Final
Environmental Impact Statement/Overseas Environmental Impact Statement
Atlantic Fleet Training and Testing Activities

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5 MITIGATION

5.1 INTRODUCTION

This chapter describes the mitigation measures that the United States (U.S.) Department of the Navy (Navy) will implement to avoid or reduce potential impacts from the Atlantic Fleet Training and Testing (AFTT) Final Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) Proposed Action. The Navy has been mitigating impacts from military readiness activities throughout areas where it trains and tests for more than two decades. Past environmental documents applicable to the Study Area are discussed in Section 1.2 (The Navy's Environmental Compliance at At-Sea Policy).

The Navy will also implement standard operating procedures specific to training and testing activities conducted under the Proposed Action. In many cases, standard operating procedures provide a benefit to environmental and cultural resources, some of which have high socioeconomic value in the Study Area. Standard operating procedures differ from mitigation measures because standard operating procedures are designed to provide for safety and mission success, whereas mitigation measures are designed specifically to avoid or reduce potential environmental impacts. An example of a standard operating procedure is that ships operated by or for the Navy have personnel assigned to stand watch at all times when underway. Watch personnel monitor their assigned sectors for any indication of danger to the ship and the personnel on board, such as a floating or partially submerged object or piece of debris, periscope, surfaced submarine, wisp of smoke, flash of light, or surface disturbance. As a standard collision avoidance procedure, watch personnel also monitor for marine mammals that have the potential to be in the direct path of the ship. The standard operating procedures to avoid collision hazards are designed for safety of the ship and personnel on board. This is different from mitigation measures for vessel movement, which require vessels to maneuver to avoid marine mammals by specified distances to avoid or reduce the potential for physical disturbance and strike of marine mammals, as described in Section 5.3.4.1 (Vessel Movement). In this example, the benefit of the mitigation measure for vessel movement is additive to the benefit of the standard operating procedure for vessel safety. A full discussion of standard operating procedures is provided in Section 2.3.3 (Standard Operating Procedures).

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

5.1.1 BENEFITS OF MITIGATION

The Chapter 3 (Affected Environment and Environmental Consequences) environmental analyses indicate that certain acoustic, explosive, and physical disturbance and strike stressors have the potential

to impact certain biological or cultural resources. The Navy developed mitigation measures for those stressors and will implement the mitigation for either action alternative. The Navy considered the benefits of mitigation in the environmental analyses for both Alternative 1 and Alternative 2 of the Proposed Action in this Final EIS/OEIS. In addition to analyzing mitigation measures pursuant to the National Environmental Policy Act (NEPA), the Navy designed its mitigation measures to achieve one or more benefits, such as the following:

- Effect the least practicable adverse impact on marine mammal species or stocks and their habitat, and have a negligible impact on marine mammal species and stocks (as required under the Marine Mammal Protection Act [MMPA]);
- Ensure that the Proposed Action does not jeopardize the continued existence of endangered or threatened species, or result in destruction or adverse modification of critical habitat (as required under the Endangered Species Act [ESA]);
- Avoid or minimize adverse effects on essential fish habitat (as required under the Magnuson-Stevens Fishery Conservation and Management Act); and
- Avoid adversely impacting historic shipwrecks (as required under the Abandoned Shipwreck Act and National Historic Preservation Act).

The Navy coordinated its mitigation with the appropriate regulatory agencies, including the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), through the consultation and permitting processes. The Navy and NMFS Records of Decision, MMPA Regulations and Letters of Authorization, and ESA Biological Opinion will document the mitigation measures that the Navy will implement under the Proposed Action. Should the Navy require a change in how it implements mitigation based on national security concerns, evolving readiness requirements, or other factors (e.g., significant changes in the best available science), the Navy will engage the appropriate agencies and reevaluate its mitigation through adaptive management or the appropriate consultations. The Navy's adaptive management approach is discussed in Section 5.1.2.2.1.1 (Adaptive Management). This approach was coordinated with NMFS during the consultation and permitting processes and will be included in the MMPA Regulations and Letters of Authorization.

5.1.2 COMPLIANCE INITIATIVES

To disseminate its mitigation requirements to the appropriate personnel and meet other compliance requirements for the MMPA and ESA, the Navy will continue using the Protective Measures Assessment Protocol and its ongoing monitoring and reporting initiatives, as described in the sections below.

5.1.2.1 Protective Measures Assessment Protocol

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

5.1.2.2 Monitoring, Research, and Reporting Initiatives

Many of the Navy's monitoring programs, research programs, and reporting initiatives have been ongoing for more than a decade and will continue as a compliance requirement for the MMPA, ESA, or both. The Navy is adding an ESA-listed coral and military expended material effects reporting initiative under Phase III as a new compliance requirement for the ESA, as described in Section 5.1.2.2.3 (Incident Reports). The Navy and NMFS will use the information contained within monitoring, research, activity, and incident reports when evaluating the effectiveness and practicality of mitigation and determining if adaptive adjustments to mitigation may be appropriate. These reports also facilitate better understandings of the biological resources that inhabit the Study Area and the potential impacts of the Proposed Action on those resources.

5.1.2.2.1 Marine Species Research and Monitoring Programs

Through its marine species research and monitoring programs, the Navy is one of the nation's largest sponsors of scientific research on and monitoring of marine species. Detailed information on these programs is provided in Section 3.0.1.1 (Marine Species Monitoring and Research Programs). Navy research programs focus on investments in basic and applied research that increase fundamental knowledge and advance naval technological capabilities. Navy monitoring programs focus on the potential impacts of training and testing activities on biological resources. Monitoring reports are available to the public on the U.S. Navy Marine Species Monitoring webpage. The Navy will post future reports online as they become available. Specific details regarding the content of the reports were coordinated with the appropriate agencies through the consultation and permitting processes. Additional information about the U.S. Navy Marine Species Monitoring Program, including its adaptive management and strategic planning components, is provided in the sections below.

5.1.2.2.1.1 Adaptive Management

Adaptive management is an iterative process of decision-making that accounts for changes in the environment and scientific understanding over time through a system of monitoring and feedback. Within the natural resource management community, adaptive management involves ongoing, real-time learning and knowledge creation, both in a substantive sense and in terms of the adaptive process itself (Williams et al., 2009). Adaptive management focuses on learning and adapting, through partnerships of natural resource managers, scientists, and other stakeholders. Adaptive management helps managers maintain flexibility in their decisions and provides them the latitude to change direction to improve understanding of ecological systems and achieve management objectives. Working to improve progress toward desired outcomes is another function of adaptive management.

The Navy's adaptive management review process and reporting requirements serve as the basis for evaluating performance and compliance. The process involves technical review meetings and ongoing discussions between the Navy, NMFS, the Marine Mammal Commission, and other experts in the scientific community. An example of a revision to the compliance monitoring structure as a result of adaptive management is the development of the Strategic Planning Process, which is a planning tool for the selection and management of monitoring investments (U.S. Department of the Navy, 2013). Through adaptive management, the Strategic Planning Process has been incorporated into the Integrated Comprehensive Monitoring Program, which is described below.

5.1.2.2.1.2 Integrated Comprehensive Monitoring Program

The Navy developed an Integrated Comprehensive Monitoring Program to serve as the overarching framework for coordinating its marine species monitoring efforts and as a planning tool to focus its

monitoring priorities pursuant to ESA and MMPA requirements (U.S. Department of the Navy, 2010). The purpose of the Integrated Comprehensive Monitoring Program is to coordinate monitoring efforts across regions and to allocate the most appropriate level and type of monitoring effort for each range complex based on a set of standardized objectives, regional expertise, and resource availability. The Integrated Comprehensive Monitoring Program does not identify specific field work or individual projects. It is designed to provide a flexible, scalable, and adaptable framework using adaptive management and the Strategic Planning Process to periodically assess progress and reevaluate objectives.

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

The Strategic Planning Process serves to guide the investment of resources to most efficiently address Integrated Comprehensive Monitoring Program objectives and intermediate scientific objectives. Navy-funded monitoring projects relating to the impact of Navy training and testing activities on protected marine species are designed to accomplish one or more of the following top-level goals, as described in the Integrated Comprehensive Monitoring Program charter:

- Increase the understanding of the likely occurrence of marine mammals and ESA-listed marine species in the vicinity of the action (e.g., presence, abundance, distribution, density).
- Increase the understanding of the nature, scope, or context of the likely exposure of marine mammals and ESA-listed marine species to any of the potential stressors associated with the action (e.g., acoustics, explosives, physical disturbance and strike of military expended materials) through a better understanding of one or more of the following: (1) the nature of the action and its surrounding environment (e.g., sound-source characterization, propagation, ambient noise levels), (2) the affected species (e.g., life history, dive patterns), (3) the likely co-occurrence of marine mammals and ESA-listed marine species with the action (in whole or part), and (4) the likely biological or behavioral context of exposure to the stressor for the marine mammal and ESA-listed marine species (e.g., age class of exposed animals or known pupping, calving, or feeding areas).
- Increase the understanding of how individual marine mammals or ESA-listed marine species respond behaviorally or physiologically to the specific stressors associated with the action and in what context (e.g., at what distance or received level).
- Increase the understanding of how anticipated individual responses to individual stressors or anticipated combinations of stressors may impact either: (1) the long-term fitness and survival of an individual, or (2) the population, species, or stock (e.g., through impacts on annual rates of recruitment or survival).
- Increase the understanding of the effectiveness of mitigation and monitoring.

- Improve the understanding and record of the manner in which the Navy complies with its Incidental Take Authorizations and Incidental Take Statements.
- Increase the probability of detecting marine mammals through improved technology or methods within the mitigation zones (to improve mitigation effectiveness) and generally (to better achieve monitoring goals).

The Navy established a Scientific Advisory Group in 2011 with the initial task of evaluating current Navy monitoring approaches under the Integrated Comprehensive Monitoring Plan and existing MMPA Regulations and Letters of Authorization. The Scientific Advisory Group was also tasked with developing objective scientific recommendations that would form the basis for the Strategic Plan. While recommendations were fairly broad and not specifically prescriptive, the Scientific Advisory Group did provide specific programmatic recommendations that serve as guiding principles for the continued evolution of the Integrated Comprehensive Monitoring Program. Key recommendations included:

- Working within a conceptual framework of knowledge, from basic information on the occurrence of species within each range complex, to more specific matters of exposure, response, and consequences.
- Facilitating collaboration among researchers in each region, with the intent to develop a coherent and synergistic regional monitoring and research effort.
- Striving to move away from effort-based compliance metrics (e.g., completing a pre-determined amount of survey hours or days), with the intent to design and conduct monitoring projects according to scientific objectives rather than effort expended.
- Approaching the monitoring program holistically and selecting projects that offer the best opportunity to advance understanding of the issues, as opposed to establishing range-specific requirements.

5.1.2.2.1.3 Strategic Planning Process

The U.S. Navy Marine Species Monitoring Program has evolved and improved as a result of adaptive management review and the Strategic Planning Process through changes that include:

- Recognizing the limitations of effort-based compliance metrics;
- Developing a strategic approach to monitoring based on recommendations from the Scientific Advisory Group;
- Shifting focus to projects based on scientific objectives that facilitate generation of statistically meaningful results upon which natural resources management decisions may be based;
- Focusing on priority species or areas of interest as well as best opportunities to address specific monitoring objectives to maximize return on investment; and
- Increasing transparency of the program and management standards, improving collaboration among participating researchers, and improving accessibility to monitoring data and results.

As a result of the changes outlined above due to the implementation of the Strategic Planning Process, the U.S. Navy Marine Species Monitoring Program has undergone a transition. Intermediate scientific objectives now serve as the basis for developing and executing new monitoring projects across Navy training and testing areas in the Atlantic and Pacific Oceans. Implementation of the Strategic Planning Process involves coordination among fleets, system commands, Chief of Naval Operations Energy and Environmental Readiness Division, NMFS, and the Marine Mammal Commission with five primary steps:

- **Identify overarching intermediate scientific objectives.** Through the adaptive management process, the Navy coordinates with NMFS and the Marine Mammal Commission to review and revise the list of intermediate scientific objectives that guide development of individual monitoring projects. Examples include addressing information gaps in species occurrence and density, evaluating behavioral responses of marine mammals to Navy training and testing activities, and developing tools and techniques for passive acoustic monitoring.
- **Develop individual monitoring project concepts.** This step generally takes the form of soliciting input from the scientific community in terms of potential monitoring projects that address one or more of the intermediate scientific objectives. This can be accomplished through a variety of forums, including professional societies, regional scientific advisory groups, and contractor support.
- **Evaluate, prioritize, and select monitoring projects.** Navy technical experts and program managers review and evaluate monitoring project concepts and develop a prioritized ranking. The goal of this step is to establish a suite of monitoring projects that address a cross-section of intermediate scientific objectives spread over a variety of range complexes.
- **Execute and manage selected monitoring projects.** Individual projects are initiated through appropriate funding mechanisms and include clearly defined objectives and deliverables, such as data, reports, or publications.
- **Report and evaluate progress and results.** Progress on individual monitoring projects is updated through the U.S. Navy Marine Species Monitoring Program website as well as annual monitoring reports submitted to NMFS. Both internal review and discussions with NMFS through the adaptive management process are used to evaluate progress toward addressing the primary objectives of the Integrated Comprehensive Monitoring Program and serve to periodically recalibrate the focus of the monitoring program.

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

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

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

5.1.2.2.2 Training and Testing Activity Reports

The Navy developed a classified data repository known as the Sonar Positional Reporting System to maintain an internal record of underwater sound sources (e.g., active sonar) used during training and

testing. The Sonar Positional Reporting System facilitates reporting pursuant to the Navy's MMPA Regulations and Letters of Authorization. Using data from the Sonar Positional Reporting System and other relevant sources, the Navy will continue to provide the NMFS Office of Protected Resources with classified or unclassified (depending on the data) annual reports on the training and testing activities that use underwater sound sources. In its annual training and testing activity reports, the Navy will describe the level of training and testing conducted during the reporting period. For example, the Navy will report the location and total hours and counts of active sonar hours and in-water explosives used, and an assessment if activities conducted in the Study Area exceeded levels of training and testing analyzed in the MMPA authorization and ESA Biological Opinion. For major training exercises, the reports will also include information on each individual marine mammal sighting related to mitigation implementation. Unclassified annual training and testing activity reports that have been submitted to NMFS can be found on the NMFS Office of Protected Resources and U.S. Navy Marine Species Monitoring Program webpages.

5.1.2.2.3 Incident Reports

The Navy's mitigation measures and many of its standard operating procedures are designed to prevent incidents involving biological and cultural resources, such as aircraft strikes, vessel strikes, and impacts on submerged historic properties and seafloor resources. The Navy has been collecting data on such incidents (if they have occurred) for more than a decade and will continue doing so under the Proposed Action. To provide information on incidents involving biological or cultural resources, the Navy will submit reports to the appropriate management authorities, as described below:

- **Birds and Bats:** As described in Section 2.3.3.3 (Aircraft Safety), animal strikes present an aviation safety risk for aircrews and aircraft. The Navy will report all bird and bat strikes per standard operating procedures.
- **Marine Mammals, Sea Turtles, and ESA-Listed Species:** The Navy will notify the appropriate regulatory agency, which may include NMFS or the USFWS, immediately or as soon as operational security considerations allow if it observes the following that is (or may be) attributable to Navy activities: (1) a vessel strike of a marine mammal or sea turtle during training or testing, (2) a stranded, injured, or dead marine mammal or sea turtle during training or testing, or (3) an injured or dead marine mammal, sea turtle or ESA-listed species during post-explosive event monitoring. The Navy will provide relevant information pertaining to the incident (e.g., vessel speed). Additional details on these incident reporting requirements will be included in the Notification and Reporting Plan. For manatee incidents, the agency contacts may include the Florida Fish and Wildlife Conservation Commission, Law Enforcement Division; the USFWS Jacksonville Ecological Field Office; the USFWS Raleigh Field Office; and the North Carolina Wildlife Resources Commission. If harassment, injury, or death of a manatee is observed, the Navy will immediately halt the training or testing activity. The Navy will continue to provide the appropriate personnel with training on marine species incidents and their associated reporting requirements to aid the data collection and reporting processes (see Section 5.3.1, Environmental Awareness and Education). Information on marine mammal strandings is included in the *Marine Mammal Strandings Associated with U.S. Navy Sonar Activities* technical report (U.S. Department of the Navy, 2017a).
- **ESA-Listed Coral:** The Navy will evaluate the extent to which military expended materials may have impacted ESA-listed corals and designated coral critical habitat in or near the Key West Range Complex through two initiatives: (1) evaluating existing data to determine whether there is past evidence of impacts, and (2) working with entities already conducting underwater

surveys to incorporate searches for potential military expended materials in future scheduled surveys to determine if there are any observed impacts from those materials. Details of the reporting process and requirements will be included in the Navy's coordination and evaluation plan, which will be developed in cooperation with the NMFS ESA Interagency Cooperation Division and relevant entities (e.g., National Marine Sanctuaries Program, NOAA Marine Debris program, relevant coral researchers).

- **Cultural Resources:** In the event the Navy impacts a submerged historic property (e.g., archaeological resource), it will commence consultation with the appropriate State Historic Preservation Officer or Tribal Historic Preservation Officer in accordance with 36 Code of Federal Regulations section 800.13(b)(3).

5.2 MITIGATION DEVELOPMENT PROCESS

The Navy, in coordination with the appropriate regulatory agencies, developed its initial suite of mitigation measures for Phase I of environmental planning (2009–2014) and subsequently revised those mitigation measures for Phase II (2013–2018). For this Final EIS/OEIS (which represents Phase III of environmental planning), the Navy worked collaboratively with the appropriate regulatory agencies to develop and finalize its mitigation through the consultation and permitting processes. The mitigation development process involved reanalyzing existing Phase II measures and analyzing new mitigation recommendations received from Navy and NMFS scientists, other governmental agencies, the public, and non-governmental organizations during the NEPA, consultation, and permitting processes. The Navy conducted a detailed review and assessment of each potential mitigation measure individually and then all potential mitigation measures collectively to determine if, as a whole, mitigation will effectively avoid or reduce potential impacts from the Proposed Action and will be practical to implement. The Navy operational community (i.e., leadership from the aviation, surface, subsurface, and special warfare communities; leadership from the research and acquisition community; and training and testing experts), environmental planners, and scientific experts provided input on the effectiveness and practicality of mitigation implementation. A four-star Admiral, the Fleet Commander of all Navy forces in the Study Area, and Navy Senior Leadership reviewed and approved the suite of mitigation measures included in this Final EIS/OEIS and determined it is the highest level of mitigation practical for the Navy to implement under the Proposed Action.

Mitigation measures that the Navy will implement under the Proposed Action are organized into two categories: procedural mitigation measures and mitigation areas. The sections below provide definitions of mitigation terminology, background information pertinent to the mitigation development process, and information about the mitigation effectiveness and practicality criteria. Additional activity or stressor-specific details, such as the level of effect to which a procedural mitigation measure is expected to mitigate and if a measure has been modified from Phase II is provided throughout Section 5.3 (Procedural Mitigation to be Implemented) and Section 5.4 (Mitigation Areas to be Implemented). Section 5.5 (Measures Considered but Eliminated) contains information on measures that did not meet the appropriate balance between being effective and practical to implement, and therefore will not be implemented under the Proposed Action.

5.2.1 PROCEDURAL MITIGATION DEVELOPMENT

Procedural mitigation is mitigation that the Navy will implement whenever and wherever training or testing activities involving applicable acoustic, explosive, and physical disturbance and strike stressors take place within the Study Area. Procedural mitigation generally involves: (1) the use of one or more

trained Lookouts to observe for specific biological resources within a mitigation zone, (2) requirements for Lookouts to immediately communicate sightings of specific biological resources to the appropriate watch station for information dissemination, and (3) requirements for the watch station to implement mitigation until a pre-activity commencement or during-activity recommencement condition has been met.

Procedural mitigation primarily involves Lookouts observing for marine mammals and sea turtles. For some activities, Lookouts may also be required to observe for additional biological resources, such as marine birds, fish, jellyfish aggregations, or floating vegetation. In this chapter, the term "floating vegetation" refers specifically to floating concentrations of detached kelp paddies and *Sargassum*. Some biological resources, such as floating vegetation, can be indicators of potential marine mammal or sea turtle presence because marine mammals or sea turtles have been known to seek shelter in, feed on, or feed among them. For example, young sea turtles have been known to hide from predators and eat the algae associated with floating concentrations of *Sargassum*. The Navy observes for these additional biological resources prior to the initial start or during the conduct of certain activities to protect ESA-listed species or to offer an additional layer of protection for marine mammals and sea turtles.

To consider the benefits of procedural mitigation to marine mammals and sea turtles within the MMPA and ESA impact estimates, the Navy conservatively factored mitigation effectiveness into its quantitative analysis process, as described in the technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing* (U.S. Department of the Navy, 2018a). The Navy's quantitative analysis assumes that Lookouts will not be 100 percent effective at detecting all individual marine mammals and sea turtles within the mitigation zones for each activity. This is due to the inherent limitations of observing marine species and because the likelihood of sighting individual animals is largely dependent on observation conditions (e.g., time of day, sea state, mitigation zone size, observation platform) and animal behavior (e.g., the amount of time an animal spends at the surface of the water). This is particularly true for sea turtles, small marine mammals, and marine mammals that display cryptic behaviors (e.g., surfacing to breathe with only a small portion of their body visible from the surface). Throughout Section 5.3 (Procedural Mitigation to be Implemented), discussions about the likelihood that a Lookout would observe a marine mammal or sea turtle pertain specifically to animals that are available to be observed (i.e., on, above, or just below the water's surface). The benefits of procedural mitigation measures for species that were not included in the quantitative analysis process (e.g., birds, fish) are discussed qualitatively.

Data inputs for assessing and developing procedural mitigation included operational data as described in Section 5.2.3 (Practicality of Implementation), the best available science discussed in Chapter 3 (Affected Environment and Environmental Consequences), published literature, data on marine mammal and sea turtle impact ranges obtained through acoustic modeling, marine species monitoring and density data, and the most recent guidance from NMFS and the USFWS. Background information on the data that were used to develop the ranges to effect for marine mammals and sea turtles (such as hearing threshold metrics) is provided in Chapter 3.7 (Marine Mammals) and Chapter 3.8 (Reptiles).

5.2.1.1 Lookouts

Lookouts perform similar duties as standard watch personnel (e.g., personnel on the bridge watch team and personnel stationed for man-overboard precautions, as described in Section 2.3.3, Standard Operating Procedures), but are designated the responsibility of helping meet the Navy's mitigation requirements by visually observing mitigation zones. The number of Lookouts designated for each

training or testing activity is dependent upon the number of personnel involved in the activity (i.e., manning restrictions) and the number and type of assets available (i.e., equipment and space restrictions).

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

When Lookouts are positioned in a fixed-wing aircraft or rotary-wing aircraft (i.e., helicopter), mission requirements determine the flight parameters (altitude, flight path, and speed) for that aircraft. For example, most fixed-wing aircraft sorties occur above 3,000 feet (ft.), while most rotary-wing sorties associated with mine countermeasure activities occur at altitudes as low as 75–100 ft. Similarly, when Lookouts are positioned on a vessel, mission requirements determine the operational parameters (course and speed) for that vessel.

The Navy's passive acoustic devices (e.g., remote acoustic sensors, expendable sonobuoys, passive acoustic sensors on submarines) can complement visual observations for marine mammals when passive acoustic assets are already participating in an activity. The passive acoustic devices can detect vocalizing marine mammals within the frequency bands already being monitored by Navy personnel. Marine mammal detections from passive acoustic devices can alert Lookouts to possible marine mammal presence in the vicinity. Lookouts can use the information from passive acoustic detections to assist their visual observations of the mitigation zone. Based on the number and type of passive acoustic devices that are typically used, passive acoustic detections do not provide range or bearing to a detected animal in order to determine its location or confirm its presence in a mitigation zone. Therefore, it is not practical for the Navy to implement mitigation in response to passive acoustic detections alone (i.e., without a visual sighting of an animal within the mitigation zone). Additional information about passive acoustic devices is provided in Section 5.5.3 (Active and Passive Acoustic Monitoring Devices).

5.2.1.2 Mitigation Zones

Mitigation zones are areas at the surface of the water within which applicable training or testing activities will be ceased, powered down, or modified to protect specific biological resources from an auditory injury (permanent threshold shift [PTS]), non-auditory injury (from impulsive sources), or direct strike (e.g., vessel strike) to the maximum extent practicable. Mitigation zones are measured as the radius from a stressor. Implementation of procedural mitigation is most effective when mitigation zones are appropriately sized to be realistically observed during typical training and testing activity conditions.

The Navy customized its mitigation zone sizes and mitigation requirements for each applicable training and testing activity category or stressor. The Navy developed each mitigation zone to be the largest area Lookouts can reasonably be expected to observe during typical activity conditions (i.e., the most environmentally protective) and the Navy can commit to implementing mitigation without impacting safety, sustainability, and the ability to meet mission requirements. The Navy designed the mitigation zones for most acoustic and explosive stressors according to its source bins. As described in Section 3.0.3.3.1.1 (Sonar and Other Transducers), sonars and other transducers are grouped into classes that share an attribute, such as frequency range or purpose of use. Classes are further sorted by bins based on the frequency or bandwidth, source level, and when warranted, the application in which the source would be used. As described in Section 3.0.3.3.2.1 (Explosions in Water), explosives detonated in water are binned by net explosive weight. Mitigation does not pertain to stressors that do not have the potential to impact biological resources (e.g., *de minimis* acoustic and explosive sources that do not have the potential to impact marine mammals).

Discussions throughout Section 5.3 (Procedural Mitigation to be Implemented) about the level of effect that will likely be mitigated are based on a comparison of the mitigation zone size to the predicted impact ranges for the applicable source bins with the longest average ranges to PTS. These conservative discussions represent the worst-case scenario for each activity category or stressor. The mitigation zones will oftentimes cover all or a larger portion of the predicted average ranges to PTS for other comparatively smaller sources with shorter impact ranges (e.g., sonar sources used at a lower source level, explosives in a smaller bin). The discussions are primarily focused on how the mitigation zone sizes compare to the ranges to PTS; however, depending on the activity category or stressor, the mitigation zones are oftentimes large enough to also mitigate within a portion of the ranges to temporary threshold shift (TTS). TTS is a threshold shift that is recoverable. Background information on PTS, TTS, and marine mammal and sea turtle hearing groups is presented in the U.S. Department of the Navy (2017d) technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)*.

5.2.1.3 Procedural Mitigation Implementation

The Navy takes several courses of action in response to a sighting of an applicable biological resource in a mitigation zone. First, a Lookout will communicate the sighting to the appropriate watch station. Next, the watch station will implement the prescribed mitigation, such as delaying the initial start of an activity, powering down sonar, ceasing an explosive detonation, or maneuvering a vessel. If floating vegetation is observed in the mitigation zone prior to the initial start of an activity, the activity will either be relocated to an area where floating vegetation is not observed in concentrations, or the initial start of the activity will be delayed until the mitigation zone is clear of floating vegetation concentrations. There are no requirements to cease activities if vegetation floats into the mitigation zone after activities commence. For sightings of marine mammals, sea turtles, and other specified biological resources within a mitigation zone prior to the initial start of or during applicable activities, the Navy will continue mitigating until one of the five conditions listed below has been met. The conditions are designed to allow a sighted animal to leave the mitigation zone before the initial start of an activity or before an activity resumes.

- The animal is observed exiting the mitigation zone;
- The animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the stressor source;
- The mitigation zone has been clear from any additional sightings for a specific wait period;

- For mobile activities, the stressor source has transited or has been relocated a distance equal to double the mitigation zone size beyond the location of the last sighting; or
- For activities using hull-mounted sonar, the ship concludes that dolphins are deliberately closing in on the ship to ride the ship's bow wave and are therefore out of the main transmission axis of the sonar (and there are no other marine mammal sightings within the mitigation zone).

To supplement the implementation of procedural mitigation, the Navy has agreed to undertake reporting initiatives for certain activities or resources based on previous consultations with NMFS and the USFWS, as summarized in Section 5.1.2.2 (Monitoring, Research, and Reporting Initiatives) and detailed where applicable in Section 5.3 (Procedural Mitigation to be Implemented). For some activities, the Navy also agreed during previous consultations with NMFS or the USFWS to adapt some of its procedural mitigation for particular resources at certain locations and plans to continue those mitigation measures for Phase III. For example, the Navy will continue implementing seasonal mitigation measures for line charge testing activities for ESA-listed Gulf Sturgeon, as discussed in Section 5.3.3.10 (Line Charge Testing).

5.2.2 Mitigation Area Development

Mitigation areas are geographic locations within the Study Area where the Navy will implement mitigation measures to: (1) avoid or reduce potential impacts on biological or cultural resources that are not observable by Lookouts from the water's surface (i.e., resources for which procedural mitigation cannot be implemented), (2) in combination with procedural mitigation, effect the least practicable adverse impact on marine mammal species or stocks and their habitat, or (3) in combination with procedural mitigation, 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.

The Navy completed an extensive assessment of the Study Area to develop the mitigation areas included in this Final EIS/OEIS. The Navy reanalyzed existing Phase II mitigation areas; assessed additional habitat areas suggested by the public, NMFS, other governmental agencies, and non-governmental organizations; and considered other habitats identified internally by the Navy. Data inputs for mitigation area assessment and development included the operational information described in Section 5.2.3 (Practicality of Implementation), the best available science discussed in Chapter 3 (Affected Environment and Environmental Consequences), published literature, predicted activity impact footprints, and marine species monitoring and density data. The Navy considered a mitigation area to be effective if it met the following criteria:

- **The mitigation area is a key area of biological or ecological importance or contains cultural resources:** The best available science suggests that the mitigation area contains submerged cultural resources (e.g., shipwrecks) or is particularly important to one or more species or resources for a biologically important life process (i.e., foraging, migration, reproduction) or ecological function (e.g., shallow-water coral reefs that provide critical ecosystem functions); and
- **The mitigation will result in an avoidance or reduction of impacts:** Implementing the mitigation will likely avoid or reduce potential impacts on: (1) species, stocks, or populations of marine mammals based on data regarding their seasonality, density, and behavior; or (2) other biological or cultural resources based on their distribution and physical properties. Furthermore, implementing the mitigation will not shift or transfer adverse effects from one species to another (e.g., to a more vulnerable or sensitive species).

Potential impacts on environmental and cultural resources cannot occur unless there is an overlap between a resource and a stressor. During the mitigation assessment and development process, the Navy did not develop mitigation areas in locations where stressors are not used because doing so would not meet the basic definition of effective mitigation (i.e., the mitigation areas would not effectively avoid or reduce potential impacts). For example, some explosive activities cannot realistically be conducted in certain areas based on operational requirements relating to water depth; therefore, mitigation to avoid conducting explosives in these locations is not warranted.

The benefits of mitigation areas are discussed qualitatively and have not been factored into the quantitative analysis process or reductions in take for MMPA and ESA impact estimates. Marine mammal mitigation areas are designed to help avoid or reduce potential impacts during biologically important life processes within particularly important habitat areas. Therefore, the mitigation benefit is discussed in terms of the context of impact avoidance or reduction. A discussion of the mitigation areas developed for this Final EIS/OEIS is presented in Section 5.4 (Mitigation Areas to be Implemented).

5.2.3 PRACTICALITY OF IMPLEMENTATION

Mitigation measures are expected to have some degree of impact on the training and testing activities that implement them (e.g., modifying where and when activities occur, ceasing an activity in response to a sighting). The Navy is willing to accept a certain level of impact on its military readiness activities because of the substantial benefit that mitigation measures provide for avoiding or reducing impacts on environmental and cultural resources. The Navy's focus during mitigation assessment and development was that mitigation measures must meet the appropriate balance between being effective and practical to implement. To evaluate practicality, the Navy operational community conducted an extensive and comprehensive assessment to determine how and to what degree potential mitigation measures would be compatible with planning, scheduling, and conducting training and testing activities under the Proposed Action in order to meet the Navy's Title 10 requirements.

5.2.3.1 Assessment Criteria

The purpose and need of the Proposed Action is to ensure that the Navy meets its mission to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. The Navy is statutorily mandated to protect U.S. national security by being ready, at all times, to effectively prosecute war and defend the nation by conducting operations at sea, as outlined in Title 10 section 5062 of the United States Code. The Navy's mission is achieved in part by conducting training and testing within the Study Area in accordance with established Navy military readiness requirements. Training requirements have been developed through many years of iteration and adaptation and are designed to ensure that Sailors achieve the levels of readiness needed to properly respond to the multitude of contingencies they may face during military missions and combat operations. Activities are planned and scheduled in accordance with the Optimized Fleet Response Plan, which details instructions on manning distribution, range scheduling, operational requirements, maintenance and modernization plans, quality of work and life for personnel, achieving training capabilities, and meeting strategic readiness objectives. There are certain geographic areas, such as the coastal zone, where the Navy does not typically plan certain training or testing activities due to operational parameters (e.g., water depth) and planning considerations (e.g., ensuring public safety), as discussed in Section 2.3.3 (Standard Operating Procedures) and Appendix A (Navy Activity Descriptions).

To achieve the highest skill proficiency and most accurate testing results possible, the Navy conducts activities in a variety of realistic tactical oceanographic and environmental conditions. Such conditions

include variations in bathymetry, topography, surface fronts, and sea surface temperatures. Training activities must be as realistic as possible to provide the experiences vital to success and survival during military missions and combat operations. Degraded training would result in units being unqualified to conduct their range of military operations required by operational Commanders. The inability of such Commanders to meet security objectives would result in not only the increased risk to life, but also the degradation of national security. Testing activities must be as realistic as possible for the Navy to conduct accurate acoustic research to validate acoustic models; conduct accurate engineering tests of acoustic sources, signal processing algorithms, and acoustic interactions; and to effectively test systems and platforms (and components of these systems and platforms) to validate whether they perform as expected and determine whether they are operationally effective, suitable, survivable, and safe for their intended use by the fleet. Testing must be completed before full-scale production or delivery to the fleet to ensure functionality and accuracy in military mission and combat conditions.

As described in Chapter 2 (Description of Proposed Action and Alternatives), the Navy requires access to sea space and airspace throughout the Study Area within range complexes, pierside locations, nearshore areas, and large-scale open ocean areas of the high seas. Each area plays a critical role in the Navy's ability to plan, schedule, and effectively execute military readiness activities. The locations where training and testing occur must be situated in a way that allows the Navy to complete its activities without physical or logistical obstructions. The Navy requires extensive sea space so that individual training and testing activities can occur at sufficient distances so they do not interfere with one another. Some training and testing activities require continuous access to large and unobstructed areas, consisting potentially of tens or thousands of square miles. This provides 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 military missions and combat operations. For example, major training exercises using integrated warfare components may require large areas of the littorals, open ocean, and nearshore areas for realistic and safe anti-submarine warfare training. The Navy also requires large areas of sea space because it trains in a manner to avoid observation by potential adversaries. Modern sensing technologies make training on a large scale without observation more difficult. A foreign military's continual observation of U.S. Navy 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. naval 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 military readiness.

The locations for training and testing activities are selected to maximize efficiency while supporting specific mission and safety requirements, deconflict sea space and airspace, and minimize the time personnel must spend away from home. Training and testing locations are typically selected based on their proximity to homeports, home bases, associated training ranges, testing facilities, air squadrons, and existing infrastructure (e.g., instrumented underwater ranges) to reduce travel time and associated costs. Activities involving the use of rotary-wing aircraft typically occur in proximity to shore or refueling stations due to fuel restrictions and safety requirements. Testing ranges are typically located near systems command support facilities, which provide critical infrastructure support and technical expertise necessary to conduct testing. Logistical support of range testing can only efficiently and effectively occur when the support is co-located with the testing activities. These same principles also apply to pierside and at-sea testing that must occur in proximity to naval shipyards and Navy contractor shipyards. Testing event site locations and associated field activities were originally established to support specific Navy mission testing needs using a selection process that included testing

requirements, cost of living, availability of personnel, and low level of crowding from industry and development.

During its assessment to determine how and to what degree the implementation of mitigation would be compatible with meeting the purpose and need of the Proposed Action, the Navy considered mitigation measures to be practical to implement if they met all criteria discussed below:

- **Implementing the mitigation is safe:** Mitigation measures must not increase safety risks to Navy personnel and equipment, or to the public. When assessing whether implementing a mitigation measure would be safe, the Navy factored in the potential for increased pilot fatigue; accelerated fatigue-life of aircraft; typical fuel restrictions of participating aircraft; locations of refueling stations; proximity to aircraft emergency landing fields, critical medical facilities, and search and rescue capabilities; space restrictions of the observation platforms; the ability to de-conflict platforms and activities to ensure that training and testing activities do not impact each other; and the ability to avoid interaction with non-Navy sea space and airspace uses, such as established commercial air traffic routes, commercial vessel shipping lanes, and areas used for energy exploration or alternative energy development. Other safety considerations included identifying if mitigation measures would reasonably allow Lookouts to safely and effectively maintain situational awareness while observing the mitigation zones during typical activity conditions, or if the mitigation would increase the safety risk for personnel. For example, the safety risk would increase if Lookouts were required to direct their attention away from essential mission requirements.
- **Implementing the mitigation is sustainable:** One of the primary factors that the Navy incorporates into the planning and scheduling of its training and testing activities is the amount and type of available resources, such as funding, personnel, and equipment. Mitigation measures must be sustainable over the life of the Proposed Action, meaning that they will not require the use of resources in excess of what is available. When assessing whether implementing a mitigation measure would be sustainable, the Navy considered if the measure would require excessive time on station or time away from homeport for Navy personnel, require the use of additional personnel (i.e., manpower) or equipment (e.g., adding a small boat to serve as an additional observation platform), or result in additional operational costs (e.g., increased fuel consumption, equipment maintenance, or acquisition of new equipment).
- **Implementing the mitigation allows the Navy to continue meeting its mission requirements:** The Navy considered if each individual measure and the iterative and cumulative impact of all potential measures would be within the Navy's legal authority to implement. The Navy also considered if mitigation would modify training or testing activities in a way that would prevent individual activities from meeting their mission objectives and if mitigation would prevent the Navy from meeting its national security requirements or statutorily-mandated Title 10 requirements, such as by:
    - Impacting training and testing realism or preventing ready access to ranges, operating areas, facilities, or range support structures (which would reduce realism and present sea space and airspace conflicts).
    - Impacting the ability for Sailors to train and become proficient in using sensors and weapon systems as would be required in areas analogous to where the military operates or causing an erosion of capabilities or reduction in perishable skills (which would result in a significant risk to personnel or equipment safety during military missions and combat operations).

- Impacting the ability for units to meet their individual training and certification requirements (which would impact the ability to deploy with the required level of readiness necessary to accomplish any tasking by Combatant Commanders).
- Impacting the ability to certify forces to deploy to meet national security tasking (which would limit the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capabilities in support of national security interests).
- Impacting the ability of researchers, program managers, and weapons system acquisition programs to conduct accurate acoustic research to meet research objectives, effectively test systems and platforms (and components of these systems and platforms) before full-scale production or delivery to the fleet, or complete shipboard maintenance, repairs, or pierside testing prior to at-sea operations (which would not allow the Navy to ensure safety, functionality, and accuracy in military mission and combat conditions per required acquisition milestones or on an as-needed basis to meet operational requirements).
- Requiring the Navy to provide advance notification of specific times and locations of Navy platforms, such as platforms using active sonar (which would present national security concerns).
- Reducing the Navy's ability to be ready, maintain deployment schedules, or respond to national emergencies or emerging national security challenges (which would present national security concerns).

5.2.3.2 Factors Affecting Practicality

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

The duration over which mitigation is implemented can differ considerably depending on the mitigation zone size, number of animal sightings, behavioral state of animals sighted (e.g., travelling at a fast pace on course to exit the mitigation zone, milling slowly in the center of the mitigation zone), and which pre-activity commencement or during-activity recommencement condition is met before the activity can commence or resume after each sighting. The duration of mitigation implementation typically equates to the amount of time the training or testing activity will be extended. The impact that extending the length of an activity has on safety, sustainability, and the Navy's ability to accomplish the activity's

intended objectives varies by activity. This is one reason why the Navy tailors its mitigation zone sizes and mitigation requirements by activity category or stressor and the platforms involved.

As described in Section 5.2.1 (Procedural Mitigation Development), the Navy will mitigate for each applicable sighting and will continue mitigating until one of five conditions has been met. In some instances, such as if an animal dives underwater after a sighting, it may not be possible for a Lookout to visually verify if the animal has exited the mitigation zone. The Navy cannot delay or cease activities indefinitely for the purpose of mitigation due to impacts on safety, sustainability, and the Navy's ability to continue meeting its mission requirements. To account for this, one of the pre-activity commencement and during-activity recommencement conditions is an established post-sighting wait period of 30 minutes (min.) or 10 min., based on the platforms involved. Wait periods are designed to allow animals the maximum amount of time practical to resurface (i.e., become available to be observed by a Lookout) before activities resume. When developing the length of its wait periods, the Navy factored in the assumption that mitigation may need to be implemented more than once. For example, an activity may need to be delayed or ceased for more than one 30-min. or 10-min. period. Information on diving behaviors of marine mammals and sea turtles is presented in the U.S. Department of the Navy (2017c) technical report titled *Dive Distribution and Group Size Parameters for Marine Species Occurring in the U.S. Navy's Atlantic and Hawaii-Southern California Training and Testing Study Areas*.

