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

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APPENDIX I GEOGRAPHIC MITIGATION ASSESSMENT

I.1 Introduction

As described in Chapter 5 (Mitigation), the United States (U.S.) Department of the Navy (Navy) will implement at-sea procedural mitigation, at-sea geographic mitigation, and terrestrial mitigation to avoid or reduce potential impacts on environmental and cultural resources from training and testing activities proposed in the Mariana Islands Training and Testing (MITT) Supplemental Environmental Impact Statement (SEIS)/Overseas Environmental Impact Statement (OEIS) Proposed Action. The purpose of this appendix is to present an assessment of the potential geographic mitigation (i.e., mitigation implemented seasonally or year-round within defined at-sea mitigation areas) that the Navy considered to reduce or avoid impacts on marine mammals and sea turtles in the Study Area. The goals of developing geographic mitigation in this appendix are (1) in combination with procedural mitigation, to effect the least practicable adverse impact on marine mammal species or stocks and their habitat, and (2) to ensure that the Proposed Action does not jeopardize the continued existence of endangered or threatened species.

This appendix includes background information on the areas that the Navy is proposing as geographic mitigation areas, information on the marine mammals and sea turtles known to occur in each area, and an assessment of the effectiveness and practicality of implementing mitigation. A summary of the mitigation areas that the Navy proposes to implement under Alternative 1 or Alternative 2 of the Proposed Action as a result of the assessments presented in this appendix is also included in Section 5.4 (At-Sea Mitigation Areas to be Implemented). The Navy will work collaboratively with the appropriate regulatory agencies to finalize its mitigation areas through the consultation and permitting processes and will coordinate with the National Marine Fisheries Service (NMFS) to finalize the geographic mitigation analyzed in this appendix. Final mitigation measures will be documented in the Navy Record of Decision, NMFS Marine Mammal Protection Act (MMPA) Final Rule and Letter of Authorization, and the Endangered Species Act (ESA) Biological Opinions as applicable.

I.2 Geographic Mitigation Development Process

See Chapter 5 (Mitigation) for general information on the Navy's mitigation development process, including definitions of mitigation terminology, background information pertinent to the overall process, and information about the mitigation effectiveness and practicality criteria. This section presents information specific to assessing and developing geographic mitigation for marine mammals and sea turtles in the Study Area.

The Navy considered areas suggested by the public, governmental agencies, and non-governmental organizations during the public involvement process. The Navy also considered additional areas that were informed by Navy-funded studies.

MFS has not identified Biologically Important Areas for marine mammals in the MITT Study Area (Ferguson et al., 2015b; Van Parijs et al., 2015). Data informing geographic mitigation area development and assessment included the operational information described in Section 5.2.4 (Practicality of Implementation), the best available science discussed in Chapter 3 (Affected Environment and Environmental Consequences), published literature, and marine species monitoring and density data. 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.

The Navy used a comprehensive qualitative method to analyze potential geographic mitigation that considered a biological assessment of how a potential time and area limitation on Navy activities would benefit the species or stock and its habitat (e.g., Does a certain area support important biological functions? Would mitigation in that area result in an avoidance or reduction of impacts?) in the context of the stressors of concern in the specific area, and an operational assessment of the practicality of implementation (e.g., including an assessment of the specific importance of that area for training and testing).

I.2.1 Identification by the Navy of Areas to Consider for Potential Geographic Mitigation

Navy scientists derived the geographic boundaries and applicable timeframes (i.e., seasonal or year-round) for potential areas based on a review of the best available science. The Navy evaluated marine mammal and sea turtle sighting and satellite tag data to identify locations where species appeared to concentrate, the timeframes of apparent concentrations, and documented behaviors from available reports and publications (Ampela et al., 2014; Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016a; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2017b; Hill et al., 2018a; Hill et al., 2018b; Hill et al., 2018c; Jones & Van Houtan, 2014a; Jones & Van Houtan, 2014b; Jones et al., 2015; Jones & Martin, 2016; Klinck et al., 2015; Klinck et al., 2016; Ligon et al., 2011; Martien et al., 2014; Martin & Jones, 2016; Martin et al., 2018; Munger et al., 2014; Munger et al., 2015; National Marine Fisheries Service, 2018; Nieukirk et al., 2016; Norris et al., 2015; Norris et al., 2014; Norris et al., 2017; Oleson et al., 2015; Summers et al., 2017; Summers et al., 2018; Tetra Tech Inc., 2014; U.S. Department of the Navy, 2013, 2018b; Uyeyama, 2014; Yack et al., 2016). Area boundaries were generally drawn with straight lines and simple shapes, with the goal that these areas would be relatively easy for operators to plot if they were carried forward for implementation.

The Navy named each area considered according to a nearby geographic feature. A list of the areas identified by the Navy as potential mitigation areas and their applicable resource protection focus and timeframe is provided in Table I-1. A map showing the location of each area identified as a potential mitigation area is shown in Figure I-1.

Table I-1: Navy-Identified Potential Geographic Mitigation Areas

Habitat Considered	*Protection Focus*	*Applicable Timeframe*
Marpi Reef Area	Humpback whales	Seasonal (December–April)
	Marine mammals	Year-round
Chalan Kanoa Reef Area	Humpback whales	Seasonal (December–April)
	Marine mammals and sea turtles	Year-round
Agat Bay Nearshore Area	Spinner dolphins and sea turtles	Year-round
North Guam Offshore Area	Marine mammals	Year-round
Ritidian Point Offshore Area	Marine mammals	Year-round
Tumon Bay Offshore Area	Marine mammals	Year-round

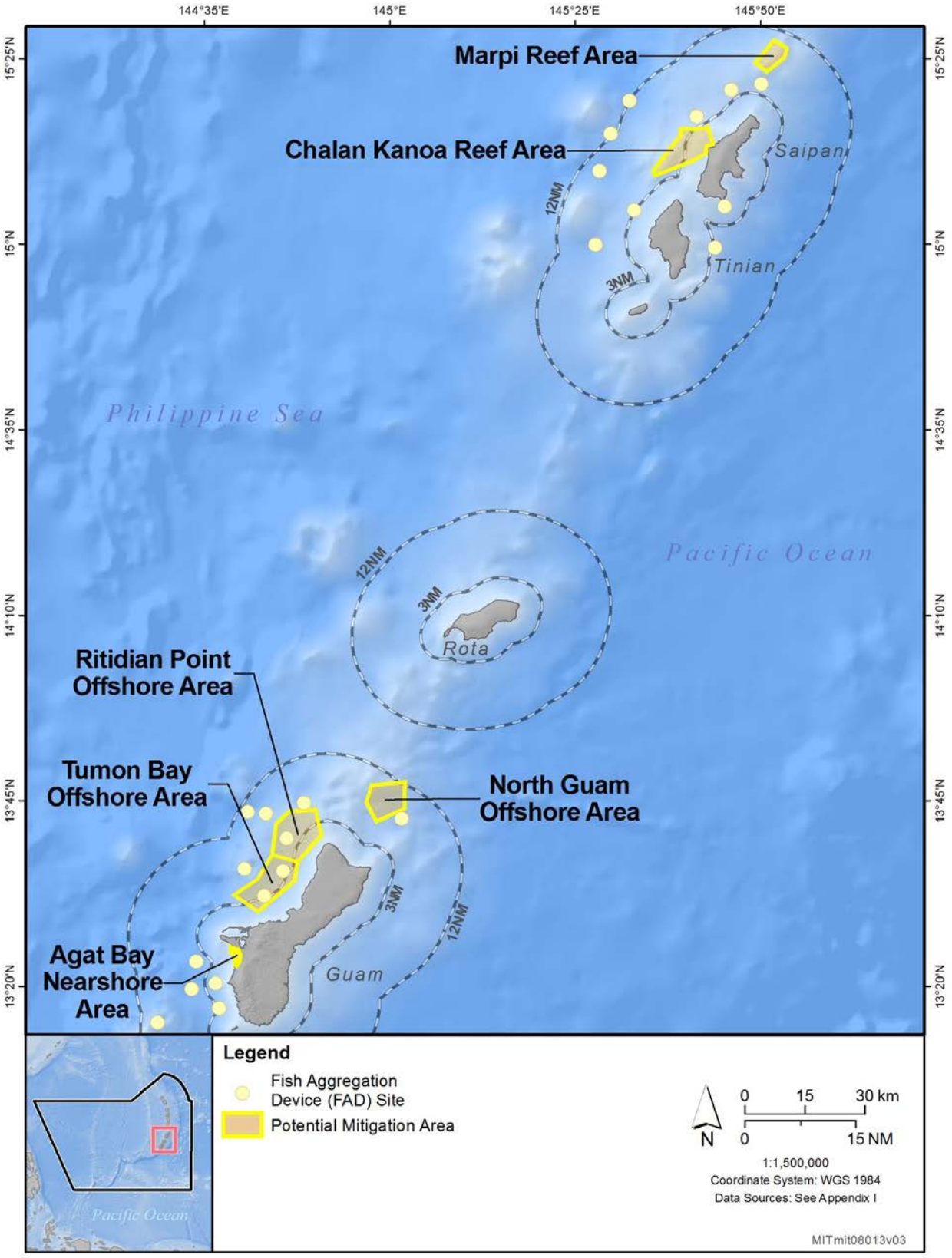

Figure I-1: Navy-Identified Potential Geographic Mitigation Areas

I.2.2 Assessing Mitigation Effectiveness

The first step in assessing the potential geographic mitigation areas was to use the best available science to determine if implementing geographic mitigation would effectively help the Navy avoid or reduce potential impacts associated with the Proposed Action on marine mammals or sea turtles. This appendix focuses on avoiding or reducing potential impacts from the stressors that have the highest potential for injurious impacts on marine mammals and sea turtles. Therefore, the Navy focused its assessment on hull-mounted mid-frequency active sonar and in-water explosives. The Navy considered a geographic mitigation area to be biologically effective if it met the following criteria:

- **The mitigation area is a key area of biological importance:** The best available science suggests that the mitigation area is particularly important to one or more species of marine mammals or sea turtles for a biologically important life process (e.g., foraging, migration, reproduction); and
- **The mitigation will result in an avoidance or reduction of impacts:** Implementing the mitigation will likely avoid or reduce potential impacts on species, stocks, or populations of marine mammals or sea turtles based on data describing their seasonal occurrence and distribution, spatial density, and behaviors in the Study Area. Furthermore, implementing the mitigation would not shift or transfer adverse impacts from one species to another (e.g., to a more vulnerable or sensitive species).

While this appendix focuses on marine mammals and sea turtles, geographic mitigation may provide potential benefits to other marine resources known to occur in each area, such as marine invertebrates and fishes. Additional information on the Navy's mitigation effectiveness criteria is presented in Section 5.2.2 (At-Sea Mitigation Area Development).

I.2.3 Assessing Practicality of Implementation

In the next step of the mitigation assessment process, the Navy operational community conducted an extensive and comprehensive analysis to determine how and to what degree the implementation of geographic mitigation areas would impact planning, scheduling, and conducting safe training and testing activities as described under the Proposed Action. Conducting the proposed training and testing activities is necessary for the Navy to fulfill its Title 10 requirements, ensuring naval forces are ready to execute the range of military operations required by operational Commanders. The Navy considered a mitigation measure to be practical to implement if it met all criteria discussed in Section 5.2.4 (Practicality of Implementation) for safety, sustainability, and mission requirements.

I.3 Geographic Mitigation Assessment – Areas Proposed for Implementation

The Navy determined that three of the six potential geographic mitigation areas met the criteria presented in Section I.2.2 (Assessing Mitigation Effectiveness) and Section I.2.3 (Assessing Practicality of Implementation). These three areas (the Marpi Reef, Chalan Kanoa Reef, and Agat Bay Geographic Mitigation Areas) are described in this appendix as proposed mitigation areas. The three other potential mitigation areas considered in this appendix did not meet the Navy's criteria because, based on the available data, the areas are not key areas of biological importance to any marine mammal or sea turtle species.

The discussion for each of the proposed geographic mitigation areas includes a physical description of the area, details on how and why the area was identified, information on Navy training and testing activities potentially occurring in the area, and a mitigation assessment. The mitigation assessment uses information presented in Sections 3.4 (Marine Mammals) and 3.5 (Sea Turtles) to assess the

effectiveness of geographic mitigation in reducing or avoiding impacts on these resources, and uses information presented in Chapter 2 (Description of Proposed Action and Alternatives) and Appendix A (Training and Testing Activities Descriptions) to assess practicality of implementation and impacts on the effectiveness of military readiness activities. The Navy considers both the potential benefit to resources and the practicality of implementing the mitigation when determining which areas were proposed as geographic mitigation areas. Additional information on the three proposed mitigation areas and the three potential mitigation areas is contained in the administrative record for this SEIS/OEIS.

I.3.1 Proposed Geographic Mitigation Area - Marpi Reef

The Marpi Reef Mitigation Area is located approximately 11 kilometers (km) north of Saipan at its closest point and covers approximately 31 square kilometers (km^2). As shown in Figure I-2, this is an observed area of concentration and reproductive behavior for humpback whales based on sightings documented during a broad area line transect survey in 2007 (Fulling et al., 2011) and during non-systematic small boat surveys occurring from 2010 through 2018 (HDR, 2011; HDR EOC, 2012; Hill et al., 2014; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Hill et al., 2018c; Ligon et al., 2011). Navy scientists reviewed these sighting data using a Geographic Information System, and a boundary was drawn to encompass the area of known concentration at Marpi Reef.

