) events would occur in areas designated for mine countermeasures and mine neutralization activities (e.g., where mine shapes are moored), limiting potential encounters with marine mammals to those areas; (4) the electromagnetic field would have no greater effect than an electromagnetic field from a passing ship, a common occurrence in the marine environment; and (5) there is no evidence to suggest the magnetic field from a passing vessel would adversely affect marine mammals.
Energy (High Energy Lasers)	(1) marine mammals could be exposed to energy from a high-energy laser only if the laser beam misses the target; however, high-energy lasers automatically cease transmitting laser light if target lock is lost, eliminating any potential for a marine mammal to be affected by the laser; (2) precision targeting high-energy lasers are fired over relatively short ranges, allowing for observation of the target; (3) marine mammals spend up to 90 percent of their time underwater limiting opportunities for exposure; (4) marine mammals do not remain stationary and may avoid activities at the target area prior to and during activity; and (5) the small diameter of the laser beam limits the size of the area exposed to the energy.

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
Physical Disturbance and Strike (Seafloor Devices)	(1) the likelihood of any marine mammal species encountering a seafloor device is considered low even for species that interact with benthic habitat, including humpback whales, sperm whales, and beaked whales, because these devices are either stationary or move very slowly along the bottom; (2) devices deployed offshore in deep waters (over hundreds to thousands of meters) would be inaccessible to nearly all marine mammals and extremely unlikely to be encountered by deep-diving species, which rarely interact with the seafloor; (3) in the unlikely event that a marine mammal is in the vicinity of a seafloor device, the stationary or very slowly moving devices would not be expected to physically disturb or alter natural behaviors of marine mammals; (4) the likelihood of a marine mammal encountering or being struck when targets, instruments, or anchors are deployed or retrieved during range modernization and sustainment activities, is low since anchors (e.g., large concrete blocks) that remain on the seafloor would not move due to their size and weight; and (5) most marine mammal species in the Study Area do not regularly interact with the benthic environment and are unlikely to encounter anchors or other instrumentation remaining on the seafloor.
Entanglement (Cables and Wires)	(1) the chance that an individual marine mammal would encounter expended wires or cables is low, because wires and cables sink directly to the seafloor upon release and would not remain suspended in the water column; (2) even if encountered, the physical properties of guidance wires and some cables (low breaking strength, sinking rates, and resistance to coiling or looping) make entanglement unlikely; (3) relatively few marine mammal species forage on the seafloor, particularly in deep offshore waters where wires and cables would be expended; and (4) expended wires and cables would be sparsely distributed on the seafloor throughout the Study Area and become fully or partially buried if residing in soft sediments.
Entanglement (Decelerators/Parachutes)	(1) most decelerators/parachutes are small, and their distribution in the Study Area would be sparse; (2) a decelerator/parachute would have to land directly on an animal, or an animal would have to swim into a floating decelerator/parachute to become entangled within the cords or fabric while the decelerator/parachute is floating at the surface or sinking through the water column; and (3) most small and medium decelerators/parachutes would be expended in deep ocean areas and sink to the bottom relatively quickly, reducing the likelihood of encounter by marine mammals that occur predominantly in nearshore waters. The main potential for entanglement is with large and extra-large decelerators/parachutes. While these larger parachutes would eventually sink and flatten on the seafloor, these decelerators/parachutes could remain suspended in the water column before sinking or billow at the seafloor for a longer period of time before flattening. The longer parachute lines pose an entanglement risk as well. Nevertheless, larger decelerators/parachutes would ultimately sink and become inaccessible to marine mammals, and the likelihood of encounter at the surface and in the water column is low. Also, decelerators/parachutes on unconsolidated soft sediments (e.g., sand or silt) are likely to become partially or completely buried over time, further reducing the likelihood that a marine mammal would encounter a decelerator/parachute.
Ingestion	(1) most munitions are composed mainly of solid metal materials and would quickly and directly sink through the water column and settle on the seafloor, becoming inaccessible to most if not all marine mammals, depending on water depth; (2) fragments from detonated munitions vary in size and quantity depending on the type and size of the munition; while the specific sizes are unknown, some fragments would likely be too large to ingest and others would be so small as to be

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
	undetectable; (3) solid metal fragments from explosive munitions would sink quickly to the seafloor, making them unavailable to most marine mammals; (4) munitions and fragments residing on the seafloor in unconsolidated soft sediments (e.g., sand or silt) would ultimately become partially or complete buried over time; and (5) most explosive munitions and many non-explosive munitions are expended at least 12 NM and some more than 50 NM from shore where waters throughout the Study Area are deeper than the foraging depths of benthic foragers, and under these circumstances there would be no potential for ingestion; (6) most other military expended material (MEM) (e.g., chaff, plastic flare caps) that remain floating on the surface or in the water column are too small to pose a risk of intestinal blockage to any marine mammal that happened to encounter and then ingest it. The adverse effects of ingesting MEM would be limited to cases where an individual marine mammal might consume an indigestible item too large to be passed through the gut (e.g., a small decelerator/parachute). This is unlikely to occur for the following reasons: (1) with the possible exception of decelerators/parachutes that may appear similar to the prey of some species such as sperm whales and beaked whales, marine mammals would not be preferentially attracted to floating MEM as potential prey; (2) most small and medium decelerators/parachutes would be expended in deep ocean areas and sink to the bottom relatively quickly, reducing the likelihood of encounter by marine mammals; and (3) MEM would most likely only be incidentally ingested by individuals foraging on the bottom where these items were released, and most MEM are expended in deep offshore waters more than 3 NM and often more than 12 NM from shore, where the seafloor is inaccessible to most marine mammals, in particular benthic foraging species.
Secondary	Potential indirect adverse effects on marine mammals would be through effects on their habitat or prey and could result from the following stressors: (1) explosives, (2) explosives byproducts and unexploded munitions, (3) metals, and (4) chemicals. Adverse effects on abiotic habitat, specifically sediments and water, are analyzed in Section 3.1. Indirect effects from explosive materials, byproducts, and unexploded munitions on marine mammals from chemical constituents in sediments are possible only if a marine mammal were to ingest a substantial amount of sediment. Section 3.4.2.1.4 explains why ingestion of MEM, which would include chemicals, in sediments is unlikely. Similarly, as discussed in Section 3.1, water quality within the water column or near the seafloor where MEM settles is not expected to be reduced due to the limited release of chemicals into the marine environment during training and testing activities and as MEM corrode and the low concentrations of potentially toxic substances, which are expected to rapidly dilute at sea. Marine mammals as a group feed on a wide variety of prey ranging from small crustaceans, the primary prey for baleen whales, to other marine mammals (e.g., some killer whales prey on seals and even large whales). U.S. Department of the Navy (2025b) describes foraging habitats and behaviors for marine mammals in the Study Area. For an adverse effect on prey to result in an indirect adverse effect on a marine mammal species, the population or a regional subpopulation of the prey (e.g., a fishery) would need to be significantly adversely affected. The analysis presented in Section 3.8 on marine invertebrates and Section 3.9 on fishes concluded that there would be less than significant to no direct adverse effects on those species. Therefore, there would be no reasonably foreseeable effects from secondary stressors on marine mammals.

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
Sea Turtles	
Energy	(1) In-water devices designed to produce an electromagnetic field are towed behind a vessel or unmanned mine countermeasure systems in a controlled, closely-monitored event; (2) the events are brief (lasting a few hours); (3) events would occur in areas designated for mine countermeasures and mine neutralization activities (e.g., where mine shapes are moored), limiting potential encounters with sea turtles to those areas; (4) the electromagnetic field would have no greater effect than an electromagnetic field from a passing ship, a common occurrence in the marine environment; (5) there is no evidence to suggest the magnetic field from a passing vessel would adversely affect sea turtles; (6) sea turtles could be exposed to energy from a high-energy laser only if the laser beam misses the target; however, high-energy lasers automatically cease transmitting laser light if target lock is lost, thus eliminating any potential for a marine mammal to be affected by the laser; (7) precision targeting high-energy lasers are fired over relatively short ranges, allowing for observation of the target; (8) sea turtles spend up to 90 percent of their time underwater, limiting opportunities for exposure; (9) sea turtles do not remain stationary and may avoid activities at the target area prior to and during activity; and (10) the small diameter of the laser beam limits the size of the area exposed to the energy.
Physical Disturbance and Strike (Seafloor Devices)	(1) the likelihood of any sea turtle species encountering a seafloor device is considered low, even for species that interact with benthic habitat, because most of these devices will be deployed in depths that exceed benthic foraging activities; (2) devices deployed offshore in deep waters (over hundreds to thousands of meters) would be inaccessible to nearly all sea turtles and extremely unlikely to be encountered by deep-diving species, which do not interact with the seafloor; (3) in the unlikely event that a sea turtle is in the vicinity of a seafloor device, the stationary or very slowly moving devices would not be expected to physically disturb or alter natural behaviors of sea turtles; (4) the likelihood of a sea turtle being struck with or encountering a target, instrument, or anchor during deployment or retrieval is low because devices are lowered or dropped from slow-moving vessels; (5) mooring anchors (e.g., large concrete blocks) are typically left in place on the seafloor when devices are retrieved and would not move due to their size and weight; and (6) mitigation measures would be implemented where applicable.
Entanglement (Cables and Wires)	(1) the chance that an individual sea turtle would encounter expended wires or cables is low, because wires and cables sink directly to the seafloor upon release and would not remain suspended in the water column; (2) even if encountered, the physical properties of guidance wires and some cables (low breaking strength, sinking rates, and resistance to coiling or looping) make entanglement unlikely; (3) relatively few sea turtle species forage on the seafloor, particularly in deep offshore waters where wires and cables would be expended; (4) expended wires and cables would be sparsely distributed on the seafloor throughout the Study Area and become fully or partially buried if residing in soft sediments; (5) mitigation would be implemented where applicable.
Entanglement (Decelerators/Parachutes)	(1) most decelerators/parachutes are small, and their distribution in the Study Area would be sparse; (2) a decelerator/parachute would have to land directly on a sea turtle, or a sea turtle would have to swim into a floating decelerator/parachute to become entangled within the cords or fabric while the decelerator/parachute is floating at the surface or sinking through the water column; (3) most small and medium decelerators/parachutes would be expended in

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
	deep ocean areas and sink to the bottom relatively quickly, reducing the likelihood of encounter by sea turtles that occur predominantly in nearshore coastal waters; (4) the likelihood of sea turtles encountering larger parachutes and their associated lines is low, and the parachutes would ultimately sink and become inaccessible to sea turtles; (5) decelerators/parachutes on unconsolidated soft sediments (e.g., sand or silt) are likely to become partially or completely buried over time, further reducing the likelihood that a sea turtle would encounter a decelerator/parachute; (6) mitigation would be implemented where applicable.
Ingestion	(1) most munitions are composed mainly of solid metal materials and would quickly and directly sink through the water column and settle on the seafloor, becoming inaccessible to most if not all sea turtles, depending on water depth; (2) fragments from detonated munitions vary in size and quantity depending on the type and size of the munition; while the specific sizes are unknown, some fragments would likely be too large to ingest and others would be so small as to be undetectable; (3) most explosive munitions and many non-explosive munitions are expended at least 12 NM and some more than 50 NM from shore, where waters throughout the Study Area are deeper than the foraging depths of benthic foraging for sea turtles, and under these circumstances there would be no potential for ingestion; (4) most other MEM (e.g., chaff, plastic flare caps) that remain floating on the surface or in the water column are too small to pose a risk of intestinal blockage to any sea turtle that happened to encounter it and then ingested the item; (5) with the possible exception of decelerators/parachutes that may appear similar to the prey of some species such as leatherback sea turtles (feeding on soft-bodied jellyfish), sea turtles would not be preferentially attracted to larger floating MEM as potential prey; (6) most small and medium decelerators/parachutes that would be too large to pass if ingested would be expended in deep ocean areas and sink to the bottom relatively quickly, reducing the likelihood of encounter by sea turtles; and (7) mitigation measures would be implemented where applicable.
Secondary	Potential indirect adverse effects on marine sea turtles would be through effects on their habitat (used for sheltering, feeding, or breeding) or prey. Stressors from military readiness activities that could pose indirect effects on sea turtles via habitat or prey include (1) explosives, (2) explosives byproducts and unexploded munitions, (3) metals, (4) chemicals, and (5) transmission of disease and parasites. Effects on abiotic habitat, specifically sediments and water, are analyzed in Section 3.1. Indirect effects from explosive materials, byproducts, and unexploded munitions on sea turtles from chemical constituents in sediments are possible only if a sea turtle were to ingest the substantial amount of sediment. *Supplemental Biological Information Technical Report for the Mariana Islands Training & Testing Study Area* describes foraging habitats and behaviors for marine sea turtles in the Study Area (U.S. Department of the Navy, 2025b). For an adverse effect on prey to result in an indirect adverse effect on a sea turtle species, the population or a regional subpopulation of the prey would need to be significantly adversely affected. The analysis presented in Section 3.8 on invertebrates and Section 3.9 on fishes concluded that there would be less than significant to no direct adverse effects on those species. Therefore, there would be no reasonably foreseeable effects from secondary stressors on sea turtles.

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
Seabirds	
Acoustic (Sonar and Other Transducers)	(1) Sonar and other transducers would not be regularly used in nearshore areas that could be utilized by foraging shorebirds, except during pierside maintenance activities or navigation in areas around ports; (2) a diving bird would have to be in close proximity to an emitting source to have an adverse effect; (3) if a bird was exposed to sound generated by sonar and other transducers, it would likely be sufficiently low (because of the distance from the sound source) so as to not alter normal feeding activities; and (4) the duration of exposure would likely be sufficiently brief as to have no discernable effect on normal activities.
Acoustic (Vessel Noise)	(1) few exposures would occur based on the infrequency of operations and the low density of vessels within the Study Area at any given time; (2) short-term behavioral or physiological responses elicited from vessel noise would not be likely to disrupt major behavior patterns, such as migration, reproduction migration, reproduction, feeding, and sheltering, or result in serious injury to any seabirds; (3) concentrated food sources (catch and bycatch) that attract seabirds to commercial fishing vessels are not present around Navy vessels; (4) vessels are not expected to result in major acoustic disturbance of seabirds in the Study Area; (5) seabird masking in response to continuous noise from Navy vessels is expected to be temporary due to the transient nature of Navy vessels; and (6) noises from Navy vessels are similar to or less than those generated by the general maritime environment.
Energy	(1) seabirds could be exposed to energy from a high-energy laser only if the laser beam misses the target; however, high-energy lasers automatically cease transmitting laser light if target lock is lost, eliminating any potential for a seabird to be affected by the laser; (2) precision targeting high-energy lasers are fired over relatively short ranges, allowing for observation of the target; (3) seabirds do not remain stationary and may avoid activities at the target area prior to and during activity; (4) the small diameter of the laser beam limits the size of the area exposed to the energy; and (5) mitigation measures would be implemented where applicable
Physical Disturbance and Strike	(1) The likelihood of an MEM strike on a seabird is extremely low; (2) seabirds and military readiness activities are widely dispersed throughout the Study Area, (3) munitions are precisely targeted, (4) once in the water column, MEM descend rapidly through the water column decreasing the probability of strike, and (5) mitigation measures would be implemented where applicable.
Entanglement	(1) the encounter rate for wires and cables is low; (2) the types of seabirds that are susceptible to these items is limited; (3) there is restricted overlap with susceptible seabirds; (4) the physical characteristics of the wires and cables and lack of associated bait reduce entanglement risk to seabirds compared to monofilament used for fishing gear; (5) seabirds would be unlikely to encounter and become entangled in any decelerators/parachutes or sonobuoy accessories due to the size of the range complexes, and the resulting widely scattered decelerators/ parachutes;(6) activities are not expected to result in substantial changes to an individual's behavior, fitness, or species recruitment; (7) population-level effects are not anticipated; and (8) mitigation measures described in Chapter 4 would be implemented.

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
Ingestion	(1) the likelihood of ingestion is low, based on the dispersed nature of the materials and the limited exposure of those items at the surface or water column within the dive depth range of diving seabirds; and (2) In addition, mitigation measures described in Chapter 4 would be implemented that limit the locations where MEM are released; (3) the number of seabirds potentially affected by ingestion of MEM would be assumed to be low, and population-level effects would not be expected.
Secondary	Secondary or indirect effects on seabirds via habitat (e.g., sediment, and water quality) and prey availability could come from (1) explosives and explosion byproducts; (2) metals; (3) chemicals; and (4) other materials such as targets, chaff, and plastics. Mitigation would be implemented to avoid potential effects from explosives and physical disturbance and strike stressors in mitigation areas throughout the Study Area (Chapter 4). This mitigation, although not specifically designed for seabirds, would consequently help avoid potential effects on prey (fishes) that shelter in and feed on shallow-water coral reefs, coral beds, artificial reefs, and shipwrecks. The effect of the Proposed Action on marine habitats is described in Section 3.3. Any physical effects on habitats would be temporary and localized because military readiness activities would occur infrequently, be distributed across a vast area, and not routinely repeated in the same location. Military readiness activities would not be expected to indirectly affect seabirds through degradation of habitats used by seabirds and prey species. Effects on sediments and water quality (Section 3.1) were determined to be not reasonably foreseeable and therefore would not indirectly affect seabirds. As noted in Section 3.8 and Section 3.9, implementation of the Proposed Action would not adversely affect populations of invertebrate or fish prey resources (e.g., crustaceans, bivalves, worms, sand lance, herring) of seabirds and therefore would not indirectly affect seabirds. Any effects on bird prey resources would be temporary and localized. Therefore, there would be no reasonably foreseeable effects from secondary stressors on seabirds.
Marine Vegetation	
Secondary	The effects of explosives and MEM in terms of habitat disturbance are described in Section 3.3. The assessment of potential sediment and water quality degradation on aquatic life is covered in Section 3.1. The analysis of sediment and water quality degradation in Section 3.1 is sufficient to suggest that marine vegetation does not have elevated sensitivities to the types of pollutants generated from military readiness activities. Potential effects from secondary stressors on marine vegetation are consistent with the analysis presented in previous MITT documents and remains valid. Supporting information on secondary stressors and their potential effects on marine vegetation are provided in U.S. Department of the Navy (2026b).
Marine Invertebrates	
Acoustic	(1) marine invertebrates are likely only sensitive to water particle motion caused by nearby low-frequency sources and likely do not sense distant or mid- and high-frequency sounds; (2) only individuals within a short distance (potentially a few feet) of the most intense sound levels would experience effects on sensory structures; (3) behavioral responses would be short term and brief; and (4) acoustic stressors would not affect the survival, growth, recruitment, or reproduction of marine invertebrate

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
	populations or subpopulations; (5) acoustic stressors originating from outside the water is not applicable to marine invertebrates due to the very low transmission of sound pressure across the air/water interface.
Entanglement	(1) most pelagic invertebrates would be too small to be ensnared by MEM (wires and cables, decelerators/parachutes) sinking through the water column; (2) lines would be relatively straight during descent, and there are large openings between the cords; (3) the area exposed to the stressor is extremely small (localized) relative to most marine invertebrates' ranges, (4) the activities are dispersed such that few individuals could conceivably be exposed to more than one activity, and (5) activities involving cables, guidance wires, and decelerators/parachutes are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at individual or population levels.
Ingestion	(1) MEM are typically too large to be consumed by most marine invertebrates; and (2) most MEM, such as chaff, poses little environmental risk to marine invertebrates at concentrations that could reasonably occur from military readiness activities; (3) only a small fraction of MEM would be of ingestible size or become ingestible after degradation and would be unlikely to affect populations.
Secondary	Secondary or indirect effects on marine invertebrates via habitat (e.g., sediment, and water quality) and prey availability could come from (1) explosives and explosion byproducts; (2) metals; (3) chemicals; and (4) other materials such as targets, chaff, and plastics. Effects on sediments and water quality (Section 3.1) were determined to not be reasonably foreseeable and therefore would not indirectly affect marine invertebrates.
Fishes	
Entanglement	(1) for many pelagic species, the risk of entanglement is unlikely given their body shape and ability to avoid materials that could entangle them in the water column; (2) it would be very unlikely that fishes would encounter and become entangled in any decelerators/parachutes or sonobuoy accessories due to the size of the range complexes and the resulting widely scattered decelerators/parachutes; (3) cables and wires do not easily form loops and are relatively brittle; (4) the encounter rate for cables and wires or decelerators/parachutes would be extremely low, as few would be expended; (5) most sonobuoys are expended in offshore areas away from more densely populated coastal habitats; and (6) decelerators/ parachutes are relatively large and visible, reducing the chance that fish would accidentally become entangled; (7) military readiness activities that produce entanglement stressors are also not expected to result in substantial changes to an individual's behavior, fitness, or species recruitment, nor population-level effects are anticipated; (8) mitigation measures described in Chapter 4 would be implemented.
Secondary	Secondary or indirect effects on fishes via habitat (e.g., sediment, and water quality) and prey availability could come from (1) explosives and explosion byproducts; (2) metals; (3) chemicals; and (4) other materials such as targets, chaff, and plastics. Potential effects from secondary stressors are consistent with the analysis presented in previous MITT documents. Supporting information on secondary stressors and their potential effects on fishes are provided in U.S. Department of the Navy (2026b). The Action Proponent recently completed a literature review of reef fish bioaccumulation, sediment, and water quality impacts of military readiness activities (U.S. Department of the Navy, 2023). The objective of this review was to determine

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
	whether the available literature supports conclusions of negligible impacts from munitions constituents on human health and the environment in the 2020 SEIS/OEIS. The literature review concluded that there are no potentially unacceptable risks from military readiness activities in the MITT Study Area on sediments, water quality, ecological and human health.
Cultural Resources	
Explosive	(1) There are no identified cultural resources within the UNDET areas within the MITT Study Area; (2) the Action Proponents routinely avoid areas with known submerged obstructions and cultural resources during training and testing activities by utilizing sonar and seafloor maps; and (3) military readiness activities would be conducted in accordance with the mitigations and best management practices (Section 2.3.3 of the 2020 SEIS/OEIS) that minimize and avoid effects on cultural resources.
Socioeconomics	
Secondary	Effects on sediments and water quality, fishes, invertebrates, and marine mammals were considered to be potential secondary stressors to socioeconomic resources. Commercial and recreational fishing, and tourism could be affected if military readiness activities altered fish or invertebrate populations to such an extent that species abundance was no longer sufficient to support these activities. The analysis in Section 3.4, Section 3.8, and Section 3.9 of this SEIS/OEIS concluded that would be no population-level effects on marine species from military readiness activities, including from the use of explosives and sonar and other transducers. Data show no discernable correlation between fluctuations in fishery landings and military readiness activities that have been ongoing in the Study Area for decades. Additionally, the analysis presented in Section 3.1 shows effects to sediments and water quality is not reasonably foreseeable as toxicity studies indicate that munitions are unlikely to have an adverse effect on marine species at the population and community level.
Public Health and Safety	
In-Water Energy	(1) activities that could affect public health and safety are often held far from popular swim and dive areas, reducing the potential for exposure; (2) public notification via USCG Broadcast Notice to Mariners to alert the public of scheduled events, allowing non-participants to avoid the areas; and (2) military readiness activities would be conducted in accordance with SOPs and range guidelines to ensure that the potential for military readiness activities to affect public health and safety would be unlikely.
In-Air Energy	(1) activities that could affect public health and safety would typically be conducted at controlled locations at sea or within restricted docked testing facilities, limiting public access and potential exposure; and (2) military readiness activities would be conducted in accordance with SOPs and range guidelines to ensure that the potential for military readiness activities to affect public health and safety would be unlikely.
Physical Internation	(1) all activities with the potential for physical interaction utilize established communication channels to inform the public of upcoming events, ensuring non-participants are aware of where and when events will occur so they can avoid these areas; and (2) military readiness activities would be conducted in accordance with SOPs and range guidelines to ensure that the potential for military readiness activities to affect public health and safety would be unlikely.

Table 3.0-20: Stressors with No Reasonably Foreseeable Effects by Resource Area (continued)

Stressor with No Reasonably Foreseeable Effects	Rationale
Secondary	Public health and safety has the potential to be affected if sediment or water quality were degraded. Section 3.1 (Sediments and Water Quality) considered the effects on marine sediments and water quality of explosions and explosive byproducts, metals, chemicals other than explosives, and other materials (marine markers, flares, chaff, targets, and miscellaneous components of other materials). The analysis determined that no Guam, CNMI, or federal water quality standards or guidelines would be violated under any of the alternatives. Although a change in military readiness activities and military expended materials would occur, military readiness activities would not significantly degrade sediment or water quality or contaminate the food supply as discussed in Sections 3.1 (Sediments and Water Quality) and 3.9 (Fishes). In addition, because standards and guidelines are structured to protect human health, and no violations would occur, no secondary effects on public health and safety would result from military readiness activities. Sections 3.9 (Fishes) and 3.11 (Socioeconomic Resources) discuss the effects that the Proposed Action would have on fish and fisheries in the Study Area.

3.1 SEDIMENTS AND WATER QUALITY

3.1.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on sediments and water quality found in Section 3.1 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

3.1.1.1 Sediments

Since the 2020 SEIS/OEIS, additional information on sediments has been reviewed for the purposes of this analysis. Updated reports include the U.S. Environmental Protection Agency (USEPA) *Guam Deep Ocean Disposal Site Monitoring and Assessment Report* (U.S. Environmental Protection Agency, 2024a). The 2024 report from the USEPA, following a 2022 monitoring survey of the Guam Deep Ocean Disposal Site (G-DODS) (located approximately 11.1 nautical miles [NM] offshore of Apra Harbor at 2,680 m depth), confirmed that disposal activities had minor, localized effects but no significant adverse effects outside the site boundaries. The report noted a slight change in sediment composition at G-DODS, with silt becoming dominant over the previously dominant sand; this is likely attributable to changes in grain-size classifications between surveys. Total organic carbon and most metal concentrations (cadmium, zinc, mercury, arsenic, chromium, and lead) remained similar to the 2015 findings, while silver concentrations decreased threefold, and selenium concentrations increased sevenfold. The selenium increase was likely due to broader regional environmental changes rather than G-DODS activity, as similar increases were found in surrounding sediments. Pesticide and organotin levels remained non-detectable, but trace amounts of total dichlorodiphenyltrichloroethane (DDTs), polychlorinated aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxin and furans were detected, all remaining well below the Effects Range – Low, which indicates adverse effects are rarely observed.

Updated marine litter data from the 2023 International Coastal Cleanup Annual Report identified marine litter collected along the shores and ocean/waterways near Guam totaling 11,865 pounds (lb.) (5,382 kilograms [kg]). In the CNMI, collected marine litter totaled 6,139 lb. (2,785 kg) (Ocean Conservancy, 2023). For more information regarding marine debris and sediments, refer to the 2015 EIS/OEIS. New information on marine debris and sediments provided in this section does not indicate an appreciable change to the existing environmental conditions as described in the previous MITT analyses.

3.1.1.2 Water Quality

The 2020 Guam Integrated Report, a comprehensive assessment of the island's surface waters, identified water quality and impairment status. The report identified 11 impaired marine bays, one impaired coastal/recreational water body, and 45 coastal/recreational assessment units as impaired, as defined under Section 303(d) of the Clean Water Act, with a developed total maximum daily load. For bays, the causes of impairment were determined to be PCBs, pesticides, dioxins, nutrients, pathogen indicators, and dissolved oxygen. In coastal shorelines, the causes of impairment were identified to be pathogens (*Enterococcus* bacteria) and PCBs (Guam Environmental Protection Agency, 2020).

3.1.1.2.1 Water Quality Standards

Guam Water Quality Standards and Classifications. There is no new information on Guam water quality standards and classifications since the publication of the 2020 SEIS/OEIS.

CNMI Water Quality Standards and Classifications. The 2020 SEIS/OEIS included the most recent water quality standards for the CNMI under Chapter 65-130 Part 200 through 400 of the Northern Marianas Administrative Code. There has been no update to the CNMI Water Classifications presented in Part 200 of the Northern Marianas Administrative Code. As of May 2024, Chapter 65-130 Part 400 of the Northern Marianas Administrative Code updated CNMI water quality standards.

USEPA Water Quality Standards. Since the 2015 EIS/OEIS, the federal standards and guidelines for metals in marine waters have been updated for cadmium. The threshold values for cadmium in marine waters is 33 micrograms per liter for acute toxicity and 7.9 micrograms per liter for chronic toxicity (U.S. Environmental Protection Agency, 2024d).

Overall, there is no other new information on water quality that would change the basis of the conclusions in the previous MITT analyses.

3.1.2 Environmental Consequences

This SEIS/OEIS analyzes potential effects of the Proposed Action on sediments and water quality and considers the same stressors as previous MITT analyses, which include (1) explosives and explosive byproducts, (2) metals, (3) chemicals other than explosives, and (4) other materials.

For each stressor, implementation of SOPs are considered part of the Proposed Action when determining if an effect is reasonably foreseeable (as described in Section 3.0.4). While SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation measures (Chapter 4) were not specifically designed to address sediments and water quality, the implementation of some of these measures (which were designed for other resource areas) would help avoid or reduce potential effects on sediments and water quality.

Based on the framework presented in Section 3.0.4, the Navy concluded that, under the Proposed Action, effects from explosives and explosive byproducts, metals, chemicals other than metals, and other materials stressors on sediments and water quality would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

3.2 AIR RESOURCES

3.2.1 Regulatory Framework

Laws, regulations, and guidance that were described in the 2020 SEIS/OEIS remain applicable to this SEIS/OEIS. The current National Ambient Air Quality Standard (NAAQS) and Guam Ambient Air Quality Standards (AAQS) are presented in Table 3.2-1. Primary standards provide public health protection, including protecting the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Table 3.2-1: National and Guam Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		National	Guam	
CO	8-hour (1)	9 ppm (10 µg/m^3)	Same as Federal	None
	1-hour (1)	35 ppm (40 µg/m^3)	Same as Federal	None
Pb	Rolling 3-month average (2)	0.15 µg/m^3	None	Same as Primary
	Calendar Quarter	None	1.5 µg/m^3	Same as Primary
NO_2	Annual (3)	53 ppb (4)	Same as Federal	Same as Primary
	1-hour (5)	100 ppb	None	None
PM_{10}	24-hour (6)	150 µg/m^3	Same as Federal	Same as Primary
	Annual	None	50 µg/m^3	Same as Primary
$PM_{2.5}$	Annual (7)	9 µg/m^3	None	15 µg/m^3 (NAAQS)
	24-hour (6)	35 µg/m^3	None	Same as Primary
O_3	8-hour (8)	0.070 ppm	None	Same as Primary
	1-hour	None	0.12 ppm	Same as Primary
SO_2	1-hour (9)	75 ppb (10)	None	None
	3-hour(1)	None	None	1300 ug/m^3 (0.5 ppm) – Guam AAQS
	24-hour	None	365 µg/m^3 (0.14 ppm)	None
	Annual mean	None	80 µg/m^3 (0.03 ppm)	10 ppb (NAAQS)

Sources: (Guam Environmental Protection Agency, 2023; U.S. Environmental Protection Agency, 2024c).
Notes: Parenthetical values are approximate equivalent concentrations. ppm = parts per million; ppb = parts per billion; µg/m^3 = micrograms per cubic meter
(1) Not to be exceeded more than once per year. (2) Not to be exceeded. (3) Annual mean. (4) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb.(5) Annual 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years. (6) Not to be exceeded more than once per year on average over 3 years. (7) Annual mean, averaged over 3 years. (8) Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years. (9) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years. (10) Final rule signed June 2, 2010. The 1971 annual (0.03 ppm) and 24-hour (0.14 ppm) SO_2 standards were revoked in that same rulemaking. These standards, however, remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

3.2.1.1 General Conformity Rule

Section 176(c)(1) of the Clean Air Act (CAA), commonly known as the General Conformity Rule, was described in the 2020 SEIS/OEIS (Section 3.2.1.2) and remains unchanged for this SEIS/OEIS.

3.2.1.2 Hazardous Air Pollutants

In addition to the six criteria pollutants, the USEPA currently designates 188 substances as Hazardous Air Pollutants (HAPs) under the federal CAA. HAPs were described in Section 3.2.1.1 of the 2015 EIS/OEIS.

3.2.1.3 Executive Order 12114 – Environmental Effects Abroad of Major Federal Actions

EO 12114, issued on January 4, 1979, applies to coastal waters and foreign lands beyond 12 NM of the U.S. coastline. EO 12114 was described in Section 1.6.2 of the 2020 SEIS/OEIS.

3.2.1.4 Guam Air Pollution Control Standards and Regulations

Guam's Air Pollution Control Act, Air Pollution Control Standards and Regulations were described in Section 3.2.1.4.3 of the 2015 EIS/OEIS. Title 22 of the Guam Administrative Code (Chapter 1, Article 3, section 1302) sets AAQS for Guam to protect the public health, safety, and welfare of the population. As shown in Table 3.2-1, most of the standards are the same as the NAAQS.

3.2.1.5 Commonwealth of the Northern Mariana Islands

The Proposed Action includes activities that occur on FDM, which is within the CNMI. In addition, aircraft takeoff and landing preparation activities occur on Tinian and Rota, which are also within the CNMI. CNMI's air quality regulations are codified in Title 65: Division of Environmental Quality, Chapter 65-10 of the Northern Mariana Islands Administrative Code. The requirements focus on protecting public health, welfare, and the environment by controlling emissions of air pollutants, achieving and maintaining compliance with the NAAQS, and ensuring that new or modified air-emission sources do not significantly degrade air quality.

3.2.2 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on air quality found in Section 3.2 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

Military readiness activities occur mostly offshore of the Territory of Guam and the CNMI, in distances greater than 3 NM, where NAAQS do not apply. Some elements of the Proposed Action would occur within or over territory waters. Given fluctuations in wind direction, air quality in adjacent onshore areas may be affected by releases of air pollutants from offshore Study Area sources.

3.2.2.1 Receptors

Identification of receptors, including sensitive receptors, is part of describing the existing air quality environment. Sensitive receptors are individuals in residential areas, schools, parks, hospitals, or other sites who are more susceptible to adverse effects of exposure to air pollutants. On the oceanic portions of the Study Area, crews of commercial vessels and recreational users of the Pacific Ocean could encounter the air pollutants generated by the Proposed Action. Few such individuals are expected to be present, and the duration of exposure to these pollutants is limited because the areas are cleared of nonparticipants before event commencement.

The air quality analysis also evaluates effects on potential receptors within the affected military installations, including military housing residents, daycares and schools, restaurants, and workers within the facility that are not part of the Proposed Action.

3.2.2.2 Climate of the Study Area

Climate in the MITT Study Area was discussed in detail in the 2015 EIS/OEIS. Meteorological conditions affect the dispersion and transport of air pollutants and the resulting air quality. On Guam, during the dry season, the prevailing winds (trade winds) from the east and northeast intensify and tend to transport pollutants released from the west shoreline toward the ocean. During the warmest months from March through August, the trade winds still blow steadily from the east or northeast. Winds from the south and west are associated with low wind speeds that could result in transport of coherent plumes. CNMI has a tropical marine climate with consistently warm temperatures (averaging 70–85°F or 21–29°C) year-round, high humidity, and distinct wet (July–November) and dry (December–June) seasons. Prevailing winds typically blow from the northeast from November to March and shift to easterly winds from May to October. Wind roses for Guam, Saipan, and Tinian are included in Appendix D.

3.2.2.3 Existing Conditions

3.2.2.3.1 Air Quality Status

The USEPA designated the Northern Mariana Islands to be in attainment or unclassified for all criteria pollutants (40 Code of Federal Regulations [CFR] 81.354). Because the CNMI is in attainment of the NAAQS, a state implementation plan is not required, and the General Conformity Rule does not apply. As shown in Table 3.2-1, Guam is in attainment with all NAAQS, except for areas centered on Piti and Tanguisson power plants that are in nonattainment for the 1971 sulfur dioxide (SO_2) NAAQS (U.S. Environmental Protection Agency, 2024b); and the Piti-Cabras area is in nonattainment for the 2010 SO_2 NAAQS, effective April 9, 2018 (U.S. Environmental Protection Agency, 2024b).

Guam has an approved nonattainment State Implementation Plan for the 1971 SO_2 NAAQS. On September 18, 2025, USEPA took final action on a clean data determination that the Piti-Cabras area has attained the 2010 1-hour SO_2 NAAQS. The clean data determination suspends the obligation to submit certain attainment planning requirements for the Piti-Cabras area for as long as the area continues to attain the 2010 SO_2 NAAQS or until the area is formally redesignated (U.S. Environmental Protection Agency, 2025).” Until the areas are redesignated to attainment, the annual net SO_2 emissions generated within the nonattainment area are compared to the General Conformity *de minimis* level of 100 tons per year (tpy) for SO_2 to determine if a general conformity determination is required. Although no recent ambient air quality data are available for Guam, the island is expected to have the same attainment/nonattainment status for Guam’s AAQS as for the NAAQS for the same pollutant. Similarly, no recent ambient air quality data are available for the CNMI.

Currently, there are no air monitoring stations operating on Guam, and ambient air quality data has not been collected for the island since 1991. However, a conservative indication of expected air quality conditions on Guam is to consider observations on a more populated island with similar military, industrial, and commercial activities and trade winds, Oahu, Hawaii, which operates six monitoring stations to monitor concentrations of criteria pollutants. The 2023 monitoring data show no violation of particulate matter with an aerodynamic size less than or equal to 10 microns (PM_{10}), particulate matter with an aerodynamic size less than or equal to

2.5 microns ($PM_{2.5}$), ozone (O_3), carbon monoxide (CO), or SO_2 NAAQS on Oahu (State of Hawaii Department of Health, 2023). With the exception of SO_2, it is expected that air quality on Guam would also have concentrations of criteria pollutants that are well below the applicable AAQS. Guam EPA is in the process of developing an annual emissions inventory for Guam; currently, no air emissions inventory information is available for the island. Air quality on CNMI is also expected to have concentrations of criteria pollutants that are well below the applicable AAQS.

USEPA's 2020 Air Toxics Screening Assessment (AirToxScreen) provides emissions, ambient concentrations, and exposure estimates for 181 HAPs plus diesel particulate matter (diesel PM). For HAP/air toxics with health data based on long-term exposure, the assessment estimates cancer risks, the potential for noncancer health effects, or both, including non-cancer health effects for diesel PM. The AirToxScreen assessment is not currently available for Guam. However, for reasons discussed previously, the assessment for Oahu, Hawaii, can be used as an indication of potential HAPs of concern on Guam. The 2020 AirToxScreen data for Hawaii show that the top contributors to cancer risk are formaldehyde, carbon tetrachloride, benzene, acetaldehyde, naphthalene, 1,3-butadiene, polycyclic aromatic hydrocarbon/ polycyclic organic matter, hexavalent chromium, ethylbenzene, and nickel compounds.

3.2.2.3.2 Air Emissions from Current Activities

Table 3.2-2 presents the updated estimated total emissions from current activities within the Study Area and includes all emissions generated, regardless of proximity to the coastline. The estimated emissions reflect updated emission factors and methodologies since the 2020 SEIS/OEIS was prepared. The estimated emissions also include transit emissions from shore location to range location for ship and aircraft, startup/idle/shutdown emissions to prepare for shore connect and disconnect, and emissions due to aircraft startup/idle and idle/shutdown activities.

Table 3.2-2: Annual Criteria Air Pollutant Emissions from Military Readiness Activities Occurring Within the MITT Study Area, Baseline[1]

Scenario	Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	2,793.14	355.89	1,314.01	25.20	326.89	326.89
Vessel	543.52	1,586.31	55.71	33.65	19.15	19.14
Munitions	195.56	0.08	--	--	0.81	0.58
Total Emissions from Existing Military Readiness Activities	3,532.22	1,942.28	1,369.72	58.85	346.84	346.61

[1] Table includes criteria pollutant precursors for ozone (e.g., VOC). Individual values may not add exactly to total values due to rounding.