The Navy assigns a 30-min. wait period to activities conducted from vessels and activities that involve aircraft that are not typically fuel constrained (e.g., maritime patrol aircraft). A 30-min. period covers the average dive times of most marine mammals and a portion of the dive times of sea turtles and deep-diving marine mammals (i.e., sperm whales, dwarf and pygmy sperm whales [Kogia whales], and beaked whales). The Navy determined that a 30-min. wait period is the maximum wait time that is practical to implement during activities involving vessels and aircraft that are not typically fuel constrained to allow the activities to continue meeting their intended objectives. For example, the typical duration of Maritime Security Operations – Anti-Swimmer Grenades (which involve the use of small boats) is 1 hour. These activities are scheduled to occur at specific locations within specific timeframes based on range scheduling and for sea space deconfliction. Implementing one wait period would result in the activity being extended by half of the typical activity duration. The Navy determined that, given the benefit of this mitigation, a 30-min. wait period would be practical to implement for this activity; however, implementing a longer wait period (such as extending the wait period to 45 min. or 60 min. to cover the average dive times of sea turtles and additional marine mammal species) would be impractical. Increasing the wait period, and consequently the amount of time the activity would need to be delayed or extended in order to accomplish its intended objective, would impact activity realism or cause sea space conflicts in a way that could impact the Navy's ability to continue meeting its mission requirements. For example, delaying an activity for multiple wait periods could result in personnel not being able to detonate an explosive before the participating platforms are required to depart the range due to range scheduling; therefore, the activity would not accomplish its intended objectives.

The Navy assigns a 10-min. wait period to activities involving aircraft that are typically fuel constrained (e.g., rotary-wing aircraft, fighter aircraft). A 10-min. period covers a portion, but not the average, dive times of marine mammals and sea turtles. The Navy determined that a 10-min. wait period is the maximum wait time that is practical to implement during activities involving aircraft that are typically fuel constrained. Increasing the wait period, and consequently the amount of time the training or testing activity would need to be extended in order to accomplish its intended objective, would require aircraft to depart the activity area to refuel in order to safely complete the event. If the wait period was

implemented multiple times, the aircraft would be required to depart the activity area to refuel multiple times. Refueling events would vary in duration, depending on the activity location and proximity to the nearest refueling station. Multiple refueling events would generally be expected to extend the length of the activity by two to five times or more. This would impact activity realism, could cause air space or sea space conflicts in a way that could impact the Navy's ability to continue meeting its mission requirements, would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the activity area, and would increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. For example, delaying a Kilo Dip activity for multiple wait periods could result in personnel not being able to conduct a functional check of the dipping sonar system before the rotary-wing aircraft is required to depart the range due to range scheduling; therefore, the activity would not accomplish its intended objectives.

Factors that influenced whether a mitigation area measure met the practicality criteria included the historical use and projected future use of geographic locations for training and testing activities under the Proposed Action, and the relative importance of each location. The frequency that an area is used for training or testing does not necessarily equate to that area's level of importance for meeting an individual activity objective, or collectively, the Navy's mission requirements. While frequently used areas can be essential to one or more types of military readiness activities, some infrequently used areas are critical for a particular training exercise, testing mission, or research project.

5.3 Procedural Mitigation to be Implemented

The first procedural mitigation measure (Section 5.3.1, Environmental Awareness and Education) is designed to aid Lookouts and other personnel with observation, environmental compliance, and reporting responsibilities. The remaining procedural mitigation measures are organized by stressor type and training or testing activity category.

5.3.1 Environmental Awareness and Education

The Navy will continue to implement procedural mitigation to provide environmental awareness and education to the appropriate personnel to aid visual observation, environmental compliance, and reporting responsibilities, as outlined in Table 5.3-1.

The Navy requires Lookouts and other personnel to complete their assigned environmental compliance responsibilities (e.g., mitigation, reporting requirements) before, during, and after training and testing activities. Marine Species Awareness Training was first developed in 2007 and has since undergone numerous updates to ensure that the content remains current. The most recent product was approved by NMFS and released by the Navy in 2014. In 2014, the Navy developed a series of educational training modules, known as the Afloat Environmental Compliance Training program, to ensure Navywide compliance with environmental requirements. The Afloat Environmental Compliance Training program, including the updated Marine Species Awareness Training, helps Navy personnel from the most junior Sailors to Commanding Officers gain a better understanding of their personal environmental compliance roles and responsibilities. Additional information on the Protective Measures Assessment Protocol is provided in Section 5.1.2.1 (Protective Measures Assessment Protocol), and additional information on training and testing activity and incident reports is provided in Section 5.1.2.2 (Monitoring, Research, and Reporting Initiatives).

From an operational perspective, the interactive web-based format of the U.S. Navy Afloat Environmental Compliance Training Series is ideal for providing engaging and educational content that is

cost effective and convenient to access by personnel who oftentimes face rotating job assignments. The U.S. Navy Afloat Environmental Compliance Training Series has resulted in an improvement in the quality and accuracy of training and testing activity reports, incident reports, and Sonar Positional Reporting System reports submitted by Navy operators. Improved reporting quality indicates that the U.S. Navy Afloat Environmental Compliance Training Series is helping to facilitate Navywide environmental compliance as intended.

Table 5.3-1: Environmental Awareness and Education

Procedural Mitigation Description
Stressor or Activity • All training and testing activities, as applicable
Resource Protection Focus • Marine mammals • Sea turtles
Mitigation Requirements • Appropriate personnel (including civilian personnel) involved in mitigation and training or testing activity reporting under the Proposed Action will complete one or more modules of the U.S. Navy Afloat Environmental Compliance Training Series, as identified in their career path training plan. Modules include: – **Introduction to the U.S. Navy Afloat Environmental Compliance Training Series.** The introductory module provides information on environmental laws (e.g., ESA, MMPA) and the corresponding responsibilities that are relevant to Navy training and testing activities. The material explains why environmental compliance is important in supporting the Navy's commitment to environmental stewardship. – **Marine Species Awareness Training.** All bridge watch personnel, Commanding Officers, Executive Officers, maritime patrol aircraft aircrews, anti-submarine warfare and mine warfare rotary-wing aircrews, Lookouts, and equivalent civilian personnel must successfully complete the Marine Species Awareness Training prior to standing watch or serving as a Lookout. The Marine Species Awareness Training provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures. Navy biologists developed Marine Species Awareness Training to improve the effectiveness of visual observations for biological resources, focusing on marine mammals and sea turtles, and including floating vegetation, jellyfish aggregations, and flocks of seabirds. – **U.S. Navy Protective Measures Assessment Protocol.** This module provides the necessary instruction for accessing mitigation requirements during the event planning phase using the Protective Measures Assessment Protocol software tool. – **U.S. Navy Sonar Positional Reporting System and Marine Mammal Incident Reporting.** This module provides instruction on the procedures and activity reporting requirements for the Sonar Positional Reporting System and marine mammal incident reporting.

Lookouts and members of the operational community have demonstrated enhanced knowledge and understanding of the Navy's environmental compliance responsibilities since the development of the U.S. Navy Afloat Environmental Compliance Training Series. From January 2007 through August 2018, the Navy reported four whale strikes during Navy activities in the Study Area (an average of 0.34 per year), with the last strike occurring in 2012. For the 10-year period (1997–2006) prior to the implementation of the original Marine Species Awareness Training in 2007, the Navy reported 15 whale strikes during Navy activities in the Study Area (an average of 1.5 per year). This is more than three times the amount reported for January 2007 through August 2018. It is likely that the implementation of the Marine Species Awareness Training starting in 2007, and the additional U.S. Navy Afloat Environmental Compliance Training Series modules starting in 2014, has contributed to this reduction in marine mammal strikes. This indicates that the environmental awareness and education program is helping to improve the effectiveness of mitigation implementation. A more detailed analysis of marine mammal vessel strikes is presented in Section 3.7.3.4.1 (Impacts from Vessels and In-Water Devices).

5.3.2 Acoustic Stressors

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

5.3.2.1 Active Sonar

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from active sonar, as outlined in Table 5.3-2. In addition to procedural mitigation, the Navy will implement mitigation for the use of active sonar within mitigation areas (see Section 5.4.2, Mitigation Areas off the Northeastern United States; Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States; and Section 5.4.4, Mitigation Areas in the Gulf of Mexico).

Table 5.3-2: Procedural Mitigation for Active Sonar

Procedural Mitigation Description
Stressor or Activity • Low-frequency active sonar, mid-frequency active sonar, high-frequency active sonar – For vessel-based activities, mitigation applies only to sources that are positively controlled and deployed from manned surface vessels (e.g., sonar sources towed from manned surface platforms). – For aircraft-based activities, mitigation applies only to sources that are positively controlled and deployed from manned aircraft that do not operate at high altitudes (e.g., rotary-wing aircraft). Mitigation does not apply to active sonar sources deployed from unmanned aircraft or aircraft operating at high altitudes (e.g., maritime patrol aircraft).
Resource Protection Focus • Marine mammals • Sea turtles (only for sources <2 kilohertz [kHz])
Number of Lookouts and Observation Platform • Hull-mounted sources: – 1 Lookout: Platforms with space or manning restrictions while underway (at the forward part of a small boat or ship) and platforms using active sonar while moored or at anchor (including pierside) – 2 Lookouts: Platforms without space or manning restrictions while underway (at the forward part of the ship) – 4 Lookouts: Pierside sonar testing activities at Port Canaveral, Florida and Kings Bay, Georgia • Sources that are not hull-mounted: – 1 Lookout on the ship or aircraft conducting the activity
Mitigation Requirements • Mitigation zones: – 1,000 yd. power down, 500 yd. power down, and 200 yd. shut down for low-frequency active sonar ≥200 decibels (dB) and hull-mounted mid-frequency active sonar – 200 yd. shut down for low-frequency active sonar <200 dB, mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar • Prior to the initial start of the activity (e.g., when maneuvering on station): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of active sonar transmission. • During the activity: – Low-frequency active sonar ≥200 decibels (dB) and hull-mounted mid-frequency active sonar: Observe the mitigation zone for marine mammals and sea turtles (for sources <2 kHz); power down active sonar transmission by 6 dB if observed within 1,000 yd. of the sonar source; power down an additional 4 dB (10 dB total) within 500 yd.; cease transmission within 200 yd. – Low-frequency active sonar <200 dB, mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar: Observe the mitigation zone for marine mammals and sea turtles (for sources <2 kHz); cease active sonar transmission if observed within 200 yd. of the sonar source. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing or powering up active sonar transmission) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the sonar source; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-deployed sonar sources or 30 min. for vessel-deployed sonar sources; (4) for mobile activities, the active sonar source has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting; or (5) for activities using hull-mounted sonar, the ship concludes that dolphins are deliberately closing in on the ship to ride the ship's bow wave, and are therefore out of the main transmission axis of the sonar (and there are no other marine mammal sightings within the mitigation zone).

Table 5.3-2: Procedural Mitigation for Active Sonar (continued)

Procedural Mitigation Description
• Additional requirements: – At Port Canaveral, Florida and Kings Bay, Georgia the Navy will equip Lookouts with polarized sunglasses and conduct active sonar activities during daylight hours to ensure adequate sightability of manatees and sea turtles. The Navy will notify the Port Authority prior to commencing pierside sonar testing at these locations. The Navy will observe the mitigation zone for marine mammals and sea turtles for 30 min. after completion of pierside sonar testing at these locations. – The Navy will reduce mid-frequency active sonar transmissions at Kings Bay, Georgia by at least 36 dB from full power. The Navy will communicate sightings of manatees and sea turtles (e.g., time, location, count, animal size, description of research tags if present, direction of travel) made during or after pierside sonar testing at Kings Bay, Georgia to the Georgia Department of Natural Resources sightings hotline, Base Natural Resources Manager, and Port Operations. Port Operations will disseminate sightings information to other vessels operating in the vicinity and will keep logs of all manatee sightings.

In Phase II, the Navy's active sonar mitigation zones were based on associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the sizes of these mitigation zones. The Navy determined that the current mitigation zones for active sonar are the largest areas within which it is practical to implement mitigation; therefore, it will continue implementing these same mitigation zones for Phase III. The Navy is clarifying that the mitigation zone for low-frequency active sonar sources at or above 200 dB will be the same as the mitigation implemented for hull-mounted mid-frequency active sonar; whereas low-frequency active sonar sources below 200 dB will implement the same mitigation zone as high-frequency active sonar and mid-frequency active sonar sources that are not hull-mounted. The Navy is also clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting active sonar activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event.

The mitigation zone sizes and proximity to the observation platforms will result in a high likelihood that Lookouts will be able to detect marine mammals and sea turtles throughout the mitigation zones. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones. The mitigation specific to Port Canaveral, Florida and Kings Bay, Georgia will provide additional protection for sea turtles and manatees during pierside testing at these locations. The mitigation to conduct pierside sonar activities during daylight hours will help increase the likelihood that Lookouts will detect manatees and sea turtles. The Navy is able to implement a 36-dB reduction from full power for mid-frequency active sonar transmissions at Kings Bay; however, this same mitigation is not practical to implement elsewhere due to the type of submarines and sonar systems used during testing activities at other pierside locations (e.g., Port Canaveral).

Section 3.7.3.1.2 (Impacts from Sonar and Other Transducers) provides a full analysis of the potential impacts of sonar on marine mammals and includes the predicted impact ranges for various source bins. For low-frequency active sonar at 200 dB or more and hull-mounted mid-frequency active sonar, bin MF1 has the longest predicted ranges to PTS. For the highest source level in bin MF1, the 1,000-yd. and 500-yd. power down mitigation zones extend beyond the average ranges to PTS for marine mammals. The 200-yd. shut down mitigation zone extends beyond the average ranges to PTS for all marine mammal hearing groups except high-frequency cetaceans (the mitigation zone extends into a portion of the average range to PTS for this hearing group). The ranges to PTS for the 200-yd. shut down mitigation zone were calculated based on full power transmissions and do not consider that the impact ranges

would be reduced if the 1,000-yd. and 500-yd. power down mitigation measures are implemented in response to a marine mammal sighting in those mitigation zones. If an animal is first sighted in the 1,000-yd. or 500-yd. power down mitigation zone, the source level reduction would shorten the ranges to PTS, and the 200-yd. shut down mitigation would then extend beyond the average ranges to PTS for all hearing groups. For low-frequency active sonar below 200 dB, mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar, bin HF4 has the longest predicted ranges to PTS. For the highest source level in bin HF4, the 200-yd. shut down mitigation zone extends beyond the average ranges to PTS for marine mammals. The mitigation zones for active sonar will help avoid or reduce the potential for exposure to PTS for marine mammals.

The active sonar mitigation zones also extend into a portion of the average ranges to TTS for marine mammals; therefore, mitigation will help avoid or reduce the potential for some exposure to higher levels of TTS. Active sonar sources that fall within lower source bins or are used at lower source levels have shorter impact ranges than those discussed above; therefore, the mitigation zones will extend further beyond or into the average ranges to PTS and TTS for these sources. The analysis in Section 3.7.3.1.2 (Impacts from Sonar and Other Transducers) indicates that pygmy and dwarf sperm whales (Kogia whales) are the only deep-diving marine mammal species that could potentially experience PTS impacts from active sonar in the Study Area. The 30-min. wait period for vessel-deployed sources will cover the average dive times of marine mammal species that could experience PTS from sonar in the mitigation zone, except for Kogia whales. The 10-min. wait period for aircraft-deployed sources will cover a portion, but not the average, dive times of marine mammals.

Section 3.8.3.1.2 (Impacts from Sonar and Other Transducers) provides a full analysis of the potential impacts of sonar on sea turtles. Due to sea turtle hearing capabilities, the mitigation only applies to sea turtles during the use of sources below 2 kHz. The range to auditory effects for most active sonar sources in sea turtle hearing range (e.g., LF5) is zero meters. Impact ranges are longer (i.e., up to tens of meters) for active sonars with higher source levels. The mitigation zones for active sonar extend beyond the ranges to PTS and TTS for sea turtles; therefore, mitigation will help avoid or reduce the potential for exposure to these effects for sea turtles.

As described previously, the Phase III mitigation zones are based on the largest areas within which it is practical for the Navy to implement mitigation during training and testing. Training and testing with active sonar is essential to national security. Active sonar is the only reliable technology for detecting and tracking potential enemy diesel-electric submarines that could be operating covertly in coastal waters of the United States or its allies. For example, small diesel-electric submarines operate quietly and may hide in shallow coastal and littoral waters. The ability to effectively operate active sonar is a highly perishable skill that must be repeatedly practiced during realistic training. Naval forces must train in the same mode and manner in which they conduct military missions and combat operations. 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 or reduce 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.

Increasing the mitigation zone sizes would result in a larger area over which active sonar would need to be powered down or shut down in response to a sighting, and therefore would likely increase the number of times that these mitigation measures would be implemented. This would extend the length of the activity, significantly diminish event realism, and prevent activities from meeting their intended objectives. It would also create fundamental differences between how active sonar would be used in training and how active sonar should be used during military missions and combat operations. For example, additional active sonar power downs or shut downs would prevent sonar operators from developing and maintaining awareness of the tactical picture during training events. Without realistic training in conditions analogous to military missions and combat operations, sonar operators cannot become proficient in effectively operating active sonar. Sonar operators, vessel crews, and aircrews would be expected to operate active sonar during military missions and combat operations in a manner inconsistent with how they were trained.

During integrated training, multiple vessels and aircraft may participate in an exercise using different warfare components simultaneously. Degrading the value of one training element results in a degradation of the training value of the other training elements. Degrading the value of training would cause a reduction in perishable skills and diminished operational capability, which would significantly impact military readiness. Each of these factors would ultimately impact the ability for units to meet their individual training and certification requirements and the Navy's ability to certify forces to safely deploy to meet national security tasking. Diminishing proficiency or eroding active sonar capabilities would present a significant risk to personnel safety during military missions and combat operations and would impact the ability to deploy with the required level of readiness necessary to accomplish any tasking by Combatant Commanders.

Increasing the number of times that the Navy must power down or shut down active sonar transmissions during testing activities would result in similar consequences to activity realism. For example, at-sea sonar testing activities are required in order to calibrate or document the functionality of sonar and torpedo systems while a ship or submarine is in an open ocean environment. Additional powering down or shutting down active sonar transmissions would prevent this activity from meeting its intended objective, such as verifying if the ship meets design acoustic specifications. These types of impacts would impede the ability of researchers, program managers, and weapons system acquisition programs to meet research objectives and testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements, and would impede shipboard maintenance, repairs, or pierside testing prior to at-sea operations.

For activities that involve aircraft (e.g., activities involving rotary-wing aircraft that use dipping sonar or sonobuoys to locate submarines or submarine targets), extending the length of the activity would require aircraft to depart the area to refuel. If multiple refueling events were required, the length of the activity would be extended by two to five times or more, which would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the activity area and increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption. Increasing the mitigation zone sizes would not result in a substantial reduction of injurious impacts because, as described above, the mitigation zones extend beyond the average ranges to PTS for sea turtles and marine mammals.

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

5.3.2.2 Air Guns

The Navy developed new procedural mitigation for Phase III to avoid or reduce potential impacts on marine mammals and sea turtles from air guns, as outlined in Table 5.3-3. The Navy developed the new mitigation zone based on the largest area within which it is practical to implement mitigation for air gun activities. The Navy will implement procedural mitigation measures for this activity that are consistent with procedural mitigation for other acoustic stressors. For example, the Navy will require observations of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event. The small mitigation zone size and proximity to the observation platform will result in a high likelihood that Lookouts will be able to detect marine mammals and sea turtles throughout the mitigation zone. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone.

Table 5.3-3: Procedural Mitigation for Air Guns

Procedural Mitigation Description
Stressor or Activity • Air guns
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned on a ship or pierside
Mitigation Requirements • Mitigation zone: – 150 yd. around the air gun • Prior to the initial start of the activity (e.g., when maneuvering on station): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of air gun use. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease air gun use. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing air gun use) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the air gun; (3) the mitigation zone has been clear from any additional sightings for 30 min.; or (4) for mobile activities, the air gun has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Section 3.7.3.1.3 (Impacts from Air Guns) and Section 3.8.3.1.3 (Impacts from Air Guns) provide a full analysis of the potential impacts of air guns on marine mammals and sea turtles, respectively, including the air gun impact ranges for the maximum number of pulses expected for air gun activities in the Study Area, which is 100 pulses. For 100 pulses, the mitigation zone extends beyond the average ranges to PTS for sea turtles and all marine mammal hearing groups. Therefore, mitigation will help avoid or reduce the potential for exposure to PTS.

The air gun mitigation zone also extends beyond the average ranges to TTS for sea turtles, high-frequency cetaceans, mid-frequency cetaceans, and phocids; and into a portion of the average ranges to TTS for low-frequency cetaceans. Therefore, depending on the hearing group, mitigation will help avoid or reduce the potential for exposure to all or a portion of TTS. Air gun activities using 10 pulses or 1 pulse have shorter impact ranges those using 100 pulses. The mitigation zone extends beyond the average ranges to PTS and TTS for sea turtles and marine mammals for 10 pulses and 1 pulse. The 30-min. wait period will cover the average dive times of the marine mammal species that could be present in the mitigation zone.

When developing the new mitigation, the Navy analyzed a range of potential mitigation zone sizes. A larger mitigation zone would result in a larger area over which air gun activities would need to be ceased in response to a sighting, and therefore would likely increase the number of times air guns would be ceased. However, establishing a larger mitigation zone would not result in a substantial reduction of injurious impacts because the mitigation zone extends beyond the average ranges to PTS for sea turtles and marine mammals.

Due to the nature of how air gun testing is conducted (e.g., generated impulses with short durations), increasing the size of the mitigation zone would extend the length of the activity and significantly diminish realism in a way that would prevent the activity from meeting its intended objectives. For example, during semi-stationary equipment testing, the Navy determines the functionality of air gun equipment and test sensors and system performance. These tests must be conducted in the same manner and under the same conditions in which they will be conducted during military readiness training exercises, military missions, and combat operations. Extending the length of the activity would decrease realism, increase time at sea for vessels, and increase fuel usage, particularly when air guns are deployed from small boats or small research vessels. Therefore, additional mitigation would prevent the Navy from validating whether air guns perform as expected; determining whether they are operationally effective, suitable, survivable, and safe for their intended uses by the fleet; from meeting research program objectives; and from meeting testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements.

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

5.3.2.3 Pile Driving

The Navy is incorporating mitigation from the 2015 Environmental Assessment for Joint Logistics Over-the-Shore Training at Joint Expeditionary Base Little Creek-Fort Story, Virginia Beach, Virginia and Marine Corps Base Camp Lejeune, Jacksonville, North Carolina to avoid or reduce potential impacts on marine mammals and sea turtles from pile driving, as outlined in Table 5.3-4. In the 2015 Environmental Assessment for Joint Logistics Over-the-Shore Training at Joint Expeditionary Base Little Creek-Fort Story, Virginia Beach, Virginia and Marine Corps Base Camp Lejeune, Jacksonville, North Carolina, the pile driving mitigation zone was based on the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zone. The Navy identified an opportunity to increase the mitigation zone size for pile driving by 40 yd. to enhance protections to the maximum extent practicable. This increase is reflected in Table 5.3-4. The mitigation zone for pile driving is now based on the largest area within which it is practical to implement mitigation.

Table 5.3-4: Procedural Mitigation for Pile Driving

Procedural Mitigation Description
Stressor or Activity • Pile driving and pile extraction sound during Elevated Causeway System training
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned on the shore, the elevated causeway, or a small boat
Mitigation Requirements • Mitigation zone: – 100 yd. around the pile • Prior to the initial start of the activity (for 30 min.): – Observe the mitigation zone for floating vegetation; if observed, delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, delay the start of pile driving or vibratory pile extraction. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease impact pile driving or vibratory pile extraction. – In the Navy Cherry Point Range Complex, the Navy will maintain a log detailing any sightings or injuries to manatees during pile driving. If a manatee was sighted during the activity, upon completion of the activity, the Navy project manager or civilian equivalent will prepare a report that summarizes all information on manatees encountered and submit the report to the USFWS, Raleigh Field Office. The Navy will report any injury of a manatee to the USFWS, NMFS, and the North Carolina Wildlife Resources Commission. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing pile driving or pile extraction) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the pile driving location; or (3) the mitigation zone has been clear from any additional sightings for 30 min.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting pile driving activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event.

The small mitigation zone size and proximity to the observation platform will result in a high likelihood that Lookouts will be able to detect marine mammals and sea turtles throughout the mitigation zone. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone. The additional mitigation in the Navy Cherry Point Range Complex will help facilitate a better understanding of manatee presence and potential impacts from pile driving at this location.

Section 3.7.3.1.4 (Impacts from Pile Driving) and Section 3.8.3.1.4 (Impacts from Pile Driving) provide a full analysis of the potential impacts of pile driving on marine mammals and sea turtles, respectively, and include the approximate impact ranges for impact pile driving and vibratory pile extraction. The ranges to effect from impact pile driving are longer than the ranges to effect for vibratory pile extraction. For impact pile driving, the 100 yd. mitigation zone extends beyond the average ranges to PTS for sea turtles and marine mammals. Therefore, mitigation will help avoid or reduce the potential for exposure to PTS. The mitigation zone also extends beyond the average range to TTS for impact pile driving for sea turtles and mid-frequency cetaceans, and into a portion of the average range to TTS for

low-frequency cetaceans, high-frequency cetaceans, and phocids. Therefore, depending on the hearing group, mitigation will help avoid or reduce the potential for exposure to all or a portion of TTS. Vibratory pile extraction has shorter predicted impact ranges than impact pile driving. The mitigation zone will extend further beyond the average ranges to PTS, and further beyond (or into, depending on hearing group) the average ranges to TTS during vibratory pile driving. The 30-min. wait period will cover the average dive times of the marine mammal species that could be present in the mitigation zone.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation for this activity. Increasing the mitigation zone would result in a larger area over which pile driving would need to be ceased in response to a sighting, and therefore would likely increase the number of times pile driving is ceased during Elevated Causeway System training. However, increasing the mitigation zone would not result in a substantial reduction of injurious impacts because the mitigation zone extends beyond the average ranges to PTS for sea turtles and marine mammals. The Navy also analyzed the potential for implementing additional types of mitigation employed by commercial construction projects, such as the use of bubble curtains and other sound attenuation devices. The Navy determined that these mitigation techniques would be impractical to use during Elevated Causeway System training due to impacts on event realism. The use of additional mitigation techniques would create fundamental differences between how pile driving would be conducted during training and how pile driving should be conducted during military missions and combat operations. This would present a significant risk to personnel safety during military missions and combat operations.

Elevated Causeway System training involves multiple steps, including driving support pilings into the sand, securing causeway platforms onto the piles, assembling causeway platforms into a pier, and removing the pier and piles. The activity provides essential training for each component individually and for the logistical coordination of all components as a whole. In order for the Navy to effectively conduct this training exercise, all components must be completed on time and as they would during military missions and combat operations. Increasing the number of times that the Navy must cease pile driving would result in schedule delays to the first component of Elevated Causeway System training (i.e., installation of support pilings), which would diminish realism, put the activity timeline at risk, and impact the Navy's ability to become proficient in each component individually and the logistical coordination of the activity as a whole. These factors would prevent the activity from meeting its intended objective.

In summary, the operational community determined that implementing procedural mitigation beyond what is detailed in Table 5.3-4 would be incompatible with the practicality assessment criteria for safety and mission requirements.

5.3.2.4 Weapons Firing Noise

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from weapons firing noise, as outlined in Table 5.3-5. In Phase II, the weapons firing noise mitigation zone was based on the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zone. The Navy determined that the current mitigation zone is the largest area within which it is practical to implement mitigation for this activity; therefore, it will continue implementing this same mitigation zone for Phase III.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that

the mitigation zone is visually clear prior to conducting weapons firing activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event.

Table 5.3-5: Procedural Mitigation for Weapons Firing Noise

Procedural Mitigation Description
Stressor or Activity • Weapons firing noise associated with large-caliber gunnery activities
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned on the ship conducting the firing – Depending on the activity, the Lookout could be the same one described in Section 5.3.3.3 (Explosive Medium-Caliber and Large-Caliber Projectiles) or Section 5.3.4.3 (Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions).
Mitigation Requirements • Mitigation zone: – 30° on either side of the firing line out to 70 yd. from the muzzle of the weapon being fired • Prior to the initial start of the activity: – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of weapons firing. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease weapons firing. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing weapons firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the firing ship; (3) the mitigation zone has been clear from any additional sightings for 30 min.; or (4) for mobile activities, the firing ship has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

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

Section 3.7.3.1.7 (Impacts from Weapons Noise) and Section 3.8.3.1.7 (Impacts from Weapons Noise) provide a full analysis of the potential impacts of weapons noise on marine mammals and sea turtles, respectively. As described in Section 3.0.3.3.1.6 (Weapons Firing, Launch, and Inert Impact), underwater sounds would be strongest just below the surface and directly under the firing point. Any sound that enters the water only does so within a narrow cone below the firing point or path of the projectile. The mitigation zone extends beyond the distance to which marine mammals and sea turtles would likely experience PTS or TTS from weapons firing noise; therefore, mitigation will help avoid or reduce the potential for exposure to these impacts.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation for this activity. Increasing the mitigation zone would result in a larger area over which weapons firing would need to be ceased in response to a sighting, and therefore would likely increase the number of times weapons firing would be ceased. However, increasing the mitigation zone size would not result in a substantial reduction of injurious impacts

because the mitigation zone extends beyond the average ranges to PTS for sea turtles and marine mammals.

Large-caliber gunnery training activities may involve a single ship firing or may be conducted as part of a larger exercise involving multiple ships. Surface ship crews learn to track targets (e.g., with radar), engage targets, practice defensive marksmanship, and coordinate their efforts within the context of larger activities. Increasing the number of times that the Navy must cease weapons firing during training would decrease realism and impact the ability for Navy Sailors to train and become proficient in using large-caliber guns as required during military missions and combat operations. For example, additional ceasing of the activity would reduce the crew's ability to react to changes in the tactical situation or response to an incoming threat, which could result in a delay to the ship's training schedule. When training is undertaken in the context of a coordinated exercise involving multiple ships, degrading the value of one of the training element results in a degradation of the training value of the other training elements. These factors would ultimately impact the ability for units to meet their individual training and certification requirements, and the Navy's ability to certify forces to deploy to meet national security tasking.

Increasing the number of times that the Navy must cease weapons firing during testing activities would result in similar consequences to activity realism, which would impede the ability of program managers and weapons system acquisition programs to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. This would impact the ability to effectively test large-caliber guns before full-scale production or delivery to the fleet to ensure functionality, safety, and accuracy in military mission and combat conditions.

In summary, the operational community determined that implementing procedural mitigation for weapons firing noise beyond what is detailed in Table 5.3-5 would be incompatible with the practicality assessment criteria for safety and mission requirements.

5.3.2.5 Aircraft Overflight Noise

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on nesting birds and cultural resources from aircraft overflights during applicable activities off Virginia and Florida, as outlined in Table 5.3-6. In Phase II, the aircraft overflight noise mitigation measures were based on the Navy's operational assessments. The Navy determined that the current mitigation measures are the largest areas within which it is practical to implement mitigation for aircraft overflight noise; therefore, it will continue implementing the same procedural mitigation measures for Phase III.

Section 3.9.3.1.6 (Impacts from Aircraft Overflight Noise) provides a full analysis of the potential impacts of aircraft noise on birds. One of the highest concentration areas for rotary-wing aircraft training is located adjacent to fleet concentration areas at Naval Station Norfolk in the lower Chesapeake Bay and off the coast of Virginia Beach, Virginia. This area is located nearby important nesting habitat for the ESA-listed piping plover and other birds that breed along Virginia's barrier islands. The Navy's mitigation for aircraft overflight noise off Virginia will help avoid potential disturbances to nesting birds within the Virginia Capes Range Complex and Fisherman Island National Wildlife Refuge during applicable activities.

The Key West Range Complex contains Fort Jefferson, which is listed on the National Register of Historic Places. Fragile mortar in Fort Jefferson's brick masonry is susceptible to damage from sonic booms (Hanson et al., 1991; James et al., 2009). As described in Section 3.10.2.3 (Tortugas Military Operations Area), the Navy established the Tortugas Military Operations Area in 2009 to reduce potential impacts of sonic booms on Fort Jefferson. The Navy's mitigation is designed to help preserve the structural integrity

of this cultural resource. The mitigation also helps the Navy avoid or reduce potential impacts from aircraft overflight noise on a nesting colony of roseate terns in the Dry Tortugas Islands.

Table 5.3-6: Procedural Mitigation for Aircraft Overflight Noise

Procedural Mitigation Description
Stressor or Activity • Aircraft overflight noise
Resource Protection Focus • Birds (ESA-listed piping plovers and other nesting birds in Virginia; roseate terns in Florida) • Cultural resources (Fort Jefferson)
Number of Lookouts and Observation Platform • Not applicable
Mitigation Requirements • 1 nautical mile (NM) from the beach within the Virginia Capes Range Complex during explosive mine neutralization activities involving Navy divers: – Maneuver to maintain distance (except when transiting offshore from Norfolk Naval Station). • 3,000 ft. altitude and 1,000 yd. from Fisherman Island National Wildlife Refuge off the coast of Cape Charles, Virginia during explosive mine neutralization activities involving Navy divers: – When transiting offshore from Norfolk Naval Station, maneuver to maintain altitude and distance. • Within the Tortugas Military Operations Area (12 NM from shore within the Dry Tortugas Islands): – Do not conduct air combat maneuver flights below 5,000 ft. or tactical maneuvers resulting in supersonic flights below 20,000 ft. – Conduct aircraft activities in the airspace adjacent to Fort Jefferson in a manner that will avoid or reduce sonic booms to the maximum extent practicable. This includes conducting training flights predisposed to supersonic conditions within designated airspace at least 30 NM from Fort Jefferson. – The Navy will incorporate mitigation instructions into pre-flight planning guidance for applicable aircrews.

Increasing mitigation would result in aircraft flying at a higher altitude, farther offshore, or in locations that could potentially interfere with established commercial air traffic routes. Extending distance offshore would increase transit distance and pilot fatigue and would accelerate the fatigue-life of aircraft. Interfering with commercial air traffic routes would increase safety risks to the commercial aircraft, Navy aircraft, and the personnel or civilians on board. In addition to these increased safety risks, the extending distances offshore would increase transit distances and result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for aircraft overflight noise beyond what is detailed in Table 5.3-6 would be incompatible with the practicality assessment criteria for safety and sustainability.

5.3.3 Explosive Stressors

The Navy will implement procedural mitigation to avoid or reduce potential impacts on biological resources from the explosive stressors or activities discussed in the sections below. Section 3.7.3.2 (Explosive Stressors) and Section 3.8.3.2 (Explosive Stressors) provide a full analysis of potential impacts of explosives on marine mammals and sea turtles, respectively, including predicted impact ranges.

5.3.3.1 Explosive Sonobuoys

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive sonobuoys, as outlined in Table 5.3-7. In addition to procedural mitigation, the Navy will implement mitigation for the use of Improved Extended Echo Ranging Sonobuoys within mitigation areas (see Section 5.4.2, Mitigation Areas off the Northeastern

United States; Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States; and Section 5.4.4, Mitigation Areas in the Gulf of Mexico).

Table 5.3-7: Procedural Mitigation for Explosive Sonobuoys

Procedural Mitigation Description
Stressor or Activity • Explosive sonobuoys
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned in an aircraft or on small boat • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zone: – 600 yd. around an explosive sonobuoy • Prior to the initial start of the activity (e.g., during deployment of a sonobuoy field, which typically lasts 20–30 min.): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations. – Visually observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of sonobuoy or source/receiver pair detonations. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease sonobuoy or source/receiver pair detonations. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the sonobuoy; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • After completion of the activity (e.g., prior to maneuvering off station): – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

In Phase II, explosive sonobuoys had two mitigation zone sizes based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of these mitigation zones. The Navy identified an opportunity to increase the mitigation zone size by 250 yd. for sonobuoys using up to 2.5-lb. net explosive weight so that explosive sonobuoys will implement a 600-yd. mitigation zone, regardless of net explosive weight, to enhance protections to the maximum extent practicable. This increase is reflected in Table 5.3-7. The mitigation zone for explosive sonobuoys is now based on the largest area within which it is practical to implement mitigation.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy developed a new mitigation measure requiring the Lookout to observe the mitigation zone after completion of the activity. The Navy currently conducts post-activity observations for some, but not all explosive activities. In developing

mitigation for Phase III, the Navy determined that it could expand this requirement to other explosive activities for enhanced consistency and to help determine if any resources were injured during explosive events, when practical. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. There are typically multiple platforms in the vicinity of activities that use explosive sonobuoys (e.g., safety aircraft). When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

Some activities that use explosive sonobuoys involve detonations of a single sonobuoy or sonobuoy pair, while other activities involve deployment of a field of sonobuoys that may be dispersed over a large distance. Lookouts will have a better likelihood of detecting marine mammals and sea turtles when observing the mitigation zone around a single sonobuoy, sonobuoy pair, or a smaller sonobuoy field than when observing a sonobuoy field dispersed over a large distance. When observing large sonobuoy fields, Lookouts will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

Bin E4 (e.g., Improved Extended Echo Ranging Sonobuoys) has the longest predicted impact ranges for explosive sonobuoys used in the Study Area. For the largest explosive in bin E4, the mitigation zone extends beyond the ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zone extends beyond the average ranges to PTS for sea turtles, mid-frequency cetaceans, and sirenians, and into a portion of the average ranges to PTS for high-frequency cetaceans, low-frequency cetaceans, and phocids. The mitigation zone also extends into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E4. Smaller explosives in bin E4 and explosives in smaller source bins (E1, E3) have shorter predicted impact ranges; therefore, the mitigation zone will extend further beyond or cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation. It is not practical to increase the mitigation zone because observations within the margin of increase would be ineffective unless the Navy allocated additional platforms to observe for biological resources. This is particularly true when observations occur from a small boat or during observations of a large field of sonobuoys. The use of additional personnel and equipment (aircraft or small boats) would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft conducting the activity to modify their flights plans (which would reduce activity realism) or force the observing aircraft to position itself a safe distance away from the activity area (which would decrease observation effectiveness). Adding vessels to observe the mitigation zone would increase safety risks due to the presence of observation vessels within the vicinity of explosive sonobuoys or an explosive sonobuoy field.

Increasing the mitigation zone size would result in a larger area over which detonations would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased and would extend the length of the activity. These impacts would significantly diminish event realism in a way that would prevent the activity from meeting its intended objectives. For example, during Sonobuoy Lot Acceptance Testing, additional ceasing of the activity would not allow the Navy to effectively verify the integrity and performance of a lot or group of sonobuoys before full-scale production or delivery to the fleet. Such testing is required to ensure functionality and accuracy in military mission and combat conditions. Extending the length of the activity would require aircraft to depart the area to refuel. If multiple refueling events were required, the activity length would extend by two to five times or more, which would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the activity area and increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

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

5.3.3.2 Explosive Torpedoes

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive torpedoes, as outlined in Table 5.3-8. In addition to procedural mitigation, the Navy will implement mitigation for explosive torpedoes within mitigation areas (see Section 5.4.2, Mitigation Areas off the Northeastern United States; Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States; and Section 5.4.4, Mitigation Areas in the Gulf of Mexico).

In Phase II, the explosive torpedo mitigation zone was based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of this mitigation zone. The Navy determined that the current mitigation zone is the largest area within which it is practical to implement mitigation for this activity; therefore, it will continue implementing this same mitigation zone for Phase III. The post-activity observations for explosive torpedoes are a continuation from Phase II and will help the Navy determine if any resources were injured during the activity. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. Typically, when aircraft are firing explosive torpedoes, there are additional observation aircraft, support vessels (e.g., range craft for torpedo retrieval), or other safety aircraft in the vicinity. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources.