I.3.1.1 Resources within the Marpi Reef Geographic Mitigation Area

The Marpi Reef Mitigation Area was developed based on the seasonal presence of humpback whales; however, other biological resources have been observed or are expected to be present at Marpi Reef, including other marine mammals, sea turtles, invertebrates including corals, and fishes. Those resources are discussed in detail in the following sections of this SEIS/OEIS: Section 3.4 (Marine Mammals), Section 3.5 (Sea Turtles), Section 3.8 (Marine Invertebrates), and Section 3.9 (Fishes).

As shown in Table I-2, five marine mammal species have been documented in the Marpi Reef Area either through sightings or satellite tag detections (Fulling et al., 2011; HDR, 2011; HDR EOC, 2012; Hill et al., 2014; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Hill et al., 2018c; Ligon et al., 2011). Species documented in the Marpi Reef Area include humpback whale, spinner dolphin, bottlenose dolphin, short-finned pilot whale, and false killer whale. Sea turtles have not been reported in the Marpi Reef Area.

Table I-2: Marine Mammals Documented Within the Proposed Marpi Reef Geographic Mitigation Area

Common Name	2007	2010	2011	2012	2013	2014	2016	2017	2018
Humpback whale	S						S	S	S
Spinner dolphin	S	S	S	S	S	S	S	S	S
Bottlenose dolphin					S+T			S	S
Short-finned pilot whale					S+T	S+T	S+T	S	
False killer whale					T				

Notes: S = One or more sightings during a survey in the area; T = one or more satellite tag detections; S+T = one or more sightings and satellite tag detections in a given year; empty cells indicate no documented occurrence of the species in the given year; years not shown indicate that no surveys were conducted in the area in that year.

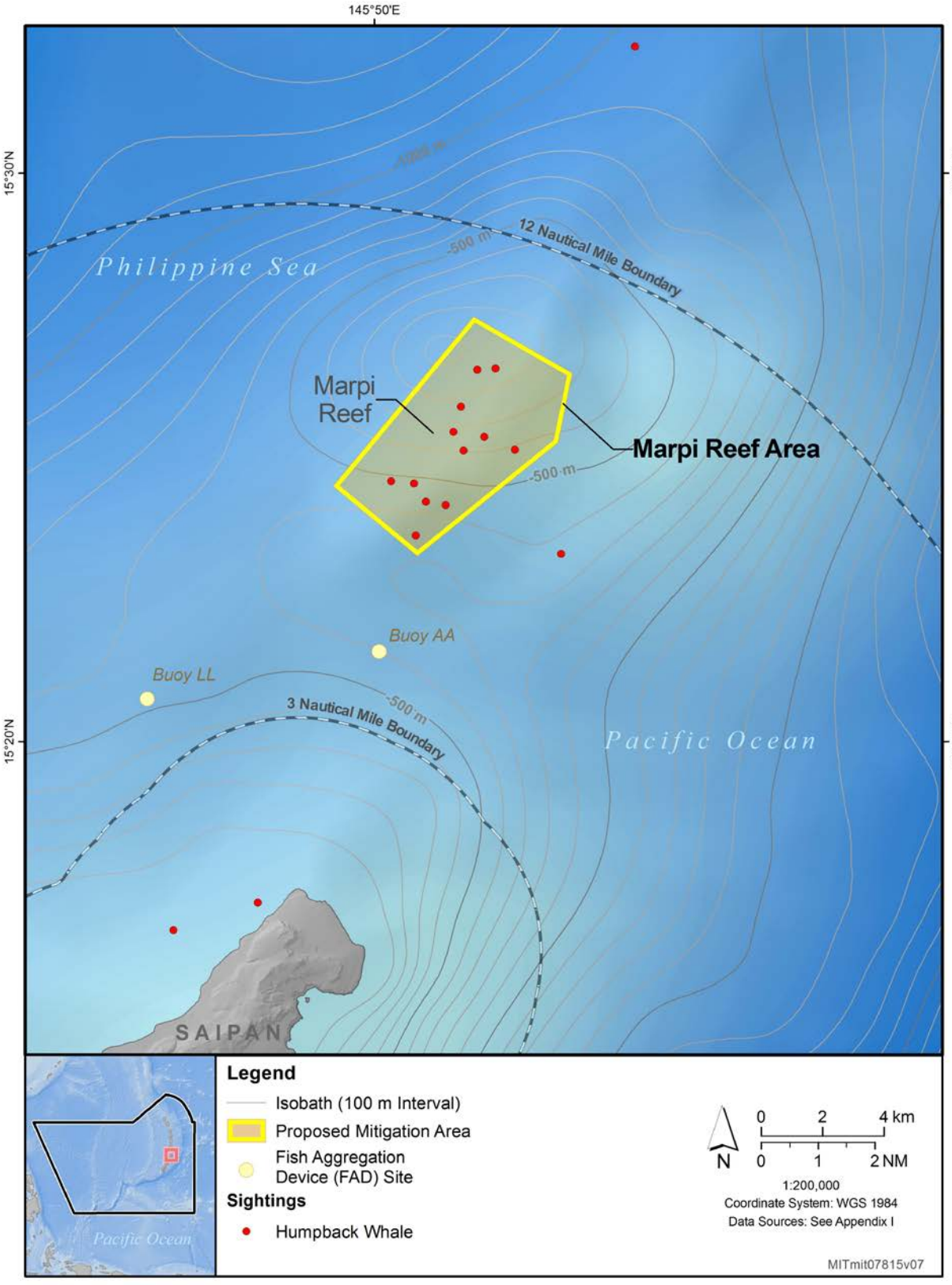

Figure I-2: Proposed Marpi Reef Geographic Mitigation Area

I.3.1.1.1 Marine Mammals

I.3.1.1.1.1 Humpback Whales

While all species of marine mammals described in this SEIS/OEIS could occur at Marpi Reef, the Marpi Reef Geographic Mitigation Area was specifically developed to avoid or reduce potential impacts on seasonally-present humpback whales engaged in reproductive behaviors (e.g., breeding, birthing, and nursing).

Humpback whales have been observed during four surveys in the vicinity of Saipan, in relatively small numbers, with multiple sightings documented within the proposed Marpi Reef Geographic Mitigation Area (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Oleson & Hill, 2010b).

Humpback whales have occasionally been observed seasonally during winter and spring (December-April) throughout the Mariana Islands by local fisherman, dive-tour operators, and during marine mammal surveys (Hill et al., 2015a; Hill et al., 2016a; U.S. Department of the Navy, 2005a; Uyeyama, 2014). Humpback whales have been sighted during surveys in the vicinity of Saipan in the months of February and March (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b). It remains unclear if humpback whales are simply transiting through the Study Area or use portions of the Study Area as a wintering location (Hill et al., 2016a). Given the species' absence in the waters off Saipan, Tinian, and Guam during any of the surveys that occurred between February 2010 and April 2014 (Hill et al., 2015a), their seasonal presence may be variable in the Mariana Islands even in the vicinity of Marpi Reef.

In the 2007 survey of the region, there were eight humpback whales observed in the proposed Marpi Reef Geographic Mitigation Area, but no calves were observed (Fulling et al., 2011). The next surveys to encounter humpback whales in the Mariana Islands occurred from February 26 to March 8, 2015, when four mother-calf pairs and four other individual humpback whales were observed at Chalan Kanoa Reef (Hill et al., 2015a; Hill et al., 2016b). During the subsequent NMFS Mariana Archipelago Cetacean Survey two months later (May 8 to June 6, 2015), survey transects sampling all the Mariana Islands out to 50 NM from shore detected no humpback whales visually or acoustically in the Mariana Islands (Hill et al., 2018c; Oleson, 2017). Humpback whales were observed at Marpi Reef again in 2016; eight humpback whales were sighted on March 2, including two mother-calf pairs, and on March 10 six humpback whales were sighted, also including two mother-calf pairs (Hill et al., 2017a). At Marpi Reef in 2017, a total of 21 humpback whales were sighted over two days of effort, but no calves were observed (Hill et al., 2018b). For the broader area around Saipan, humpback whales were encountered in the 2017 surveys off Marpi Reef, Chalan Kanoa Reef, or off the northwest side of Saipan between the two reefs. Sightings included mother-calf pairs, one accompanied by an escort, and other humpbacks in competitive groups (Hill et al., 2018b). Humpback whales engaged in reproductive activities or in the company of calves are generally found at or near the surface and therefore more readily observable from survey vessels, so it is unlikely that humpbacks were present and were unobserved.

In 2007 and in all subsequent surveys, all age classes of humpbacks have been observed in the Mariana Islands, including calves (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2016a; Hill et al., 2018b; Hill et al., 2018c). These surveys have documented behaviors (e.g., escorting, competitive groups) consistent with known humpback whale reproductive activities in other locations (Gabriele et al., 2017; Pack et al., 2017; U.S. Department of Commerce et al., 2015), and in 2018 NMFS confirmed that the waters around

Saipan are a newly identified "breeding location" for humpback whales (National Oceanic and Atmospheric Administration, 2018).

Based on a compendium of all observations, humpback whales have been sighted in the Study Area from January through March (U.S. Department of the Navy, 2005b; Uyeyama, 2014), and male humpback songs have been recorded from December through April (Hill et al., 2017a; Klinck et al., 2016; Munger et al., 2014; Norris et al., 2014; Oleson et al., 2015). Except for the potential presence of a few individual humpback whales at any time during the year or when migrating to or from summer feeding areas in the North Pacific, humpback whales will most likely occur in the vicinity of the Mariana Islands in relatively shallow waters during the December to April timeframe. For the purposes of establishing geographic mitigation and based on a conservative approach extending beyond the time periods for sightings in the Mariana Islands (Fulling et al., 2011; Hill et al., 2016a; Hill et al., 2017a; Hill et al., 2017b; Hill et al., 2018b; Hill et al., 2018c), humpback whales are assumed to be seasonally present from December through April in the proposed Marpi Reef Geographic Mitigation Area.

I.3.1.1.1.2 Spinner Dolphins

In 2017, spinner dolphins were sighted at Marpi Reef in group sizes that ranged between 25 and 110 individuals (Hill et al., 2018b). Spinner dolphins have been the most commonly encountered marine mammal species in small boat surveys since 2010 (Hill et al., 2018b; Hill et al., 2018c). As shown in Table I-2, spinner dolphins have been sighted in every year that a survey of the Marpi Reef Area has occurred, present in the months of at least February through September (Fulling et al., 2011; HDR, 2011; HDR EOC, 2012; Hill et al., 2014; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Ligon et al., 2011). Spinner dolphin behaviors observed most often at this location include milling or approaches to the survey boat to bow-ride (Hill et al., 2018b). The behaviors of these animals and their common occurrence throughout the Mariana Islands suggest that the proposed Marpi Reef Geographic Mitigation Area is of no particular biological importance for this species.

I.3.1.1.1.3 Bottlenose Dolphins

Bottlenose dolphins were sighted in the Marpi Reef Area in 2013, 2017, and 2018, in groups of two to eight individuals. A satellite tag was deployed on a bottlenose dolphin off Aguijan in 2013, and that individual moved through the Marpi Reef Geographic Mitigation Area and continued north to waters south of Sarigan (Hill et al., 2014), which is a distance of approximately 200 km. This is consistent with findings from other bottlenose dolphin tagging efforts in the Mariana Islands (Hill et al., 2013b; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b) indicating that bottlenose dolphins are wide-ranging across the Mariana Islands. During the 2017 encounter, it was noted the bottlenose dolphins were interacting with the humpback whales and short-finned pilot whales that were also present at Marpi Reef (Hill et al., 2018b). The wide-ranging movements of these animals suggest that no specific islands or areas in the Mariana Islands are of any particular biological importance for this species.

I.3.1.1.1.4 Short-Finned Pilot Whales

Short-finned pilot whales were sighted and detected via satellite tag in the Marpi Reef Area from 2013 through 2017 (Hill et al., 2013b; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b). During the 2017 survey, a pod of approximately 35 short-finned pilot whales was observed interacting with bottlenose dolphins and humpback whales (Hill et al., 2018b). Satellite tag location data for short-finned pilot whales indicate that these animals also range widely across the

Mariana Islands and that no specific islands or areas in the Mariana Islands are of any particular biological importance for this species.

I.3.1.1.1.5 False Killer Whales

False killer whales have not been sighted within the Marpi Reef Area during any surveys. In 2013, satellite tags were deployed on four false killer whales off Rota in pods with a group size ranging from 15 to 17 individuals (Hill et al., 2013b). Only one of these four tagged individuals moved north and through the Marpi Reef Area, but all four individuals traveled in excess of 200 NM from their initial tag detection locations off Rota (Hill et al., 2013b). The wide-ranging movements provided by these tag data indicate no particular islands or areas of importance for the species in the Mariana Islands.

I.3.1.1.2 Sea Turtles

Sea turtles could be present in the vicinity of the Marpi Reef Area (Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018; U.S. Department of the Navy, 2018b). Sea turtles have not been sighted within the boundaries of the proposed Marpi Reef Geographic Mitigation Area during any of the surveys conducted to date (HDR, 2011, 2012; HDR EOC, 2012; Hill et al., 2011; Hill et al., 2013a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Ligon et al., 2011; Oleson & Hill, 2010b) and have not transited through the area based on the satellite tag detections recorded since 2013 (Jones & Van Houtan, 2014b; Jones et al., 2015; Jones & Martin, 2016; Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018).