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter ≤ 10 microns in diameter, SO_X = sulfur oxides (precursor to $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds

3.2.3 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on air quality and considers the same stressors as previous MITT analyses, which includes (1) Criteria Air pollutants, and (2) HAPs.

For each stressor, the implementation of SOPs, if applicable, is considered as part of the Proposed Action when determining if an effect is reasonably foreseeable (as described in Section 3.0.4).

Based on the framework presented in Section 3.0.4, the Navy concluded that, under the Proposed Action, effects on air quality from criteria air pollutants and HAPs stressors would be reasonably foreseeable. Effects would be considered significant if expected air quality conditions would result in an exceedance of a AAQS; and exposure to HAPs would cause significant and unacceptable health effects on populations, including sensitive receptors. The air quality analysis also evaluates the change in emissions due to changes in the types and tempo (increases or decreases) of the existing military readiness activities. The following sections detail these effects and take into account the analyses presented in Section 3.2 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.2.3.1 Effects from Air Emissions under Alternative 1

Table 3.2-3 presents the total estimated change in emissions under Alternative 1 within the Study Area and includes all emissions generated, regardless of proximity to the coastline. The upper range value was used to estimate the change in emissions for activities where the number of proposed annual operations are presented as a range. The estimated change in emissions includes transit emissions from shore location to range location for ship and aircraft, startup/idle/shutdown emissions to prepare for shore connect and disconnect, and emissions due to aircraft startup/idle and idle/shutdown activities.

Table 3.2-3: Total Annual Net Change in Criteria Air Pollutant Emissions from Military Readiness Activities Occurring Within the Entire MITT Study Area, Alternative 1[1]

Scenario	Change in Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	-71.10	181.61	-54.46	5.30	20.88	20.88
Vessel	72.36	324.73	16.95	6.01	10.95	10.92
Munitions	-52.07	-0.02	--	--	-0.17	-0.12
Range Modernization and Sustainment	0.015	0.021	0.000496	0.000192	0.0004	0.0004
Total Net Change in Emissions from Proposed Military Readiness Activities	-50.79	506.35	-37.51	11.31	31.66	31.68

[1] Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding.

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides (precursor to $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds

3.2.3.1.1 Criteria Pollutant Emissions subject to AAQS and General Conformity under Alternative 1

Emissions within 3 NM impact air quality the most for areas subject to the AAQS and where human exposure to HAPs would be the highest. Refer to the Section 3.2.3.1.2 for discussion of effects from these pollutants. Emissions that occur within 3 NM of nonattainment or maintenance areas are subject to the CAA General Conformity evaluation. Table 3.2-4 presents the estimated annual emissions change for proposed activities within 3 NM of Guam under Alternative 1 as compared to the current level of nearshore activities. The increase in emission is primarily due to the increase in nearshore Amphibious Warfare activities such as Amphibious Assault and Non-Combat Amphibious Operations. The emissions presented in this table do not all occur within the Guam nonattainment areas. Some of the emissions occur nearshore areas

that are in attainment with the NAAQS for all criterial pollutants. As such, Table 3.2-4 presents a conservative comparison of the net annual SO_x emissions increase to the General Conformity *de minimis* level for the 2010 SO_2 nonattainment area, which is 100 tpy (see footnote 2 of the table).

As shown in Table 3.2-4, even with the conservative assumption that all the emissions within 3 NM occur within nonattainment areas, the estimated annual SO_2 emission increase is well below the applicable General Conformity *de minimis* level. A General Conformity Determination is not required, and this is documented in the Record of Non-Applicability, included in Attachment A of Appendix D.

Table 3.2-4: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities Within 3 NM of Guam, Alternative 1[1]

Source	Change in Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_x[2]	PM_{10}	$PM_{2.5}$
Aircraft	-19.80	45.97	-1.78	1.31	8.01	8.01
Vessel	24.42	171.64	9.17	2.86	7.18	7.16
Munitions	--	--	--	--	--	--
Range Modernization and Sustainment	0.015	0.021	0.0005	0.0002	0.0004	0.0004
Total Change in Emissions, TPY	4.64	217.64	7.39	4.17	15.20	15.18
de minimis threshold	N/A	N/A	N/A	100	N/A	N/A
Exceeds threshold?	--	--	--	No	--	--

[1] Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. [2] Sulfur oxides (SO_x) are a broader category that includes sulfur dioxide (SO_2) and other sulfur-oxygen compounds. For the purpose of this analysis, the *de minimis threshold for* SO_2 is conservatively compared to SO_x emissions. Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides (precursor to $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds.

3.2.3.1.2 Effects from Criteria Pollutants and HAPs Under the National Environmental Policy Act Alternative 1

Table 3.2-5 presents the estimated change in criteria pollutant emissions within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. The decrease in CO, volatile organic compound emissions is primarily due to the decrease in Air Combat Maneuvers - CNMI activities, which in turn reduce aircraft takeoff and landing preparation activities on Tinian and Guam. The increase in vessel emissions is primarily due to increase in Amphibious Warfare activities.

Table 3.2-5: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities (Within 12 NM), Alternative 1[1]

Source	Change in Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	-455.80	172.66	-317.19	3.94	-22.15	-22.15
Vessel	5.73	226.41	13.99	2.64	12.42	12.40
Munitions	--	--	--	--	--	--
Range Modernization and Sustainment	0.015	0.021	0.0005	0.0002	0.0004	0.0004
Total Change in Emissions, TPY	-450.06	399.09	-303.19	6.57	-9.73	-9.75

Source	Change in Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding. Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

Table 3.2-6 presents the estimated annual change in HAP emissions within 12 NM for proposed activities under Alternative 1 as compared to the current level of activities. The HAPs listed in the table are those typically associated with aircraft and vessel activities. The decrease in HAP emissions is primarily due to the decrease in Air Combat Maneuvers - CNMI activities. HAP emissions from Range Modernization and Sustainment activities are negligible; no HAP emissions are associated with munition activities within 12 NM.

Table 3.2-6: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities (Within 12 NM), Alternative 1

Pollutant	Aircraft	Vessel	Total, tons/year	Total, lb/year
1,3 Butadiene	-5.35	--	-5.35	-10,702
2,2,4-Trimethylpentane	--	0.10	0.10	199
Acetaldehyde	-13.55	0.14	-13.41	-26,827
Acrolein	-7.77	0.03	-7.74	-15,484
Benzene	-5.33	0.07	-5.27	-10,531
Ethylbenzene	-0.55	--	-0.55	-1,104
Formaldehyde	-39.05	0.60	-38.45	-76,896
Hexane	--	0.04	0.04	78
Methanol	-5.73	--	-5.73	-11,450
Naphthalene	-1.72	0.44	-1.28	-2,556
Phenol	-2.30	--	-2.30	-4,606
Propanal	-2.31	0.02	-2.28	-4,569
Styrene	-0.98	--	-0.98	-1,960
Toluene	-2.04	0.03	-2.01	-4,016
Xylenes (Mixed Isomers)	-1.42	0.02	-1.40	-2,802
Inorganic HAPs (including Metals)	--	0.001	0.0006	1.26

The Study Area includes pierside locations on Guam in Apra Harbor and nearshore areas of Guam and the Commonwealth of the Northern Mariana Islands (CNMI);where public exposure to the increase in emissions could occur. Figure 3.2-1 presents the sensitive receptors near Apra Harbor, which include public parks, William C. McCool Elementary and Middle School, Navy Gateway Inns and Suites, and Naval Base Guam (NBG) Medical Branch Clinic on Guam. Appendix D includes figures for the sensitive receptors near the proposed activity areas on Saipan and Tinian, including beaches, public parks, and resorts.

Table 3.2-4 and Table 3.2-5 show the change in criteria pollutant emissions within 3 NM and 12 NM, respectively. Upon initial release into the atmosphere, pollutant emissions are expected to initially rise in the immediate vicinity of the activity; however, wakes developed from wind flowing past the asset body or asset in motion cause downwash of the exhaust plume.

Downwash is expected to overcome any plume rise that could have resulted from buoyancy and momentum, and increase atmospheric concentrations at ground level and sea level. Depending on the location of these activities and time of year, winds would disperse emissions from the military readiness activities away from the coastal land masses. During periods when winds would transport emissions into coastal areas, the substantial transport distance and resulting dispersion of these emissions would produce minor increases of air pollutant concentrations near onshore locations.

Figure 3.2-1 shows that HAP emissions within 12 NM would decrease for most HAP. Any increase in HAP emissions due to vessel activities is relatively small. The prevailing winds from the east and northeast would transport HAP emissions released toward the ocean. However, during certain meteorological conditions, HAP emissions could be transported toward nearby receptors. Due to the relatively low HAP emissions occurring infrequently and given the distance to downwind receptors, emissions are not expected to cause any discernable increase to human health risks from HAP exposure in areas where public presence is expected.

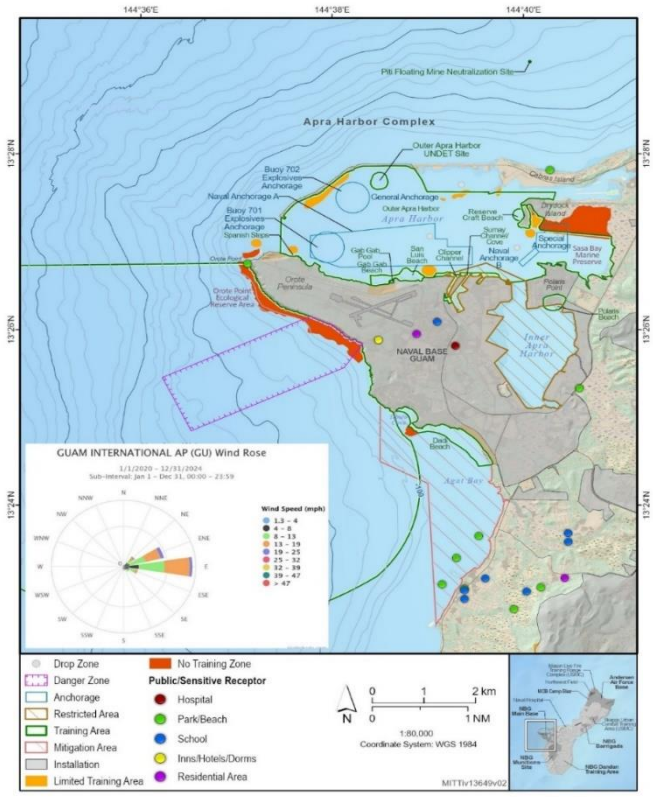

Figure 3.2-1: Sensitive Receptors Near Pierside Locations in Apra Harbor, Guam

3.2.3.1.3 Effects from Hazardous Air Pollutants Under Executive Order 12114 Alternative 1

Table 3.2-7 presents the estimated total change in annual HAP emissions beyond 12 NM under Alternative 1. Most of the HAP emissions are due to aircraft activity. The increase in formaldehyde and acetaldehyde emissions are primarily due to aircraft landing and takeoff preparation activities associated with the increase in carrier-based Air Combat Maneuvers and Air Defense Exercises. The slight decrease in inorganic HAP emissions is due to the decrease in vessel operations associated with Joint Expeditionary Exercises. Given the distance to downwind receptors, emissions are not expected to cause any discernable increase to human health risks from HAP exposure toxic effects in areas where public presence is expected.

Table 3.2-7: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities (Greater than 12 NM), Alternative 1

Pollutant	Aircraft	Vessel	Total, tons/year	Total, lb/year
1,3 Butadiene	4.43		4.43	8,864
2,2,4-Trimethylpentane		0.021	0.02	42
Acetaldehyde	11.22	0.029	11.25	22,505
Acrolein	6.43	0.005	6.44	12,879
Benzene	4.42	0.014	4.43	8,861

Pollutant	Aircraft	Vessel	Total, tons/year	Total, lb/year
Ethylbenzene	0.46		0.46	914
Formaldehyde	32.34	0.126	32.47	64,935
Hexane		0.008	0.01	16
Methanol	4.74		4.74	9,484
Naphthalene	1.42	0.093	1.51	3,028
Phenol	1.91		1.91	3,815
Propanal	1.91	0.004	1.91	3,829
Styrene	0.81		0.81	1,624
Toluene	1.69	0.006	1.69	3,385
Xylenes (Mixed Isomers)	1.18	0.004	1.18	2,362
Inorganic HAPs (including Metals)		-0.00008	0.00	-0.15

3.2.3.1.4 Summary of Effects from Criteria Pollutants and HAPs Under Alternative 1

The increase in criteria air pollutants emitted in the Study Area is not expected to result in air quality conditions that lead to exceedance of an AAQS. Exposure to increase in HAP emissions resulting from the Proposed Action would not cause significant and unacceptable health effects to populations, including sensitive receptors. Net emission increases within the SO_2 nonattainment area in the Study Area are below the applicable General Conformity Rule *de minimis* thresholds. Therefore, implementation of Alternative 1 would result in less than significant effects on air quality.

3.2.3.2 Effects from Air Emissions under Alternative 2

Table 3.2-8 presents the total estimated change in emissions under Alternative 2 within the Study Area and includes all emissions generated, regardless of proximity to the coastline. The change in emissions is nearly identical to Alternative 1 since Alternative 2 proposed activities are the same as the upper range of activities proposed under Alternative 1. The estimated change in emissions includes transit emissions from shore location to range location for ship and aircraft, startup/idle/shutdown emissions to prepare for shore connect and disconnect, and emissions due to aircraft startup/idle and idle/shutdown activities.

Table 3.2-8: Total Annual Net change in Criteria Air Pollutant Emissions from Military Readiness Activities Occurring Within the Entire MITT Study Area, Alternative 2[1]

Scenario	Change in Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	-71.10	181.61	-54.46	5.30	20.88	20.88
Vessel	72.36	324.73	16.95	6.01	10.95	10.92
Munitions	-48.76	-0.01	--	--	0.05	0.04
Range Modernization and Sustainment	0.015	0.021	0.000496	0.000192	0.0004	0.0004
Total Net Change in Emissions from Proposed Military Readiness Activities	-47.48	506.36	-37.51	11.31	31.88	31.84

[1] Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding.

Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides (precursor to $PM_{2.5}$), TPY = tons per year, VOC = volatile organic compounds

3.2.3.2.1 Criteria Pollutant Emissions subject to AAQS and General Conformity, Alternative 2

Table 3.2-9 presents the estimated annual emissions change, within 0–3 NM, for proposed activities under Alternative 2 as compared to the current level of nearshore activities. Emission changes under Alternative 2 are similar to those under Alternative 1. The discussion presented in Section 3.2.3.1.1 applies to Alternative 2.

Table 3.2-9: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities Within 3 NM of Guam , Alternative 2[1]

Source	Change in Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X[2]	PM_{10}	$PM_{2.5}$
Aircraft	-19.80	45.97	-1.78	1.31	8.01	8.01
Vessel	24.42	171.64	9.17	2.86	7.18	7.16
Munitions	--	--	--	--	--	--
Range Modernization and Sustainment	0.015	0.021	0.0005	0.0002	0.0004	0.0004
Total Change in Emissions, TPY	4.64	217.64	7.39	4.17	15.20	15.18
de minimis threshold	N/A	N/A	N/A	100	N/A	N/A
Exceeds threshold?	--	--	--	No	--	--

[1] Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. [2] Sulfur oxides (SO_x) are a broader category that includes sulfur dioxide (SO_2) and other sulfur-oxygen compounds. For the purpose of this analysis, the *de minimis threshold for* SO_2 is conservatively compared to SO_x emissions. Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter

3.2.3.2.2 Effects from Criteria Pollutants and HAPs Under the National Environmental Policy Act Alternative 2

Table 3.2-10 presents the estimated change in criteria pollutant emissions within 12 NM for proposed activities under Alternative 2 as compared to the current level of activities.

Table 3.2-10: Estimated Net Change in Annual Criteria Air Pollutant Emissions from Military Readiness Activities (Within 12 NM), Alternative 2[1]

Source	Change in Emissions by Air Pollutant (TPY)					
	CO	NO_X	VOC	SO_X[2]	PM_{10}	$PM_{2.5}$
Aircraft	-455.80	172.66	-317.19	3.94	-22.15	-22.15
Vessel	5.73	226.41	13.99	2.64	12.42	12.40
Munitions	--	--	--	--	--	--
Range Modernization and Sustainment	0.015	0.021	0.0005	0.0002	0.0004	0.0004
Total Change in Emissions, TPY	-450.06	399.09	-303.19	6.57	-9.73	-9.75

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds). Individual values may not add exactly to total values due to rounding.
Notes: CO = carbon monoxide, NO_X = nitrogen oxides, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, PM_{10} = particulate matter≤ 10 microns in diameter, SO_X = sulfur oxides, TPY = tons per year, VOC = volatile organic compounds

Table 3.2-11 presents the estimated annual change in emissions of HAPs within 12 NM for proposed activities under Alternative 2 as compared to the current level of activities. Criteria pollutants and HAP emission changes under Alternative 2 are similar to those under Alternative

1. The discussion presented in Section 3.2.3.1.2 applies to Alternative 2.

Table 3.2-11: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities (Within 12 NM), Alternative 2[1]

Pollutant	Aircraft	Vessel	Total, tons/year	Total, lb/year
1,3 Butadiene	-5.35	--	-5.35	-10,702
2,2,4-Trimethylpentane	--	0.10	0.10	199
Acetaldehyde	-13.55	0.14	-13.41	-26,827
Acrolein	-7.77	0.03	-7.74	-15,484
Benzene	-5.33	0.07	-5.27	-10,531
Ethylbenzene	-0.55	--	-0.55	-1,104
Formaldehyde	-39.05	0.60	-38.45	-76,896
Hexane	--	0.04	0.04	78
Methanol	-5.73	--	-5.73	-11,450
Naphthalene	-1.72	0.44	-1.28	-2,556
Phenol	-2.30	--	-2.30	-4,606
Propanal	-2.31	0.02	-2.28	-4,569
Styrene	-0.98	--	-0.98	-1,960
Toluene	-2.04	0.03	-2.01	-4,016
Xylenes (Mixed Isomers)	-1.42	0.02	-1.40	-2,802
Inorganic HAPs (including Metals)	--	0.001	0.0006	1.26

3.2.3.2.3 Effects from Hazardous Air Pollutants Under Executive Order 12114 Alternative 2

Table 3.2-12 presents the estimated total change in annual HAP emissions beyond 12 NM under Alternative 2. HAP emission changes under Alternative 2 are similar to those under Alternative 1. The discussion presented in Section 3.2.3.1.3 applies to Alternative 2.

Table 3.2-12: Estimated Net Change in Annual Hazardous Air Pollutants of Concern Emissions from Military Readiness Activities (Greater than 12 NM), Alternative 2

Pollutant	Aircraft	Vessel	Total, tons/year	Total, lb/year
1,3 Butadiene	4.43	--	4.43	8,864
2,2,4-Trimethylpentane	--	0.021	0.02	42
Acetaldehyde	11.22	0.029	11.25	22,505
Acrolein	6.43	0.005	6.44	12,879
Benzene	4.42	0.014	4.43	8,861
Ethylbenzene	0.46	--	0.46	914
Formaldehyde	32.34	0.126	32.47	64,935
Hexane	--	0.008	0.01	16
Methanol	4.74	--	4.74	9,484
Naphthalene	1.42	0.093	1.51	3,028
Phenol	1.91	--	1.91	3,815
Propanal	1.91	0.004	1.91	3,829
Styrene	0.81	--	0.81	1,624
Toluene	1.69	0.006	1.69	3,385
Xylenes (Mixed Isomers)	1.18	0.004	1.18	2,362
Inorganic HAPs (including Metals)	--	-0.00008	0.00	-0.15

3.2.3.2.4 Summary of Effects from Criteria Pollutants and HAPs Under Alternative 2

Effects from Criteria Pollutants and HAPs Under Alternative 2 are similar to those under Alternative 1. The discussion presented in Section 3.2.3.1.4 applies to Alternative 2.

3.2.4 Greenhouse Gas Emissions

Activities conducted as part of the Proposed Action would involve mobile sources using fossil fuel combustion as a source of power. Additionally, the expenditure of munitions could generate greenhouse gas (GHG) emissions. GHGs are naturally occurring and human-made atmospheric constituents that absorb and re-emit infrared radiation. Common GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, sulfur hexafluoride, and water vapor. GHG emissions are commonly reported in carbon dioxide equivalent (CO_2e). To convert emissions of a GHG to CO2e, the emissions are multiplied by the gas' Global Warming Potential, which is a measure of how much heat a GHG traps in the atmosphere over a specific period (usually 100 years) relative to CO_2.

The increase in GHG emissions for each alternative was calculated for all altitudes using emissions factors provided by the U.S. Navy for aircraft and vessels and published by the USEPA for munitions. GHG emissions, in CO_2e units, are summarized in Table 3.2-13, along with estimated baseline GHG emissions. These data show that Alternatives 1 and 2 would result in increases in GHG emissions within the Study Area compared to the current level of activities.

Table 3.2-13: Estimated Baseline and Increase in Annual Greenhouse Gas Emissions from Military Readiness Activities in the Study Area

Alternative	Annual Increase in CO_2e Emissions (CO_2e [in Metric Tons/Year])
Baseline	1,242,640
Alternative 1	90,941
Alternative 2	90,943

Note: CO_2e = carbon dioxide equivalent

Per the 2023 Fiscal Responsibility Act amendments to NEPA and current DoD guidance, environmental analysis is limited to "reasonably foreseeable" impacts with a close causal connection to the federal action. Given the lack of specific ambient air quality standards for GHGs and the absence of a direct causal link between project-level emissions and specific local climate outcomes, the impact of these emissions on the human environment would not be reasonably foreseeable; therefore, no further analysis is required.

3.3 MARINE HABITATS

3.3.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on marine habitats found in Section 3.3 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020). Potential effects on terrestrial habitat at FDM are addressed in Section 3.10. Other necessary habitats for living resources, including those that form biotic habitats such as aquatic plant beds and coral reefs, are discussed in other sections (e.g., Section 3.7 and Section 3.8). For the purposes of this analysis, the term "marine habitats" is synonymous with "benthic habitats" and is used interchangeably.

Overall, the new information presented below for marine habitats would not change the basis of conclusions from previous MITT analyses. Three basic abiotic substrates[2] described the affected environment: soft, hard, and mixed substrates. The term "mixed" has been updated to be inclusive of the term "rocky shores," previously used in Phase II and III. This update is also consistent with the Coastal Marine Ecological Classification Standard developed to provide a consistent classification framework for federally funded projects (Federal Geographic Data Committee, 2012). Mixed substrates are dominated by unconsolidated material larger than sand but smaller than cobbles (e.g., gravel, shell fragments), and may or may not be stable enough for habitat-forming invertebrates or attached seaweeds, depending on depth and other factors (e.g., current speeds). Overall, the classification of soft and hard bottoms is consistent with the descriptions in Sections 3.3.2.5 (Soft Bottoms) and 3.3.2.6 (Hard Bottoms) of the 2015 EIS/OEIS (U.S. Department of the Navy, 2015b).

3.3.1.1 Marine Habitats Mapping

There is no comprehensive benthic habitat mapping for the MITT Study Area. Mapping is conducted primarily in U.S. territorial waters (<12 NM from shore) where the dominant habitat is hard bottom. The Study Area does not include sea extending inland from 12 NM towards the Federated States of Micronesia and Palau, and therefore is not included in marine habitat mapping figures. No benthic habitat data is available for offshore areas of the MITT Study Area. As such, habitat distribution is disproportionately represented within the Study Area, since the majority of the mapped area is nearshore, which is dominated by hard bottom. Offshore habitat is typically dominated by soft substrates, as discussed in Section 3.3.2.5.2 (Distribution) of the 2015 EIS/OEIS; however, it is not represented by the available benthic habitat mapping data (U.S. Department of the Navy, 2015b). For the purposes of this SEIS/OEIS, unmapped offshore habitat is assumed to be soft substrates.

Nearshore benthic habitat data has been mapped across 14 islands, five of which are within the Study Area: Guam, Rota, Saipan, FDM, and Tinian (Table 3.3-1; Figures 3.3-1 and 3.3-2). Detailed benthic habitat data was available in Saipan Lagoon (Figure 3.3-1) and Apra Harbor, Guam (Figure 3.3-2). Updated benthic habitat sources from the previous MITT analyses are described below.

Andersen (2004) provided the basis of benthic habitat mapping in the 2015 EIS/OEIS for Guam and FDM. Since the development of the 2020 SEIS/OEIS, very little updated benthic habitat data have been released. However, two new data sources were identified during a literature/data review in preparation of this SEIS/OEIS, one in Saipan Lagoon and one in Guam's Apra and Haputo Harbors, and they are discussed further in this section.

The 2020 SEIS/OEIS cited Kendall et. al. (2017) benthic habitat data of Saipan Lagoon for updated benthic habitat data. Since the development of the 2020 SEIS/OEIS, this dataset has been updated in 2024 by the NOAA National Center for Environmental Information (NCEI). The updated benthic habitat of Saipan lagoon has been taken into consideration during the development of this SEIS/OEIS and is shown in Figure 3.3-1.

In 2024, NOAA NCEI mapped the benthic habitat within NBG's Apra and Haputo Harbors (Costa

[2]Although many classification schemes are available that span a range of spatial dimension and granularity (Allee et al., 2000; Cowardin et al., 1979; Federal Geographic Data Committee, 2012; Howell et al., 2010; Kendall et al., 2001; United Nations Educational Scientific and Cultural Organization, 2009; Valentine et al., 2005), for purposes of this EIS/OEIS, soft, hard, and mixed substrates are used to describe the affected environment.

et al., 2024). The updated benthic habitat of NBG Apra and Haputo Harbors was taken into consideration in this SEIS/OEIS and is shown in Figure 3.3-2.

Table 3.3-1: Area Coverage of Mapped Abiotic Substrate Types in the MITT Study Area

Island	Mapped Habitat Type			Total Mapped Area (km^2)
	Hard (km^2)	Soft (km^2)	Mixed(km^2)	
Guam	68.0	30.3	7.6	105.8
Farallon de Medinilla	4.7	1.4	0.0	6.5
Rota	12.5	8.7	4.1	25.3
Saipan	76.3	23.0	4.6	103.8
Tinian	12.5	5.5	8.3	26.2
Area Grand Total	174	68.9	24.6	207.9

Notes: km^2 = square kilometers
Totals were calculated prior to rounding and may result in minor differences compared to what is presented in the table.

3.3.1.2 Farallon de Medinilla

The Navy is committed to performing shallow water hardbottom (including coral reef, artificial reefs, and shipwrecks) habitat surveys in accordance with the NMFS 2017 and 2020 Biological Opinions (National Marine Fisheries Service, 2017, 2020b), which includes terms and conditions for conducting in-water surveys at FDM. Coral reef surveys have historically been conducted around FDM. Since 2017, the Navy began FDM coral reef surveys, which are revisited every five years to monitor the status and health of these reefs (Marx et al., 2023). In 2022, FDM coral reef surveys identified two fresh (identified by lack of colonization of marine biological growth) ordnance items, with the majority of ordnance identified being old (defined as supporting marine life/colonized). The 2024 Technical Report for the FDM 2022 Coral Reef Survey concluded that the conditions of marine habitats had not changed from what was assessed in 2017; except for the two new ordnance items, the report indicated coral growth on most ordnance observed. The surveys concluded that training activities at FDM do not affect marine habitats (Marx et al., 2023). Refer to Section 3.8 for further discussion regarding corals.

3.3.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on marine habitats and is focused on the same stressors as previous MITT analyses, which includes (1) explosive (in-water explosions), and (2) physical disturbance and strike (vessels and in-water devices, MEM, and seafloor devices).

For each stressor, implementation of SOPs is considered part of the Proposed Action when determining if an effect is reasonably foreseeable (as described in Section 3.0.4). While SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation measures (Chapter 4) were not specifically designed to address marine habitats, the implementation of some of these measures (which were designed for other resource areas) would help avoid or reduce potential effects on marine habitats.

Based on the framework presented in Section 3.0.4, the Navy concluded that, under the Proposed Action, effects on marine habitats from explosives and physical disturbance and strike stressors would be reasonably foreseeable; effects would be considered significant if marine habitats are degraded over the long term or permanently, such that they would no longer possess sustainable habitat requirements. The following sections analyze the effects of the Proposed Action on marine habitats and take into account the analysis presented in Section 3.3 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

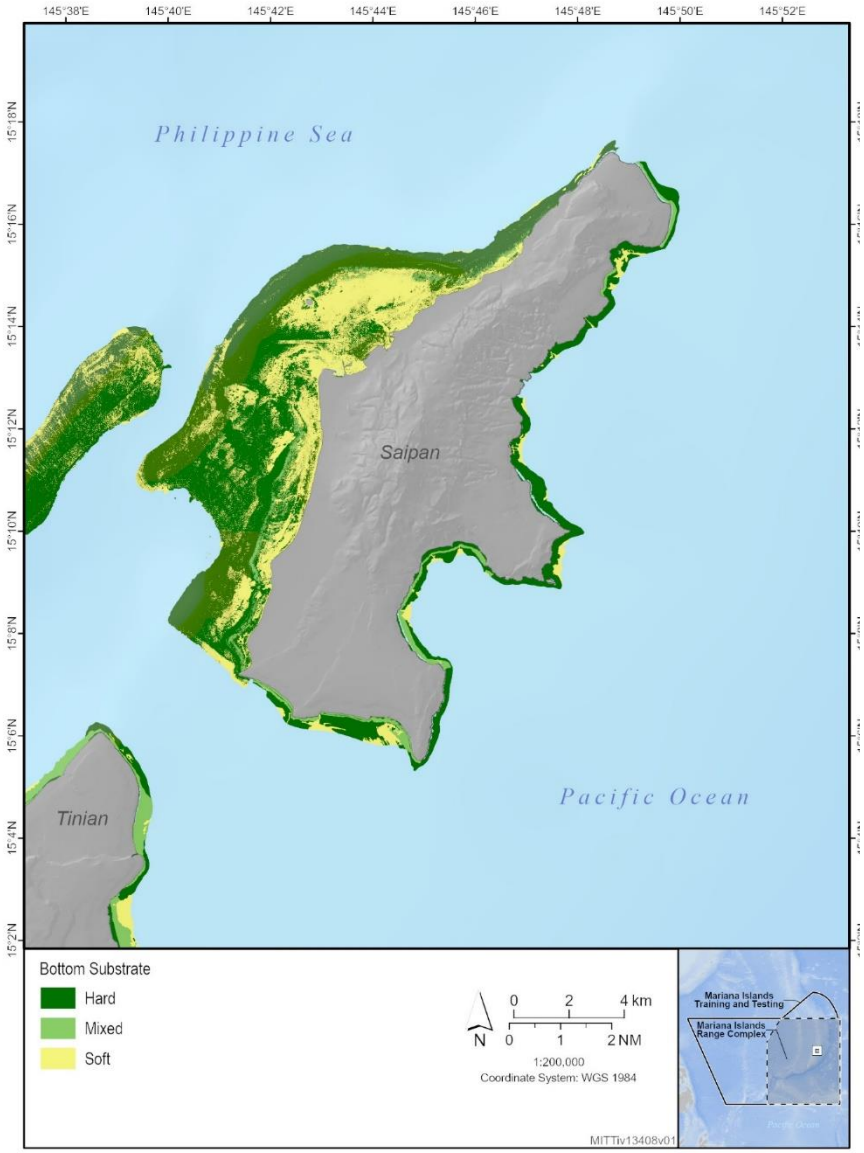

Figure 3.3-1: Mapped Marine Habitat in Saipan

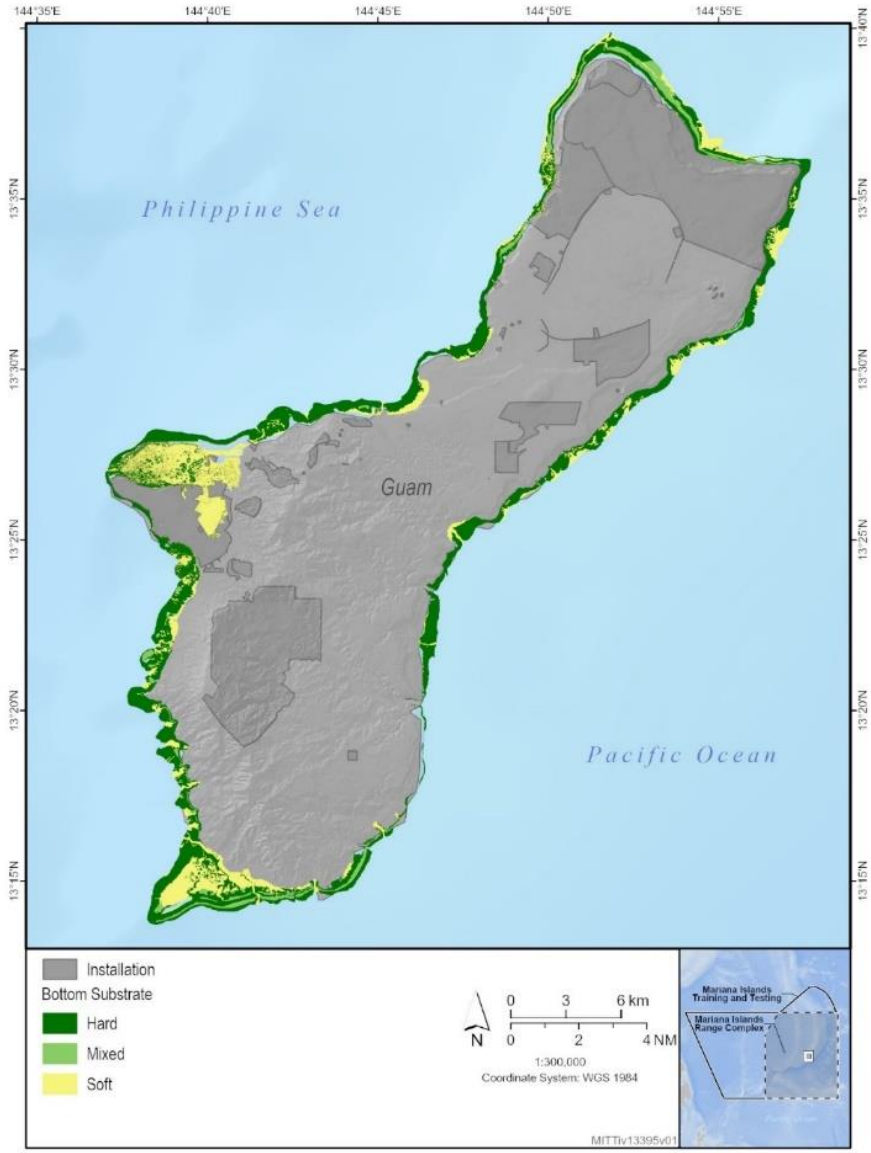

Figure 3.3-2: Mapped Marine Habitat on Guam

3.3.2.1 Effects on Marine Habitats Under Alternative 1

3.3.2.1.1 Effects from Explosive Stressors

Underwater detonations that occur on or near the bottom during mine warfare activities are the only explosive stressors that would have the potential to affect marine habitats. All other explosive stressors (e.g., gunnery exercises, missile exercises, and air-to-surface rockets) used during military readiness activities occur on the water surface or in the water column and would not affect marine habitats. As stated in the previous MITT analyses, mine warfare military readiness activities utilizing bottom placed detonations would only occur in the existing mine warfare underwater detonation area at Agat Bay site, Piti, and Outer Apra Harbor. These sites are comprised of soft substrate and mixed or hard-bottom habitat. Those hard-bottom areas, which may contain coral or wrecks, would be avoided during military readiness activities to the maximum extent practicable (refer to Chapter 4). Detailed information on explosive stressors can be found in Section 3.0.4.1.2 of this SEIS/OEIS.

Training and Testing. Under Alternative 1, explosives used during mine warfare activities would change from the number analyzed in the 2020 SEIS/OEIS (see Bin E4 in Table 3.0-4); however, these activities would continue to occur in the same areas and would have no appreciable change in the analysis or conclusions for explosive stressors as presented in the previous MITT analyses.

Range Modernization and Sustainment. Explosives would not be used during range modernization and sustainment; therefore, there would be no explosives effects.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving explosive stressors under Alternative 1 of the Proposed Action would have a reasonably foreseeable effect on marine habitats; however, the degree of effect would be less than significant because: (1) seafloor detonations would be infrequent, (2) the percentage of the Study Area affected would be small, and (3) impacts on soft bottom habitat would be temporary (recovery in days to weeks) to short term (recovery in weeks up to three years) in duration.

3.3.2.1.2 Effects from Physical Disturbance and Strike Stressors

This section analyzes the potential effects on marine habitats from the various types of physical disturbance and strike stressors during military readiness activities within the Study Area. Three types of physical disturbance and strike stressors are evaluated for their effects on marine habitats, including (1) vessels and in-water devices, (2) MEM, and (3) seafloor devices. For further supporting information on physical disturbance and strike stressors on marine habitats, refer to Appendix F.

Training and Testing. Under Alternative 1, the number of proposed training and testing events that would result in physical disturbance and strike stressors (see Tables 3.0-10, 3.0-12 through 3.0-15, 3.0-17) would change compared to the numbers analyzed in the 2020 SEIS/OEIS. Because the stressors associated with these new activities would be the same as those evaluated in previous MITT analyses, the potential effects of activities utilizing vessels and towed in-water devices, military expended materials, and seafloor devices on marine habitats

as presented in the 2015 EIS/OEIS (Section 3.3.3.2) and the 2020 SEIS/OEIS (Section 3.3.2.2) remain valid and are summarized below.

Under Alternative 1, the number of MEM used for training and testing events that have the potential to affect marine habitats would generally increase (see Tables 3.0-12 through 3.0-15). MEM during military readiness activities could disturb or strike marine habitat as it falls to the seafloor.

The number of seafloor devices used during training and testing under Alternative 1 would increase (Table 3.0-17). The use of seafloor devices could disturb marine habitats depending on the type of substrate they are deployed over. Seafloor devices may fracture hard bottom or suspend sediments over soft or mixed substrates.

The use of vessels and in-water devices would decrease under Alternative 1 (Table 3.0-10). This includes increases in amphibious warfare training activities occurring in the Guam and CNMI nearshore (Table 2.4-1). As stated in the previous MITT analyses, the effects of vessels and in-water devices on marine habitats would remain inconsequential because vessel and in-water activities that could come in contact with marine substrates would be located in previously disturbed areas (i.e., nearshore shallow waters).

Range Modernization and Sustainment. Physical disturbance and strike from installation and maintenance of subsurface targets and instrumentation would be primarily in soft bottom habitat, and would occur in a relatively small area, and any effects on marine habitats would be expected to be short term.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving physical disturbance and strike stressors under Alternative 1 of the Proposed Action would have a reasonably foreseeable effect on marine habitats; however, the degree of effect would be less than significant because: (1) the impact area of MEM is very small relative to the amount of marine habitat, (2) increases in military readiness activities would not significantly change the quality or type of habitat presented throughout the Study Area, (3) hard bottom habitats are avoided for all activities, (4) vessels avoid contact with the bottom (excluding amphibious vehicles and landings on soft-bottom substrate only), and (5) soft bottom habitats that would be likely affected recover quickly.