Table 5.3-8: Procedural Mitigation for Explosive Torpedoes

Procedural Mitigation Description
Stressor or Activity • Explosive torpedoes
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned in an aircraft • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zone: – 2,100 yd. around the intended impact location • Prior to the initial start of the activity (e.g., during deployment of the target): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations. – Visually observe the mitigation zone for marine mammals, sea turtles, and jellyfish aggregations; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals, sea turtles, and jellyfish aggregations; if observed, cease firing. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • After completion of the activity (e.g., prior to maneuvering off station): – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

Explosive torpedo activities involve detonations at a target located down range of the firing platform. Due to the distance between the mitigation zone and the observation platform, Lookouts will have a better likelihood of detecting large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles. As described in Chapter 3.8 (Reptiles), some species of sea turtles forage on jellyfish, and some of the locations (such as off the northeastern United States) where explosive torpedo activities could occur support high densities of jellyfish throughout parts of the year. Observing for indicators of marine mammal and sea turtle presence (including jellyfish aggregations) will further help avoid or reduce potential impacts on these resources within the mitigation zone.

Bin E11 has the longest predicted impact ranges for explosive torpedoes used in the Study Area. For the largest explosive in bin E11, the mitigation zone extends beyond the ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zone extends beyond the average ranges to PTS for sea turtles, mid-frequency cetaceans, and sirenians, and into a portion of the average ranges to PTS for high-frequency cetaceans, low-frequency cetaceans, and phocids. The mitigation zone also extends into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for

the largest explosives in bin E11. Explosive torpedoes in smaller source bins (e.g., E8) have shorter predicted impact ranges; therefore, the mitigation zone will extend further beyond or cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation. It is not practical to increase this mitigation zone because observations within the margin of increase would be ineffective unless the Navy allocated additional platforms to observe for biological resources. The use of additional personnel and observation platforms would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft participating in the activity to modify their flights plans (which would reduce activity realism) or force the observing aircraft to position itself a safe distance away from the activity area (which would decrease observation effectiveness). Adding vessels to observe the mitigation zone would increase safety risks due to the presence of observation vessels within the vicinity of explosive torpedoes.

Increasing the mitigation zone size would result in a larger area over which detonations would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased and would extend the length of the activity. These impacts would significantly diminish event realism in a way that would prevent the activity from meeting its intended objectives. For example, the Navy conducts Torpedo (Explosive) Testing events to test the functionality of torpedoes and torpedo launch systems. These events often involve aircrews locating, approaching, and firing a torpedo on an artificial target. They require focused situational awareness of the activity area and continuous coordination between the participating platforms as required during military missions and combat operations. Extending the length of the activity would require aircraft to depart the area to refuel. If the firing aircraft departed the activity location to refuel, the aircrew would lose the ability to maintain situational awareness and effectively coordinate with other participating platforms. If multiple refueling events were required, the activity length would extend by two to five times or more, which would increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. Therefore, an increase in mitigation would impede the Navy's ability to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

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

5.3.3.3 Explosive Medium-Caliber and Large-Caliber Projectiles

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive gunnery activities, as outlined in Table 5.3-9. In addition to procedural mitigation, the Navy will implement mitigation for explosive gunnery activities within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources; Section 5.4.2, Mitigation Areas off the Northeastern United States; Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States; and Section 5.4.4, Mitigation Areas in the Gulf of Mexico).

Table 5.3-9: Procedural Mitigation for Explosive Medium-Caliber and Large-Caliber Projectiles

Procedural Mitigation Description
Stressor or Activity • Gunnery activities using explosive medium-caliber and large-caliber projectiles – Mitigation applies to activities using a surface target
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout on the vessel or aircraft conducting the activity – For activities using explosive large-caliber projectiles, depending on the activity, the Lookout could be the same as the one described in Section 5.3.2.4 (Weapons Firing Noise). • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zones: – 200 yd. around the intended impact location for air-to-surface activities using explosive medium-caliber projectiles – 600 yd. around the intended impact location for surface-to-surface activities using explosive medium-caliber projectiles – 1,000 yd. around the intended impact location for surface-to-surface activities using explosive large-caliber projectiles • Prior to the initial start of the activity (e.g., when maneuvering on station): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-based firing or 30 min. for vessel-based firing; or (4) for activities using mobile targets, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • After completion of the activity (e.g., prior to maneuvering off station): – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

In Phase II, explosive gunnery activity mitigation zones were based on net explosive weight and the associate average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of these mitigation zones. The Navy identified an opportunity to increase the mitigation zone size by 400 yd. for surface-to-surface activities to enhance protections to the maximum extent practicable. This increase is reflected in Table 5.3-9. The mitigation zones for explosive medium-caliber and large-caliber projectiles are now based on the largest areas within which it is practical to implement mitigation.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy developed a new mitigation measure requiring the Lookout to observe the mitigation zone after completion of the activity. The Navy currently conducts post-activity observations for some, but not all explosive activities. In developing

mitigation for Phase III, the Navy determined that it could expand this requirement to other explosive activities for enhanced consistency and to help determine if any resources were injured during explosive events, when practical. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. Typically, when aircraft are firing explosive munitions there are additional observation aircraft, multiple aircraft firing munitions, or other safety aircraft in the vicinity. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

Large-caliber gunnery activities involve vessels firing projectiles at targets located up to 6 NM down range. Medium-caliber gunnery activities involve vessels or aircraft firing projectiles at targets located up to 4,000 yd. down range, although typically much closer. As described in Section 5.2.1 (Procedural Mitigation Development), certain platforms, such as the small boats and aircraft used during explosive medium-caliber gunnery exercises, have manning or space restrictions; therefore, the Lookout for these activities is typically an existing member of the aircraft or boat crew who is responsible for other essential tasks (e.g., navigation). Due to their relatively lower vantage point, Lookouts on vessels (during medium-caliber or large-caliber gunnery exercises) will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles when observing around targets located at the furthest firing distances. The Navy will implement larger mitigation zones for large-caliber gunnery activities than for medium-caliber gunnery activities due to the nature of how the activities are conducted. For example, large-caliber gunnery activities are conducted from surface combatants, so Lookouts can observe a larger mitigation zone because they typically have access to high-powered binoculars mounted on the ship deck. This will enable observation of the distant mitigation zone in combination with hand-held binoculars and naked-eye scanning. Lookouts in aircraft (during medium-caliber gunnery exercises), have a relatively higher vantage point for observing the mitigation zones but will still be more likely to detect individual marine mammals and sea turtles when observing mitigation zones located close to the firing platform than at the furthest firing distances. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

The mitigation applies only to activities using surface targets. Most airborne targets are recoverable aerial drones that are not intended to be hit by ordnance. Given the speed of the projectiles and mobile target, and the long ranges that projectiles typically travel, it is not possible to definitively predict or to effectively observe where the projectile fragments will fall. For gunnery activities using explosive medium-caliber and large-caliber projectiles, the potential military expended material fall zone can only be predicted within thousands of yards, which can be up to 6 NM from the firing location. These areas are too large to be effectively observed for marine mammals and sea turtles with the number of personnel and platforms available for this activity. The potential risk to marine mammals and sea turtles during events using airborne targets is limited to the animal being directly struck by falling military expended materials. There is no potential for direct impact from the explosives because the detonations occur in air. Based on the extremely low potential for projectile fragments to co-occur in space and time with a marine mammal or sea turtle at or near the surface of the water, the potential for a direct strike is negligible; therefore, mitigation for gunnery activities using airborne targets would not be effective at avoiding or reducing potential impacts. Additional information on military expended materials is provided in Appendix F (Military Expended Material and Direct Strike Impact Analysis).

Bin E5 (e.g., 5-in. projectiles) has the longest predicted impact ranges for explosive projectiles that apply to the 1,000-yd. mitigation zone. Bin E2 (e.g., 40-millimeter [mm] projectiles) has the longest predicted impact ranges for explosive projectiles that apply to the 600-yd. and 200-yd. mitigation zones. The 1,000-yd., 600-yd., and 200-yd. mitigation zones extend beyond the respective ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zones extend beyond the respective average ranges to PTS for sea turtles and all marine mammal hearing groups except high-frequency cetaceans (the mitigation zones extend into a portion of the respective average ranges to PTS for this hearing group). The mitigation zones also extend into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E5 and bin E2. Explosives in smaller source bins (e.g., E1) have shorter predicted impact ranges; therefore, the mitigation zones will extend further beyond or cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zones are based on the largest areas within which it is practical for the Navy to implement mitigation. It is not practical to increase these mitigation zones because observations within the margin of increase would be unsafe and ineffective. One of the mission-essential safety protocols for explosive gunnery activities is a requirement for event participants (including Lookouts) to maintain focus on the activity area to ensure safety of Navy personnel and equipment, and the public. For example, when air-to-surface medium-caliber gunnery exercises involve fighter aircraft descending on a target, or rotary-wing aircraft flying a racetrack pattern and descending on a target using a forward-tilted firing angle, maintaining attention on the activity area is paramount to aircraft safety. The typical activity areas for medium-caliber and large-caliber gunnery activities coincide with the applicable mitigation zones developed for Phase III; therefore, Lookouts can safely and effectively observe the mitigation zones for biological resources while simultaneously maintaining focus on the activity areas. However, if the mitigation zone sizes increased, Lookouts would need to redirect their attention to observe beyond the activity area. This would not meet the safety criteria since personnel would be required to direct attention away from mission requirements. Alternatively, the Navy would need to add personnel to serve as additional Lookouts on the existing observation platforms or allocate additional platforms to the activity to observe for biological resources. These actions would not be safe or sustainable due to an exceedance of manpower, resource, and space restrictions for these activities. Similarly, positioning platforms closer to the intended impact location would increase safety risks related to proximity to the detonation location and path of the explosive projectile.

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

Depending on the type of target being used, additional stopping of the activity could result in the target needing to be recovered and relaunched, which would cause a significant loss of training or testing time. For activities that involve aircraft, extending the length of the activity would require aircraft to depart the area to refuel. If multiple refueling events were required, the length of the activity would be

extended by two to five times or more, which would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the activity area and increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. These types of impacts would reduce the number of opportunities that gun crews have to fire on the target and cause significant delays to the training or testing schedule. Therefore, an increase in mitigation would impede the ability for gun crews to train and become proficient in using their weapons as required during military missions and combat operations, would prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish their missions), and would impede the ability of program managers and weapons system acquisition programs to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for explosive medium-caliber and large-caliber projectiles beyond what is detailed in Table 5.3-9 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.4 Explosive Missiles and Rockets

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive missiles and rockets, as outlined in Table 5.3-10. In addition to procedural mitigation, the Navy will implement mitigation for explosive missiles and rockets within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources; Section 5.4.2, Mitigation Areas off the Northeastern United States; Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States, and Section 5.4.4, Mitigation Areas in the Gulf of Mexico).

In Phase II, explosive missile and rocket mitigation zones were based on net explosive weight and the associate average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the mitigation zone sizes. The Navy identified an opportunity to increase the mitigation zone by 1,100 yd. for missiles and rockets using 21–250 lb. net explosive weight to enhance protections to the maximum extent practicable. This increase is reflected in Table 5.3-10. The mitigation zones are now based on the largest areas within which it is practical to implement mitigation.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy developed a new mitigation measure requiring the Lookout to observe the mitigation zone after completion of the activity. The Navy currently conducts post-activity observations for some, but not all explosive activities. In developing mitigation for Phase III, the Navy determined that it could expand this requirement to other explosive activities for enhanced consistency and to help determine if any resources were injured during explosive events, when practical. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. Typically, when aircraft are firing explosive munitions there are additional observation aircraft, multiple aircraft firing munitions, or other safety aircraft in the vicinity. For example, during typical explosive missile exercises, two aircraft circle the activity location, one aircraft clears the intended impact location while the other fires, and vice versa. A third aircraft is

typically present for safety or proficiency inspections. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

Table 5.3-10: Procedural Mitigation for Explosive Missiles and Rockets

Procedural Mitigation Description
Stressor or Activity • Aircraft-deployed explosive missiles and rockets – Mitigation applies to activities using a surface target
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned in an aircraft • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zones: – 900 yd. around the intended impact location for missiles or rockets with 0.6–20 lb. net explosive weight – 2,000 yd. around the intended impact location for missiles with 21–500 lb. net explosive weight • Prior to the initial start of the activity (e.g., during a fly-over of the mitigation zone): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • After completion of the activity (e.g., prior to maneuvering off station): – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

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

The Navy will implement larger mitigation zones for missiles using 21–500 lb. net explosive weight than for missiles and rockets using 0.6–20 lb. net explosive weight due to the nature of how these activities

are conducted. During activities using missiles in the larger net explosive weight category, the firing aircraft (e.g., maritime patrol aircraft) have the capability of mitigating a larger area due to their larger fuel capacity. During activities using missiles or rockets in the smaller net explosive weight category, the firing aircraft (e.g., rotary-wing aircraft) are typically constrained by their fuel capacity.

The mitigation applies to aircraft-deployed missiles and rockets because aircraft can fly over the intended impact area prior to commencing firing. Mitigation would be ineffective for vessel-deployed missiles and rockets because of the inability for a Lookout to detect marine mammals or sea turtles from a vessel from the distant firing position. It would not be effective or practical to have a vessel conduct close-range observations of the mitigation zone prior to firing due to the length of time it would take to complete observations and transit back to the firing position, and the costs associated with increased fuel consumption.

The mitigation applies to activities using surface targets. Most airborne targets are recoverable aerial drones that are not intended to be hit by ordnance. For example, telemetry-configured anti-air missiles used in training are designed to detonate or simulate a detonation near a target, but not as a result of a direct strike on a target. Given the speed of missiles and mobile targets, the high altitudes involved, and the long ranges that missiles typically travel, it is not possible to definitively predict or to effectively observe where the missile fragments will fall. The potential expended material fall zone can only be predicted within tens of miles for long range events, which can be 75 NM from the firing location; and thousands of yards for short range events, which can occur 15 NM from the firing location. These areas are too large to be effectively observed for marine mammals and sea turtles with the number of personnel and platforms available for this activity. The potential risk to marine mammals and sea turtles during events using airborne targets is limited to the animal being directly struck by falling military expended materials. There is no potential for direct impact from the explosives because the detonations occur in air. Based on the extremely low potential for military expended materials to co-occur in space and time with a marine mammal or sea turtle at or near the surface of the water, the potential for a direct strike is negligible; therefore, mitigation would not be effective at avoiding or reducing impacts. Additional information on military expended materials is provided in Appendix F (Military Expended Material and Direct Strike Impact Analysis).

Bin E10 (e.g., Harpoon missiles) has the longest predicted impact ranges for explosive missiles that apply to the 2,000-yd. mitigation zone. Bin E6 (e.g., Hellfire missiles) has the longest predicted impact ranges for explosive missiles and rockets that apply to the 900-yd. mitigation zone. The 2,000-yd. and 900-yd. mitigation zones extend beyond the respective ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zones extend beyond the respective average ranges to PTS for sea turtles and all marine mammal hearing groups except high-frequency cetaceans (the mitigation zones extend into a portion of the respective average ranges to PTS for this hearing group). The mitigation zones also extend into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E10 and bin E6. Explosives in smaller source bins (e.g., missiles in bin E9, rockets in bin E3) have shorter predicted impact ranges; therefore, the mitigation zones will cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zones are based on the largest areas within which it is practical for the Navy to implement mitigation. It is not practical to increase these mitigation zones because observations within the margin of increase would be unsafe and ineffective unless the Navy

allocated additional platforms to the activity to observe for biological resources. The use of additional personnel and equipment (e.g., aircraft) would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft conducting the activity to modify their flights plans (which would reduce activity realism) or force the observing aircraft to position itself a safe distance away from the activity area (which would decrease observation effectiveness). Similarly, positioning platforms closer to the intended impact location (as would be required if mitigation applied to vessel-deployed missiles and rockets) would increase safety risks related to proximity to the detonation location and path of the explosive missile or rocket.

Increasing the mitigation zone sizes would result in larger areas over which firing would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased and would extend the length of the activity. These impacts would significantly diminish event realism in a way that would prevent the activity from meeting its intended objectives. Explosive missile and rocket events require focused situational awareness of the activity area and continuous coordination between the participating platforms as required during military missions and combat operations. For activities using missiles in the larger net explosive weight category, the flyover distance between the mitigation zone and the firing location can extend upwards of 75 NM; therefore, even aircraft with larger fuel capacities would need to depart the activity area to refuel if the length of the activity was extended. If the firing aircraft departed the activity location to refuel, the aircrew would lose the ability to maintain situational awareness of the activity area and effectively coordinate with other participating platforms. If multiple refueling events were required, the activity length would extend by two to five times or more, which would increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. These types of impacts would cause a significant loss of training or testing time, reduce the number of opportunities that aircrews have to fire on the target, and cause a significant delay to the training or testing schedule. Therefore, an increase in mitigation would impede the ability for aircrews to train and become proficient in using their weapons as required during military missions and combat operations, would prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish their missions), and would impede the ability of program managers and weapons system acquisition programs to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for explosive missiles and rockets beyond what is detailed in Table 5.3-10 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.5 Explosive Bombs

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive bombs, as outlined in Table 5.3-11. In addition to procedural mitigation, the Navy will implement mitigation for explosive bombs within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources; Section 5.4.2, Mitigation Areas off the Northeastern United States; Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States; and Section 5.4.4, Mitigation Areas in the Gulf of Mexico).

Table 5.3-11: Procedural Mitigation for Explosive Bombs

Procedural Mitigation Description
Stressor or Activity • Explosive bombs
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned in the aircraft conducting the activity • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zone: – 2,500 yd. around the intended target • Prior to the initial start of the activity (e.g., when arriving on station): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of bomb deployment. • During the activity (e.g., during target approach): – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease bomb deployment. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target; (3) the mitigation zone has been clear from any additional sightings for 10 min.; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • After completion of the activity (e.g., prior to maneuvering off station): – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

In Phase II, the explosive bombing mitigation zone was based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of this mitigation zone. The Navy determined that the current mitigation zone for explosive bombs is the largest area within which it is practical to implement mitigation for this activity; therefore, it will continue implementing this same mitigation zone for Phase III.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy developed a new mitigation measure requiring the Lookout to observe the mitigation zone after completion of this activity. The Navy currently conducts post-activity observations for some, but not all explosive activities. In developing mitigation for Phase III, the Navy determined that it could expand this requirement to other explosive activities for enhanced consistency and to help determine if any resources were injured during explosive events, when practical. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. Typically, when aircraft are firing explosive munitions there are additional observation aircraft, multiple aircraft firing munitions, or other safety aircraft in the vicinity. When available, having additional personnel support observations of the mitigation zone will help

increase the likelihood of detecting biological resources. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

Bombing exercises involve an aircraft deploying munitions at a surface target located beneath the firing platform. During target approach, aircraft maintain a relatively steady altitude of approximately 1,500 ft. Lookouts, by necessity for safety and mission success, primarily focus their attention on the water surface surrounding the intended detonation location (i.e., the mitigation zone). Being positioned in an aircraft gives the Lookout a good vantage point for observing marine mammals and sea turtles throughout the mitigation zone. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone.

Bin E12 (e.g., 2,000-lb. bombs) has the longest predicted impact ranges for explosive bombs used in the Study Area. The 2,500-yd. mitigation zone extends beyond the ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zone extends beyond the average ranges to PTS for sea turtles and all marine mammal hearing groups except high-frequency cetaceans (the mitigation zones extend into a portion of the respective average ranges to PTS for this hearing group). The mitigation zone also extends into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest bombs in bin E12. Smaller bombs (e.g., 250-lb. bombs, 500-lb. bombs) have shorter predicted impact ranges; therefore, the mitigation zone will extend further beyond or cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation. It is not practical to increase this mitigation zone because observations within the margin of increase would be unsafe and ineffective unless the Navy allocated additional platforms to the activity to observe for biological resources. The use of additional personnel and aircraft would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft participating in the activity to modify their flights plans (which would reduce activity realism) or force the observing aircraft to position itself a safe distance away from the activity area (which would decrease observation effectiveness). Adding vessels to observe the mitigation zone would increase safety risks due to the presence of observation vessels within the vicinity of the intended explosive bomb detonation location.

Increasing the mitigation zone would result in a larger area over which explosive bomb deployment would need to be ceased in response to a sighting, and therefore would likely increase the number of times explosive bombing activities would be ceased and would extend the length of the activity. These impacts would significantly diminish event realism in a way that would prevent the activity from meeting its intended objectives. For example, critical components of a Bombing Exercise Air-to-Surface training activity are the assembly, loading, delivery, and assessment of an explosive bomb. The activity requires focused situational awareness of the activity area and continuous coordination between multiple training components. The training exercise starts with ground personnel, who must practice the building and loading of explosive munitions. Training includes the safe handling of explosive material, configuring munitions to precise specifications, and loading munitions onto aircraft. Aircrew must then identify a target and safely deliver fused munitions, discern if the bomb was assembled correctly, and determine

bomb damage assessments based on how and where the explosive detonated. Extending the length of the activity would require aircraft to depart the area to refuel. If the firing aircraft departed the activity area to refuel, aircrew would lose the ability to maintain situational awareness of the activity area, effectively coordinate with other participating platforms, and complete all training components as required during military missions and combat operations. If multiple refueling events were required, the activity length would be extended by two to five times or more, which would cause a significant loss of training or testing time and would increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. This which would reduce the number of opportunities that aircrews have to approach targets and deploy bombs and reduce the Navy's ability to evaluate the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced, which would cause a significant delay to the training or testing schedule. Therefore, an increase in mitigation would impede the ability for aircrews to train and become proficient in using their weapons, would prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish their missions), and would impede the ability of program managers and weapons system acquisition programs to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for explosive bombs beyond what is detailed in Table 5.3-11 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.6 Sinking Exercises

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles during sinking exercises, as outlined in Table 5.3-12. In Phase II, the mitigation zone was based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zone. The Navy determined that the current mitigation zone for sinking exercises is the largest area within which it is practical to implement mitigation; therefore, it will continue implementing this same mitigation zone for Phase III.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. Sinking exercises typically involved multiple participating platforms. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources. The 2-hour post-activity observations for sinking exercises are a continuation from Phase II and will help the Navy determine if any resources were injured during the activity. Sinking exercises are scheduled to ensure they are conducted only in daylight hours. The Navy will be able to complete the full 2-hours of post-activity observation during typical activity conditions and it is unlikely that observations will be shortened due to nightfall. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

Table 5.3-12: Procedural Mitigation for Sinking Exercises

Procedural Mitigation Description
Stressor or Activity • Sinking exercises
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 2 Lookouts (one positioned in an aircraft and one on a vessel) • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zone: – 2.5 NM around the target ship hulk • Prior to the initial start of the activity (90 min. prior to the first firing): – Conduct aerial observations of the mitigation zone for floating vegetation; delay the start until the mitigation zone is clear. – Conduct aerial observations of the mitigation zone for marine mammals, sea turtles, and jellyfish aggregations; if observed, delay the start of firing. • During the activity: – Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations. – Visually observe the mitigation zone for marine mammals and sea turtles from the vessel; if observed, cease firing. – Immediately after any planned or unplanned breaks in weapons firing of longer than 2 hours, observe the mitigation zone for marine mammals and sea turtles from the aircraft and vessel; if observed, delay recommencement of firing. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the target ship hulk; or (3) the mitigation zone has been clear from any additional sightings for 30 min. • After completion of the activity (for 2 hours after sinking the vessel or until sunset, whichever comes first): – Observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

There is a chance that animals could enter the mitigation zone after the aircraft conducts its close-range mitigation zone observations and before firing begins (once the aircraft has transited to its distant firing position). The Lookout positioned on the vessel will have a higher likelihood of detecting individual marine mammals and sea turtles that are in the central portion of the mitigation zone near the target ship hulk. Near the perimeter of the mitigation zone, the Lookout will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles. The Lookout positioned in the aircraft will be able to assist the vessel-based Lookout by observing the entire mitigation zone, including near the perimeter, because the aircraft will be able to transit a larger area more quickly (e.g., during range clearance), and will offer a better vantage point. As described in Chapter 3.8 (Reptiles), some species of sea turtles forage on jellyfish in the region where this activity occurs. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone.

Bin E11 has the longest predicted impact ranges for the types of explosives used during sinking exercises in the Study Area. For the largest explosive in bin E11, the mitigation zone extends beyond the ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zone extends beyond the average ranges to PTS for sea turtles and all marine mammal

hearing groups except high-frequency cetaceans (the mitigation zone extends into a portion of the average range to PTS for this hearing group). The mitigation zone also extends beyond or into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E11. Smaller explosives in bin E11 and explosives in smaller source bins (e.g., E5, E10) have shorter predicted impact ranges; therefore, the mitigation zone will extend further beyond or cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation. It is not practical to increase this mitigation zone because observations within the margin of increase would be ineffective unless the Navy allocated additional platforms to the activity to observe for biological resources. The use of additional personnel, aircraft, or vessels would be unsustainable due to increased operational costs and an exceedance of available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft participating in the activity to modify their flights plans (which would reduce activity realism) or force the observing aircraft to position itself a safe distance away from the activity area (which would decrease observation effectiveness). Adding additional platforms to observe the mitigation zone would increase safety risks due to the presence of additional vessels or aircraft within the vicinity of the intended impact location or in the path of explosive projectiles.

Increasing the mitigation zone size would result in a larger area over which firing would need to be ceased in response to a sighting, and therefore would likely increase the number of times that the sinking exercise would be ceased and would extend the length of the activity. These impacts would significantly diminish event realism in a way that would prevent the activity from meeting its intended objectives. Sinking exercises require focused situational awareness of the activity area and continuous coordination of tactics between ship, submarine, and aircraft crews using multiple weapon systems to deliver explosive ordnance to deliberately sink a deactivated vessel. Extending the length of the activity would require aircraft to depart the area to refuel, which would disrupt the ability for platforms to maintain continuous coordination of tactics. If multiple refueling events were required, the length of the activity would be extended by two to five times or more, which would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the activity area and increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. These types of impacts would reduce the frequency at which participants would be able to fire on the deactivated vessel. Because the activity ends when the ship sinks, firing at a decreased frequency would ultimately extend the amount of time it takes for the deactivated vessel to sink. Sinking exercises only take place during daylight hours; therefore, the training exercise would likely be delayed into the next day or next several days, which would significantly impact the schedules of the multiple participants. An increase in mitigation would impede the ability for the participants to become proficient in using their weapons as required during military missions and combat operations and would prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish their missions). Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for sinking exercises beyond what is detailed in Table 5.3-12 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.7 Explosive Mine Countermeasure and Neutralization Activities

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive mine countermeasure and neutralization activities, as outlined in Table 5.3-13. The mitigation applies to explosive mine countermeasure and neutralization activities except those that involve the use of Navy divers, which are discussed in Section 5.3.3.8 (Explosive Mine Neutralization Activities Involving Navy Divers). In addition to procedural mitigation, the Navy will implement mitigation for explosive mine countermeasure and neutralization activities within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources; Section 5.4.2, Mitigation Areas off the Northeastern United States; and Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States).

The types of charges used in these activities are positively controlled, which means the detonation is controlled by the personnel conducting the activity and is not authorized until the mitigation zone is clear at the time of detonation. In Phase II, explosive mine countermeasure and neutralization activity mitigation zones were based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zones. The Navy identified an opportunity to increase the mitigation zone sizes for bins E5 through E10 to enhance protections to the maximum extent practicable. This increase is reflected in Table 5.3-13. The mitigation zones for explosive mine countermeasure and neutralization activities are now based on the largest areas within which it is practical to implement mitigation. The post-activity observations are a continuation from Phase II and will help the Navy determine if any resources were injured during the activity. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources.

For the 600-yd. mitigation zone, the small observation area and proximity to the observation platform will result in a high likelihood that the Lookout will be able to detect marine mammals and sea turtles throughout the mitigation zone (regardless of the type of observation platform used). For the 2,100-yd. mitigation zone, the Lookout on a small boat will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) or splashes of individual marine mammals than cryptic marine mammal species and sea turtles near the mitigation zone perimeter, while the Lookout positioned in an aircraft will help increase the chance that marine mammals and sea turtles will be detected throughout the mitigation zone. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

Table 5.3-13: Procedural Mitigation for Explosive Mine Countermeasure and Neutralization Activities

Procedural Mitigation Description
Stressor or Activity • Explosive mine countermeasure and neutralization activities
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned on a vessel or in an aircraft when implementing the smaller mitigation zone • 2 Lookouts (one positioned in an aircraft and one on a small boat) when implementing the larger mitigation zone • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zones: – 600 yd. around the detonation site for activities using 0.1–5-lb. net explosive weight – 2,100 yd. around the detonation site for activities using 6–650 lb. net explosive weight (including high explosive target mines) • Prior to the initial start of the activity (e.g., when maneuvering on station; typically, 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of detonations. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease detonations. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to detonation site; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • After completion of the activity (typically 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained): – Observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

Bin E11 (e.g., 650-lb. high explosive target mines) has the longest predicted impact ranges for explosives that apply to the 2,100-yd. mitigation zone. Bin E4 (e.g., 5-lb. net explosive weight charges) has the longest predicted impact ranges for explosives that apply to the 600-yd. mitigation zone. The 2,100-yd. and 600-yd. mitigation zones extend beyond the respective ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zones extend beyond the respective average ranges to PTS for sea turtles, mid-frequency cetaceans, and sirenians, and into a portion of the average ranges to PTS for high-frequency cetaceans, low-frequency cetaceans, and phocids. The mitigation zones also extend into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E11 and bin E4. Smaller explosives within bin E11 and bin E4 and explosives in smaller source bins (e.g., E2) have shorter predicted impact ranges; therefore, the mitigation zones will cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zones are based on the largest areas within which it is practical for the Navy to implement mitigation. It is not practical to increase these mitigation zones

because observations within the margin of increase would be unsafe and ineffective unless the Navy allocated additional platforms to the activity to observe for biological resources. The use of additional personnel and equipment (e.g., small boats, aircraft) would be unsustainable due to increased operational costs and an exceedance of available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft conducting the activity to modify their flights plans (which would reduce activity realism) or force the observing aircraft to position itself a safe distance away from the activity area (which would decrease observation effectiveness). Adding vessels to observe the mitigation zone would increase safety risks due to the presence observation vessels within the vicinity of detonations.

Increasing the mitigation zone sizes would result in larger areas over which firing would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased and would extend the length of the activity. These impacts would significantly diminish realism in a way that would prevent the activity from meeting its intended objectives. For example, Mine Countermeasures – Mine Neutralization – Remotely Operated Vehicle training exercises require focused situational awareness of the activity area and continuous coordination of tactics between ship, small boat, and rotary-wing aircraft crews to locate and neutralize mines. During Airborne Mine Neutralization Systems Test events, personnel evaluate the system's ability to detect and destroy mines from an airborne mine countermeasures-capable rotary-wing aircraft in advance of delivery to the fleet for operational use. Extending the length of these activities would require aircraft to depart the activity area to refuel. If multiple refueling events were required, the length of the activity would be extended by two to five times or more. This would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the activity area and would increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft.

These types of impacts would result in a significant loss of training or testing time (which would reduce the number of opportunities that platforms have to locate and neutralize mines and reduce the Navy's ability to validate whether mine neutralization systems perform as expected) and cause a significant delay to the training or testing schedule. Therefore, an increase in mitigation would impede the ability for the Navy to train and become proficient in using mine neutralization systems as required during military missions and combat operations, would prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish their missions), and would impede the ability of program managers and weapons system acquisition programs to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. Extending the length of the activities would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for explosive mine countermeasure and neutralization activities beyond what is detailed in Table 5.3-13 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.8 Explosive Mine Neutralization Activities Involving Navy Divers

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from explosive mine neutralization activities involving Navy divers, as outlined in Table 5.3-14. Navy divers participating in these activities may be explosive ordnance disposal

personnel. In addition to procedural mitigation, the Navy will implement mitigation for these activities within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources; Section 5.4.2, Mitigation Areas off the Northeastern United States; and Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States).

Table 5.3-14: Procedural Mitigation for Explosive Mine Neutralization Activities Involving Navy Divers

Procedural Mitigation Description
Stressor or Activity • Explosive mine neutralization activities involving Navy divers
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 2 Lookouts (two small boats with one Lookout each, or one Lookout on a small boat and one in a rotary-wing aircraft) when implementing the smaller mitigation zone • 4 Lookouts (two small boats with two Lookouts each), and a pilot or member of an aircrew will serve as an additional Lookout if aircraft are used during the activity, when implementing the larger mitigation zone • All divers placing the charges on mines will support the Lookouts while performing their regular duties and will report applicable sightings to their supporting small boat or Range Safety Officer. • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zones: – 500 yd. around the detonation site during activities under positive control using 0.1–20 lb. net explosive weight – 1,000 yd. around the detonation site during activities using time-delay fuses (0.1–20 lb. net explosive weight) and during activities under positive control using 21–60 lb. net explosive weight charges • Prior to the initial start of the activity (e.g., when maneuvering on station for activities under positive control; 30 min. for activities using time-delay firing devices): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of detonations or fuse initiation. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease detonations or fuse initiation. – To the maximum extent practicable depending on mission requirements, safety, and environmental conditions, boats will position themselves near the mid-point of the mitigation zone radius (but outside of the detonation plume and human safety zone), will position themselves on opposite sides of the detonation location (when two boats are used), and will travel in a circular pattern around the detonation location with one Lookout observing inward toward the detonation site and the other observing outward toward the perimeter of the mitigation zone. – If used, aircraft will travel in a circular pattern around the detonation location to the maximum extent practicable. – The Navy will not set time-delay firing devices (0.1–20 lb. net explosive weight) to exceed 10 min. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the detonation site; or (3) the mitigation zone has been clear from any additional sightings for 10 min. during activities under positive control with aircraft that have fuel constraints, or 30 min. during activities under positive control with aircraft that are not typically fuel constrained and during activities using time-delay firing devices. • After completion of an activity (for 30 min): – Observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

In Phase II, the mitigation zones for explosive mine neutralization activities involving Navy divers were based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zones. The Navy identified an opportunity to increase the mitigation zone size for positive control charges in bin E4 or below and bin E7 to enhance protections to the maximum extent practicable and for consistency across activities. These increases are reflected in Table 5.3-14. The mitigation zones for explosive mine neutralization activities involving the use of Navy divers are now based on the largest areas within which it is practical to implement mitigation. The post-activity observations are a continuation from Phase II and will help the Navy determine if any resources were injured during the activity. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources.

The charges used during explosive mine neutralization activities involving Navy divers are either positively controlled or initiated using a time-delay fuse. Positive control means the detonation is controlled by the personnel conducting the activity and is not authorized until the area is clear at the time of detonation. Time-delay means the detonation is fused with a specified time-delay by the personnel conducting the activity and is not authorized until the area is clear at the time the fuse is initiated but cannot be terminated once the fuse is initiated due to human safety concerns. For activities using a time-delay fuse, there is a remote chance that animals could swim into the mitigation zone after the fuse has been initiated. The Navy established a mitigation measure to set time-delay firing devices not to exceed 10-min. to limit the potential time that animals have to swim into the mitigation zone after fuse initiation. During activities under positive control, the Navy can cease detonations at any time in response to a sighting of a marine mammal or sea turtle. For this reason, all activities using a time-delay fuse will implement the 1,000-yd. mitigation zone, while activities that are under positive control will implement either the 500-yd. or 1,000-yd. mitigation zone, depending on the size of the charge. Time-delay charges have a maximum charge size of 20-lb. net explosive weight.

For the 500-yd. mitigation zone, the small observation area and proximity to observation platforms will result in a high likelihood that Lookouts will be able to detect marine mammals and sea turtles throughout the mitigation zone. For the 1,000-yd. mitigation zone, the use of two additional Lookouts increases the likelihood that Lookouts will be able to detect marine mammals and sea turtles across the larger observation area. Due to their low vantage point on the water, Lookouts in small boats will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) or the splashes of individual marine mammals than cryptic marine mammal species and sea turtles near the perimeter of the 1,000-yd. mitigation zone. When rotary-wing aircraft are used, Lookouts positioned in an aircraft will have a good vantage point for observing out to the perimeter of the 500-yd. and 1,000-yd. mitigation zones. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

Bin E7 (e.g., 60-lb. net explosive weight charges) and bin E6 (e.g., 20-lb. net explosive weight) have the longest predicted impact ranges for positive control explosives and time-delay explosives that apply to the 1,000-yd. mitigation zone, respectively. Bin E6 (e.g., 20-lb. net explosive weight) has the longest predicted impact ranges for the positive control explosives that apply to the 500-yd. mitigation zone. The 1,000-yd. and 500-yd. mitigation zones extend beyond the respective ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. For time-delay charges, the 1,000-yd. mitigation zone extends beyond the average ranges to PTS for sea turtles and marine mammals that could potentially occur in the locations where this activity takes place (high-frequency cetaceans and phocids are unlikely to occur in the areas where these activities take place). For positive control charges, the 1,000-yd. and 500-yd. mitigation zones extend beyond the average ranges to PTS for sea turtles and marine mammals that could potentially occur in the locations where this activity takes place except low-frequency cetaceans (the mitigation zones extend into a portion of the average ranges to PTS for this hearing group). The mitigation zones also extend into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, depending on the species, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E7 and bin E6. Smaller explosives within bin E7 and bin E6 and explosives in smaller source bins (e.g., E5) have shorter predicted impact ranges; therefore, the mitigation zones will cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zones are based on the largest areas within which it is practical for the Navy to implement mitigation. It is not practical to increase these mitigation zones because observations within the margin of increase would be unsafe and ineffective unless the Navy allocated additional platforms to the activity to observe for biological resources. Because mine neutralization activities involve training Navy divers in the safe handling of explosive charges, one of the mission-essential safety protocols required of all event participants, including Lookouts, is to maintain focus on the activity area to ensure safety of personnel and equipment. The typical mine neutralization activity areas coincide with the mitigation zone sizes developed for Phase III; therefore, Lookouts can safely and effectively observe the mitigation zones for biological resources while simultaneously maintaining focus on the activity areas. However, if the mitigation zone sizes increased, Lookouts would need to redirect their attention beyond the activity areas. This would not meet the safety criteria since personnel would be required to direct their attention away from mission requirements. Alternatively, the Navy would need to add personnel to serve as additional Lookouts on the existing observation platforms or allocate additional platforms to the activity to observe for biological resources. These actions would not be safe or sustainable due to an exceedance of manpower, resource, and space restrictions for these activities.

Increasing the mitigation zone sizes would result in larger areas over which detonations would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased. This would extend the length of the activities and cause significant safety risks for Navy divers and loss of training time. Ceasing an activity (e.g., fuse initiation) with divers in the water would have safety implications for diver air consumption and bottom time. It would also impede the ability for Navy divers to complete the training exercise with the focused endurance as required during military missions and combat operations. These impacts would significantly diminish event realism in a way that would prevent activities from meeting their intended objectives. For example, the number of opportunities that divers would have to locate and neutralize mines would be reduced. Divers would then not be able to gain skill proficiency in precise identification and evaluation of a threat mine, safe handling of explosive material during charge placement, and effective charge detonation or

fuse initiation. Mine neutralization activities involving the use of Navy divers only take place during daylight hours for safety reasons; therefore, extending the length of the activity could delay the activity into the next day or next several days, which would significantly impact training schedules for all participating platforms. Therefore, an increase in mitigation would impede the ability for Navy divers to train and become proficient in mine neutralization and would prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish their missions).

For activities that involve aircraft, extending the length of the activity would require aircraft to depart the area to refuel. If multiple refueling events were required, the length of the activity would be extended by two to five times or more, which would decrease the ability for Lookouts to safely and effectively maintain situational awareness of the activity area and increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption.

In summary, the operational community determined that implementing procedural mitigation for explosive mine neutralization activities involving Navy divers beyond what is detailed in Table 5.3-14 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.3.9 Maritime Security Operations – Anti-Swimmer Grenades

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles from anti-swimmer grenades during Maritime Security Operations, as outlined in Table 5.3-15. In addition to procedural mitigation, the Navy will implement mitigation for in-water detonations within mitigation areas (see Section 5.4.2, Mitigation Areas off the Northeastern United States; Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States; and Section 5.4.4, Mitigation Areas in the Gulf of Mexico).