The available data indicate that the proposed Marpi Reef Geographic Mitigation Area does not meet the Navy's criteria as a key area of biological importance for sea turtles.

I.3.1.2 Navy Training and Testing Activities – Marpi Reef Area

The Marpi Reef Area is a low-use area for Navy training and testing activities. Explosive munitions have not been used in this area, nor has sonar use been reported in this area. However, transiting vessels could engage in training or testing activities within this area using sonar or explosives while implementing of procedural mitigation measures and following Standard Operating Procedures to ensure public safety.

I.3.1.3 Mitigation Assessment – Proposed Marpi Reef Geographic Mitigation Area

I.3.1.3.1 Biological Assessment – Marpi Reef

NMFS has concluded that the waters around Saipan are a newly identified "breeding location" for humpback whales (National Oceanic and Atmospheric Administration, 2018). Based on the non-systematic survey data described above indicating that humpback whales, including mother-calf pairs, are seasonally present on a non-annual basis in the Marpi Reef Area, the area may be of biological importance to humpback whales for biologically important life processes associated with reproduction (e.g., breeding, birthing, and nursing) for part of the year. Marpi Reef is one of only two locations in the Study Area where reproductive activities have been repeatedly, although not always annually, observed. Additional data would help refine frequency of occurrence in terms of oceanographic variability, validate re-sightings of the same individuals as a percent of a humpback whale DPS, and determine if actual residency time for mother-calf pairs at Marpi Reef is significant or not. This is different from others areas in the Pacific, such as Hawaii or the U.S. West Coast, where datasets of 30–40 years are available and where far larger numbers of animals engaged in biologically important life processes have been observed. However, in consideration of the scientific data that is available at this time for the Study Area

and in order to be conservative to the resource (i.e., over-protective) the Navy considers that this area does meet its criteria as an area of biological importance for humpback whale reproductive behaviors. The data do not indicate that the Marpi Reef Area is of any particular importance for other marine mammal species that may occur there.

As detailed in Section 3.4.2 (Environmental Consequences) of this SEIS/OEIS and based on the discussion above, the proposed Navy training and testing activities described in Chapter 2 (Description of Proposed Action and Alternatives) and Appendix A (Training and Testing Activities Descriptions) are not expected to result in long-term consequences to any marine species present in the Marpi Reef Area. Geographic mitigation limiting training and testing activities would likely reduce or avoid potential impacts on marine mammals present in the Marpi Reef Area in the event that naval forces conduct training or testing activities using hull-mounted mid-frequency active sonar or in-water explosives.

I.3.1.3.2 Practicality of Geographic Mitigation – Proposed Marpi Reef Geographic Mitigation Area

Access to a variety of bathymetric features, including shallow areas, is critical to support realistic Anti-Submarine Warfare training and testing activities using sonar. Areas with shallow depths are limited in the Mariana Archipelago; therefore, the Navy has determined that it would be imprudent to limit the use of sonar at the Marpi Reef Area.

The Navy has access to established, nearshore training and testing areas for the use of explosive munitions; therefore, the Navy has determined that it would be practical to avoid using explosives in the proposed Marpi Reef Geographic Mitigation Area.

I.3.1.3.3 Summary – Proposed Marpi Reef Geographic Mitigation Area

As a result of the assessment of the Marpi Reef Area, the Navy is proposing to implement geographic mitigation and to report sonar use as described in Table I-3. Geographic mitigation would reduce or avoid impacts to any marine mammals or sea turtles present in the event a ship does transit through the area and mission requirements necessitate using active sonar while conducting a training or testing activity. Given that the Marpi Reef may be an area for humpback whale reproductive behaviors, the Navy has developed special reporting requirements, similar to those employed in the Hawaiian Humpback Whale Sanctuary, specifically for the use of MF1 surface ship hull-mounted mid-frequency active sonar, which will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.

Based on current operational projections and the availability of other similar, suitable training and testing locations in the Study Area, the Navy has determined that it would be practical to avoid using explosives in the Marpi Reef Area year round under the Proposed Action. Such geographic mitigation would ensure that marine mammals are not exposed to explosives in this area, which is thought to be particularly important for humpback whale reproductive behaviors. The Navy does need to retain some degree of capability to potentially conduct active sonar in the limited shallow, nearshore waters of the MITT Study Area, including Marpi Reef, to ensure transiting vessels can meet critical training and testing requirements for MF1 surface ship hull-mounted mid-frequency active sonar.

Table I-3: Proposed Mitigation Within the Marpi Reef Geographic Mitigation Area

Mitigation Area Description
Stressor or Activity MF1 surface ship hull-mounted mid-frequency active sonar In-water explosives
Identified Resource Protection Focus Humpback whales; seasonally present Marine mammals; potentially present year-round
Mitigation Area Requirements Seasonal (December–April): The Navy will report the total hours of MF1 surface ship hull-mounted mid-frequency active sonar used in this area in its annual training and testing activity reports submitted to NMFS. Year-round: Prohibition on the use of in-water explosives Should national security present a requirement to use in-water explosives that could potentially result in the take of marine mammals during training or testing, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification of an event involving the use of in-water explosives and include information about the event in its annual activity reports submitted to NMFS. The designated Command authority will base such authorization on the unique characteristics of the area from a military readiness perspective, taking into account the importance of the area for humpback whales and the need to avoid adverse impacts to the maximum extent practicable. Furthermore, the Command authority conducting the activity will provide specific direction to operational units on required mitigation prior to conducting training or testing using in-water explosives in this area.

I.3.2 Proposed Geographic Mitigation Area – Chalan Kanoa Reef

The Chalan Kanoa Reef[1] includes exposed fringing reef, reef flats exposed at low tide, nearshore shallow waters (less than 20 meters in depth), and a portion of Saipan Harbor. The area extends to approximately 2 km off the west coast of Saipan and covers approximately 80 km^2, as shown in Figure I-3. This area was developed to encompass the relative concentration of total marine mammal sightings and tag detections as observed and documented between 2007 and 2018, which included seasonal (in February and March) humpback whale sightings documented during non-systematic small boat surveys occurring in 2015 through March 2018 (Fulling et al., 2011; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Hill et al., 2018c; Oleson & Hill, 2010b). Navy scientists reviewed the locations of sightings and tag detections using a Geographic Information System, and delineated a boundary to encompass the area of highest concentration at Chalan Kanoa Reef with a particular emphasis on including humpback whale sightings.

[1] Chalan Kanoa Reef is also known as "CK Reef," "Double Reef," or "6-Mile Reef" (Hill et al., 2015a).

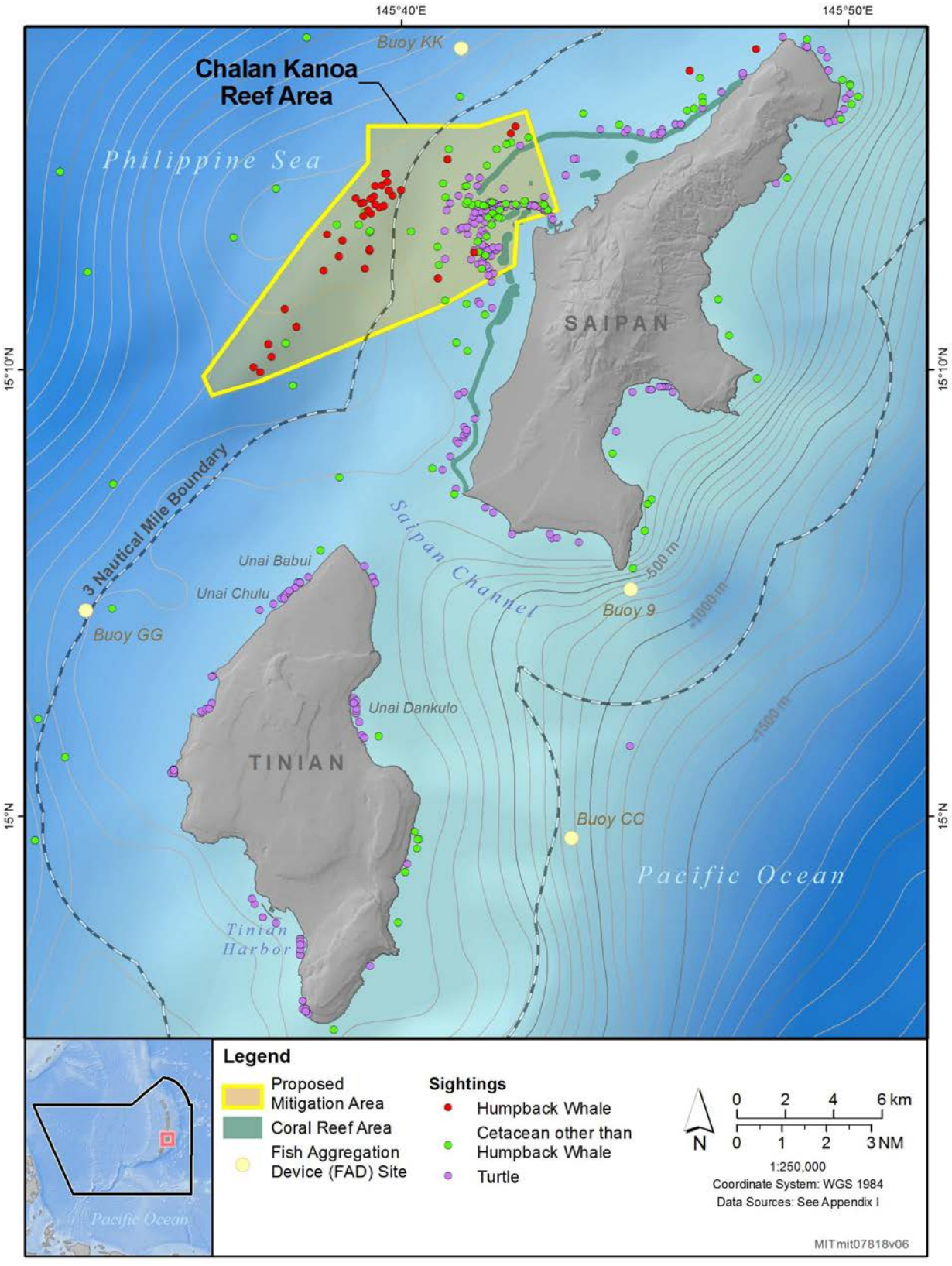

Figure I-3: Proposed Chalan Kanoa Reef Geographic Mitigation Area

I.3.2.1 Resources within the Chalan Kanoa Reef Geographic Mitigation Area

The Chalan Kanoa Reef Geographic Mitigation Area was developed based on the seasonal presence of humpback whales, observed behaviors associated with reproduction, and sightings and tag detections of other marine mammals and sea turtles. Other biological resources have been observed or are expected to be present at Chalan Kanoa Reef, including corals, other invertebrates, and fishes. These resources are discussed in detail in the following sections of this SEIS/OEIS: Section 3.4 (Marine Mammals), Section 3.5 (Sea Turtles), Section 3.8 (Marine Invertebrates), and Section 3.9 (Fishes). Seven marine mammal species have been sighted or detected via satellite tag in the area: humpback whale, spinner dolphin, bottlenose dolphin, short-finned pilot whale, false killer whale, rough-toothed dolphin, and pygmy killer whale (Table I-4). Sea turtles have also been sighted in the Chalan Kanoa Reef Mitigation Area, but not all observations identified the specific species. Based on sea turtle surveys conducted throughout the Mariana Islands, the most likely species observed were green sea turtles and hawksbill sea turtles (Martin et al., 2016; U.S. Department of the Navy, 2014a).

Table I-4: Marine Mammals and Sea Turtles Documented Within the Proposed Chalan Kanoa Reef Mitigation Area

Common Name	2010	2011	2012	2013	2014	2015	2016	2017	2018
Humpback whale						S	S	S	S
Spinner dolphin	S		S	S	S		S	S	S
Bottlenose dolphin				S+T	S+T	S		S	
Short-finned pilot whale				T	T		T		
False killer whale				T					
Rough-toothed dolphin				S+T					S
Pygmy killer whale						S			
Sea Turtle			S	S				S	

Notes: S = One or more sightings during a survey in the area; T = one or more satellite tag detections; S+T = one or more sightings and satellite tag detections in a given year; empty cells indicate no documented occurrence of the species in the given year; years not shown indicate that no surveys were conducted in the area in that year.

I.3.2.1.1 Marine Mammals

Surveys and satellite tag data have documented the presence of seven marine mammal species in the proposed Chalan Kanoa Reef Geographic Mitigation Area (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Oleson & Hill, 2010b). However, the Navy assumes all species of marine mammals known to occur in the Mariana Islands could potentially be present, if only briefly, in the offshore portion of the Chalan Kanoa Reef Mitigation Area. It is unlikely marine mammals other than spinner dolphins would be present in the shallow waters

landward of the fringing reef, in Saipan Harbor, or the channel leading to the harbor. Spinner dolphins have been sighted within these inshore areas, likely using them as resting areas, consistent with behavior documented in similar habitats (Hill et al., 2015b; Hill et al., 2017a; Hill et al., 2018b).