3.3.2.2 Effects on Marine Habitats Under Alternative 2

Under Alternative 1, the number of activities with associated explosive and physical disturbance and strike stressors would be equal to or increase compared to Alternative 1. However, while SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation measures (Chapter 4) were not specifically designed to address marine habitats, the implementation of some of these measures (which were designed for other resource areas) would help avoid or reduce potential effects on marine habitats. As such, although activities involving explosive and physical disturbance and strike would increase under Alternative 2, potential effects on marine habitats are not expected to be meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving explosive and physical disturbance and strike stressors under Alternative 2 would result in less than significant effects on marine habitats.

3.4 MARINE MAMMALS

3.4.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on marine mammals found in Section 3.4 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

Information describing each marine mammal species and stock or Distinct Population Segment (DPS) is presented in the *Biological Resources Background Information Technical Report for the Mariana Islands Training and Testing Study Area* (U.S. Department of the Navy, 2025b). The content of the technical report is focused on information necessary to support the analysis of adverse effects on marine mammals from the Proposed Action and provides information on status and management, habitat and distribution, population trends, and population threats to marine mammals.

While all potential effects from the Proposed Action are considered in this section, the primary quantitative analysis focuses on potential effects from acoustic stressors and explosive stressors.

3.4.1.1 Marine Mammals in the Study Area

There are 27 marine mammal species with known occurrence in the Study Area. All species are protected under the MMPA and are managed by NMFS within the U.S. Exclusive Economic Zone off Guam and the CNMI. The stock structure for marine mammals in the Western North Pacific is not well defined, so the analysis in this SEIS/OEIS is at the species level, with the exception of blue whale and humpback whale.

Table 3.4-1 provides an abundance estimate (if known) for each marine mammals species in the Study Area and associated coefficient of variation value (if available), which is a measure of uncertainty in the abundance estimate. NMFS stock assessment reports do not provide abundance estimates for species in this region, so abundances are taken from other published sources, which are identified in footnotes at the bottom of the table. Details on species' distributions in the Study Area, including seasonal occurrence, are described in the technical report, *U.S. Navy Marine Species Density Database Phase IV for the Mariana Islands Training and Testing Study Area* (U.S. Department of the Navy, 2024d).

Table 3.4-1: Marine Mammal Occurrence Within the Study Area

Common Name	Scientific Name	Status		Occurrence in the Study Area	Abundance (CV) in U.S. EEZ Waters of Guam and CNMI [8]
		MMPA	ESA		
Mysticetes: VLF (larger whales) and LF Hearing Groups					
Blue whale (Central North Pacific stock)	*Balaenoptera musculus*	Depleted	Endangered	Seasonal, likely absent in summer	Unknown
Bryde's whale	*Balaenoptera edeni*	-	-	Regular	233 (0.45) [1]
Fin whale	*Balaenoptera physalus*	Depleted	Endangered	Seasonal, likely absent in summer	Unknown

Common Name	Scientific Name	Status		Occurrence in the Study Area	Abundance (CV) in U.S. EEZ Waters of Guam and CNMI [8]
		MMPA	ESA		
Humpback whale (Western North Pacific stock/DPS)	*Megaptera novaeangliae*	Depleted	Endangered	Seasonal, likely absent in summer	61 (0.21) for shallow waters off Saipan and neighboring islands[2]
Minke whale	*Balaenoptera acutorostrata*	-	-	Seasonal, likely absent in summer	91 (0.34) [3]
Omura's whale	*Balaenoptera omurai*	-	-	Rare	Unknown
Sei whale	*Balaenoptera borealis*	Depleted	Endangered	Seasonal, likely absent in summer	166 (0.49) [1]
Odontocetes: HF (dolphins, beaked whales, sperm whales) and VHF (porpoises and *Kogia* species) Hearing Groups					
Blainville's beaked whale	*Mesoplodon densirostris*	-	-	Regular	15,667 (0.19) [4]
Common bottlenose dolphin	*Tursiops truncatus*	-	-	Regular	1,800 (1.11) [5]
Deraniyagala's beaked whale	*Mesoplodon hotaula*	-	-	Rare	Unknown
Dwarf sperm whale	*Kogia sima*	-	-	Regular	Unknown
False killer whale	*Pseudorca crassidens*	-	-	Regular	1,059 (0.84) [5]
Fraser's dolphin	*Lagenodelphis hosei*	-	-	Regular	Unknown
Ginkgo-toothed beaked whale	*Mesoplodon ginkgodens*	-	-	Regular	Unknown
Goose-beaked whale (or Cuvier's beaked whale [6])	*Ziphius cavirostris*	-	-	Regular	6,001 (0.20) [4]
Killer whale	*Orcinus orca*	-	-	Regular	Unknown
Longman's beaked whale	*Indopacetus pacificus*	-	-	Regular	730 (1.09) [5]
Melon-headed whale	*Peponocephala electra*	-	-	Regular	2,455 (0.70) [1]
Pantropical spotted dolphin	*Stenella attenuata*	-	-	Regular	33,866 (0.39) [7]
Pygmy killer whale	*Feresa attenuata*	-	-	Regular	4,351 (1.11) [5]
Pygmy sperm whale	*Kogia breviceps*	-	-	Regular	Unknown
Risso's dolphin	*Grampus griseus*	-	-	Regular	Unknown
Rough-toothed dolphin	*Steno bredanensis*	-	-	Regular	9,256 (1.22) [5]
Short-finned pilot whale	*Globicephala macrorhynchus*	-	-	Regular	1,192 (0.98) [5]
Sperm whale	*Physeter macrocephalus*	Depleted	Endangered	Regular	1,574 (0.79) [5]
Spinner dolphin	*Stenella longirostris*	-	-	Regular	9,011 (0.46) [7]
Striped dolphin	*Stenella coeruleoalba*	-	-	Regular	7,103 (0.37) [7]

Common Name	Scientific Name	Status		Occurrence in the Study Area	Abundance (CV) in U.S. EEZ Waters of Guam and CNMI [8]
		MMPA	ESA		

[1] Fulling et al. (2011); [2] Hill et al. (2020)' [3] Norris et al. (2017); [4] Badger et al. (2024) [5] Bradford et al. (*In Prep*.)
[6] The species *Ziphius cavirostris* is known by two common names: Goose-beaked whale and Cuvier's beaked-whale. Henceforth in this section, the species is referred to as the goose-beaked whale.
[7] Becker et al. (*In Prep*.)
[8]Species' densities (animals/km^2) and seasonal distributions are described in detail in the technical report, *U.S. Navy Marine Species Density Database Phase IV for the Mariana Islands Training and Testing Study Area* (U.S. Department of the Navy, 2024d).
Notes: DPS = Distinct Population Segment, EEZ = Exclusive Economic Zone, ESA = Endangered Species Act, MMPA = Marine Mammal Protection Act, CV = coefficient of variation, LF = Low Frequency, VLF = Very LF, HF = High Frequency, VHF = Very HF.

3.4.1.2 Consultations Under the ESA and MMPA

Due to the potential co-occurrence of ESA-listed marine mammals and military readiness activities, the Navy is preparing a Biological Assessment and consulting with NMFS under the ESA. In addition, the Navy has requested a LOA from NMFS in accordance with the MMPA for training and testing activities that use sonars and explosives. Military readiness activities that introduce other stressors into the marine environment are not expected to result in Level A or Level B harassment of any marine mammals.

Within the Study Area, no critical habitat has been designated for ESA-listed marine mammal species.

3.4.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on marine mammals and is focused on the same stressors as previous MITT analyses, which include (1) acoustic (sonar and other transducers; vessel noise; aircraft noise; and weapons noise), (2) explosive (explosions in-water), (3) energy (in-water electromagnetic devices; high-energy lasers), (4) physical disturbance and strike (vessels and in-water devices; MEM; seafloor devices), (5) entanglement (decelerators/parachutes; wires and cables), (6) ingestion (MEM), and (7) secondary stressors.

For each stressor, the implementation of SOPs, which may indirectly reduce or avoid potential effects on marine mammals (Section 2.3.3 of the 2020 SEIS/OEIS); and activity-based and geographic mitigation measures specifically applicable to activities with explosives, acoustic, and physical disturbance and strike stressors (Chapter 4) established in previous consultations are considered part of the Proposed Action when determining if an effect is reasonably foreseeable (as described in Section 3.0.4). The development of geographic mitigation is discussed in detail in Appendix I of the 2020 SEIS/OEIS and will be carried forward unchanged as part of the Proposed Action in this SEIS/OEIS.

Based on the framework presented in Section 3.0.4, the Navy concluded that, under the Proposed Action, effects from energy stressors, seafloor devices (a physical disturbance and strike stressor), entanglement, ingestion, and secondary stressors would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

Effects on marine mammals from acoustic, explosive, and certain physical disturbance and strike stressors would be reasonably foreseeable; effects would be considered significant if there are short-term or long-term changes well outside the limits of natural variability in terms of the species' ability to meet nutritional, physiological, or reproductive requirements within the Study Area. A significant impact finding would be appropriate if a marine mammal species would be adversely affected over the long term or permanently such that the population in the Study Area would no longer be sustainable. The following sections analyze the effects of the Proposed Action on marine mammals and take into account the analysis presented in Section 3.4 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.4.2.1 Effects on Marine Mammals Under Alternative 1

In this analysis, marine mammal species are grouped based on similar biology (e.g., hearing sensitivity) or behaviors (e.g., feeding or expected reaction to stressors) when appropriate for the analysis. For some stressors, species are grouped based on their taxonomic relationship and discussed as mysticetes (baleen whales) or odontocetes (toothed whales, dolphins, and porpoises). When adverse effects are expected to be similar for all species or when it is determined there would be no adverse effect on any species, the discussion is general and not species-specific. If military readiness activities would only occur in or be concentrated in certain areas, the discussion is geographically focused.

In coordination with NMFS, effects from acoustic and explosive stressors are quantified at the species or stock level to facilitate take authorizations under the MMPA.

3.4.2.1.1 Effects from Acoustic Stressors

This section summarizes the potential adverse effects of acoustic stressors used during military readiness activities within the Study Area. The acoustic sub-stressors included for analysis are (1) sonars, (2) vessel noise, (3) aircraft noise, and (4) weapons noise. Detailed information on acoustic terminology used in this analysis and acoustic effects categories as well as a summary of best available science on effects on marine mammals specific to each sub-stressor, are provided in the *Acoustic and Explosive Concepts Technical Report* (U.S. Department of the Navy, 2026b).

Due to new information, such as revised criteria and thresholds that have been updated since the 2020 SEIS/OEIS, effects on marine mammals from Navy sonar was reanalyzed in this SEIS/OEIS. Detailed results on the effects of sonars on marine mammals in the Study Area is presented in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025a).

In addition to changes in the Proposed Action, changes in the predicted effects from sonars compared to the 2020 results are due to the following:

- Improvements to criteria used to determine if exposures to acoustic stressors may cause auditory effects and behavioral responses. Changes to the auditory effects criteria include changes to some hearing group divisions and names. A summary of these changes is provided in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025a). For additional details on criteria and thresholds see

the technical report *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase IV)* (U.S. Department of the Navy, 2024a).

- Revisions to the Navy Acoustic Effects Model, including a new sonar avoidance model (U.S. Department of the Navy, 2024a).
- Updates to data on marine mammal distribution, including species density (number of animals per square kilometer [km^2]) group size, and depth distribution. For details see the technical reports *U.S. Navy Marine Species Density Database Phase IV for the Mariana Islands Training and Testing Study Area* (U.S. Department of the Navy, 2024d) and *Dive Distribution and Group Size Parameters for Marine Species Occurring in the U.S. Navy's Mariana Islands Training and Testing Study Area* (Oliveira et al., 2025).
- The number of model-predicted auditory injuries is not reduced due to activity-based mitigation, unlike in prior analyses.

The Action Proponents will implement activity-based mitigation and geographic mitigation under Alternative 1 or Alternative 2 to reduce potential adverse effects from acoustic stressors on marine mammals, including within important marine mammal habitats (see Chapter 4). Detailed information on geographic mitigation areas is presented in Appendix I of the 2020 SEIS/OEIS.

3.4.2.1.1.1 Sonar and Other Transducers

The effects of sonars on marine mammals may result in hearing loss, masking, physiological stress, or behavioral reactions. Behavioral reactions can depend on the characteristics of the sonar signal; behavioral state of the animal; sensitivity and individuals' prior experience with the sound; and other contextual factors, including distance from the sound source, movement of the source, physical presence of vessels or other devices, time of year, and geographic location. Different groups of marine mammals may respond in different ways to sonars.

Mysticetes: Mysticetes (low frequency [LF] and very low frequency [VLF] hearing groups) are susceptible to masking, behavioral responses, and adverse auditory effects from LF and mid-frequency (MF) sonars. Mysticetes are less likely to be affected by signals from high-frequency and very high-frequency sonars, which are outside of their range of best hearing. Mysticetes are more adaptive while migrating; however, sonar signals could have a greater effect on mysticete behavior at seasonal foraging and breeding grounds. Little is known about possible physiological stress responses by mysticetes.

Odontocetes: Odontocetes (high frequency [HF] and very high frequency [VHF] hearing groups) are susceptible to masking, behavioral responses, noise-induced vocal modification, and adverse auditory effects due to sonars. MF and HF sonars are more likely to result in masking and adverse auditory effects than other sonars. Beaked whales are more sensitive to disturbance than other odontocetes.

Sonars: As discussed in Section 3.0.4.1.1, a detailed comparison of sonar quantities analyzed in the 2020 SEIS/OEIS with sonar quantities under this Proposed Action is not feasible due to changes in the acoustic source binning. One exception is the sonar systems within the MF1 bins (i.e., MF1; MF1K; and MF1C, formerly MF11). MF1 and MF1C sonars are mid-frequency sonar systems mounted on surface ships and used during certain anti-submarine warfare activities (see Chapter 2 and Appendix A). As shown in U.S. Department of the Navy (2025a), activities

using MF1 and MF1C sonars are associated with some of the highest percentages of predicted effects on marine mammals. Table 3.0-3 shows that the annual use of MF1 and MF1C sonars combined would decrease by at least 472 hours annually compared to hours proposed in the 2020 SEIS/OEIS. Fewer sonar hours reduce the potential for exposure to sound and the likelihood of effects on marine mammals, including auditory injury (AINJ), Temporary Threshold Shift (TTS), masking, and behavioral responses.

Most anti-submarine warfare sonars produce individual sounds, or pings, which are short, lasting up to a few seconds each. Systems typically operate with low-duty cycles for most tactical sources, but some systems may operate nearly continuously or with higher duty cycles. These higher duty cycle sources would pose a greater risk of masking than intermittent sources. Most anti-submarine warfare activities are geographically dispersed, have a limited duration, and intermittently use sonars with a narrow frequency band. These factors reduce the potential for significant or extended masking in marine mammals.

Effects of Sonars on Marine Mammals: Low- (less than 1 kHz), mid- (1 to 10 kHz), and some high (greater than 10 to 100 kHz) frequency sonars are within the hearing ranges of all marine mammals. Additionally, all high- and very high-frequency (100 to 200 kHz) sonars are in the hearing range of all odontocetes. Sonars with higher source levels, longer durations, higher duty cycles, and frequencies near the best range of hearing for a species or hearing group are more likely to affect hearing. Due to their high source levels and low transmission loss (compared to higher frequency sources), anti-submarine warfare sonar sources, including hull-mounted sonar (MF1) and high duty cycle hull-mounted sonar (MF1C), have large zones of effects. See U.S. Department of the Navy (2025a) for ranges to auditory effects for MF1, MF1C, and other selected sonars.

The number of predicted auditory effects have changed since the previous MITT analyses, with the number of effects decreasing for some species and increasing for others. While some changes may be attributable to changes in the Proposed Action, many are due to changes in methodologies used to model effects as listed in Section 3.4.2.1.1. Notably, the updated criteria for the HF cetacean hearing group, which includes delphinids and most other odontocetes, indicate increased susceptibility to auditory effects at low and mid-frequencies compared to the prior auditory criteria. Consequently, predicted auditory effects from most anti-submarine warfare sonars are substantially higher for HF cetaceans than in prior analyses of the same activities. The change in susceptibility to auditory effects from sonars is less pronounced for other hearing groups. For most hearing groups, the revision to the avoidance model, which assumes that some marine mammals may avoid sound levels that can cause AINJ, has also resulted in increased estimates of auditory injuries for certain activities, particularly activities using certain high duty cycle sonars. The revised avoidance method bases the initiation of an avoidance response on the behavioral response criteria. The ability to avoid a sonar exposure that may cause auditory effects in the model depends on a species' susceptibility to auditory effects, a species' sensitivity to behavioral disturbance, and characteristics of the sonar source, including duty cycle, source level, and frequency. Thus, predicted auditory effects have increased for species that have a higher susceptibility to auditory effects and are less likely to avoid sound sources due to being less sensitive to acoustic disturbance.

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

Other Factors Influencing Model Predicted Effects: In addition to the changes in the analysis of acoustic sound sources, densities for species in the Study Area were updated based on new survey data, improved understanding of species' distribution and abundance, and refined species distribution models developed to estimate densities (U.S. Department of the Navy, 2024d). While several factors typically combine to influence model-predicted acoustic effects, an increase or decrease in a species' density generally results in a proportional change in predicted effects.

While model-predicted effects are not quantitatively reduced to account for activity-based mitigation (as in previous MITT analyses), opportunities to mitigate model-predicted effects were identified by determining if the closest points of approach associated with predicted auditory injuries were also within the mitigation zone. This analysis is presented in U.S. Department of the Navy (2025a).

While the geographic mitigation areas are established for specific species, the limitations on sonar use defined in the mitigation measures would also benefit other marine species, including other marine mammals, occurring in the geographic mitigation areas. Detailed information on geographic mitigation areas is presented in Appendix I of the 2020 SEIS/OEIS.

Training and Testing. Under Alternative 1, the overall use of sonars would decrease from the previous MITT analyses for both training and testing activities for most sources. MF hull-mounted sonar systems have historically resulted in the highest number of predicted effects on marine mammals. For regular duty cycle (MF1) hull-mounted sonar, the maximum year of training and testing activities includes 23 percent fewer hours in the Study Area compared to the 2020 SEIS/OEIS analysis (Table 3.0-3). For high duty cycle (MF1C) hull-mounted sonar, the maximum year of training and testing activities includes 15 percent fewer hours compared to the 2020 SEIS/OEIS analysis, and for regular duty cycle (MF1K) hull-mounted sonar, the maximum year of training and testing activities would increase from 3 to 33 hours in the Study Area compared to the 2020 SEIS/OEIS analysis. While the MF1K sonar hours would increase, the MF1K is operated at a lower power setting than the MF1 and MF1C sonars and would have a lower probability of affecting marine mammals.

The number of effects on each species due to exposure to sonar and explosives combined during training and testing under Alternative 1 are shown in Table 3.4-2 for seven years of activities. The number of effects due to sonars alone annually and over seven years is provided in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025c). Depending on the species, effects on individuals may be permanent (AINJ) or temporary (TTS, masking, stress, or behavioral response). Effects resulting in AINJ would persist with the

individual, which would experience decreased hearing sensitivity in the affected frequency range.

Decreased hearing sensitivity may lead to a reduced ability to sense biologically important cues from the environment, such as vocalizations from other marine mammals, sounds made by prey, and anthropogenic sounds like noise from an approaching vessel. Behavioral patterns of some individuals, which may include communication, foraging, or breeding, are likely to be temporarily disrupted. Individuals or groups may avoid areas around sonar activities and be temporarily displaced from a preferred habitat. Displacement may be brief for short duration activities or extended for multi-day events and would depend on the behavioral sensitivity of the species. Sensitive species, particularly beaked whales, may avoid at farther distances and for longer durations.

Most proposed activities do not occur for extended multi-day periods and would occur over small areas relative to population ranges. Comparing the predicted number of effects to the number of animals modeled in the Study Area shows that individuals of most species would be affected less than once per year on average. Individuals of several beaked whale species are predicted to be affected about once per year. These comparisons are described in detail in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025c). Individuals of some behaviorally sensitive species or in populations concentrated near warning areas in the MIRC have higher repeated effects.

Range Modernization and Sustainment. Sonar would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, training and testing activities involving sonars under Alternative 1 would have a reasonably foreseeable effect on marine mammals; however, the degree of effect would be less than significant, because (1) most individuals would be affected an average of less than once per year; (2) 99 percent of total predicted effects are either temporary shifts in hearing sensitivity or brief behavioral responses; and (3) effects are not expected to interfere with feeding, reproduction, or other biologically important functions such that the continued viability of a population would be threatened.

3.4.2.1.1.2 Vessel Noise

Vessels produce broadband, non-impulsive, continuous noise during operation and transit. Vessel noise may result in masking, physiological stress, or behavioral reactions. Behavioral reactions to vessels can be caused by multiple factors. Vessel sound exposure is rarely decoupled from the physical presence of a surface vessel, making it difficult to determine the source of the reaction. In some more industrialized or populated areas, vessel noise is a chronic and frequent stressor.

Different groups of marine mammals may respond in different ways to vessels disturbance. LF and VLF vocalizations by mysticetes are likely to be masked or otherwise affected (noise-induced vocal modification) by vessel noise, resulting in decreased communication space. Responses to vessel noise vary and include no response to approaching vessels and both horizontal (swimming away) and vertical (diving) avoidance.

Table 3.4-2: Effects Due to 7 Years of Sonar and Explosives Training and Testing Under Alternative 1 and Alternative 2

Species	Stock or Population	Alternative 1					Alternative 2				
		BEH	TTS	AINJ	INJ	MORT	BEH	TTS	AINJ	INJ	MORT
ESA-Listed											
Blue whale	Central North Pacific	15	254	3	-	-	16	255	3	-	-
Fin whale	(NSD)	18	211	1	-	-	19	212	1	-	-
Humpback whale	Western North Pacific stock and DPS	319	10,215	136	-	-	343	10,266	137	-	-
Sei whale	(NSD)	10	231	2	-	-	10	233	2	-	-
Sperm whale	(NSD)	850	691	0	-	-	860	693	0	-	-
Non ESA-Listed											
Bryde's whale	(NSD)	17	432	5	-	-	19	434	5	-	-
Minke whale	(NSD)	6	148	2	-	-	6	149	2	-	-
Omura's whale	(NSD)	15	321	2	-	-	16	323	2	-	-
Bottlenose dolphin	(NSD)	795	1,659	1	0	0	809	1,664	1	0	0
Dwarf sperm whale	(NSD)	9,212	120,366	2,156	0	0	9,751	121,207	2,214	0	0
False killer whale	(NSD)	482	1,094	0	0	-	490	1,098	0	0	-
Fraser's dolphin	(NSD)	29,067	50,112	22	1	0	29,644	50,301	22	1	0
Killer whale	(NSD)	92	274	0	-	-	94	275	0	-	-
Melon-headed whale	(NSD)	1,177	2,113	1	0	-	1,191	2,122	1	0	-
Pantropical spotted dolphin	(NSD)	9,337	22,156	11	0	0	9,605	22,268	12	0	0
Pygmy killer whale	(NSD)	1,849	4,283	1	0	0	1,881	4,296	1	0	0
Pygmy sperm whale	(NSD)	10,390	134,939	2,486	0	0	10,998	135,908	2,554	0	0
Risso's dolphin	(NSD)	3,799	8,555	3	1	-	3,879	8,585	3	1	-
Rough-toothed dolphin	(NSD)	3,466	10,297	6	0	0	3,534	10,332	7	0	0
Short-finned pilot whale	(NSD)	549	1,018	0	0	0	558	1,023	0	0	0
Spinner dolphin	(NSD)	14,664	12,711	9	0	-	15,723	12,889	9	0	-
Striped dolphin	(NSD)	2,977	7,865	3	0	-	3,028	7,892	3	0	-
Blainville's beaked whale	(NSD)	21,373	162	0	0	-	21,657	162	0	0	-
Deraniyagala beaked whale	(NSD)	34,165	26	3	-	-	34,764	30	3	-	-
Ginkgo-toothed beaked whale	(NSD)	40,346	374	0	0	-	41,119	375	0	0	-
Goose-beaked whale	(NSD)	17,905	130	0	0	-	18,181	131	0	0	-
Longman's beaked whale	(NSD)	6,885	72	0	0	-	7,016	72	0	0	-

BEH = Significant Behavioral Response, TTS = Temporary Threshold Shift, AINJ = Auditory Injury, INJ = Non-Auditory Injury, MORT = Mortality
A dash (-) indicates a (true zero) and zero (0) indicates a rounded value less than 0.5.
Stocks are not shown if no effects are estimated.
NSD = No stock designation.

Odontocetes' communication calls are more likely to be masked by vessel noise than higher-frequency echolocation, but masking of echolocation is possible. Responses to vessel noise includes both attraction (e.g., bowriding) and avoidance behaviors, particularly by more sensitive species (e.g., *Kogia* whales and beaked whales) or individuals. Many noise-induced vocal modifications and short-term response to boat traffic have been documented. Additional information on the assessment of this acoustic stressor is in U.S. Department of the Navy (2025a).

Training and Testing. Marine mammals may be exposed to vessel-generated noise throughout the Study Area, but the greatest potential for exposure would occur in high vessel traffic areas, including within and adjacent to Apra Harbor (see Chapter 2 and Appendix A). Table 3.0-10 shows the number of events using vessels would decrease by approximately 50 percent compared with the number of events in the 2020 SEIS/OEIS.

Vessel noise during training and testing activities under Alternative 1 may include brief behavioral reactions and short periods of masking while a marine mammal is in the proximity of a stationary or passing vessel. Navy and USCG vessels do not purposefully approach marine mammals and noise from passing vessels is not expected to elicit significant behavioral responses from any marine mammal species.

Range Modernization and Sustainment. Vessel noise would be produced during range modernization and sustainment activities when target and instrument placement and recovery activities are conducted. Vessel speeds for modernization and sustainment activities are typically much slower than during training and testing activities, ranging from 0 to 3 knots, which would limit ship-radiated noise from propeller cavitation and water flow across the hull. These slowly moving vessels would be easily avoided by marine mammals, reducing the level of effect. Marine mammals that occur offshore would not be affected by vessel noise from modernization and sustainment activities that typically occur in shallower nearshore waters. Vessel noise may result in masking, physiological stress, or behavioral reactions, but effects are expected to be short-term and infrequent

Conclusion. Consistent with previous MITT analyses, military readiness activities involving vessel noise under Alternative 1 would have a reasonably foreseeable effect on marine mammals; however, the degree of effect would be less than significant because: (1) activities that include the use of vessels would generate temporary and transient noise that may result in minor disturbance or masking to nearby marine mammals; and (2) such disturbances are not expected to interfere with feeding, reproduction, or other biologically important functions needed to sustain an individual or a population, and would not rise to the level of harassment under MMPA.

3.4.2.1.1.3 Aircraft Noise

Aircraft produce broadband, non-impulsive, continuous noise from overflights, hovering rotary wing aircraft, and unmanned aircraft. An infrequent type of aircraft noise is the sonic boom, produced when the aircraft exceeds the speed of sound. While also producing higher frequency sounds, sound from rotary-wing aircraft is often dominated by low-frequency (< 20 Hz to 30 Hz) sound and vibration (Naz et al., 2020). Additional information on the different types of aircraft noise and how they may affect marine mammals is presented in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025c)

Transmission of sound from a moving airborne source to a receptor underwater is influenced by numerous factors, but significant acoustic energy is primarily transmitted into the water directly below the craft in a narrow cone. Underwater sounds from aircraft are strongest just below the surface and directly under the aircraft. Most aircraft noise would be concentrated around airbases but could also occur in the waters immediately surrounding aircraft carriers at sea as aircraft take off and land, or directly below hovering rotary-wing aircraft that are near the water's surface.

Marine mammals may respond to both the physical presence and to the noise generated by aircraft, making it difficult to attribute causation to one or the other stimulus. All low-flying aircraft can produce shadows, which may cause animals at the surface to react. Rotary-wing aircraft may also produce strong downdrafts, which can affect an animal's behavior at or near the surface. Aircraft noise may result in temporary masking, physiological stress, or behavioral reactions.

Different groups of marine mammals may respond in different ways to aircraft noise. Typically, mysticetes either ignore or occasionally dive in response to aircraft overflights. Some whales may avoid helicopters or fixed-wing aircraft, but unmanned aerial vehicles have not produced responses in any mysticete species to date.

Odontocete responses to aircraft noise are varied, but overall little change in behavior has been observed. Some odontocetes will fluke, flipper slap or avoid the noise source, particularly species sensitive to noise or other stimuli like beaked whales or *Kogia* whales. Effects on deep-diving species not frequently at the surface (e.g., beaked whales), would occur less often due to fewer opportunities for exposure. Odontocetes may react to helicopters, but they do not appear responsive to smaller unmanned aerial vehicles, except at low altitudes.

Training and Testing. Training and testing activities with aircraft would be conducted as described in the activity descriptions in Appendix A. The number of events using aircraft is shown in Table 3.0-11 in Section 3.0. As shown in the table, the number of training and testing events using aircraft would decrease by about 25 percent compared with the number of events analyzed in the 2020 SEIS/OEIS.

As described in the 2020 SEIS/OEIS and summarized above, aircraft noise during training and testing under Alternative 1 may cause brief temporary changes in the behavior of marine mammals under certain conditions. Marine mammals at or near the water's surface may startle when an aircraft flies overhead at low altitude, divert their attention to the aircraft, or avoid the immediate area by swimming away or diving. These brief and infrequent behavioral responses, should they occur, would not lead to long-term consequences for affected individuals.

Range Modernization and Sustainment. Aircraft would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, training and testing activities involving aircraft noise under Alternative 1 would have a reasonably foreseeable effect on some marine mammals. However, the degree of effect would be less than significant for the following reasons: (1) activities that include the use of aircraft would generate temporary and transient noise that would result in only minor disturbances; and (2) such disturbances are not expected

to interfere with feeding, reproduction, or other biologically important functions needed to sustain an individual or a population, and would not rise to the level of harassment under MMPA.

3.4.2.1.1.4 Weapons Noise

Marine mammals may be exposed to sounds caused by the firing of weapons, objects in flight, and impact of non-explosive munitions on the water's surface during activities conducted at sea. This incidental noise is collectively called weapons noise. Impulsive noise from weapons firing may result in hearing loss, masking, physiological stress, or behavioral reactions in marine mammals. The brief and intermittent nature of most impulsive sounds would limit masking effects. Due to the rapid rise time and higher instantaneous peak pressure of impulsive noise, marine mammals close to the noise source are more likely to startle or avoid the area.

Different groups of marine mammals may respond in different ways to impulsive noise. Mysticetes are more likely to be affected due to the low frequency component of the impulsive noise, which propagates farther and overlaps with their range of best hearing. Mysticetes have shown a variety of responses to impulsive noise, including avoidance, habitat displacement, reduced surface intervals, altered swimming behavior, and changes in vocalization rates.

Most odontocetes are behaviorally less sensitive to impulsive noise than mysticetes, with responses occurring at much closer distances. Impulsive noise can result in hearing loss for VHF and HF odontocetes close to the noise source, with the VHF hearing group exhibiting greater sensitivity to noise. Masking effects are possible, but relief from masking during the silent period between impulsive sounds is likely to limit the effects.

The Action Proponents will implement activity-based mitigation to reduce potential effects from weapons noise on marine mammals (see Chapter 4).

Training and Testing. Training and testing activities using gunnery and other weapons that generate firing noise would be conducted as described in the activity descriptions in Appendix A. Table 3.0-12 and Table 3.0-14 show the numbers and types of non-explosive practice munitions and explosive munitions that would be fired during training and testing activities annually. As shown in Table 3.0-12, there are substantial reductions in the number of non-explosive large and medium caliber projectiles and rockets. Weapons noise from these larger munitions, both firing noise and impact noise, would decrease. Smaller munitions, such as small-caliber projectiles, which would increase compared to the 2020 SEIS/OEIS, are likely to produce lower impact noise as they strike a target or the water's surface.

As described in the 2020 SEIS/OEIS and summarized above, weapons noise during training and testing under Alternative 1 may cause brief, temporary changes in the behavior of marine mammals and would not meet the definition of take under the MMPA. Marine mammals may startle or avoid the immediate area. Because firing of medium and large caliber gunnery would occur greater than 12 NM from shore, with the exception of training and testing activities occurring on FDM, effects on coastal and island-associated species are unlikely.

Range Modernization and Sustainment. Weapons would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, training and testing activities involving weapons noise under Alternative 1 would have a reasonably foreseeable effect on marine mammals; however, the degree of effect would be less than significant, for the following reasons: (1) activities that include the use of weapons would result in brief impulsive noise that may cause minor, temporary disturbances, such as a startle response, to marine mammals at the surface and close to either the firing location or impact site; and (2) even if a marine mammal is exposed to weapons noise, effects are not expected to interfere with feeding, reproduction, or other biologically important functions needed to sustain an individual or a population, and would not rise to the level of harassment under MMPA.

3.4.2.1.2 Effects from Explosive Stressors

In-water explosives, which for the purposes of estimating effects includes explosives that detonate within 30 feet above the water's surface, are analyzed for effects on marine mammals. Background information on new applicable and emergent science regarding explosive effects is presented in U.S. Department of the Navy (2026b).

Due to updates to criteria and thresholds used to assess effects, densities (animals per unit area), acoustic effects modeling, and changes to the proposed use of explosives, the quantitative analyses of effects due to explosives in this section supplant the previous MITT analyses. The detailed assessment of explosive stressors under this Proposed Action is in U.S. Department of the Navy (2025a).

In addition to changes in the Proposed Action, changes in the predicted explosive effects since the 2020 SEIS/OEIS are due to the following:

- Updates to criteria used to determine if an exposure to explosive energy may cause auditory effects; non-auditory injury (including mortality); and behavioral responses. Changes to auditory criteria for explosives are the same as for other impulsive sounds. Behavioral response thresholds are related to TTS thresholds and were revised accordingly. Non-auditory injury criteria are unchanged, but the onset thresholds were applied instead of the mean thresholds. For additional details see *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase IV)* (U.S. Department of the Navy, 2025d).
- Revisions to the modeling of explosive effects in the Navy Acoustic Effects Model, including an updated explosive propagation model (U.S. Department of the Navy, 2024b).
- Updates to marine mammal densities, group size, and depth distribution. For additional details see (U.S. Department of the Navy, 2024d) and Oliveira et al. (2025).
- The number of model-predicted mortalities is not reduced due to activity-based mitigation, unlike in prior analyses.

For information on the location and quantity of explosives by NEW under each alternative, see Table 3.0-4.

Effects of Explosives on Marine Mammals: Explosions produce loud, impulsive, broadband sounds that are within the hearing range of all marine mammals. Potential impacts from explosive energy and sound include mortality, non-auditory injury, behavioral reactions, physiological stress

response, masking, and hearing loss (both AINJ and TTS). No mortality effects and two non-auditory injuries are predicted to result from training and testing using explosives.

Direct injury due to explosives depends on the charge size (i.e., NEW), the geometry of the exposure (e.g., distance and depth), and the size of the animal (larger animals are less likely to be injured). The intermittent nature of most impulsive sounds would result in very limited probability of any masking effects. Due to the rapid rise time and higher instantaneous peak pressure of impulsive noise, marine mammals closer to the detonation site are more likely to startle or respond by avoiding the area. At a greater distance from the site, a marine mammal may alert or not respond to the sound at all. Few studies on reactions to explosives exist, but responses to seismic surveys, pile driving, and other impulsive noises have been recorded. Different groups of marine mammals may respond in different ways to impulsive noise.

Mysticetes: The greater body mass of mysticetes makes them less vulnerable to injury and mortality from an explosion; however, mysticetes are more sensitive to lower frequency sounds, and the greatest amount of energy from an explosion is at frequencies below 500 Hz. Lower-frequency energy also propagates farther than higher-frequency components, potentially affecting mysticetes at greater distances from the source.

Odontocetes: Odontocetes are less massive than mysticetes and would be more vulnerable to injury and mortality closer to the detonation site. While most energy propagates at lower frequencies, energy from an explosion is present at frequencies exceeding 10 kHz, which is within hearing range of odontocetes. Detailed information describing effects on marine mammals from explosions is presented in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025a).

The Action Proponents will implement activity-based mitigation and geographic mitigation to reduce potential adverse effects from explosive stressors on marine mammals, including within important marine mammal habitats (see Chapter 4). Detailed information on geographic mitigation areas is presented in Appendix I of the 2020 SEIS/OEIS.

Training and Testing. The use of in-water explosives would increase for some bins and decrease for other bins compared to the use of explosives proposed in the previous MITT analyses. Refer to Table 3.0-4 and Table 3.0-5 for changes in the use of explosive munitions at sea and at FDM, respectively, by individual bins.

Most activities involving in-water (including surface) explosives associated with large caliber naval gunfire, missiles, bombs, or other munitions are conducted more than 12 NM from shore. Sinking Exercises are conducted greater than 50 NM from shore and could be conducted 1–2 times annually by the Navy. Certain activities with explosives may be conducted close to shore at locations identified in Appendix A, including certain Mine Warfare activities. In the MIRC, explosive activities could occur at nearshore areas to include specified ranges and designated locations around Guam, including the Agat Bay Mine Neutralization Site, and designated locations in and near Apra Harbor (e.g., Outer Apra Harbor Underwater Detonation Site).

The number of effects on each species due to exposure to explosives and sonars combined during training and testing under Alternative 1 and Alternative 2 is shown in Table 3.4-2 for seven years of activities. The number of effects due to explosives alone annually and over seven

years is provided in the *Acoustic and Explosive Effects Analysis Technical Report* (U.S. Department of the Navy, 2025c). Depending on the species, effects on individuals may be permanent (AINJ) or temporary (TTS, stress, or behavioral response). Effects resulting in AINJ and non-auditory injury would persist with the individual, which would experience persistent injury or decreased hearing sensitivity in the affected frequency range. The *Acoustic and Explosive Effects Analysis Technical Report* provides additional details on predicted effects on each species, including seasons and regions in which effects are most likely to occur; which activities are most likely to cause effects; and analysis of effects in geographic mitigation areas, where applicable. Note that the number of effects on marine mammals due to the use of explosives are over-estimated in this analysis by modeling explosions that occur at or near the water surface as underwater explosions.

No mortalities are predicted, and two non-auditory injuries (one for Fraser's dolphin and one for Risso's dolphin) are predicted to occur due to the use of explosives over a seven year period. The behavioral patterns of a limited number of individuals exposed to energy from an explosion may be interrupted. Individuals or groups may temporarily avoid areas around explosive activities if multiple detonations occur. Activities would be relatively brief and occur over small areas relative to population ranges.

For activities using explosives, the Action Proponents will implement mitigation to relocate, delay, or cease detonations when a marine mammal is sighted within or entering a mitigation zone to avoid or reduce potential effects from explosives.

Range Modernization and Sustainment. Explosives would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, training and testing activities involving the use of explosives under Alternative 1 would have a reasonably foreseeable effect on marine mammals; however, the degree of effect would be less than significant due to the following: (1) extensive pre- and during event visual observation for marine mammals; (2) implementation of mitigation measures to relocate, delay, or cease detonations when a marine mammal is sighted within or entering a mitigation zone; and (3) TTS and behavioral reactions of marine mammals would be short term, and no long-term consequences to individuals are expected. The majority of effects are not expected to interfere with feeding, reproduction, or other biologically important functions of marine mammals, and permanent effects (i.e., non-auditory injury or AINJ) would occur in low enough numbers such that the continued viability of populations is not threatened. Therefore, training and testing activities that include the use of explosives under Alternative 1 would result in less than significant effects on marine mammals.