In Phase II, the Maritime Security Operations – Anti-Swimmer Grenade mitigation zone was based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zone. The Navy determined that the current mitigation zone is the largest area within which it is practical to implement mitigation for this activity; therefore, it will continue implementing this same mitigation zone for Phase III.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy developed a new mitigation measure requiring the Lookout to observe the mitigation zone after completion of the activity. The Navy currently conducts post-activity observations for some, but not all explosive activities. In developing mitigation for Phase III, the Navy determined that it could expand this requirement to other explosive activities for enhanced consistency and to help determine if any resources were injured during explosive events, when practical. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

Table 5.3-15: Procedural Mitigation for Maritime Security Operations – Anti-Swimmer Grenades

Procedural Mitigation Description
Stressor or Activity • Maritime Security Operations – Anti-Swimmer Grenades
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned on the small boat conducting the activity • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zone: – 200 yd. around the intended detonation location • Prior to the initial start of the activity (e.g., when maneuvering on station): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of detonations. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease detonations. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended detonation location; (3) the mitigation zone has been clear from any additional sightings for 30 min.; or (4) the intended detonation location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • After completion of the activity (e.g., prior to maneuvering off station): – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

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

Explosives used during Maritime Security Operations – Anti-Swimmer Grenades exercises are in bin E2 (e.g., 0.5-lb. net explosive weight). The mitigation zone extends beyond the ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zone extends beyond the respective average ranges to PTS for sea turtles all marine mammal hearing groups that could potentially occur in the locations where this activity takes place (high-frequency cetaceans are unlikely to occur in the areas where this activity takes place). The mitigation zone also extends into a portion of the average ranges to TTS for sea turtles and marine mammals. Therefore, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E2.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation. It is not practical to increase the mitigation zone because observations within the margin of increase would be unsafe and ineffective. Because this activity involves training crews in the safe handling of explosive hand grenades, one of the mission-essential

safety protocols required of all event participants, including the Lookout, is to maintain focus on the activity area to ensure safety of personnel and equipment. The typical activity area coincides with the mitigation zone that will be implemented for Phase III; therefore, Lookouts can safely and effectively observe the mitigation zone for biological resources while simultaneously maintaining focus on the activity area. However, if the mitigation zone size increased, the Lookout would need to redirect attention to observe beyond the activity area. This would not meet the safety criteria since personnel would be required to direct their attention away from mission requirements. Alternatively, the Navy would need to either add personnel to serve as additional Lookouts on the existing observation platform or allocate additional platforms to the activity to observe for biological resources. These actions would not be safe or sustainable due an exceedance of manpower, resource, and space restrictions for this activity.

In summary, the operational community determined that implementing procedural mitigation for Maritime Security Operations – Anti-Swimmer Grenades beyond what is detailed in Table 5.3-15 would be incompatible with the practicality assessment criteria for safety and sustainability.

5.3.3.10 Line Charge Testing

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals, sea turtles, and fish (ESA-listed Gulf sturgeon) from line charge testing, as outlined in Table 5.3-16. In Phase II, the line charge testing mitigation zone was based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zone. The Navy determined that the current mitigation zone is the largest area within which it is practical to implement mitigation for this activity; therefore, it will continue implementing this same mitigation zone for Phase III.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy developed a new mitigation measure requiring the Lookout to observe the mitigation zone after completion of the activity. The Navy currently conducts post-activity observations for some, but not all explosive activities. In developing mitigation for Phase III, the Navy determined that it could expand this requirement to other explosive activities for enhanced consistency and to help determine if any resources were injured during explosive events, when practical. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

Naval Surface Warfare Center, Panama City Division Testing Range is currently the Navy's only location capable of supporting this type of activity. Mitigation to not conduct line charge testing at night from March through September will help avoid or reduce potential impacts on green, Kemp's ridley, loggerhead, and leatherback sea turtles during the time of day when they would be most likely to transit to and from their nesting beaches during nesting season. Mitigation to not conduct line charge testing activities from October through March (except within a designated location on Santa Rosa Island) will help avoid or reduce potential impacts on ESA-listed Gulf sturgeon during their seasonal migration from

the Gulf of Mexico winter and feeding grounds to the spring and summer natal (hatching) rivers (the Yellow, Choctawhatchee, and Apalachicola Rivers).

Table 5.3-16: Procedural Mitigation for Line Charge Testing

Procedural Mitigation Description
Stressor or Activity • Line charge testing
Resource Protection Focus • Marine mammals • Sea turtles • Fish (Gulf sturgeon)
Number of Lookouts and Observation Platform • 1 Lookout positioned on a vessel • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zone: – 900 yd. around the intended detonation location • Prior to the initial start of the activity (e.g., when maneuvering on station): – Observe the mitigation zone for floating vegetation; if observed, delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, delay the start of detonations. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease detonations. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended detonation location; or (3) the mitigation zone has been clear from any additional sightings for 30 min. • After completion of the activity (e.g., prior to maneuvering off station): – When practical (e.g., when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred. • Additional requirements: – From March through September (sea turtle nesting season), the Navy will not conduct line charge testing at night. – From October through March (Gulf sturgeon migration season), Navy will not conduct line charge testing except within a designated location on Santa Rosa Island.

During line charge testing, surface vessels deploy line charges to test the capability to safely clear surf zone areas for sea-based expeditionary forces. Line charges consist of a 350-ft. detonation cord with explosives lined from one end to the other end in a series of 5-lb. increments. Lookouts will have a better likelihood of detecting individual marine mammals and sea turtles that are in the near-range or central portion of the mitigation zone. Lookouts will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) or the splashes of individual marine mammals than cryptic marine mammal species and sea turtles near the perimeter of the mitigation zone (e.g., near the shoreline). Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zones.

Bin E14 (2,500-lb. high blast explosive) is the largest explosive used in line charge testing. Mitigation will likely help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS during line charge testing.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation. It is not practical to increase the mitigation zone because observations within the margin of increase would be unsafe and ineffective unless the Navy allocated additional platforms to the activity to observe for biological resources. The use of additional personnel and equipment (e.g., vessels) would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding vessels to observe the mitigation zone would increase safety risks due to the presence of observation vessels within the vicinity of an explosive line charge.

Increasing the mitigation zone would result in a larger area over which detonations would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased. This would extend the length of the activity and significantly diminish realism in a way that would prevent the activity from meeting its intended objectives. For example, ceasing a detonation during the event would mean that the Navy would not be able to test the explosive array continuously from one end to the other, which would impede the ability for surface vessels to effectively test the capability of the line charges to neutralize mine threats and clear surf zone areas for sea-based expeditionary forces as required during military missions and combat operations, and to meet testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements. Line charge testing only takes place during daylight hours from March through September as mitigation for sea turtle nesting; therefore, extending the length of the activity would result in a delay into the next day or next several days during that season, which would significantly impact the testing schedules of all event participants.

In summary, the operational community determined that implementing procedural mitigation for line charge testing beyond what is detailed in Table 5.3-16 would be incompatible with the practicality assessment criteria for safety, sustainability and mission requirements.

5.3.3.11 Ship Shock Trials

The Navy will continue to implement procedural mitigation to avoid or reduce potential impacts on marine mammals and sea turtles to from ship shock trials, as outlined in Table 5.3-17. The Navy will continue to provide detailed ship shock trial mitigation to NMFS for review and approval approximately 1 year prior to each event. In Phase II, the ship shock trial mitigation zone was based on net explosive weight and the associated average ranges to PTS. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of this mitigation zone. The Navy determined that the current mitigation zone for ship shock trials is the largest area within which it is practical to implement mitigation for this activity; therefore, it will continue implementing this same mitigation zone for Phase III. The post-activity observations are a continuation from Phase II and will help the Navy determine if any resources were injured during the activity. The Navy will follow the incident reporting procedures outlined in Section 5.1.2.2.3 (Incident Reports) if an incident is detected at any time during the event, including during the post-activity observations.

The Navy is clarifying that it will require observation of the mitigation zone prior to the initial start of the activity to ensure the area is clear of applicable biological resources. The Navy has always verified that the mitigation zone is visually clear prior to conducting explosive activities and is more clearly capturing this current practice in the mitigation measures for Phase III. The Navy is adding a requirement that additional platforms already participating in the activity will support observing the mitigation zone before, during, and after the activity while performing their regular duties. There are typically multiple

platforms in the vicinity of ship shock trial activities (e.g., safety aircraft). When available, having additional personnel support observations of the mitigation zone will help increase the likelihood of detecting biological resources.

Table 5.3-17: Procedural Mitigation for Ship Shock Trials

Procedural Mitigation Description
Stressor or Activity • Ship shock trials
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • At least 10 Lookouts or trained marine species observers (or a combination thereof) positioned either in an aircraft or on multiple vessels (i.e., a Marine Animal Response Team boat and the test ship) – If aircraft are used, Lookouts or trained marine species observers will be in an aircraft and on multiple vessels – If aircraft are not used, a sufficient number of additional Lookouts or trained marine species observers will be used to provide vessel-based visual observation comparable to that achieved by aerial surveys • If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) will support observing the mitigation zone for applicable biological resources while performing their regular duties.
Mitigation Requirements • Mitigation zone: – 3.5 NM around the ship hull • During event planning: – The Navy will not conduct ship shock trials in the Jacksonville Operating Area during North Atlantic right whale calving season from November 15 through April 15. – The Navy develops detailed ship shock trial monitoring and mitigation plans approximately 1-year prior to an event and will continue to provide these to NMFS for review and approval. – Pre-activity planning will include selection of one primary and two secondary areas where marine mammal populations are expected to be the lowest during the event, with the primary and secondary locations located more than 2 NM from the western boundary of the Gulf Stream for events in the Virginia Capes Range Complex or Jacksonville Range Complex. – If it is determined during pre-activity surveys that the primary area is environmentally unsuitable (e.g., observations of marine mammals or presence of concentrations of floating vegetation), the shock trial could be moved to a secondary site in accordance with the detailed mitigation and monitoring plan provided to NMFS. • Prior to the initial start of the activity at the primary shock trial location (in intervals of 5 hours, 3 hours, 40 min., and immediately before the detonation): – Observe the mitigation zone for floating vegetation; if observed, delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, delay triggering the detonation. • During the activity: – Observe the mitigation zone for marine mammals, sea turtles, large schools of fish, jellyfish aggregations, and flocks of seabirds; if observed, cease triggering the detonation. – After completion of each detonation, observe the mitigation zone for marine mammals and sea turtles; if any injured or dead marine mammals or sea turtles are observed, follow established incident reporting procedures and halt any remaining detonations until the Navy can consult with NMFS and review or adapt the mitigation, if necessary. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the ship hull; or (3) the mitigation zone has been clear from any additional sightings for 30 min. • After completion of the activity (during the following 2 days at a minimum, and up to 7 days at a maximum): – Observe the vicinity of where detonations occurred; if any injured or dead marine mammals or ESA-listed species are observed, follow established incident reporting procedures. – If additional platforms are supporting this activity (e.g., providing range clearance), these assets will assist in the visual observation of the area where detonations occurred.

Lookouts positioned in aircraft will have the best vantage point for observing the mitigation zone. During small ship shock trials, aerial surveys are not always operationally feasible due to resource limitations; however, if vessels are used as the sole observation platform, the use of additional vessels will ensure that observations of the mitigation zone are comparable to what is achieved when aircraft are used.

The mitigation zone represents the maximum area that would likely be effective at avoiding or reducing impacts on marine mammals and sea turtles during ship shock trials based on the amount of time it takes for vessels and aircraft to patrol the area. The longer a vessel or aircraft spends transiting the survey area, the less focused the survey becomes at observing individuals that may be present close to the detonation location. Even with the intensive observation effort that will be used during ship shock trials, there is a chance that animals could enter the mitigation zone at one end while observation platforms are conducting observations in other locations. Lookouts will have a better likelihood of detecting marine mammals and sea turtles that are in the central portion of the mitigation zone (around the ship hull) and during closer-range observations but are not likely to detect these resources at the far side of the mitigation zone perimeter. At far distances, Lookouts will have a better likelihood of detecting large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone. The Navy will observe for additional marine mammal and sea turtle indicators during this activity (large schools of fish, jellyfish aggregations, and flocks of seabirds) as an added precaution.

Bin E17 has the longest predicted impact ranges for explosives used in ship shock trials in the Study Area. For the largest explosive in bin E17, the mitigation zone extends beyond the ranges to 50 percent non-auditory injury and 50 percent mortality for sea turtles and marine mammals. The mitigation zone extends beyond the average ranges to PTS for sea turtles and all marine mammal hearing groups that could potentially occur in the locations where this activity takes place except high-frequency cetaceans and low-frequency cetaceans (the mitigation zone extends into a portion of the average ranges to PTS for these hearing groups). Phocids and sirenians are unlikely to occur in the areas where this activity takes place. The mitigation zone also extends beyond the average ranges to TTS for mid-frequency cetaceans and into a portion of the average ranges to TTS for sea turtles and other marine mammals. Therefore, mitigation will help avoid or reduce all or a portion of the potential for exposure to mortality, non-auditory injury, PTS, and higher levels of TTS for the largest explosives in bin E17. Smaller explosives in bin E17 and explosives in smaller source bins (e.g., E16) have shorter predicted impact ranges; therefore, the mitigation zone will extend further beyond or cover a greater portion of the impact ranges for these explosives.

As described previously, the Phase III mitigation zone is based on the largest area within which it is practical for the Navy to implement mitigation. It is not practical to increase the mitigation zones because observations within the margin of increase would be unsafe and ineffective unless the Navy allocated additional platforms to the activity to observe for biological resources. The use of additional personnel (Lookouts or trained marine species observers) and equipment (vessels or aircraft) would be unsustainable due to increased operational costs and an exceedance of the available manpower and resources for this activity. Adding aircraft to observe the mitigation zone could result in airspace conflicts with the event participants. This would either require the aircraft conducting the activity to modify their flights plans (which would reduce activity realism) or force the observing aircraft to position itself a safe distance away from the activity area (which would decrease observation effectiveness). Adding vessels to observe the mitigation zone would increase safety risks due to the presence of

observation vessels within the vicinity of high blast explosives. Alternatively, vessels would need to position themselves a safe distance from the activity, which would decrease observation effectiveness.

Increasing the mitigation zone would result in a larger area over which detonations would need to be ceased in response to a sighting, and therefore would likely increase the number of times detonations would be ceased. This would extend the length of the activity and significantly diminish realism in a way that would prevent the activity from meeting its intended objectives. Extending the length of the activity would require aircraft to depart the area to refuel. If multiple refueling events were required, the activity length would be extended by two to five times or more, which would decrease the ability for aircraft to safely and effectively maintain situational awareness of the activity area and increase safety risks due to increased pilot fatigue and accelerated fatigue-life of aircraft. Extending the length of the activity would also result in additional operational costs due to increased fuel consumption. Increasing the mitigation would significantly impact the schedules of the participants due to the logistical complexity of event coordination between participating aircraft carriers, support craft, fixed-wing aircraft, and rotary-wing aircraft. These delays would prevent the Navy from meeting testing requirements per required acquisition milestones or on an as-needed basis to meet operational requirements.

In summary, the operational community determined that implementing procedural mitigation for ship shock trials beyond what is detailed in Table 5.3-17 would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.4 Physical Disturbance and Strike Stressors

The Navy will implement procedural mitigation to avoid or reduce potential impacts on biological resources from the physical disturbance and strike stressors or activities discussed in the sections below. Section 3.7.3.4 (Physical Disturbance and Strike Stressors) and Section 3.8.3.4 (Physical Disturbance and Strike Stressors) provide a full analysis of the potential impacts of physical disturbance and strikes on marine mammals and sea turtles, respectively. Appendix F (Military Expended Material and Direct Strike Impact Analysis) presents the impact footprints and direct strike calculations.

5.3.4.1 Vessel Movement

The Navy will continue to implement procedural mitigation to avoid or reduce the potential for vessel strikes of marine mammals and sea turtles, as outlined in Table 5.3-18. In addition to procedural mitigation, the Navy will implement mitigation for vessel movement within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources; Section 5.4.2, Mitigation Areas off the Northeastern United States; and Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States).

The procedural mitigation measures for vessel movement are based on guidance from NMFS and the USFWS for vessel strike avoidance. When developing Phase III mitigation, the Navy analyzed the potential for implementing additional mitigation. The Navy identified a potential opportunity to develop a new mitigation measure for broadcasting North Atlantic right whale Dynamic Management Area information to Navy assets. The other procedural mitigation measures for vessel movement listed in Table 5.3-18 are a continuation from Phase II. Although the Navy is unable to position Lookouts on unmanned vessels, some vessels that operate autonomously have embedded sensors that aid in avoidance of large objects. The embedded sensors may help those unmanned vessels avoid marine mammal vessel strikes.

Table 5.3-18: Procedural Mitigation for Vessel Movement

Procedural Mitigation Description
Stressor or Activity • Vessel movement – The mitigation will not be applied if: (1) the vessel's safety is threatened, (2) the vessel is restricted in its ability to maneuver (e.g., during launching and recovery of aircraft or landing craft, during towing activities, when mooring, etc.), or (3) the vessel is operated autonomously.
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout on the vessel that is underway
Mitigation Requirements • Mitigation zones: – 500 yd. around whales – 200 yd. around other marine mammals (except bow-riding dolphins and pinnipeds hauled out on man-made navigational structures, port structures, and vessels) – Within the vicinity of sea turtles • During the activity: – When underway, observe the mitigation zone for marine mammals and sea turtles; if observed, maneuver to maintain distance. – When underway in the turning basins, channels, and waterways adjacent to Naval Station Mayport, the Navy will comply with federal, state, and local Manatee Protection Zones and reduce speed in accordance with established operational safety and security procedures. – When mooring pierside at Kings Bay, Georgia, the Navy will ensure proper fendering techniques (e.g., the use of buoys that keep submarines 20 ft. off the quay wall) to prevent submarines from injuring a manatee. • Additional requirements: – The Navy will broadcast awareness notification messages with North Atlantic right whale Dynamic Management Area information (e.g., location and dates) to applicable Navy assets operating in the vicinity of the Dynamic Management Area. The information will alert assets to the possible presence of a North Atlantic right whale to maintain safety of navigation and further reduce the potential for a vessel strike. Platforms will use the information to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation, including but not limited to mitigation for vessel movement. – The Navy will ensure that small boats operating out of Naval Station Mayport will be fitted with manatee propeller guards. Pursuant to the Naval Station Mayport Integrated Natural Resource Management Plan, the Navy will provide manatee awareness education to Harbor Operations personnel, require that manatee sightings are communicated to other vessels in the vicinity, and maintain signage at select locations that will alert personnel of the potential presence of manatees and the requirements and procedures for reporting manatee sightings. For information on protective measures pertaining to activities not conducted under the Proposed Action, see the Integrated Natural Resource Management Plan for Naval Station Mayport. – If a marine mammal or sea turtle vessel strike occurs, the Navy will follow the established incident reporting procedures.

As discussed in Section 5.3.1 (Environmental Awareness and Education), it is likely that the implementation of the Marine Species Awareness Training starting in 2007, and the additional U.S. Navy Afloat Environmental Compliance Training Series modules starting in 2014, has contributed to a reduction in marine mammal vessel strikes. The Navy is able to detect if a whale is struck due to the diligence of standard watch personnel and Lookouts stationed specifically to observe for marine mammals while a vessel is underway. In the unlikely event that a marine mammal vessel strike occurs, the Navy will notify the appropriate regulatory agency immediately or as soon as operational security considerations allow per the established incident reporting procedures described in Section 5.1.2.2.3 (Incident Reports). The Navy's incident reports include relevant information pertaining to the incident, including but not limited to vessel speed.

The small mitigation zone sizes and close proximity to the observation platform will result in a high likelihood that Lookouts will be able to detect marine mammals throughout the mitigation zones while

vessels are underway. A mitigation zone size is not specified for sea turtles to allow flexibility based on vessel type and mission requirements (e.g., small boats operating in a narrow harbor). The mitigation measures for Naval Station Mayport and Kings Bay, Georgia will further help avoid impacts on manatees at these locations. The mitigation measures for submarine fendering techniques at Kings Bay, Georgia do not apply to other vessel types or locations (e.g., Naval Station Mayport) because of the unique method of mooring submarines to the Kings Bay wharf. Due to hull differences between submarines and the various surface ships, all vessels are not moored in the same manner. Submarine and surface ship berthing methods are primarily based on hull configuration and type of pier or quay wall within the port.

Dynamic Management Area information originates from NMFS. NMFS implements two types of vessel speed management areas off the U.S. East Coast, Seasonal Management Areas and Dynamic Management Areas, to reduce the likelihood of North Atlantic right whale vessel strikes. Under the regulations, the vessel speed restrictions are not mandatory for Federal agencies, such as the Navy. Seasonal Management Areas are located near ports, bay entrances, or areas where North Atlantic right whales could potentially occur. Seasonal Management Areas are in effect for up to 6 months every year, depending on the location. Unlike Seasonal Management Areas, which have static locations and time components based on potential animal occurrence, the locations and timing of Dynamic Management Areas fluctuate based on confirmed North Atlantic right whale detections. Dynamic Management Areas were in effect for approximately 3 months in 2018. Dynamic Management Areas cover extensive areas of water space that could overlap with essential Navy training and testing areas. Seasonal Management Areas overlap critical training and testing areas or are in proximity to Navy ports or pierside locations that are instrumental to training and testing in the Study Area (e.g., Naval Station Norfolk, Naval Station Mayport).

The Navy has developed the new mitigation measure to broadcast Dynamic Management Area information based on potential changes in North Atlantic right whale distribution. Platforms will use Dynamic Management Area information to assist their visual observation of applicable mitigation zones during training and testing activities. This will make units aware of North Atlantic right whale aggregations to better plan and conduct activities to minimize interactions with this species. Not only will this mitigation measure help the Navy further avoid or reduce potential impacts on North Atlantic right whales from vessel movements, it will also help aid the implementation of applicable procedural mitigation measures for acoustic, explosive, and physical disturbance and strike stressors when Dynamic Management Areas are in effect.

In addition to procedural mitigation, the Navy will continue to implement mitigation for vessel movements within select mitigation areas. For example, the Navy will implement vessel speed restrictions in certain locations seasonally in response to sightings of North Atlantic right whales, as described in Section 5.4.3 (Mitigation Areas off the Mid-Atlantic and Southeastern United States) and Section 5.4.2 (Mitigation Areas off the Northeastern United States). The Navy will implement a 10-knot speed restriction during certain portions of non-explosive torpedo activities in the Northeast North Atlantic Right Whale Mitigation Area. The Navy is able to implement a specific speed restriction for this activity due to the nature of how it is conducted. For example, during transits and normal firing, maintaining a speed of no more than 10 knots still allows the Navy to meet the activity's intended objectives.

As described in Section 2.3.3.2 (Vessel Safety), Navy vessels are required to operate in accordance with applicable navigation rules, including Inland Navigation Rules (33 Code of Federal Regulations 83) and International Regulations for Preventing Collisions at Sea (72 COLREGS), which were formalized in the

Convention on the International Regulations for Preventing Collisions at Sea, 1972. These rules require that vessels proceed at a safe speed so proper and effective action can be taken to avoid collision and so vessels can be stopped within a distance appropriate to the prevailing circumstances and conditions. In addition to complying with navigation requirements, Navy ships transit at speeds that are optimal for fuel conservation, to maintain ship schedules, and to meet mission requirements. Vessel captains use the totality of the circumstances to ensure the vessel is traveling at appropriate speeds in accordance with navigation rules. Depending on the circumstances, this may involve adjusting speeds during periods of reduced visibility or in certain locations.

As discussed in Section 3.0.3.3.4.1 (Vessels and In-Water Devices), large Navy ships typically operate at average speeds of between 10 and 15 knots, which for reference is slower than large commercial vessels, such as container ships that steam at approximately 24 knots during normal operations (Maloni et al., 2013). Operating vessels at speeds that are not optimal for fuel conservation or mission requirements would be unsustainable due to increased time on station and increased fuel consumption. Each ship has a limited amount of time that it can be underway based on target service requirements and ship schedules. Ship schedules are driven largely by training cycles, scheduled maintenance periods, certification schedules, and deployment requirements. Because of the complex logistical considerations involved with maintaining ship schedules, the Navy does not have the flexibility to extend the amount of time that ships are underway, which would result from vessel speed restriction mitigation. If the Navy were to incorporate vessel speed restrictions into event planning for approximately 3–6 months out of the year, ships would be unable to meet all of their requirements during their limited time available to be underway. This would hold true even if the restrictions only applied to transits to and from training or testing event locations and not during the events themselves. Therefore, it would not be practical for the Navy to implement speed restrictions within Dynamic Management Areas or Seasonal Management Areas.

Navy vessel operators need to train to proficiently operate vessels as they would during military missions and combat operations, including being able to react to changing tactical situations and evaluate system capabilities. For example, during training activities involving flight operations from an aircraft carrier, the vessel must maintain a certain wind speed over the deck to launch or recover aircraft. Depending on wind conditions, the aircraft carrier itself must travel at a certain speed to generate the wind required to launch or recover aircraft. Implementing vessel speed restrictions would increase safety risks for Navy personnel and equipment and the public during the training event and would reduce skill proficiency in a way that would increase safety risks during military missions and combat operations. Furthermore, vessel speed restrictions would not allow the Navy to continue meeting its training requirements due to diminished realism of training exercises.

The Navy needs to test the full range of its vessel and system capabilities to ensure safety and functionality in conditions analogous to military missions and combat operations. For example, during non-explosive torpedo testing activities, the Navy must operate its vessels using speeds typical of military missions and combat operations to accurately test the functionality of its acoustic countermeasures and torpedo systems during firing on submarine and vessel targets. The Navy conducts some activities, such as Aircraft Carrier Sea Trials – Propulsion Testing, specifically to test the functionality of vessel propulsion systems, including maneuvering, full-power runs, and endurance runs. During this event, ships must operate across the full spectrum of capable speeds to accomplish the primary testing objectives. Vessel speed restrictions would not allow the Navy to continue meeting its testing program requirements due to diminished realism of testing events. Researchers, program

managers, and weapons system acquisition programs would be unable to conduct accurate acoustic research to meet research objectives and effectively test vessels and vessel-deployed systems and platforms before full-scale production or delivery to the fleet. Such testing is required to ensure functionality and accuracy in military mission and combat conditions per required acquisition milestones or on an as-needed basis to meet operational requirements.

In summary, the operational community determined that implementing procedural mitigation for vessel movements beyond what is detailed in Table 5.3-18 and implementing restrictions on vessel speed beyond what is detailed in Table 5.4-2 and Table 5.4-3 (including speed restrictions in Dynamic Management Areas, Seasonal Management Areas, or other locations in the Study Area) would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements.

5.3.4.2 Towed In-Water Devices

The Navy will continue to implement procedural mitigation to avoid or reduce the potential for strike of marine mammals and sea turtles from towed in-water devices, as outlined in Table 5.3-19. Vessels involved in towing in-water devices will implement the mitigation described in Section 5.3.4.1 (Vessel Movement), in addition to the mitigation outlined in Table 5.3-19.

Table 5.3-19: Procedural Mitigation for Towed In-Water Devices

Procedural Mitigation Description
Stressor or Activity • Towed in-water devices – Mitigation applies to devices that are towed from a manned surface platform or manned aircraft – The mitigation will not be applied if the safety of the towing platform or in-water device is threatened
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned on the manned towing platform
Mitigation Requirements • Mitigation zones: – 250 yd. around marine mammals – Within the vicinity of sea turtles • During the activity (i.e., when towing an in-water device): – Observe the mitigation zone for marine mammals and sea turtles; if observed, maneuver to maintain distance.

The small mitigation zone size and proximity to the observation platform will result in a high likelihood that Lookouts will be able to detect marine mammals throughout the mitigation zone when manned vessels or manned aircraft are towing in-water devices. A mitigation zone size is not specified for sea turtles to allow flexibility based on towing platform type and mission requirements (e.g., small boats operating in a narrow harbor).

The mitigation zones for towed in-water devices are based on the largest areas within which it is practical for the Navy to implement mitigation. When developing Phase III mitigation, the Navy analyzed the potential for increasing the size of the mitigation zones. Mission and safety requirements determine the operational parameters (e.g., course) for in-water device towing platforms. Towed in-water devices must be towed at certain speeds and water depths for stability, which are controlled in part by the towing platform's speed and directional movements. Because these devices are towed and not self-propelled, they generally have limited maneuverability and are not able to make immediate course corrections. For example, during a Mine Countermeasure – Towed Mine Neutralization activity using

rotary-wing aircraft, towed devices are used to trigger mines and perform various other functions, such as detaching floating moored mines. A high degree of pilot skill is required in deploying devices, safely towing them at relatively low speeds and altitudes, and then recovering devices. 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.

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

The Navy will continue to implement procedural mitigation to avoid or reduce the potential for strike of marine mammals and sea turtles from small-, medium-, and large-caliber non-explosive practice munitions, as outlined in Table 5.3-20. In addition to procedural mitigation, the Navy will implement mitigation for small-, medium-, and large-caliber non-explosive practice munitions within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources and Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States).

Table 5.3-20: Procedural Mitigation for Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions

Procedural Mitigation Description
Stressor or Activity • Gunnery activities using small-, medium-, and large-caliber non-explosive practice munitions – Mitigation applies to activities using a surface target
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned on the platform conducting the activity – Depending on the activity, the Lookout could be the same as the one described in Section 5.3.2.4 (Weapons Firing Noise).
Mitigation Requirements • Mitigation zone: – 200 yd. around the intended impact location • Prior to the initial start of the activity (e.g., when maneuvering on station): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting before or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-based firing or 30 min. for vessel-based firing; or (4) for activities using a mobile target, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

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

impact footprints than large-caliber non-explosive practice munitions; therefore, the mitigation zone will extend even further beyond the impact footprints for these smaller projectiles.

Large-caliber gunnery activities involve vessels firing projectiles at a target located up to 6 NM down range. Small- and medium-caliber gunnery activities involve vessels or aircraft firing projectiles at targets located up to 4,000 yd. down range, although typically much closer. Lookouts will have a better likelihood of detecting marine mammals and sea turtles when observing mitigation zones around targets located close to the firing platform. When observing activities that use a target located far from the firing platform, Lookouts will be more likely to detect large visual cues (e.g., whale blows or large pods of dolphins) than individual marine mammals, cryptic marine mammal species, and sea turtles. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone. Positioning additional observers closer to the targets would increase safety risks because these platforms would be located in the vicinity of an intended impact location or in the path of a projectile.

5.3.4.4 Non-Explosive Missiles and Rockets

The Navy will continue to implement procedural mitigation to avoid or reduce the potential for strike of marine mammals and sea turtles from non-explosive missiles and rockets, as outlined in Table 5.3-21. In addition to procedural mitigation, the Navy will implement mitigation for non-explosive missiles and rockets within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources and Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States).

Table 5.3-21: Procedural Mitigation for Non-Explosive Missiles and Rockets

Procedural Mitigation Description
Stressor or Activity • Aircraft-deployed non-explosive missiles and rockets – Mitigation applies to activities using a surface target
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned in an aircraft
Mitigation Requirements • Mitigation zone: – 900 yd. around the intended impact location • Prior to the initial start of the activity (e.g., during a fly-over of the mitigation zone): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease firing. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting prior to or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained.

The mitigation zone for non-explosive missiles and rockets is conservatively designed to be several times larger than the impact footprint for the largest non-explosive missile based on the military expended material impact footprints calculated in Appendix F (Military Expended Material and Direct Strike Impact Analysis). Smaller non-explosive missiles and non-explosive rockets have smaller impact footprints than

the largest non-explosive missile used for these activities; therefore, the mitigation zone will extend even further beyond the impact footprints for these smaller projectiles.

Mitigation applies to activities using non-explosive missiles or rockets fired from aircraft at targets that are typically located up to 15 NM down range, and infrequently up to 75 NM down range. There is a chance that animals could enter the mitigation zone after the aircraft conducts its close-range mitigation zone observations and before firing begins (once the aircraft has transited to its firing position). Due to the distance between the mitigation zone and the observation platform, Lookouts will have a better likelihood of detecting marine mammals and sea turtles during the close-range observations and are less likely to detect these resources once positioned at the firing location, particularly individual marine mammals, cryptic marine mammal species, and sea turtles. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone during the close-range observations. The mitigation only applies to aircraft-deployed missiles and rockets for the reasons discussed in Section 5.3.3.4 (Explosive Missiles and Rockets). Positioning additional observers closer to the targets would increase safety risks because these platforms would be located in the vicinity of an intended impact location or in the path of a projectile.

5.3.4.5 Non-Explosive Bombs and Mine Shapes

The Navy will continue to implement procedural mitigation to avoid or reduce the potential for strike of marine mammals and sea turtles from non-explosive bombs and mine shapes, as outlined in Table 5.3-22. In addition to procedural mitigation, the Navy will implement mitigation for non-explosive bombs and mine shapes within mitigation areas (see Section 5.4.1, Mitigation Areas for Seafloor Resources; Section 5.4.2, Mitigation Areas off the Northeastern United States; and Section 5.4.3, Mitigation Areas off the Mid-Atlantic and Southeastern United States).

Table 5.3-22: Procedural Mitigation for Non-Explosive Bombs and Mine Shapes

Procedural Mitigation Description
Stressor or Activity • Non-explosive bombs • Non-explosive mine shapes during mine laying activities
Resource Protection Focus • Marine mammals • Sea turtles
Number of Lookouts and Observation Platform • 1 Lookout positioned in an aircraft
Mitigation Requirements • Mitigation zone: – 1,000 yd. around the intended target • Prior to the start of the activity (e.g., when arriving on station): – Observe the mitigation zone for floating vegetation; if observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals and sea turtles; if observed, relocate or delay the start of bomb deployment or mine laying. • During the activity (e.g., during approach of the target or intended minefield location): – Observe the mitigation zone for marine mammals and sea turtles; if observed, cease bomb deployment or mine laying. • Commencement/recommencement conditions after a marine mammal or sea turtle sighting prior to or during the activity: – The Navy will allow a sighted marine mammal or sea turtle to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment or mine laying) until one of the following conditions has been met: (1) the animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target or minefield location; (3) the mitigation zone has been clear from any additional sightings for 10 min.; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

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

Activities involving non-explosive bombing and mine laying involve aircraft deploying munitions or mine shapes from a relatively steady altitude of approximately 1,500 ft. at a surface target or in an intended minefield located beneath the aircraft. Due to the mitigation zone size, proximity to the observation platform, and the good vantage point from an aircraft, Lookouts will be able to observe the entire mitigation zone during approach of the target or intended minefield location. Observing for indicators of marine mammal and sea turtle presence will further help avoid or reduce potential impacts on these resources within the mitigation zone.

5.4 Mitigation Areas to be Implemented

The first section (Section 5.4.1, Mitigation Areas for Seafloor Resources) describes mitigation areas that are designed to avoid or reduce potential impacts on seafloor resources throughout the Study Area. The remaining sections are organized by geographic region.

5.4.1 Mitigation Areas for Seafloor Resources

As outlined in Table 5.4-1 and shown in Figure 5.4-1, Figure 5.4-2, and Figure 5.4-3, the Navy will implement mitigation to avoid or reduce potential impacts on biological or cultural resources that are not observable by Lookouts from the water's surface (i.e., resources for which procedural mitigation cannot be implemented).

5.4.1.1 Resource Description

Seafloor resources fulfill important ecosystem functions. Live hard bottom habitats and artificial structures (e.g., artificial reefs, shipwrecks) provide attachment substrate for aquatic vegetation and invertebrates, such as corals, seaweed, seagrass, macroalgae, and sponges. These habitats in turn support a community of organisms, such as fish, shrimp, crabs, barnacles, worms, and sea cucumbers. Shallow-water coral reefs provide substrate, shelter, and food for hundreds of invertebrate species, sea turtles, fishes, and other biological resources. They are one of the most productive and diverse assemblages on Earth.

Dive sites occur throughout nearshore areas of the Study Area where there are shipwrecks, artificial reefs, and shallow-water coral reefs, making these resources highly valuable from a socioeconomic standpoint. Similarly, submerged aquatic vegetation provides important habitat for commercially and recreationally important fish species. Historic shipwrecks are classified as archaeological resources and are an important part of maritime history. For additional information on the biological, cultural, and socioeconomic importance of seafloor resources and their associated ecosystem components, refer to Chapter 3.3 (Vegetation), Chapter 3.4 (Invertebrates), Chapter 3.5 (Habitats), Chapter 3.6 (Fishes), Chapter 3.7 (Marine Mammals), Chapter 3.8 (Reptiles), Chapter 3.10 (Cultural Resources), and Chapter 3.11 (Socioeconomics).

Table 5.4-1: Mitigation Areas for Seafloor Resources

Mitigation Area Description
Stressor or Activity • Explosives • Physical disturbance and strikes
Resource Protection Focus • Shallow-water coral reefs • Live hard bottom • Artificial reefs • Submerged aquatic vegetation • Shipwrecks
Mitigation Area Requirements (year-round) • **Within the anchor swing circle of shallow-water coral reefs, live hard bottom, artificial reefs, submerged aquatic vegetation, and shipwrecks:** – The Navy will not conduct precision anchoring (except in designated anchorages). • **Within a 350-yd. radius of live hard bottom, artificial reefs, submerged aquatic vegetation, and shipwrecks:** – The Navy will not conduct explosive mine countermeasure and neutralization activities or explosive mine neutralization activities involving Navy divers (except in designated locations, such as Truman Harbor and Demolition Key, where these resources will be avoided to the maximum extent practicable). – The Navy will not place mine shapes, anchors, or mooring devices on the seafloor. • **Within a 350-yd. radius of shallow-water coral reefs:** – The Navy will not conduct explosive or non-explosive small-, medium-, and large-caliber gunnery activities using a surface target; explosive or non-explosive missile and rocket activities using a surface target; explosive or non-explosive bombing and mine laying activities; explosive or non-explosive mine countermeasure and neutralization activities; and explosive or non-explosive mine neutralization activities involving Navy divers. – The Navy will not place mine shapes, anchors, or mooring devices on the seafloor. • **Within the Key West Range Complex:** – Vessels will operate within waters deep enough to avoid bottom scouring or prop dredging, with at least a 1-ft. clearance between the deepest draft of the vessel (with the motor down) and the seafloor at mean low water. • **Within the South Florida Ocean Measurement Facility Testing Range:** – The Navy will use real-time geographic information system and global positioning system (along with remote sensing verification) during deployment, installation, and recovery of anchors and mine-like objects and during deployment of bottom-crawling unmanned underwater vehicles in waters deeper than 10 ft. to avoid shallow-water coral reefs and live hard bottom. – Vessels deploying anchors, mine-like objects, and bottom-crawling unmanned underwater vehicles will aim to hold a relatively fixed position over the intended mooring or deployment location using a dynamic positioning navigation system with global positioning system. – The Navy will minimize vessel movement and drift in accordance with mooring installation and deployment plans and will conduct activities during sea and wind conditions that allow vessels to maintain position and speed control during deployment, installation, and recovery of anchors, mine-like objects, and bottom-crawling unmanned underwater vehicles. – Vessels will operate within waters deep enough to avoid bottom scouring or prop dredging, with at least a 1-ft. clearance between the deepest draft of the vessel (with the motor down) and the seafloor at mean low water. – The Navy will not anchor vessels or spud over shallow-water coral reefs and live hard bottom. – The Navy will use semi-permanent anchoring systems that are assisted with riser buoys over soft bottom habitats to avoid contact of mooring cables with shallow-water coral reefs and live hard bottom.