I.3.2.1.1.1 Humpback Whales

Humpback whales have been observed during four surveys in the vicinity of Saipan in relatively small numbers, and multiple sightings have been documented within the proposed Chalan Kanoa Reef Geographic Mitigation Area in 2015 and 2017 (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Oleson & Hill, 2010b). Four encounters with humpback whales during surveys in the vicinity of Saipan occurred in February and March (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b). Hill et al. (2016b; 2017b) proposed that humpback whales use the Mariana Islands as a wintering location, but given the species' absence during surveys in the waters off Saipan, Tinian, and Guam in February 2010 and in April 2014 (Hill et al., 2015a), their seasonal presence may be variable in the Mariana Islands.

In 2015 small boat surveys conducted over a nine-day period a total of 12 humpback whales were encountered in the proposed Chalan Kanoa Reef Geographic Mitigation Area, including four mother-calf pairs (Hill et al., 2015a). In 2016, two humpbacks, a single mother-calf pair, were sighted in the area. The mother that was detected and photographed in 2007 at Marpi Reef (Fulling et al., 2011) was identified in the Chalan Kanoa Reef Geographic Mitigation Area in 2016 by matching patterns observed on her flukes with those in the photographs (Hill et al., 2016b). In a 2017 survey, nine humpback whales, including two mother-calf pairs, were documented during three encounters in the Chalan Kanoa Reef Geographic Mitigation Area (Hill et al., 2018b). Three of the nine whales had been identified during previous surveys in the vicinity of the Chalan Kanoa Reef (Hill et al., 2018b). As detailed in the discussion of the proposed Marpi Reef Geographic Mitigation Area (Section I.3.1.1.1.1, Humpback Whales), NMFS has confirmed that the waters around Saipan are a newly identified breeding location for humpback whales (National Oceanic and Atmospheric Administration, 2018). For purposes of geographic mitigation and based on a conservative approach exceeding the time periods for sightings in the Mariana Islands (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Oleson & Hill, 2010b), humpback whales are assumed to be seasonally present from December through April in the Chalan Kanoa Mitigation Area.

I.3.2.1.1.2 Spinner Dolphins

Spinner dolphins are the most commonly encountered species in small boat surveys and have been sighted in the proposed Chalan Kanoa Reef Geographic Mitigation Area during every survey that has been conducted in the area, except during the winters of 2011 and 2015 (HDR EOC, 2012; Hill et al., 2011; Hill et al., 2013a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b). During small boat surveys, group sizes in the Chalan Kanoa Reef Geographic Area have ranged from as few as seven individuals in a pod to as many as 124 in the largest group observed. Milling behavior and slow travel were the most commonly observed behaviors and indicate spinner dolphin resting behavior, as documented in other locations (Tyne et al., 2015).

I.3.2.1.1.3 Bottlenose Dolphins

Small groups of bottlenose dolphins were routinely sighted in the years 2013, 2015, and 2017 in the Chalan Kanoa Reef Geographic Mitigation Area. In 2013, there were two sightings of bottlenose dolphins on the same day, a pod of three and a pod of six (Hill et al., 2013b). In 2015, a single individual was

sighted in the area (Hill et al., 2016b). In February 2017, a pod of four bottlenose dolphins was sighted, and in May a pod of six was observed in the Chalan Kanoa Geographic Reef Area (Hill et al., 2018b). Satellite tags on two bottlenose dolphins deployed in the Marpi Reef Area during 2017 documented the extensive travel by these animals (and likely their accompanying pods). The animals traveled from within the proposed Chalan Kanoa Reef Geographic Area, south to waters off Tinian, north past Saipan to Marpi Reef, and then farther north with a final tag detection approximately 85 km west of Farallon de Medinilla (FDM) (Hill et al., 2018b). Although these satellite tracking data are limited, they indicate that the Chalan Kanoa Reef Geographic Mitigation Area is only a small portion of the range these tagged individuals (and their accompanying pods) use in the Study Area.

I.3.2.1.1.4 Short-finned Pilot Whales

Short-finned pilot whales have not been visually sighted in the Chalan Kanoa Reef Geographic Mitigation Area. However, individuals initially tagged off Guam, Rota, and Tinian with satellite tags were detected within the Chalan Kanoa Geographic Mitigation Reef Area in 2013, 2014, and 2016. The animals ranged widely in the Mariana Islands from waters south of Guam and north to at least as far as FDM (Hill et al., 2013b; Hill et al., 2014; Hill et al., 2017a). Through 2017, there have been 17 satellite tags deployed on short-finned pilot whales in the Mariana Islands; these individuals were in groups ranging in size from 15 to 48 animals (Hill et al., 2013b; Hill et al., 2014; Hill et al., 2017a). The wide-ranging movements of these animals suggest that no specific islands or areas in the Mariana Islands are of any particular biological importance for this species.

I.3.2.1.1.5 False Killer Whales

False killer whales have not been sighted within the Chalan Kanoa Reef Mitigation Area during any surveys. In 2013, satellite tags were deployed on four false killer whales off Rota in groups ranging in size from 15 to 17 individuals (Hill et al., 2013b). Two of the four tagged animals moved north and through the Chalan Kanoa Reef Mitigation Area, and all four individuals traveled in excess of 200 NM from their initial tag detection locations off Rota (Hill et al., 2013b). The wide-ranging movements of these animals suggest that no specific islands or areas in the Mariana Islands are of any particular biological importance for this species.

I.3.2.1.1.6 Rough-toothed Dolphins

In 2013, a pod of four rough-toothed dolphins was sighted in the Chalan Kanoa Reef Geographic Mitigation Area (Hill et al., 2013b). Five days prior to the sighting, a satellite tag was deployed on a rough-toothed dolphin in a group of six individuals off Aguijan (Hill et al., 2013b). The tagged animal moved north from the deployment location over an 11-day period and transited through the Chalan Kanoa Reef Geographic Mitigation Area to waters north of Saipan, at which point the transmissions ended. In total, the animal covered a distance of approximately 65 km. It is not known whether the tagged animal remained with the five other dolphins. The distance traveled by this individual, and possibly the group, coupled with the lack of other occurrence data, suggests that the Chalan Kanoa Reef Geographic Mitigation Area is not of any particular importance for rough-toothed dolphins in the Mariana Islands.

I.3.2.1.1.7 Pygmy Killer Whales

In March 2015, a pod of six pygmy killer whales was sighted in the Chalan Kanoa Reef Geographic Mitigation Area interacting with two adult humpback whales (Hill et al., 2016b). The only other sighting

of pygmy killer whales in the vicinity of Saipan was a 2011 encounter with a pod of 11 approximately 2 NM from the proposed Marpi Reef Geographic Mitigation Area (Hill et al., 2011). The limited sighting data from the surveys at the Chalan Kanoa Reef indicate that the Chalan Kanoa Reef Geographic Mitigation Area is not of any particular importance for pygmy killer whales in the Mariana Islands.

I.3.2.1.2 Sea Turtles

All species of sea turtles could be present in the proposed Chalan Kanoa Reef Geographic Mitigation Area; although as discussed in Section 3.5 (Sea Turtles), the species most likely to be present are green sea turtles and hawksbill sea turtles, based on documented sightings the Mariana Islands (Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018; Summers et al., 2017; U.S. Department of the Navy, 2018a). Loggerhead and leatherback sea turtles are known to pass through the Study Area during migration, and olive ridley sea turtles are expected to be rare throughout the year in all waters in the Study Area (U.S. Department of the Navy, 2018).

Sea turtle sightings shown in Figure I-3 were recorded during surveys conducted in the vicinity of the Chalan Kanoa Reef (not necessarily within the boundaries of the proposed Chalan Kanoa Geographic Mitigation Area) from 2009 through the spring of 2017 (HDR, 2011, 2012; HDR EOC, 2012; Hill et al., 2011; Hill et al., 2013a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Jones & Martin, 2016; Ligon et al., 2011; Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018; Oleson & Hill, 2010b; Summers et al., 2017; U.S. Department of the Navy, 2018b). The concentration of sightings of sea turtles (almost certainly all green and hawksbill sea turtles) in nearshore waters of the Chalan Kanoa Reef (Figure I-3) demonstrates that the area, including portions of the proposed Chalan Kanoa Geographic Mitigation Area, is used by sea turtles; however, the reef is not the only location where sea turtles are known to concentrate off Saipan. Summers et al. (2017) assessed population demographics and habitat-use for green and hawksbill sea turtles off Tinian, Saipan, and Rota using a mark-recapture study. They captured 493 green and 36 hawksbill turtles between August 2006 and February 2014 and noted long-term residency and high site fidelity among both species at the locations surveyed. Refer to Section 3.5 (Sea Turtles) and the Navy Marine Species Density Database Technical Report for the MITT Study Area (U.S. Department of the Navy, 2018b) for additional information regarding the general distribution of sea turtles in the Study Area, including in the vicinity of the Chalan Kanoa Reef Geographic Mitigation Area.

I.3.2.2 Navy Training and Testing Activities – Chalan Kanoa Reef

The Chalan Kanoa Reef is a low-use area for Navy training and testing activities. Explosive munitions have not been used in this area, nor has sonar use been reported in this area. However, transiting vessels could engage in training or testing activities within this area using sonar or explosives while implementing procedural mitigation measures and following Standard Operating Procedures to ensure public safety.

I.3.2.3 Mitigation Assessment – Proposed Chalan Kanoa Reef Geographic Mitigation Area

I.3.2.3.1 Biological Assessment – Chalan Kanoa Reef

Based on sea turtle sightings in the area, the Navy assumes that sea turtles may use the Chalan Kanoa Reef Geographic Mitigation Area for foraging; however, the available data (Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018; Summers et al., 2017; U.S. Department of the Navy, 2018a) do not indicate that the Chalan Kanoa Reef Geographic Mitigation Area is unique or particularly important for a

biologically important process (e.g., foraging), and therefore the proposed mitigation area does not meet the Navy's criteria as a key area of biological importance for sea turtles.

NMFS has concluded that the waters around Saipan are a newly identified "breeding location" for humpback whales (National Oceanic and Atmospheric Administration, 2018). Based on the non-systematic survey data described above indicating that humpback whales, including mother-calf pairs, are seasonally present in the Chalan Kanoa Reef Area, the area may be of biological importance to humpback whales for biologically important life processes associated with reproduction (e.g., birthing, nursing, and breeding) for part of the year. Chalan Kanoa Reef is one of only two locations in the study area where reproductive activities have been repeatedly, although not always annually, observed. Additional data would help refine frequency of occurrence in terms of oceanographic variability, validate re-sightings of the same individuals as a percent of a humpback whale DPS, and determine if actual residency time for mother-calf pairs at Chalan Kanoa Reef is significant or not. This is different from others areas in the Pacific such as Hawaii or the U.S. West Coast, where datasets of 30–40 years are available and where far larger number of animals engaged in biologically important life process have been observed. However, in consideration of the scientific data that is available at this time for the MITT study area and in order to be conservative to the resource (i.e., over-protective), the Navy considers this area does meet its criteria as an area of biological importance for humpback whale reproductive behaviors. The data do not indicate that the Chalan Kanoa Reef Area is of any particular importance for other marine mammal species that may occur there.

As detailed in Section 3.4.2 (Environmental Consequences) of this SEIS/OEIS and based on the discussion above, the proposed Navy training and testing activities as described in Chapter 2 (Description of Proposed Action and Alternatives) and Appendix A (Training and Testing Activities Descriptions) are not expected to result in long-term consequences to any marine resources present in the Chalan Kanoa Reef. Geographic mitigation would reduce or avoid impacts to any marine mammals present in the Chalan Kanoa Reef in the event that naval forces conduct training or testing activities using hull-mounted mid-frequency active sonar or in-water explosives. While it was determined that the proposed mitigation area did not meet the Navy's criteria as a key area of biological importance for sea turtles, this mitigation would also reduce or avoid impacts to any sea turtles present.

I.3.2.3.2 Practicality of Geographic Mitigation – Chalan Kanoa Reef

Access to a variety of bathymetric features, including shallow areas, is critical to support realistic Anti-Submarine Warfare training and testing activities using sonar. Areas with shallow depths are limited in the Mariana Archipelago; therefore, the Navy has determined that it would be imprudent to limit the use of sonar at the Chalan Kanoa Reef Area.

The Navy has access to established, nearshore training and testing areas for the use of explosive munitions; therefore, the Navy has determined that it would be practical to avoid using explosives in the Chalan Kanoa Reef Area.

I.3.2.3.3 Summary – Chalan Kanoa Reef

As a result of the assessment for the proposed Chalan Kanoa Reef Geographic Mitigation Area, the Navy is proposing to implement the mitigation and reporting requirements described in Table I-5. Geographic mitigation would reduce or avoid impacts to any marine mammals or sea turtles present in the event a ship does transit through the area and mission requirements necessitate using active sonar while conducting a training or testing activity. Given that the Chalan Kanoa Reef may be an area for humpback whale reproductive behaviors, the Navy has developed special reporting requirements, similar to those

employed in the Hawaiian Humpback Whale Sanctuary, specifically for the use of MF1 surface ship hull-mounted mid-frequency active sonar, which will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.

Based on current operational projections and the availability of other similar, suitable training and testing locations in the Study Area, the Navy has determined that it would be practical to avoid using in-water explosives in the Chalan Kanoa Reef Area year-round under the Proposed Action. Such geographic mitigation would ensure that marine mammals are not exposed to explosives in this area, which is thought to be particularly important for humpback whale reproductive behaviors. The Navy does need to retain some degree of capability to potentially conduct active sonar in the limited shallow, nearshore waters of the Study Area, including Chalan Kanoa Reef, to ensure transiting vessels can meet critical training and testing requirements for MF1 surface ship hull-mounted mid-frequency active sonar.