3.4.2.1.3 Effects from Physical Disturbance and Strike Stressors

Physical disturbance, including the potential for strike during military readiness activities within the Study Area could result from (1) vessels; (2) in-water devices; (3) MEM, including non-explosive practice munitions and fragments from high-explosive munitions; and (4) seafloor devices, including cables, targets, and equipment associated with range modernization and sustainment.

The way a physical disturbance may affect a marine mammal would depend in part on the relative size of the object, the speed of the object, the location of the marine mammal in the water column, and reactions of marine mammals to anthropogenic activity, which may include avoidance or attraction. It is not known at what point or through what combination of stimuli (visual, acoustic, or through detection in pressure changes) an animal becomes aware of a vessel or other potential physical disturbances before reacting or being struck. Refer to U.S. Department of the Navy (2025a) for further discussion of the potential for disturbance from acoustic stimuli.

A physical disturbance resulting from the proposed activities should be very rare and brief, the cost from the response is likely to be within the normal variation experienced by an animal in its daily routine unless the animal is struck by a vessel, another in-water device, or MEM. If a strike does occur, the cost to the individual could range from minor disturbance to mortality. For a summary of background studies on physical disturbance and strike stressors, refer to Appendix C.

3.4.2.1.3.1 Vessels and In-Water Devices

Vessel strike to marine mammals is not associated with any specific training or testing activity but rather an inadvertent, limited, sporadic, and incidental result of Navy and USCG vessel movement within the Study Area. An examination of vessel traffic within the Study Area shows that military vessel traffic is orders of magnitude lower than commercial traffic in the same areas (Starcovic & Mintz, 2021), and this and other related studies also revealed that while commercial traffic is relatively steady throughout the year, Navy vessel use is episodic, based on specific exercises being conducted at different times of the year (Mintz, 2012; Mintz, 2016; Starcovic & Mintz, 2021). Aggregated data from 2014 to 2018 breaking down vessel traffic by the type of vessel, show that U.S. and foreign military vessels combined make up less than 2 percent of vessel traffic intensity in the Study Area. For comparison, commercial bulk carriers account for 56 percent of total vessel traffic, and cargo vessels account for 21 percent (Starcovic & Mintz, 2021). Based on the same data, the U.S. Navy and USCG combined make up less than 1 percent of total estimated vessel time in the Study Area.

There have been no vessels strikes on marine mammals by Navy or USCG vessels reported in the Study Area, and the Navy and USCG do not anticipate vessel strikes to be a significant threat to marine mammal populations within the Study Area. NMFS made the same determination in their 2020 Biological Opinion evaluating the activities proposed in the 2020 SEIS/OEIS (National Marine Fisheries Service, 2020a). Since there are no vessel strike data from the Study Area, the Poisson analysis used by Navy and NMFS in other study areas to estimate the probability of a vessel strike occurring in the Study Area over the 7-year MMPA permit period is not possible.

In-water devices could pose a collision risk to marine mammals when operated at high speeds or if they are unmanned. In-water devices, such as unmanned underwater vehicles, and in-water devices towed from unmanned platforms that move slowly through the water are highly unlikely to strike a marine mammal, because a highly mobile marine mammal could easily avoid the object. In-water devices towed by manned platforms would have observers stationed on the towing platform to implement mitigation and standard safety measures employed when towing in-water devices (see Chapter 4). Torpedoes (a type of in-water device) are generally

smaller than most vessels. The Navy reviewed torpedo design features and many previous anti-submarine warfare torpedo exercises to assess the potential of torpedo strikes on marine mammals. In thousands of exercises in which torpedoes were fired or in-water devices used, there have been no recorded instances of a marine mammal strike.

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

Training and Testing. As shown in Table 3.0-10 in Section 3.0, the number of events that use vessels would decrease by about 50 percent compared with the 2020 SEIS/OEIS totals. The concentration of vessels in the Study Area and the manner of training and testing would remain consistent with the types of activities conducted in the Study Area over the last decade.

Physical disturbance and strike from large vessels and in-water devices would be more likely in waters closer to shore than in the open ocean farther from shore, because the concentration of vessel traffic and in-water device activities is higher and coincides with higher marine mammal densities for many cetacean species (e.g., dolphins) (U.S. Department of the Navy, 2024c). Marine mammal species that tend to occur over the continental shelf would therefore have a greater potential to be adversely affected. Large vessels may occasionally be required to operate at speeds that are higher than average operating speeds, which may pose a greater strike risk to marine mammals, because there would be less time for the vessel crew to detect a marine mammal and maneuver to avoid a strike. There would also be less time over a given distance for a marine mammal to react and avoid the vessel. Two of the three Navy vessel strikes of whales that occurred off California in 2023 were associated with vessels operating at higher speeds; however, the third strike occurred when a vessel was traveling at a relatively low speed. Vessel speed data reported by Starcovic and Mintz (2021) show that Navy vessels typically travel between 5 and 10 knots around Guam and the CNMI, and between 10 and 20 knots in offshore waters along routes towards Asia, Hawaii, and the U.S. West Coast.

The use of small crafts traveling at higher speeds (i.e., greater than 10 knots) during military readiness activities occurs more frequently, although not exclusively, in nearshore waters, ports, and harbors than in offshore waters. Nearshore waters in the Study Area are generally more confined waterways where species that prefer deep, offshore waters do not regularly occur. Odontocetes known to occur in nearshore waters, such as bottlenose dolphins and spinner dolphins, are not as susceptible to vessel strikes as mysticetes; although strikes are known to occur to these species (see U.S. Department of the Navy (2025b) for more information). No vessel strikes of marine mammals have been reported in the MITT Study Area due to Navy or USCG vessel activities in nearshore waters and ports and harbors.

Physical disturbance from small crafts operating at higher speeds would be limited to areas where those vessels tend to operate on a regular basis, specifically, closer to shore, in ports and harbors (see Table 3.0-8 and Table 3.0-9 for information on vessel types, sizes, and typical operating speeds). Marine mammal species with the highest densities in these areas (e.g., bottlenose dolphins and spinner dolphins) would have a higher potential for vessel strike by

small craft. Spinner dolphins resting in nearshore bays or coves during the day may be particularly susceptible to vessel strike. The Navy established a geographic mitigation area in nearshore waters of Agat Bay, a known spinner dolphin resting area, in the 2020 SEIS/OEIS that limits use of the area for certain Navy activities in part to reduce potential effects on spinner dolphins.

Military readiness activities involving vessels and in-water devices may occur year-round; therefore, adverse effects from physical disturbance would depend on each species' seasonal patterns of occurrence or degree of residency, primarily in the continental shelf portions of the Study Area. Refer to U.S. Department of the Navy (2025b) for species seasonal distribution patterns and migratory behavior. As previously indicated, any physical disturbance from vessel movements and use of in-water devices is not expected to result in more than a brief behavioral response (e.g., avoidance).

Range Modernization and Sustainment. Vessels would be used to deploy targets and bottom-placed instruments. During deployment the vessels would move very slowly (0-3 knots) and would not pose a collision risk to marine mammals occurring near the vessel. Activity-based mitigation would further reduce the potential for physical disturbance and strike.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving the use of vessels and in-water devices under Alternative 1 would have a reasonably foreseeable effect on marine mammals; however, the degree of effect would be less than significant, because, as described above: (1) the likelihood of a vessel strike on a marine mammal remains low; (2) odontocetes are generally able to avoid an approaching vessel; and (3) behavioral effects due to disturbance are not expected to interfere with feeding, reproduction, or other biologically important functions such that the continued viability of the population would be threatened. Therefore, military readiness activities that include the use of vessels and in-water devices under Alternative 1 would result in less than significant effects.

A vessel strike on an individual marine mammal would be considered a significant adverse effect on the individual even if the strike does not result in mortality. However, as noted above, no vessel strikes of marine mammals due to Navy or USCG activities have been reported in the Study Area, including nearshore waters, ports, and harbors, so the Poisson probability analysis used by the Navy and NMFS, which is reliant on historical data, is not possible. Therefore, military readiness activities that involve the potential for strike from vessels and in-water devices under Alternative 1 are not likely to occur.

3.4.2.1.3.2 Military Expended Materials

This section analyzes the strike potential to marine mammals from the following categories of MEM: (1) all sizes of non-explosive practice munitions, (2) fragments from high-explosive munitions, (3) expendable targets and target fragments, and (4) expended materials other than munitions. Activities that use MEM are shown in Appendix B, and quantities of expended items are shown in Table 3.0-12 through Table 3.0-15.

The primary concern is the potential for a marine mammal to be struck by MEM at or near the water's surface. While disturbance or strike from an item falling through the water column is

possible, it is not very likely given that objects designed to be aerodynamic generally sink slowly through the water and can be avoided by marine mammals.

The potential for marine mammals to be struck by MEM was evaluated using a statistical probability model to estimate direct strike exposures based on four scenarios developed using marine mammal densities and the dimensions of MEM types (e.g., bombs). The analysis is described in detail in Appendix F and briefly summarized here.

Training and Testing. Military readiness activities that involve MEM would occur in nearshore and offshore waters of the Study Area. The marine mammal species with the highest average annual density (the average of four seasonal densities) is pantropical spotted dolphin, with a density of 0.13498 animals per km^2. The probability of exposure to a direct strike, including a buffer area surrounding the animal, from MEM was calculated to be 0.0000004, and the number of predicted exposures was calculated to be 0.167236 per year. Predicted exposures for all other marine mammal species are lower, in many cases several orders of magnitude lower, mainly because densities for all other species are lower. For ESA-listed species, humpback whale had the highest probability of exposure at 0.000002, and the highest number of predicted exposures at 0.150217 per year.

The analysis is likely an overestimation of the probability of a direct strike for the following reasons: (1) it calculates the probability of a single military item (of all the items expended over the course of the year) hitting a single animal at its species' highest average annual density; (2) it does not take into account the possibility that an animal may avoid military activities occurring prior to the MEM impact; (3) it does not take into account the possibility that an animal may not be at the water surface; (4) it does not take into account that most projectiles fired during training and testing activities are fired at targets and only a very small portion of those projectiles would miss the target and hit the water with their maximum velocity and force; (5) the scenarios include a buffer area to account for an MEM missing the animal and striking the water's surface nearby and disturbing the animal; and (6) it does not quantitatively take into account the Navy avoiding animals that are sighted through the implementation of mitigation measures.

Range Modernization and Sustainment. Activities would include deploying, moving, and retrieving mine countermeasure targets and instrumentation on established ranges. Temporary training areas would be established by installing devices that could include hydrophones anchored to the seafloor similar to the way mine training shapes or other targets are anchored. Temporary range instrumentation is removed after completing the event. Some anchors may not be recovered and, in that case, would be considered MEM; however, anchors are analyzed as seafloor devices and would not pose a physical disturbance and strike risk to marine mammals.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving the use of MEM under Alternative 1 would have a reasonably foreseeable effect on marine mammals; however, the degree of effect would be less than significant, because, as described above, (1) the probability of a direct strike is so low as to be discountable even for the most abundant species; (2) the predicted number of exposures to a disturbance or strike for the most abundant species rounds to zero; and (3) even if it were to occur, a direct strike on an individual

marine mammal may or may not result in injury or mortality, depending on the type of MEM (e.g., a large projectile is more likely to cause injury than a small decelerator/parachute) and the species (e.g., a large whale is less like to sustain injury than a small dolphin). Serious injury or mortality would be considered a significant effect on the individual; however, such an effect, even if it were to occur, is not expected to threaten the continued viability of a population.

3.4.2.2 Effects on Marine Mammals under Alternative 2

Under Alternative 2, the number of activities with associated acoustic, explosive, and physical disturbance stressors would be equal to or increase compared to Alternative 1. However, as described above, the Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS), activity-based mitigation, and geographic mitigation (Chapter 4) to reduce potential adverse effects from acoustic and explosive stressors on marine mammals, including within important marine mammal habitats. While the geographic mitigation areas are established for specific species, the limitations on sonar use defined in the mitigation measures would also benefit other marine species, including other marine mammals, occurring in the geographic mitigation areas. Detailed information on geographic mitigation areas is presented in Appendix I of the 2020 SEIS/OEIS. Although activities involving physical disturbance and strike would increase under Alternative 2, effects would not be measurably different than under Alternative 1 because more vessel movements do not necessarily equate to greater adverse effects. Additionally, the number of predicted exposures to MEM for pantropical spotted dolphin was calculated to be 0.204858 per year and 0.158934 for humpback whale under Alternative 2. As such, increases in military readiness activities would not result in substantive changes to the potential for or types of effects on marine mammals, and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving acoustic, explosive, and physical disturbance and strike stressors under Alternative 2 would result in less than significant effects on marine mammals.

3.4.2.3 Summary of Potential Effects on Marine Mammals

The total number of effects on each marine mammal species due to exposure to both sonar and explosives during training and testing under Alternative 1 and Alternative 2 are shown in Table 3.4-2 for seven years of activities. Effects from vessel noise, aircraft noise, weapons noise, and physical disturbance and strike stressors; although reasonably foreseeable, would not rise to the level of take as defined under the MMPA.

3.5 SEA TURTLES

3.5.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on sea turtles found in Section 3.5 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

Information describing each sea turtle species, including species where NMFS has designated DPSs, is presented in the *Supplemental Biological Information Technical Report for the Mariana Training and Testing Study Area* (U.S. Department of the Navy, 2025b). The content of the

technical report is focused on information necessary to support the analysis of adverse effects on sea turtles from the Proposed Action.

3.5.1.1 Sea Turtles in the Study Area

There are five sea turtle species with known occurrence in the Study Area. These species include the green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), loggerhead sea turtle (*Caretta caretta*), olive ridley sea turtle (*Lepidochelys olivacea)*, and leatherback sea turtle (*Dermochelys coriacea*). Each species is ESA listed as endangered or threatened. Information on the occurrence of these species is in Table 3.5-1. The Navy is consulting with NMFS as required by section 7(a)(2) of the ESA.

Sea snake status and distribution was reviewed for updated literature since the 2020 SEIS/OEIS. There are no verified records of sea snakes in nearshore waters of the Mariana Islands.

3.5.1.1.1 Critical Habitat in the Study Area

No critical habitat has been designated for ESA-listed sea turtle species in the Study Area. Both NMFS (88 FR 46472) and U.S. Fish and Wildlife Service (USFWS) (88 FR 46476) have issued proposed rules to designate critical habitat within the Study Area. A detailed description of the proposed critical habitat for the green sea turtle is included in the *Supplemental Biological Information Technical Report for the Mariana Training and Testing Study Area* (U.S. Department of the Navy, 2025b). NMFS declined to include nearshore waters of FDM within the proposed designation.

Table 3.5-1: Sea Turtle Occurrence Within the Study Area

Species Name and Regulatory Status				Presence in Study Area[1]	
Common Name		Scientific Name	Endangered Species Act Status	Open Ocean/ Transit Corridor	Coastal/ Ocean
Family Cheloniidae (hard-shelled sea turtles)					
Green sea turtle[2]	Central West Pacific DPS[3]	*Chelonia mydas*	Endangered	Yes	Yes[4]
	East Indian-West Pacific DPS		Threatened		No
	Central North Pacific DPS		Threatened		No
Hawksbill sea turtle (throughout range)		*Eretmochelys imbricata*	Endangered	Yes	Yes[4,5]
Loggerhead sea turtle	North Pacific DPS	*Caretta caretta*	Endangered[5]	Yes[6]	Yes[6]
Olive ridley sea turtle		*Lepidochelys olivacea*	Endangered[7]	Yes[6]	Yes[6]
Family Dermochelyidae (leatherback sea turtle)					
Leatherback sea turtle	(throughout range)	*Dermochelys coriacea*	Endangered	Yes[6]	Yes[6]

[1]MITT Study Area = Mariana Islands Training and Testing Study Area

[2]In 2015, NMFS published a final rule that classifies green sea turtles within the Study Area as part of the Western Pacific Distinct Population Segment. Green sea turtles within other DPS may occur within the Study Area—the East Indian-West Pacific DPS and the Central North Pacific DPS.

[3]In 2023, NMFS issued a proposed rule for green sea turtle critical habitat designation (88 FR 46372) containing four essential features, two of which overlap with the Central West Pacific DPS and Navy training and testing activities. A detailed description of the proposed critical habitat for the green sea turtle is included in the *Supplemental Biological*

Species Name and Regulatory Status			Presence in Study Area[1]	
Common Name	Scientific Name	Endangered Species Act Status	Open Ocean/ Transit Corridor	Coastal/ Ocean

Information Technical Report for the Mariana Training and Testing Study Area (U.S. Department of the Navy, 2025b). NMFS declined to include nearshore waters of FDM within the proposed designation.
[4]Indicates nesting activity within the Study Area. Only green sea turtles and hawksbill sea turtles are known to nest in the Study Area.
[5]The Northeast Atlantic Ocean, Mediterranean Sea, North Indian Ocean, North Pacific Ocean, and South Pacific Ocean Distinct Population Segments are listed as Endangered; the Northwest Atlantic Ocean, South Atlantic Ocean, Southeast Indo-Pacific Ocean, and Southwest Indian Ocean Distinct Population Segments are listed as threatened.
[6]Species occurrence is only expected to be migratory and occur in extremely low densities.
[7]Separate populations of olive ridleys are listed as threatened or endangered, both likely occur within the Study Area.

3.5.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on sea turtles and considers the same stressors as previous MITT analyses, which include (1) acoustic (sonar and other transducers, vessel noise, aircraft noise, and weapons noise), (2) explosive (explosions in-water), (3) energy (in-water electromagnetic devices, high-energy lasers), (4) physical disturbance and strike (vessels and in-water devices, MEM, seafloor devices), (5) entanglement (decelerators/parachutes, wires and cables), (6) ingestion (MEM), and (7) secondary stressors.

For each stressor, implementation of SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and activity-based mitigation measures (Chapter 4) established in previous consultations is considered part of the Proposed Action when determining if an if an effect is reasonably foreseeable (as described in Section 3.0.4). In general, the Navy's portfolio of mitigation measures are not specific to sea turtles; however, these measures would reduce the likelihood of adverse interactions with military readiness activities. Only green sea turtles and hawksbill sea turtles are expected to occur within nearshore waters of Guam and other islands in the Mariana Archipelago, where most of the mitigation zones are established as part of the Proposed Action.

Based on the framework presented in Section 3.0.4, the Navy concluded that, under the Proposed Action, effects from energy stressors, seafloor devices (a substressor of physical disturbance and strike stressors), entanglement stressors, ingestion, and secondary stressors on sea turtles would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

Effects on sea turtles from acoustic, explosive, and physical disturbance and strike (except for seafloor devices) stressors would be reasonably foreseeable; effects are considered significant if populations of sea turtles are impacted, areas used by sea turtles are denied, or habitat is physically altered to the point of no longer supporting sea turtles. The following sections analyze the effects of the Proposed Action on sea turtles and take into account the analysis presented in Section 3.5 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.5.2.1 Effects on Sea Turtles Under Alternative 1

3.5.2.1.1 Effects from Acoustic Stressors

This section summarizes the potential effects of acoustic stressors used during military readiness activities within the Study Area. The acoustic substressors included for analysis

include (1) sonar and other transducers, (2) vessel noise, (3) aircraft noise, and (4) weapons firing.

The types and quantities of sonar sources, the number of events using vessels and aircrafts, and the locations of those events under each alternative are shown in Section 3.0.4.1.1. The detailed assessment of these acoustic stressors under this Proposed Action is in Appendix C. Changes in the predicted acoustic effects are due to the following:

- Updates to criteria used to determine if acoustic stressors may cause auditory effects and behavioral responses. Changes to the auditory effects criteria include the weighted non-impulsive sound exposure level thresholds decreased by 22 decibels referenced to 1 micropascal squared seconds (dB re 1 μPa^2s).
- Revisions to the modeling of explosive effects in the Navy Acoustic Effects Model. See the technical report *Acoustic and Explosive Concepts Technical Report* (U.S. Department of the Navy, 2026b).
- Updates to data on sea turtle presence, including estimated density of each species or stock (number of animals per unit area), group size, and depth distribution. For additional details see the technical reports *U.S. Navy Marine Species Density Database Phase IV for the Mariana Islands Training and Testing Study Area* (U.S. Department of the Navy, 2024d) and *Dive Distribution and Group Size Parameters for Marine Species Occurring in the U.S. Navy's Mariana Islands Training and Testing Study Areas* (Oliveira et al., 2025).
- Changes in the locations, numbers, and types of modeled military readiness activities as described in Chapter 2, and associated quantities (hours and counts) of acoustic stressors shown in Section 3.0.4.1.1.
- As discussed in Section 3.5.2.1, the Action Proponents will implement activity-based mitigation under Alternative 1 and Alternative 2 to reduce potential effects from acoustic stressors on sea turtles. However, the Action Proponents do not reduce the number of model-predicted effects, due to using activity-based mitigation.

3.5.2.1.1.1 Sonars and Other Transducers

Sonars have the potential to affect sea turtles by causing a range of effects, from behavioral responses to AINJ. As discussed in the *Acoustic and Explosive Concepts Technical Repo*rt (U.S. Department of the Navy, 2026), sea turtle hearing is most sensitive from 100 to 400 Hz and limited over 1 kHz. Therefore, only sonars below 2 kHz, including low-frequency sonar, are analyzed for their effects on sea turtles. Modeling results showed no results for significant behavioral response, TTS, or auditory injury effects from sonar and other transducers under Alternative 1 and 2.

The Action Proponents will also implement geographic mitigation to reduce potential acoustic effects within sea turtle habitats supporting key biological behaviors, including breeding and resting behaviors (Chapter 4). While established for specific species, the limitations on sonar use defined in the mitigation measures would also benefit other marine species, including sea turtles, occurring in the geographic mitigation areas. Detailed information on geographic mitigation areas is presented in Appendix I of the 2020 SEIS/OEIS.

Training and Testing. Impacts from sonars to sea turtles within the Study Area would be limited to systems operating below 2 kHz, primarily from low-frequency sonars but could also include some broadband and lower mid-frequency sources (less than 2 kHz). These systems could be used throughout the MITT Study Area but are typically operated greater than 3 NM offshore. Although the use of low-frequency sonars has increased since the prior analysis, they are still used less than higher-frequency sources across the Study Area, resulting in a low overall risk of exposure. Low-frequency sonars are operated less often than mid- or high-frequency sources throughout the Study Area. Activities using sonar would generally occur within the MIRC, around inshore locations, and within Apra Harbor. Activities using sonar range from single-source, limited duration events to multi-day events with multiple sound sources on different platforms. The types of sonars and the way they are used differ between primary mission areas. This in turn influences the potential for effects on exposed sea turtles.

Range Modernization and Sustainment. Sonar would not be used during range modernization and sustainment.

Conclusion. Consistent with previous MITT analyses, training and testing activities involving sonars under Alternative 1 would have a reasonably foreseeable effect on sea turtles; however, the degree of effect would be less than significant, for the following reasons: (1) sea turtle hearing ability is limited to lower frequencies; and (2) no effects from sonars were predicted by the Navy's acoustic effects model, as discussed in the *Acoustic and Explosive Impacts Supporting Information* Technical Report.

3.5.2.1.1.2 Vessel Noise

The broadband, non-impulsive, and continuous noise from vessels is within the hearing range of all sea turtles (Appendix C). Additional information on sea turtle hearing and potential impacts on sea turtles from non-impulsive broadband sound is discussed in the *Acoustic and Explosive Concepts Technical* Report (U.S. Department of the Navy, 2026a).

Training and Testing. Sea turtles may be exposed to vessel-generated noise throughout the Study Area (Table 3.0-10). Military readiness activities with vessel-generated noise would be conducted as described in the *Proposed Activities and Activity Descriptions* sections. Based on the updated background and analysis for training and testing under Alternative 1, vessel noise effects on sea turtles could include brief behavioral reactions and short periods of masking while in the proximity of a vessel.

Range Modernization and Sustainment. Vessel noise would be produced during range modernization and sustainment during target and instrument placement and recovery.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving vessel noise under Alternative 1 would have a reasonably foreseeable effect on sea turtles; however, the degree of effect would be less than significant for the following reasons (1) activities that include the use of vessels would generate transient noise that would be temporary (lasting only while the vessel is transiting through the area; and (2) vessel noise may mask biologically important sounds, but would not measurably interfere with feeding, reproduction, or other biologically important functions needed to sustain an individual or a population.

3.5.2.1.1.3 Aircraft Noise

Aircraft (i.e., fixed-wing and rotary-wing) are used for a variety of military readiness activities, and sea turtles may be exposed to aircraft-generated noise throughout the Study Area (Table 3.0-11). Additional information on the assessment of this acoustic stressor under the Proposed Action is in the *Acoustic and Explosive Concepts Technical Report*.

Training and Testing. Based on the updated background and analysis for training and testing under Alternative 1, aircraft noise effects on sea turtles would be limited to temporary (lasting up to several hours) behavioral and stress-startle responses to individual sea turtles found within localized areas. Sea turtles at or near the surface when an aircraft flies overhead at low altitude may startle, divert their attention to the aircraft, or avoid the immediate area by swimming away or diving.

Range Modernization and Sustainment. Aircraft noise would not be produced during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, training and testing activities involving aircraft noise under Alternative 1 would have a reasonably foreseeable effect on some sea turtles. However, the degree of effect would be less than significant for the following reasons: (1) activities that include the use of aircraft would generate temporary and transient noise that would result in only minor disturbances, if any; and (2) such disturbances are not expected to interfere with feeding, reproduction, or other biologically important functions needed to sustain an individual or a population.

3.5.2.1.1.4 Weapons Noise

Firing of guns, vibrations from the hull of ships, items that impact the water's surface, and items launched from underwater may produce weapons noise that are within the hearing range of all sea turtles.

Training and Testing. Sea turtles may be exposed to sounds caused by the firing of weapons, objects in flight, and impact of non-explosive munitions on the water surface during activities conducted at sea. This incidental noise is collectively called weapons noise. Training and testing activities using gunnery and other weapons that generate firing noise would be conducted as described in Chapter 2 and Appendix A.

Based on the updated background and analysis for training and testing under Alternative 1, the effect of weapons noise on sea turtles would be limited to temporary (lasting up to several minutes) behavioral and stress-startle responses to individual sea turtles found within localized areas. Because firing of medium- and large-caliber gunnery would occur greater than 12 NM from shore, with the exception of training and testing activities occurring on FDM, effects on coastal species are unlikely.

Range Modernization and Sustainment. Weapons noise would not be produced during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving weapons noise under Alternative 1 would have a reasonably foreseeable effect on sea turtles; however, the degree of effect would be less than significant, for the following reasons: (1)

percussive noise generated by weapons firing noise would be temporary (lasting for a few seconds to several minutes); and (2) weapons firing noise may elicit startle responses, but normal behaviors (such as feeding and courtship in nearshore waters) would be expected to resume soon after a weapons firing event with no loss in population viability.

3.5.2.1.2 Effects from Explosive Stressors

In-water explosives, which for the purposes of estimating effects includes explosives that detonate within 30 feet (ft.) above the water's surface, are analyzed for effects on sea turtles. Background information on new applicable and emergent science regarding explosive effects is presented in U.S. Department of the Navy (2025a).

In addition to changes in the Proposed Action, changes in the predicted explosive effects since the 2020 SEIS/OEIS are due to the following:

- Updates to criteria used to determine if an exposure to explosive energy may cause auditory effects, non-auditory injury or mortality, and behavioral responses. Changes to the auditory effects criteria include the weighted impulsive sound exposure level thresholds decreased by 20 dB re 1 μPa^2s, and the impulsive sound pressure level thresholds decreased by 2 dB re 1 µPa.
- Revisions to the modeling of explosive effects in the Navy Acoustic Effects Model. See the technical report, *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase IV Training and Testing* (U.S. Department of the Navy, 2024b).
- Updates to data on sea turtle presence, including estimated density of each species or stock (number of animals per unit area), group size, and depth distribution. For additional details, see the technical report *Dive Distribution and Group Size Parameters for Marine Species Occurring in the U.S. Navy's Mariana Islands Training and Testing Study Areas* (Oliveira et al., 2025).
- Changes in the locations, numbers, and types of modeled military readiness activities as described in Chapter 2 and associated quantities of explosives (counts) shown in Section 3.0.4.1.2.
- As discussed in Section 3.5.2.1, the Action Proponents will implement activity-based mitigation under Alternative 1 and Alternative 2 to reduce potential effects from explosives on sea turtles. The Action Proponents will also implement geographic mitigation to reduce potential explosive effects, as identified in Chapter 4. Mitigation areas for seafloor resources, as described in Section 3.5.2.1, may also provide some level of protection from explosive effects for sea turtles that feed among, shelter, or otherwise inhabit these habitats.
- No reduction of model-predicted effects due to animal avoidance of a sound source, unlike in prior analyses.

The Action Proponents will implement activity-based mitigation and geographic mitigation under Alternative 1 and Alternative 2 to reduce potential adverse effects from explosives on sea turtles (refer to Chapter 4). Detailed information on geographic mitigation areas is presented in Appendix I of the 2020 SEIS/OEIS.

For information on the types and quantity of explosives by NEW under each alternative, see Table 3.0-4.

Training and Testing. The use of in-water explosives would increase for some bins and decrease for other bins compared to the use of explosives proposed in the previous MITT analyses. Refer to Table 3.0-4 and Table 3.0-5 for changes in the use of explosive munitions at sea and at FDM, respectively, by individual bins.

Most activities involving in-water (including surface) explosives associated with large caliber naval gunfire, missiles, bombs, or other munitions are conducted more than 12 NM from shore, where sea turtle densities are relatively lower than nearshore coastal environments in the Mariana Islands. Sinking exercises are conducted greater than 50 NM from shore and could be conducted 1–2 times annually by the Navy. Certain activities with explosives may be conducted close to shore at locations identified in Appendix A, including certain Mine Warfare activities. In the MIRC, explosive activities could occur at nearshore areas, to include specified ranges and designated locations around Guam, such as the Agat Bay Mine Neutralization Site, and designated locations in and near Apra Harbor (e.g., Outer Apra Harbor Underwater Detonation Site). In addition, bombing exercises and some gunnery and missile exercises can occur closer to shore at FDM, and misses and ricochets may cause in-water explosions in nearshore waters surrounding FDM.

The number of effects on each species due to exposure to explosives during training and testing under Alternative 1 is discussed in the *Acoustic and Explosive Effects Analysis Technical Report* U.S. Department of the Navy (2025a). This technical report provides additional details on modeled effects on each species, including seasons and regions in which effects are most likely to occur; which activities are most likely to cause effects; and analysis of effects in geographic mitigation areas, where applicable. The technical report also shows total effects to each species due to training or testing activities under this alternative and explains how effects are summed to estimate maximum annual and seven-year total effects. The number of effects on sea turtles are overestimated in this analysis by modeling explosions at or near the water surface as underwater explosions.

No mortalities are predicted, and just one non-auditory injury (for a green sea turtle) is predicted to occur due to the use of explosives over a seven-year period. For activities using explosives, the Action Proponents will implement mitigation to relocate, delay, or cease detonations when a sea turtle is sighted within or entering a mitigation zone to avoid or reduce potential effects from explosives.

Based on the updated background and analysis for training and testing under Alternative 1, effects on individuals may be permanent (auditory or non-auditory injuries) or temporary (TTS, masking, stress, or behavioral response). The behavioral patterns of a limited number of individuals may be interrupted. Individuals or groups may temporarily avoid areas around explosive activities if multiple detonations occur. Activities would be relatively brief and occur over small areas relative to population ranges.

Range Modernization and Sustainment. Explosives would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, training and testing activities involving the use of explosives under Alternative 1 would have a reasonably foreseeable effect on sea turtles however, the degree of effect would be less than significant, based on the following: (1) estimated behavioral and TTS effects from explosives are expected to be short term and would not result in substantial changes to behavior, growth, survival, annual reproductive success, lifetime reproductive success, or species recruitment for an individual; (2) activities would not result in population-level effects; (3) low levels of estimated AINJ and injuries from explosives may have deleterious effects on the fitness of an individual turtle but are not expected to affect the fitness of enough individuals to cause population level effects; and (4) no mortalities from explosives were modeled. Additionally, SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and the mitigation measures described in Chapter 4 would be implemented.

3.5.2.1.3 Effects from Physical Disturbance and Strike Stressors

The evaluation of the effects from physical disturbance and strike stressors on sea turtles focuses on proposed activities that affect sea turtles by an object that is moving through the water (e.g., vessels and in-water devices), dropped into the water (e.g., MEM), deployed on the seafloor (e.g., mine shapes, anchors, wires as part of range modernization actions), or propelled through the water column (e.g., explosive fragments).

Detailed information on physical disturbance effect categories, as well as effects specific to each substressor, is provided in Appendix F.

3.5.2.1.3.1 Vessels and In-Water Devices

Vessel strike to sea turtles is not associated with any specific training or testing activity but rather an inadvertent, limited, sporadic, and incidental result of Navy and USCG vessel movement within the Study Area. There have been no vessel strikes on sea turtles by Navy or USCG vessels reported in the Study Area. The Navy and USCG do not anticipate vessel strikes to be a significant threat to sea turtle populations within the Study Area.

In-water devices could pose a collision risk to sea turtles when operated at high speeds or if they are unmanned. In-water devices, such as unmanned underwater vehicles, and in-water devices towed from unmanned platforms that move slowly through the water are highly unlikely to strike a sea turtle. In-water devices towed by manned platforms would have observers stationed on the towing platform to implement mitigation and standard safety measures employed when towing in-water devices (see Chapter 4).

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

Training and Testing. Table 3.0-10 provides estimates of relative vessel use in the Study Area. The concentration of vessels in the open ocean areas of the Study Area and the manner of training and testing would remain consistent with the levels and types of activities undertaken in the Study Area over the last decade, as described in the previous MITT analyses. Alternative 1

includes an increase in small boat maneuvering within Apra Harbor, which may increase exposure to green sea turtles (and to a lesser extent, hawksbill sea turtles) to strike risk.

Vessel movement can be widely dispersed throughout the Study Area but is more concentrated near naval ports, piers, and range areas. Navy training vessel traffic would especially be concentrated near Apra Harbor. Smaller support craft usage would also be more concentrated in the coastal areas near naval installations, ports, and ranges.

Although the likelihood is low, a harmful interaction with a vessel or in-water device cannot be discounted, and sea turtle strikes in high vessel traffic areas (e.g., Apra Harbor) have been reported. Potential effects of exposure to vessels may result in substantial changes in an individual's behavior, growth, survival, annual reproductive success, lifetime reproductive success (fitness), or species recruitment. Any strike at high speed is likely to result in significant injury. Potential effects of exposure to vessels are not expected to result in population-level effects for all sea turtle species. Under Alternative 1 training and testing activities, the Action Proponents will continue to implement activity-based mitigation to avoid or reduce the potential for vessel and in-water device strike of sea turtles (see Section 4.6.2). Within a mitigation zone of a vessel or in-water device, trained observers will relay sea turtle locations to the operators, who are required to change course when practical. A mitigation zone size is not specified for sea turtles to allow flexibility based on vessel type and mission requirements (e.g., small boats operating in a narrow harbor).

Range Modernization and Sustainment. Vessels would be used to deploy targets and bottom-placed instruments. During deployment the vessels would move very slowly (0–3 knots) and would not pose a collision risk to sea turtles occurring near the vessel. Activity-based mitigation would further reduce the potential for physical disturbance and strike.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving the use of vessels and in-water devices under Alternative 1 would have a reasonably foreseeable effect on sea turtles; however, the degree of effect would be less than significant, because (1) the likelihood of a vessel strike on a sea turtles remains low; and (2) behavioral effects due to disturbance are not expected to interfere with feeding, reproduction, or other biologically important functions such that the continued viability of the population would be threatened.

3.5.2.1.3.2 Military Expended Materials

This section analyzes the strike potential to sea turtles from the following categories of MEM: (1) all sizes of non-explosive practice munitions, (2) fragments from high-explosive munitions, (3) expendable targets and target fragments, and (4) expended materials other than munitions, such as sonobuoys, expended bathythermographs, and torpedo accessories. For a list of the types of activities that use MEM, refer to Appendix B, and for a discussion on where items would be used or expended under each alternative, see Table 3.0-12 through Table 3.0-15.

The primary concern is the potential for a sea turtle to be struck by MEM at or near the water's surface. While disturbance or strike from an item falling through the water column is possible, it is not very likely given that objects generally sink slowly through the water and can be avoided by sea turtles. Therefore, the discussion of MEM strikes focuses on the potential of a strike at the surface of the water.

Training and Testing. MEM that may cause physical disturbance or strike on sea turtles are listed in Table 3.0-12 through 3.0-15.

Appendix F includes more information on the type and quantities of MEM proposed to be used, and an analysis of potential strike risk of MEM on sea turtles. Green sea turtles, the sea turtle species with the highest average annual density (the average of four seasonal densities), was used to assess probability of MEM strike. Using four probability of strike scenarios (see Appendix F), the probability of exposure to a direct strike from training activities was calculated to be 0.084926 per year based on an average of the four probability of strike scenarios. For testing activities, the strike risk was lower, calculated to be 0.0361857.

The analysis in Appendix F is likely an overestimation of the probability of a direct strike for the following reasons: (1) it calculates the probability of a single military item (of all the items expended over the course of the year) hitting a single animal at its species' highest average annual density; (2) it does not take into account the possibility that a sea turtle may avoid military activities occurring prior to the MEM impact; (3) it does not take into account the possibility that a sea turtle may not be at the water surface; (4) it does not take into account that most projectiles fired during training and testing activities are fired at targets and only a very small portion of those projectiles would miss the target and hit the water with their maximum velocity and force; (5) the scenarios include a buffer area to account for an MEM missing the sea turtle and striking the water's surface nearby and disturbing the animal; and (6) it does not quantitatively take into account the Navy avoiding sea turtles that are sighted through the implementation of mitigation measures.

Range Modernization and Sustainment. No MEM would be expended during range modernization and sustainment activities. Some anchors may not be recovered and become MEM, but those are covered in the analysis of seafloor devices.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving the use of MEM under Alternative 1 would have a reasonably foreseeable effect on sea turtles; however, the degree of effect would be less than significant because, as described above: (1) calculated strike risk probability is less than 0.1 for green sea turtles, the sea turtle species with the highest densities within the Study Area; (2) the analysis in Appendix F makes assumptions that likely overestimate the calculated probability (such as assuming that sea turtles are at the surface at all times, assuming sea turtles display no avoidance behavior, and not accounting for mitigation measures); and (3) the low probability of strike calculation may or may not result in injury or mortality, depending on the type of MEM (e.g., a large projectile is more likely to cause injury than a small decelerator/parachute).

3.5.2.2 Effects on Sea Turtles Under Alternative 2

Under Alternative 2, the number of activities with associated acoustic, explosive, and physical disturbance stressors would be equal to or increase compared to Alternative 1. However, as described above, the Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS), activity-based mitigation, and geographic mitigation (Chapter 4) to reduce potential adverse effects from acoustic and explosive stressors. The Navy's portfolio of mitigation measures is not specific to sea turtles; however, these measures would reduce the likelihood of

adverse interactions with military readiness activities. Detailed information on geographic mitigation areas is presented in Appendix I of the 2020 SEIS/OEIS.