5.4.1.2 Mitigation Area Assessment

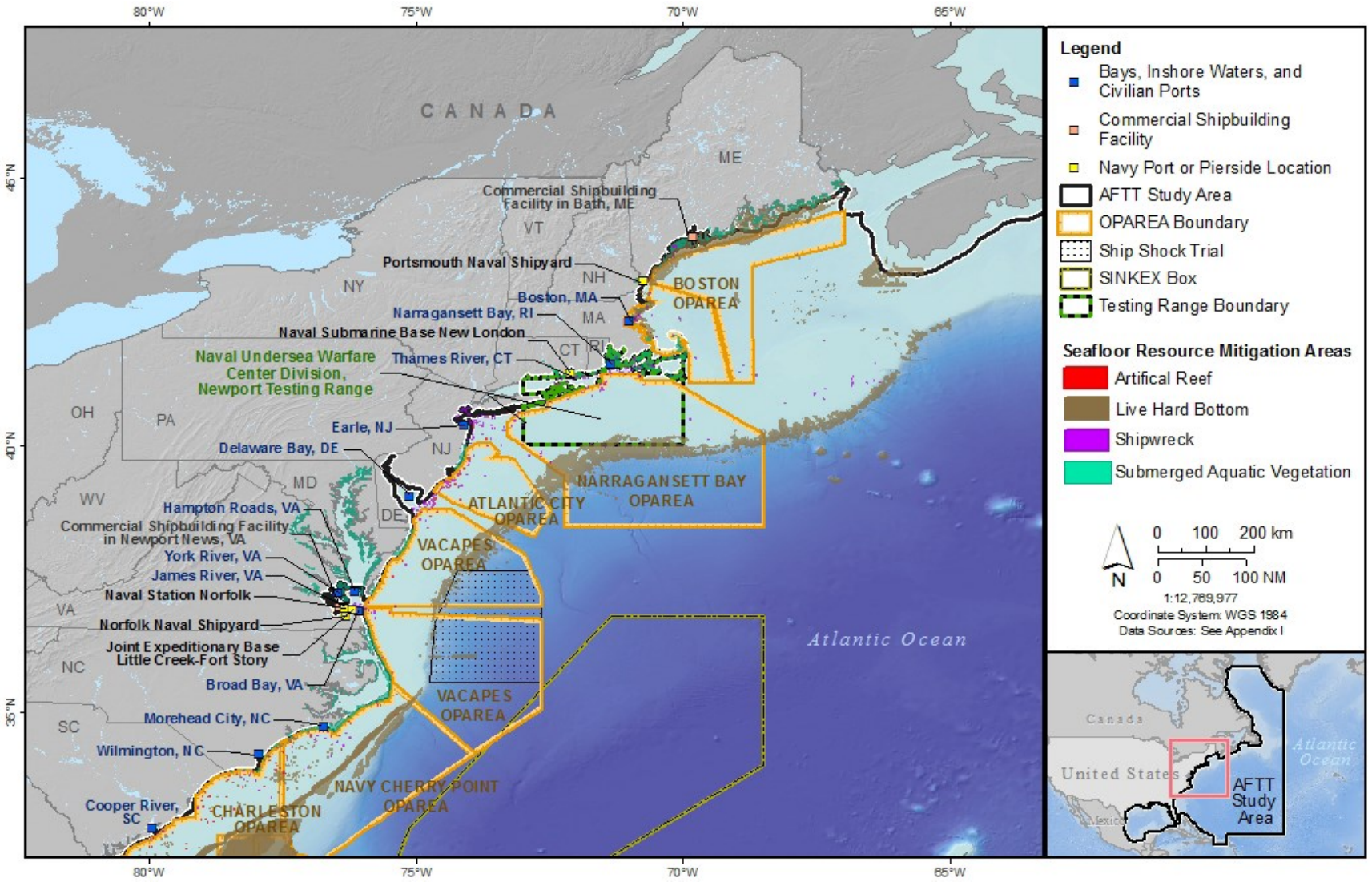
Without mitigation, explosives and physical disturbance and strike stressors could potentially impact shallow-water coral reefs, live hard bottom, artificial reefs, submerged aquatic vegetation, shipwrecks, and their associated ecosystem components during certain training and testing activities in the Study Area. The Navy developed mitigation areas as either the anchor swing circle diameter or a 350-yd. radius around a seafloor resource, as indicated by the best available georeferenced data. Mitigating within the anchor swing circle will protect seafloor resources during precision anchoring activities when factoring in environmental conditions that could affect anchoring position and swing circle size, such as winds, currents, and water depth. For other activities applicable to the mitigation, a 350-yd. radius around a

seafloor resource is a conservatively sized mitigation area that will provide protection well beyond the maximum expected impact footprint (e.g., crater and expelled material radius) of the explosives and non-explosive practice munitions used in the Study Area. As described in Appendix F (Military Expended Material and Direct Strike Impact Analysis), the military expended material with the largest footprint that applies to the mitigation is an explosive mine with 650-lb. net explosive weight, which has an estimated impact footprint of approximately 14,800 square ft. and associated radius of 22.7 yd. The 350-yd. mitigation zone is well beyond the maximum expected direct impact footprint for the activities listed in Table 5.4-1, and further mitigates some level of indirect impact from explosive disturbances. Other applicable explosive activities and non-explosive practice munitions have a smaller impact footprint; therefore, the mitigation area will result in additional protection during those activities.

The seafloor resource mitigation areas will help the Navy avoid or reduce potential impacts from explosives and physical disturbance and strike stressors on sensitive seafloor resources and to any biological or cultural resources that inhabit, shelter, rest, feed, or occur in the mitigation areas. As described in Chapter 3.5 (Habitats), other habitats, such as soft bottom, are expected to recover relatively quickly from potential disturbances; therefore, there would be a limited benefit of mitigation for other habitat types. The Navy does not have mitigation specific to scallop beds or deep-sea coral reefs because training and testing activities do not use bottom-placed explosive charges in locations where these resources are known to occur, such as within the Northeast Range Complexes.

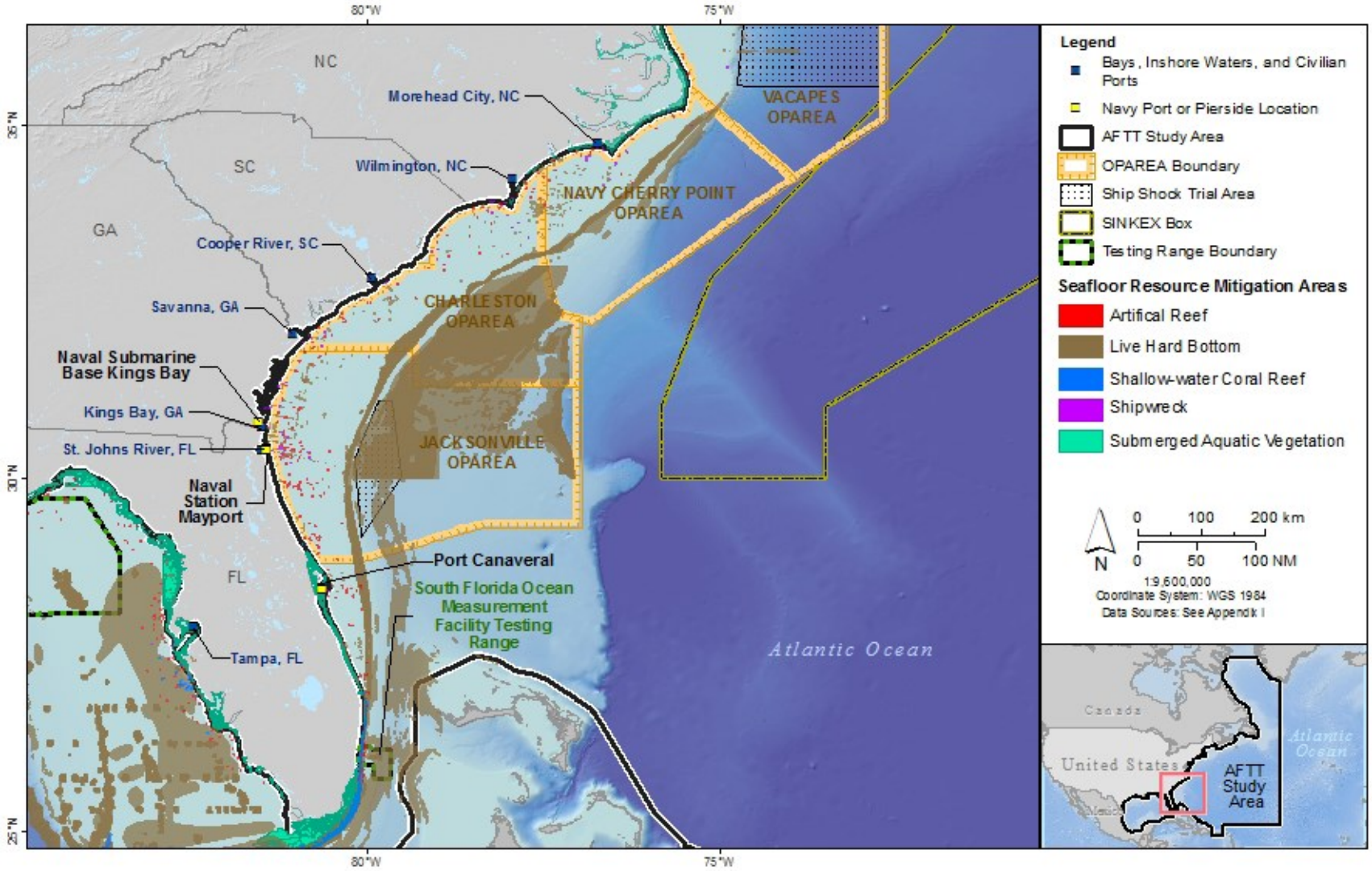
To facilitate mitigation implementation, the Navy will include maps of the best available georeferenced data for shallow-water coral reefs, artificial reefs, live hard bottom, submerged aquatic vegetation, and shipwrecks in its Protective Measures Assessment Protocol. The Navy will include data that most accurately represent the natural boundaries of seafloor resources, as described in *Building and Maintaining a Comprehensive Database and Prioritization Scheme for Overlapping Habitat Data* (U.S. Department of the Navy, 2018b). Data presented in Chapter 3.3 (Vegetation), Chapter 3.4 (Invertebrates), Chapter 3.5 (Habitats), and Chapter 3.10 (Cultural Resources) will serve as the baseline of best available georeferenced data for seafloor resource mitigation areas. Mitigation areas apply to georeferenced resources because the Navy requires accurate resource identification and mapping for mitigation to be effective and practical to implement.

Input from the operational community indicates that the mitigation detailed in Table 5.4-1 is practical to implement. Implementing additional mitigation for other activities or types of seafloor resources would not allow the Navy to continue meeting its mission requirements to successfully accomplish military readiness objectives. Expanding the mitigation to protect additional seafloor features where marine species are known to occur (e.g., soft bottom, which provides habitat for resources such as worms and clams) would essentially result in the Navy not conducting training and testing activities along the entire U.S. Atlantic Coast and in the Gulf of Mexico. This would prohibit the Navy from accessing a majority of its ranges and operating areas and conducting the Proposed Action in environments that are analogous to where the military operates, or may need to operate in the future, which would prevent it from meeting its mission requirements. This would also push training and testing activities farther offshore, which would have implications for safety and sustainability. Moving activities farther offshore would increase the distance from aircraft emergency landing fields, critical medical facilities, and search and rescue capabilities; would require excessive time on station or time away from homeport for Navy personnel; and would result in significant increases to operational costs.



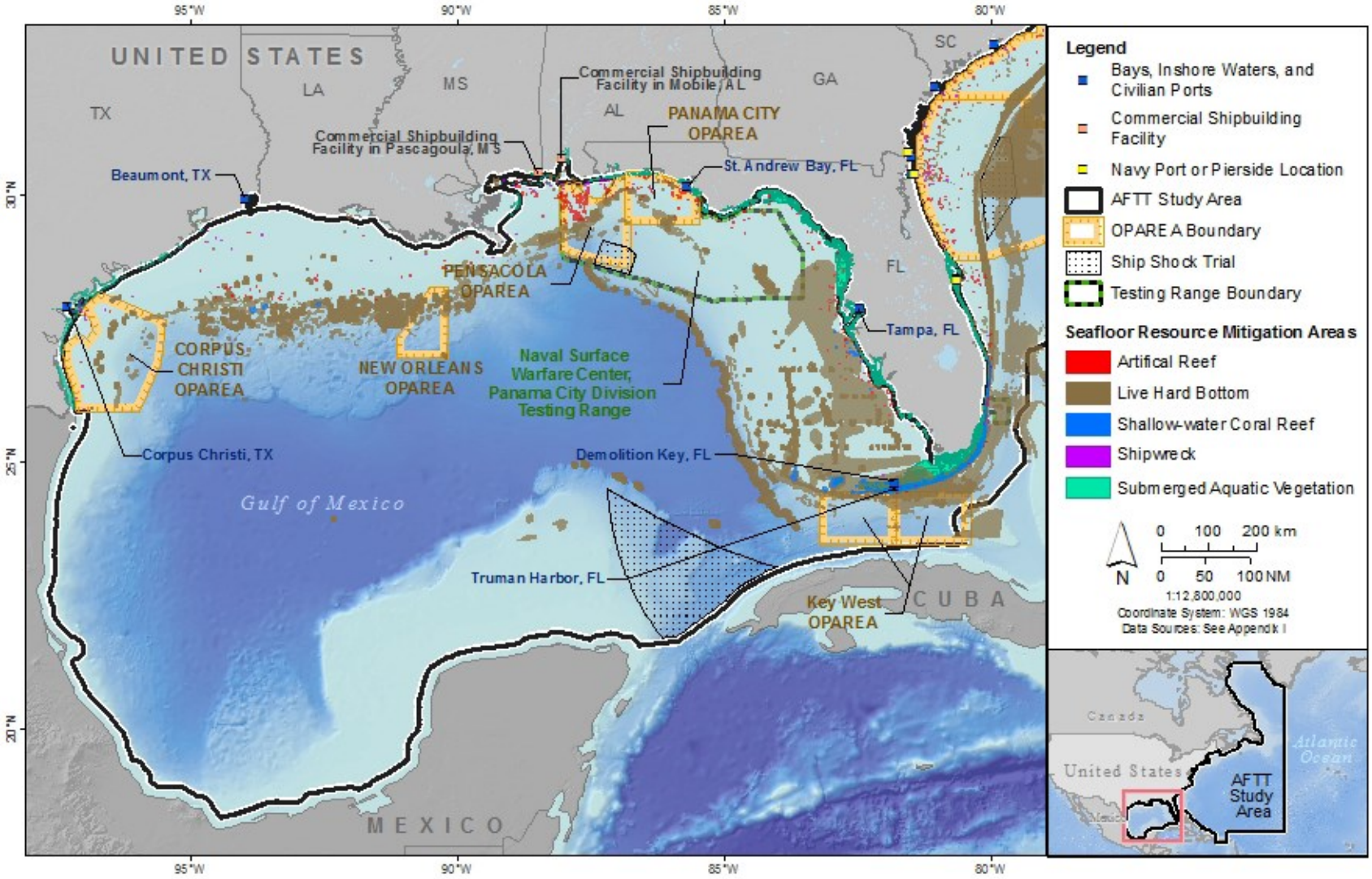
Notes: AFTT: Atlantic Fleet Training and Testing; OPAREA: Operating Area; SINKEX: sinking exercise; VACAPES: Virginia Capes

Figure 5.4-1: Seafloor Resource Mitigation Areas off the Northeastern United States



Notes: AFTT: Atlantic Fleet Training and Testing; OPAREA: Operating Area; SINKEX: sinking exercise; VACAPES: Virginia Capes

Figure 5.4-2: Seafloor Resource Mitigation Areas off the Mid-Atlantic and Southeastern United States



Notes: AFTT: Atlantic Fleet Training and Testing; OPAREA: Operating Area

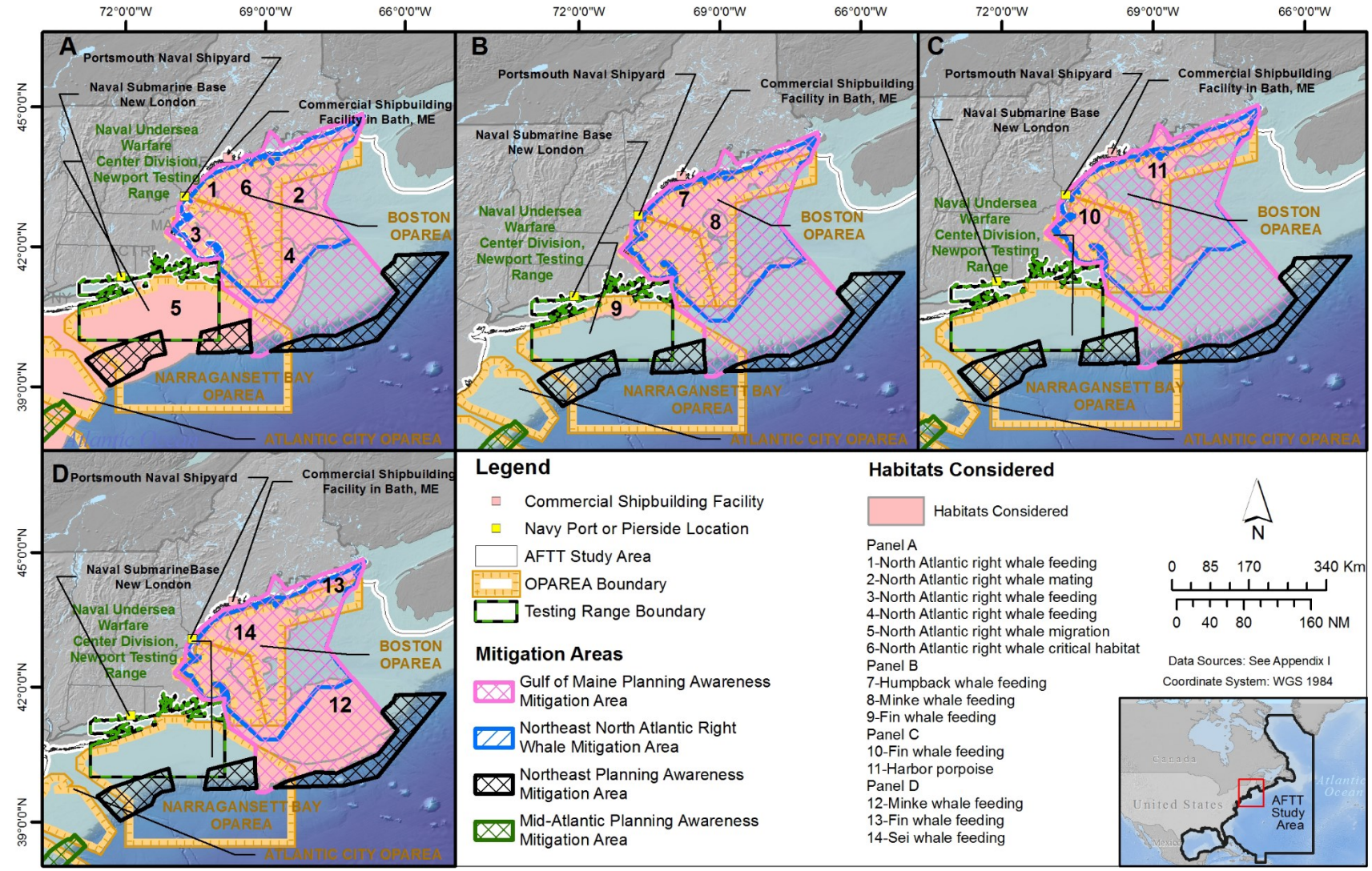
Figure 5.4-3: Seafloor Resource Mitigation Areas in the Gulf of Mexico

5.4.2 MITIGATION AREAS OFF THE NORTHEASTERN UNITED STATES

As described in Table 5.4-2 and shown in Figure 5.4-4, the Navy will implement mitigation within mitigation areas off the northeastern United States to, in combination with procedural mitigation, effect the least practicable adverse impact on marine mammal species or stocks and their habitat.

Table 5.4-2: Mitigation Areas off the Northeastern United States

Mitigation Area Description
Stressor or Activity • Sonar • Explosives • Physical disturbance and strikes
Resource Protection Focus • Marine mammals
Mitigation Area Requirements (year-round) • **Northeast North Atlantic Right Whale Mitigation Area:** – The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area (i.e., the northeast North Atlantic right whale critical habitat) in its annual training and testing activity reports submitted to NMFS. – The Navy will minimize the use of low-frequency active sonar, mid-frequency active sonar, and high-frequency active sonar to the maximum extent practicable within the mitigation area. – The Navy will not use Improved Extended Echo Ranging sonobuoys (within 3 NM of the mitigation area), explosive and non-explosive bombs, in-water detonations, and explosive torpedoes within the mitigation area. – For activities using non-explosive torpedoes within the mitigation area, the Navy will conduct activities during daylight hours in Beaufort sea state 3 or less. The Navy will use three Lookouts (one positioned on a vessel and two in an aircraft during dedicated aerial surveys) to observe the vicinity of the activity. An additional Lookout will be positioned on the submarine, when surfaced. Immediately prior to the start of the activity, Lookouts will observe for floating vegetation and marine mammals; if observed, the activity will not commence until the vicinity is clear or the activity is relocated to an area where the vicinity is clear. During the activity, Lookouts will observe for marine mammals; if observed, the activity will cease. To allow a sighted marine mammal to leave the area, the Navy will not recommence the activity until one of the following conditions has been met: (1) the animal is observed exiting the vicinity of the activity; (2) the animal is thought to have exited the vicinity of the activity based on a determination of its course, speed, and movement relative to the activity location; or (3) the area has been clear from any additional sightings for 30 min. During transits and normal firing, ships will maintain a speed of no more than 10 knots. During submarine target firing, ships will maintain speeds of no more than 18 knots. During vessel target firing, vessel speeds may exceed 18 knots for brief periods of time (e.g., 10–15 min.). – Before vessel transits within the mitigation area, the Navy will conduct a web query or email inquiry to the National Oceanographic and Atmospheric Administration Northeast Fisheries Science Center's North Atlantic Right Whale Sighting Advisory System to obtain the latest North Atlantic right whale sightings information. Vessels will use the sightings information to reduce potential interactions with North Atlantic right whales during transits. Vessels will implement speed reductions within the mitigation area after observing a North Atlantic right whale, if transiting within 5 NM of a sighting reported to the North Atlantic Right Whale Sighting Advisory System within the past week, and if transiting at night or during periods of reduced visibility. • **Gulf of Maine Planning Awareness Mitigation Area:** – The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. – The Navy will not conduct >200 hours of hull-mounted mid-frequency active sonar per year within the mitigation area. – The Navy will not conduct major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) within the mitigation area. If the Navy needs to conduct a major training exercise within the mitigation area in support of training requirements driven by national security concerns, it will confer with NMFS to verify that potential impacts are adequately addressed in this Final EIS/OEIS and associated consultation documents. • **Northeast Planning Awareness Mitigation Areas:** – The Navy will avoid conducting major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) within the mitigation area to the maximum extent practicable. – The Navy will not conduct more than four major training exercises per year within the mitigation area (all or a portion of the exercise). If the Navy needs to conduct additional major training exercises in the mitigation area in support of training requirements driven by national security concerns, it will provide NMFS with advance notification and include the information in its annual training and testing activity reports submitted to NMFS.



Notes: AFTT: Atlantic Fleet Training and Testing; OPAREA: Operating Area

Figure 5.4-4: Mitigation Areas and Habitats Considered off the Northeastern United States

5.4.2.1 Resource Description

The Navy assessed the northeastern United States region for potential mitigation areas. The assessment included, but was not limited to, the following marine mammal areas that have been established by NMFS as critical habitat or identified by LaBrecque et al. (2015b) as biologically important areas (as shown in Figure 5.4-4 and described in the sections below):

- Fin whale feeding area in the northern Gulf of Maine (June through October)
- Fin whale feeding area in the southern Gulf of Maine (year-round)
- Fin whale feeding area east of Montauk Point (March through October)
- Harbor porpoise small and resident population in the Gulf of Maine (July through September)
- Humpback whale feeding area in the Gulf of Maine, Stellwagen Bank, and the Great South Channel (March through December)
- Minke whale feeding area in the central Gulf of Maine - Parker Ridge and Cashes Ledge (March through November)
- Minke whale feeding area in the southwestern Gulf of Maine and Georges Bank (March through November)
- North Atlantic right whale critical habitat (northeastern U.S. foraging area; year-round)
- North Atlantic right whale mating area in the central Gulf of Maine (November through January)
- North Atlantic right whale feeding area on Jeffreys Ledge (June through July, October through December)
- North Atlantic right whale feeding area on Cape Cod Bay and Massachusetts Bay (February through April)
- North Atlantic right whale feeding area in the Great South Channel and on the northern edge of Georges Bank (April through June)
- North Atlantic right whale migratory corridor along the U.S. East Coast (upper portion) (November through December, March through April)
- Sei whale feeding area in the Gulf of Maine (May through November)

5.4.2.1.1 Fin Whales

Three areas in the AFTT Study Area were identified as biologically important fin whale feeding areas by LaBrecque et al. (2015b): (1) June to October in the northern Gulf of Maine; (2) year-round in the southern Gulf of Maine; and (3) March to October east of Montauk Point, which is located off the eastern tip of Long Island, New York. These areas were substantiated through vessel-based survey data, photo-identification data, and expert judgment.

New England waters are considered the primary feeding grounds for fin whales (Waring et al., 2016). Fin whales are often seen closer to shore after periodic patterns of upwelling (upward water motion) and the resultant increased prey density (Azzellino et al., 2008). This species is highly adaptable, often following its prey off the continental shelf (Azzellino et al., 2008; Panigada et al., 2008). Fin whales feed primarily in higher latitudes from March through October when primary prey availability is high (Mizroch et al., 1984a), but more recently have been found to also feed in more southerly latitudes (Silva et al., 2013). An important fin whale feeding area is located south of New England and directly east of Montauk Point between the 15-meter (m) and 50-m contours (Hain et al., 1992). Though most of the published literature on fin whale feeding areas is based on data more than 10 years old, LaBrecque et al.

(2015b) noted that unpublished sighting data of feeding fin whales from the Provincetown Center for Coastal Studies (1984–2011) spatially coincide with previously published data, indicating that these feeding areas continue to be important to the species. Data from Waring et al. (2016) and Palka (2012) also show that fin whales continue to use these areas at least seasonally.

Fin whale sightings and acoustic detections are highest in New England waters during spring and summer (Hain et al., 1992; Morano et al., 2012b; Waring et al., 2014). Agler et al. (1993) reported that fin whales were seen in the southern Gulf of Maine from March to October, while fin whales in the northern Gulf of Maine were seen only from June to October. In the southwestern Gulf of Maine, Provincetown Center for Coastal Studies recorded sightings of feeding fin whales in all months of the year; therefore, feeding in the southern Gulf of Maine is considered to occur year-round (LaBrecque et al., 2015b).

Multi-year photo-identification data from the Gulf of Maine and Massachusetts Bay shows that individual fin whales displayed site fidelity over successive years. There is evidence of site fidelity by females and potentially some segregation by sexual, maturational, or reproductive class in the feeding areas (Agler et al., 1993; Waring et al., 2016). Photo-identification records from 1974–1988 show that female fin whales exhibit feeding site fidelity in the lower Bay of Fundy, Seal Island, and Mt. Desert in the northern Gulf of Maine and in the Great South Channel, Jeffreys Ledge, and Stellwagen Bank in the southern Gulf of Maine (Agler et al., 1993). Photo-identification records from 1980–1987 identified 156 individual fin whales within the Massachusetts Bay area feeding grounds (Seipt et al., 1990). Approximately 62 percent of these individuals were observed more than once and 45 percent were photographed in multiple years (some as many as 8 years) (Seipt et al., 1990).

For additional information about fin whale habitats and geographic range, see Section 3.7.2.2.4.2 (Habitat and Geographic Range).

5.4.2.1.2 Harbor Porpoise

One area in the AFTT Study Area was identified as a biologically important area for a small and resident population of harbor porpoises in the Gulf of Maine from July through September (LaBrecque et al., 2015b). The area was delineated based on NMFS vessel and aerial surveys, genetic analyses, strandings, and bycatch reports, which have identified the area as having high concentrations of harbor porpoises seasonally (LaBrecque et al., 2015b).

In the U.S. Atlantic Ocean, harbor porpoises occur from the Bay of Fundy to North Carolina. From July to September, harbor porpoises are generally concentrated in the northern Gulf of Maine and southern Bay of Fundy region in waters shallower than 150 m (Gaskin, 1977; Kraus et al., 1983; Palka, 1995a; Palka, 1995b), with a few sightings in the upper Bay of Fundy and on the northern edge of Georges Bank (Palka, 2000). From October to December and April to June, harbor porpoises are widely dispersed from New Jersey to Maine, with lower densities farther north and south. From January to March, intermediate densities of harbor porpoises are found in waters off New Jersey to North Carolina, and lower densities are found in waters off New York to New Brunswick, Canada (Waring et al., 2016).

Unlike other cetacean species that use the Gulf of Maine and Bay of Fundy in the summer, harbor porpoises do not appear to have seasonal migrations or well-defined migration routes in the region (LaBrecque et al., 2015b). Some portion of the population is thought to use the region year-round (National Marine Fisheries Service, 2014; National Oceanic and Atmospheric Administration, 2015). Satellite tagging from 1994 and 1995 showed that some harbor porpoises were commonly found in the waters around the 92-m isobath, suggesting that this area may be used for migrations from the Bay of

Fundy to the lower Gulf of Maine (Read & Westgate, 1997); however, additional data are needed to verify the species' movement patterns.

For additional information about harbor porpoise habitats and geographic range, see Section 3.7.2.3.27.2 (Habitat and Geographic Range).

5.4.2.1.3 Humpback Whales

One area in the AFTT Study Area was identified by LaBrecque et al. (2015b) as a biologically important area for humpback whale feeding from March to December. The feeding area includes the Gulf of Maine, Stellwagen Bank, and the Great South Channel. It has been substantiated through photo-identification data, aerial and vessel survey data, radio tracking data, and expert judgment (LaBrecque et al., 2015b).

Humpback feeding habitats are typically shallow banks or ledges with high seafloor relief (Hamazaki, 2002; Payne et al., 1990a). In the western North Atlantic, humpback whales feed during spring, summer and fall over a large geographic range that includes the Gulf of Maine, Gulf of St. Lawrence, Newfoundland Grand Banks, Labrador Sea, West Greenland, and Scotian Shelf (Cetacean and Turtle Assessment Program, 1982; Kenney & Winn, 1986; Stevick et al., 2006; Whitehead, 1982). Roberts et al. (2016) habitat-based density modeling depicted the areas of highest occurrence to be located south of Jeffreys Ledge, including Stellwagen Bank, the Great South Channel, and western Georges Bank.

Humpback whale ecology in the Gulf of Maine has been studied since the mid-1970s (Clapham & Mayo, 1987; Clapham & Mattila, 1990; Clapham et al., 1993; Hazen et al., 2009; Payne et al., 1986; Weinrich et al., 1997; Weinrich & Kuhlberg, 1991). The Gulf of Maine stock of humpback whales was designated as a separate feeding stock based on the strong site fidelity displayed by individual whales within the region (Waring et al., 2016). Humpback whales feed in the Gulf of Maine from March through December, with most feeding activity observed in June and July. Humpback whale distribution in this region has been largely correlated to abundance of prey species, although behavior and bathymetry are factors influencing foraging strategy (Payne et al., 1990b). Humpback whales are frequently piscivorous when in New England waters, feeding on herring (*Clupea harengus*), sand lance (*Ammodytes* spp.), and other small fishes. In the northern Gulf of Maine, euphausiids are also a frequent prey item (Paquet et al., 1997). Payne et al. (1986) suggested that an increase in the number of humpback whale sightings in the southwest Gulf of Maine since 1978 was concurrent with an increase in the number of sand lance in the same area. However, a significant correlation between humpback whale sightings on Georges Bank where sand lance was abundant was not found. Researchers found that environmental factors, such as topography, combined with foraging behavior (and not solely prey distribution) influence humpback whale feeding distribution (Payne et al., 1986).

For additional information about humpback whale habitats and geographic range, see Section 3.7.2.3.1.2 (Habitat and Geographic Range).

5.4.2.1.4 Minke Whales

Two areas in the AFTT Study Area were identified as biologically important areas for minke whale feeding from March to November by LaBrecque et al. (2015b): (1) Central Gulf of Maine around Parker Ridge and Cashes Ledges, and (2) waters shallower than 200-m in the southern and southwestern section of the Gulf of Maine, including Georges Bank, the Great South Channel, Cape Cod Bay, Massachusetts Bay, Stellwagen Bank, Cape Anne, and Jeffreys Ledge. Identification of these areas was substantiated through vessel-based survey data and expert judgment (LaBrecque et al., 2015b).

Minke whales are most abundant in New England waters from May through September, including the Gulf of Maine, Cape Cod Bay, Great South Channel, and Georges Bank (Waring et al., 2016). Year-round acoustic monitoring in Stellwagen Bank (2006 and 2007–2010) detected minke whale vocalizations from August to mid-November, with 88 percent of detections made in September and October and only a few detections made from March to June (Risch et al., 2013). Minke whales appear to be largely absent in New England waters in winter (LaBrecque et al., 2015b; Risch et al., 2013). Roberts et al. (2016) habitat-based density modeling depicts a markedly higher density of minke whales in these areas from April through October.

Minke whales have been observed feeding in the Great South Channel and adjacent waters from March through November (LaBrecque et al., 2015b). During vessel-based surveys from 1988 to 2011, the Provincetown Center for Coastal Studies recorded 19 sightings of individual minke whales feeding in waters shallower than 150 m along the northern edge of Georges Bank, Great South Channel, and Stellwagen Bank, and off Race Point, Massachusetts (LaBrecque et al., 2015b). From 1998 to 2009, the Northeast Fisheries Science Center aerial survey team recorded 15 sightings of minke whales feeding during all survey months (March to July and October) in waters shallower than 200 m (LaBrecque et al., 2015b). Twenty-one observations of surface feeding were recorded from March through September during surveys within the 100-m isobath in the Great South Channel, along Cape Anne, and at Jeffreys Ledge (Cetacean and Turtle Assessment Program, 1982). Between 1979 and 1992, there were 27 confirmed sightings of minke whales surface feeding in Cape Cod Bay, Massachusetts Bay, and at Stellwagen Bank (Murphy, 1995). Feeding group size was recorded in 24 of the 27 sightings. Two sightings were of pairs, one sighting was of three individuals, and the remaining sightings were of single individuals.

For additional information about minke whale habitats and geographic range, see Section 3.7.2.3.2.2 (Habitat and Geographic Range).

5.4.2.1.5 North Atlantic Right Whales

One area in the AFTT Study Area has been designated by NMFS as critical habitat for North Atlantic right whale feeding, which includes the Gulf of Maine and Georges Bank region. As described in Section 3.7.2.2.2.2 (Habitat and Geographic Range), NMFS designated the critical habitat in 2016 to replace two smaller critical habitats that had been previously designated in 1994. Overlapping this critical habitat are four areas that were identified by LaBrecque et al. (2015b) as biologically important areas for North Atlantic right whales: (1) a feeding area on Jeffreys Ledge (June through July, October through December), (2) feeding areas in Cape Cod Bay and Massachusetts Bay (February through April), (3) feeding areas in the Great South Channel and the northern edge of Georges Bank (April through June), and (4) a migration area (November through December, March through April).

North Atlantic right whales primarily feed on copepods (a type of zooplankton) (Jefferson et al., 2015; Waring et al., 2016) off the northeastern United States between February and December (Baumgartner & Mate, 2003; Baumgartner et al., 2003; Kenney et al., 1986; Weinrich et al., 2000). North Atlantic right whales arrive in Cape Bod Bay and Massachusetts Bay to feed in late winter, with peak abundance in March and April (Hamilton & Mayo, 1990; Mayo et al., 2004; National Oceanic and Atmospheric Administration, 2012). Passive acoustic monitoring studies indicate that North Atlantic right whale presence and calls are persistent in Massachusetts Bay throughout most of the year, except during July and August (Morano et al., 2012a; Mussoline et al., 2012). Call rates have been found to be highest from January through May with a peak in April (Mussoline et al., 2012).

Aerial surveys conducted by NMFS and the Provincetown Center for Coastal Studies in the springs of 1999–2006 found North Atlantic right whales along the northern edge of Georges Bank, in the Great South Channel, in Georges Basin, and in various locations in the Gulf of Maine. The sightings data show that North Atlantic right whales display a strong seasonal occurrence in these areas (Pace & Merrick, 2008). Most spring feeding in the Great South Channel and northern edge of Georges Bank takes place from April to June with a peak in May (Cetacean and Turtle Assessment Program, 1982; Kenney et al., 1995). Tagged North Atlantic right whales have been found to forage at the surface and near the seafloor in the Great South Channel, depending on copepod depth in the water column (Baumgartner et al., 2011; Winn et al., 1995).

Individual North Atlantic right whales and mother-calf pairs depart the Great South Channel for the Bay of Fundy and Roseway Basin in late summer and fall (Brown et al., 2009). During this time, whales have been observed feeding at Jeffreys Ledge in the western Gulf of Maine. Recorded feeding activity at Jeffreys Ledge has been compiled from Cetacean and Turtle Assessment Program (1982) surveys, whale-watching trips, and the North Atlantic right whale sightings database. Each source of data recognized two seasonal peaks: summer sightings from July to August primarily of mother-calf pairs, and fall sightings from October to December of all age classes. Jeffreys Ledge may serve as a stopover feeding area, especially for whales transiting between more northerly waters (Weinrich et al., 2000). Sightings at Jeffreys Ledge peak between October and November (Weinrich et al., 2000; Weinrich et al., 2005). Skim feeding and near-surface feeding have been observed during the fall (Longley, 2012; Weinrich et al., 2000). Acoustic monitoring at Jeffreys Ledge (2004–2005) has detected North Atlantic right whale calls from November to May, with the highest call rates from November to February (Mussoline et al., 2012). More dedicated surveys during the fall and early winter, as well as studies of the physical and oceanographic characteristics of Jeffreys Ledge, would provide more insight into the importance of this area as habitat for North Atlantic right whales (Weinrich et al., 2000).

In addition to the feeding areas, one location in the AFTT Study Area was identified by LaBrecque et al. (2015b) as a biologically important area for North Atlantic right whale mating based on a demographic comparison of North Atlantic right whale habitats conducted by Cole et al. (2013). The mating area is in the central Gulf of Maine and includes the Outer Falls and Cashes Ledge. Some North Atlantic right whales (mostly pregnant females and juveniles) return to the calving grounds off the southeastern United States in December and January, but the location of the rest of the population during the winter months is currently unknown. It is believed that the remaining population resides in the cold, offshore waters off the northeastern United States where prey availability is high (Bort et al., 2015). Research suggests that North Atlantic right whales are present in the Gulf of Maine throughout the winter and may be using the central Gulf of Maine, including Outer Falls and Cashes Ledge, as a potential mating area (Bort et al., 2015; Cole et al., 2013). Cole et al. (2013) found that North Atlantic right whales aggregate in the central Gulf of Maine during their believed conception period from November to January. A large number of reproductively successful males and females occur in this area during these months, when compared to other regions that were analyzed, such as the Bay of Fundy, Great South Channel, and Jeffreys Ledge. About half of the North Atlantic right whale population was sighted in this area between 2002 and 2008. Slightly less than half the individuals were identified as males, including some that were known fathers. Passive acoustic monitoring conducted by Bort et al. (2015) also showed that the central Gulf of Maine is a seasonally important habitat for right whales, with male display and mating behaviors possibly occurring at high rates in this area. Cole et al. (2013) does not refute the idea of conception possibly occurring outside of the identified mating area during the believed conception period, or that this population may have another mating area that has yet to be identified. Longley

(2012) proposed that in addition to feeding, North Atlantic right whales may use Jeffreys Ledge for mating. The timing of North Atlantic right whale sightings at Jeffreys Ledge corresponds with the timing of when mating is believed to occur (Kraus et al., 2007); however, mating activities in this area have yet to be confirmed. A longer term dataset is needed to better understand how North Atlantic right whales use the central Gulf of Maine for mating (Cole et al., 2013).

LaBrecque et al. (2015b) also identified a biologically important area for North Atlantic right whale migration off the U.S. Atlantic coast from November through December and March through April. Section 5.4.3.1.3 (North Atlantic Right Whales) presents a discussion of the southern portion of the migration habitat. In the northeast, the migration habitat overlaps a portion of the northeastern North Atlantic right whale critical habitat and feeding areas. North Atlantic right whales undertake large seasonal migrations. LaBrecque et al. (2015b) identified a migratory corridor along the East Coast of the United States. The migratory corridor is used by North Atlantic right whales during southward migrations in November and December to calving grounds, and northward migrations in March and April to feeding areas, the Bay of Fundy, and other unknown areas (Kenney, 2008; Roberts et al., 2016; Whitt et al., 2013). The subset of the population that has been observed migrating between the northern feeding grounds and southern calving grounds includes reproductively mature and pregnant females, juveniles, and young calves (Federal Register 81 [17]: 4838-4874). North Atlantic right whales are believed to migrate along the continental shelf (Schick et al., 2009; Whitt et al., 2013); however, it is unknown if the whales use the whole shelf area or just the nearshore waters (LaBrecque et al., 2015b). Tagging results from an analysis by Schick et al. (2009) suggest that the migratory corridor is broader than was initially estimated, and that suitable habitat exists beyond 20 NM from the coast, a distance that is presumed to represent the primary migratory pathway (National Marine Fisheries Service, 2008). NMFS has not defined critical habitat for North Atlantic right whale migration due to the lack of information on migratory routes and the lack of data needed to identify essential physical and biological features (Federal Register 81 [17]: 4838-4874).

For additional information about North Atlantic right whale habitats and geographic range, see Section 3.7.2.2.2.2 (Habitat and Geographic Range).

5.4.2.1.6 Sei Whales

One area in the AFTT Study Area was identified as a biologically important area for sei whale feeding from May to November by LaBrecque et al. (2015b). The identification of this area was substantiated thorough vessel and aerial survey data, feeding information from commercial whale watching trips, and expert judgment (LaBrecque et al., 2015b). The area extends from the 25-m contour off coastal Maine and Massachusetts to the 200-m contour in the central Gulf of Maine, including the northern shelf break area of Georges Bank. The feeding area also includes the southern shelf break area of Georges Bank from 100–2,000 m and the Great South Channel.

The sei whale is the only rorqual species that seems to have evolved the ability to capture prey both by engulfment (as do the other rorquals) or by skimming on relatively low prey concentrations (as do North Atlantic right whales and bowhead whales) (Prieto et al., 2012). This adaptation is reflected in the variety of prey recorded for the species. The sei whale has the most extensive diet of any baleen whale, which includes copepods, euphausiids, amphipods, decapods, cephalopods, and fish. Prey preferences are highly dependent on ocean basin and swarming characteristics of the prey (Prieto et al., 2012). Sei whales in the North Atlantic are largely planktivorous, feeding primarily on copepods, and secondarily on euphausiids (Baumgartner et al., 2011; Cetacean and Turtle Assessment Program, 1982; Flinn et al., 2002; Jonsgard & Darling, 1977; Kenney & Winn, 1986; Mizroch et al., 1984b; Prieto et al., 2012).