Table I-5: Proposed Mitigation Within the Chalan Kanoa Reef Geographic Mitigation Area

Mitigation Area Description
Stressor or Activity MF1 surface ship hull-mounted mid-frequency active sonar In-water explosives
Identified Resource Protection Focus Humpback whales; seasonally present Marine mammals; potentially present year-round Sea turtles; present year-round
Mitigation Area Requirements Seasonal (December–April): – The Navy will report the total hours of MF1 surface ship hull-mounted mid-frequency active sonar used in this area in its annual training and testing activity reports submitted to NMFS Year-round: Prohibition on the use of in-water explosives Should national security present a requirement to use in-water explosives that could potentially result in the take of marine mammals during training or testing, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification of an event involving the use of in-water explosives and include information about the event in its annual activity reports submitted to NMFS. The designated Command authority will base such authorization on the unique characteristics of the area from a military readiness perspective, taking into account the importance of the area for humpback whales and the need to avoid adverse impacts to the maximum extent practicable. Furthermore, the Command authority conducting the activity will provide specific direction to operational units on required mitigation prior to conducting training or testing using in-water explosives in this area.

I.3.3 Proposed Geographic Mitigation Area – Agat Bay Nearshore

The proposed Agat Bay Nearshore Geographic Mitigation Area (Figure I-4) encompasses the shoreline between Tipalao, Dadi Beach, and Agat on the west coast of Guam, with a boundary across the bay enclosing an area of approximately 5 km^2 in relatively shallow waters (less than 100 m). The boundaries of the proposed Agat Bay Nearshore Geographic Mitigation were defined by Navy scientists based on spinner dolphin sightings documented during small boat surveys from 2010 through 2014. Sea turtle sightings documented during surveys from 2007 through 2017 were also used to define the mitigation area (Fulling et al., 2011; HDR, 2011; HDR EOC, 2012; Hill et al., 2013a; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Jones & Van Houtan, 2014b; Jones et al., 2015; Jones & Martin, 2016; Ligon et al., 2011; Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018; Oleson & Hill, 2010b).

I.3.3.1 Resources within Agat Bay Nearshore Geographic Mitigation Area

Biological resources within the proposed Agat Bay Nearshore Geographic Mitigation Area include spinner dolphins, sea turtles, invertebrates including corals, and fishes. These resources and their occurrence in the Study Area are discussed in detail in this SEIS/OEIS in the following sections: Section 3.4 (Marine Mammals), Section 3.5 (Sea Turtles), Section 3.8 (Marine Invertebrates), and Section 3.9 (Fishes).

As shown in Table I-6, species documented as sighted or having a satellite tag detection[2] within the boundaries of the proposed Agat Bay Nearshore Geographic Mitigation Area include spinner dolphin and sea turtles (as noted in the sections above, most likely green and hawksbill sea turtles).

Table I-6: Marine Mammals and Sea Turtles Documented Within the Proposed Agat Bay Nearshore Geographic Mitigation Area

Common Name	2010	2011	2012	2013	2014	2015	2017
Spinner dolphin	S	S	S	S			
Sea Turtle	S	S	S	S+T	S+T	S+T	S

Notes: S = One or more sightings during a survey in the area; T = one or more satellite tag detections; S+T = one or more sightings and satellite tag detections in a given year; empty cells indicate no documented occurrence of the species in the given year; years not shown indicate that no surveys were conducted in the area in that year.

[2] There was one instance during an 11.4 day period in 2016 where a satellite-tracked pantropical spotted dolphin had one reported position just within the outer boundary of the Agat Bay Nearshore area (Hill et al., 2017a). However, given the uncertainty in the reported position due to the limited precision (error range) of even high-quality Argos satellite fixes, and in particular with regard to reduced longitudinal precision, associated with the polar orbits used by the Argos satellites (Boyd & Brightsmith, 2013; Vincent et al., 2002), the reported position does not sufficiently demonstrate that the animal was in the Agat Bay Nearshore Geographic Mitigation Area. Given the wide-ranging use of offshore waters by the same animal as demonstrated by the remainder of the detections over the 11-day tracking period, the track of the animal between subsequent positions, and the lack of precision for the locations, pantropical spotted dolphins are not expected to be present in the Agat Bay Nearshore Geographic Mitigation Area.

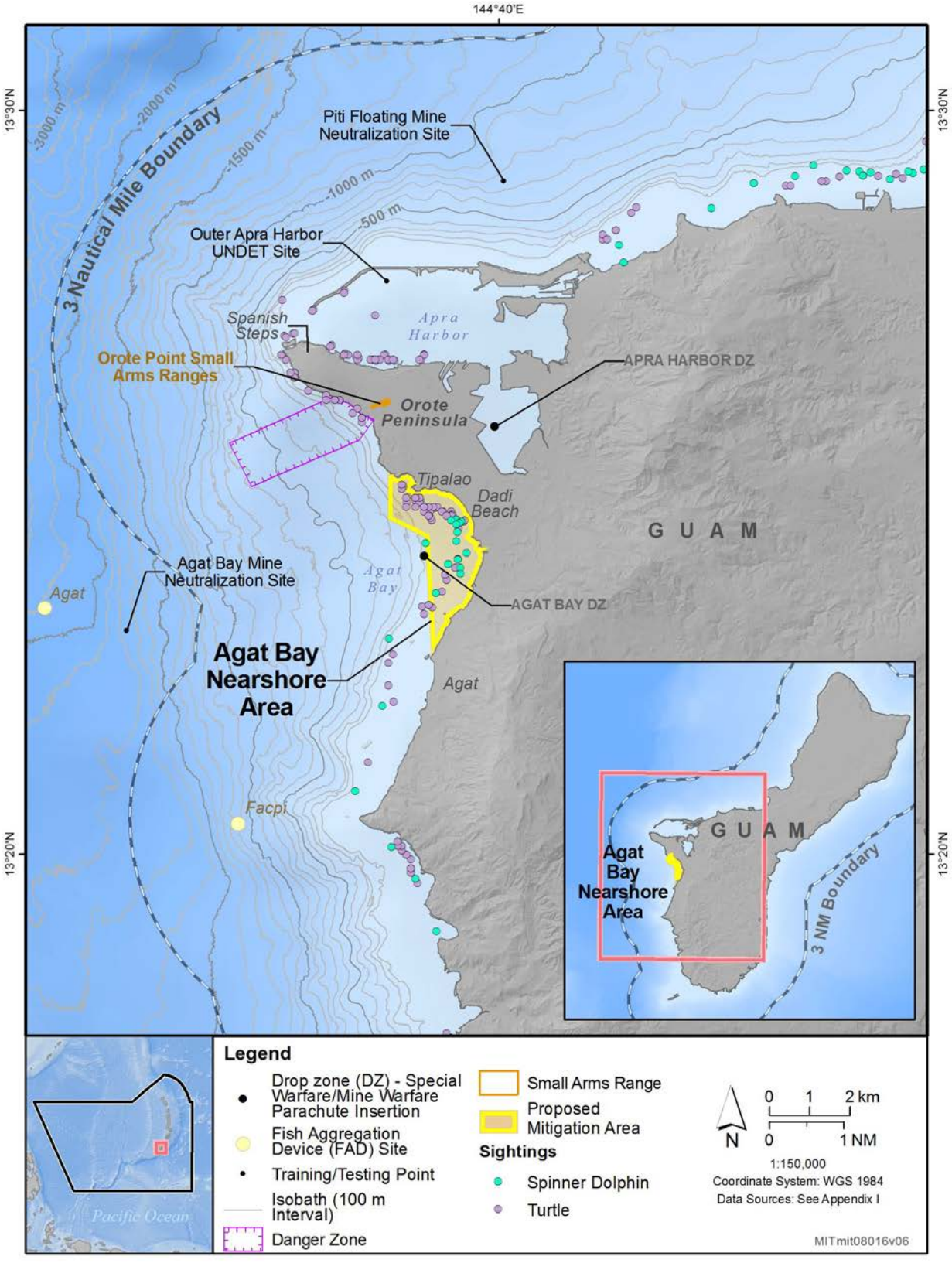

Figure I-4: Proposed Agat Bay Nearshore Potential Geographic Mitigation Area

I.3.3.1.1 Marine Mammals

I.3.3.1.1.1 Spinner Dolphins

Spinner dolphins have been the most frequently encountered species during small boat reconnaissance surveys conducted in the Mariana Islands since 2010. Consistent with more intensive studies completed for the species in the Hawaiian Islands, island-associated spinner dolphins are expected to occur in shallow water resting areas (about 50 meters [m] deep or less) in the morning and throughout the middle of the day, moving into deep waters offshore during the night to feed (Heenehan et al., 2016b; Heenehan et al., 2017a; Hill et al., 2010; Norris & Dohl, 1980). As reported by Ligon et al. (2011), this behavior is consistent with reports from Guam residents and tour boat captains describing spinner dolphin nearshore resting areas at Agat Bay; the Merizo channel, tucked into the several small remote bays between Merizo and Facpi Point; Piti Bay; Hagatna; Tumon Bay; and Pugua Point.

Consistent with documented resting behavior, a large pod of resting spinner dolphins (average group size between 22 and 85 individuals) was encountered in Agat Bay in the morning on six consecutive survey days in 2010 (February 9–14) (Ligon et al., 2011; Oleson & Hill, 2010a). Groups larger than 25 have not been observed again in Agat Bay during the small boat surveys since these sightings in 2010 (HDR, 2011, 2012; HDR EOC, 2012; Hill et al., 2011; Hill et al., 2013a; Hill et al., 2013b; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Jones & Van Houtan, 2014b; Jones et al., 2015; Jones & Martin, 2016; Ligon et al., 2011; Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018; Oleson & Hill, 2010b).

In February 2011, during two survey passes, a group of four spinner dolphins were observed resting in Agat Bay, but none were present in the area on subsequent survey days (HDR, 2011). No spinner dolphins were observed in two survey passes of Agat Bay in August–September 2011, although there were multiple sightings involving large pods of spinner dolphins present nearshore off Guam north of Apra Harbor, off Anderson, and south of Pati Point on the east side of Guam, as well as elsewhere in the Mariana Islands (Hill et al., 2011). In March 2012, a group of 20 spinner dolphins was present during one of two passes through Agat Bay (HDR EOC, 2012), and in June 2013 a group of 25 was present in the bay (Hill et al., 2013a). From 2014 through 2017, no spinner dolphins were observed in Agat Bay during seven surveys of the area (four passes in May 2014, one pass in 2015, and two passes in 2017) (Hill et al., 2018b). The Agat Bay area was not surveyed in 2016 (Hill et al., 2016b).

In 2010, Agat Bay was described as the “bread and butter” of the Guam dolphin-watching industry given its proximity to various small boat harbors and the expected presence of spinner dolphins (Ligon et al., 2011). Concerns have been raised in Hawaii where daytime resting by spinner dolphins has been chronically disturbed by watching boats, kayaks, and swimmer traffic, resulting in spinner dolphins spending less time in essential resting habitats (Heenehan et al., 2016a; Heenehan et al., 2016b; Heenehan et al., 2017a; Heenehan et al., 2017b; Tyne et al., 2014; Tyne, 2015; Tyne et al., 2015; Tyne et al., 2017; Tyne et al., 2018). Ligon et al. (2011) reported being uncertain of the number of boats that interacted with the spinner dolphins in Agat Bay on a daily basis, but that some of the dolphin watch boats were known to make multiple viewing trips per day, and that during the survey they occasionally observed two to three boats grouped together in the area where the dolphins were regularly observed. Given the concern over similar tourism-related disturbance elsewhere, this impact may be why there have not been reported routine sightings of spinner dolphins or pods larger than 25 during subsequent small boat surveys of Agat Bay since 2010.

I.3.3.1.2 Sea Turtles

Sea turtle sightings around Guam have increased steadily since 2000 (Jones et al., 2015; Martin et al., 2016; Martin et al., 2018). A summary of 32 years of in-water aerial surveys around Guam was compiled by Martin et al. (2016). Aerial surveys conducted by the Guam Division of Aquatic and Wildlife Resources indicated the year-round presence of a resident population in Guam's nearshore waters (Kolinski et al., 2001; Martin et al., 2016; National Marine Fisheries Service & U.S. Fish and Wildlife Service, 1998; Pultz et al., 1999). As presented in Section 3.5 (Sea Turtles), it is most likely that the species present would be green or hawksbill turtles (Jones & Van Houtan, 2014b; Jones et al., 2015; Martin et al., 2016; Martin et al., 2018). The summarized results of five decades of marine surveys around Guam indicate the entire west coast of Guam, including the proposed Agat Bay Nearshore Geographic Mitigation Area, should be expected to have a relatively uniform density of sea turtles (Zone 6 in Martin et al. (2016)).