Under Alternative 2, the use of sonar sources would not change from Alternative 1, and increases in other acoustic stressors would not result in substantive changes to the potential for or types of effects on sea turtles. The use of explosives during training and testing activities would be nearly identical to Alternative 1 and result in the same modeled effects for all sea turtle species (see the *Acoustic and Explosive Effects Analysis Technical Report* U.S. Department of the Navy (2025a)). Effects from activities involving physical disturbance and strike would not be measurably different than under Alternative 1 because more vessel movements do not necessarily equate to greater adverse effects, and the quantity of materials expended would increase, but not significantly (see Section 3.0.4.1.3). Additionally, the locations where military materials are expended would be the same as Alternative 1. As such, increases in military readiness activities would not result in substantive changes to the potential for or types of effects on sea turtles, and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving acoustic, explosive, and physical disturbance and strike stressors under Alternative 2 would result in less than significant effects on sea turtles.

3.6 SEABIRDS

3.6.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on seabirds found in Section 3.6 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

Information describing seabirds species and populations is presented in the Supplemental Biological Information Technical Report for the Mariana Training and Testing Study Area (U.S. Department of the Navy, 2025b). Within the Study Area, seabirds nest and visit FDM—these seabirds are addressed in Section 3.10 that includes a more focused analysis of potential effects on terrestrial biological resources on FDM.

Seabirds are some of the most threatened marine animals in the world, with 29 percent of species at risk of extinction (Spatz et al., 2014). In the marine environment, interactions with commercial fisheries, particularly longline operation (Bentley et al., 2021) pose significant risks of bycatch mortality for foraging albatrosses, petrels, and shearwaters (Bentley et al., 2021; Phillips et al., 2023; Raine et al., 2023). The pervasive issue of plastic pollution is another major concern, with seabirds succumbing to starvation or internal injury from ingesting plastic debris mistaken for prey, as well as entanglement in larger plastic items (Puskic, 2023; Rapp et al., 2017; Thiel et al., 2018). Oceanic warming and increased stratification are predicted to alter the abundance and distribution of critical prey species, while rising sea levels and increased storm-surge intensity directly threaten the viability of low-lying nesting colonies (Keogan et al., 2018; Young & VanderWerf, 2023).

In pelagic environments of the Study Area, other threats include interactions with commercial and recreational fishing gear and pollution, such as oil spills and plastic debris (Anderson et al.,

2007; Jeglinski et al., 2024; Jessup et al., 2009; North American Bird Conservation Initiative, 2022; North American Bird Conservation Initiative & U.S. Committee, 2010; U.S. Fish and Wildlife Service, 2005). Disease, volcanic eruptions, storms, and harmful algal blooms are also natural threats to seabirds (Anderson et al., 2007; Jeglinski et al., 2024; Jessup et al., 2009; North American Bird Conservation Initiative, 2022; North American Bird Conservation Initiative & U.S. Committee, 2010; U.S. Fish and Wildlife Service, 2005).

3.6.1.1 Endangered Species Act-Listed Species

Three marine birds present in the Study Area are listed under the ESA; the short-tailed albatross (*Phoebastria albatrus*) and Hawaiian petrel (*Pterodroma sandwichensis*) are listed as endangered, and the Newell's shearwater (*Puffinus auricularis newelli*)[3] is listed as threatened (U.S. Fish and Wildlife Service, 2010, 2015). However, the Mariana Archipelago is considered peripheral or extralimital to the primary foraging ranges of these pelagic species, and their occurrence in the region is rare. The comprehensive Mariana Archipelago Cetacean Survey (MACS) conducted from May to July 2021 did not record any sightings of the short-tailed albatross, Newell's shearwater, or the Hawaiian petrel (Yano et al., 2022). Accordingly, there would be little to no overlap with at-sea training and testing activities.

3.6.1.2 Species Not Listed under the Endangered Species Act

Other pelagic bird species not listed under the ESA are known to occur within the Study Area. These seabirds, which are highly adapted for an open ocean existence, utilize the region for foraging, migration, and breeding, contributing significantly to the archipelago's biodiversity. The composition and abundance of this avifauna are intrinsically linked to oceanographic conditions, resource availability, and seasonal cycles (Pratt et al., 2023).

The pelagic avifauna of the Mariana Islands is composed of several families, with Procellariidae (shearwaters and petrels) and Sulidae (boobies) being particularly prominent. The wedge-tailed Shearwater (*Ardenna pacifica*) is a common breeding species within the archipelago, establishing significant colonies on several of the northern islands (Raine et al., 2023). Migratory species are also a major component; for instance, the Short-tailed Shearwater (*Ardenna tenuirostris*) is observed in substantial numbers as it transits the region during its extensive north-south migrations (Pratt et al., 2023). Other notable procellariids recorded include the Bonin Petrel (*Pterodroma hypoleuca*) and the federally listed Newell's Shearwater (*Puffinus newelli*), although the latter's presence is less frequent (Pratt et al., 2023; U.S. Fish and Wildlife Service, 2021). For additional information on seabird occurrence within the Study Area, see Section 3.6 of the 2020 SEIS/OEIS.

3.6.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on seabirds and considers the same stressors as previous MITT analyses, which include (1) acoustic (sonar and other

[3] The current taxonomic classification of this species holds that the Newell's shearwater is a subspecies of the Townsend's shearwater. In some instances, this subspecies is also named the Newell's Townsend's shearwater; however, both Newell's shearwater and Newell's Townsend's shearwater refer to the same subspecies (scientific name *Puffinus auricularis newelli*).

transducers, vessel noise, aircraft noise, and weapons noise), (2) explosive (explosions in air), (3) energy (in-water electromagnetic devices, high-energy lasers), (4) physical disturbance and strike (vessels and in-water devices, MEM, seafloor devices), (5) entanglement (decelerators/parachutes, wires and cables), (6) ingestion (MEM), and (7) secondary stressors

For each stressor, the implementation of SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation measures (Chapter 4) are considered as part of the Proposed Action when determining if an effect is reasonably foreseeable as described in Section 3.0.4.

Based on the framework presented in Section 3.0.4 and considering the analysis presented in Section 3.6 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS, the Navy concluded that effects from sonar and other transducers and vessel noise (both substressors of acoustic stressors), energy stressors, physical disturbance and strike, entanglement stressors, ingestion, and secondary stressors on seabirds would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

Effects on seabirds from acoustic (aircraft and weapons noise) and explosive stressors would be reasonably foreseeable; effects are considered significant if populations of seabirds are impacted, areas used by seabirds are denied, or habitat is physically altered to the point of no longer supporting seabirds. Under the Military Readiness Rule (50 CFR section 21.42, *Authorization of take incidental to military readiness activities*) and Migratory Bird Treaty Act (MBTA), if the Navy determines that, over the course of training and testing activities, the population of migratory birds would be significantly affected, the Navy would be required to confer and cooperate with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate such significant adverse effects. The following sections analyze the effects of the Proposed Action on seabirds and take into account the analysis presented in Section 3.6 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.6.2.1 Effects on Seabirds Under Alternative 1

3.6.2.1.1 Effects from Acoustic Stressors

This section summarizes the potential effects of acoustic stressors used during military readiness activities within the Study Area. More detailed information and analysis on acoustic stressors, as well as effects specific to each substressor, is provided in Appendix C.

3.6.2.1.1.1 Aircraft Noise

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

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

Training and Testing. Fixed- and rotary-wing (e.g., helicopters) aircraft are used for a variety of military readiness activities, and seabirds may be exposed to aircraft-generated noise throughout the Study Area (Table 3.0-11).

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

Range Modernization and Sustainment. Aircraft would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, effects to seabirds from aircraft noise utilized during military readiness activities would be reasonably foreseeable; however, the degree of effect would be less than significant because (1) seabirds in nearshore environments (where the most aircraft noise exposures would occur) would likely be disturbed, however, any observable behavioral change would be temporary with normal activities quickly resuming after the aircraft has left the area; (2) the brief overflight time and the high altitude of the aircraft relative to the lower altitudes maintained by foraging seabirds; and (3) sonic booms would be generated at elevations sufficiently high enough where the noise generated by the sonic boom would be short in duration (a few seconds) and not likely discernable from ambient sounds in the pelagic environment.

3.6.2.1.1.2 Weapons Noise

Seabirds may be exposed to sounds caused by the firing of weapons, objects in flight, and impact of non-explosive munitions on the water's surface during activities conducted at sea.

Firing of guns, vibrations from the hull of ships, items that affect the water's surface, and items launched from underwater may produce weapons noise and affect seabirds in air or underwater. Explosive and non-explosive munitions fired at land-based targets on FDM that unintentionally affect the nearshore area adjacent to FDM may result in impulsive sound propagating underwater. Unexploded and inert munitions have been documented in the shallow water habitat adjacent to the island (Smith, 2016), providing evidence that misses or ricochets off the land can occur; no training or testing activities intentionally release munitions or other MEM over water at FDM. While it is possible that munitions would impact in nearshore waters adjacent to FDM, the frequency of occurrence has historically been and is expected to

remain very low. The Action Proponents will implement terrestrial mitigation under Alternative 1 to reduce potential effects from weapons noise on seabirds on FDM.

Training and Testing. Most sounds generated by weapons platforms under the surface, on the surface, or in air would be brief, lasting from less than a second for a blast or inert impact to a few seconds for other launch and object travel sounds. Most incidents of impulsive sounds produced by weapons firing, launch, or inert object effects would be single events, with the exception of gunfire activities.

Use of weapons during training would typically occur in the range complexes, with fewer activities in the transit corridor. Most activities involving large-caliber naval gunfire or the launching of targets, missiles, bombs, or other munitions are conducted more than 3 NM from shore.

Birds that migrate or forage in open-ocean areas could be exposed to large-caliber weapons noise. All species could be exposed to small- and medium-caliber weapons noise that may occur closer to shore. Because weapons firing occurs at varying locations over a short time period and bird presence changes seasonally and on a short-term basis, individual seabirds would not be expected to be repeatedly exposed to weapons firing, launch, or projectile noise. Any effects on migratory or breeding seabirds related to startle reactions, displacement from a preferred area, or reduced foraging success in offshore waters would likely be brief and infrequent.

Range Modernization and Sustainment. Weapons would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, effects on seabirds from weapons noise during military readiness activities would be reasonably foreseeable; however, the degree of effect would be less than significant because (1) although a few individuals may experience long-term effects and potential mortality from military readiness activities that result in in-air explosions, population-level effects are not expected, and (2) terrestrial mitigations measures to reduce weapons firing noise on FDM described in Chapter 4 would be implemented.

3.6.2.1.2 Effects from Explosive Stressors

In-air explosives (defined here as explosions above the water surface and down to a depth of 10 meters [m]) are analyzed for effects on seabirds. Background information on new applicable and emergent science regarding explosive effects is presented in Appendix C.

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

Range Modernization and Sustainment. Explosives would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, effects on seabirds from explosions during military readiness activities would be reasonably foreseeable; however, the degree of effect would be less than significant because (1) although a few individuals may experience long-term effects and potential mortality from military readiness activities that result in in-air explosions,

population-level effects are not expected, and (2) mitigations measures described in and Chapter 4 would be implemented.

3.6.2.2 Effects on Seabirds Under Alternative 2

Under Alternative 2, the number of activities with associated acoustic and explosive stressors would be equal to or increase compared to Alternative 1. However, increases in these stressors are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of seabird species at individual or population levels for the same reasons detailed above for Alternative 1. Additionally, the Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and activity-based mitigation (Chapter 4) to reduce potential adverse effects from acoustic and explosive stressors. The Navy's portfolio of mitigation measures is not specific to seabirds; however, these measures would reduce the likelihood of adverse interactions with military readiness activities. As such, increases in military readiness activities would not result in substantive changes to the potential for, or types of, effects on seabirds; and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving acoustic and explosive stressors under Alternative 2 would result in less than significant effects on seabirds.

3.7 MARINE VEGETATION

3.7.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on marine vegetation found in Section 3.7 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

There is no new information on general threats, taxonomic groups, seagrasses, or mangroves in the MITT Study Area that would change the conclusions from the previous MITT analyses.

However, McKenzie et al. (2021) summarizes information on seagrasses in Pacific Island countries. This study found that only three species of seagrasses are found on three of the 14 islands, including *Enhalus acoroides* at Saipan, Tinian, and Rota. On both Tinian and Rota, *E. acoroides* only occurs in a single locations (Unai Chiget at Tinian and as a narrow band in the West Dock area at Rota) (McKenzie et al., 2021). The dominant seagrass in the shallow sandy nearshore waters of the Saipan Lagoon is *Halodule uninervis*, while *E. acoroides* is conspicuous at the mouths of streams emptying into the lagoon. *Halophila gaudichaudii* occurs along shallow lagoon waters near the coastline of Saipan, Tinian, and Rota (McKenzie et al., 2021). The lack of seagrasses on the other islands in the Marianas is likely due to a lack of habitat conducive for seagrass establishment and growth (McKenzie et al., 2021).

3.7.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on marine vegetation and is focused on the same stressors as previous MITT analyses, which include (1) explosive (explosions in water), (2) physical disturbance and strike (vessels and in-water devices, MEM, seafloor devices, and personnel disturbance), and (3) secondary stressors.

For each stressor, the implementation of SOPs is considered part of the Proposed Action when determining if an effect is reasonably foreseeable (as described in Section 3.0.4).

Based on the framework presented in Section 3.0.4, the Navy concluded that effects from secondary stressors on marine vegetation would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

Effects from explosives, and physical disturbance and strike stressors on marine vegetation would be reasonably foreseeable; effects would be considered significant if they cause long-term changes to a population well outside the limits of natural variability, their habitats, or the natural processes sustaining them. The following sections analyze the effects of the Proposed Action on marine vegetation and take into account the analysis presented in Section 3.7 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.7.2.1 Effects on Vegetation Under Alternative 1

3.7.2.1.1 Effects from Explosive Stressors

Explosive sources analyzed that could be used underwater or at the water surface are presented in Table 3.0-4. Detailed background information supporting the explosive stressor analysis is provided in Appendix C. Note that the use of explosives underwater has not been identified among the causes of decline in marine vegetation to date (U.S. Department of the Navy, 2025b).

As stated in the previous MITT analyses, the potential for an explosion to injure or destroy marine vegetation would depend on the amount of vegetation present, the number of munitions used, and their NEW. In areas where marine vegetation and locations for explosions overlap, marine vegetation on the surface of the water, in the water column, or rooted in the seafloor may be affected. Seafloor macroalgae and single-celled algae may overlap with underwater and sea surface explosion locations. Underwater explosions also may temporarily increase the turbidity (sediment suspended in the water) in nearby waters, incrementally reducing the amount of light available to marine vegetation. Reducing light availability decreases, albeit temporarily, the photosynthetic ability of marine vegetation.

Training and Testing. Under Alternative 1, the number of explosive ordnances used in the Study Area during military readiness activities would change compared to the number analyzed in the previous MITT analyses (Table 3.0-4). Under Alternative 1, underwater detonations for underwater demolition qualification/certification would be the same as the 2020 SEIS/OEIS. However, these activities would continue to occur in the same areas at the Agat Bay, Piti, and Outer Apra Harbor sites, and would have no appreciable change in the effects analysis or conclusions for explosive stressors as presented in the previous MITT analyses.

As described in the 2020 SEIS/OEIS, most explosive detonations during military readiness activities would occur in waters greater than 3 NM from shore and at deeper depths that are not known to support marine vegetation. The effects from explosives during military readiness activities would be minimal disturbances of floating algal mats at the surface and negligible effects on macroalgae from bottom-placed explosives in soft bottom habitat. Areas with special status algal species, such as seagrass beds, would be avoided to the greatest extent practicable.

Range Modernization and Sustainment. Explosives would not be used during range modernization and sustainment; therefore, there would be no explosives effects.

Conclusions. Consistent with previous MITT analyses, effects on marine vegetation from explosives utilized during military readiness activities would be reasonably foreseeable; however, the degree of effect would be less than significant because (1) the majority of underwater explosions occur at or near the surface at offshore locations greater than 3 NM from shore in water depths greater than 100 ft., where only floating seaweed would be affected; (2) explosions on or near the seafloor occur mostly in estuarine or shallow ocean waters, where vegetation (benthic macroalgae) is much less abundant compared to hard bottom areas and artificial structures; (3) if floating seaweed or benthic vegetation is in the immediate vicinity of an explosion, the taxa most likely affected are resilient to fragmentation and damage due to lack of vital organs, fast growth rate, and asexual reproduction; (4) most explosions would take place in soft-bottom habitats, and most bottom-placed explosions are detonated in the same established soft bottom locations where explosions would have very limited and localized (if any), temporary effects; and (5) areas with special status algal species, such as seagrass beds, would be avoided to the greatest extent practicable.

3.7.2.1.2 Effects from Physical Disturbance and Strike Stressors

The physical disturbance and strike stressors that may affect marine vegetation include (1) vessels and in-water devices, (2) MEM, (3) seafloor devices, and (4) personnel disturbance. While the number of training and testing events would change under this SEIS/OEIS, the analysis presented in the previous MITT analyses remains valid. The changes in military readiness activities are not substantial and would not result in an overall change to existing environmental conditions or an increase in the level or intensity of physical disturbance and strike stressors within the Study Area. Supporting information on marine vegetation effects from physical disturbance and strike stressors are provided in Appendix C. Note that physical disturbance from human activities has been identified among the causes of decline in marine vegetation to date (U.S. Department of the Navy, 2025b).

The evaluation of the effects from physical disturbance and strike stressors on vegetation focuses on proposed activities that may cause marine vegetation to be damaged by an object that is moving through the water (e.g., vessels and in-water devices), dropped into the water (e.g., MEM), or deployed on the seafloor (e.g., mine shapes and anchors). Specific locations of activities are given in Appendix A. Wherever appropriate, specific geographic areas of potential effect are identified.

Training and Testing. Under Alternative 1, the combined number of proposed military readiness activities involving MEM (Table 3.0-12 through 3.10-15), and seafloor devices (Table 3.0-17) would change from those presented in the previous MITT analyses. Military readiness activities could cause damage to marine vegetation from an object that is moving through the water (e.g., vessels and in-water devices), dropped into the water (e.g., MEM), or deployed on the seafloor (e.g., mine shapes and anchors). Changes in physical disturbance and strike stressors, such as increases in MEM, could influence the level of effect on marine vegetation. Overall, these changes do not appreciably change the analysis or potential effects presented in the previous MITT documents because the effects analyses were based on the probability of an effect on a resource.

Range Modernization and Sustainment. Physical disturbance and strike from placement and retrieval of subsurface targets and instrumentation would only pose a threat to marine vegetation if anchors or instruments such as hydrophones are placed in shallow areas or harbors where most marine vegetation occurs. Since in-water devices would be placed primarily in soft bottom areas where most marine vegetation does not occur, effects on benthic vegetation would be less than significant.

Conclusion. Consistent with previous MITT analyses, effects on marine vegetation from physical disturbance and strike associated with military readiness activities would be reasonably foreseeable; however, the degree of effect would be less than significant because (1) vegetation on the sea surface such as marine algal mats would not likely be affected by seafloor devices; (2) seafloor devices use sandy substrates, devoid of marine vegetation, to the greatest extent practicable; (3) while It is possible that increases in suspended sediment during amphibious landing could affect vegetation in soft bottom habitats, these effects would be considered temporary and localized; and (4) population-level effects are unlikely because of the low frequency of military readiness activities in these small localized areas.

3.7.2.2 Effects on Marine Vegetation Under Alternative 2

Under Alternative 2, the number of activities with associated explosive and physical disturbance and strike stressors would be equal to or increase compared to Alternative 1. However, increases in these stressors are not expected to yield any lasting effects on the survival or growth of marine vegetation at population levels for the same reasons detailed for Alternative 1. Additionally, the Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation (Chapter 4) to reduce potential adverse effects on marine vegetation. As such, increases in military readiness activities would not result in substantive changes to the potential for or types of effects on marine vegetation, and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving explosive and physical disturbance and strike stressors under Alternative 2 would result in less than significant effects on marine vegetation.

3.8 MARINE INVERTEBRATES

3.8.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on marine invertebrates found in Section 3.8 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

3.8.1.1 Sound Sensing and Production

Marine invertebrates have evolved around the extraction of information from soundscapes and are mainly sensitive to the particle motion of sound, rather than the sound pressure (Sole´ et al., 2023). Since marine invertebrates often live close to the seabed, they can be affected by substrate vibration, which usually involves particle motion (Hawkins et al., 2021). Sources of marine underwater anthropogenic noise that generate vibration include shipping (fishing boats, recreational motorboats, jet skis, trade vessels), oil and gas exploration and operation, the construction and operation of offshore wind farms and other renewable energy devices,

dredging, construction of bridges and harbors, commercial and military sonar, and underwater explosions for construction or ordnance disposal (Sole´ et al., 2023). Even with the addition of new noise information on marine invertebrates, this does not appreciably change the information or analyses presented in previous MITT analyses.

3.8.1.2 General Threats

There is no new information on threats to marine invertebrates in the MITT Study Area that would change the conclusions from previous MITT analyses.

3.8.1.3 Endangered Species Act-Listed Species

Table 3.8-1 presents ESA-listed marine invertebrates in the Study Area, including three coral species listed as threatened (*Acropora globiceps, A. retusa*, and *Seriatopora aculeata*) and giant clam species (*Hippopus hippopus*, *Tridacna derasa, T. gigas*, and *T. squamosa*). On August 15, 2025, NMFS issued a final rule designating critical habitat for five threatened coral species in U.S. waters in the Pacific Islands region, including *A. globiceps* (90 Federal Register 39339). Critical habitat includes Rota; Aguijan; Tinian; Saipan; Alamagan; Pagan; and Maug Islands, Asuncion and Uracas in the Mariana Trench Marine National Monument, as well as Guam. Detailed information on each ESA-listed species is presented in the Navy's Supplemental Biological Information Technical Report (U.S. Department of the Navy, 2025b).

Table 3.8-1: Status of Endangered Species Act-Listed Species Within the Study Area

Species Name and Regulatory Status			Presence in Study Area	
Common Name	**Scientific Name**	**Endangered Species Act Status**	**Open Ocean/ Transit Corridor**	**Coastal Ocean**
	Acropora globiceps	Threatened	No	Yes
	Acropora retusa	Threatened	No	Yes
Club finger coral	*Seriatopora aculeata*	Threatened	No	Yes
Horse's hoof, bear paw, strawberry clam	*Hippopus hippopus*	Proposed Threatened	No	Yes*
Smooth giant clam	*Tridacna derasa*	Proposed Endangered	No	Yes*
True giant clam	*Tridacna gigas*	Proposed Endangered	No	Yes*
Fluted giant clam	*Tridacna squamosa*	Proposed Threatened	No	Yes*

* May be locally extirpated. Source: Sole´ et al. (2023)

3.8.1.4 Taxonomic Groups

There is no new information on marine invertebrate taxonomic groups that would change the basis of the conclusions from the previous MITT analyses.

3.8.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on marine invertebrates and considers the same stressors as previous MITT analyses, which include (1) acoustic (sonars), (2) explosive (explosions in water), (3) physical disturbance and strike (MEM, seafloor devices, and personnel disturbance), (4) entanglement (wires and cables, decelerators/parachutes), (5) ingestion (MEM), and (6) secondary stressors.

For each stressor, the implementation of SOPs is considered part of the Proposed Action when determining if an effect is reasonably foreseeable.

Based on the framework presented in Section 3.0.4, the Navy concluded that effects from acoustic, entanglement, ingestion, and secondary stressors on marine invertebrates would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

Effects on marine invertebrates from explosive and physical disturbance and strike stressors would be reasonably foreseeable; effects would be considered significant if they cause long-term changes to a population well outside the limits of natural variability, their habitats, or the natural processes sustaining them. The following sections analyze the effects of the Proposed Action on marine invertebrates and takes into account the analysis presented in Section 3.8 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.8.2.1 Effects on Marine Invertebrates Under Alternative 1

3.8.2.1.1 Effects from Explosive Stressors

Explosive sources analyzed that could be used underwater or at the water surface are presented in Table 3.0-4. Supporting information on how explosives affect marine invertebrates is presented in U.S. Department of the Navy (2025b). Note that underwater explosions from human activities have not been identified among the causes of decline in marine invertebrate populations to date (U.S. Department of the Navy, 2025a).

Training and Testing. Under Alternative 1, the number of explosive ordnances used in the Study Area during military readiness activities would change compared to the number analyzed in the previous MITT analyses (Table 3.0-4). Under Alternative 1, underwater detonations for underwater demolition qualification/certification would be the same as the 2020 SEIS/OEIS. However, these activities would continue to occur in the same areas at the Agat Bay, Piti, and Outer Apra Harbor sites, and would have no appreciable change in the effects analysis or conclusions for explosive stressors as presented in the previous MITT analyses.

As described in the 2020 SEIS/OEIS, most explosive detonations during military readiness activities would occur in waters greater than 3 NM from shore, which are not known to support ESA-listed coral species. In addition, energy from an explosion at the surface would dissipate below detectable levels before reaching the seafloor and would not injure or otherwise affect deep-water, benthic marine invertebrates. However, various developmental stages such as eggs, sperm, early embryonic stages, and planula larvae of corals, as well as adults, could be affected in areas overlapping with other military readiness activities using explosives. Consequences of exposure to an explosive shock wave could include breakage, injury, or mortality. Many corals and hard-bottom invertebrates are sessile, fragile, and particularly vulnerable. Because exposures to explosive shock waves are brief, limited in number, and spread over a large area, no long-term effects are expected. Explosives may affect individual marine invertebrates and groups of marine invertebrates, but they are unlikely to affect populations or subpopulations.

The Navy will implement mitigation to avoid or reduce effects from explosives on seafloor resources in mitigation areas throughout the Study Area (see Chapter 4). For example, the Navy will not conduct explosive mine countermeasure and neutralization activities within 350 yards of shallow-water coral reefs, artificial reefs, and shipwrecks, except at designated nearshore training areas around Guam and Apra Harbor, where these resources will be avoided to the

maximum extent practicable. This mitigation measure additionally avoids or reduces potential effects on marine invertebrates that inhabit these areas. There is also activity-based mitigation that affects "jellyfish aggregations," specifically for explosive torpedoes and sinking exercises (Section 4.6).

Range Modernization and Sustainment. Explosives would not be used during range modernization and sustainment; therefore, there would be no explosives effects.

Conclusion. Consistent with previous MITT analyses, explosives utilized during military readiness activities would have reasonably foreseeable effects on marine invertebrates; however, the degree of effect would be less than significant because (1) it is unlikely that the distribution of sensitive marine invertebrates (e.g., shallow-water coral reefs) would spatially coincide with explosive effects; (2) soft bottom communities more likely to be affected (e.g., worms, clams) would be expected recover quickly; (3) most local disturbances of the surface water or seafloor would only have short-term effects, with some temporary increases in suspended sediment in mostly shallow, soft bottom habitats; (4) behavioral responses would be short-term and brief; and (5) the Navy will implement mitigation to avoid or reduce effects from explosives on seafloor resources in mitigation areas throughout the Study Area, which will consequently help avoid or reduce potential effects on invertebrates that inhabit these areas.

3.8.2.1.2 Effects from Physical Disturbance and Strike Stressors

The physical disturbance and strike stressors that may affect marine invertebrates include (1) MEM, (2) seafloor devices, and (3) personnel disturbance. While the number of training and testing events would change under this SEIS/OEIS, the analysis presented in the previous MITT analyses remains valid. The changes in military readiness activities are not substantial and would not result in an overall change to existing environmental conditions or an increase in the level or intensity of physical disturbance and strike stressors within the Study Area. Supporting information on marine invertebrate effects from physical disturbance and strike stressors are provided in U.S. Department of the Navy (2025b).

Training and Testing. Under Alternative 1, the combined number of proposed military readiness activities involving MEM (Table 3.0-12 through Table 3.0-15), and seafloor devices (Table 3.0-17) would change from those presented in the previous MITT analyses. However, these changes do not appreciably change the analysis or effect conclusions presented in the previous MITT analyses because the effects analysis was based on the probability of an effect on a resource.

As stated in previous MITT analyses, the effect of physical disturbance and strike stressors on marine invertebrates is likely to cause injury or mortality to individuals, such as corals on nearshore reefs, but effects on populations, including those that live in hydrothermal vents, are not expected because the area exposed to the stressor is extremely small (localized) relative to most marine invertebrates' ranges, and the activities are dispersed such that few individuals could conceivably be exposed to more than one event. Activities involving MEM, seafloor devices, and personnel disturbance are not expected to yield any behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level. However, the combined consequences of all physical disturbance and strike

stressors could degrade habitat quality at some locations. In addition, combat swimmers and Marines may be required to walk through nearshore areas and reefs during these activities, potentially causing damage to coral species. As stated in previous MITT analyses, these activities could cause injury or mortality to individuals, but effects on marine invertebrate populations, including ESA-listed corals, are unlikely.

Range Modernization and Sustainment. Similar effects on marine invertebrates would occur during range modernization and sustainment activities, including injury or mortality to individuals. These effects would not affect populations and are considered less than significant.

Conclusion. Consistent with previous MITT analyses, MEM, seafloor devices, and personnel disturbance utilized during military readiness activities would have reasonably foreseeable effects on marine invertebrates; however, the degree of effect would be less than significant because (1) the area exposed to physical disturbance and strike stressors is localized relative to most marine invertebrates' ranges; (2) the activities are dispersed such that few individuals could conceivably be exposed to more than one event; (3) activities could cause injury or mortality to individuals, but effects on marine invertebrate populations, including ESA-listed corals, are unlikely; and (4) behavioral changes or lasting effects on the survival, growth, recruitment, or reproduction of invertebrate species at the population level are not anticipated.

3.8.2.2 Effects on Marine Invertebrates Under Alternative 2

Under Alternative 2, the number of activities with associated explosive and physical disturbance and strike stressors would be equal to or increase compared to Alternative 1. However, increases in these stressors are not expected to yield any lasting effects on the survival or growth of marine invertebrates at population levels for the same reasons detailed for Alternative 1. Additionally, the Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and geographic mitigation (see Chapter 4 and Appendix I of the 2020 SEIS/OEIS) to reduce potential adverse effects on marine invertebrates. As such, increases in military readiness activities would not result in substantive changes to the potential for or types of effects on marine invertebrates, and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving explosive and physical disturbance and strike stressors under Alternative 2 would result in less than significant effects on marine invertebrates.

3.9 FISHES

3.9.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on fishes found in Section 3.9 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

3.9.1.1 Hearing and Vocalization

A summary of fish hearing and vocalizations is described in the previous MITT analyses. Due to the availability of new literature, including revised sound exposure criteria, new information to

supplement the previous MITT analyses for fishes is provided in the Navy's *Biological Resources Technical Report* (U.S. Department of the Navy, 2025a).

3.9.1.2 General Threats

There is no new information on threats to fishes in the MITT Study Area that would change the conclusions from the previous MITT analyses.

3.9.1.3 Endangered Species Act-Listed Species and Federally Managed Fish Species

ESA-listed fish species in the Study Area include the scalloped hammerhead shark (*Sphyrna lewini*), oceanic whitetip shark (*Carcharhinus longimanus*), and giant manta ray (*Mobula birostris*). Detailed information on each ESA-listed species is presented in the Navy's *Biological Resources Technical Report* (U.S. Department of the Navy, 2025a). Pursuant to the ESA, the Navy is consulting with NMFS on potential effects on ESA-listed fish species from military readiness activities, as required by section 7(a)(2) of the ESA.

Fish species managed by the Western Pacific Fishery Management Council as listed in Table 3.9-2 in the 2020 SEIS/OEIS have not substantially changed since the publication of the SEIS/OEIS and the information and analysis presented remains valid.

3.9.1.4 Taxonomic Group Descriptions

A literature review found that the information on the taxonomic groups of fishes in the Study Area has not substantially changed from what is included in the previous MITT analyses and remains valid.

3.9.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on fishes and considers the same stressors as previous MITT analyses, which include (1) acoustic (sonars, vessel noise, aircraft noise, and weapons noise), (2) explosive (in-water explosions), (3) energy (in-water electromagnetic devices and high-energy lasers), (4) physical disturbance and strike (vessels and in-water devices, MEM, seafloor devices), (5) entanglement (wires and cables, decelerators/parachutes), (6) ingestion (MEM), and (7) secondary stressors.

For each stressor, the implementation of SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation measures (Chapter 4) is considered part of the Proposed Action when determining if an effect is reasonably foreseeable.

Based on the framework presented in Section 3.0.4, the Navy concluded that effects from entanglement and secondary stressors on fishes would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

Effects on fishes from acoustic, explosive, physical disturbance and strike, energy, and ingestion stressors would be reasonably foreseeable; effects would be considered significant if they cause long-term changes to a population well outside the limits of natural variability, their habitats, or the natural processes sustaining them. The following sections analyze the effects of the Proposed Action on fishes and takes into account the analysis presented in Section 3.9 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.9.2.1 Effects on Fishes Under Alternative 1

3.9.2.1.1 Effects from Acoustic Stressors

This section summarizes the potential effects of acoustic stressors used during military readiness activities within the Study Area. The acoustic substressors included for analysis are (1) sonar and other transducers, (2) vessel noise, (3) aircraft noise, and (4) weapons noise. Detailed information on acoustic impact categories in general, as well as effects specific to each substressor, is provided in the *Acoustic and Explosive Concepts Technical Report* (U.S. Department of the Navy, 2026b). For a listing of the types of activities that use or produce acoustic stressors, refer to Appendix A.

There are many factors that contribute to how a fish will respond to sound, such as the frequency and received sound level, the duration of the sound-producing activity, the animal's behavioral activity at the time of exposure (e.g., feeding, traveling, resting), and proximity of the animal to the source of the sound. In addition, fishes are not equally sensitive to sound at all frequencies. Most marine fishes are hearing generalists and primarily detect particle motion at frequencies below 2 kHz, while hearing specialists can detect low frequencies but also possess anatomical specializations to enhance hearing and are capable of sound pressure detection up to 10 kHz, or over 100 kHz in some species. Fishes with a swim bladder are generally more susceptible to TTS than those without a swim bladder, regardless of the sound source.

Training and Testing. Fishes may only detect the most powerful low-frequency sonars within a few kilometers; and most other, less powerful systems, at shorter ranges. Overall, TTS is not anticipated to occur in fishes exposed to low-frequency sonars as these systems generally lack the power necessary to generate hearing loss. Although unlikely, hearing specialists in proximity (tens of meters) to some mid-frequency systems may experience TTS. These individuals may experience a reduced ability to detect biologically relevant sounds until their hearing recovers (likely within a few minutes to hours depending on the amount of threshold shift). In addition, moderate- to low-level passive sound sources such as vessel noise are unlikely to cause any direct injury or trauma due to characteristics of the sounds and the moderate source levels. Furthermore, vessels are transient and would result in brief periods of exposure. Similarly, it is unlikely that most fish would respond to fixed-wing aircraft or transiting rotary-wing aircraft because noise may not be detectable beyond a short distance (10s of meters) beneath the flight path due to their low sound levels in water. Sound from weapons generally lack the duration and high intensity to cause mortality or injury.

Range Modernization and Sustainment. Except for vessel noise, no other acoustic substressors would occur during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, effects on fishes from acoustic stressors including sonars, vessel noise, aircraft noise, and weapons noise utilized during military readiness activities would be reasonably foreseeable. However, the degree of effect would be less than significant because of (1) the limited to brief (seconds to minutes) periods of physiological or behavioral reactions to individual fish found within localized areas, (2) noise may not be detectable beyond a short distance (tens of meters), and (3) acoustic sources

generally lack the duration and high intensity to cause mortality or injury. Overall, it is unlikely that acoustic stressors would have long-term consequences for fish populations.

3.9.2.1.2 Effects from Explosive Stressors

This section summarizes the potential effects of explosives used during military readiness activities within the Study Area. Due to updates to acoustic effects modeling, criteria and thresholds used to assess effects, and changes to proposed use of explosives, the analysis of effects due to explosives provided in this section supplant the analyses presented in the previous MITT documents (U.S. Department of the Navy, 2015a, 2020). Detailed information on acoustic impact categories in general, as well as effects specific to each substressor, is provided in the Navy's *Acoustic and Explosive Effects Analysis for Marine Species in the Mariana Training and Testing Study Area (Phase IV) Technical Report* (U.S. Department of the Navy, 2025a).

As detailed in the 2020 SEIS/OEIS, fishes may be exposed to sound and energy from explosions in the water and near the water surface associated with the proposed activities. Activities using explosives would be conducted as described in Chapter 2 and Appendix A. Most activities involving in-water (including at or near the surface) explosions associated with naval gunfire, missiles, bombs, and other munitions are conducted more than 3 NM from shore. While Surface-to-Surface Missile Exercises and Air-to-Surface Bombing Exercises are conducted in offshore locations, Sinking Exercises are only conducted greater than 50 NM from shore. However, some explosions may occur in shallower/nearshore areas such as Agat Bay Mine Neutralization Site, Outer Apra Harbor Underwater Detonation Site, and Piti Mine Neutralization Site.

Potential effects from explosive energy and sound on fishes include non-auditory injury (including mortality), auditory effects (auditory injuries and TTS), behavioral reactions, physiological response, and masking. Ranges to effects for mortality, non-auditory injury, and auditory effects are shown in U.S. Department of the Navy (2025a). Explosive noise is very brief and intermittent, and detonations usually occur in a limited area over a brief period rather than being widespread. The potential for masking is limited. Fishes may behaviorally respond, but responses to single detonations or small numbers of clusters may be limited to startle responses.

Training and Testing. Under Alternative 1, there would be a change in the number of explosive ordnances used in the Study Area during military readiness activities compared to the number analyzed in the previous MITT analyses (Table 3.0-4). Under Alternative 1, underwater detonations for underwater demolition qualification/certification would be the same as the 2020 SEIS/OEIS. However, these activities would continue to occur in the same areas at the Agat Bay, Piti, and Outer Apra Harbor sites, and would have no appreciable change in the effects analysis or conclusions for explosive stressors as presented in the previous MITT analyses.

The death of an animal would eliminate them from the population and impact future reproductive potential. Exposures that result in non-auditory injuries may limit an animal's ability to find food, communicate with other animals, interpret the surrounding environment, or detect and avoid predators. Impairment of these abilities can decrease an individual's chance

of survival or affect its ability to reproduce depending on the severity of the impact. Though TTS can impair an animal's abilities, individuals may recover quickly with little significant effect depending on the amount of threshold shift.

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

Based on the updated background and analysis for training and testing under Alternative 1, explosive effects on fishes could result in the death or injury of a small number of individual fish, as well as brief (seconds to minutes) periods of physiological or behavioral reactions of fish found within localized areas.

Range Modernization and Sustainment. Explosives would not be used during range modernization and sustainment activities.

Conclusion. Consistent with previous MITT analyses, explosives utilized during military readiness activities would have reasonably foreseeable effects on fishes; however, the degree of effect would be less than significant because (1) explosions are generally dispersed in space and time, (2) only a small number of individuals would overlap with where explosions occur, (3) most behavioral effects are expected to be short term (seconds or minutes) and localized. Although some individuals may be affected, long-term consequences to fish populations would not be expected.

3.9.2.1.3 Effects from Energy Stressors

The potential adverse effects on fishes from energy stressors that can occur during military readiness activities within the Study Area are from (1) in-water electromagnetic devices and (2) high-energy lasers. The characteristics of energy introduced through military readiness activities and the relative magnitude and location of these activities that are the basis for analysis of potential effects on biological resources are provided in Section 3.0.4.1.3. The number and location of in-water electromagnetic devices and high-energy lasers events are provided in Table 3.0-6 and Table 3.0-7, respectively. Note that in-air electromagnetic stressors are not applicable to fishes because they are transmitted in the air and not underwater and will not be analyzed further in this section.

Training and Testing. Under Alternative 1, the number of proposed training and testing events involving the use of in-water electromagnetic devices (Table 3.0-6) and high-energy lasers (Table 3.0-7) would change in comparison to the previous MITT analyses. The activities would occur in the same locations and in a similar manner as were analyzed previously. Note that high-energy lasers were not in the 2015 EIS/OEIS.