Baumgartner et al. (2011) suggest that the distribution and vertical migrations of copepods influence the distribution, abundance, and calling behaviors of sei whales in the southwestern Gulf of Maine. Baumgartner and Fratantoni (2008) found that sei whale calling rates increased during the day when vertically migrating copepods were at depth and decreased at night when the copepods had migrated to the surface. Sei whales may be unable to feed on deep layers of copepods, and their increased calling behavior during the day may be associated with a reduction in feeding on copepods and an increase in socializing with conspecifics or switching to a different prey species (Baumgartner & Fratantoni, 2008).

Sei whales were once believed to visit the inshore waters of the Gulf of Maine (including the Great South Channel) only occasionally in response to increases in the availability of copepods (Payne et al., 1990b; Schilling et al., 1992). However, Baumgartner et al. (2011) found sei whales to be reasonably common in the Great South Channel in most years. Sightings from the Cetacean and Turtle Assessment Program (1982) and data from NMFS shipboard surveys (Waring et al., 2014) found peak abundances of sei whales in U.S. Atlantic waters in spring. This was particularly true along the shelf break of Georges Bank, into the Northeast Channel, and southwest to Hydrographer Canyon. Roberts et al. (2016) habitat-based density modeling depicts the highest sei whale densities in the LaBrecque et al. (2015b)-identified feeding areas in May and June. LaBrecque et al. (2015b) suggested that feeding activity in U.S. Atlantic waters was concentrated from May to November, with a peak in July and August; however, the authors did not specify locations.

For additional information about sei whale habitats and geographic range, see Section 3.7.2.2.5.2 (Habitat and Geographic Range).

5.4.2.2 Mitigation Area Assessment

When developing Phase III mitigation, the Navy analyzed the potential for increasing mitigation areas in the Study Area. Based on its ongoing analysis of the best available science and potential mitigation measures, the Navy determined it can implement additional mitigation measures off the northeastern United States under the Proposed Action to enhance protection of marine mammals (including North Atlantic right whales) to the maximum extent practicable. In addition to evaluating areas for marine mammals, the Navy assessed the potential for developing mitigation areas for explosives within Habitat Areas of Particular Concern for sandbar and sand tiger sharks. The Navy does not plan to conduct training or testing activities involving explosives in sandbar and sand tiger shark Habitat Areas of Particular Concern off the northeastern United States; therefore, mitigation for explosives within these areas is not warranted.

New mitigation developed for Phase III includes: (1) enlarging the Northeast North Atlantic Right Whale Mitigation Area to cover the full extent of the northeast North Atlantic right whale critical habitat, (2) developing new special reporting requirements for the use of active sonar and in-water explosives within the Northeast North Atlantic Right Whale Mitigation Area, and (3) developing a new mitigation area known as the Gulf of Maine Planning Awareness Mitigation Area to limit hull-mounted mid-frequency active sonar hours, not conduct major training exercises, and implement special reporting requirements for the use of active sonar and in-water explosives. The remaining mitigation measures presented in Table 5.4-2 are continuations from Phase II.

Mitigation areas off the northeastern United States will avoid or reduce impacts on one or more marine mammal species or stocks and their habitat, as summarized below:

- **Northeast North Atlantic Right Whale Mitigation Area.** The Navy has enlarged the mitigation area to cover the full extent of the northeast North Atlantic right whale critical habitat.

Mitigation to limit the use of active sonar to the maximum extent practicable and not use certain explosive and non-explosive munitions will help the Navy further avoid or reduce potential impacts on North Atlantic right whales year-round in their most important feeding areas, a mating area, and the northern portion of their migration habitat. Conducting non-explosive torpedo activities during daylight hours in Beaufort sea state 3 or less will help increase Lookout effectiveness during these activities. Mitigation to obtain the latest sighting information from the North Atlantic Right Whale Sighting Advisory System will help vessels avoid North Atlantic right whales during training and testing activities. The North Atlantic Right Whale Sighting Advisory System is a National Oceanographic and Atmospheric Administration program that collects sightings information off the northeastern United States from aerial surveys, shipboard surveys, whale watching vessels, and opportunistic sources, such as the U.S. Coast Guard, commercial ships, fishing vessels, and the public. By expanding the size of the Northeast North Atlantic Right Whale Mitigation Area, the Navy will avoid or reduce potential impacts on other marine mammal species within key areas of biological importance, such as humpback whale, minke whale, sei whale, and fin whale feeding areas and a small and resident population of harbor porpoises. The Navy will also implement new special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.

- **Gulf of Maine Planning Awareness Mitigation Area.** Newly developed for Phase III, the Gulf of Maine Planning Awareness Mitigation Area extends throughout the Gulf of Maine and southward over Georges Bank. The mitigation will further help the Navy avoid or reduce potential impacts on marine mammals from active sonar during major training exercises within key areas of biological importance, including North Atlantic right whale critical habitat; a portion of the northern North Atlantic right whale migration area; North Atlantic right whale, humpback whale, minke whale, sei whale, and fin whale feeding areas; a North Atlantic right whale mating area; and a small and resident population of harbor porpoises. The Navy will also implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.
- **Northeast Planning Awareness Mitigation Areas.** The Northeast Planning Awareness Mitigation Areas extend across the shelf break and contain underwater canyons that have been associated with marine mammal feeding and abundance, including within a portion of the Northeast Canyons and Seamounts National Marine Monument. They are situated among highly productive environments, such as persistent oceanographic features associated with upwellings and steep bathymetric contours. Continuing the mitigation within the Northeast Planning Awareness Mitigation Areas will help the Navy further avoid or reduce potential impacts from active sonar during major training exercises on marine mammals that inhabit, feed in, mate in, or migrate through the northeast region. For example, the mitigation areas overlap a portion of the North Atlantic right whale northern migration habitat. Fin whales are known to follow prey off the continental shelf in this region (Azzellino et al., 2008; Panigada et al., 2008). Sei whales have high abundance in two of the mitigation areas along the shelf break of Georges Bank and near Hydrographer Canyon (Waring et al., 2014).

The Navy conducts training and testing activities off the northeastern United States because this region provides valuable access to sea space and airspace conditions analogous to areas where the Navy operates or may need to operate in the future. The Navy uses the Northeast Range Complexes and adjacent waters to support torpedo exercises, tracking exercises, Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection exercises, missile and rocket exercises, Maritime Security Operations – Anti-Swimmer Grenades activities, gunnery exercises, submarine sonar maintenance and system checks, kilo dip tests, at-sea sonar testing, and other air warfare, anti-submarine warfare, mine warfare, expeditionary warfare, and surface warfare activities. The Navy also performs acoustic and oceanographic research in continental shelf areas off the northeastern United States. Research involves active acoustic transmissions used for engineering tests of acoustic sources, validation of ocean acoustic models, tests of signal processing algorithms, and characterization of acoustic interactions with the seafloor.

Training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and other training plans, forecasting of future testing requirements, and emerging requirements. When scheduling activities, the Navy considers the need to minimize sea space and airspace conflicts within the northeast region and throughout the entire Study Area. For example, the Navy schedules training and testing to minimize conflicts between its own activities and with consideration for public safety (e.g., safe distances from commercial or recreational fishing activities). Daily fluctuations in training and testing schedules and objectives could mean that, on any given day, vessels or aircraft may depend on discrete locations of sea space or airspace off the northeastern United States for discrete purposes.

The Navy selects training areas in this region to allow for the realistic tactical development of the myriad training scenarios that Navy units are required to complete to be mission effective. For example, the topography and bathymetry in this region consists of a wide continental shelf leading to the shelf break, which affords a wide range of opportunities to plan and execute training exercises to certify forces to deploy. The Navy selects the locations (e.g., pierside in Boston, Massachusetts) and scenarios for Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection exercises according to Department of Homeland Security strategic goals and evolving world events. The Navy chooses locations for other training activities based on proximity to training ranges (e.g., Boston Operating Area), available airspace (e.g., warning area W-107A in the Atlantic City Range Complex), unobstructed sea space (e.g., throughout the Narragansett Bay Operating Area), and aircraft emergency landing fields (e.g., Quonset Point Air National Guard Base, Quonset Point, Rhode Island).

The Navy conducts testing activities in the northeast region because it provides a variety of bathymetric and environmental conditions necessary to ensure functionality and accuracy of systems and platforms in areas analogous to where the military operates. Testing locations are typically located near systems command support facilities, which provide critical safety, platform, and infrastructure support and technical expertise necessary to conduct testing (e.g., proximity to air squadrons). The Naval Undersea Warfare Center Division, Newport Testing Range provides critical sea space for the use of active sonar during Anti-Submarine Warfare Mission Package Testing events and other testing activities. The Navy has used the same torpedo testing areas in this region for decades because these areas provide critical bathymetric features and consistency for comparative data collection.

The Navy selects locations for acoustic and oceanographic research in the northeast because this region has ideal water depths for important research on shallow-water acoustic propagation. The northeast also has seafloor types that are of particular interest for ocean acoustics research and an abundance of

three-dimensional bathymetric phenomena (e.g., Hudson Canyon). The region provides unique opportunities for the Navy to conduct acoustic and oceanographic research experiments to observe systems with different acoustic parameters (e.g., frequency, directionality, signal) under a variety of environmental conditions (e.g., wind, waves, pre- and post-storms). The Northeast Range Complexes provide one of the most appropriate environments to test mine countermeasure systems during Emerging Mine Countermeasure Technology Research events, when considering how mine systems would be used by an adversary. Logistical support for acoustic and oceanographic research experiments is available from university research vessels and the Naval Undersea Warfare Center Division, Newport.

The Navy requires flexibility in the timing of its use of active sonar and explosives in order to meet individual training and testing schedules and deployment schedules. Navy vessels, aviation squadrons, and testing programs have a limited amount of time available for training and testing. The Navy must factor in variables such as maintenance and weather when scheduling event locations and timing. Major 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. This precludes the ability to completely prohibit major training exercises from occurring in this region. The schedules of other training activities, such as explosive missile exercises, are driven by deployment requirements and national command authority assignments.

The testing community is required to install and test systems on platforms at the locations where those platforms are stationed. Testing associated with new construction ships must occur in locations close to the shipbuilder's facilities in the northeast for reasons associated with construction schedule, proximity to testing ranges and facilities, and safety. Additionally, the testing community has a need for rapid development to quickly resolve tactical deficiencies. For example, due to its positioning within the boundary of the Naval Undersea Warfare Center Division, Newport Testing Range, the Navy will not develop a mitigation area for one of the habitats considered in Section 5.4.2.1 (Resource Description), the area east of Montauk Point that was identified by LaBrecque et al. (2015b) as a biologically important area for fin whale feeding. Overall, training and testing schedules can be cyclical and are partially driven by geo-political situations, which precludes the Navy from implementing additional mitigation to reduce or eliminate the use of active sonar or explosives off the northeastern United States.

The Navy determined that enlarging the Northeast North Atlantic Right Whale Mitigation Area to cover the full extent of the northeast North Atlantic right whale critical habitat, developing the new Gulf of Maine Planning Awareness Mitigation Area, and continuing the mitigation within the Northeast Planning Awareness Mitigation Areas as described in Table 5.4-2 would be practical to implement under the Proposed Action. This determination was based on an operational assessment of past use of active sonar, explosives, and non-explosive practice munitions; projected future training and testing needs in the region; and consideration of fleet concentration areas in the Study Area. The mitigation areas off the northeastern United States as described in Table 5.4-2 represent the largest areas and highest level of mitigation within each area that is practical for the Navy to implement within this region under the Proposed Action. Further modifications of training and testing activities off the northeastern United States would have a significant impact on safety, sustainability, and the Navy's ability to meet its mission requirements.

Expanding the mitigation areas in this region would encroach upon the primary water space where training and testing activities are scheduled to occur. Implementing additional mitigation off the northeastern United States would have a significant impact on the ability for units to meet their

individual training and certification requirements (impacting the ability to deploy with the required level of readiness necessary to accomplish their missions), to certify forces to deploy to meet national security tasking (limiting the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capability in support of national security interests), and for program managers and weapons system acquisition programs to meet testing requirements and required acquisition milestones. Based on the Navy's assessment, additional mitigation in this region would increase operational costs (due to extending distance offshore, which would increase fuel consumption, maintenance, and time on station to complete required training and testing activities), increase safety risks (associated with conducting training and testing at extended distances offshore and farther away from critical medical and search and rescue capabilities), and accelerate fatigue-life of aircraft and ships (leading to increased safety risk and higher maintenance costs). Furthermore, additional mitigation would significantly impact training and testing realism due to reduced access to necessary environmental or oceanographic conditions that replicate military mission and combat conditions. This would diminish the ability for Navy Sailors to train and become proficient in using sensors and weapon systems as required during military missions and combat operations. Prohibiting or modifying certain activities, such as Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection exercises, would also result in impacts on national security.

The iterative and cumulative impact of all potential mitigation measures the Navy assessed, including certain mitigation measures suggested through public comments on the Draft EIS/OEIS, would deny national command authorities the flexibility to respond to national security challenges and effectively accomplish the training necessary for deployment. For example, additional limitations on the use of active sonar and explosives off the northeastern United States would require the Navy to shift its training activities to alternative locations farther offshore, farther south along the Eastern seaboard, or to the Gulf of Mexico. This would have significant impacts on safety, sustainability, and the ability to meet mission requirements within limited available timeframes. Likewise, requiring weapons system program managers and research, testing, and development program managers to use alternative areas within limited available timeframes would deny them the necessary flexibility to rapidly field or develop systems to meet testing program requirements and emerging requirements.

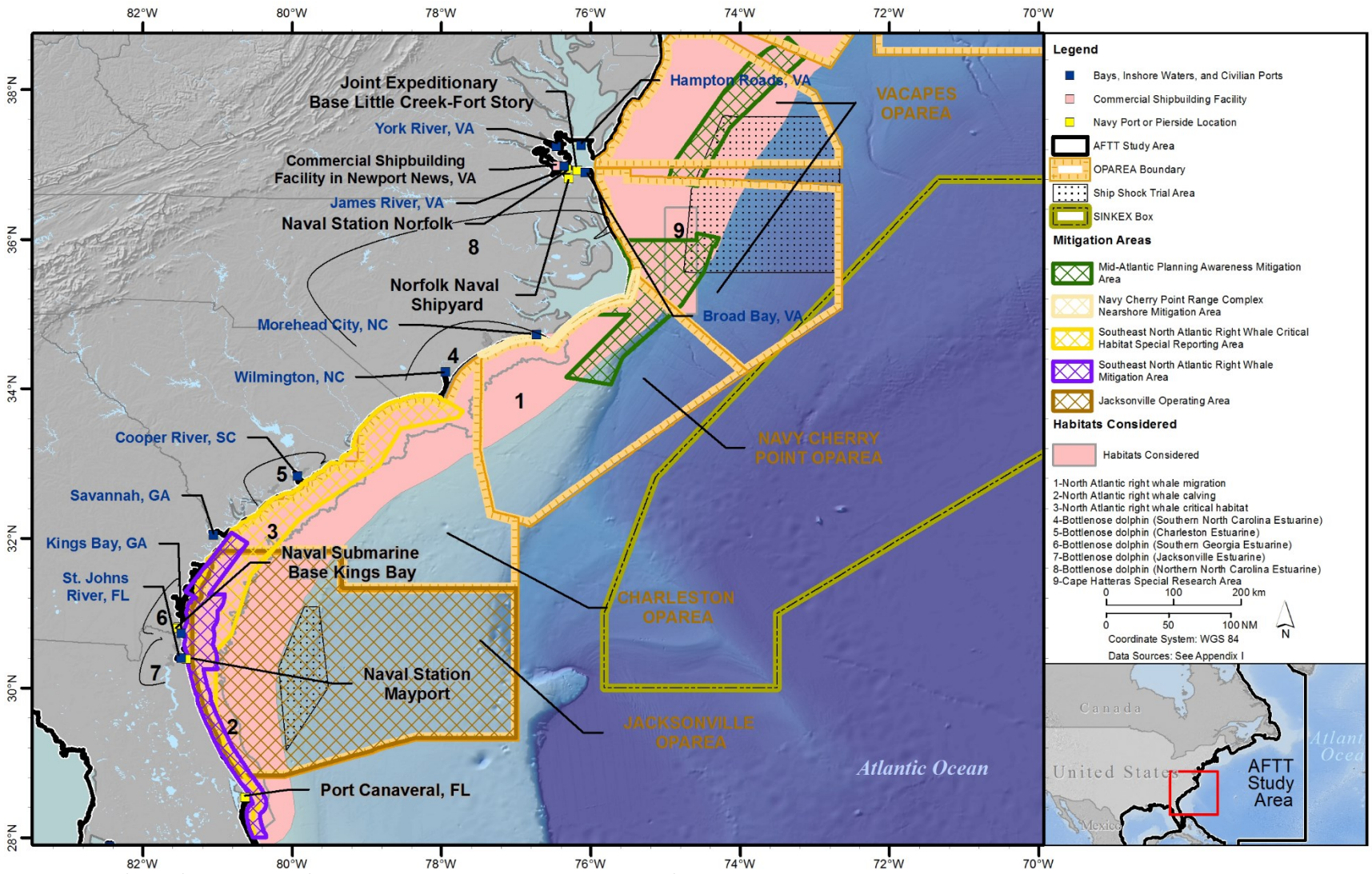
In summary, the Navy developed the mitigation areas identified in Table 5.4-2 to provide further protection for marine mammals in areas the best available science suggests are important for foraging, migrating, and reproduction. The mitigation will help the Navy avoid or reduce potential impacts on harbor porpoises and fin, humpback, minke, North Atlantic right, and sei whales within the mitigation areas. Further restrictions off the northeastern United States on the level, number, or timing (seasonal or time of day) of training and testing activities would be impractical to due implications for safety, sustainability, and mission requirements.

5.4.3 Mitigation Areas off the Mid-Atlantic and Southeastern United States

As described in Table 5.4-3 and shown in Figure 5.4-5, the Navy will implement mitigation within mitigation areas off the mid-Atlantic and southeastern United States to, in combination with procedural mitigation, effect the least practicable adverse impact on marine mammal species or stocks and their habitat and to avoid or reduce potential impacts on sea turtles and sandbar sharks.

Table 5.4-3: Mitigation Areas off the Mid-Atlantic and Southeastern United States

Mitigation Area Description
Stressor or Activity • Sonar • Explosives • Physical disturbance and strikes
Resource Protection Focus • Marine mammals • Sea turtles • Fish (sandbar sharks)
Mitigation Area Requirements • **Southeast North Atlantic Right Whale Mitigation Area (November 15 through April 15):** – The Navy will report the total hours and counts of active sonar and in-water explosives used within the mitigation area in its annual training and testing activity reports submitted to NMFS. – The Navy will not conduct: (1) low-frequency active sonar (except as noted below), (2) mid-frequency active sonar (except as noted below), (3) high-frequency active sonar, (4) missile and rocket activities (explosive and non-explosive), (5) small-, medium-, and large-caliber gunnery activities, (6) Improved Extended Echo Ranging sonobuoy activities, (7) explosive and non-explosive bombing activities, (8) in-water detonations, and (9) explosive torpedo activities within the mitigation area. – To the maximum extent practicable, the Navy will minimize the use of: (1) helicopter dipping sonar, (2) low-frequency active sonar and hull-mounted mid-frequency active sonar used for navigation training, and (3) low-frequency active sonar and hull-mounted mid-frequency active sonar used for object detection exercises within the mitigation area. – Before transiting or conducting training or testing activities within the mitigation area, the Navy will initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System North Atlantic right whale sightings data. The Fleet Area Control and Surveillance Facility, Jacksonville will advise vessels of all reported whale sightings in the vicinity to help vessels and aircraft reduce potential interactions with North Atlantic right whales. Commander Submarine Force U.S. Atlantic Fleet will coordinate any submarine activities that may require approval from the Fleet Area Control and Surveillance Facility, Jacksonville. Vessels will use the sightings information to reduce potential interactions with North Atlantic right whales during transits. – Vessels will implement speed reductions after they observe a North Atlantic right whale, if they are within 5 NM of a sighting reported within the past 12 hours, or when operating in the mitigation area at night or during periods of poor visibility. – To the maximum extent practicable, vessels will minimize north-south transits in the mitigation area. • **Jacksonville Operating Area (November 15 through April 15):** – Navy units conducting training or testing activities in the Jacksonville Operating Area will initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System North Atlantic right whale sightings data. The Fleet Area Control and Surveillance Facility, Jacksonville will advise vessels of all reported whale sightings in the vicinity to help vessels and aircraft reduce potential interactions with North Atlantic right whales. Commander Submarine Force U.S. Atlantic Fleet will coordinate any submarine activities that may require approval from the Fleet Area Control and Surveillance Facility, Jacksonville. The Navy will use the reported sightings information as it plans specific details of events (e.g., timing, location, duration) to minimize potential interactions with North Atlantic right whales to the maximum extent practicable. The Navy will use the reported sightings information to assist visual observations of applicable mitigation zones and to aid in the implementation of procedural mitigation. • **Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area (November 15 through April 15):** – The Navy will report the total hours and counts of active sonar and in-water explosives used within the Special Reporting Area (i.e., southeast North Atlantic right whale critical habitat) in its annual training and testing activity reports submitted to NMFS. • **Mid-Atlantic Planning Awareness Mitigation Areas (year-round):** – The Navy will avoid conducting major training exercises within the mitigation area (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) to the maximum extent practicable. – The Navy will not conduct more than four major training exercises per year (all or a portion of the exercise) within the mitigation area. If the Navy needs to conduct additional major training exercises in the mitigation area in support of training requirements driven by national security concerns, it will provide NMFS with advance notification and include the information in its annual training and testing activity reports submitted to NMFS. • **Navy Cherry Point Range Complex Nearshore Mitigation Area (March through September):** – The Navy will not conduct explosive mine neutralization activities involving Navy divers in the mitigation area. – To the maximum extent practicable, the Navy will not use explosive sonobuoys, explosive torpedoes, explosive medium-caliber and large-caliber projectiles, explosive missiles and rockets, explosive bombs, explosive mines during mine countermeasure and neutralization activities, and anti-swimmer grenades in the mitigation area.



Notes: AFTT: Atlantic Fleet Training and Testing; OPAREA: Operating Area; SINKEX: sinking exercise; VACAPES: Virginia Capes

Figure 5.4-5: Mitigation Areas and Habitats Considered off the Mid-Atlantic and Southeastern United States

5.4.3.1 Resource Description

The Navy assessed the mid-Atlantic and southeastern United States region for potential mitigation areas. The assessment included, but was not limited to, the following areas that have been established by NMFS as critical habitat or habitat with high marine mammal abundance, or identified by LaBrecque et al. (2015b) as biologically important areas (as shown in Figure 5.4-5 and described in the sections below):

- Bottlenose dolphin Northern North Carolina Estuarine System small and resident population (year-round)
- Bottlenose dolphin Southern North Carolina Estuarine System small and resident population (year-round)
- Bottlenose dolphin Charleston Estuarine System small and resident population (year-round)
- Bottlenose dolphin Southern Georgia Estuarine System small and resident population (year-round)
- Bottlenose dolphin Jacksonville Estuarine System small and resident population (year-round)
- Cape Hatteras Special Research Area (year-round)
- North Atlantic right whale critical habitat (southeastern U.S. calving area; mid-November through late April)
- North Atlantic right whale calving habitat in the southeast Atlantic (mid-November through late April)
- North Atlantic right whale migratory corridor along the U.S. East Coast (southern portion) (November through December, March through April)

The primary focus of the mitigation area assessment was for marine mammals; however, because the Navy assessed sea space throughout the region, many of the geographic areas considered for marine mammals are also known to be inhabited by non-marine mammal species, such as sea turtles. For example, the Navy assessed the potential for developing mitigation areas within nearshore habitats along the coast of North Carolina, which are inhabited by marine mammals, sea turtles, sharks, and a variety of other marine species.

5.4.3.1.1 Bottlenose Dolphins

Five areas that overlap the AFTT Study Area were identified by LaBrecque et al. (2015b) as biologically important areas for small and resident populations of bottlenose dolphins along the U.S. East Coast: (1) the Northern North Carolina Estuarine System Population, (2) the Southern North Carolina Estuarine System Population, (3) the Charleston Estuarine System Population, (4) the Southern Georgia Estuarine System Population, and (5) the Jacksonville Estuarine System Population. The areas were recognized through various methods, including photo-identification, vessel surveys, satellite tagging, and genetic analyses. The small and resident populations are individual stocks that use coastal waters as important reproductive, migration, and feeding areas.

The bottlenose dolphin coastal morphotype is continuously distributed along the U.S. East Coast south of Long Island, New York, around the Florida peninsula, and along the Gulf of Mexico coast. Although the structure of the individually recognized stocks is somewhat uncertain, it appears to be complex. Not every portion of the coast appears to be a significantly important bottlenose dolphin habitat; however, scientific evidence suggests that important breeding grounds, migration habitat, and foraging grounds for the individually recognized bottlenose dolphin coastal morphotypes are scattered throughout

coastal waters. The Charleston Estuarine System Population has high site fidelity based on data collected through photo-identification, remote biopsy, capture-release, and radio-tracking (Speakman et al., 2006). Within the Charleston Estuarine System population, 839 animals have been individually identified, with 115 animals being observed up to 10 times over periods up to 10 years. The Southern Georgia Estuarine System Population also has high genetic and site fidelity. Further studies are required to better understand the residency patterns of the Northern North Carolina Estuarine System Population, the Southern North Carolina Estuarine System Population, and the Jacksonville Estuarine System Population. Due to ongoing photo-identification studies (including Navy-funded monitoring efforts), the full habitat extent of several of these small and resident populations is subject to change as new information becomes available (LaBrecque et al., 2015b).

For additional information about bottlenose dolphin habitats and geographic range, see Section 3.7.2.3.10.2 (Habitat and Geographic Range).

5.4.3.1.2 Cape Hatteras Special Research Area

NMFS designated the Cape Hatteras Special Research Area as part of the Pelagic Longline Take Reduction Plan in January 2009 (National Marine Fisheries Service, 2009a). The area was designated due to high rates of pilot whale and Risso's dolphin bycatch in the U.S. East Coast Atlantic pelagic longline fishery. Unique oceanographic properties exist in the area due to how the Gulf Stream separates from the continental slope to the deep ocean, and southward-flowing continental shelf waters from the Middle Atlantic Bight converge with northward-flowing continental shelf waters from the South Atlantic Bight. These water flow patterns support upwelling events and high biodiversity, two features that indicate an area could have high value for marine mammal feeding. NMFS management measures for the Cape Hatteras Special Research Area apply to fisheries and not to Navy activities; however, the Navy considered this area due to its potential as an important marine mammal feeding area.

Numerous species of marine mammals occur in the Cape Hatteras Special Research Area, including beaked, fin, humpback, minke, and sperm whales; and pilot whales, bottlenose, short-beaked common, Atlantic spotted, striped, Clymene, and Risso's dolphins. The area is thought to be important for short-finned pilot whale feeding and is associated with high species abundance (Thorne et al., 2017). The area is also used seasonally during migrations by numerous species and overlaps the North Atlantic right whale migration habitat identified by LaBrecque et al. (2015b).

Navy monitoring data supports this area as having high diversity and density of marine mammals, including extremely high encounter rates for beaked whales. The Navy has been conducting aerial and vessel-based surveys off Cape Hatteras since July 2009 and acoustic monitoring since 2011. Between 2009 and 2015, 14 species or species groups were observed during vessel-based surveys, totaling more than 500 animals (Foley et al., 2015). Vessel-based surveys typically took place during the spring, summer, and fall. Aerial surveys were conducted year-round, with one to two survey days per month, depending on weather conditions. During aerial surveys conducted over 16 days in January and December 2015, 13 species were observed, totaling 160 sightings and more than 5,000 individual cetaceans (McAlarney et al., 2016). Species observed included bottlenose, Atlantic spotted, short-beaked common, Risso's, striped, and Clymene dolphins; and short-finned pilot, Cuvier's beaked, True's beaked, sperm, humpback, minke, fin, mesoplodont beaked, and Kogia whales.

Satellite tagging of several deep-diving marine mammal species has also recently been conducted in the Cape Hatteras Special Research Area. In 2015, satellite tags were deployed on bottlenose dolphins, Cuvier's beaked whales, short-finned pilot whales, and short-beaked common dolphins (Baird et al.,

2016). In 2017, satellite tags were deployed on short-finned pilot whales and Cuvier's beaked whales (Baird et al., 2018). The findings from these studies indicate that while individuals have varying levels of site fidelity, the continental slope area off Cape Hatteras appears to be an important location for these species. One deep-diving species, the sperm whale, is found east and northeast of Cape Hatteras throughout winter months (Waring et al., 2015). Sperm whales inhabit the area year-round; however, distribution primarily shifts north in the summer. Pilot whales (primarily short-finned) are commonly observed in waters off Cape Hatteras, generally along the continental shelf edge (Waring et al., 2016). Some species, such as Cuvier's beaked whales, remained near the slope within the Cape Hatteras Special Research Area, while other species, such as short-finned pilot whales, traveled into more northern and southern waters before returning to the Cape Hatteras Special Research Area (Baird et al., 2016).

5.4.3.1.3 North Atlantic Right Whales

An area off the southeastern United States has been designated by NMFS as critical habitat for North Atlantic right whale calving. The southern North Atlantic right whale critical habitat includes the coasts of North Carolina, South Carolina, Georgia, and Florida. As described in Section 3.7.2.2.2.2 (Habitat and Geographic Range), NMFS designated the critical habitat in 2016 to replace a smaller critical habitat that had been previously designated in 1994. Overlapping the critical habitat are areas identified by LaBrecque et al. (2015b) as biologically important habitat for North Atlantic right whale calving from mid-November to late April and migration from November through December and March through April.

Waters off the southeastern United States are the primary wintering ground for calving females, other adults, and juvenile North Atlantic right whales. These waters are the only known calving ground for North Atlantic right whales and are used from November to April. North Atlantic right whales typically give birth from December to March (Knowlton et al., 1994; Kraus et al., 2007). Most sightings of neonates and calves have occurred during aerial surveys off southern Georgia and northeastern Florida (Garrison, 2007; Hamilton et al., 2007). During passive acoustic monitoring and visual surveys conducted off Savannah, Georgia and Jacksonville, Florida from 2009–2011, North Atlantic right whales were detected between November and April at both survey locations. More calls and sightings were recorded off Jacksonville than Savannah (Soldevilla et al., 2014). Aerial surveys sponsored by the Navy offshore of Jacksonville, Florida between 2009 and 2016 resulted in the following sightings: (1) a single whale approximately 40 NM offshore, (2) a female giving birth 40 NM offshore in March 2010 (U.S. Department of the Navy, 2011), (3) three whales approximately 20–25 NM offshore, and (4) two whales approximately 10 NM from shore. In the fall and winter of 2009–2010, Navy-sponsored acoustic recorders were deployed between 60–150 kilometers offshore of Jacksonville. Although sightings typically occur most frequently within continental shelf waters from northeastern Florida to southeastern Georgia during the fall and winter, there were no North Atlantic right whale vocalizations detected during this passive acoustic monitoring study (Charif et al., 2015).

Sighting rates within North Atlantic right whale calving habitat have shown a correlation with water temperature and depth. One study found sighting rates to be highest in waters with sea surface temperatures less than 22°C and water depths between 10–20 m (Good, 2008). Gowan and Ortega-Ortiz (2014) found that sea surface temperature and water depth are significant factors in predicting North Atlantic right whale abundance on calving grounds. Using temperature and depth as habitat predictors, calving could occur over continental shelf waters as far north as Cape Lookout, North Carolina (Good, 2008; Keller et al., 2012). Navy-sponsored monitoring conducted off Cape Hatteras, North Carolina in 2011 and in Onslow Bay, North Carolina in 2007 confirmed the winter occurrence of North Atlantic right whales in these areas (U.S. Department of the Navy, 2014). During surveys conducted off the coast of

North Carolina in the winters of 2001 and 2002, researchers sighted eight calves, suggesting that the calving grounds may extend as far north as Cape Fear, North Carolina (Waring et al., 2016). The species has also been observed in winter around Cape Canaveral, Florida (Keller et al., 2006) and off South Carolina (McLellan et al., 2004).

LaBrecque et al. (2015b) used aerial sightings data and habitat analyses of sea surface temperatures and water depths to delineate the North Atlantic right whale calving area as extending from Cape Lookout, North Carolina to Cape Canaveral, Florida. The area encompasses waters from the shoreline to the 25-m isobath from mid-November through late April. Only a few sightings of calves have been reported outside of this area, such as a calf apparently born in the Gulf of Maine in the spring of 2007 (Patrician et al., 2009) and a newborn with its mother sighted off Plymouth Harbor, New England in January 2013 (LaBrecque et al., 2015b).

North Atlantic right whales undertake large seasonal migrations, with some of the population traveling to cold and productive waters during spring and summer to feed, to warmer waters during winter to calve, or to other unknown wintering areas (Kenney, 2008; Roberts et al., 2016; Whitt et al., 2013). LaBrecque et al. (2015b) identified a migratory corridor along the East Coast of the United States that is used by North Atlantic right whales during southward migrations to the calving grounds in November and December, and northward migrations to the feeding areas, the Bay of Fundy, and other unknown areas in March and April. The subset of the population that has been observed migrating between the northern feeding grounds and southern calving grounds includes reproductively mature and pregnant females, juveniles, and young calves (Federal Register 81 [17]: 4838-4874). North Atlantic right whales are believed to migrate along the continental shelf (Schick et al., 2009; Whitt et al., 2013); however, it is unknown if the whales use the whole shelf area, or just the nearshore waters (LaBrecque et al., 2015b). Analysis by Schick et al. (2009) of a tagging survey suggests that the migratory corridor is broader than was initially estimated and that suitable habitat exists beyond 20 NM from the coast, a distance that is presumed to represent the primary migratory pathway (National Marine Fisheries Service, 2008). NMFS has not defined critical habitat for North Atlantic right whale migration due to the lack of information on migratory routes and data needed to identify essential physical and biological features (Federal Register 81 [17]: 4838-4874). Section 5.4.2.1.5 (North Atlantic Right Whales) presents a discussion of the northern portion of the North Atlantic right whale migration area.

Recent passive acoustic monitoring studies have detected the presence of North Atlantic right whales along the mid-Atlantic coast throughout the year (Hodge et al., 2015; Oedekoven et al., 2015; Salisbury et al., 2015; Whitt et al., 2013). North Atlantic right whales were acoustically detected across all seasons along the coastal waters of North Carolina and Georgia in 2009. Seasonal occurrence peaked during fall off Georgia and during winter off North Carolina; however, a secondary peak occurrence was also recorded from June to July off Georgia, a season during which North Atlantic right whales were not previously believed to be in this region (Hodge et al., 2015). North Atlantic right whales were detected every month from June 2012 to June 2013 between the Virginia coast and the continental shelf. Whales were detected more in fall when they are thought to be migrating to the south; however, a high number of calls were also detected in late winter and early spring when whales are thought to be migrating to the northern feeding grounds (Salisbury et al., 2015). Additional monitoring is needed over a longer time span to better understand the seasonal occurrence of North Atlantic right whales in mid-Atlantic waters.

For additional information about North Atlantic right whale habitats and geographic range, see Section 3.7.2.2.2.2 (Habitat and Geographic Range).

5.4.3.2 Mitigation Area Assessment

When developing Phase III mitigation, the Navy analyzed the potential for increasing mitigation areas in the Study Area. Based on its ongoing analysis of the best available science and potential mitigation measures, the Navy determined it can implement additional mitigation measures off the mid-Atlantic and southeastern United States under the Proposed Action to enhance protection of marine mammals (including North Atlantic right whales) to the maximum extent practicable. In addition to evaluating areas for marine mammals, the Navy assessed the potential for developing mitigation areas for explosives within Habitat Areas of Particular Concern for sandbar and sand tiger sharks. The Navy does not plan to conduct training or testing activities involving explosives in sandbar and sand tiger shark Habitat Areas of Particular Concern off the mid-Atlantic and southeastern United States except for one small mission-essential area in the Lower Chesapeake Bay and in the Navy Cherry Point Range Complex; therefore, mitigation for explosives within the areas off New Jersey and Delaware is not warranted. Information about the Habitat Areas of Particular Concern off Virginia and the new mitigation area developed off North Carolina is presented below.

New mitigation developed for Phase III includes: (1) enlarging the Southeast North Atlantic Right Whale Mitigation Area to correlate with the occurrence of North Atlantic right whales to the maximum extent practicable based on readiness requirements, (2) developing a new mitigation area known as the Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area with special reporting requirements for the use of active sonar and in-water explosives, (3) developing new mitigation measures to use Early Warning System North Atlantic right whale sightings data in the Jacksonville Operating Area, and (4) expanding the mitigation requirements for nearshore areas of the Navy Cherry Point Range Complex to include additional types of explosives to the maximum extent practicable. The remaining mitigation measures presented in Table 5.4-3 are continuations from Phase II.

Mitigation areas off the mid-Atlantic and southeastern United States will avoid or reduce impacts on one or more marine mammal species or stocks and their habitat, as summarized below:

- **Southeast North Atlantic Right Whale Mitigation Area.** The Navy has expanded the existing Southeast North Atlantic Right Whale Mitigation Area northward approximately 50 NM along the coast of northern Georgia from the shoreline out to 10–12 NM. The Navy expanded the mitigation area to correlate with the occurrence of North Atlantic right whales to the maximum extent practicable based on readiness requirements. The mitigation area encompasses a portion of the North Atlantic right whale migration and calving areas identified by LaBrecque et al. (2015b) and a portion of the southeast North Atlantic right whale critical habitat. Mitigation to not conduct or to limit the use of active sonar to the maximum extent practicable (depending on the source) and to not conduct in-water detonations and certain activities using explosives and non-explosive practice munitions will help the Navy further avoid or reduce potential impacts on North Atlantic right whales in these key habitat areas seasonally. The Navy will implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in the mitigation area. Mitigation for vessel movements includes minimizing north-south transits, implementing speed reductions after vessels observe a North Atlantic right whale, if they are within 5 NM of a sighting reported within the past 12 hours, or when operating in the mitigation area at night or during periods of poor visibility, and continuing to participate in and sponsor the Early Warning System. The Early

Warning System is a comprehensive information exchange network dedicated to reducing the risk of vessel strikes to North Atlantic right whales off the southeast United States from all mariners (i.e., Navy and non-Navy vessels). Navy participants include the Fleet Area Control and Surveillance Facility, Jacksonville; Commander, Naval Submarine Forces, Norfolk, Virginia; and Naval Submarine Support Command. The Navy, U.S. Coast Guard, U.S. Army Corps of Engineers, and NMFS collaboratively sponsor daily aerial surveys from December 1 through March 31 (weather permitting) to observe for North Atlantic right whales from the shoreline out to approximately 30–35 NM offshore. Aerial surveyors relay sightings information to all mariners transiting within the North Atlantic right whale calving habitat (e.g., commercial vessels, recreational boaters, Navy ships).

- **Jacksonville Operating Area.** The Navy has developed new mitigation measures for units conducting training or testing activities in the Jacksonville Operating Area. The mitigation measures to obtain and use Early Warning System North Atlantic right whale sightings data will help vessels and aircraft reduce potential interactions with North Atlantic right whales in portions of the southeast North Atlantic right whale critical habitat and North Atlantic right whale migration and calving areas identified by LaBrecque et al. (2015b).
- **Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area.** Newly developed for Phase III, the Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area covers the entire southeast North Atlantic right whale critical habitat. The Navy will implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area (i.e., the southeast North Atlantic right whale critical habitat) in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.
- **Mid-Atlantic Planning Awareness Mitigation Areas.** The Mid-Atlantic Planning Awareness Mitigation Areas extend across large swaths of shelf break and contain underwater canyons associated with high marine mammal diversity (e.g., Norfolk Canyon). The mitigation areas are situated among highly productive environments, such as persistent oceanographic features associated with upwellings and steep bathymetric contours. Continuing the mitigation within the Mid-Atlantic Planning Awareness Mitigation Areas will help the Navy further avoid or reduce potential impacts from active sonar during major training exercises on marine mammals that inhabit, feed in, reproduce in, or migrate through the mid-Atlantic region. For example, during recent passive acoustic monitoring surveys in Norfolk Canyon, researchers detected vocalizations of blue, fin, minke, sei, sperm, beaked, Kogia, and humpback whales, as well as Risso's dolphins and unidentified delphinid species (Hodge et al., 2016). The Mid-Atlantic Planning Awareness Mitigation Areas overlap a portion of the North Atlantic right whale migration habitat. The more southern mitigation area also overlaps much of the Cape Hatteras Special Research Area.
- **Navy Cherry Point Range Complex Nearshore Mitigation Area.** The Navy is continuing an existing mitigation measure to not conduct explosive mine neutralization activities involving Navy divers from March through September within the mitigation area, which is defined as within 3.2 NM of an estuarine inlet and within 1.6 NM of the shoreline in the Navy Cherry Point Range Complex. For Phase III, the Navy is expanding the mitigation requirements in this mitigation area to include additional in-water explosives to the maximum extent practicable. The mitigation will help the Navy avoid or reduce potential impacts on sea turtles near nesting

beaches during the nesting season and on sandbar sharks in Habitat Areas of Particular Concern. The mitigation area also overlaps a portion of the North Atlantic right whale migration area identified by LaBrecque et al. (2015b).