As described in Sections 3.5.1.2 (Habitat Use) and 3.5.1.3 (Dive Behavior), it is assumed that the shallow water area within proposed Agat Bay Nearshore Geographic Mitigation Area would be used for foraging by sea turtles. There has been no known nesting at Dadi Beach, but there have been a relatively high number of documented sea turtle sightings in the water off Tipalao. There have been 47 sea turtles sighted in the Agat Bay Nearshore Geographic Mitigation Area between 2010 and 2017 (HDR, 2011, 2012; HDR EOC, 2012; Hill et al., 2011; Hill et al., 2013a; Hill et al., 2013b; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Jones & Van Houtan, 2014b; Jones et al., 2015; Jones & Martin, 2016; Ligon et al., 2011; Martin & Jones, 2016; Martin et al., 2016; Martin et al., 2018; Oleson & Hill, 2010b). The distribution of sea turtle sightings is a result of the survey coverage, and Agat Bay should not be interpreted as the only area where sea turtles would be expected to be found in waters off Guam. The proposed Agat Bay Nearshore Geographic Mitigation Area overlaps a portion of what was identified as a "core area" of based on the movements of tagged green sea turtles (Martin et al., 2018). Two tags that remained active after 189 days tracked the turtles' movements to the north from Agat, with one going to as far as Apra Harbor and the other to Pati Point on the north coast of Guam (Martin et al., 2016), indicating that green sea turtles move and forage widely around Guam.

I.3.3.2 Navy Training and Testing Activities – Agat Bay Nearshore

The Agat Bay Nearshore Area is a low-use area for most types of Navy training and testing activities. Explosive munitions have not been used in this area nor has sonar use been reported in this area. However, transiting vessels could conduct training or testing activities within this area using sonar or explosives while implementing procedural mitigation measures and following Standard Operating Procedures to ensure public safety. Navy training and testing activities have been shut down or canceled in the vicinity of the proposed mitigation area in the past due to the presence of marine mammals and civilian boat traffic.

I.3.3.3 Mitigation Assessment – Proposed Agat Bay Nearshore Geographic Mitigation Area

I.3.3.3.1 Biological Assessment – Agat Bay Nearshore

Spinner dolphins are known to use Agat Bay, including the proposed Agat Bay Nearshore Geographic Mitigation Area, for resting behavior, and a relatively high number of sea turtles have been documented in the area off Tipalao. The available data on spinner dolphin occurrence and behaviors and the data on sea turtles indicate that the Agat Bay Nearshore Geographic Mitigation Area does meet the Navy's criteria as an area of biological importance for spinner dolphins and sea turtles. As discussed in detail in Section 3.4.2.1.2 (Impacts from Sonar and Other Transducer Stressors) and Section 3.4.2.2.2 (Impacts

from Explosive Stressors), marine mammals engaged in important behaviors, such as resting, may be more likely to ignore or tolerate a source of disturbance and continue their natural behavior patterns. Behavioral reactions, if occurring at all, are likely to be short term and low-to-moderate severity and unlikely to produce long-term consequences. The Navy has determined that impacts to spinner dolphins and sea turtles are likely to be avoided or reduced by prohibiting the use of MF1 surface ship hull-mounted mid-frequency active sonar and in-water explosives in the Agat Bay Nearshore Geographic Mitigation Area.

I.3.3.3.2 Practicality of Geographic Mitigation – Agat Bay Nearshore

Access to a variety of bathymetric features, including shallow areas, is critical to support realistic Anti-Submarine Warfare training and testing activities using sonar. However, due to multiple factors impacting its value for some training and testing activities, such as the very shallow depth of this area, and the proximity to shore and civilian boating activity, the Navy has determined that it would be appropriate and practical to restrict the use of MF1 surface ship hull-mounted mid-frequency active sonar.

As the Navy has access to established, nearshore training and testing areas for explosive munitions, the Navy has determined that it would be practical to avoid using in-water explosives in the Agat Bay Nearshore Geographic Mitigation Area year round.

I.3.3.3.3 Summary – Agat Bay Nearshore

As a result of the assessment for the Agat Bay Nearshore Geographic Mitigation Area, the Navy is proposing implementation of geographic mitigation as described in Table I-7. Based on current operational projections and the availability of other similar, suitable training and testing locations in the Study Area, the Navy has determined that it would be practical to avoid using surface ship hull-mounted mid-frequency active sonar and in-water explosives in the proposed Agat Bay Nearshore Geographic Mitigation Area year-round under the Proposed Action. Such geographic mitigation would ensure that spinner dolphins and sea turtles are not exposed to MF1 sonar and explosives in this area, which has the potential to disturb spinner dolphin resting behavior and sea turtle foraging behavior.

Table I-7: Proposed Mitigation Within the Agat Bay Nearshore Geographic Mitigation Area

Mitigation Area Description
Navy Activity MF1 surface ship hull-mounted mid-frequency active sonar In-water explosives
Identified Resource Protection Focus Spinner dolphins; present year-round Sea turtles; present year-round
Mitigation Area Requirements Year-round: Prohibition on use of MF1 mid-frequency active sonar and in-water explosives Should national security present a requirement to use MF1 mid-frequency active sonar or in-water explosives that could potentially result in the take of marine mammals or sea turtles during training or testing, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification of an event involving the use of in-water explosives and include information about the event in its annual activity reports submitted to NMFS. The designated Command authority will base such authorization on the unique characteristics of the area from a military readiness perspective, taking into account the importance of the area for spinner dolphins and sea turtles and the need to avoid adverse impacts to the maximum extent practicable. Furthermore, the Command authority conducting the activity will provide specific direction to operational units on required mitigation prior to conducting training or testing using in-water explosives in this area.

I.4 Geographic Mitigation Assessment – Areas Not Carried Forward for Implementation

The Navy received scoping comments suggesting areas for potential mitigation within the MITT Study Area. The comments and a brief description and assessment of the areas are presented in the following subsections.

I.4.1 West Mariana Ridge

The West Mariana Ridge was identified by the Governor of the Commonwealth of the Northern Mariana Islands (CNMI) (Ralph D.L.G. Torres) as an area of potential geographic mitigation in a scoping comment on the 2017 Draft SEIS/OEIS Notice of Intent. The area was originally identified by the previous governor, Governor Eloy S. Inos, in a comment on the 2013 MITT Draft EIS/OEIS. The comment recommended that the Navy avoid conducting activities with sonar and explosives along the bathymetric feature known as the West Mariana Ridge.

The West Mariana Ridge (Figure I-5) consists of a seafloor ridge formed by a chain of conical seamounts extending northward to Japan, approximately parallel to the island chain that forms Guam and the CNMI. Coordinates or a map for the entire West Marina Ridge area were not provided in the scoping comment so, for the purposes of this assessment, the potential mitigation area was defined as an area centered approximately over the ridge that extends out to the 3,500 m isobath between approximately 13° north and 18° north latitude and would include (according to the comment letter) "some seamounts (including the Pathfinder, Arakane, and Suruga seamounts between 142° and 143° E) [that] rise to summits less than 50 m below sea level." As shown in Figure I-5, the area spans approximately 1,000 km north to south and covers an area of 69,800 km^2 within the Study Area, although the bathymetric feature defining this area continues extends north of the Study Area, terminating in waters off Japan.

The ridge is approximately 250 km west of Guam and, as stated in the comment by Governor Inos in 2013, "support[s] a rich diversity of coral reef and continental slope species," and "dense concentrations of biological productivity: high planktonic production, and large schools of small and predatory fishes including skipjack and other species of tuna." Also specifically mentioned in the comment were two beaked whale sightings, detections of short-finned pilot whales, and satellite tag detections of a false killer whale in the vicinity of the ridge. The comment letter indicated that "… multiple sightings of several cetacean species…supported the delineation of a geographic mitigation area and were evidence indicative of… a biologically important feature that should be protected."

The Navy recognizes that biological productivity is often associated with bathymetric features like ocean ridges and seamounts; however, productivity in such areas is often highly dependent on changeable conditions, including weather patterns, wind intensity and direction, localized currents and eddies, and the presence of nutrients in the water column.

Based on the distribution of marine mammals as known from visual surveys and satellite tag detections within the Study Area (Figure I-5), limiting Navy training and testing activities at the West Mariana Ridge and surrounding region to the 3,500 m isobath would not result in avoiding "high concentrations" of marine mammals (Fulling et al., 2011; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Klinck et al., 2015; Klinck et al., 2016; Ligon et al., 2011; Munger et al., 2014; Munger et al., 2015; National Oceanic and Atmospheric Administration, 2015; Nieukirk et al., 2016; Norris et al., 2017; Oleson et al., 2015; Tetra Tech Inc., 2014; U.S. Department of the Navy, 2007, 2012, 2013, 2014b, 2018b; Yack et al., 2016). While marine mammals have been observed in the area of the West Mariana Ridge, the vast majority of marine mammal sightings and satellite tag detections have

been recorded far to the east of the ridge (Figure I-5) (Fulling et al., 2011; Hill et al., 2018b). The available data do not indicate that the West Mariana Ridge or surrounding area is an area of key biological importance for marine mammals or other marine species, nor is it clear that limiting the use of sonar and explosives in the area would result in an avoidance or reduction of impacts. Therefore the West Mariana Ridge area does not meet the Navy's criteria for effective geographic mitigation.

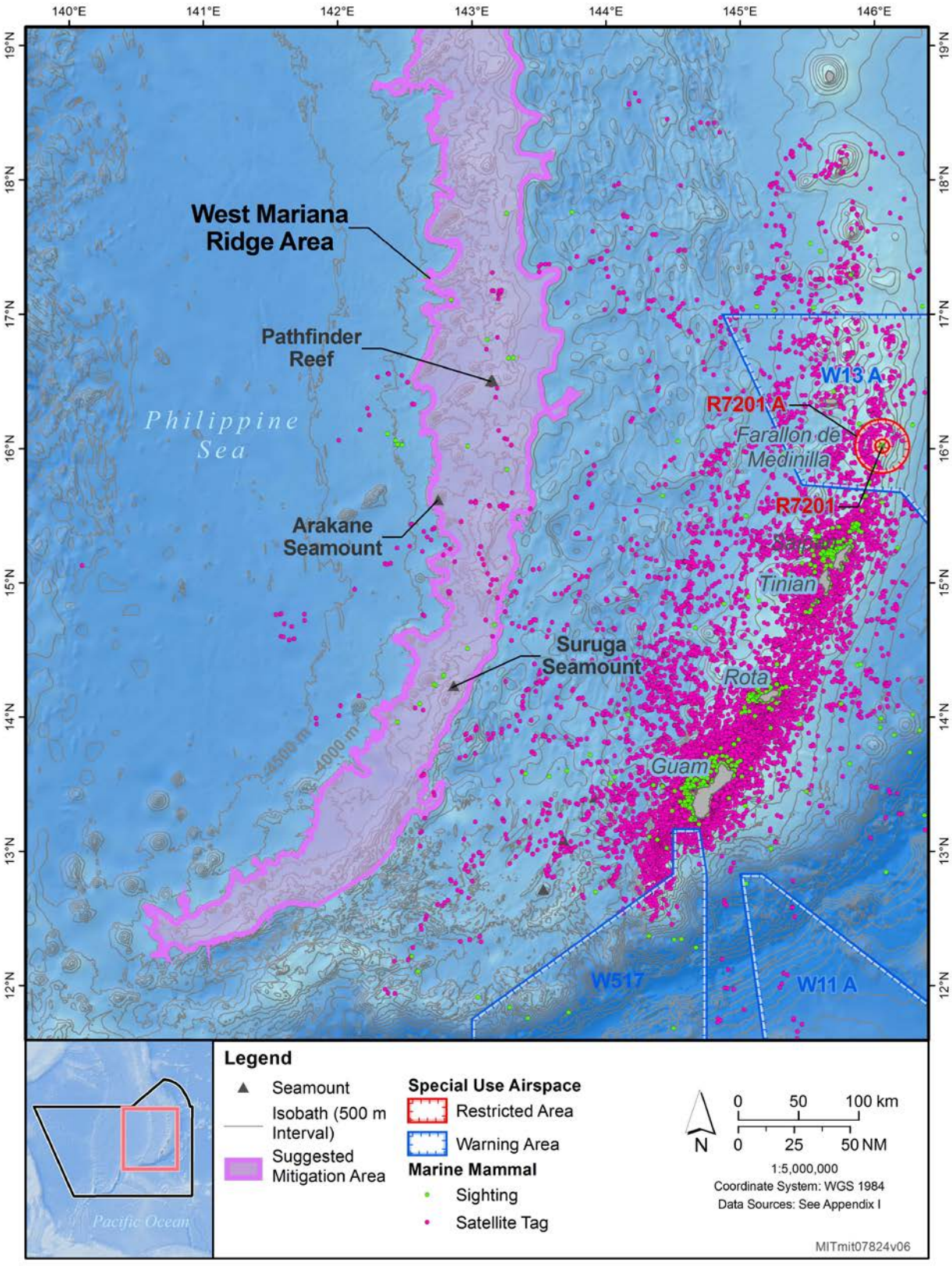

Figure I-5: West Mariana Ridge Area Suggested as a Potential Mitigation Area

This area was identified by the Governor of the CNMI (Ralph D.L.G. Torres) in a scoping comment on the 2017 Draft SEIS/OEIS Notice of Intent. The comment recommended that the Navy avoid conducting activities with sonar and explosives around the Islands of the CNMI landward of the 3,500 m isobath (Figure I-6). The comment was originally submitted by the previous governor, Governor Eloy S. Inos, as a comment on the 2013 MITT Draft EIS/OEIS.