As stated in the previous MITT documents, in-water electromagnetic devices would not result in any potential risk to fishes because (1) the range of effects (i.e., greater than earth's magnetic field) is small (i.e., 13 ft. from the source), (2) the electromagnetic components of these activities are limited to simulating the electromagnetic signature of a vessel as it passes through the water, and (3) the electromagnetic signal is temporally variable and would cover only a small spatial range during each activity in the Study Area.

The generation of electromagnetic fields during military readiness activities has the potential to interfere with prey detection and navigation in ESA-listed scalloped hammerhead sharks, oceanic white tip sharks, and giant manta rays, but any disturbance would be inconsequential

Fishes would not be exposed to the laser if the beam misses the target because the laser is designed to automatically shut down if target lock is lost, preventing the laser from striking anything but the target.

Activities that include the use of high-energy lasers would not have reasonably foreseeable adverse effects on fishes based on (1) the relatively low number of events, (2) the very localized potentially affected area of the laser beam, (3) the temporary duration of potential effects (seconds), and (4) the low likelihood of a fish surfacing at the precise time and location where a laser missed the target and hit the ocean surface.

Range Modernization and Sustainment. Range modernization and sustainment such as installation and maintenance of subsurface targets and instrumentation would not produce electromagnetic fields.

Conclusion. Consistent with previous MITT analyses, effects on fishes from energy stressors such as in-water electromagnetic devices associated with military readiness activities would have reasonably foreseeable effects on fishes; however, the degree of effect would be less than significant because: (1) physiological and behavioral effects would be unlikely at the electromagnetic field strengths that fishes encounter, as supported by a recent review (Copping et al., 2021), and (2) mitigation measures described in Chapter 4 would be implemented.

3.9.2.1.4 Effects from Physical Disturbance and Strike Stressors

The physical disturbance and strike stressors that may affect fishes include (1) vessels and in-water devices, (2) MEM, and (3) seafloor devices. While the number of training and testing events would change under this SEIS/OEIS, the analysis presented in the previous MITT analyses remains valid, even with the addition of new military readiness activities. Supporting information on effects on fishes from physical disturbance and strike stressors are provided in U.S. Department of the Navy (2026b).

Training and Testing. Under Alternative 1, the combined number of proposed military readiness activities involving vessels and in-water devices (Table 3.0-10), MEM (Tables 3.0-12 through 3.0-15), and seafloor devices (Table 3.0-17) would change from those presented in the previous MITT analyses. Changes in physical disturbance and strike stressors, such as MEM, could influence the level of effect on some fishes. Analysis by individual category of expended items indicates that those items having the most potential to affect fishes have decreased. Overall, these changes do not appreciably change the analysis or effects conclusions presented

in the previous MITT documents because the effects analyses were based on the probability of an effect on a resource.

ESA-listed scalloped hammerhead sharks, oceanic whitetip sharks, and giant manta rays, would be able to sense pressure changes in the water column and swim quickly, and are likely to escape collision with vessels and in-water devices.

Range Modernization and Sustainment. Vessels would be used during range modernization and sustainment activities. The types of vessels, length, and speeds used (Table 3.0-8) during modernization and sustainment of ranges are typically much slower (ranging from 0 to 3 knots) and would not pose a collision threat to fishes.

Conclusion. Consistent with previous MITT analyses, effects on fishes from physical disturbance and strike stressors associated with military readiness activities would be reasonably foreseeable; however, the degree of effect would be less than significant because (1) the low likelihood for most fishes to be struck by a vessel, since most fish occupy waters below the surface, (2) the fact that fish typically display an avoidance response to an approaching vessel, and (3) the fact that most in-water devices move slowly and are closely monitored during deployment. In addition, mitigation measures described in Chapter 4 would be implemented. In addition, potential effects of exposure to vessels and in-water devices are not expected to result in substantial changes to an individual's behavior, fitness, or species recruitment, and are not expected to result in population-level effects.

3.9.2.1.5 Effects from Ingestion Stressors

The various types of MEM used during military readiness activities within the Study Area may be broadly categorized as munitions and MEM other than munitions. Aspects of ingestion stressors applicable to marine organisms in general are presented in Section 3.0.4.1.3. Supporting information on ingestion stressors for fishes is provided in U.S. Department of the Navy (2026b).

It is reasonable to assume that any item of a size that can be swallowed by a fish could be eaten at some time; this analysis focuses on ingestion of materials in two locations: (1) at the surface or water column and (2) at the seafloor. The potential for fish to encounter and ingest expended materials is evaluated with respect to their feeding group and geographic range, which influence the probability that they would eat MEM.

Training and Testing. Under Alternative 1, the combined number of ingestion stressors would change compared to the number in the previous MITT analyses (see Tables 3.0-12 through 3.0-15). However, this does not appreciably change the effects analysis or conclusions presented in the previous MITT analyses.

As presented in the previous MITT documents, open-ocean predators and open-ocean planktivores are most likely to ingest materials in the water column, while coastal bottom-dwelling predators and estuarine bottom-dwelling predators could ingest materials from the seafloor. Open-ocean predators such as tunas and sharks may eat floating or sinking expended materials, while open-ocean planktivores, such as sardines and filter-feeding species such as whale sharks, may ingest floating expended materials incidentally as they feed in the water

column. Other fish species such as skates and rays forage on the seafloor and may ingest expended materials on the seafloor. Encounter rates for all these feeding guilds would be extremely low but may result in injury or death to individuals; however, population-level effects are not anticipated.

Potential effects of ingestion on some adult fishes are different than for other life stages (eggs, larvae, and juveniles) because early life stages for some species are too small to ingest any MEM except for chaff, which has been shown to have limited effects on fishes in the concentration levels that it is released at (Arfsten et al., 2002; U.S. Department of the Air Force, 1997; U.S. Department of the Navy, 1999). Therefore, except for later stage larvae and juveniles that could ingest microplastics, no ingestion effects on early life stages are expected.

Overall, the potential effect of ingesting MEM such as munition fragments or other expended materials such as chaff and flare end caps and pistons, would be limited to individual fish that might suffer a negative response from a given ingestion event. While ingestion of MEM could result in sublethal or lethal effects on a small number of individuals, the likelihood of a fish encountering an expended item is dependent on where that species feeds and the amount of material expended. Furthermore, an encounter may not lead to ingestion, as a fish might "taste" an item, then expel it (Felix et al., 1995), in the same manner that a fish would take a lure into its mouth then spit it out.

Range Modernization and Sustainment. Activities during range modernization and sustainment such as installation and maintenance of subsurface targets and instrumentation would not produce MEM that could be ingested by fishes.

Conclusion. Consistent with previous MITT analyses, effects on fishes from ingestion stressors associated with military readiness activities would be reasonably foreseeable; however, the degree of effect would be less than significant because (1) the likelihood of ingestion is low based on the dispersed nature of the materials and the limited exposure of those items at the surface/water column or seafloor; and (2) if ingested, a fish would temporarily take the expended material into its mouth, then spit it out. In addition, mitigation measures described in Chapter 4 would be implemented. Therefore, the number of fishes potentially affected by ingestion of munitions or fragments from munitions would be assumed to be low, and population-level effects would not be expected.

3.9.2.2 Effects on Fishes Under Alternative 2

Under Alternative 2, the number of activities with associated acoustic, explosive, energy, physical disturbance and strike, and ingestion stressors would be equal to or increase compared to Alternative 1. However, increases in these stressors are not expected to yield any lasting effects on the survival of fishes at population levels for the same reasons detailed for Alternative 1. Additionally, the Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation (Chapter 4); while the Navy's portfolio of mitigation measures is not specific to fishes, these measures would reduce the likelihood of adverse interactions with military readiness activities. As such, increases in military readiness activities would not result in substantive changes to the potential for or types of effects on fishes, and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving acoustic, explosive, energy, physical disturbance and strike, and ingestion stressors under Alternative 2 would result in less than significant effects on fishes.

3.10 TERRESTRIAL SPECIES AND HABITATS

3.10.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on terrestrial species and habitats found in Section 3.10 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020). Similar to the 2020 SEIS/OEIS, FDM is the only land area considered in this analysis; Guam, Tinian, Saipan, and Rota were addressed in the 2015 EIS/OEIS.

Since the publication of the 2020 SEIS/OEIS, Joint Region Marianas completed an updated Integrated Natural Resources Management Plan for all Navy-owned and leased properties on Guam and within the CNMI, including FDM. Summaries of the major components of the terrestrial environment on FDM are included in *Supplemental Biological Information Technical Report for the Mariana Training and Testing Study Area* (U.S. Department of the Navy, 2025b)

Since 1971, the U.S. military has used FDM as a bombing range under a long-term lease, a practice that has significantly transformed the island's ecology from closed-canopy forest to an open, cratered landscape favored by opportunistic plants. While continuous live-fire training causes direct mortality and habitat destruction for significant seabird colonies, the island remains a critical nesting ground for 12 migratory bird species and supports an isolated population of Micronesian megapodes on the island, as well as providing potential temporary stopover habitat for Mariana fruit bat and birds moving through the archipelago.

FDM's vegetation appears to have undergone significant changes since the island was leased by the Department of Defense and the subsequent bombardment for military training. The most intensive bombardment to date of FDM occurred during the Vietnam War era, when as many as 22 tons of ordnance per month were dropped on the island (Lusk et al., 2000). Based on early 20th century descriptions of FDM vegetation and aerial photographs of the island prior to military bomb activities, island tree height and canopy cover have been greatly reduced (Lusk et al., 2000; Mueller-Dombois & Fosberg, 1998; Mueller-Dombois & Fosberg, 2013). The earliest published description of FDM's vegetation, dating back to 1902, noted that the upland area was covered by brush approximately 4 m tall, as reported in Naval Facilities Engineering Command Marianas (2022).

3.10.1.1 Endangered Species Act Listed Species

There are two ESA-listed species known to occur on FDM, the Micronesian megapode (*Megapodius laperouse*) and the Mariana fruit bat (*Pteropus mariannus mariannus*) (see Table 3.10-1). Megapodes are believed to persist on FDM, while Mariana fruit bats, if they occur at all, would likely only use FDM's relatively more intact canopy on the northern end of the island, as a stopover location as they transit through the island chain.

Table 3.10-1: Endangered Species Act Listed Species on Farallon de Medinilla

Species Name and Regulatory Status			Presence in Study Area[1]	
Common Name	Scientific Name	Endangered Species Act Status	Open Ocean	Visitor/Breeding on FDM
Micronesian megapode (Sasangat)	*Megapodius laperouse laperouse*	Endangered	No	Yes
Mariana fruit bat (Fanihi)	*Pteropus mariannus mariannus*	Threatened	Yes	Yes, likely transient

[1]Study Area = Mariana Islands Training and Testing Study Area. Note: FDM = Farallon de Medinilla

In 2015, the Navy consulted with USFWS for training activities on FDM included in this SEIS/OEIS (U.S. Fish and Wildlife Service, 2015). At the conclusion of the formal consultation, the USFWS provided the Navy with a Biological Opinion and Incidental Take Statement with an indefinite timeline, as long as no reinitiation triggers. The incidental take statement authorized take of two pairs of Micronesian megapodes per year, and one Mariana fruit bat every five years on FDM as a result of bombing, gunnery, and missile exercises analyzed in the 2015 EIS/OEIS. USFWS considered that the proposed activities, and associated adverse effects on the listed species, would continue for an indefinite period of time. The Action Proponents will continue to implement SOPs on FDM, along with the terms and conditions specified in the current Biological Opinion.

The Navy conducted a review of criteria that would reinitiate consultation with USFWS, specified in 50 CFR section 402.16. Upon review, the Navy determined that reinitiation of consultation was not warranted, and the current Biological Opinion remains valid.

3.10.1.2 Species Not Listed under the Endangered Species Act

FDM is recognized by regional ornithologists as an important bird area for many species of marine birds and migrant shorebirds, and it supports a limited number of terrestrial bird species. The 2020 SEIS/OEIS included an assessment by Camp et al. (2015) which published this peer-reviewed information. During the 159 counts conducted between February 1997 and August 2014, the numbers detected during each count ranged from 0 to 447 for brown booby, 6 to 404 for masked booby, and 42 to 915 for red-footed booby. From 1997 to 2014, there is some evidence that masked and red-footed booby populations on FDM have declined, while brown booby populations have increased. However, the general conclusion is that all three species exhibited population fluctuations over time. Combined with the level of variability observed in the count data, this precluded any definite conclusions about long-term population trends (i.e., the data showed no statistically significant trends) (Camp et al., 2015). Breeding has been reported on FDM for seven seabird species: black noddies (*Anous minutus*), brown noddies (*Anous stolidus*), brown boobies, masked boobies, red-footed boobies, white terns (*Gygis alba*), and great frigatebirds (*Fregata minor*). Booby species are the most readily identifiable due to their numbers and individual sizes. The other species breeding locations are either dispersed or breeding activity is sporadic. The great frigatebird may occasionally nest on FDM, which is one of only two small breeding colonies known to exist within the Mariana Islands (the other is located on Maug in the northern portion of the archipelago). The majority of the bird species observed on FDM are protected under the MBTA.

Under the military readiness rule, the Navy may take migratory birds incidental to military readiness activities described in this SEIS/OEIS, provided that the Navy's actions do not result in a significant adverse effect on a population of birds protected under the MBTA. Consistent with past analyses involving the same training activities on FDM, the Navy has determined that the

Proposed Action would not result in a significant adverse effect on a population of a migratory bird species. If over the course of training and testing activities, the Navy determines that a population of migratory birds would be significantly affected, the Navy would be required to confer and cooperate with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate such significant adverse effects.

3.10.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on terrestrial species and habitats and considers the same stressors as previous MITT analyses, which include (1) acoustic (weapons firing noise and noise generated from explosive detonations); (2) explosive (explosions within the impact zones directly affecting biological resources); and (3) physical disturbance and strike (direct strike and habitat degradation resulting from munitions use).

For each stressor, the implementation of SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and mitigation measures (Chapter 4) is considered part of the Proposed Action when determining if an effect is reasonably foreseeable (as described in Section 3.0.4).

Based on the framework presented in Section 3.0.4, the Navy concluded that effects on terrestrial species and habitats from acoustic, explosives, and physical disturbance and strike stressors would be reasonably foreseeable; effects would be considered significant if the Proposed Action ceased FDM's ability to support populations of nesting seabirds or other native wildlife that visit or reside on the island. Range modernization and sustainment activities would not be conducted on FDM and therefore are not analyzed further in this section. The best available science, presented below and in the *Biological Resources Technical Report* (U.S. Department of the Navy, 2025c), indicates that FDM continues to support stable seabird nesting and resident ESA-listed species populations. This stability persists despite decades of training activities, largely due to the targeting and munitions restrictions detailed in Chapter 4. The following sections analyze the effects of the Proposed Action on terrestrial species and habitats and take into account the analysis presented in Section 3.10 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.10.2.1 Effects on Terrestrial Species and Habitats Under Alternative 1

3.10.2.1.1 Effects from Acoustic Stressors

Noise can result from direct munitions effects (one object striking another), blasts (explosions that result in shock waves), bow shock waves (pressure waves from projectiles flying through the air), and substrate vibrations (combinations of explosion, recoil, or vehicle motion with the ground). Noise may be continuous (lasting for a long time without interruption), or impulsive (lasting for only a short duration). Continuous impulses (e.g., helicopter rotor noise, bursts from rapid-fire weapons) represent an intermediate type of sound and, when repeated rapidly, may resemble continuous noise. These types of sounds are distinguished here as they differ in their effects. Continuous and impulsive sounds can result in hearing damage, while shorter duration, less frequent, or lower sound levels typically elicit physiological or behavioral responses. Some birds may be killed or injured during these activities, or expend energy stores needed for migration to avoid or reduce perturbations generated by explosions.

FDM has three impact areas, a special use area on the northern portion of the island, and a special use area on the land bridge. Targeting of areas inside of the special use areas and other areas outside of impact areas are prohibited. In other words, all areas outside of the impact areas are considered "no-fire areas." Any ordnance that inadvertently lands outside of impact areas, including special use areas and in water, must be reported to MIRC Operations, in accordance with Commander, U.S. Naval Forces Marianas Instruction 3500.4A (U.S. Department of the Navy, 2011). The impact areas and special use areas are shown on Figure 3.10-1 and described below:

- **Northern Special Use Area**. Reserved for direct action (tactical air control party) type exercises and personnel recovery. This area is about 41 acres (ac.) (17 hectares [ha]) and includes a landing zone. Weapons may be fired from the special use area into impact areas, such as small-caliber rounds, grenades, and mortars.
- **Impact Area 1**. This area contains high-fidelity target structures of varying shapes and sizes, and is made up of four vehicles and six targets comprised of shipping containers. Impact Area 1 is about 22 ac. (9 ha).
- **Impact Area 2**. Impact Area 2 may be used for both live and inert ordnance. Strafing is permitted in this area. Impact Area 2 is about 22 ac. (9 ha).
- **Land Bridge**. The land bridge is designated as a "no target zone." Operators are required to report ordnance observed impacting the land bridge.
- **Impact Area 3**. This area is south of the land bridge and authorized for inert ordnance, although live ordnance may be used only with prior approval from Joint Region Marianas. Strafing is permitted in this area. Impact Area 3 is about 11 ac. (4.5 ha).

Both alternatives analyzed in this SEIS/OEIS propose an overall reduction in the number of ordnance expended on FDM, a reduction in the number of explosive events on FDM, and a reduction in the cumulative NEW expended on FDM (Table 3.10-2 and Table 3.10-3). As a result, the Proposed Action is anticipated to have fewer effects on the listed species or habitat than what was analyzed previously. There would be s a net decrease of 11 percent in the number of events and a 12 percent decrease in the number of munitions proposed to occur under both alternatives presented in this SEIS/OEIS compared to what was analyzed previously in the previous MITT analyses. Most of these decreases are in large explosive munitions, as shown in Table 3.10-3, which shows a 27 percent decrease in NEW compared to what was previously analyzed.

Training and Testing. As shown in Table 3.10-2 and Table 3.10-3, the number, type, and amount of munitions that would introduce noise into the terrestrial environment of FDM would decrease. These activity changes should lessen the effects of acoustic stressors on birds and ESA-listed species on the island; however, harmful effects would continue from military use of FDM. Mitigation measures and standard operating procedures (Chapter 4) would continue to further reduce adverse effects to the maximum extent practicable.

In the USFWS's 2015 Biological Opinion, two pairs of Micronesian megapodes per year were estimated to be taken as a result of bombing, gunnery, and missile exercises proposed in the 2015 EIS/OEIS. The best available science indicates that general habitat conditions can be derived from periodic and recent surveys on the island. Surveys for megapodes have been

conducted intermittently on FDM since 1996, with the most recent available data from a 2023 survey. Starting in 2013, the Navy implemented a consistent point count survey protocol restricted to trails cleared of unexploded ordnance, allowing for more direct comparison of results (Naval Facilities Engineering Command Marianas, 2022).

Results from the consistent point count surveys show variability in megapode detections. The total number of individuals detected was 11 in 2013, 23 in 2019, 10 in 2021, and 16 in the most recent 2023 survey (Naval Facilities Engineering Command Marianas, 2021; Naval Facilities Engineering Systems Command Marianas, 2023). The significant decrease in detections between 2019 (23 birds) and 2021 (10 birds) may be due to environmental factors, such as significantly higher wind speeds and a later survey start time during the 2021 event, which might have reduced the effectiveness of the playback recordings. The 2023 survey's minimum detection of 16 individuals represents an increase from the 2021 survey, falling within the historic range of observations for the island.

The location of megapode sightings in relation to the live-fire zones on FDM is variable, yet the data suggests the limited continued use of areas near or within the Impact Areas. Megapode detections have been recorded within and near Impact Area 1 (inert ordnance only) and Impact Area 2 (live/inert ordnance) across all survey years. In the 2023 survey, the highest percentage of detections (69 percent) were located in or near Special Use Area 1, which is designated a no-targeting/no-ordnance zone intended to alleviate direct impacts on the birds. Conversely, only 15 percent of detections in 2023 were associated with Impact Area 1, and 15 percent were associated with Impact Area 2 (Naval Facilities Engineering Systems Command Marianas, 2023). Despite the ongoing use of the live-fire range, the number of megapodes detected within or near Impact Areas 1 and 2 does not appear to show a significant decline over time when compared across the different survey methods, suggesting that military activity may not be causing a significant localized decline in the number of birds in those specific areas.

Due to the proposed reduction in the munitions used at FDM, biological resources such as nesting seabirds, resident landbirds, and ESA-listed species on FDM will face decreased exposure from the proposed additional ordnance to be expended.

Table 3.10-2: Number of Events and Munitions by Activity Type on FDM

Activity	Number of Events			Number of Munitions			
	2015 EIS/OEIS	Alt 1, 2026 Draft SEIS/OEIS	Percent changed from 2015 EIS/OEIS to 2026 SEIS/OEIS	Munitions Type	2015 EIS/OEIS	Alt 1, 2026 Draft SEIS/OEIS	Percent changed from 2015 EIS/OEIS to 2026 SEIS/OEIS
Bombing Exercise (A-G)	2,300	1,910	-17%	NEPM Rounds	1,800	4,210	134%
				Explosive Rounds	6,242	4,530	-27%
Gunnery Exercise (A-G)	96	175	82%	Small-cal Rounds	24,000	25,300	5%
				Med-cal Rounds	94,150	63,350	-33%
				Explosive Med-cal Rounds	17,350	12,620	-27%
				Explosive Large-cal Rounds	200	9	-96%
Missile Exercise (A-G)	85	125	47%	Explosive Rockets	600	1,240	106%
				Explosive Missiles	85	141	66%
				Non-Explosive Missiles	0	100	N/A
Naval Surface Fire Support	10	5	-50%	Explosive Rounds	1,000	450	-55%
Direct Action – Tactical Air Control Party	18	18	0%	Small-cal Rounds	18,000	30,000	67%
				Explosive Med-cal Rounds	0	1,000	N/A
				Explosive Rounds (grenade/mortar)	600	1,000	67%

Notes: MITT = Mariana Islands Training and Testing, EIS = Environmental impact Statement, OEIS = Overseas Environmental Impact Statement, SEIS = Supplemental Environmental Impact Statement, A-G = Air to Ground, NEPM = Non-explosive Practice Munitions

Table 3.10-3: Munitions Use and Net Explosive Weight Comparisons on FDM

Explosive Munitions used at FDM	NEW Range	2015 EIS/OEIS		2026 Draft SEIS/OEIS Alternative 1			
		Number of Munitions	NEW	Number of Munitions	NEW	Percent of Total NEW	% NEW changed from 2015 EIS/OEIS to 2026 SEIS/OEIS
Medium Caliber Projectiles	0.1–0.25	17,350	1,735–4,338	14,070	1,507–3,768	< 1%	-13%
Rockets	> 0.5–2.5	600	300–1,500	1,240	620–3,100	< 1%	206%
Large Caliber Projectiles	> 5–10	1,200	6,000–12,000	459	2,295–4,590	< 1%	-62%
Missiles	> 10–20	85	850–1,700	141	1,410–2,820	< 1%	166%
Bombs	> 60–1,000	6,242	374,520–6,242,000	4,530	271,800–4,530,000	> 95%	-27%

Note: NEW=Net Explosive Weight, units measured in pounds

Conclusion. Consistent with previous MITT analyses, acoustic stressors would have reasonably foreseeable effects on FDM's terrestrial species and habitats; however, the degree of effect would be less than significant because (1) effects on terrestrial biological resources from acoustic stressors used in training activities are not expected to differ from what was previously analyzed due to the decrease in total NEW used under Alternative 1; and (2) the continued use of targeting and munitions use restrictions, substantiated by periodic surveys that assess the general condition of vegetation and wildlife communities on FDM, has not resulted in habitat loss or decrease in ESA-listed Micronesian megapodes or overall population decreases in breeding seabird populations.

3.10.2.1.2 Effects from Explosive Stressors

The training activities that have the greatest effect on vegetation and wildlife communities within the impact areas on FDM are those that result in percussive force from the use of explosive munitions. Training activities that involve high explosive detonations on FDM introduce the potential for wildfires on the island. Cluster bombs, live cluster weapons, live scatterable munitions, fuel-air explosives, incendiary devices, and bombs greater than 2,000 lb. NEW. are prohibited on FDM. It should be noted that some munitions contain a small amount of phosphorous for spotting charges, and smoke markers are used in some direct-action training activities. Phosphorous is not a main constituent to any munitions used on FDM. As noted above, the live-fire weapons allowed are only targeted at impact areas authorized for live and inert ordnance. The areas for target placement support only low-growing vegetation because of long-term training with explosives. Dense vegetation in the northern special use area presents a wildfire risk from potential weapon misfires. Explosions may ignite fires in impact areas, which may spread to higher stature fine fuels outside of impact areas, endangering the remnant forest portions on the northern side of the island and the Megapode population. Besides direct burns, wildfires can potentially cause respiratory distress from

smoke. However, the dense vegetation and shaded canopy of trees in the northern portion of the island likely increases the moisture content of vegetation, which should decrease the ability of fires to spread into the special use area (U.S. Fish and Wildlife Service, 2015).

Training and Testing. As shown in Table 3.10-3, the number, type, and amount of munitions that would introduce explosive stressors into the terrestrial environment of FDM would decrease under Alternative 1. These activity changes should lessen the effects on vegetation communities, nesting seabirds and other resident land birds, and ESA-listed species on the island; however, harmful effects would continue from military use of FDM. Mitigation measures (Chapter 4) would continue to further reduce adverse effects.

Conclusion. Consistent with previous MITT analyses, explosive stressors would have reasonably foreseeable effects on FDM's terrestrial species and habitats; however, the degree of effect would be less than significant because (1) effects on terrestrial biological resources from explosive stressors used in training activities are expected to be reduced from what was previously analyzed due to the decrease in total NEW used under Alternative 1; and (2) the continued use of targeting and munitions use restrictions, substantiated by periodic surveys that assess the general condition of vegetation and wildlife communities on FDM, has not resulted in habitat loss or decrease in ESA-listed Micronesian megapodes or overall population decreases in breeding seabird populations.

3.10.2.1.3 Effects from Physical Disturbance and Strike Stressors

The potential for effects on vegetation communities and wildlife resources, including the Micronesian megapode, Mariana fruit bats that may occur on the island, land bird species, and nesting seabird species associated with direct strike from inert munitions is considerably lower than the potential for blast effects associated with explosive munitions. A direct strike, however, of any animal would likely result in death or serious injury leading to mortality. No bird strikes have been reported from support work at FDM involving fixed or rotary-winged aircraft.

Training and Testing. As shown in Table 3.10-3, the number, type, and amount of munitions that would introduce explosive stressors under Alternative 1 into the terrestrial environment of FDM would decrease. These activity changes should lessen the effects on vegetation communities, birds and ESA-listed species on the island; however, harmful effects would continue from military use of FDM. Mitigation measures (Chapter 4) would continue to further reduce adverse effects to the maximum extent practical.

Other physical disturbance stressors include activities associated with helicopter landings and training activities involving pedestrian on the ground movement of personnel. Some of these activities are range clearance surveys and cleanup and biological surveys. Direct Action and Tactical Air Control Party training activities require helicopter landings on FDM at a landing zone within the "no target area." Marines and special warfare personnel would then disembark and conduct Direct Action training activities, where vegetation may be trampled. Because of unexploded ordnance clearance requirements, only marked trails (laid out by explosive ordnance disposal specialists prior to range clearance activities) are used, which reduces the potential for vegetation trampling (as well as nest trampling) in areas away from access trails.

As shown in Table 3.10-3, the number of Direct Action training activities on FDM would not change compared to what was previously analyzed.

Conclusion. Consistent with previous MITT analyses, physical disturbance and strike stressors would have reasonably foreseeable effects on FDM's terrestrial species and habitats; however, the degree of effect would be less than significant because (1) effects on terrestrial biological resources from physical disturbance and strike stressors are not expected to differ from what was previously analyzed due to the decrease in the number of activities; and (2) the general condition of vegetation and wildlife communities on FDM, substantiated by periodic and repeated surveys on FDM, shows that habitat loss or decrease in ESA-listed Micronesian megapodes or overall population decreases in breeding seabird populations are not occurring.

3.10.2.2 Effects on Terrestrial Species and Habitats Under Alternative 2

Under Alternative 2, the number of activities with associated acoustic, explosive, and physical disturbance and strike stressors would be equal to Alternative 1 and are not expected to yield any lasting effects on the survival of terrestrial species and habitats at population levels for the same reasons detailed above. The Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) and terrestrial mitigation (Chapter 4) to reduce potential effects on terrestrial species and habitats.

Therefore, military readiness activities involving acoustic, explosive, and physical disturbance and strike stressors under Alternative 2 would result in less than significant effects on fishes.

3.11 CULTURAL RESOURCES

3.11.1 Regulatory Framework

NEPA and Section 106 of the NHPA are the guiding mandates and apply to U.S. territorial waters (within 12 NM); only potential impacts on World Heritage sites will be addressed in areas beyond 12 NM. Following the 2020 SEIS/OEIS, two Programmatic Agreements (PAs) regarding Training and Testing (PATTs) were developed in consultation for military readiness activities within the MITT Study Area: the P*rogrammatic Agreement Between the Commander, Joint Region Marianas (JRM) and the Guam State Historic Preservation Officer, regarding Military Training and Testing on and within the Surrounding Waters of the Island of Guam* (2020 Guam PATT); and the *Programmatic Agreement Between the Commander, JRM and the CNMI State Historic Preservation Officer, regarding Military Training and Testing on and within the Surrounding Waters of the Islands of the CNMI* (2022 CNMI PATT). The Navy is meeting its responsibilities pursuant to Section 106 of the NHPA for the Proposed Action in accordance with stipulations in the 2020 Guam PATT and the 2022 CNMI PATT. In order to account for the new military readiness activities, the Navy will initiate Section 106 consultation and follow the process to amend the existing PATTs in accordance with Stipulation XIII of the 2020 Guam PATT and Stipulation XIV of the 2022 CNMI PATT.

In compliance with NHPA and Archaeological Resources Protection Act, the Navy adheres to confidentiality restrictions to prevent the inappropriate release of locational data for archaeological sites and traditional cultural places (TCPs). Accordingly, this SEIS/OEIS does not contain detailed descriptions or figures showing the specific locations of certain submerged cultural resources or TCPs.

3.11.2 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on cultural resources found in Section 3.11 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

Section 3.11.1.1 of the 2015 EIS/OEIS provides an explanation of the procedures associated with the preservation of cultural resources. Previously identified historic properties, as defined under the National Historic Preservation Act (NHPA) of 1966, within the Study Area are described in Section 3.11.1 in the 2020 SEIS/OEIS.

3.11.2.1 Guam

As presented in the previous MITT analyses, geospatial data provided by NOAA documented the presence of several wrecks, obstructions, or occurrences in the waters around Guam (Figure 3.11-1). Newly identified submerged cultural resources are described below but are not depicted in the figure since the associated Geographic Information Systems data is not publicly available.

Following a literature review, additional submerged cultural resources have been identified around Guam. In 2019 and 2022, a maritime archeological remote sensing survey was conducted by the University of Hawaii, Hilo on behalf of JRM to investigate cultural heritage sites in Apra Harbor and the offshore submerged lands. The survey was divided into multiple volumes, of which Volumes 1 and 3 identified additional cultural resources within the Study Area. In addition to investigating previously recorded resources, surveys conducted during Volume 1 identified four new discrete sites, including three WWII barges, one Landing Craft Utility, and a wooden hulled sailing ship (possibly nineteenth century) (Carrell et al., 2020).

Volume 3 of the maritime archaeological remote sensing survey investigated previously identified resources, as well as a newly identified WWII pontoon barge (not NRHP-eligible) and a WWII Japanese aircraft wreck (NRHP-eligible). The survey also documented the nineteenth century wooden-hulled sailing ship (NRHP-eligible). Additionally, three wrecks in Inner Apra Harbor were determined not NRHP-eligible (Carrell et al., 2023).

In 2023, a two-part survey within the War in the Pacific National Historical Park identified additional submerged cultural resources associated with the U.S. invasion of the then-Japanese-occupied island of Guam (National Oceanic and Atmospheric Administration, 2023b). The survey findings resulted in the identification of WWII artifacts within the barrier reef of Asan and Agat beaches and in the deep water outside the barrier reef. Military readiness activities within these locations are not the types of activity to affect historic properties; therefore, cultural resources identified during the 2023 NOAA survey are not considered further in this analysis.

In 2025, an underwater archaeological survey in Outer Apra Harbor investigated approximately 20 potential cultural resources, including four U.S. Navy Lighterage Pontoons, one amphibious vehicle, one Japanese seaplane, four metal debris, five anchors with chains, and two suspected shipwrecks. One of the pontoons and the Japanese seaplane were recommended as eligible for NHRP listing. Two of the sites need additional investigation to determine site integrity and significance. The remaining 16 sites are either not historic or do not retain integrity (Burkhard et al., 2025).

3.11.2.2 Commonwealth of the Northern Marianas Islands

3.11.2.2.1 Farallon de Medinilla

Following a literature review, no submerged cultural resources, land-based archaeological sites[4], or isolated non-modern artifacts have been identified around or on FDM. A survey conducted in 2025 around FDM utilized aerial photogrammetry, multispectral imaging, multibeam echosounder, magnetometer, and side-scan sonar to identify historic properties around FDM. The aerial surveys successfully covered 100 percent of the island and did not identify any potential cultural resources. The submerged surveys covered 79 percent of its Study Area; dangerous conditions and geological magnetic interference hampered access to some of the Study Area. The survey did not find any cultural resources requiring NRHP evaluation. One acoustic contact identified just outside the Study Area was classified as a possible wreck; however, geological interference may have skewed the readings. As such, the information presented in the previous MITT analyses is still valid and the most current.

3.11.2.2.2 Tinian

As presented in the previous MITT analyses, geospatial data provided by NOAA documented the presence of several wrecks, obstructions, or occurrences in the waters around Tinian (Figure 3.11-1).

Following a literature review, no additional submerged cultural resources have been identified around Tinian. As such, the information presented in the previous MITT analyses is still valid and the most current. Traditional cultural places identified on Tinian are described in Section 3.11.2.3.1.

3.11.2.2.3 Saipan

As presented in the previous MITT analyses, geospatial data provided by NOAA documented the presence of several wrecks, obstructions, or occurrences in the waters around Saipan (Figure 3.11-1).

Following a literature review, additional submerged cultural resources have been identified in the waters around Saipan. Newly identified submerged cultural

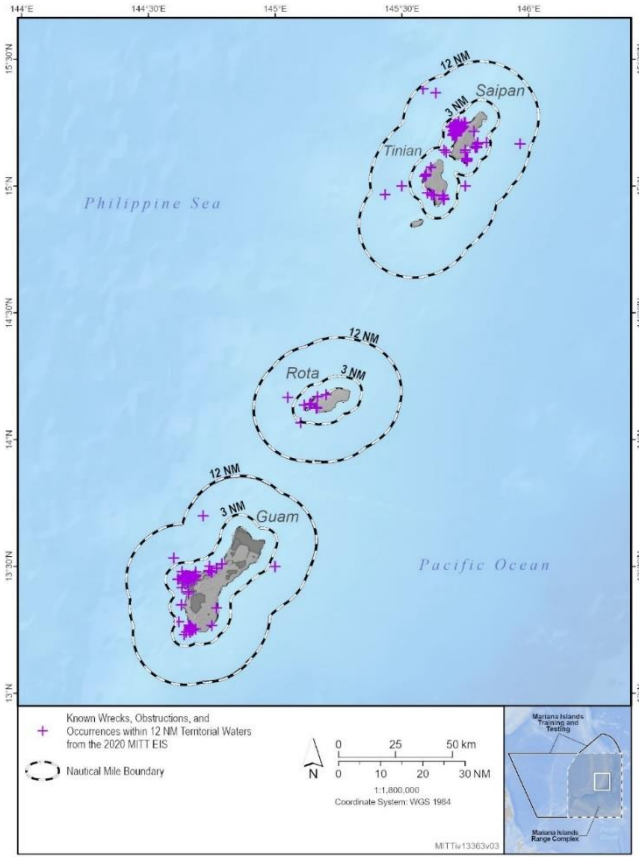

Figure 3.11-1: Known Wrecks, Obstructions, or Occurrences Within the U.S. Territorial Waters Around Guam and CNMI

[4] Land elevation and submerged land bathymetry data for CNMI and FDM can be access at the following link: https://coast.noaa.gov/dataviewer/#/lidar/search/-23817161.261553798,1802345.213255328,-23812746.984076977,1811951.0330138607/details/9510

resources are described but are not depicted in Figure 3.11-1 since the associated Geographic Information Systems data is not publicly available. In April and May of 2023, NOAA conducted surveys to investigate and document remains of the underwater battlefield from WWII's Battle of Saipan. Surveys identified submerged amphibious landing vehicles, iron anchor chains, a seaplane, a dump site containing multiple WWII vehicles, ordnance, iron plating, and other battle-related items. During the surveys, divers also conducted conservation and photogrammetric surveys of 15 previously identified sites that are on the Battle of Saipan's Maritime Heritage Trail in the shallow waters of Saipan Lagoon (National Oceanic and Atmospheric Administration, 2023a).

In 2022, two new cultural resources were identified during a NOAA survey in the Saipan Channel. However, military readiness activities that would be conducted in the Saipan Channel would only consist of vessel movement. Due to the depth of the water where these vessels transit, cultural resources identified during the 2022 survey would not be affected and therefore are not considered further in this analysis.

3.11.2.2.4 Rota

As presented in the previous MITT analyses, several wrecks, obstructions, or occurrences are present in the waters around Rota (Figure 3.11-1).

Following a literature review, no additional submerged cultural resources have been identified around Rota. As such, the information presented in the previous MITT analyses is still valid and the most current.

3.11.2.3 Cultural/Traditional Practices and Beliefs

Chamorros and Carolinians (Refaluwasch) have a unique cultural history in the Marianas, with which they are closely connected. As far back as 4,000 years ago, the Chamorros migrated from Southeast Asia to the Mariana Islands. Their people and culture experienced centuries of change, from Spanish occupation in the 16th and 17th centuries, to European-introduced diseases and conflict over land in the 18th century, to Japanese occupation during World War II. Today, Chamorros and Carolinians strive to maintain their ancestral heritage, cultural traditions, and language.

As described in the 2020 SEIS/OEIS, public comments received on the Draft 2020 SEIS/OEIS refer to the history of displacement and marginalization the Chamorros and Carolinians experienced. Commenters stated that military training and testing activities within the Mariana Islands are believed to hinder cultural beliefs, access to cultural sites, and the ability to practice cultural traditions. While specific practices were not described, cultural traditions include (but are not limited to) resource collection for traditional events or ceremonial purposes, seafaring customs, and practices related to traditional and familial roles.

3.11.2.3.1 Tinian Traditional Cultural Places

Three TCPs have been identified on Tinian as eligible for listing on the National Register of Historic Places. A TCP is a building, structure, object, site, or district that may be National Register of Historic Places-listed or -eligible for its "significance to a living community because of its association with cultural beliefs, customs, or practices that are rooted in the community's

history and that are important in maintaining the community's cultural identity" (National Park Service, 2024). The three TCPs on Tinian are the shore-based Chamorro fishing areas of Unai Chulu, Unai Dankulo, and Puntan Masalok (also called Unai Masalok). These sites are considered significant under Criterion A (36 CFR section 60.4) for their association and contribution to Chamorro history—namely the historic and continued practices of *chenchulu* (Chamorro net fishing), *lulay* (hook-and-line pole fishing), and other traditional fishing techniques that are important to local subsistence, culturally important fiestas, and Chamorro cultural identity (U.S. Department of the Navy, 2025e).