The Navy conducts training and testing activities off the mid-Atlantic and southeastern United States because this region provides valuable access to sea space and airspace conditions analogous to areas where the Navy operates or may need to operate in the future. The waters off the mid-Atlantic and southeastern United States encompass part of the primary water space in the AFTT Study Area where unit-level training, integrated training, and deployment certification exercises occur. The Navy also uses waters off the mid-Atlantic and southeastern United States for testing components of air warfare, mine warfare, surface warfare, anti-submarine warfare, electronic warfare, vessels and vessel signatures, unmanned systems; and other components, such as chemical and biological simulant testing. The Navy conducts pierside sonar testing at Kings Bay, Georgia; Norfolk, Virginia; and Port Canaveral, Florida.

Training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and other training plans, forecasting of future testing requirements, and emerging requirements. When scheduling activities, the Navy considers the need to minimize sea space and airspace conflicts within the mid-Atlantic and southeast region and throughout the Study Area. For example, the Navy schedules training and testing to minimize conflicts between its own activities and with consideration for public safety (e.g., safe distances from recreational boating activities). Daily fluctuations in training and testing schedules and objectives could mean that, on any given day, vessels may depend on discrete locations in waters off the mid-Atlantic and southeastern United States for discrete purposes.

The Navy selects training areas in this region to allow for the realistic tactical development of the myriad training scenarios that Navy units are required to complete to be mission effective. For example, the topography and bathymetry in this region consists of a wide continental shelf leading to the shelf break, which affords a wide range of opportunities to plan and execute major training exercises to certify forces to deploy. Certain 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. The Jacksonville Operating Area and Charleston Operating Area represent critical training sea spaces that are necessary to prepare naval forces for combat. Training in these areas, such as mine countermeasure training, is vital to ensure Navy units are familiar with this region and will be able to operate and defend the U.S. mainland from adversaries. The Navy selects the locations (e.g., pierside in Kings Bay, Georgia) and scenarios for Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection exercises according to Department of Homeland Security strategic goals and evolving world events. The Navy uses coastal areas along the U.S. East Coast for a limited number of inshore training activities, such as Kings Bay, Georgia; Charleston Harbor, South Carolina; and St. John's River, Florida. The Navy chooses locations for other training activities based on proximity to training ranges (e.g., Jacksonville Range Complex), available airspace (e.g., avoiding airspace conflicts with major airports such as Jacksonville International Airport), unobstructed sea space, aircraft emergency landing fields (e.g., Naval Air Station Jacksonville), and target storage and deployment locations (e.g., Mayport, Florida).

The Navy conducts testing activities in the mid-Atlantic and southeast region because it provides a variety of bathymetric and environmental conditions necessary to ensure functionality and accuracy of systems and platforms in areas analogous to where the military operates. Testing locations are typically located near systems command support facilities, which provide critical safety, platform, and infrastructure support and technical expertise necessary to conduct testing (e.g., proximity to air

squadrons). One example of an important bathymetric feature that provides testing realism and access to necessary environmental or oceanographic conditions in this region is Blake Plateau, which starts at the Continental shelf slope and extends eastward. Other pierside, nearshore, and offshore waters provide critical environments for a multitude of testing activities in this region.

The Navy requires flexibility in the timing of its use of active sonar and explosives in order to meet individual training and testing schedules and deployment schedules. Navy vessels, aviation squadrons, and testing programs have a limited amount of time available for training and testing. The Navy must factor in variables such as maintenance and weather (e.g., hurricanes) when scheduling event locations and timing. The Navy can restrict the number of major training exercises within the Mid-Atlantic Planning Awareness Mitigation Areas because it is not tied to a specific range support structure in this area for these events. However, major 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. This precludes the ability to completely prohibit major training exercises from occurring in this region. The schedules of other training activities, such as explosive missile exercises, are driven by deployment requirements and national command authority assignments.

The testing community is required to install and test systems on platforms at the locations where those platforms are stationed. Testing associated with new construction ships must occur in locations close to the shipbuilder's facilities in the mid-Atlantic for reasons associated with construction schedule, proximity to testing facilities, and safety. Additionally, the testing community has a need for rapid development to quickly resolve tactical deficiencies. Overall, training and testing schedules can be cyclical and are partially driven by geo-political situations, which precludes the Navy from implementing additional mitigation to reduce or eliminate the use of active sonar or explosives in this region.

The Navy determined that enlarging the Southeast North Atlantic Right Whale Mitigation Area, developing the new mitigation measures for the Jacksonville Operating Area and Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area, and continuing the mitigation within the Mid-Atlantic Planning Awareness Mitigation Areas as described in Table 5.4-3 would be practical to implement under the Proposed Action. This determination was based on an operational assessment of past use of active sonar, explosives, and non-explosive practice munitions; projected future training and testing needs in the region; and consideration of fleet concentration areas in the Study Area. The mitigation areas off the mid-Atlantic and southeastern United States as described in Table 5.4-3 represent the largest areas and highest level of mitigation within each area that is practical for the Navy to implement within this region under the Proposed Action. The Navy received public comments on the Draft EIS/OEIS requesting additional mitigation, such as avoiding the Charleston Bump, expanding mitigation areas to encompass the full extent of the Cape Hatteras Special Research Area, developing new mitigation areas based on predicted animal densities, developing mitigation areas for bottlenose dolphin small and resident populations identified by LaBrecque et al. (2015b), and further expanding the Southeast North Atlantic Right Whale Mitigation Area eastward to mirror the boundary of the expanded critical habitat and northward to encompass all areas of high animal density. The Navy assessed the potential to implement these and other additional mitigation measures and determined that further modifications of training and testing activities off the mid-Atlantic and southeastern United States would have a significant impact on safety, sustainability, and the Navy's ability to meet its mission requirements, as discussed below.

On 27 January 2016, NMFS issued a Final Rule (81 FR 4838) extending the North Atlantic right whale critical habitat northward and eastward from the prior designation. In the 2016 Final Rule, NMFS

determined that the essential features for the expanded critical habitat area were water depth, water temperature, and sea surface roughness. Through the critical habitat expansion process, NMFS determined that current and future Navy mitigation areas should be correlated with the occurrence of North Atlantic right whales, and not with the critical habitat boundary or its essential features (due to implications for national security that would result from the Navy being required to expand its mitigation area to mirror the boundaries of the expanded critical habitat). The best available density data for the Study Area shows that the Navy's Southeast North Atlantic Right Whale Mitigation Area encompasses the areas of highest density in the region (Roberts et al., 2016; U.S. Department of the Navy, 2017b). Although North Atlantic right whales have been sighted on rare occasions east of the mitigation area, these animals were located outside of the higher use habitats that represent the primary occurrence of the population. Overall, most North Atlantic right whale sightings made during Navy and NMFS surveys have occurred in or very near the Southeast North Atlantic Right Whale Mitigation Area, which further indicates that the mitigation area may have the highest seasonal abundance of North Atlantic right whales in waters off the mid-Atlantic and southeastern United States.

The Navy will implement mitigation within the Southeast North Atlantic Right Whale Mitigation Area to minimize the use of active sonar to the maximum extent practicable during three active sonar activities seasonally: helicopter dipping, object detection exercises, and navigation training. Helicopter dipping activities, such as Kilo Dip (a functional check activity) need to occur close to an air station in the event of a system failure if all systems are not functioning properly. Extending these activities farther offshore would significantly increase safety risks for Navy personnel and equipment, and the public. It would be impractical to restrict the number of navigation training and object detection exercises due to implications for the safety of the ship and the personnel on board. These exercises are required to ensure ships can navigate safely and operate safely in a mine threat environment that is extremely dangerous and life-threatening. Additional restrictions (e.g., seasonal limitations) would preclude units from conducting the necessary training to safely operate in military missions and combat operations.

Further expansions of the mitigation areas in this region would require the Navy to relocate its training to alternative locations, such as farther offshore. Moving activities farther offshore would reduce a unit's training opportunities during its limited available training timeframes (i.e., increased time spent transiting to more distant training areas results in decreased time available for training). This would also result in training and testing activities being conducted in water conditions that do not accurately reflect the types of environments where military missions and combat operations occur. Increasing transit distances would result in additional fuel consumption and expenditures, which could serve as a limiting factor for Navy surface units whose available underway times are constrained by fuel expenses.

Some activities, such as 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 and deployment location in Mayport, Florida. Targets used for these activities have limitations on how far offshore they can be safely employed and controlled. For example, remote control jet ski targets stored at Naval Station Mayport would not be able to transit beyond the Southeast North Atlantic Right Whale Mitigation Area in challenging seas. Shifting events farther offshore would preclude the Navy from safely employing and controlling the targets necessary to conduct these training and testing activities, which would significantly impact the Navy's ability to effectively complete the events.

Certain nearshore areas serve as critical training and testing locations for the use of explosives in this region. For example, the Navy's explosive ordnance disposal training location off the coast of Virginia is vital due to its existing target setup, ideal bottom structure, and good bottom depth to safely train Navy

divers with explosives. Explosive ordnance disposal teams can be required to deploy with 3-weeks' notice, which presents a need to constantly train to maintain readiness for combat operations. Relocating this activity to a location that does not have these features would increase safety risks and diminish the effectiveness of training events. Similarly, implementing seasonal restrictions on the use of explosive ordnance at this location (e.g., within sandbar shark Habitat Areas of Particular Concern off Virginia) would prevent the Navy from meeting its readiness requirements.

The Navy also uses select inshore areas along the U.S. East Coast, such as Kings Bay, Georgia; Charleston Harbor, South Carolina; and St. John's River, Florida for a limited number of training activities. These waters overlap the habitat extent of bottlenose dolphins within the Southern Georgia Estuarine System Population, Charleston Estuarine System Population, and Jacksonville Estuarine System Population (respectively), which were identified by LaBrecque et al. (2015b) as biologically important areas for bottlenose dolphins. It is critical for national security that the Navy's inshore training activities, such as Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection exercises, occur in these inshore areas as planned to provide training realism and access to the necessary environmental conditions. Because the Navy conducts a limited number of training activities within inshore areas, implementing additional mitigation would not result in an avoidance or reduction of impacts on bottlenose dolphins in these areas.

Expanding the mitigation areas in this region would encroach upon the primary water space where training and testing activities are scheduled to occur. Implementing additional mitigation off the mid-Atlantic and southeastern United States would have a significant impact on the ability for units to meet their individual training and certification requirements (impacting the ability to deploy with the required level of readiness necessary to accomplish their missions), to certify forces to deploy to meet national security tasking (limiting the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capability in support of national security interests), and for program managers and weapons system acquisition programs to meet testing requirements and required acquisition milestones. Based on the Navy's assessment, additional mitigation in this region would increase operational costs (due to extending distance offshore, which would increase fuel consumption, maintenance, and time on station to complete required training and testing activities), increase safety risks (associated with conducting training and testing at extended distances offshore and farther away from critical medical and search and rescue capabilities), and accelerate fatigue-life of aircraft and ships (leading to increased safety risk and higher maintenance costs). Furthermore, additional mitigation would significantly impact training and testing realism due to reduced access to necessary environmental or oceanographic conditions that replicate military mission and combat conditions. This would diminish the ability for Navy Sailors to train and become proficient in using sensors and weapon systems as required during military missions and combat operations.

The iterative and cumulative impact of all potential mitigation measures the Navy assessed, including certain mitigation measures suggested through public comments on the Draft EIS/OEIS, would deny national command authorities the flexibility to respond to national security challenges and effectively accomplish the training necessary for deployment. For example, additional limitations on the use of active sonar and explosives off the mid-Atlantic and southeastern United States would require the Navy to shift its training activities to alternative locations farther offshore, farther north or south along the Eastern seaboard, or to the Gulf of Mexico. This would have significant impacts on safety, sustainability, and the ability to meet mission requirements within limited available timeframes. Likewise, requiring weapons system program managers and research, testing, and development program managers to use

alternative areas within limited available timeframes would deny them the necessary flexibility to rapidly field or develop systems to meet testing program requirements and emerging requirements.

In summary, the Navy developed the mitigation areas identified in Table 5.4-3 to provide further protection for marine mammals in areas the best available science suggests are important for foraging, migrating, and reproduction. The mitigation will help the Navy avoid or reduce potential impacts on numerous species, including North Atlantic right whales. Further restrictions in the mid-Atlantic and southeast region on the level, number, or timing (seasonal or time of day) of training or testing activities would be impractical to due implications for safety, sustainability, and mission requirements.

5.4.4 Mitigation Areas in the Gulf of Mexico

As described in Table 5.4-4 and shown in Figure 5.4-6, the Navy will implement mitigation within mitigation areas in the Gulf of Mexico to, in combination with procedural mitigation, effect the least practicable adverse impact on marine mammal species or stocks and their habitat.

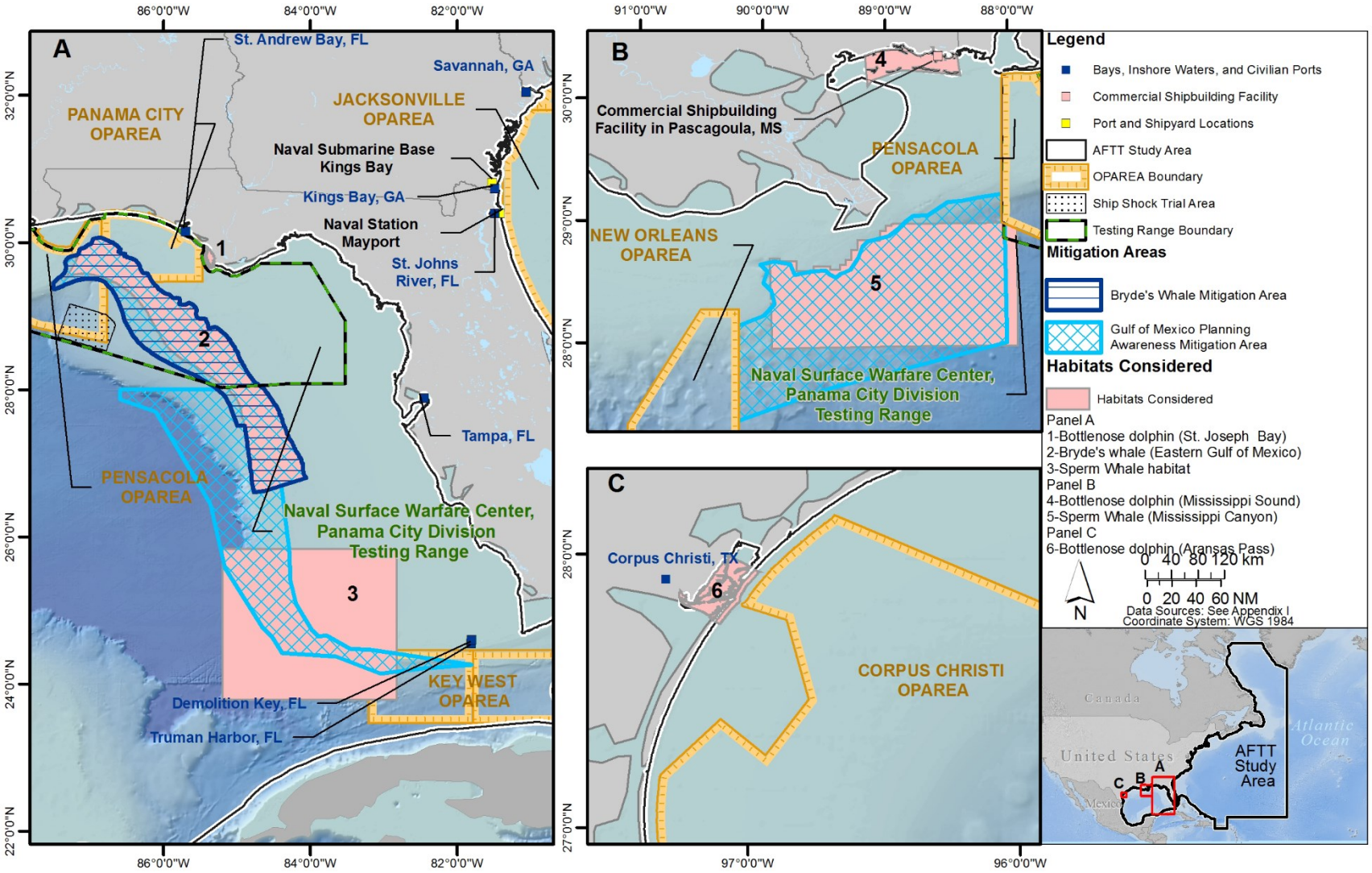
Table 5.4-4: Mitigation Areas in the Gulf of Mexico

Mitigation Area Description
Stressor or Activity • Sonar • Explosives
Resource Protection Focus • Marine mammals
Mitigation Area Requirements (year-round) • **Bryde's Whale Mitigation Area:** – The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. – The Navy will not conduct >200 hours of hull-mounted mid-frequency active sonar per year within the mitigation area. – The Navy will not use explosives (except during mine warfare activities) within the mitigation area. • **Gulf of Mexico Planning Awareness Mitigation Areas:** – The Navy will avoid conducting major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) within the mitigation areas to the maximum extent practicable. – The Navy will not conduct any major training exercises within the mitigation areas (all or a portion of the exercise) under Alternative 1. – The Navy will not conduct more than one major training exercise per year within the mitigation areas (all or a portion of the exercise) under Alternative 2. – If the Navy needs to conduct additional major training exercises within the mitigation areas in support of training requirements driven by national security concerns (more than the numbers identified above), it will confer with NMFS to verify that potential impacts are adequately addressed in this Final EIS/OEIS and associated consultation documents.

5.4.4.1 Resource Description

The Navy assessed the Gulf of Mexico region for potential mitigation areas. The assessment included, but was not limited to, the following areas that were identified by LaBrecque et al. (2015a) as biologically important areas (as shown in Figure 5.4-6 and described in the sections below):

- Bottlenose dolphin Aransas Pass small and resident area (year-round)
- Bottlenose dolphin Mississippi Sound small and resident area (year-round)
- Bottlenose dolphin St. Joseph Bay small and resident area (year-round)
- Bryde's whale small and resident population in the Gulf of Mexico (year-round)
- Sperm whale habitat in Mississippi Canyon (year-round)
- Sperm whale habitat west of Key West and the Dry Tortugas (year-round)



Note: AFTT: Atlantic Fleet Training and Testing; OPAREA: Operating Area

Figure 5.4-6: Mitigation Areas and Habitats Considered in the Gulf of Mexico

5.4.4.1.1 Bottlenose Dolphins

Three areas in the AFTT Study Area were identified by LaBrecque et al. (2015a) as biologically important areas for small and resident populations of bottlenose dolphins in the Gulf of Mexico: (1) Aransas Pass, (2) Mississippi Sound, and (3) St. Joseph Bay. The areas were recognized through various methods, including photo-identification, vessel surveys, satellite tagging, and genetic analyses. The small and resident populations are individual stocks that use the coastal waters as reproductive, migration, and feeding areas (LaBrecque et al., 2015a).

The bottlenose dolphin coastal morphotype is continuously distributed along the U.S. East Coast south of Long Island, New York; around the Florida peninsula; and along the Gulf of Mexico coast. Although the structure of the individually recognized stocks is somewhat uncertain, it appears to be complex. Not every portion of the coast appears to be a significantly important marine mammal habitat; however, scientific evidence suggests that important breeding grounds, migration habitat, and foraging grounds for the individually recognized bottlenose dolphin coastal morphotypes are scattered throughout coastal waters. In the Gulf of Mexico, the Aransas Pass area displays a low level of site fidelity year-round with the most recent study reporting that 35 of 782 individually identified animals were re-sighted over 3 years (1991–1994) (Weller, 1998). In the Gulf of Mexico, the Mississippi Sound area contains animals that display greater site fidelity, with the most recent study reporting that up to 71 individuals display year-round residency and up to 109 animals displayed seasonal fidelity (Mackey, 2010). The St. Joseph Bay area also contains a small portion of St. Andrew Bay, with potential mixing of animals between the two areas (LaBrecque et al., 2015a); however, only St. Joseph Bay is located within the Study Area. Within St. Joseph Bay, a resident population of between 78 and 152 animals was identified (Balmer et al., 2008). Animals from the St. Joseph Bay population are known to move into the mouth of St. Andrew Bay and into nearshore waters (LaBrecque et al., 2015a). Due to ongoing photo-identification studies (including Navy-funded monitoring efforts), the full habitat extent of several of these small and resident populations is subject to change as new information becomes available (LaBrecque et al., 2015a, 2015b).

For additional information about bottlenose dolphin habitats and geographic range, see Section 3.7.2.3.10.2 (Habitat and Geographic Range).

5.4.4.1.2 Bryde's Whales

One area in the AFTT Study Area was identified by LaBrecque et al. (2015a) as a biologically important area for a small and resident population of Bryde's whales in the Gulf of Mexico. The area was identified through vessel and aerial surveys, passive acoustic monitoring, and genetic analyses (LaBrecque et al., 2015a). A recent genetic analysis suggests that the population found in this area is genetically distinct from other Bryde's whales (Rosel & Wilcox, 2014). The Gulf of Mexico subspecies of Bryde's whale was proposed for listing as endangered under the Endangered Species Act in December 2016. The 2016 NMFS status review for this species stated that the biologically important area for Bryde's whale identified by LaBrecque et al. (2015a) would be better defined as out to the 400-m depth contour and to Mobile Bay, Alabama (Rosel et al., 2016).

Bryde's whales are thought to be the most common baleen whale in the Gulf of Mexico (Würsig et al., 2000). They are the only baleen whale known to occur year-round in this region (Jefferson & Schiro, 1997). The population is small (estimated 33 individuals) and resident to the Gulf of Mexico (Rosel et al., 2016). Bryde's whales have been observed exclusively within the northeastern Gulf of Mexico and there is evidence to suggest that this area is more important for this species than any other area within the

Gulf of Mexico. Most Bryde's whale sighting records in the northern Gulf of Mexico are from NMFS abundance surveys (Waring et al., 2016) that were conducted during spring and summer months over several years (Davis & Fargion, 1996; Davis et al., 2000; Hansen et al., 1995; Hansen et al., 1996; Jefferson & Schiro, 1997; Maze-Foley & Mullin, 2006; Mullin & Hoggard, 2000; Mullin & Fulling, 2004). During surveys conducted throughout the oceanic waters of the U.S. Gulf of Mexico, Bryde's whales have been observed between the 100-m and 300-m isobaths in the northeastern Gulf of Mexico. The most recent NMFS Gulf of Mexico abundance survey took place during summer 2009. Three Bryde's whale sightings were recorded seaward of the 100-m depth contour (Waring et al., 2016). More recent surveys in the Gulf of Mexico have been conducted by the Atlantic Marine Assessment Program for Protected Species. During a 2011 survey in the northeastern Gulf of Mexico, three Bryde's whale sightings were reported along the 200-m depth contour (National Marine Fisheries Service, 2011).

Passive acoustic recorders deployed in DeSoto Canyon over 53 days recorded 680 calls attributed to Bryde's whales (Širović et al., 2014). Calls were consistently recorded between March and July, and in October and January. It was noted that there was a lack of calls during November and December. During those times when calls were detected, there was a peak in late June with a relatively high number of calls also recorded in later March, early April, and early January (Širović et al., 2014). In addition to sightings and acoustic data, there are stranding records in the Gulf of Mexico from throughout the year (Würsig et al., 2000). Further studies are required to understand how Bryde's whales use the northeastern Gulf of Mexico for biological life processes, such as reproduction and feeding.

For additional information about Bryde's whale habitats and geographic range, see Section 3.7.2.3.3.2 (Habitat and Geographic Range).

5.4.4.1.3 Sperm Whales

Two areas in the AFTT Study Area have been suggested as potentially important areas for sperm whales in the Gulf of Mexico: Mississippi Canyon and an area west of Dry Tortugas, Florida. Animals within the Northern Gulf of Mexico Stock have been determined to be genetically distinct from other sperm whale stocks (Jochens et al., 2008; Waring et al., 2016).

Aerial and line transect surveys in the northern Gulf of Mexico indicate that numerous marine mammal species, including sperm whales, are widely distributed throughout the northern Gulf of Mexico year-round. Most sperm whale sightings in the Gulf of Mexico have occurred in waters greater than 200 m, over the upper continental slope, and out to deeper waters (more than 2,000 m) (Baumgartner et al., 2001; Davis et al., 2000; Mullin et al., 1994a; Waring et al., 2016). Researchers have identified the Mississippi Canyon and the Mississippi River Delta as an area where sperm whales are sighted consistently throughout the year (Baumgartner et al., 2001; Davis et al., 1998; Maze-Foley & Mullin, 2006; Mullin et al., 1994b; Mullin & Fulling, 2004; Ruiz-Cooley & Engelhaupt, 2010; Weller et al., 2000). The Mississippi Canyon region is noted as being important sperm whale habitat (Davis et al., 1998; Weller et al., 2000). A summer 2009 NMFS vessel survey in the northern Gulf of Mexico reported 39 sperm whale sightings, of which at least 2 were within the Mississippi Canyon area (National Marine Fisheries Service, 2009b). It is thought that the Mississippi River plume and its associated high primary productivity may be the reason that sperm whales aggregate in the area and may be an important feeding habitat during years when biological productivity is high (Jochens et al., 2008; Mullin et al., 2004; Weller et al., 2000). Prey species and their relation to sperm whale distribution patterns have not yet been identified for this area (Jochens et al., 2008). However, researchers have found a correlation between the influx of nutrients from the Mississippi River, water flow patterns, and the distribution and abundance of sperm whales (Biggs et al., 2005; Jochens et al., 2008). Photo-identification, while limited,

also suggests that sperm whales in the northern Gulf of Mexico may exhibit differing levels of site fidelity within this region on an annual basis (Jochens et al., 2008; Weller et al., 2000).

Researchers have identified a second potential sperm whale aggregation location as the southeastern region of the northern Gulf of Mexico, an area west of the Dry Tortugas (Maze-Foley & Mullin, 2006; Mullin & Fulling, 2004; Mullin et al., 2004). Surveys conducted by NMFS Southeast Fisheries Science Center and the Bureau of Ocean Energy Management in the southeastern portion of the Gulf of Mexico between June and August of 2012 resulted in observations of 29 sperm whales, all in water deeper than 1,000 m and within the area west of the Dry Tortugas (National Marine Fisheries Service, 2013). This area is thought to have high levels of primary productivity that are influenced by the Loop Current and other dynamic water flow patterns, such as the Tortugas Gyre (Mullin & Fulling, 2004). Sperm whales have been observed in multiple seasons within the area, particularly in locations with steep bathymetry (National Marine Fisheries Service, 2013). Further studies are required to understand how sperm whales use these areas in the Gulf of Mexico for biological life processes, such as reproduction and feeding.

For additional information about sperm whale habitats and geographic range, see Section 3.7.2.2.6.2 (Habitat and Geographic Range).

5.4.4.2 Mitigation Area Assessment

When developing Phase III mitigation, the Navy analyzed the potential for increasing mitigation areas in the Study Area. Based on its ongoing analysis of the best available science and potential mitigation measures, the Navy determined it can implement additional mitigation measures in the Gulf of Mexico under the Proposed Action to enhance protection of marine mammals (including Bryde's whales) to the maximum extent practicable. New mitigation developed for Phase III includes: (1) developing a new mitigation area known as the Bryde's Whale Mitigation Area with special reporting requirements and restrictions on the use of hull-mounted mid-frequency active sonar and in-water explosives, and (2) enlarging the more eastern Gulf of Mexico Planning Awareness Mitigation Area to include the extended area identified by NMFS in its 2016 Bryde's whale status review (Rosel et al., 2016). The remaining mitigation measures presented in Table 5.4-4 are continuations from Phase II.

Mitigation areas in the Gulf of Mexico will avoid or reduce impacts on one or more marine mammal species or stocks and their habitat, as summarized below:

- **Bryde's Whale Mitigation Area.** Newly developed for Phase III, the Bryde's Whale Mitigation Area covers the extent of the Bryde's whale small and resident population area identified by LaBrecque et al. (2015a), including the extended area identified by NMFS in its 2016 Bryde's whale status review (Rosel et al., 2016). Mitigation to limit annual hours of mid-frequency active sonar use and to not use in-water explosives (except during mine warfare activities) will help the Navy avoid or reduce potential impacts on the small and resident population of Bryde's whales. To accomplish the mitigation for explosives, the Navy has adjusted the boundaries of the northern Gulf of Mexico ship shock trial area. The ship shock trial area is being relocated 5 NM from the western boundary of the Bryde's Whale Mitigation Area. This will help the Navy avoid the potential for Bryde's whales to be exposed to explosives during ship shock trials within the mitigation area. The Navy will implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.

- **Gulf of Mexico Planning Awareness Mitigation Areas.** The Navy is enlarging the more eastern Gulf of Mexico Planning Awareness Mitigation Area to fully encompass the Bryde's whale small and resident population area identified by LaBrecque et al. (2015a) and the extended area identified by NMFS in its 2016 Bryde's whale status review (Rosel et al., 2016). The Gulf of Mexico Planning Awareness Mitigation Areas overlap most of the Mississippi Canyon sperm whale habitat area and a portion of sperm whale habitat area west of the Dry Tortugas discussed in Section 5.4.4.1.3 (Sperm Whales). They extend across large swaths of shelf break and contain underwater canyons associated with marine mammal abundance (e.g., Mississippi Canyon, DeSoto Canyon). The mitigation areas are situated among highly productive environments, such as persistent oceanographic features associated with upwellings and steep bathymetric contours. Mitigation within the Gulf of Mexico Planning Awareness Mitigation Areas will help the Navy further avoid or reduce potential impacts from active sonar during major training exercises on marine mammals that inhabit, feed in, reproduce in, or migrate through these areas.

The Navy conducts training and testing activities in the Gulf of Mexico because this region provides valuable access to sea space and airspace conditions analogous to areas where the Navy operates or may need to operate in the future. The Gulf of Mexico encompasses part of the primary water space in the AFTT Study Area where certain unit-level training, integrated training, and deployment certification exercises occur, such as mine warfare training. The Gulf of Mexico also supports composite training unit exercises under Alternative 2. The Gulf of Mexico is also important for testing components of air warfare, mine warfare, surface warfare, anti-submarine warfare, electronic warfare, vessels and vessel signatures, unmanned systems; and other areas including submersibles, line charges, and semi-stationary equipment testing. The Navy conducts pierside sonar testing and propulsion testing during sea trials near Pascagoula, Mississippi.

Training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and various training plans, forecasting of future testing requirements, and emerging requirements. When scheduling activities, the Navy considers the need to minimize sea space and airspace conflicts within the Gulf of Mexico and throughout the entire Study Area. For example, the Navy schedules training and testing to minimize conflicts between its own activities and with consideration for public safety (e.g., safe distances from recreational boating activities). Daily fluctuations in training and testing schedules and objectives could mean that, on any given day, vessels may depend on discrete locations of the Gulf of Mexico for discrete purposes.

The Navy selects training areas in this region to allow for the realistic tactical development of the myriad training scenarios Navy units are required to complete to be mission effective. Certain 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. The Navy chooses training locations based on proximity to training ranges (e.g., Pensacola Operating Area), available airspace (e.g., avoiding airspace conflicts with major airports, such as Key West International Airport), unobstructed sea space (e.g., throughout the New Orleans Operating Area), and aircraft emergency landing fields (e.g., Naval Air Station Pensacola). The Navy selects the locations (e.g., pierside in Corpus Christi, Texas) and scenarios for Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection exercises according to Department of Homeland Security strategic goals and evolving world events.

The Navy conducts testing activities in the Gulf of Mexico because it provides a variety of bathymetric and environmental conditions necessary to ensure functionality and accuracy of systems and platforms

in areas analogous to where the military operates. Testing locations are typically located near systems command support facilities, which provide critical safety, platform, and infrastructure support and technical expertise necessary to conduct testing (e.g., proximity to air squadrons). Naval Surface Warfare Center, Panama City Division Testing Range provides critical capabilities for meeting littoral and expeditionary maneuver warfare requirements by providing research, development, test, and evaluation and in-service engineering for expeditionary maneuver warfare, operations in extreme environments, mine warfare, maritime operations, and coastal operations. The Navy has designated the Key West Operating Area as a back-up location for sonobuoy lot acceptance testing when the primary area of San Clemente Island, California is not available. The Key West Operating Area is particularly valuable due to the favorable weather conditions (e.g., low sea state) that are typical of the area.

The Navy requires flexibility in the timing of its use of active sonar and explosives in order to meet individual training and testing schedules and deployment schedules. Navy vessels, aviation squadrons, and testing programs have a limited amount of time available for training and testing. The Navy must factor in variables such as maintenance and weather (e.g., hurricanes) when scheduling event locations and timing. The Navy can restrict the number of major training exercises within the Gulf of Mexico Planning Awareness Mitigation Areas because it is not tied to a specific range support structure in this area for these events. However, major 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. This precludes the ability to completely prohibit major training exercises from occurring in the entire region.

The testing community is required to install and test systems on platforms at the locations where those platforms are stationed. Testing associated with new construction ships must occur in locations close to the shipbuilder's facilities in the Gulf of Mexico for reasons associated with construction schedule, proximity to testing facilities, and safety. Additionally, the testing community has a need for rapid development to quickly resolve tactical deficiencies. Overall, training and testing schedules can be cyclical and are partially driven by geo-political situations, which precludes the Navy from implementing additional mitigation to reduce or eliminate the use of active sonar or explosives in the Gulf of Mexico.

The Navy determined that enlarging the more eastern Gulf of Mexico Planning Awareness Mitigation Area, developing the new Bryde's Whale Mitigation Area, and continuing the other mitigation measures as described in Table 5.4-4 would be practical to implement under the Proposed Action. This determination was based on an operational assessment of past use of active sonar, explosives, and non-explosive practice munitions; projected future training and testing needs in the region; and consideration of fleet concentration areas in the Study Area. The mitigation areas in the Gulf of Mexico as described in Table 5.4-4 represent the largest areas and highest level of mitigation within each area that is practical for the Navy to implement within this region under the Proposed Action. Further modifications of training and testing activities in the Gulf of Mexico, such as developing mitigation areas for bottlenose dolphin small and resident population areas identified by LaBrecque et al. (2015a) or for dolphin habitat associated with the Deepwater Horizon oil spill, would have a significant impact on safety, sustainability, and the Navy's ability to meet its mission requirements, as discussed below.

Further expansions of the mitigation areas in this region would require the Navy to relocate its activities to alternative locations, such as farther offshore. Moving activities farther offshore would reduce a unit's training opportunities during its limited available training timeframes (i.e., increased time spent transiting to more distant training areas results in decreased time available for training). This would also result in training and testing activities being conducted in water conditions that do not accurately reflect

the types of environments where military missions and combat operations occur. Increasing transit distances would result in additional fuel consumption and expenditures, which could serve as a limiting factor for Navy surface units whose available underway times are constrained by fuel expenses.

The Navy uses select inshore areas in the Gulf of Mexico for a limited number of training and testing activities. These waters overlap the habitat extent of bottlenose dolphins within the Aransas Pass, Mississippi Sound, and St. Joseph Bay small and resident populations identified by LaBrecque et al. (2015a). It is critical for national security that the Navy's inshore activities, such as Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection exercises, occur in these inshore areas as planned to provide realism and access to the necessary environmental conditions. Because the Navy conducts a limited number of activities within inshore areas, implementing additional mitigation would not result in an avoidance or reduction of impacts on bottlenose dolphins in these areas.

Expanding the mitigation areas in this region would encroach upon the primary water space where training and testing activities are scheduled to occur. Implementing additional mitigation in the Gulf of Mexico would have a significant impact on the ability for units to meet their individual training and certification requirements (impacting the ability to deploy with the required level of readiness necessary to accomplish their missions), to certify forces to deploy to meet national security tasking (limiting the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capability in support of national security interests), and for program managers and weapons system acquisition programs to meet testing requirements and required acquisition milestones. Based on the Navy's assessment, additional mitigation in this region would increase operational costs (due to extending distance offshore, which would increase fuel consumption, maintenance, and time on station to complete required training and testing activities), increase safety risks (associated with conducting training and testing at extended distances offshore and farther away from critical medical and search and rescue capabilities), and accelerate fatigue-life of aircraft and ships (leading to increased safety risk and higher maintenance costs). Furthermore, additional mitigation would significantly impact training and testing realism due to reduced access to necessary environmental or oceanographic conditions that replicate military mission and combat conditions. This would diminish the ability for Navy Sailors to train and become proficient in using sensors and weapon systems as required during military missions and combat operations.

The iterative and cumulative impact of all potential mitigation measures the Navy assessed, including certain mitigation measures suggested through public comments on the Draft EIS/OEIS, would deny national command authorities the flexibility to respond to national security challenges and effectively accomplish the training necessary for deployment. For example, additional limitations on the use of active sonar and explosives in the Gulf of Mexico would require the Navy to shift its training activities to alternative locations further offshore or to areas along the Eastern seaboard. This would have significant impacts on safety, sustainability, and the ability to meet mission requirements within limited available timeframes. Likewise, requiring weapons system program managers and research, testing, and development program managers to use alternative areas within limited available timeframes would deny them the necessary flexibility to rapidly field or develop systems to meet testing program requirements and emerging requirements.

In summary, the Navy developed the mitigation areas identified in Table 5.4-4 to provide further protection for marine mammals in areas the best available science suggests are important to small and resident populations of Bryde's whales and sperm whales. The mitigation will help the Navy avoid or reduce potential impacts from active sonar or explosives on these species. Further restrictions in the

Gulf of Mexico on the level, number, or timing (seasonal or time of day) of training or testing activities would be impractical to due implications for safety, sustainability, and mission requirements.

5.5 MEASURES CONSIDERED BUT ELIMINATED

As described in Section 5.2 (Mitigation Development Process), the Navy conducted a detailed review and assessment of each potential mitigation measure individually and then all potential mitigation measures collectively to determine if, as a whole, the mitigation will be effective at avoiding or reducing impacts and practical to implement. The assessment included consideration of mitigation recommendations received during scoping, through public comments, and during consultations for Phase III and past environmental compliance documents applicable to the Study Area. The operational community determined that implementing mitigation beyond what is detailed in Section 5.3 (Procedural Mitigation to be Implemented) and Section 5.4 (Mitigation Areas to be Implemented) would be incompatible with the practicality assessment criteria for safety, sustainability, and mission requirements. Information about why implementing additional mitigation measures for active sonar, explosives, active and passive acoustic monitoring devices, thermal detection systems, third-party observers, foreign navy mitigation, reporting requirements, and permission schemes would be impractical is provided in the sections below. Information about why implementing additional geographic mitigation would be impractical is provided in Section 5.4 (Mitigation Areas to be Implemented).

When analyzing all potential mitigation measures collectively, the operational community determined that adopting the additional mitigation measures beyond what is included in this Final EIS/OEIS would essentially result in the Navy losing access to the significant majority of its required sea space and airspace. Additional measures would restrict or prohibit Navy training and testing along the U.S. East coast and throughout the Gulf of Mexico except in very narrow circumstances. For example, blanket limitations or restrictions on the level, number, or timing (seasonal or time of day) of training and testing activities within discrete or broad-scale areas of water (e.g., embayments and large swaths of the littorals and open ocean), or other areas vital to mission requirements would prevent the Navy from accessing its ranges, operating areas, facilities, or range support structures necessary to meet the purpose and need of the Proposed Action. As described in Section 5.2.3 (Practicality of Implementation), the Navy requires extensive sea space so that individual training and testing activities can occur at sufficient distances so they do not interfere with one another, and so that Navy units can train to communicate and operate in a coordinated fashion over tens or hundreds of square miles, as required during military missions and combat operations. The Navy also needs to maintain access to sea space with the unique, challenging, and diverse environmental and oceanographic features (e.g., bathymetry, topography, surface fronts, and variations in sea surface temperature) analogous to military mission and combat conditions to achieve the highest skill proficiency and most accurate testing results possible.

Threats to national security are constantly evolving. The Navy requires the ability to adapt training and testing to meet these emerging threats. Restricting access to broad-scale areas of water would impact the ability for Navy training and testing to evolve as the threat evolves. Eliminating opportunities for the Navy to train and test in a myriad of at-sea conditions would put U.S. forces at a tactical disadvantage during military missions and combat operations. This would also present a risk to national security if adversaries were to be alerted to the environmental conditions within which the U.S. Navy is prohibited from training and testing. Restricting large areas of ocean or other smaller areas at sea that are critical to Navy training and testing would make training and concealment much more difficult and would adversely impact the Navy's ability to perform its statutory mission.