The comment indicates there are island-associated populations of marine mammals present in the Study Area. The comment assumes there are island-associated populations in the Mariana Islands, because there have been a number of small and resident populations documented in the Hawaiian Islands (Baird et al., 2015). The comment offers that because "…insular populations of odontocetes are generally concentrated within the 3,500 m isobath…" around the Hawaiian Islands, then that same isobath should be used to define the boundary for a mitigation area in the Mariana Islands to mitigate "… the distinct risks posed to resident marine mammal populations, near island habitat…." The comment goes on to suggest that results of small boat, nearshore surveys in the Mariana Islands are indicative of site fidelity for several species, including spinner dolphins, bottlenose dolphins, rough-toothed dolphins, and short-finned pilot whales in waters shallower than 3,500 m (Hill et al., 2011; Hill et al., 2014; Hill et al., 2018b), similar to the findings from Hawaii (Baird et al., 2015). However, data from surveys conducted in the Study Area and cited in the comment, as well as other surveys (Fulling et al., 2011; Hill et al., 2013a; Hill et al., 2014; Hill et al., 2018b; Klinck et al., 2015; Norris et al., 2017; Oleson & Hill, 2010a) and data from satellite tags recording the movement of individual animals, indicate many of those same species utilize ocean areas beyond the 3,500 m isobath. Many of these species, including bottlenose dolphins, rough-toothed dolphins, pantropical spotted dolphins, false killer whales, and beaked whales have wide-ranging distributions in the Study Area.

Additionally, research from areas, including Hawaii, where training and testing activities occur more often and involve more concentrated use of sonar and explosives, such as at the Pacific Missile Range Facility, has documented the presence of numerous small and resident populations of marine mammals and long-term residency of individuals (Baird et al., 2015). These marine mammals have co-existed for decades alongside areas of concentrated Navy training and testing activity.

Furthermore, there are no indications from satellite tag data or photographic identification of marine mammals that there are any island-associated small or resident populations of marine mammals in the Mariana Islands (Ampela et al., 2014; HDR, 2011, 2012; HDR EOC, 2012; Hill et al., 2011; Hill et al., 2013a; Hill et al., 2015a; Hill et al., 2013b; Hill et al., 2014; Hill et al., 2015b; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Ligon et al., 2011). For additional information on the results from research and monitoring where the Navy has been training and testing for decades in the Mariana Islands, refer to Section 3.4.3.4 (Summary of Monitoring and Observations During Navy Activities Since 2015) of this SEIS/OEIS.

With regard to the practicality of geographic mitigation, the suggested mitigation area overlaps with all nearshore training and testing areas and completely encompasses FDM and R-7201. The suggested area overlaps with the northern part of W-517, most of W-13A, and a small part of W-13B. Essentially every training and testing activity in the Proposed Action may occur in the suggested mitigation area, and many of the Navy's activities would only occur in the suggested mitigation area.

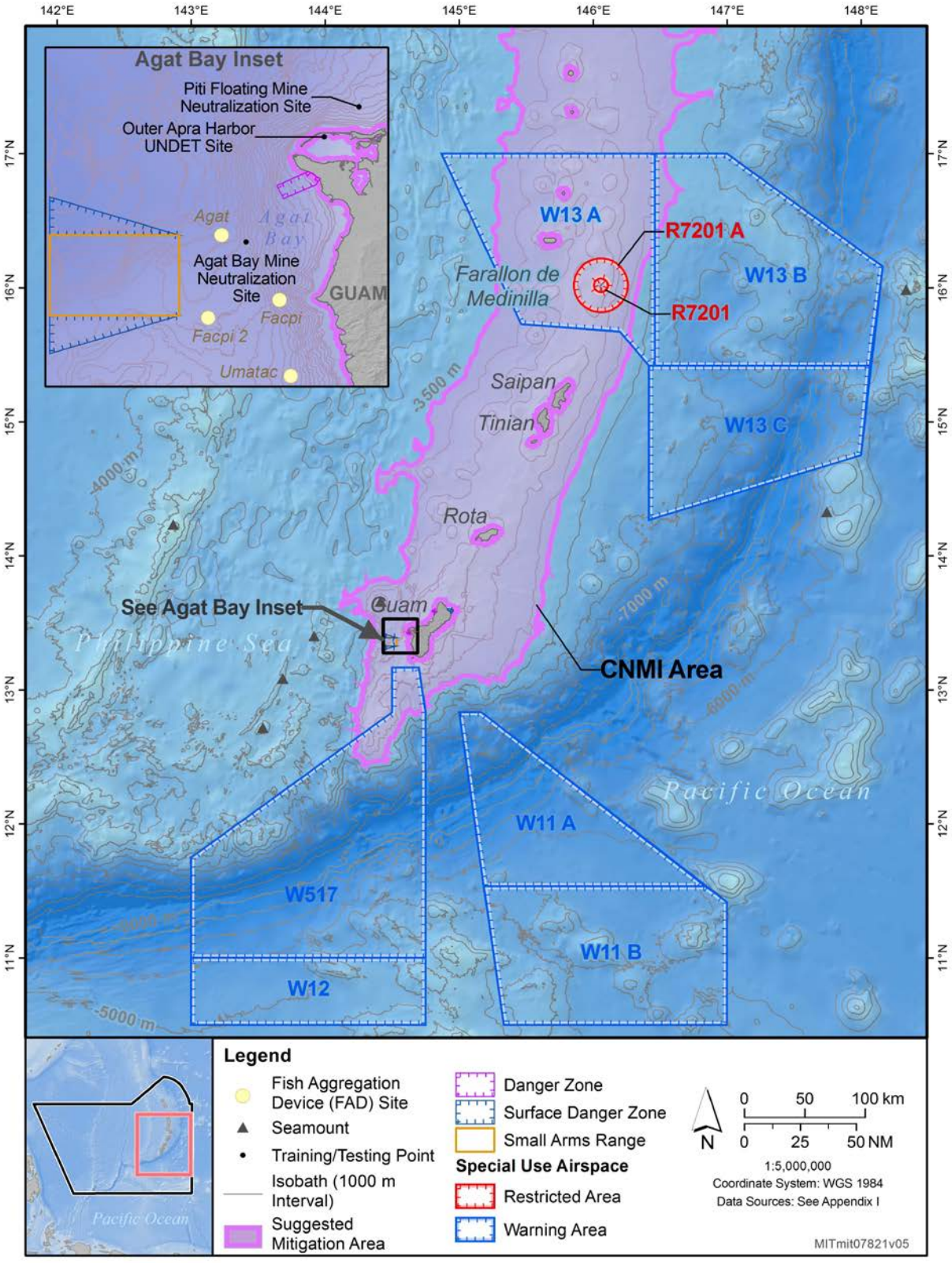

Figure I-6: Commonwealth of the Northern Mariana Islands Landward of the 3,500 Meter Isobath Suggested as a Potential Mitigation Area

W-517 is special use airspace and is important because it overlays a large, contiguous deep-ocean area that is relatively free of surface vessel traffic. W-517 altitude limits are from the surface to infinity and it supports GUNEX, CHAFFEX, MISSILEX, MINEX, SINKEX, BOMBEX, TORPEX, and Carrier training activities. W-517 is a laser certified open-ocean range. It is also used for surface vessel unit-level training.

FDM consists of the island land mass and the restricted airspace around it, R-7201. It contains a live-fire and inert bombing range and supports live-fire and inert engagements such as surface-to-ground and air-to-ground GUNEX, BOMBEX, MISSILEX, and Naval Surface Fire Support. FDM is an uncontrolled and un-instrumented, laser-certified range with fixed targets, including boxes and truck frames in various configurations within the lightweight, inert-only zone.

The suggested geographic mitigation area encompasses all mine neutralization sites, all shorelines, all anchorages, and all drop zones. All proposed amphibious warfare training and expeditionary warfare activities can only occur in the suggested mitigation area.

In addition to the training and testing areas where sonar may be used (e.g., required in-port sonar testing in Apra Harbor, Operating Areas), the suggested mitigation area encompasses open-ocean areas and several transit corridors between operating areas where sonar may be used for unit-level training or testing. Requiring units to take circuitous transit routes between Operating Areas in order to complete their required unit-level training and testing outside the 3,500 m isobath would add a substantial burden in terms of lost time for productive events, time away from home, unnecessary wear on equipment, and excessive fuel usage.

The MIRC provides training and testing venues that support the operational readiness of the Navy, U.S. Marine Corps, U.S. Air Force, Guam Army National Guard, Guam Air National Guard, Army Reserves Marianas, U.S. Coast Guard, and other users based and deployed in the Western Pacific. The MIRC is characterized by a unique combination of attributes that make it a strategically important range complex for the Services. These attributes include

- location within U.S. territory;
- live-fire ranges on Guam and FDM;
- expansive airspace, surface sea space, and underwater sea space;
- authorized use of multiple types of live and inert ordnance on FDM;
- support for all Navy warfare areas and numerous other Service roles, missions, and tactical tasks;
- support to homeported Navy, Army, U.S. Coast Guard, and U.S. Air Force units based at military installations on Guam and CNMI;
- training support for deployed forces;
- Western Pacific Theater training venue for Special Warfare forces;
- ability to conduct Joint and combined force exercises; and
- rehearsal area for WESTPAC contingencies.

Geographic mitigation for explosives and sonar landward of the 3,500 m isobath would have a substantial impact on training and testing activities and largely negate the existence of the MIRC; it is unlikely that Naval forces would be able to meet required conditions of readiness, and it could impact readiness for the other services. It would not be operationally practical to implement.

I.4.2 Earthjustice and on Behalf of Tinian Women Association, Guardians of Gani', PaganWatch, and Center for Biological Diversity

Scoping comments on five topics regarding marine species were submitted by Earthjustice and on behalf of the Tinian Women Association, Guardians of Gani', PaganWatch, and Center for Biological Diversity in response to the Notice of Intent for this SEIS/OEIS. The basis for the mitigation as stated by the Earthjustice letter was that the MITT activities "… threaten serious harm to marine mammals," citing to the current authorization of MMPA takes of marine mammals in the Study Area. There have been two previous sets of analyses of impacts on marine mammals by NMFS and the Navy, including two previous Letters of Authorization pursuant to the MMPA, and two Biological Opinions pursuant to the ESA for Navy activities in the Study Area. To date, there has been no empirical evidence suggesting, and NMFS has made no findings of, "serious harm" as suggested in the comment. The Navy models take as defined under the MMPA, the Navy does not model instances of "serious harm," and the vast majority of the takes modeled for this Proposed Action are temporary behavioral reactions. Species-specific comments provided in the Earthjustice letter are provided in the following subsections.

I.4.2.1 Minke Whale Habitat

The commenter suggested geographic mitigation for minke whale habitat. Minke whales have been detected acoustically in the Mariana Islands (Fulling et al., 2011; Klinck et al., 2015; Klinck et al., 2016; Norris et al., 2012; Norris et al., 2017; Oleson & Hill, 2010a), and this body of research has been considered and integrated into this SEIS/OEIS (see Section 3.4.1.12, Minke Whale [*Balaenoptera acutorostrata*] and supporting documents) (U.S. Department of the Navy, 2018b). As the cited research indicates, minke whales are one of the most abundant species of baleen whales worldwide (Norris et al., 2017). The purpose of the research was to reliably estimate minke whale abundance in the survey area based on passive acoustic detections of "calling" minke whales (Norris et al., 2017). The acoustic detections of minke whales in the area do not indicate the Mariana Islands are in any way unique or represent key areas of biological importance. While the authors state "There are also advantages to using passive acoustic methods for identifying important habitat for species of marine mammals with low densities," that statement is in the context of survey detection, not with regard to determination of specific areas of importance. Methods for estimating density from acoustic detections are currently being developed and numerous assumptions are associated with the calculations. Norris et al. (2017) mention "several caveats, biases, uncertainties and potential violations of the assumptions," which make clear the "preliminary" nature of "some obvious and interesting patterns" in the distribution of acoustic detections (Norris et al., 2017). Basically, those patterns were that all 30 individual minke whales detected acoustically during the 2007 survey (Fulling et al., 2011) were located to the south and east of the Mariana Islands within an area of approximately 156,600 km^2. Such a large area lacks precision to identify particularly key important areas and is much too large to be practical for geographic mitigation. In addition to Norris et al. (2017) noting the requirement for more detailed analyses of the current data, these results were collected from only a single season (January to April 2007), so it remains unknown if the minke whale detections were associated with static features such as water depth and bathymetry slope or were associated with dynamic ocean conditions present during that particular survey. Given the temporally dynamic redistributions of marine mammals in response to both seasonal variation and longer-term climate change affecting ocean conditions (Becker et al., 2017; Forney et al., 2015; Ramp et al., 2015; Risch et al., 2014; Silber et al., 2017), and that species such as minke whales migrate from low-productivity tropical waters in the summer (Jefferson et al., 2015; Perrin & Brownell, 2009), it is possible that minke whales may not have a fixed distribution within the MITT Study Area.

Therefore, establishing a mitigation area based on the results from a single survey would not be scientifically valid and does not meet the Navy's criteria for a geographic mitigation area (see Section I.2.2, Assessing Mitigation Effectiveness). There is no evidence delineating a specific area that is particularly important for any biologically important life process (e.g., foraging, migration, reproduction), and there is no empirical evidence of significant impacts on the minke whale population in the Study Area resulting from military readiness activities. Therefore, mitigation would not result in an avoidance or reduction of impacts.