Accessibility to TCPs is analyzed in Section 3.11.2.2.1 below. Accessibility related to commercial, recreational, and subsistence fishing is analyzed in Section 3.12.2.1.

3.11.2.4 Marianas Islands Training and Testing Transit Corridor

The length and variable width of the MITT transit corridor is so vast and deep (sometimes over 18,000 ft. [5,486 m]), that it precludes systematic survey for submerged cultural resources. In accordance with Section 402 of the NHPA regarding international federal activities affecting historic properties, the World Heritage List was reviewed, and no known natural/cultural resources were identified within the MITT transit corridor.

3.11.3 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on cultural resources and considers the same stressors as previous MITT analyses, which includes (1) explosives (in-water explosions), (2) physical disturbance and strike (vessels and in-water devices, MEM, seafloor devices, and personnel disturbance), and (3) accessibility.

For each stressor, the implementation of minimization measures and best management practices listed in Table 3.11-1 are considered as part of the Proposed Action when determining if an effect is reasonably foreseeable.

Based on the framework presented in Section 3.0.4, the Navy concluded that effects from explosives stressors on cultural resources would not be reasonably foreseeable. Table 3.0-20 summarizes these findings.

Based on the framework presented in Section 3.0.4, the Navy concluded that effects from physical disturbance and strike and accessibility stressors on cultural resources would be reasonably foreseeable; effects would be considered significant if (1) cultural resources or historic properties are physically destroyed, damaged, or altered in a manner that compromises the integrity of the resource; or (2) public access to TCPs is permanently restricted. The following sections analyze the effects of the Proposed Action on cultural resources and takes into account the analysis presented in Section 3.11 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

Table 3.11-1: List of Minimization Measures and Best Management Practices for Cultural Resources

Applicable Stressor	Minimization or BMP	Requirements Summary and Protection Focus
Explosives; physical disturbance and strike	Minimization	• 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 yards (320 meters) from shipwrecks (except at designated nearshore training areas, where these resources will be avoided to the maximum extent practicable). • The Action Proponents will not place non-explosives on or near the seafloor within a horizontal distance of 350 yards from shipwrecks (except at designated nearshore training areas, where these resources would be avoided to the maximum extent practicable). • The Action Proponents will not set vessel anchors within the anchor swing circle radius from shipwrecks (except at designated anchorages and nearshore training areas around Guam and within Apra Harbor, where these resources would be avoided to the maximum extent practicable). • The Action Proponents will not position precisely placed non-explosive seafloor devices directly on shipwrecks. • The Action Proponents will avoid positioning precisely placed non-explosive seafloor devices near shipwrecks by the largest distance that is practicable to implement based on mission requirements.
Explosives; physical disturbance and strike	BMP	Military readiness activities are only conducted in locations where no cultural resources are known to exist.
Explosives; physical disturbance and strike	BMP	The military routinely avoids submerged cultural resources during at-sea activities by utilizing sonar and seafloor maps.
Physical disturbance and strike; in-water devices	BMP	Military readiness activities associated with towed systems are conducted in areas where the sea floor is deeper than the length of the tow lines; towed in-water devices are designed and operated within the water column and do not contact the seafloor.
Seafloor Devices	BMP	Seafloor devices are laid out to avoid known cultural resources.
Accessibility	BMP	Beach and road closures during amphibious training activities on Tinian would only last for the duration of the activity and are coordinated with the relevant CNMI government offices to avoid scheduling training on holidays, festivals, and other important days when public access within the Military Lease Area is desired.
Education	BMP	Units would complete cultural awareness training prior to conducting military readiness activities.

Note: BMP = Best Management Practice

3.11.3.1 Effects on Cultural Resources Under Alternative 1

3.11.3.1.1 Effects from Physical Disturbance and Strike Stressors

The evaluation of the effects from physical disturbance and strike stressors on cultural resources focuses on proposed activities that may cause cultural resources to be damaged by an object that is moving through the water (e.g., vessels and in-water devices), dropped into or propelled through the water (e.g., MEM), or deployed on the seafloor (e.g., mine shapes and

anchors). Detailed information on physical disturbance and strike stressors and substressors can be found in Section 3.0.4.1.3 of this SEIS/OEIS.

Training and Testing. Under Alternative 1, the number of proposed training and testing events for activities that result in physical disturbance and strike stressors (see Tables 3.0-10, Table 3.0-12 through 3.0-15, Table 3.0-17, and Table 3.0-18) would change compared to the numbers analyzed in the 2020 SEIS/OEIS.

Physical disturbance and strike from vessels and in-water devices can occur as some smaller craft, in-water devices, and amphibious vessels can come into contact with the seafloor in the nearshore environment, potentially affecting submerged cultural resources by striking them or causing nearby sediment displacement. However, the number of events using vessels and in-water devices under the Proposed Action would decrease from what was considered in the 2020 SEIS/OEIS.

The deposition of non-explosive practice munitions, sonobuoys, and MEM other than munitions could affect submerged cultural resources via strike or by causing sediment displacement if such resources are located nearby. Most of the anticipated MEM would be small objects and fragments that lose velocity as they descend through the water column. It is possible that larger and heavier objects associated with MEM could strike the ocean surface with greater velocity and affect a submerged cultural resource site by creating sediment and artifact displacement.

Physical disturbances from activities using seafloor devices such as precision anchoring, targets or mines resting on the ocean floor, moored mines, bottom-placed instruments, and bottom crawlers (unmanned underwater vehicles) could create sediment and artifact displacement, or damage or destroy submerged cultural resources if such resources are located nearby.

Training and testing activities involving personnel disturbance could affect submerged cultural resources as personnel move along the nearshore seafloor in a shallow or amphibious environment. Amphibious training activities would continue to occur at the beaches at Unai Babui, Unai Chulu, and Unai Dankulo on Tinian. Unai Chulu and Unai Dankulo have been identified as TCPs (see Section 3.11.2.3.1). Physical disturbance and strike from amphibious vessels and personnel coming ashore could result in disturbance to the environmental setting of the TCP. However, amphibious activities currently take place at these beaches and would continue to avoid the fringing reef, and therefore would not affect character--defining features of the TCPs. Any impacts on soft substrate (sandy bottom) where amphibious activities occur would be temporary and consistent with natural disturbances caused by tidal action. Additionally, any measures to avoid, minimize, or resolve adverse effects on historic properties resulting from ongoing Section 106 consultations, as stipulated in the 2020 Guam PATT and the 2022 CNMI PATT, would be implemented.

Range Modernization and Sustainment. Vessels used to deploy mine countermeasure targets, bottom equipment, and equipment tethered to the seafloor associated with range modernization and sustainment in the MITT Study Area could come into contact with the seafloor and potentially affect submerged cultural resources by striking them or causing nearby sediment displacement.

Conclusion. Consistent with previous MITT analyses, military readiness activities involving physical disturbance and strike stressors under Alternative 1 of the Proposed Action would have a reasonably foreseeable effect on cultural resources. However, the degree of effect would be less than significant because: (1) vessels and in-water devices are operated in a manner that avoids known submerged cultural resources; (2) amphibious activities only occur in designated areas where no known submerged cultural resources are present; (3) prior to deploying a towed device, there is a standard operating procedure to search the intended path of the device for potential surface obstructions; (4) towed in-water devices are designed and operated within the water column and thus would not contact submerged resources on the seafloor; (5) most anticipated MEM would be small objects and fragments that lose velocity after striking the ocean surface and drift to the seafloor; (6) activities that result in larger MEM would take place in water of greater depths, resulting in a reduction of velocity as the object descends to the seafloor; (7) seafloor devices are either stationary or move very slowly along the bottom; (8) seafloor devices are laid out to avoid known cultural resources; (9) military readiness activities would be conducted in accordance with the minimization measures and best management practices (Section 2.3.3 of the 2020 SEIS/OEIS) that minimize and avoid effects on cultural resources; and (10) any measures to avoid, minimize, or resolve adverse effects on historic properties resulting from ongoing Section 106 consultations, as stipulated in the 2020 Guam PATT and the 2022 CNMI PATT, would be implemented.

3.11.3.1.2 Effects from Accessibility Stressors

The evaluation of the effects from accessibility stressors on cultural resources focuses on proposed activities that may temporarily limit access to TCPs.

Training and Testing. Under Alternative 1, beach road access would be temporarily closed, and Broadcast Notice to Mariners (BNMs) would be issued to restrict public access to the beaches and surrounding nearby water during amphibious training activities conducted on Tinian.

Range Modernization and Sustainment. There would be no effects on accessibility under Alternative 1 during range modernization and sustainment activities.

Conclusion. Military readiness activities involving accessibility stressors under Alternative 1 of the Proposed Action would have a reasonably foreseeable effect on cultural resources. However, the degree of effect would be less than significant because the following reasons: (1) closures would be temporary and limited to the duration of the training event; (2) closures are coordinated with the relevant CNMI government offices to avoid scheduling training on holidays, festivals, and other important days when public access within the Military Lease Area is desired; (3) any measures to avoid, minimize, or resolve adverse effects on historic properties resulting from ongoing Section 106 consultations, as stipulated in the 2020 Guam PATT and the 2022 CNMI PATT, would be implemented. Further discussion on accessibility related to cultural practices such as recreational and subsistence fishing is analyzed in Section 3.12.2.1.1.

3.11.3.2 Effects on Cultural Resources Under Alternative 2

Under Alternative 2, the number of activities with associated physical disturbance and strike and accessibility stressors would be equal to or increase compared to Alternative 1. However, increases in these stressors are not expected to compromise the integrity of historic properties or

permanently restrict access to TCPs for the same reasons detailed above for Alternative 1. Additionally, the Action Proponents would implement minimization measures and best management practices (Chapter 4; and Section 2.3.3 of the 2020 SEIS/OEIS) that minimize and avoid effects on cultural resources. As such, increases in military readiness activities would not result in substantive changes to the potential for or types of effects on cultural resources, and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving physical disturbance and strike and accessibility stressors under Alternative 2 would result in less than significant effects on cultural resources.

3.12 SOCIOECONOMIC RESOURCES

Consistent with previous MITT analyses, this SEIS/OEIS considers four broad socioeconomic elements (commercial transportation and shipping; commercial and recreational fishing; traditional fishing practices; and tourism and recreational use) based on their association with human activities and livelihoods in the Study Area. These four elements were chosen as the focus of the analysis in this section because of their importance to the local economy and the way of life on Guam and the CNMI, and the potential for these elements to be affected by the proposed military readiness activities.

3.12.1 Affected Environment

This section provides new data available since the 2020 SEIS/OEIS to supplement the effects analysis on socioeconomic resources found in Section 3.12 of the previous MITT analyses (U.S. Department of the Navy, 2015a, 2020).

The primary area of interest for assessing potential effects on socioeconomic resources is the U.S. territorial waters (seaward of the mean high-water line to 12 NM) of Guam and the CNMI. Figures A-2 through A-5 in Appendix A of this SEIS/OEIS outline the 3 NM and 12 NM territorial limits for Guam, Tinian, Saipan, Rota, and FDM. Limited socioeconomic resources outside this area of interest (i.e., that portion of the EEZ between 12 and 200 NM from shore) are also described when relevant to human activities.

The Center for Naval Analyses (CNA) characterized military and non-military vessel traffic within the Study Area. Data is based on a four-year average (2014–2018) acquired from approximately one billion positional vessel data records. Data indicate that non-military vessels account for 98 percent of vessel traffic in the MITT Study Area, whereas military vessels (Navy and USCG vessels) account for 2 percent of traffic (Starcovic & Mintz, 2021). Most vessel traffic in the Study Area was attributed to bulk tankers (56 percent), followed by cargo (21 percent) and tankers (14 percent). The CNA report indicates that majority of military vessel traffic was concentrated in the surrounding areas around the Mariana Islands, particularly near Naval Base Guam. To a lesser extent, traffic was concentrated in the west and northwest Philippine Sea due to transiting vessels.

3.12.1.1 Commercial Transportation and Shipping

3.12.1.1.1 Ocean Transportation

Commercial transportation and shipping, including port usage and vessel transits, remains generally consistent with previous MITT analyses. Fluctuations in port usage and vessel transit volumes would not be expected to appreciably change the information or analysis conclusions

presented in Section 3.12.2 of this SEIS/OEIS. Refer to Section 3.12.2.1 of the 2015 EIS/OEIS and Section 3.12.1.1 of the 2020 SEIS/OEIS for additional information on commercial transportation and shipping practices and their economic contributions in the region.

Since 2021, the waters adjacent to the Mason Live-Fire Training Range Complex have been designated as a Danger Zone (DZ) (33 CFR Part 334), which is in addition to the existing Orote Point Small Arms Firing Range and Finegayan Small Arms Firing Range off the coast of Guam. These DZs serve to intermittently restrict vessel access for public safety during active live-fire training exercises. When the ranges are not in use, these areas are open to maritime traffic. A discussion of DZs and restricted areas located in the Study Area is provided in Chapter 2 of this SEIS/OEIS, as well Chapter 2 of the 2015 EIS/OEIS and 2020 SEIS/OEIS.

3.12.1.1.2 Air Transport

No changes to existing special use airspace are proposed in this SEIS/OEIS. While there may be changes to airspace associated with other projects on Guam and the CNMI, general air traffic conditions and use of airspace for commercial and recreational purposes would not be expected to appreciably change the information or analysis conclusions presented in Section 3.12.2 of this SEIS/OEIS.

Current military projects, such as the Pacific Deterrence Initiative, are enhancing military capabilities through construction and restoration work in the CNMI, including at the Palau and Tinian Airfields. This effort may increase military use of commercial airports in the region. As discussed in the 2020 SEIS/OEIS, training and testing activities are conducted at commercial airports with appropriate planning and coordination with the local port authorities and the Federal Aviation Administration (FAA). For example, on Tinian, the military conducts aviation training in the military lease area by delivering personnel and cargo to maneuver areas and providing various support functions to forces already on the ground. Refer to Section 3.12.2.1.2 (Air Traffic) of the 2015 EIS/OEIS and Section 3.12.1.1.2 (Air Traffic) of the 2020 SEIS/OEIS for additional information regarding military air transit in the CNMI, including the use of restricted airspace on FDM. A detailed discussion of special use airspace located in the Study Area is also provided in Chapter 2 of this SEIS/OEIS, as well Chapter 2 of the 2015 EIS/OEIS and 2020 SEIS/OEIS.

3.12.1.2 Commercial and Recreational Fishing

The dominant fishery on Guam and the CNMI is a small-boat fishery targeting bottom, reef, and nearshore pelagic species. Commercial fishing takes place throughout the Study Area from nearshore waters adjacent to Guam and the CNMI, offshore banks, and pelagic waters. Sportfishing peaks in summer (June through August) when popular sport fish, including blue marlin and yellowfin tuna, are most abundant.

Additional information on commercial and recreational fishing practices on Guam and the CNMI, including gear types, target species, charter fishing, commonly used harbors and marinas, and popular fishing sites, is presented in Section 3.12.2.2 of the 2015 EIS/OEIS and Section 3.12.1.2 of the 2020 SEIS/OEIS.

3.12.1.2.1 Guam

On Guam, most small boat fisheries are comprised of a mix of commercial and non-commercial fishing (Western Pacific Fishery Management Council, 2024). The total average number of small boat-based fishing trips on Guam from 2018 through 2022 was estimated as 9,266 trips (Chan, 2024). Based on available information, the total estimated ex-vessel revenue for small-boat fisheries on Guam in 2019 was estimated at over $490,000 (Chan, 2024). A total of 25,713 lb. of the Guam Bottomfish Management Unit Species (BMUS) stock were landed in 2023; however, no commercial catch trends were reported for the stock complex due to data confidentiality rules. Additionally, Guam has continued to experience high levels of commercial activity targeting reef fish, predominantly carried out by migrants from the Federated States of Micronesia often hired by retail shops (Western Pacific Fishery Management Council, 2024).

Based on the Western Pacific Fisheries Information Network best estimated total commercial landings for all species, the value and quantity (lb.) of commercial landings on Guam has fluctuated but gradually declined over the years (Figure 3.12-1). The declining trend in fisheries landings is consistent with the results presented by Weijerman et al. (2016), which documented a decline of over 60 percent in the annual catch of reef fish around Guam between the years 1985 and 2012. In 2021, both the total lb. landed (58,592 lb.) and the value of landings ($157,091) hit their lowest point over the 23-year period in Guam, likely due to the effects of the COVID-19 pandemic. Total commercial landings were estimated at 135,019 lb. and valued at $596,703 in 2023, representing over a 279 percent increase in commercial value from 2021 totals (Pacific Islands Fisheries Science Center, 2023).

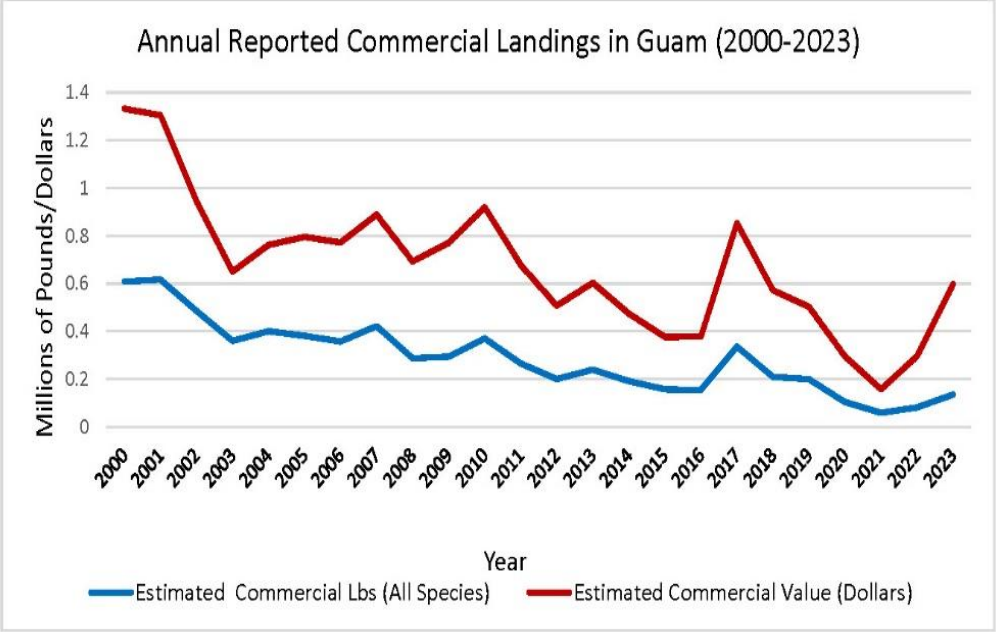

Figure 3.12-1: Annual Reported Commercial Landings for All Species on Guam (2000–2023)

It is estimated that 38 to 58 percent of catch on Guam is intended for sale, while the rest of catch supports important social and cultural practices in fishing communities (Western Pacific Fishery Management Council, 2024). The report estimates non-commercial catch (calculated as total estimated catch from boat and shore-based creel surveys minus dealer-reported commercial catch) for the Guam BMUS stock complex as 33,348 lb. in 2022, representing 91 percent of the total catch estimate for the year.

3.12.1.2.2 Commonwealth of the Northern Mariana Islands

The total average number of small boat-based fishing trips (commercial and non-commercial) in the CNMI was estimated as 3,573 trips from 2018 through 2022 (Chan, 2024). Recent data presented in (Chan, 2024) estimates that a total of 5,213 lb. of the CNMI BMUS stock complex were sold for a revenue of $28,519 in 2023. The report also estimates that 29,672 lb. of the top 10 CNMI Ecosystem Component species were commercially landed and sold for a revenue of $108,939 in the same year.

Based on the Western Pacific Fisheries Information Network best estimated total commercial landings for all species in the CNMI, the value and quantity (lb.) of commercial landings has significantly fluctuated throughout the years (Figure 3.12-2). In 2023, The total lb. landed for all species (218,102 lb.) and the total value of landings ($528,485) reached their lowest levels recorded over the 23-year period. This decrease is likely attributed to Typhoon Mawar, as well as infrastructure issues (e.g., congested boat ramps and influx of boats) and high fuel prices (Ayers, 2024). Although there have been fluctuations in the value and quantity (lb. of landings, landing values have continued to surpass the total pounds caught, indicating that the types of species landed in the CNMI remain economically valuable.

It is estimated that 56 to 84 percent of catch in the CNMI is intended for sale, while the rest of the catch supports important social and cultural practices in fishing communities (Western Pacific Fishery Management Council, 2024). The report estimates non-commercial catch (total estimate catch from boat and shore-based creel surveys minus dealer-reported commercial catch) for the CNMI BMUS in 2023 as 30,859 lb., representing 36 percent of the total catch estimate for the year.

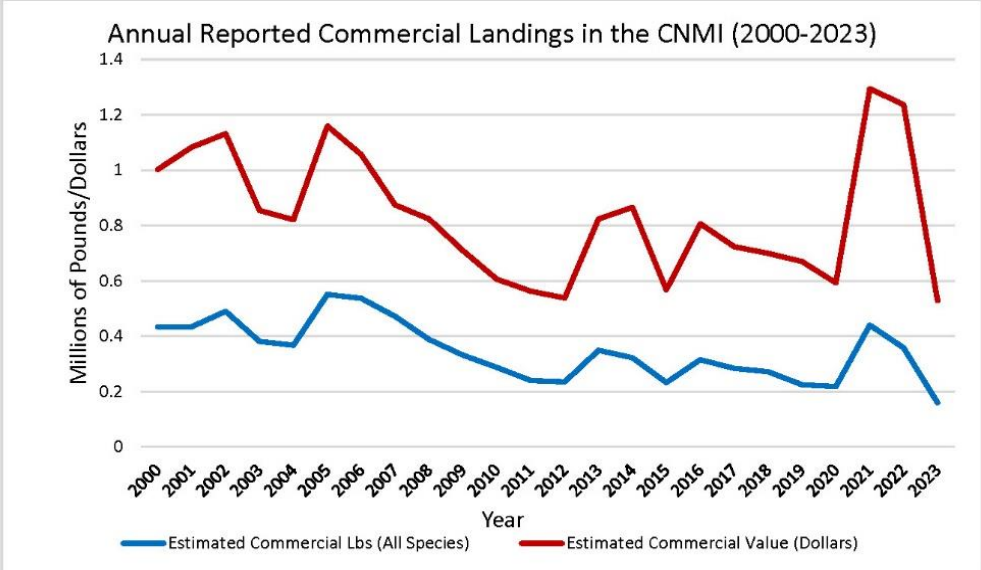

Figure 3.12-2: Annual Reported Commercial Landings for All Species in the CNMI (2000–2023)

3.12.1.2.3 Transit Corridor

There are no data on commercial or recreational fishing within the transit corridor. Due to the distance from shore and a lack of known fishing areas within the corridor, it is assumed that there is limited to no commercial and recreational fishing activity within the transit corridor.

3.12.1.3 Tourism and Recreational Use

Tourism is a major source of revenue for the economy on Guam and the CNMI. Tourism and recreational activities remain generally consistent with previous MITT analyses. Fluctuations in tourism and recreation would not be expected to appreciably change the information or

analysis conclusions presented in Section 3.12.2 of this SEIS/OEIS. Refer to Section 3.12.2.4 of the 2015 EIS/OEIS and Section 3.12.1.3 of the 2020 SEIS/OEIS for additional information on tourism and recreation in the Study Area.

3.12.1.4 Traditional Fishing Practices

3.12.1.4.1 Guam

Traditional fishing practices on Guam often involve nearshore or small boat fishing targeting pelagic, bottom fish, and coral reef fish. Most bottomfish fishing around Guam takes place on offshore banks. Galvez Bank is the closest and most accessible offshore bank, and consequently, continues to be fished most frequently (Western Pacific Fishery Management Council, 2024). There is limited information describing the conditions of offshore banks on Guam; however, based on anecdotal information, it is likely that most of the offshore banks remain in good condition because of their isolated locations (Western Pacific Fishery Management Council, 2024).

The 2019 NMFS stock assessment report for the bottomfish fishery on Guam concluded that the Guam BMUS was in an overfished state, but was not undergoing overfishing at that time (Langseth et al., 2019). An assessment conducted in 2024 indicated that the Guam BMUS is no longer in an overfished state and not subject to overfishing. Although the stock has exceeded the minimum stock size threshold, it has not yet reached its rebuilt state (Western Pacific Fishery Management Council, 2024).

Coral reef fisheries support most subsistence and traditional fishing in the Study Area. To further understand the status reef species on Guam, the NOAA Fisheries Pacific Islands Regional Office and Pacific Islands Fisheries Science Center conducted an evaluation of the status of 7 reef species identified as priority species by Guam's Department of Agriculture Division of Aquatic and Wildlife Resources (Ahrens & Nadon, 2023). The assessment results concluded that longface emperor and blacktail snapper may be experiencing overfishing (Ahrens & Nadon, 2023). As described in the 2020 SEIS/OEIS, as the availability of target species in the reef fish fishery continues to decline, the annual catch from traditional fishers would also be expected to decline. While target fish species may be less available, which may have a greater effect on the success of traditional practices like subsistence fishing.

3.12.1.4.2 Commonwealth of the Northern Mariana Islands

As discussed in Section 3.11 of this SEIS/OEIS, three TCPs have been identified on Tinian as eligible for listing in the NRHP. These TCPs are the shore-based Chamorro fishing areas known as Unai Chulu, Unai Dankulo, and Puntan Masalok (also referred to as Unai Masalok). Further discussion regarding the accessibility and availability of ocean space for traditional fishing practices, including nearshore environments in the Study Area, can be found in Section 3.12.2.1. For additional information concerning TCPs identified in the Study Area, see Section 3.11.

The 2019 NMFS stock assessment report for the bottomfish fishery in the CNMI concluded that the CNMI BMUS was determined to not be overfished and was not experiencing overfishing (Langseth et al., 2019). Additionally, creel survey data have indicated that coral reef fisheries have been generally steady in recent years relative to previous decades (Western Pacific Fishery Management Council, 2024). However, as discussed in the 2020 SEIS/OEIS, the catch from the

non-commercial reef fish fishery in the CNMI has historically been in decline since the late 1970s based on data from a new reporting system introduced at that time (Cuetos-Bueno & Houk, 2014). Similar to traditional fishing practices on Guam, if the availability of target species in the reef fish fishery in the CNMI continues to decline, the annual catch from traditional fishers is likely to decline. Traditional fishers that are more dependent on a successful catch (e.g., subsistence fishers) may be affected to a greater degree than fishers who engage in traditional practices for social and cultural reasons.

3.12.1.4.3 Transit Corridor

There are no data on traditional fishing practices occurring in the transit corridor. It is assumed that traditional fishing practices do not typically occur within the transit corridor, because the corridor is a transoceanic route and the majority of traditional fishing typically occurs in nearshore waters.

3.12.2 Environmental Consequences

This SEIS/OEIS analyzes potential impacts of the Proposed Action on socioeconomic resources and considers the same stressors as previous MITT analyses, which include (1) accessibility (availability of access to ocean and airspace), (2) airborne acoustics (weapons firing, in-air explosions, aircraft, and vessel noise), (3) physical disturbance and strike aircraft, vessels and in-water devices, MEM), and (4) secondary stressors.

For each stressor, the implementation of SOPs is considered as part of the Proposed Action when determining if an effect is reasonably foreseeable.

Based on the framework presented in Section 3.0.4, the Navy concluded that effects on socioeconomic resources from accessibility, airborne acoustics, and physical disturbance and strike stressors would be reasonably foreseeable; effects would be considered significant if it results in the long-term loss of income, revenue, or employment; or if it permanently degrades the quality of experience for tourism and recreational activities. The following sections analyze the effects of the Proposed Action on socioeconomic resources and takes into account the analysis presented in Section 3.12 of the 2015 EIS/OEIS and the 2020 SEIS/OEIS.

3.12.2.1 Effects on Socioeconomic Resources Under Alternative 1

3.12.2.1.1 Effects from Accessibility Stressors

Training and Testing. Under Alternative 1, the number of training and testing activities that have the potential to affect accessibility would change compared to the 2020 SEIS/OEIS. However, the stressors associated with these activities remain the same as those evaluated in previous MITT analyses, and the changes in the number of activities would not be expected to appreciably affect existing conditions within the Study Area. Therefore, the potential impacts pertaining to accessibility, as presented in the 2015 EIS/OEIS (Section 3.12.3.1) and 2020 SEIS/OEIS (Section 3.12.2.1), remain valid and are summarized below.

Generally, activities involving the use of aircraft, vessels, or in-water devices may temporarily limit accessibility to parts of the Study Area. This analysis includes data on BNMs and the annual number of days affected by military readiness activities from 2020 through 2024, supplementing the data from 2010 through 2019 presented in previous MITT analyses. For

purposes of this analysis, if any restriction or closure was issued for any part of a particular day, then the entire day was considered to be affected by that closure. When a BNM is issued, it specifies the time of day and the length of time that a particular area is restricted or closed to the public. Data indicate that the number of days per year affected by military readiness activities for FDM and W-517 has fluctuated; however, there is an overall decline in annual affected days, suggesting increased availability of these areas for public access (Figure 3.12-3). For W-517, the average number of affected days from 2020 through 2024 was 64, representing almost a 38 percent decrease from the average of 103 recorded between 2015 and 2019. For FDM, accessibility (between 3 and 12 NM from shore) was restricted for an average of 82 days per year from 2020 through 2024. Since the 2020 SEIS/OEIS was completed, the Navy has been working with the CNMI government to consider whether access/non-access interests for various reasons (sustainable resources, fishing interests, science projects) outweigh the safety need that led to the full closure of the 3 NM area around FDM due to potential unexploded ordnance from historical misfires. While the Navy will continue this dialogue in parallel to this Proposed Action, at present the area remains restricted from access.

The observed decrease in the utilization of W-517 in recent years may be attributable to a corresponding increase in the use of W-11, W-12, and W-13 for training and testing activities. The operational tempo in W-13 resulted in an average of 89 days affected annually from 2020 to 2024, compared to 18 days for W-11 and 15 days for W-12 (Figure 3.12-4). Furthermore, the establishment and use of the DZs for the Orote, Mason, and Finegayan firing ranges has affected accessibility in those specific areas. The number of days affected by the activities from 2022 through 2024 for the Orote DZ was an average of 256, compared to 27 for Mason and 6 for Finegayan in those same years (Figure 3.12-5).

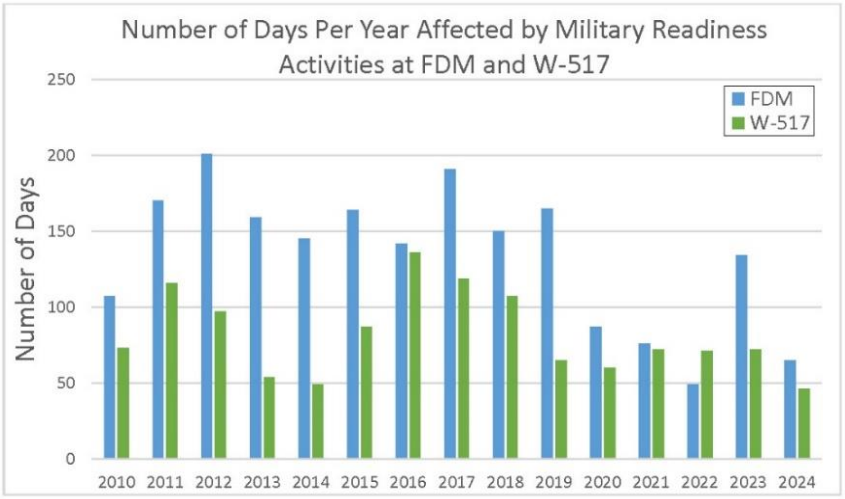

Figure 3.12-3: Number of Days per Year Affected by Military Readiness Activities at FDM and W-517

Although socioeconomic resources could be present throughout the Study Area, there is a demonstrably greater potential for perceived effects on accessibility within 3 NM. This is due to high concentrations of public presence and marine-based activities within the nearshore environment, leading to more opportunities for spatial and temporal conflicts with training and testing activities. Increases in certain activities, such as amphibious vehicle maneuvers/rehearsals in Apra Harbor, would affect accessibility within 3 NM as temporary closures of areas may be required for public safety.

Beach road access at the Chamorro fishing areas of Unai Chulu and Unai Dankulo would be closed, and BNMs would be issued to restrict public access to the beaches and surrounding

nearby water during amphibious training activities. However, closures would be limited to the duration of the training event and are coordinated with the relevant CNMI government offices to avoid scheduling training on holidays, festivals, and other important days when public access within the Military Lease Area is desired.

BNMs and Notices to Airmen (NOTAMs) are issued at least 72 hours in advance of training and testing activities in the Study Area. These temporary clearance procedures are established and implemented for the safety of the public and military personnel and have been employed regularly over time without substantial effects on socioeconomic resources in the region. The locations of restricted areas are published and available to mariners and pilots, who typically review such information before boating or flying in any area.

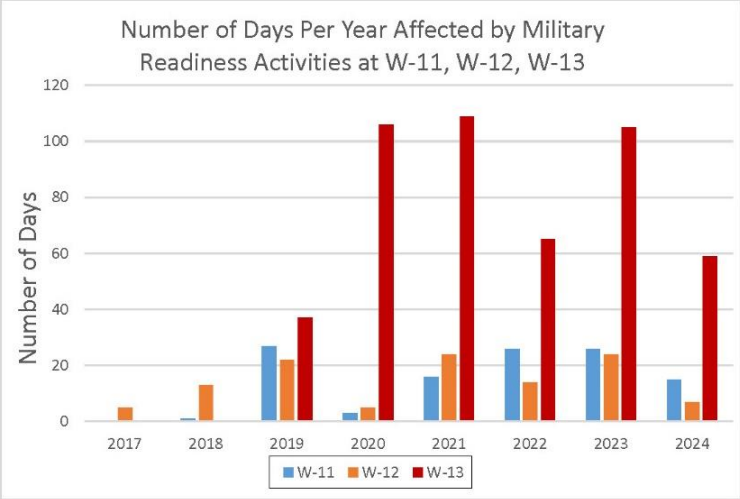

Figure 3.12-4: Days Per Year Affected by Military Readiness Activities at W-11, W-12, W-13

To help manage competing demands and maintain public access in the Study Area, the military would continue to conduct its offshore military readiness activities in a manner that reduces restrictions to commercial fisherman. Prior to initiating an activity, standard operating procedures would be followed to visually scan an area to ensure that nonparticipants are not present. If nonparticipants are present, the Action Proponents delay, move, or cancel the activity. Limited military readiness activities are expected to restrict accessibility within 3 NM, where most recreational and traditional fishing is anticipated to occur. The addition of nine new training and testing activities associated with Proposed Action would not be expected to incrementally affect accessibility to the ocean space for recreational and traditional fishing practices. Traditional fishing practices typically occur in the same general areas as recreational fishing (Allen, 2013), which is close to shore and far from most training and testing activities that would limit access to an area (with the exception of activities at FDM). Additionally, data

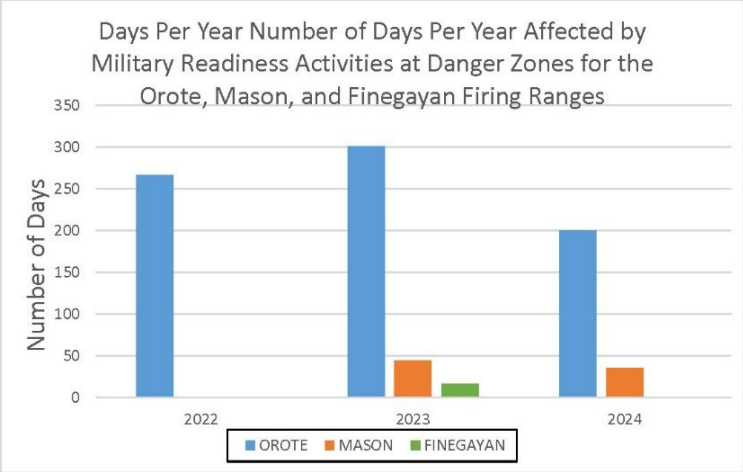

Figure 3.12-5: Number of Days per Year Affected by Military Readiness Activities at Danger Zones for the Finegayan, Orote, & Mason Firing Ranges

presented in Section 3.12.1 show no discernable correlation between fluctuations in fishery landings and military readiness activities that have been ongoing in the Study Area for decades.

Notification methods associated with the announcements of scheduled training and testing activities have been updated from previous MITT analyses. In addition to issuing BNMs and NOTAMs to announce scheduled training and testing activities, upcoming events are communicated to stakeholders (e.g., Guam and CNMI local mayors, Guam legislators, resources agencies, and fishers) via e-mail distribution developed by JRM with stakeholder input. In the scoping period of this SEIS, the Navy heard fishing community interest for other means of accessible closure notification (signs at known fishing fleet harbors, social media methods), which the Navy will continue to explore as this Proposed Action is further evaluated. Upon completion of training and testing activities, restrictions are lifted, and commercial and recreational fishers (and other non-military vessels) and non-military aircraft would be able to return to transit through the area.

Range Modernization and Sustainment. Effects on accessibility under Alternative 1 would be associated with the installation and maintenance of temporary subsurface targets and instrumentation. Although this activity is expected to occur nearshore, it would only occur once or twice annually under Alternative 1. Accessibility to airspace would not be affected since aircraft would not be used for this specific activity. Notification methods associated with the announcements of scheduled modernization and sustainment activities would be the same as described above.

Conclusion. Consistent with previous MITT analyses, changes in accessibility as a result of military readiness activities under Alternative 1 would be reasonably foreseeable; however, as summarized above, the degree of effects would be less than significant because (1) closures are temporary, and the large expanse of the Study Area would remain available to the public for commercial and recreational use; and (2) the overall access to airspace and the ocean by the public in the Study Area would remain consistent with the level of accessibility in the recent past and advance notice of pending closures to areas used by the military through BNMs and NOTAMs will help to avoid or reduce effects.

3.12.2.1.2 Effects from Airborne Acoustics Stressors

Training and Testing. Under Alternative 1, the number of training and testing activities that have the potential to generate airborne acoustics would change compared to the numbers analyzed in the 2020 SEIS/OEIS. However, the stressors associated with these activities remain the same as those evaluated in previous MITT analyses, and the changes in the number of activities would not be expected to appreciably affect existing conditions within the Study Area. Therefore, the potential impacts pertaining to airborne acoustics, as presented in the 2015 EIS/OEIS (Section 3.12.3.2) and 2020 SEIS/OEIS (Section 3.12.2.2), remain valid and are summarized below.

Generally, activities involving the use of aircraft, vessels, or explosive munitions may generate airborne acoustics detectable by the public in areas of the Study Area where military and civilian activities occur in close proximity. Noise interference has the potential to decrease public enjoyment of tourism and recreational activities. Socioeconomic resources potentially affected by airborne acoustics associated with military readiness activities include commercial

and recreational fishing, traditional fishing practices, and tourism. Airborne noise associated with military readiness activities would not be expected to affect or interfere with commercial transportation and shipping practices in the Study Area and is not analyzed further.

Range Modernization and Sustainment. Potential airborne acoustic effects under Alternative 1 would be associated with vessel use during the temporary installation and maintenance of subsurface targets and instrumentation near Apra Harbor.