5.5.1 ACTIVE SONAR

When assessing and developing mitigation, the Navy considered reducing active sonar training and testing hours, modifying active sonar sound sources, implementing time-of-day restrictions and restrictions during surface ducting conditions, replacing active sonar training and testing with synthetic activities (e.g., computer simulated training), and implementing active sonar ramp-up procedures. As discussed in Chapter 2 (Description of Proposed Action and Alternatives), Section 5.2.3 (Practicality of Implementation), and Appendix A (Navy Activity Descriptions), training and testing activities are planned and scheduled based on numerous factors and data inputs, such as compliance with the Optimized Fleet Response Plan. Information on why training and testing with active sonar is essential to national security is presented in Section 5.3.2.1 (Active Sonar). The Navy uses active sonar during military readiness activities only when it is essential to training missions or testing program requirements since active sonar has the potential to alert opposing forces to the operating platform's presence. Passive sonar and other available sensors are used in association with active sonar to the maximum extent practicable.

The Navy currently uses, and will continue to use, computer simulation to augment training and testing whenever possible. As discussed in Section 1.4.1 (Why the Navy Trains), simulators and synthetic training are critical elements that provide early skill repetition and enhance teamwork; however, they cannot duplicate the complexity faced by Sailors during military missions and combat operations for the types of active sonar used under the Proposed Action (e.g., hull-mounted mid-frequency active sonar). Just as a pilot would not be ready to fly solo after simulator training, a Navy Commander cannot allow military personnel to engage in military missions and combat operations based merely on simulator training. Similarly, in testing a system that is being developed, simulation can be used during the initial stages of development, but ultimately the system must be tested under conditions analogous to those faced during military missions and combat operations. Systems that have undergone maintenance need to be tested, and not simulated, to ensure that the system is operating correctly.

Sonar operators must train to effectively handle bottom bounce and sound passing through changing currents, eddies, and across changes in ocean temperature, pressure, salinity, depth, and in surface ducting conditions. Sonar systems must be tested in these conditions to ensure functionality and accuracy in military mission and combat conditions. The Navy tests its active sonar systems in areas analogous to where the Navy trains and operates. This includes a nighttime testing requirement for some active sonar systems, and a requirement to test in a variety of locations and environmental conditions depending on the testing program objectives. Training and testing in 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 how sonar systems function and are operated.

Submarines may hide in the higher ambient noise levels of shallow coastal waters and surface ducts. 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. Avoiding surface ducting conditions would be impractical because ocean conditions contributing to surface ducting change frequently and surface ducts can be of varying duration. Surface ducting can also lack uniformity and may or may not extend over a large geographic area, making it difficult to determine where to reduce power and for what periods. Submarines have long been known to take advantage of the phenomena associated with surface ducting to avoid being detected by sonar. When surface ducting

occurs, active sonar becomes more useful near the surface but less useful at greater depths. 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 Navy to be able to train under these conditions when they occur. Training with active sonar in these conditions is a critical component of military readiness because sonar operators need to learn how sonar transmissions are altered due to surface ducting, how submarines may take advantage of them, and how to operate sonar effectively under these conditions. Reducing power or shutting down active sonar based on environmental conditions as a 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 military missions and combat operations, such as during periods of low visibility.

Active sonar signals are designed explicitly to provide optimum performance at detecting underwater objects (e.g., submarines) in a variety of acoustic environments. The Navy assessed the potential for implementing active sonar signal modification as mitigation. At this time, the science on the differences in potential impacts of up or down sweeps of the sonar signal (e.g., different behavioral reactions) is extremely limited and requires further development. If future studies indicate that modifying active sonar signals (i.e., up or down sweeps) could be an effective mitigation approach, then the Navy will investigate if and how the mitigation would affect the sonar's performance.

Active sonar equipment power levels are set consistent with mission requirements. Active sonar ramp-up procedures are used during seismic surveys and some foreign navy sonar activities. Ramping up involves slowly increasing sound levels over a certain length of time until the optimal source level is reached. The intent of ramping up a sound source is to alert marine mammals with a low sound level to deter them from the area and avoid higher levels of sound exposure. The best available science does not suggest that ramp-up would be an effective mitigation tool for U.S. Navy active sonar training and testing activities under the Proposed Action. Wensveen et al. (2017) found that active sonar ramp-up was not an effective method for reducing impacts on humpback whales because most whales did not display strong behavioral avoidance to the sonar signals. The study suggested that sonar ramp-up could potentially be more effective for other more behaviorally responsive species but would likely also depend on the context of exposure. For example, ramp-up would be less effective if animals have a strong motivation not to move away from their current location, such as when foraging. Dunlop et al. (2016) and von Benda-Beckmann et al. (2014) found that implementing ramp-up as mitigation may be effective for some activities in some situations. Additionally, von Benda-Beckmann et al. (2014) found that the main factors limiting ramp-up effectiveness for a typical anti-submarine warfare activity are a high source level, a moving sonar source, and long silences between consecutive sonar transmissions. Based on the source levels, vessel speeds, and sonar transmission intervals that will be used during typical active sonar activities under the Proposed Action, the Navy has determined that ramp-up would be an ineffective mitigation measure for the active sonar activities analyzed in this document.

Implementing active sonar ramp-up procedures during training or testing under the Proposed Action would not be representative of military mission and combat conditions and would significantly impact training and testing realism. For example, during an anti-submarine warfare exercise using active sonar, ramp-ups have the potential to 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. Similarly, testing program requirements determine test parameters to accurately determine whether a system is meeting its operational and performance requirements;

therefore, implementing ramp-up during testing activities would impede the Navy's ability to collect essential data for evaluation of a system's capabilities.

Reducing realism in training impedes the ability for Navy Sailors to train and become proficient in using active sonar, erodes capabilities, and reduces perishable skills. These impacts would result in a significant risk to personnel safety during military missions and combat operations and would prevent units from meeting their individual training and certification requirements. Therefore, implementing additional mitigation that would reduce training realism would ultimately prevent units from deploying with the required level of readiness necessary to accomplish their missions and impede the Navy's ability to certify forces to deploy to meet national security tasking. Reducing realism in testing would impact the ability of researchers, program managers, and weapons system acquisition programs to conduct accurate acoustic research and effectively test systems and platforms (and components of these systems and platforms) before full-scale production or delivery to the fleet. These tests are required to ensure functionality and accuracy in military mission and combat conditions per required acquisition milestones or on an as-needed basis to meet operational requirements.

5.5.2 EXPLOSIVES

When assessing and developing mitigation, the Navy considered reducing the number and size of explosives and limiting the locations and time of day of explosive training and testing in the Study Area. As discussed in Chapter 2 (Description of Proposed Action and Alternatives), Section 5.2.3 (Practicality of Implementation), and Appendix A (Navy Activity Descriptions), the locations and timing of the training and testing activities that use explosives vary throughout the Study Area based on range scheduling, mission requirements, testing program requirements, and standard operating procedures for safety and mission success. The Navy's suite of mitigation includes extensive mitigation areas for explosives, including avoiding seafloor resource areas throughout the Study Area and important marine mammal habitats in the northeast, mid-Atlantic, southeast, and Gulf of Mexico. The Navy determined that, beyond what is described in Section 5.4 (Mitigation Areas to be Implemented), it would be impractical to develop additional mitigation areas to limit the locations of explosive training and testing activities.

Activities that involve explosive ordnance are inherently different from those that involve non-explosive practice munitions. For example, critical components of an explosive Bombing Exercise Air-to-Surface include the assembly, loading, delivery, and assessment of the explosive bomb. The explosive bombing training exercise starts with ground personnel, who must practice the building and loading of explosive munitions. Training includes the safe handling of explosive material, configuring munitions to precise specifications, and the loading of munitions onto aircraft. Aircrew must then identify a target and safely deliver fused munitions, discern if the bomb was assembled correctly, and determine bomb damage assessments based on how and where the explosive detonated. An air-to-surface bombing exercise using non-explosive practice munitions can train aircrews on valuable skills to locate and accurately deliver munitions on a target; however, it cannot effectively replicate the critical components of an explosive activity in terms of assembly, loading, delivery, and assessment of an explosive bomb. Reducing the number and size of explosives or diminishing activity realism by implementing time of day or geographic restrictions for additional explosive training exercises would impede the ability for Navy Sailors to train and become proficient in using explosive weapon systems (which would result in a significant risk to personnel safety during military missions and combat operations), and would ultimately prevent units from meeting their individual training and certification requirements (which would prevent them from deploying with the required level of readiness necessary to accomplish their missions) and impede the Navy's ability to certify forces to deploy to meet national security tasking.

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

5.5.3 Active and Passive Acoustic Monitoring Devices

When assessing and developing mitigation, the Navy considered using active and passive acoustic monitoring devices as procedural mitigation. 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 known as "HF/M3" to mitigate potential impacts. HF/M3 can only be towed at slow speeds and operates like a fish finder used by commercial and recreational fishermen. Installing the HF/M3 adjunct system on the tactical sonar ships used under the Proposed Action would have implications for safety and mission requirements due to impacts on speed and maneuverability. Furthermore, installing the system would significantly increase costs associated with designing, building, installing, maintaining, and manning the equipment. The Navy will not install the HF/M3 system or other adjunct marine mammal monitoring devices as mitigation under the Proposed Action. However, Navy assets with passive acoustic monitoring capabilities that are already participating in an activity will continue to monitor for marine mammals, as described in Section 5.2.1 (Procedural Mitigation Development) and Section 5.3 (Procedural Mitigation to be Implemented). Significant manpower and logistical constraints make constructing and maintaining additional passive acoustic monitoring systems for each training and testing activity under the Proposed Action impractical. Diverting platforms with passive acoustic monitoring capabilities to monitor training and testing events would impact their ability to meet their mission requirements and would reduce the service life of those systems.

The Navy is continuing to improve its capabilities to use range instrumentation to aid in the passive acoustic detection of marine mammals. For example, at the Southern California Offshore Range, the Pacific Missile Range Facility off Kauai, Hawaii, and the Atlantic Undersea Test and Evaluation Center in the Bahamas, the Navy can monitor instrumented ranges in real-time or through data recorded by hydrophones. The Navy has sponsored numerous studies that have produced meaningful results on marine mammal occurrence, distribution, and behavior on these ranges through the U.S. Navy Marine Species Monitoring Program. For information on the U.S. Navy Marine Species Monitoring Program, see Section 3.0.1.1 (Marine Species Monitoring and Research Programs) and Section 5.1.2.2.1 (Marine Species Research and Monitoring Programs).

The Navy's instrumented ranges are helping to facilitate a better understanding of the species that are present in those areas. However, instrumented ranges do not have the capabilities to be used effectively for mitigation. To develop an estimated position for an individual marine mammal, the animal's vocalizations must be detected on at least three hydrophones. The vocalizations must be loud enough to provide the required signal to noise ratio on those hydrophones. The hydrophones must have the required bandwidth and dynamic range to capture that signal. Detection capabilities are generally

degraded under noisy conditions that affect signal to noise ratio, such as high sea state. The ability to detect and develop an estimated position for marine mammals on the Navy's instrumented ranges depends of numerous factors, such as behavioral state, species, location relative to the hydrophones, and location on the range. For example, only vocalizing animals can be detected, and species vocalize at varying rates, call types, and source levels. The Navy's hydrophones cannot track the real-time locations of individual animals with dispersed and directional vocalizations with the level of precision needed for effective mitigation. Even marine mammals that have been vocalizing for extended periods of time have been known to stop vocalizing for hours at a time, which would prevent the Navy from obtaining or maintaining an accurate estimate of that animal's location. In addition, the Navy does not currently have the capability to perform data processing for large baleen whales in real-time. Determining if an animal is located within a mitigation zone within the timeframes required for mitigation would be prohibited by the amount of time it takes to process the data.

If a vocalizing animal is detected on only one or two hydrophones, estimating its location is not possible, and the location of the animal would be assigned generally within the detection radius around each hydrophone. The detection radius of a hydrophone is typically much larger than the mitigation zone for the activities conducted on instrumented ranges. The Navy does not have a way to verify if that vocalizing animal is located within the mitigation zone or at a location down range. Mitigating for passive acoustic detections based on unknown animal locations would essentially increase the mitigation zone sizes for each activity to that of the hydrophone detection radius. Increasing the mitigation zone sizes beyond what is described for each activity is impractical for the reasons described throughout Section 5.3 (Procedural Mitigation to be Implemented).

In summary, although the Navy is continuing to improve its capabilities to use range instrumentation to aid in the passive acoustic detection of marine mammals, at this time it would not be effective or practical for the Navy to monitor instrumented ranges for real-time mitigation or to construct additional instrumented ranges as a tool to aid in the implementation of mitigation.

5.5.4 Thermal Detection Systems

Thermal detection technology is designed to allow observers to detect the difference in temperature between a surfaced marine mammal (i.e., the body or blow of a whale) and the environment (i.e., the water and air). Although thermal detection may be reliable in some applications and environments, current technologies are limited by their: (1) reduced performance in certain environmental conditions, (2) inability to detect certain animal characteristics and behaviors, (3) low sensor resolution and narrow fields of view, and (4) high cost and low lifecycle (Boebel, 2017; Zitterbart et al., 2013).

Thermal detection systems can be effective at detecting some types of marine mammals in a limited range of marine environmental conditions. Current thermal detection systems have proven more effective at detecting large whale blows than the bodies of small animals, particularly at a distance (Zitterbart et al., 2013). The effectiveness of current technologies has not been demonstrated for small marine mammals. Thermal detection systems exhibit varying degrees of false positive detections (i.e., incorrect notifications) due in part to their low sensor resolution and reduced performance in certain environmental conditions. False positive detections may incorrectly identify other features (e.g., birds, waves, boats) as marine mammals. In one study, Zitterbart et al. (2013) reported a false positive rate approaching one incorrect notification per 4 min. of observation.

Thermal detection systems are generally thought to be most effective in cold environments, which have a large temperature differential between an animal's temperature and the environment. Two studies

that examined the effectiveness of thermal detection systems for marine mammal observations are Zitterbart et al. (2013), which tested a thermal detection system and automatic algorithm in polar waters between 34–50 degrees Fahrenheit, and a Navy-funded study in subtropical and tropical waters. Zitterbart et al. (2013) found that current technologies have limitations regarding temperature and survey conditions (e.g., rain, fog, sea state, glare, ambient brightness), for which further effectiveness studies are required. The Office of Naval Research Marine Mammals and Biology program funded a project (2013-2018) to test the thermal limits of infrared-based automatic whale detection technology. This project is focused on capturing whale spouts at two different locations featuring subtropical and tropical water temperatures, optimizing detector/classifier performance on the collected data, and testing system performance by comparing system detections with concurrent visual observations.

The Navy has also been investigating the use of thermal detection systems with automated marine mammal detection algorithms for future mitigation during training and testing, including on autonomous platforms. For example, the Defense Advanced Research Projects Agency funded six initial studies to test and evaluate infrared-based thermal detection technologies and algorithms to automatically detect marine mammals on an unmanned surface vehicle. Based on the outcome of these initial studies, follow-on efforts and testing are planned for 2018-2019.

Thermal detection systems are currently used by some specialized U.S. Air Force aircraft for marine mammal mitigation. These systems are specifically designed for and integrated into Air Force aircraft and cannot be added to Navy aircraft. Only certain Navy aircraft have specialized infrared capabilities, and these capabilities are only for fine-scale targeting within a narrow field of view. The only thermal imagery sensors aboard Navy surface ships are associated with specific weapons systems, and these sensors are not available on all vessels. These sensors are typically used only in select training events, have a limited lifespan before requiring expensive replacement, and are not optimized for marine mammal observations within the Navy's mitigation zones. For example, as described in Section 5.3.3.3 (Explosive Medium-Caliber and Large-Caliber Projectiles), Lookouts are required to observe a 1,000-yd. mitigation zone around the intended impact location during explosive large-caliber gunnery activities. In addition to observing for marine mammals, one of the activity's mission-essential requirements is for event participants, including Lookouts, to maintain focus on the mitigation zone to ensure the safety of Navy personnel and equipment and the public. Lookouts would not be able to observe the 1,000-yd. mitigation zone using the Navy's thermal imagery sensors due to their narrow fields of view and technological design specific to fine-scale targeting. Such observations would be ineffective for marine mammals and would prevent Lookouts from effectively maintaining focus on the activity area and implementing mission-essential safety protocols.

The effectiveness of even the most advanced commercially available thermal detection systems with technological designs specific to marine mammal observations is highly dependent on environmental conditions, animal characteristics, and animal behaviors (Zitterbart et al., 2013). Considering the range of environmental conditions and diversity of marine mammal species found throughout the Study Area, the use of thermal detection systems would be less effective than the traditional techniques currently employed by the Navy, such as naked-eye scanning, hand-held binoculars, and high-powered binoculars mounted on a ship deck. Furthermore, high false positive rates of thermal detection systems could result in the Navy implementing mitigation for features incorrectly identified as marine mammals. Increasing the instances of mitigation implementation based on incorrectly-identified features would have significant impacts on the ability for training and testing activities to accomplish their intended objectives, without providing any mitigation benefit to the species. In addition, thermal detection

systems are designed to detect marine mammals and do not have the capability to detect other resources for which the Navy is required to implement mitigation. Requiring Lookouts to use thermal detection systems would prevent them from detecting and mitigating for sea turtles and other biological resources (e.g., floating vegetation, jellyfish aggregations, large schools of fish).

As discussed in Section 5.3 (Procedural Mitigation to be Implemented), the Navy's procedural mitigation measures include the maximum number of Lookouts the Navy can assign to each activity based on available manpower and resources. It would be impractical to add personnel to serve as additional Lookouts for the sole purpose of thermal detection system use. For example, the Navy does not have available manpower to add Lookouts to use thermal detection systems in tandem with existing Lookouts who are using traditional observation techniques.

In summary, thermal detection systems have not been sufficiently studied both in terms of their effectiveness within the environmental conditions found in the Study Area and their compatibility with Navy training and testing. The Navy plans to continue researching thermal detection systems to determine their effectiveness and compatibility with Navy applications. If the technology matures to the state where thermal detection is determined to be an effective mitigation tool during training and testing, the Navy will assess the practicality of using the technology during training and testing events and retrofitting its observation platforms with thermal detection devices. The assessment will include an evaluation of the budget and acquisition process (including costs associated with designing, building, installing, maintaining, and manning equipment that is expensive and has a relatively short lifecycle before key system components need replacing); logistical and physical considerations for device installment, repair, and replacement (e.g., conducting engineering studies to ensure there is no electronic or power interference with existing shipboard systems); manpower and resource considerations for training personnel to effectively operate the equipment; and considerations of potential security and classification issues. New system integration on Navy assets can entail up to 5 to 10 years of effort to account for acquisition, engineering studies, and development and execution of systems training. The Navy will provide information to NMFS about the status and findings of Navy-funded thermal detection studies and any associated practicality assessments at the annual adaptive management meetings. Information about the Navy's adaptive management program is included in Section 5.1.2.2.1.1 (Adaptive Management).

5.5.5 Third-Party Observers

When assessing and developing mitigation, the Navy considered increasing the use of third-party observers during training and testing to aid in the implementation of procedural mitigation. The use of third-party observers to conduct pre- or post-activity biological resource observations would be an ineffective mitigation because marine mammals would likely move into or out of the activity area, and mitigation must be implemented at the time the activity is taking place. The Navy will use third-party observers in combination with Lookouts for ship shock trials primarily because of the requirement to conduct marine species monitoring for multiple days after the event, which would detract Navy personnel from essential tasks related to mission objectives.

There are significant manpower and logistical constraints that make using third-party observers for every training and testing activity under the Proposed Action impractical. Training and testing activities often occur simultaneously and in various regions throughout the Study Area, some of which last for days or weeks at a time. Having third-party observers embark on Navy vessels or aircraft would result in safety and security clearance issues. Training and testing event planning includes careful consideration

of capacity limitations when placing personnel on participating aircraft and vessels. The Navy is unable to add third-party observers on a ship or substitute a Navy Lookout with a third-party observer without causing a berthing shortage or exceedance of other space limitations, or impacting the ability for Lookouts to complete their other mission-essential duties. The use of third-party observers also presents national security concerns due to the requirement to provide advance notification of specific times and locations of Navy platform movements and activities (e.g., vessels using active sonar).

Reliance on the availability of third-party personnel for mitigation would be impractical because training and testing activity timetables oftentimes cannot be precisely fixed and are instead based on the free-flow development of tactical situations. Waiting for third-party aircraft or vessels to complete surveys, refuel, or transit on station would extend the length of the activity in a way that would diminish realism and delay training and testing schedules. Hiring third-party civilian vessels or aircraft to observe additional Navy training and testing activities would also be unsustainable due to the significant associated costs. Because many training and testing activities take place offshore, the amount of time observers would spend on station would be limited due to aircraft fuel restrictions. Fuel restrictions and distance from shore would increase safety risks should mechanical problems arise. The presence of civilian aircraft or vessels in the vicinity of training and testing activities would present increased safety risks due to airspace conflicts and proximity to explosives.

5.5.6 Foreign Navy Mitigation

When assessing and developing mitigation, the Navy considered adopting the mitigation measures implemented by foreign navies. Mitigation measures are carefully developed for and assessed by each individual navy based on the potential impacts of their activities on the biological resources that live in their Study Areas, and the practicality of mitigation implementation based on their training mission and testing program requirements and the resources available for mitigation. The U.S. Navy's readiness considerations differ from those of foreign navies based on each navy's strategic reach, global mission, country-specific legal requirements, and geographic considerations. Most non-U.S. navies do not possess an integrated strike group and do not have integrated training requirements. The U.S. Navy's training is built around the integrated warfare concept and is based on the U.S. Navy's capabilities, the threats faced, the operating environment, and the overall mission. For this reason, not all measures developed for foreign navies would be effective at reducing impacts of U.S. Navy training or testing, or practical to implement by the U.S. Navy (and vice versa). For example, some navies implement active sonar ramp-up as mitigation for marine mammals; however, as described in Section 5.5.1 (Active Sonar), the U.S. Navy determined that active sonar ramp-up would be an ineffective mitigation measure for training and testing activities under the Proposed Action and would be impractical to implement because it would significantly impact training and testing realism.

The U.S. Navy will implement the mitigation measures as described in Section 5.3 (Procedural Mitigation to be Implemented) and Section 5.4 (Mitigation Areas to be Implemented) because they have been determined to be effective at avoiding or reducing impacts from the Proposed Action and practical to implement by the U.S. Navy. Many of these measures are the same as, or comparable to, those implemented by foreign navies. For example, most navies implement some form of procedural mitigation to cease certain activities if a marine mammal is observed in a mitigation zone (Dolman et al., 2009). Some navies also implement geographic mitigation to restrict activities within particularly important marine mammal breeding, feeding, or migration habitats. The U.S. Navy will implement several mitigation measures and environmental compliance initiatives that are not implemented by foreign navies. For example, as discussed in Section 5.1.2.2 (Monitoring, Research, and Reporting

Initiatives), the U.S. Navy will continue to sponsor scientific monitoring and research and comply with stringent reporting requirements.

5.5.7 Reporting Requirements

When assessing and developing mitigation, the Navy considered increasing its reporting requirements, such as additional reporting of vessel speeds and marine species observations. As discussed in Section 5.1.2.2 (Monitoring, Research, and Reporting Initiatives), the Navy developed its reporting requirements in conjunction with NMFS and the USFWS to be consistent with mission requirements and balance the usefulness of the information to be collected with the practicality of collecting it. The Navy's training and testing activity reports and incident reports are designed to verify mitigation implementation; comply with current permits, authorizations, and consultation requirements; and improve future environmental analyses. The Navy reports to NMFS if mitigation was implemented during sinking exercises and ship shock trials (e.g., number of times explosive detonations were delayed due to marine mammal sightings). For major training exercises, the Navy's annual training and testing activity reports include information on each individual marine mammal sighting related to mitigation implementation. In the unlikely event a that a marine mammal vessel strike occurs, the Navy provides NMFS with relevant information pertaining to the incident, including but not limited to vessel speed.

Additional administrative reporting would be ineffective as mitigation because it would not result in modifications to training or testing activities or further avoidance or reductions of potential impacts. For example, additional administrative reporting of vessel speed data would not result in modifications to vessel speeds (e.g., speed restrictions) or reduce the already low potential for marine mammal vessel strikes. Lookouts are not trained to make species-specific identification and would not be able to provide detailed scientific data if more detailed marine species observation reports were to be required. Furthermore, the Navy does not currently maintain a record management system to collect, archive, analyze, and report marine species observation or vessel speed data for every training and testing activity and all vessel movements. For example, the speed of Navy vessels can fluctuate an unlimited number of times during training and 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 participations with requirements to complete additional administrative reporting would distract them from preparing a ready force and focusing on mission-essential tasks. Additional reporting requirements would draw event participants' attention away from the complex tactical tasks they are primarily obligated to perform, such as driving a warship or engaging in a gunnery event, which would adversely impact Navy personnel safety, public safety, and the effectiveness of training or testing.

As part of the U.S. Navy Marine Species Monitoring Program, the Navy conducted 5 years of monitoring before, during, and after several types of events involving the use of explosives in the Study Area. For example, the Navy submitted annual marine mammal monitoring reports for mine neutralization exercises in the Virginia Capes Range Complex under its Phase I and Phase II MMPA permits. These reports were designed, in part, to address if the Navy's mitigation measures for explosives were effective at avoiding injury and mortality of marine mammals. The Navy's monitoring reports detailed all marine mammal sightings and if mitigation was implemented during each event. The Navy did not observe any dead or injured marine mammals during these monitoring events. There has not been a demonstrated utility for, or benefit of, continuing to collect and report similar marine species observation and mitigation data for training and testing activities under the Proposed Action.

5.5.8 PERMISSION SCHEMES

Following publication of the 2013 Hawaii-Southern California Training and Testing (HSTT) Final EIS/OEIS, a 2015 settlement agreement temporarily prohibited or restricted Navy activities within specific areas in the HSTT Study Area. The temporary settlement measures were derived pursuant to negotiations with plaintiffs and were not evaluated or selected based on the type of thorough examination of best available science that occurs through the consultation process under the MMPA, or through analysis conducted for NEPA purposes. The temporary settlement agreement did not constitute a concession by the Navy as to the potential impacts of its activities on marine mammals or other species. The settlement terms do not extend ad infinitum, were agreed to only for the purpose of settling the lawsuit, and were never intended to be a framework for how the Navy develops future mitigation.

The Navy's adoption of temporary restrictions on its activities as part of a relatively short-term settlement does not mean that those restrictions are supported by the best available science or are practical to implement from a military readiness standpoint over the longer term in either the HSTT Study Area or other Study Areas, such as AFTT. For example, an activity permission scheme is impractical and unwarranted in the AFTT Study Area based on the extensive level of Navy Senior Leadership review and approval of mitigation measures that will be implemented under the Proposed Action. The mitigation measures described in Section 5.3 (Procedural Mitigation to be Implemented) and Section 5.4 (Mitigation Areas to be Implemented) were reviewed and approved by a four-star Admiral, the Fleet Commander of all Navy forces in the Study Area, and Navy Senior Leadership; therefore, additional permission or authorization from Navy Leadership prior to conducting training or testing in the Study Area would be redundant.

As described in Chapter 2 (Description of Proposed Action and Alternatives) and Chapter 3 (Affected Environment and Environmental Consequences), the Navy conducts thousands of discrete training and testing activities, many involving active sonar and explosives. In most cases, activities are small-scale unit-level training activities or testing events with minor potential to impact the environment. To require that each individual event be approved at an elevated level of command would essentially paralyze Navy decision-making as senior Commanders would be focused on approving otherwise minor and minimally impactful activities. For major training exercises, senior Commanders are already part of the planning and approval processes. Burdening operational Commanders with requirements to complete additional administrative tasks would distract them from preparing a ready force. At the most fundamental level, a training and testing activity permission scheme within the AFTT Study Area would run counter to one of the foundational concepts of naval command and control at sea, which is the ability and duty for a commanding officer to train and fight their ship. Requiring additional permission for training and testing activities in the AFTT Study Area would be impractical because it would not be compatible with meeting the purpose and need of the Proposed Action. The Navy will continue to institutionalize mitigation procedures and tools to facilitate Navywide environmental compliance and reduce administrative burdens, such as the Protective Measures Assessment Protocol discussed in Section 5.2 (Mitigation Development Process) and Section 5.3.1 (Environmental Awareness and Education).

5.6 MITIGATION SUMMARY

Table 5.6-1 and Table 5.6-2 summarize the mitigation measures that the Navy will implement under Alternative 1 or Alternative 2 of the Proposed Action. Figure 5.6-1 displays the mitigation areas in the Study Area. Unless specified otherwise in the tables, the mitigation applies year-round. For specific

requirements, additional information, and clarifications to the table summaries, see Section 5.3 (Procedural Mitigation to be Implemented) and Section 5.4 (Mitigation Areas to be Implemented).

Table 5.6-1: Summary of Procedural Mitigation

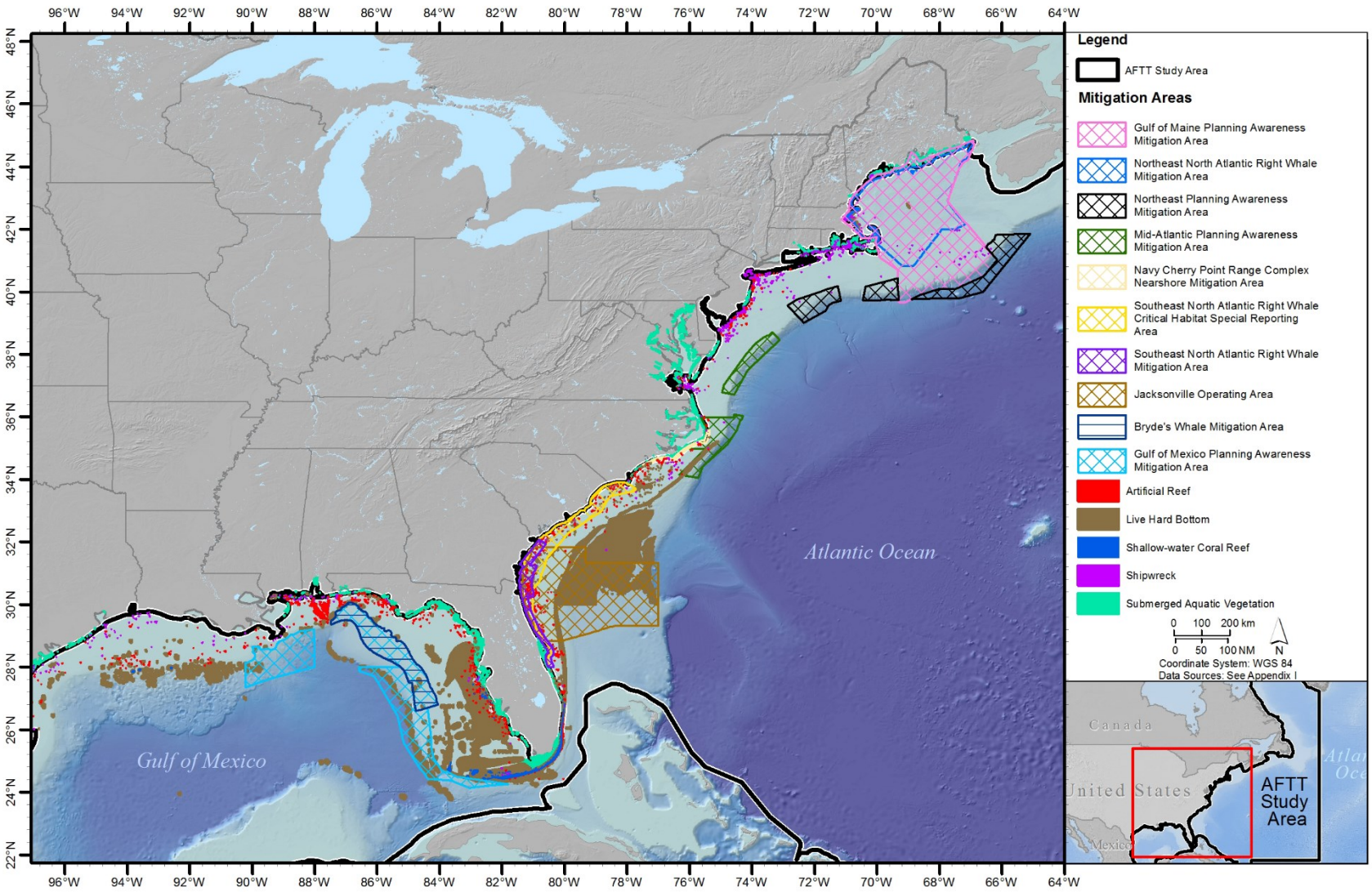
Stressor or Activity	*Mitigation Zones Sizes and Other Requirements*	*Protection Focus*
Environmental Awareness and Education	• Afloat Environmental Compliance Training program for applicable personnel	Marine mammals, Sea turtles
Active Sonar	Depending on sonar source: • 1,000 yd. power down, 500 yd. power down, and 200 yd. shut down • 200 yd. shut down	Marine mammals, Sea turtles
Air Guns	• 150 yd.	Marine mammals, Sea turtles
Pile Driving	• 100 yd.	Marine mammals, Sea turtles
Weapons Firing Noise	• 30° on either side of the firing line out to 70 yd.	Marine mammals, Sea turtles
Aircraft Overflight Noise	• Distance from shore in the Virginia Capes Range Complex and Fisherman Island National Wildlife Refuge during explosive mine neutralization activities involving Navy divers (piping plovers and other nesting birds) • Distance from shore in the Dry Tortugas Islands for supersonic flights (Fort Jefferson and roseate terns)	Birds, Cultural resources
Explosive Sonobuoys	• 600 yd.	Marine mammals, Sea turtles
Explosive Torpedoes	• 2,100 yd.	Marine mammals, Sea turtles
Explosive Medium-Caliber and Large-Caliber Projectiles	• 1,000 yd. (large-caliber projectiles) • 600 yd. (medium-caliber projectiles during surface-to-surface activities) • 200 yd. (medium-caliber projectiles during air-to-surface activities)	Marine mammals, Sea turtles
Explosive Missiles and Rockets	• 2,000 yd. (21–500 lb. net explosive weight) • 900 yd. (0.6–20 lb. net explosive weight)	Marine mammals, Sea turtles
Explosive Bombs	• 2,500 yd.	Marine mammals, Sea turtles
Sinking Exercises	• 2.5 NM	Marine mammals, Sea turtles
Explosive Mine Countermeasure and Neutralization Activities	• 2,100 yd. (6–650 lb. net explosive weight) • 600 yd. (0.1–5 lb. net explosive weight)	Marine mammals, Sea turtles
Explosive Mine Neutralization Activities Involving Navy Divers	• 1,000 yd. (21–60 lb. net explosive weight for positive control charges and charges using time-delay fuses) • 500 yd. (0.1–20 lb. net explosive weight for positive control charges)	Marine mammals, Sea turtles
Maritime Security Operations – Anti-Swimmer Grenades	• 200 yd.	Marine mammals, Sea turtles
Line Charge Testing	• 900 yd.	Marine mammals, Sea turtles, Gulf sturgeon
Ship Shock Trials	• 3.5 NM	Marine mammals, Sea turtles
Vessel Movement	• 500 yd. (whales) • 200 yd. (other marine mammals) • Vicinity (sea turtles) • North Atlantic right whale Dynamic Management Area notification messages	Marine mammals, Sea turtles
Towed In-Water Devices	• 250 yd. (marine mammals) • Vicinity (sea turtles)	Marine mammals, Sea turtles
Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions	• 200 yd.	Marine mammals, Sea turtles
Non-Explosive Missiles and Rockets	• 900 yd.	Marine mammals, Sea turtles
Non-Explosive Bombs and Mine Shapes	• 1,000 yd.	Marine mammals, Sea turtles

Table 5.6-2: Summary of Mitigation Areas

Summary of Mitigation Area Requirements
Mitigation Areas for Shallow-water Coral Reefs
• The Navy will not conduct precision anchoring (except in designated anchorages), explosive or non-explosive mine countermeasure and neutralization activities, explosive or non-explosive mine neutralization activities involving Navy divers, explosive or non-explosive small-, medium-, and large-caliber gunnery activities using a surface target, explosive or non-explosive missile and rocket activities using a surface target, or explosive or non-explosive bombing or mine laying activities. • The Navy will not place mine shapes, anchors, or mooring devices on the seafloor. • Within the Key West Range Complex, vessels will operate within waters deep enough to avoid bottom scouring or prop dredging, with at least a 1-ft. clearance between the deepest draft of the vessel (with the motor down) and the seafloor at mean low water. • Within the South Florida Ocean Measurement Facility Testing Range, the Navy will implement additional measures for shallow-water coral reefs, such as using real-time positioning and remote sensing information to avoid shallow-water coral reefs during deployment, installation, and recovery of anchors and mine-like objects, and during deployment of bottom-crawling unmanned underwater vehicles.
Mitigation Areas for Live Hard Bottom, Artificial Reefs, Submerged Aquatic Vegetation, and Shipwrecks
• The Navy will not conduct precision anchoring (except in designated anchorages), explosive mine countermeasure and neutralization activities, or explosive mine neutralization activities involving Navy divers, and will not place mine shapes, anchors, or mooring devices on the seafloor (except in designated locations). • Within the Key West Range Complex, vessels will operate within waters deep enough to avoid bottom scouring or prop dredging, with at least a 1-ft. clearance between the deepest draft of the vessel (with the motor down) and the seafloor at mean low water. • Within the South Florida Ocean Measurement Facility Testing Range, the Navy will implement additional measures for live hard bottom, such as using real-time positioning and remote sensing information to avoid live hard bottom during deployment, installation, and recovery of anchors and mine-like objects, and during deployment of bottom-crawling unmanned underwater vehicles.
Northeast North Atlantic Right Whale Mitigation Area
• The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy will minimize use of active sonar to the maximum extent practicable and will not use explosives that detonate in the water. • The Navy will conduct non-explosive torpedo testing during daylight hours in Beaufort sea state 3 or less using three Lookouts (one on a vessel, two in an aircraft during aerial surveys) and an additional Lookout on the submarine when surfaced; during transits, ships will maintain a speed of no more than 10 knots; during firing, ships will maintain a speed of no more than 18 knots except brief periods of time during vessel target firing. • Vessels will obtain the latest North Atlantic right whale sightings data and implement speed reductions after they observe a North Atlantic right whale, if within 5 NM of a sighting reported within the past week, and when operating at night or during periods of reduced visibility.
Gulf of Maine Planning Awareness Mitigation Area
• The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy will not conduct major training exercises and will not conduct >200 hours of hull-mounted mid-frequency active sonar per year.
Northeast Planning Awareness Mitigation Areas and Mid-Atlantic Planning Awareness Mitigation Areas
• The Navy will avoid conducting major training exercises to the maximum extent practicable. • The Navy will not conduct more than four major training exercises per year.
Southeast North Atlantic Right Whale Mitigation Area (November 15 – April 15)
• The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy will not use active sonar except as necessary for navigation training, object detection training, and dipping sonar. • The Navy will not expend explosive or non-explosive ordnance. • Vessels will obtain the latest North Atlantic right whale sightings data; will implement speed reductions after they observe a North Atlantic right whale, if within 5 NM of a sighting reported within the past 12 hours, and when operating at night or during periods of reduced visibility; and will minimize north-south transits to the maximum extent practicable.
Jacksonville Operating Area (November 15 – April 15)
• Navy units conducting training or testing activities in the Jacksonville Operating Area will obtain and use Early Warning System North Atlantic right whale sightings data as they plan specific details of events to minimize potential interactions with North Atlantic right whales to the maximum extent practicable. The Navy will use the reported sightings information to assist visual observations of applicable mitigation zones and to aid in the implementation of procedural mitigation.
Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area (November 15 – April 15)
• The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports.

Table 5.6-2: Summary of Mitigation Areas (continued)

Summary of Mitigation Area Requirements
Navy Cherry Point Range Complex Nearshore Mitigation Area (March – September)
• The Navy will not conduct explosive mine neutralization activities involving Navy divers in the mitigation area. • To the maximum extent practicable, the Navy will not use explosive sonobuoys, explosive torpedoes, explosive medium-caliber and large-caliber projectiles, explosive missiles and rockets, explosive bombs, explosive mines during mine countermeasure and neutralization activities, and anti-swimmer grenades in the mitigation area.
Bryde's Whale Mitigation Area
• The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy will not conduct >200 hours of hull-mounted mid-frequency active sonar per year and will not use explosives (except during explosive mine warfare activities).
Gulf of Mexico Planning Awareness Mitigation Areas
• The Navy will avoid conducting major training exercises to the maximum extent practicable. • The Navy will not conduct any major training exercises under Alternative 1 and no more than one per year under Alternative 2.



Notes: AFTT: Atlantic Fleet Training and Testing

Figure 5.6-1: Summary of Mitigation Areas in the Study Area

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