I.4.2.2 Humpback Whale Calving Grounds

Earthjustice commented: "The SEIS must examine the impacts of MITT activities on humpback whale calving grounds, particularly given the potential the affected whales come from the endangered Western North Pacific humpback population. See Hill et al. (2017)." As noted in this SEIS/OEIS in Section 3.4.1.11 (Humpback Whale [*Megaptera novaeangliae]*), the Navy-funded surveys and research have resulted in the documentation of recorded mother-calf pairs, competitive groups, and 35 additional photo-identified non-calf whales (Fulling et al., 2011; Hill et al., 2015a; Hill et al., 2015b; Hill et al., 2016a; Hill et al., 2016b; Hill et al., 2017a; Hill et al., 2018b; Hill et al., 2018c), so it is possible that humpback whale calving is occurring somewhere (as yet unknown) in the Mariana Islands (National Marine Fisheries Service, 2018), but the literature and the commenter provide no details on where a hypothetical calving ground mitigation area would be specifically located. The Navy has proposed two areas off Saipan (Section I.3.1, Proposed Geographic Mitigation Area – Marpi Reef; and Section I.3.2, Proposed Geographic Mitigation Area – Chalan Kanoa Reef) as geographic mitigation areas that were based largely on the aggregated sightings of humpback whales engaged in reproductive behaviors, though calving itself has not been observed.

I.4.2.3 Marine Mammal Biologically Sensitive Areas

Earthjustice requested that consideration should be given to "…severely limit training and testing activities in biologically sensitive areas" specific to marine mammals. The Navy interpreted this to mean Biologically Important Areas (BIAs) as have been identified for marine mammals in other geographic areas of the Pacific (Ferguson et al., 2015a; Van Parijs et al., 2015). In the Mariana Islands, no BIAs have been identified. No critical habitat has been designated for ESA-listed marine mammals within the Study Area. However, in lieu of BIAs or critical habitat, the Navy has compiled and assessed existing data from the Study Area and proposed mitigation areas in this appendix based upon that data. As detailed in Chapter 5 (Mitigation) of this SEIS/OEIS, the Navy, in consultation with NMFS, has implemented mitigation measures to reduce or avoid impacting marine species and their habitat in general. If in the future there is a location identified as a BIA, then the Navy, in consultation with NMFS, will undertake analysis of that location as described in Section 5.2 (Mitigation Development Process) to consider implementation of geographic mitigation measures as part of the adaptive management process.

I.4.2.4 Sea Turtle Biologically Sensitive Areas

Earthjustice requested that consideration should be given to "…severely limit training and testing activities in biologically sensitive areas" and restrictions on MITT activities "…in areas identified as containing high densities of imperiled sea turtles." The Navy has funded much of the research providing information on sea turtles in the Mariana Islands (Hill et al., 2014; Hill et al., 2018b; Jones & Van Houtan, 2014b; Jones et al., 2015; Jones & Martin, 2016; Martin et al., 2016; Martin et al., 2018; Summers et al., 2017; Summers et al., 2018) and has considered those references and others in the analysis presented in this SEIS/OEIS. Sea turtle sightings around Guam have increased steadily since 2000 (Martin & Jones,

2016; Martin et al., 2016; Martin et al., 2018), which does not suggest ongoing Navy training and testing activities are resulting in negative effects on sea turtle populations in the area Martin et al. (2018). While sea turtle nesting areas on land can be considered sensitive areas in need of protection from certain activities, the Navy already actively manages nesting areas at onshore locations like Spanish Steps and Haupto on Guam, and currently implements mitigation measures associated with training and testing activities in other locations where sea turtle nesting may occur (U.S. Department of the Navy, 2015). The Navy has also proposed two geographic mitigation areas (see Section 1.3.2, Mitigation Area – Chalan Kanoa Reef; and Section I.3.3, Mitigation Area – Agat Bay Nearshore) that are locations where sea turtles have been routinely sighted during surveys. As detailed in Section 3.5.2 (Environmental Consequences) and in consideration of the mitigation measures that would be implemented as described in Chapter 5 (Mitigation), long-term consequences to individual sea turtle or sea turtle populations are not expected as a result of the proposed training and testing activities.

I.4.3 Seafloor Habitat less than 700 Meters Deep

The NMFS Habitat Conservation Division recommended that the Navy avoid all areas where the seafloor is less than 700 m deep, including offshore banks, shoals, and seamounts, because the use of expended materials in depths shallower than 700 m would impact seafloor Essential Fish Habitat. This area would include approximately 7,500 km^2 of the waterspace around the Mariana Islands.

As detailed in Section 3.1 (Sediments and Water Quality) and Section 3.9 (Fishes), the evidence indicates that effects to seafloor habitat would be minimal and localized where expended materials are in direct contact with the seafloor. This is expected to result in small proximate changes or otherwise minimal impact to the environment and insignificant changes in ecological functions (67 Federal Register 2354). The Navy considers an impact minimal if:

- the intensity of the impact at the specific site being affected is low,
- the spatial extent of the impact relative to the availability of the habitat type affected is small,
- the sensitivity/vulnerability of the habitat to the impact is low,
- the habitat functions that may be altered by the impact (e.g., shelter from predators) are negligible, and
- the timing of the impact relative to when the species or life stage needs the habitat is not critical

Adverse effects to Essential Fish Habitat under the Magnuson-Stevens Act are evaluated by the lost value to the management unit species, and appropriate mitigation or offsets produce outcomes that result in no more than minimal adverse effects to Essential Fish Habitat. The Navy completed an Essential Fish Habitat consultation with NMFS in 2014 for these ongoing training and testing activities. NMFS provided conservation recommendations to avoid, minimize, or offset adverse impacts. The Navy responded to NMFS' concerns, agreed to implement all practicable recommendations, and provided explanations for any disagreements as required by the Magnuson-Stevens Act. The Navy cannot practicably avoid discharging expended materials in all waters less than 700 m in depth, which encompass many training and testing areas that are specifically designed for these types of activities and are required to be near shore for accessibility (e.g., small arms ranges). In addition, the Navy currently implements mitigation for seafloor resources as described in Section 5.4.1 (Mitigation Areas for Seafloor Resources), which should also avoid or reduce impacts on sensitive seafloor habitat.

I.4.4 Various and Anonymous Commenters – Generalized Geographic Avoidance

The Navy received comments suggesting that in the future the Navy should stop conducting training and testing activities in various generalized or notional locations in the Mariana Islands. The Navy considered all public comments received during the National Environmental Policy Act scoping process. There were scoping comments related to the general theme of geographic mitigation that are not addressed individually here. These comments fell into one of three categories: (1) they involved notional suggestions and provided no specific location where a mitigation might be implemented; (2) they lacked scientific basis in support of the recommendation; or (3) science did not support the recommendation by the commenter.

The Navy currently implements integrated at-sea procedural mitigation (see Section 5.3, At-Sea Procedural Mitigation to be Implemented) and at-sea mitigation areas for seafloor resources (see Section 5.4, At-Sea Mitigation Areas to be Implemented) wherever and whenever applicable activities occur, as detailed in Chapter 5 (Mitigation) of this SEIS/OEIS.

Scoping comments specific to a particular marine resource were summarized at the end of the applicable resource section in this SEIS/OEIS (see Section 3.4.6, Public Scoping Comments). The concerns raised were generally based on assumptions that significant harm or damage would occur to marine resources in the future if ongoing training and testing activities were to continue into the future, despite decades of ongoing activities with no evidence of the harm or damage. In addition, a more generalized presentation of the rationale for eliminating many non-specific geographic locations from consideration was also provided in the 2015 MITT Final EIS/OEIS in Section 5.3.4.1.6 (Limiting Access to Training and Testing Locations) and Section 5.3.4.1.7 (Avoiding Locations Based on Bathymetry and Environmental Conditions). Those sections explained why the Navy cannot generally impose geographic limitations on ongoing training and testing activities. Reasons include (1) an increased safety risk to personnel, (2) an unacceptable impact on the effectiveness of training and testing activities that would affect military readiness, and (3) impractical burden with regard to implementation. For more information on how mitigation measures were developed in general, see Section 5.2 (Mitigation Development Process) in this SEIS/OEIS.

With regard to assumptions that significant harm or damage would occur to marine resources if Navy training and testing were to continue, potential effects on marine mammals and sea turtles from sonar and other active acoustic sources and explosives were quantitatively analyzed using the Navy's acoustic effects model. The Navy's modeled takes, the majority of which are temporary behavioral reactions, are not modeled instances of "significant harm." As detailed in Section 3.4.3.4 (Summary of Monitoring and Observations During Navy Activities Since 2015), the Navy's analysis, the previous analyses by NMFS, and the monitoring that has occurred have not indicated any significant harm or damage would occur to marine resources as a result of Navy training and testing activities. Based on the analysis, no mortality or serious injury were predicted in 2015, none have occurred, and none are predicted in this SEIS/OEIS. Additionally, as detailed in Chapter 3 (Affected Environment and Environmental Consequences), long-term consequences to other marine resources in the Mariana Islands are not expected.

I.5 Summary of Geographic Proposed Mitigation Areas

Based on the extensive review and analysis presented in this appendix, the Navy proposes to implement the mitigation areas summarized in Table I-8 and depicted in Figure I-7. The Navy has taken into account public comments received as well as reviewed available scientific information in making these determinations. The proposed mitigation areas were developed because they met the biological effectiveness criteria when balanced against the operational practicality criteria. The Navy finds that implementing these geographic mitigations would, in combination with procedural mitigation, effect the least practicable adverse impact on marine mammal species or stocks and their habitat.

Table I-8: Summary of Navy-Proposed Geographic Mitigation

Area Name	Stressors Limited	Timeframe for Measures
Marpi Reef	MF1 Sonar	Seasonal: December–April special reporting
	Explosives	Year-round prohibition
Chalan Kanoa Reef	MF1 Sonar	Seasonal: December–April special reporting
	Explosives	Year-round prohibition
Agat Bay Nearshore	MF1 Sonar and Explosives	Year-round prohibition

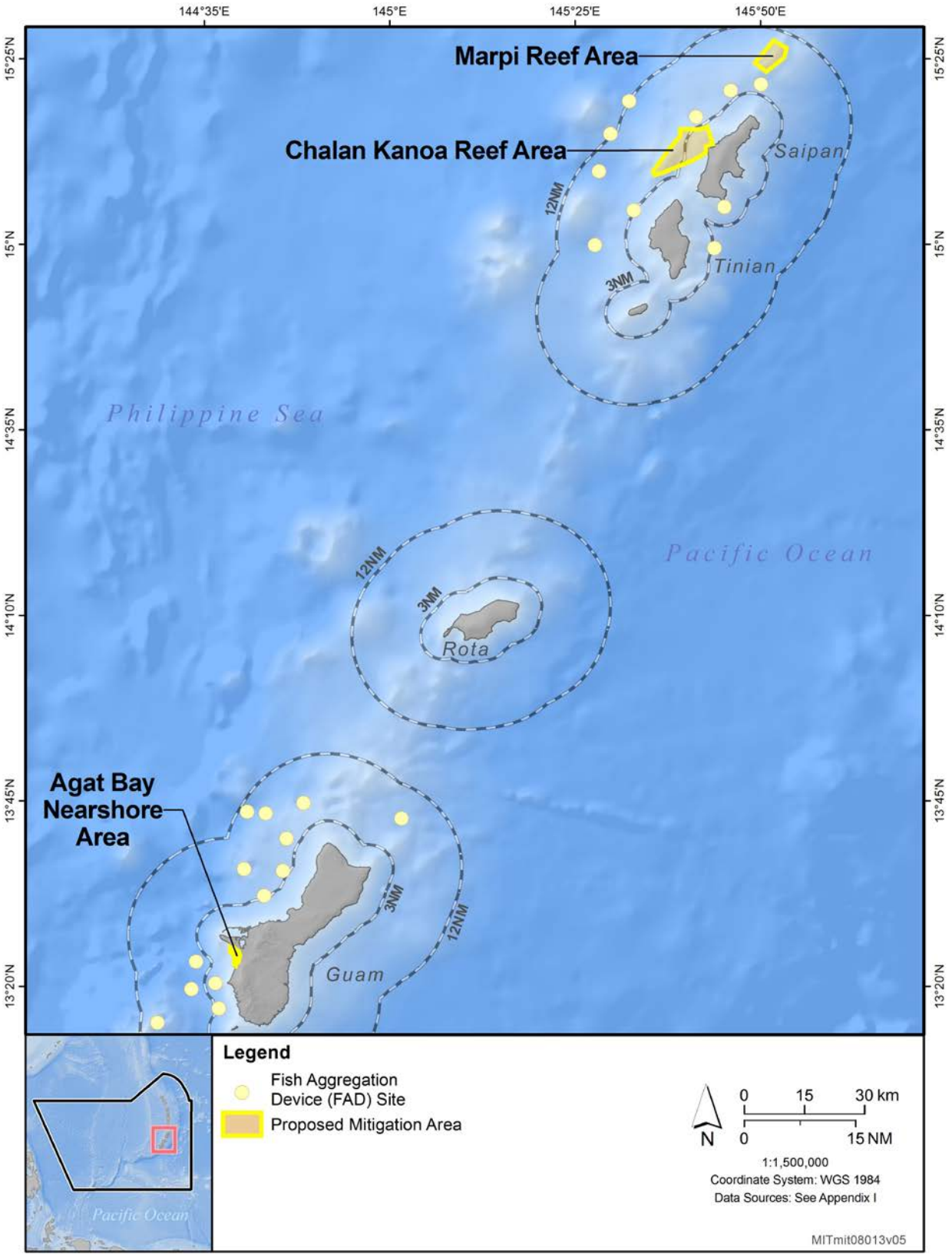

Figure I-7: Navy-Proposed Geographic Mitigation Areas

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