Conclusion. Consistent with previous MITT analyses, airborne acoustics as a result of military readiness activities under Alternative 1 are reasonably foreseeable; however, the degree of effects would be less than significant because (1) most military readiness activities occur well out to sea, while most tourism and recreational activities occur nearshore; (2) although certain activities would occur inshore, noise would be infrequent, short term, and temporary, lasting for the duration of the activity; (3) vessel noise would not be expected to deter a resident or tourist from participating in a recreational activity (e.g., a fishing trip) in nearshore or offshore areas; (4) infrequent exposure to airborne noise would not result in a direct loss of income, revenue, employment, resource availability, or quality of experience; (5) because airborne acoustics do not substantially impact fish or invertebrates (refer to Sections 3.8 and 3.9), the availability of species for commercial, recreational, and traditional fishing in the region would remain unaffected; and (6) SOPs are implemented to avoid effects on civilian activities and would require that the area is clear of nonparticipants before initiating an activity.

3.12.2.1.3 Effects from Physical Disturbance and Strike Stressors

Training and Testing. Under Alternative 1, the number of training and testing activities that have the potential to result in physical disturbance and strike would change compared to the numbers analyzed in the 2020 SEIS/OEIS. However, the stressors associated with these activities remain the same as those evaluated in previous MITT analyses. Therefore, the potential impacts pertaining to physical disturbance and strike, as presented in the 2015 EIS/OEIS (Section 3.12.3.3) and 2020 SEIS/OEIS (Section 3.12.2.3), remain valid and are summarized below.

The evaluation of effects on socioeconomic resources from physical disturbance and strike focuses on physical encounters with objects dropped or fired into the water (e.g., non-explosive practice munitions, other MEM, and ocean bottom-deployed devices), or resting on the ocean floor (e.g., anchors, mines, targets) that may damage or encounter civilian equipment. Direct encounters and collisions with MEM and other objects were determined to not be reasonably foreseeable due to SOPs in place to ensure an area is clear of all non-participating vessels and aircraft before training and testing activities take place.

Range Modernization and Sustainment. Potential physical disturbance and strike stressors under Alternative 1 would be associated with vessel and in-water devices, and seafloor device use during the temporary installation and maintenance of subsurface targets and instrumentation.

Conclusion. Consistent with previous MITT analyses, physical disturbance and strike stressors associated with military readiness activities under Alternative 1 are reasonably foreseeable; however, effects would be less than significant because (1) most military readiness activities involving munitions or other expended materials occur beyond 3 NM, where limited recreational and traditional fishing practices would be conducted; (2) many practice munitions

are recovered after an activity concludes and unrecoverable pieces of targets are typically small or are designed to sink to the seafloor after use and would not be expected to damage civilian equipment if encountered; and (3) the Action Proponents would continue to implement mitigation to avoid or reduce effects from physical disturbance and strike stressors on seafloor resources, which are valuable assets for tourism and recreation.

3.12.2.2 Effects on Socioeconomic Resources Under Alternative 2

Under Alternative 2, the number of activities with associated accessibility, airborne acoustics, and physical disturbance and strike stressors would be equal to or increase compared to Alternative 1. However, increases in these stressors are not expected to result in a long-term loss of income, revenue, or employment; or permanently degrade the quality of experience for tourism and recreational activities for the same reasons detailed for Alternative 1. Additionally, the Action Proponents would implement SOPs (Section 2.3.3 of the 2020 SEIS/OEIS) that minimize and avoid effects on socioeconomic resources. As such, increases in military readiness activities would not result in substantive changes to the potential for or types of effects on socioeconomic resources, and overall effects are not meaningfully different from those analyzed under Alternative 1.

Therefore, military readiness activities involving accessibility, airborne acoustics, and physical disturbance and strike stressors under Alternative 2 would result in less than significant effects on socioeconomic resources.

3.13 PUBLIC HEALTH AND SAFETY

There have been no updates to the affected environment of public health and safety since the 2020 SEIS/OEIS. The analysis of effects on Public Health and Safety under the Proposed Action remains consistent with previous analyses presented in the 2015 EIS/OEIS and the 2020 SEIS/OEIS. There is no new information, science, or regulations that would change the analysis or conclusions. Public access to FDM and its nearshore waters within a 3 NM radius of FDM is permanently restricted for commercial or recreational activities and would not change.

The Navy maintains its commitment to safety through established Safety and Inspection Procedures, which are fully detailed in Section 3.13 of the 2015 EIS/OEIS and 2020 SEIS/OEIS and would continue to be implemented. These procedures include coordination with the USCG and FAA, consideration of activity location, and ensuring training and testing areas are clear of non-participants before commencement.

This SEIS/OEIS analyzes potential impacts of the Proposed Action on public health and safety and considers the same stressors as previous MITT analyses, which include (1) in-water energy (sonar and in-water explosives), (2) in-air energy (high-energy lasers and microwaves), (3) physical interactions (aircraft, vessels, in-water devices/targets, munitions, seafloor devices), and (4) secondary stressors (effects on water quality from explosives [in-air explosives and in-water explosives] and explosion byproducts, metals, chemicals other than explosives, and other materials).

Based on the framework presented in Section 3.0.4, the Navy concluded that effects from in-water energy, in-air energy, and physical interactions stressors are not expected to have reasonably foreseeable effects on public health and safety. Table 3.0-20 summarizes these findings.

4 MITIGATION

4.1 Introduction

The terms “mitigation” and “mitigation measures” mean actions taken to completely avoid, partially reduce, or minimize the potential for a stressor to affect a resource. This chapter describes and assesses mitigation the Action Proponents will implement under Alternatives 1 or 2 of the Proposed Action. 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 NMFS. Mitigation is designed to achieve one or more of the following overarching benefits: (1) ensure that the Proposed Action has a negligible effect on marine mammal species and stocks, and effects the least practicable adverse effect on marine mammal species or stocks and their habitat (as required under the MMPA); (2) 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); (3) 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); (4) avoid adversely affecting historic shipwrecks (as required under the Abandoned Shipwreck Act and National Historic Preservation Act)

For requirements under the MMPA, NMFS has supported the position that the reduction of effects on marine mammal stocks and species (e.g., effects on reproductive success or survivorship) may accrue through the application of mitigation that limits effects on individual animals (National Marine Fisheries Service, 2023). Mitigation developed for the following types of effects is thought to have greater value in reducing the likelihood or severity of adverse effects on marine mammal populations (National Marine Fisheries Service, 2023): (1) avoiding injury or mortality; (2) limiting interruption of known feeding, breeding, mother/young, or resting behaviors; (3) minimizing abandonment of important habitat (temporally and spatially); (4) minimizing the number of individuals subjected to these types of disruptions; and (5) 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 effects 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 effects 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 effects to individuals (and how many individuals), and within the context of the species-correlated

factors. Similar considerations were applied to mitigation developed for ESA-listed species, including sea turtles, fish, birds, and corals.

The Navy standardizes its mitigation across the Atlantic, Hawaii-California, Mariana Islands, Northwest, and Gulf of Alaska Study Areas to the maximum extent practical. Mitigation is tailored to each Study Area as needed and appropriate based on the following: (1) the Proposed Action; (2) best available science on species occurrence and potential effects from the Proposed Action; (3) expected mitigation benefits; (4) operational practicality assessments; (5) consultations and coordination with regulatory agencies or departments, such as NMFS, the NOAA, the USFWS, Coastal Zone Management program offices, and State Historic Preservation Officers; (6) consultations and coordination with Alaska Native federally recognized tribes, Native Hawaiian organizations, and Native American Tribes, nations, and tribal organizations; and (7) suggestions received through public comments during scoping and on the Draft SEIS/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 (2020 to 2027 for the MITT SEIS/OEIS). This SEIS/OEIS (which represents Phase IV) uses mitigation from the 2020 SEIS/OEIS as the baseline for refining mitigation specific to the Proposed Action. For additional information about the at-sea environmental planning process, see Chapter 1.

This Phase IV SEIS/OEIS also addresses military readiness activities on FDM. Similar to at-sea measures, terrestrial mitigation measures on FDM are based on the 2020 SEIS/OEIS baseline. The Navy's mitigation measures on FDM primarily involve access, targeting, and ordnance restrictions, as detailed in Section 4.8. The terrestrial mitigation measures discussed in this SEIS/OEIS were originally developed for past environmental compliance documents in coordination with the USFWS. Data inputs for assessing and developing terrestrial mitigation included the operational data described in Table 4.1-1, the best available science discussed in Chapter 3, published literature, and consultation with the USFWS. Terrestrial mitigation measures are designed to avoid or reduce potential effects on ESA-listed species and their habitats, and roosting seabirds; and to minimize physical damage to the island itself. The benefits of terrestrial mitigation measures are discussed qualitatively.

Table 4.1-1: 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 restriction on visual observation platforms – Decreased ability to de-conflict sea space or airspace conflicts (e.g., ensuring military readiness activities do not affect 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)

Criterion	Description of Practicality Assessment Criterion
	– 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 mitigations 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 operations 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 to 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

4.2 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 (Figure 4.2-1). The program provides operators with 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 SEIS/OEIS and associated consultation documents.

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. EEZ (12 to 200 NM from shore), the Action Proponents will encourage that unit's voluntary compliance with the mitigation when practical.

Figure 4.2-1: Protective Measures Assessment Protocol Home Screen

4.3 Personnel Training

As described in Section 2.3.3 of the 2020 SEIS/OEIS, 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 underway on small boats (e.g., crewmembers responsible for navigation) fulfill similar watch standing responsibilities to those positioned on surface ships. To qualify to stand watch as a Lookout, personnel undertake a training program that includes computer-based training, on-the-job instruction, and a formal qualification program. Lookouts are trained in accordance with the *U.S. Navy Lookout Training Handbook* or equivalent to use correct scanning procedures while monitoring assigned sectors, to estimate the relative bearing, range, position angle, and target angle of sighted objects, and to rapidly communicate accurate sighting reports. The *U.S. Navy Lookout Training Handbook* was updated in 2022 to include a more robust chapter on environmental compliance, mitigation, and marine species observation tools and techniques (NAVEDTRA 12968-E). Environmental awareness and education training is also provided to personnel through the Afloat Environmental Compliance Training program (described below) or equivalent. Training is designed to help personnel gain an understanding of their personal environmental compliance roles and responsibilities (including mitigation implementation). Upon reporting aboard and annually thereafter, appointed personnel must complete training identified in their career path training plan.

Introduction to Afloat Environmental Compliance. Developed in 2014, the introduction module provides information on at-sea environmental laws, regulations, and compliance roles.

Marine Species Awareness Training. This module was developed by civilian marine biologists employed by the Navy and was reviewed and approved by NMFS. It provides information on marine species sighting cues, visual observation tools and techniques, and sighting notification procedures. It is a video-based complement to the *U.S. Navy Lookout Training Handbook* or

equivalent. Since 2007, this module has been required for commanding officers, executive officers, equivalent civilian personnel, and personnel who will stand watch as a Lookout.

Protective Measures Assessment Protocol. This module provides information on how personnel should access and operate the Protective Measures Assessment Protocol. Since 2014, this module has been required for personnel tasked with generating mitigation reports.

Sonar Positional Reporting System and Marine Mammal Incident Reporting. This module provides information on sonar reporting requirements and marine mammal incident reporting procedures, which are described in Section 4.4. Since 2014, this module has been required for personnel tasked with preparing, approving, or submitting applicable reports.

4.4 Reporting

Reporting requirements are designed to track compliance with MMPA and ESA authorizations. They also provide the Action Proponents and regulators with 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 4.7. The reports include additional information for major training exercises, and the Sinking Exercise, 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 (described in Section 4.5). Unclassified reports submitted to NMFS are available on the NMFS Office of Protected Resources (https://www.fisheries.noaa.gov/about/office-protected-resources).

4.4.1 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: (1) 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. (2) 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. (3) Comply with the reporting requirements for incidents involving ESA-listed species under NMFS' jurisdiction, as outlined in the NMFS Biological Opinion. (4) Comply with the reporting and response requirements for incidents involving ESA-listed species under USFWS' jurisdiction, as outlined in the USFWS consultation documents. (5) 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 affected during a training or testing event.

4.5 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). Through the Action Proponents' environmental offices and programs, the U.S. Navy Marine Species Monitoring Program, the Living Marine Resources Program, and the ONR, the Action Proponents have been sponsoring research and monitoring for over 30 years in areas where they conduct military readiness activities. Additionally, the USCG 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 effect on the maritime environment.

Thanks in part to advancements in science from these programs, the understanding of military readiness activity effects 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 effects when considering the range of environmental conditions analogous to where the Action Proponents train and test, the species that could co-occur in space and time with the activities, and the characteristics of the sound sources and platforms used during the activities, then the Action Proponents will assess their compatibility with military readiness applications. This would include a practicality assessment of the budget and acquisition process (including costs associated with designing, building, installing, maintaining, and manning equipment), the logistical and physical considerations for retrofitting platforms with the appropriate equipment and their associated maintenance, repairs, or replacements (e.g., conducting engineering studies to ensure compatibility with existing shipboard systems), the resource considerations for training personnel to effectively operate the equipment, and the potential security and classification issues.

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

4.6 Activity-Based Mitigation

Activity-based mitigation was referred to as "Procedural Mitigation" in the 2020 SEIS/OEIS. 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 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 4.6-1 through Table 4.6-2. 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 4.6-1 and Table 4.6-2. 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 4.6-1 and Table 4.6-2) using established communication methods. Lookouts will use the information received to help inform their visual observation of mitigation zones.

4.6.1 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 weapon firing or ordnance deployment, or (3) 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 effects on safety, sustainability, and the ability to meet mission requirements. Wait periods are designed to allow animals the maximum amount of time practical to resurface (i.e., become available to be observed) before activities resume. The assumption that mitigation may need to be implemented more than once was factored when developing wait period durations. Wait periods are 10 minutes when events involve aircraft that are typically fuel constrained (e.g., rotary-wing aircraft, fighter aircraft), or 30 minutes when events involve only vessels or aircraft that are not typically fuel constrained.

4.6.1.1 Additional Details for Acoustic Stressors

Additional details on the activity-based mitigation requirements for acoustic stressors are described in Table 4.6-1. Activity-based mitigation will not apply to: (1) sources not operated under positive control; (2) sources used for safety of navigation; (3) sources used or deployed by aircraft operating at high altitudes; (4) 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; (5) sources used by submerged submarines; (6) *de minimis* sources; (7) unattended sources, such as moored buoys used for acoustic and oceanographic research; (8) 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); and (9) sources above 2 kHz for sea turtles (based on their hearing capabilities).

4.6.1.2 Additional Details for Explosives

Additional details on the activity-based mitigation requirements for explosives are described in Table 4.6-1. 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.

4.6.1.3 Additional Details for Non-Explosive Ordnance

Additional details on the activity-based mitigation requirements for non-explosive ordnance are described in Table 4.6-1. 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 4.6-1. Activity-based mitigation does 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 4.6-1: Activity-Based Mitigations for Acoustic, Explosive, and Non-Explosive Ordnance Stressors

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Acoustic Stressors				
Active Acoustic Sources				
• Active acoustic sources with power down and shut down capabilities: – Low-frequency active sonar ≥200 dB – Mid-frequency active sonar sources that are hull mounted on a surface ship (including surfaced submarines) – Broadband and other active acoustic sources >200 dB	• 200 yd. from active acoustic sources (shut down) • 500 yd. from active acoustic sources (power down of 10 dB total) • 1,000 yd. from active acoustic sources (power down of 6 dB total)	• One Lookout in/on one of the following: – Aircraft – Pierside, moored, or anchored vessel – Underway vessel with space/crew restrictions (including small boats) – Underway vessel already participating in the event that is escorting (and has positive control over sources used, deployed or towed by) an unmanned platform • Two Lookouts on an underway vessel without space/crew restrictions • Lookouts would use information from passive acoustic detections to inform visual observations when passive acoustic devices are already being used in the event	• Immediately prior to the initial start of using active acoustic sources (e.g., while maneuvering on station), 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 – Broadband and other active acoustic sources <200 dB	• 200 yd. from active acoustic sources (shut down)			
Weapon Firing Noise				
• Explosive and non-explosive large-caliber gunnery firing noise (surface-to-surface and surface-to-air)	• 30 degrees on either side of the firing line out to 70 yd. from the gun muzzle (cease fire)	• One Lookout on a vessel	• Immediately prior to the initial start of large-caliber gun firing (e.g., during target deployment) observe for: – Marine mammals – Sea turtles – Floating vegetation • During large-caliber gun firing observe for: – Marine mammals – Sea turtles	• 30 minutes

Table 4.6-1: Activity-Based Mitigations for Acoustic, Explosive, and Non-Explosive Ordnance Stressors (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Explosive Stressors				
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)			
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:	• 10 or 30 minutes (depending on

Table 4.6-1: Activity-Based Mitigations for Acoustic, Explosive, and Non-Explosive Ordnance Stressors (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
• >5 lb. NEW	• 2,100 yd. from the detonation site (cease fire)	• Two Lookouts: one in a small boat and one in an aircraft	– Marine mammals – Sea turtles – Floating vegetation • During detonations or fuse initiation, observe for: – Marine mammals – Sea turtles • After the event, observe the detonation vicinity for 10 or 30 minutes (depending on fuel constraints), observe 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.	fuel constraints of the platform)
Explosive Mine Neutralization (With Divers)				
• Activities under 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) 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 – Hammerhead sharks and manta rays within the Mariana Islands Range Complex: Divers will notify the support boat or Range Safety Officer of sightings (of any hammerhead sharks or manta rays, 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	• 10 or 30 minutes (depending on fuel constraints or the platform)
• Activities using time-delay fuses	• 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 4.6-1: Activity-Based Mitigations for Acoustic, Explosive, and Non-Explosive Ordnance Stressors (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
			• 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.	
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)			
Research-Based Sub-Surface Explosives				
• 0.1–5 lb. NEW for other types of sub-surface explosives used in research applications	• 600 yd. from the device 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, observe for: – Marine mammas – 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	• 10 or 30 minutes (depending on fuel constraints of the platform)

Table 4.6-1: Activity-Based Mitigations for Acoustic, Explosive, and Non-Explosive Ordnance Stressors (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
			immediately, and established incident reporting procedures would be followed	
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)
Sinking Exercise (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 or 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 4.6-1: Activity-Based Mitigations for Acoustic, Explosive, and Non-Explosive Ordnance Stressors (continued)

Mitigation Category	Mitigation Zones	Mitigation Requirements	Mitigation Requirement Timing	Wait Period
Non-Explosive Ordnance Stressors				
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: – 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)

4.6.2 Mitigation Specific to Vessels, Vehicles, and Towed In-Water Devices

Additional details on the activity-based mitigation requirements for vessels, unmanned vehicles, and towed in-water devices are described in Table 4.6-2. 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), and (4) when impractical based on mission requirements (e.g., during certain aspects of amphibious exercises).

Table 4.6-2: Activity-Based Mitigations for Vessels, Vehicles, and Towed In-Water Devices

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 the following: – 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 the following: – 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 circumstance allow: – 500 yd. from whales – 200 yd. from other marine mammals – Vicinity of sea turtles
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 the following: – 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

4.6.3 Visual Observation Effectiveness

Oedekoven and Thomas (2022) evaluated the effectiveness of Navy Lookout Teams at detecting marine mammals before they entered a defined set of mitigation zones (i.e., 200, 500, and 1,000 yd.). The study analyzed sighting data collected by the Navy over 27 embarks from 2010 to 2019. Results indicated that the effectiveness of Navy Lookout Teams was generally less than that of trained biologist observer teams, and varied by sighted species, group size, and distance. The Navy reviewed the same dataset used by Oedekoven and Thomas (2022), plus sonar use data, and found that sonar status (i.e., on versus off) was an important factor in evaluating how species availability may influence the prevalence of marine mammal sightings for Navy Lookouts and biologists alike. Sighting rates near vessels using hull-mounted active sonar were lower when sonar was on versus off, suggesting that a portion of marine mammals were not available to be sighted when the sonar was on (due to changed surfacing behavior or avoiding close exposures to sonar) (Navy, 2023). Table 4.6-3 provides a summary of the factors that could potentially influence the real-time effectiveness of the Action Proponents' visual observations (Barlow, 2015; Jefferson et al., 2015; Navy, 2023; Oedekoven & Thomas, 2022). As described in the Acoustic and Explosive and Acoustic Effects Report, the quantitative analysis for this SEIS/OEIS does not reduce model-estimated impacts to account for activity-based mitigation.

Table 4.6-3: 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 period of time, which limits the amount of time they are available to be seen by Lookouts. Groups size also influences sightability. Species that travel in groups or large pods (e.g., delphinids, sperm whales, fin whales) are generally easier to detect than solitary individuals or pairs. Information on dive behaviors and group sizes for species that occur in the Study Area is provided in the technical reports titled *Dive Distribution for Marine Species Occurring in the U.S. Navy's* and the *U.S. Navy Marine Species Density Database Phase IV for the Mariana Islands Training and Testing Study Area*.
Species group size	
Species physical traits and surface behaviors	Larger-bodied species (e.g., baleen and sperm whales) or species with tall dorsal fins (e.g., killer whales) would generally be easier to detect relative to small-bodied species and species without dorsal fins (e.g., 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) 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 whales) would be easier to detect than cryptic species that surface inconspicuously (e.g., 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., sea turtles).
Observation conditions	Weather conditions, such a 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, ad distance between the two. Aircraft (when no 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).

4.7 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" (Figure 4.7-1). 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 this chapter.

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 commencing 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.

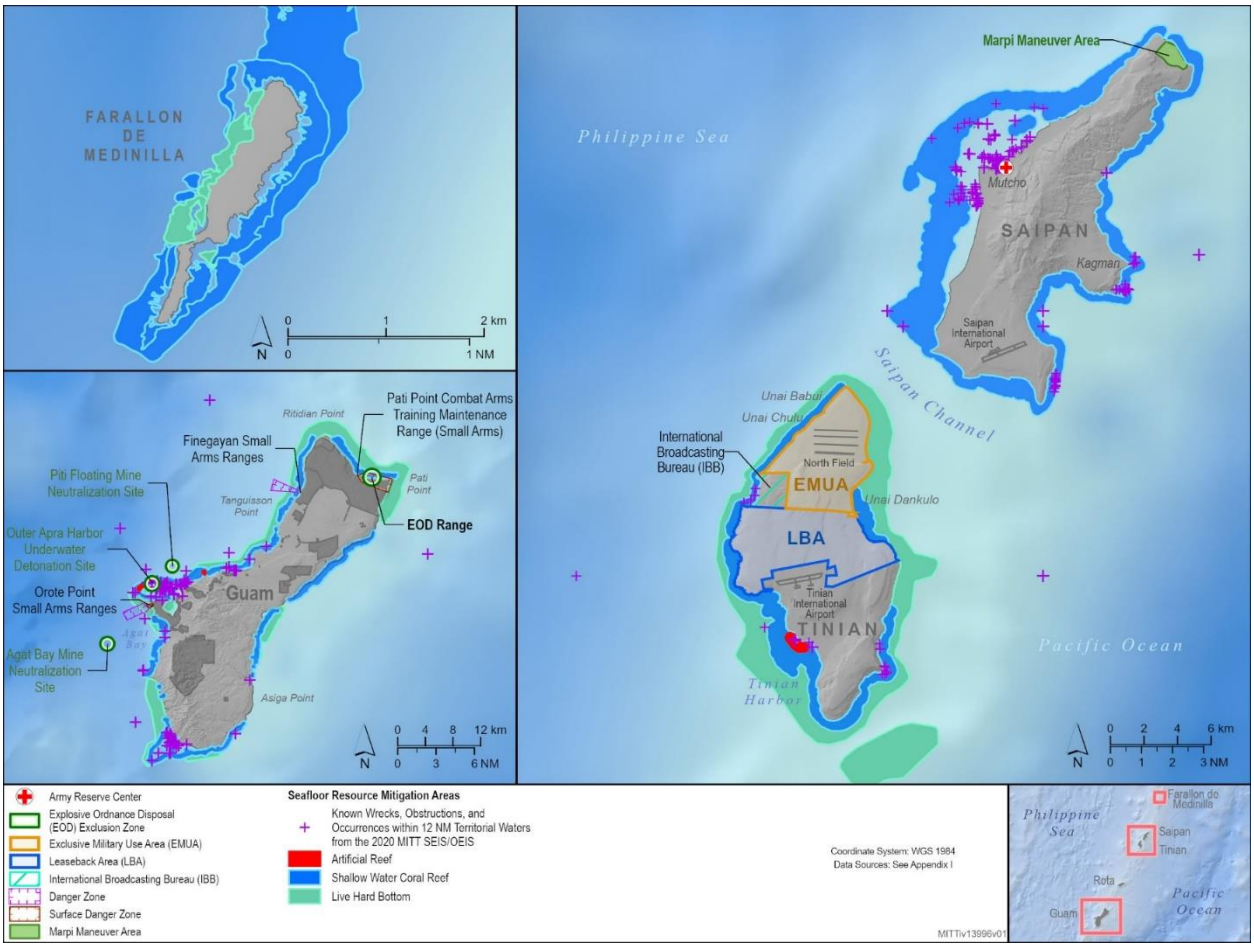

Figure 4.7-1: Guam and CNMI Mitigation Areas

4.7.1 Seafloor Resource Mitigation Areas

The Action Proponents implement geographic mitigation to protect sensitive seafloor habitats – including shallow-water coral reefs, artificial reefs, shipwrecks, and hard bottom substrates – from the impacts of explosives and physical strike stressors (as indicated in Table 4.7-1). These measures are designed to safeguard not only the physical structures themselves but also the vital ecosystem services they provide for fish, sea turtles, and invertebrates that rely on them for feeding and shelter. The effectiveness of these protections is largely dependent on high-quality mapping data from the Phase IV Mariana Islands Training and Testing SEIS/OEIS: Marine Benthic Habitat Database Technical Report (U.S. Department of the Navy, 2024d), which allows for the precise placement of training activities to avoid these ecologically and socioeconomically valuable areas.

Table 4.7-1: Seafloor Resource Mitigation Area Requirements

Category	Mitigation Requirements	Mitigation Benefits
Shallow Water Coral Reef		
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 (except at designated nearshore training areas around Guam and Apra Harbor, such as Piti Floating Mine Neutralization Site, Outer Apra Harbor Underwater Detonation Site, and Agat Bay Mine Neutralization Site, where these resources will be avoided to the maximum extent practicable).	• 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. The military expended material with the largest footprint used in other Navy study areas is a 650-lb. net explosive weight (NEW) mine with an estimated impact footprint radius of 22.7 yd. (20.8 m). The 350-yd. mitigation area radius is 11 times larger than this footprint radius and is even more conservatively sized when compared to the impact footprints of smaller explosives, including the largest explosive applicable to the MITT Study Area, which has a charge size of 20 lb. NEW and a footprint radius of just 2.2 yd. (2 m). Therefore, the mitigation will prevent direct effects (and some level of indirect effects) from explosives on shallow-water coral reefs 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 (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 (except at designated anchorages and nearshore training areas around Guam and within Apra Harbor, where these resources will be avoided to the maximum extent practicable).	• 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 positions, 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 effects (and some level of indirect effects) from seafloor devices and non-explosive ordnance deployed against surface targets on shallow-water coral reefs and precious coral beds.
Artificial Reef, Hard Bottom Substrate, and Shipwreck		
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 locations, where these resources will be avoided to the maximum extent practicable).	• The 350-yd. mitigation area radius will prevent direct effects (and some level of indirect effects) from explosives on artificial reefs, hard bottom substrate, and shipwrecks for the reasons described in Section 4.7.1.
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 at designated anchorages and nearshore training areas around Guam and within Apra Harbor, where these	• 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, current, and water depth. • For ease of implementation, the 350-yd. mitigation area radius for explosives was also adopted for seafloor devices (that are

Category	Mitigation Requirements	Mitigation Benefits
	resources will be avoided to the maximum extent practicable). • 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 at designated nearshore training areas, where these resources will be avoided to the maximum extent practicable). • 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.	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 Assessment consultation (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 effects (and some level of indirect effects) from seafloor devices on artificial reefs, hard bottom substrate, and shipwrecks.

4.7.2 Marine Mammal and Sea Turtle Mitigation Areas

Table 4.7-2 details geographic marine mammal and sea turtle mitigation related to the use of active sonar and explosives off Marpi Reef, north of Saipan, Chalan Kanoa Reef, west of Saipan, and Agat Bay, Guam. The mitigation is a continuation from the 2020 SEIS/OEIS.

Table 4.7-2: Mitigation Area Requirements for Marpi Reef, Chalan Kanoa Reef, and Agat Bay Nearshore

Category	Mitigation Requirements	Mitigation Benefits
Marpi Reef		
Acoustic	• From December 1 – April 30, the Action Proponents will not use more than 20 combined hours of MF1 and MF1C surface ship hull-mounted mid-frequency active sonar during training and testing within the Marpi Reef and Chalan Kanoa Reef mitigation areas. • The Navy will report the total hours of active sonar (all bins, by bin) used in the Marpi Reef Mitigation Area and Chalan Kanoa Reef Mitigation Area from December 1 to April 30 in its annual training and testing activity reports submitted to NMFS.	• Mitigation is designed to reduce exposure of humpback whales in important seasonal reproductive habitat to levels of sound that have the potential to cause injurious or behavioral effects.
Explosives	• The Action Proponents will not detonate in-water explosives (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 important seasonal reproductive habitat to explosives that have the potential to cause injury, mortality, or behavioral disturbance.
Acoustic, Explosives, Physical disturbance and strike	• The Navy will issue an annual seasonal awareness notification message to alert ships and aircraft operating in the Marpi Reef Mitigation Area and Chalan Kanoa Reef Mitigation Area to the possible presence of increased concentrations of humpback whales from December 1 through April 30. To maintain safety of navigation and to avoid interactions with large whales during transits, the Navy will instruct vessels to remain vigilant to the presence of humpback whales that, when concentrated seasonally, may become vulnerable to vessel strikes. • Platforms will use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of activity-based mitigation.	• 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.
Chalan Kanoa Reef		
Acoustic	• From December 1 to April 30, the Action Proponents will not use more than 20 combined hours of MF1 and MF1C surface ship hull-	• Mitigation is designed to avoid or reduce exposure of humpback whales in important

Category	Mitigation Requirements	Mitigation Benefits
	mounted mid-frequency active sonar during training and testing within the Marpi Reef and Chalan Kanoa Reef mitigation areas. • The Navy will report the total hours of active sonar (all bins, by bin) used in the Marpi Reef Mitigation Area and Chalan Kanoa Reef Mitigation Area from December 1 to April 30 in its annual training and testing activity reports submitted to NMFS.	seasonal reproductive habitat and sea turtles foraging at or near the reef to levels of sound that have the potential to cause injurious or behavioral effects.
Explosives	• The Action Proponents will not detonate in-water explosives (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 important seasonal reproductive habitat and sea turtles foraging at or near the reef to explosives that have the potential to cause injury, mortality, or behavioral disturbance.
Acoustic, Explosives, Physical disturbance and strike	• The Navy will issue an annual seasonal awareness notification message to alert ships and aircraft operating in the Marpi Reef Mitigation Area and Chalan Kanoa Reef Mitigation Area to the possible presence of increased concentrations of humpback whales from December 1 through April 30. To maintain safety of navigation and to avoid interactions with large whales during transits, the Navy will instruct vessels to remain vigilant to the presence of humpback whales that, when concentrated seasonally, may become vulnerable to vessel strikes. • Platforms will use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of activity-based mitigation.	• 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.
Agat Bay Nearshore		
Acoustic	• The Action Proponents will not use MF1 or MF1C surface ship hull-mounted mid-frequency active sonar during training and testing annually within the mitigation area (year-round).	• Mitigation is designed to avoid or reduce exposure of spinner dolphins in seasonally important resting habitat and sea turtles in foraging habitat to levels of sound that have the potential to cause injurious or behavioral effects.
Explosives	• The Action Proponents will not detonate in-water explosives (including underwater explosives and explosives deployed against surface targets) within the mitigation area (year-round).	• Mitigation is designed to prevent exposure of spinner dolphins in seasonally important resting habitat and sea turtles in foraging habitat to explosives that have the potential to cause injury, mortality, or behavioral disturbance.

4.8 Terrestrial Mitigation

The Action Proponents implement terrestrial mitigation on FDM, which serves as the only land-based area for activities like air-to-ground bombing and naval surface fire support. Recognized as an important habitat, FDM supports several endangered and protected species, including the Micronesian megapode, Mariana fruit bat, and various migratory seabirds. Because the island's unique environment allows for training under realistic combat conditions, the Action Proponents have developed a baseline of protection designed to minimize the physical and biological impact on these sensitive resident populations.

To protect these species, the Action Proponents enforce strict restrictions on the locations and types of ordnance used, particularly in the northern SUA where megapodes and fruit bats are most likely to forage and roost. Furthermore, ship-based bombardment is strategically limited to firing from the west to prevent disturbances to major seabird rookeries located on the island's eastern cliffs. These measures represent the highest level of mitigation that remains operationally practical, ensuring that essential military readiness tasks can coexist with the preservation of FDM's diverse avian and bat populations.

Table 4.8-1 details terrestrial mitigation measures related to physical disturbance, strikes, and explosives on FDM. The mitigation is a continuation from the 2020 SEIS/OEIS.

Table 4.8-1: Farallon de Medinilla Mitigation Requirements

Category	Mitigation Requirements	Mitigation Benefits
Physical Disturbance and Strikes	• The Navy will not use explosive cluster weapons, scatterable munitions, fuel air explosives, incendiary munitions, depleted uranium rounds, and bombs greater than 2,000 lb. within the mitigation area (year-round). • The Navy will not target the northern Special Use Area and the narrow land bridge with explosive or non-explosive ordnance (year-round). • The Navy will not use explosive ordnance in Impact Area 1 (year-round) • The Navy will only target Impact Areas 1, 2, and 3 during air-to-ground bombing, missile, and gunnery exercises. • The Navy will only fire from the west during ship-based bombardment. • Navy personnel will not be authorized on FDM without approval from Joint Region Marianas Operations. • During training activities involving aircraft dropping explosive or non-explosive ordnance on a surface target, mitigation will include visual observation immediately before and during the exercise. Firing will cease if a sea turtle is observed (on shore) in the vicinity of the intended impact location. Firing will recommence if the sea turtle is observed exiting the vicinity of the intended impact location, or if the intended impact location has been repositioned to a new location (i.e., to where the sea turtle is no longer within the vicinity of the intended impact location).	• Mitigation is designed to avoid or reduce exposure of birds, bats, and sea turtles that occur on land to physical disturbance and strikes that have the potential to cause injury, mortality, or behavioral disturbance. • Certain mitigations provide further benefit by reducing the potential for physical damage to the island.
Explosives		• Mitigation is designed to prevent exposure of birds, bats, and sea turtles that occur on land to explosives that have the potential to cause injury, mortality, or behavioral disturbance.

4.9 Summary of New or Modified Mitigation Requirements

Table 4.8-2 summarizes new mitigation measures and substantive modifications to existing measures.

Table 4.9-1: Summary of New or Modified Mitigation Requirements

Category	Changes in Mitigation Requirements for this SEIS/OEIS
Activity-based Mitigation	
Lookout Teams	This SEIS/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 disturbances and strike stressor mitigation categories. In the 2020 SEIS/OEIS, additional personnel were required to assist Lookouts for explosive events only. The Action Proponents have also been, in practice, implementing this for active sonar and non-explosive events, and are now formalizing their current practice as a requirement. Additionally, the *U.S. Navy Lookout Training Handbook* was updated in 2022 to include a more robust chapter on environmental compliance, mitigation, and marine species observation tools and techniques (NAVEDTRA 12968-E). These changes are collectively designed to improve the effectiveness of activity-based mitigation.
Broadband and Other Active Acoustic Sources	For this SEIS/OEIS, a 200-yd. shut down mitigation zone would apply 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 2020 SEIS/OEIS.
High-Altitude Aircraft	This SEIS/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 SEIS/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 2020 SEIS/OEIS required one Lookout on underway vessels.
Unmanned Vehicles	This SEIS/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 2020 SEIS/OEIS, activity-based mitigations were not required for unmanned vehicles or sources they used, towed, or deployed.
Research-Based Sub-Surface Explosives	This SEIS/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.
Geographic Mitigation	
Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Areas	This SEIS/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 SEIS/OEIS, that mitigation is being applied to the whole mitigation area category of hard bottom substrate as well as artificial reefs and shipwrecks for consistency and practicality of implementation.

4.10 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 4.10-1.

Table 4.10-1: Mitigation Considered but Eliminated

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
1. Mitigation 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 operation 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 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.

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
6. Adding third-party marine species observers to conduct visual observations that inform mitigations for additional even types		X	X	X	Adding third-party visual observers to observe additional event types would require 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).
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 effects 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 4.6.
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.

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
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 effect 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 effects on mission requirements as increasing the mitigation zone size as described in row 15 of this table.
14. Using developmental mitigation technologies for mitigation	X				As described in Section 4.5, 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 affects the ability to deploy with required levels of readiness necessary to accomplish tasking by Combatant Commanders or other national security tasking.

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
					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, 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 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 4.6.2, 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 2.3.3 of the 2020 SEIS/OEIS, vessels used under the Proposed Action are required to operate in accordance with applicable navigation rules. In addition, vessels transit at speeds that are optimal for fuel conservation, to maintain schedules, and to meet mission requirements. Vessel captains use the totality of the circumstances to ensure the vessel is traveling at appropriate speeds in accordance with navigation rules. Depending on the circumstances, this may involve adjusting speeds during periods of reduced visibility or in certain locations (e.g., locations with other vessel traffic). For training, mandatory vessel speed restrictions would be impractical to implement because vessel operators need to train to operate vessels safely and proficiently as they realistically would during real-world missions, including being able to react to changing tactical situations and evaluate system capabilities. For example, during training activities involving flight operations from an aircraft carrier, the vessel must maintain a certain wind speed over the deck to launch or recover aircraft. Depending on wind conditions, the aircraft carrier itself must travel at a certain speed to generate the wind required to launch or recover aircraft. Additionally, operating vessels at speeds that are not optimal for fuel conservation or mission

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: 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.
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				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.

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
use for training and testing					
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.
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 effects 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. 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.

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
					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 affect 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.
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. The Action Proponents use active sonar only when it is essential to the mission. For example, 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 2020 SEIS/OEIS.
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 solely on simulator training.
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

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
					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 Winter v. Natural Resources Defense Council Inc., 555 U.S. 7 (2008), because surface ducting conditions occur relatively rarely and are unpredictable, it is especially important for the Action Proponents to be able to train under these conditions when they occur.
29. Requiring use of active acoustic monitoring devices		X	X	X	During Surveillance Towed Array Sensor System low-frequency active sonar (which is not part of the Proposed Action), the Navy uses a specially designed adjunct high-frequency marine mammal monitoring active sonar, or "HF/M3." HF/M3 can only be towed at slow speeds and operates like fish finders used by fishermen. Installing the HF/M3 adjunct system on the tactical sonar ships used under the Proposed Action would have implications for safety and mission requirements due to effects 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 4.6. 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.
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

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
					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 effects 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 effects. 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 affect personnel safety, public health and safety, and the ability to meet mission objectives.
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. Vessel movement mitigation for cable laying vessels performing Modernization &		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

Table 4.10-1: Mitigation Considered but Eliminated (continued)

Mitigation Considered	Not Sufficiently Beneficial	Impractical			Assessment Summary
		Criterion 1: Safety	Criterion 2: Sustainability	Criterion 3: Mission	
Sustainment of Ranges activity					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.
36. 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 affect 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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