Appendix K Geographic Mitigation Assessment

Environmental Impact Statement/
Overseas Environmental Impact Statement
Hawaii-California Training and Testing

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APPENDIX K GEOGRAPHIC MITIGATION ASSESSMENT

K.1 INTRODUCTION

The Action Proponents have been mitigating effects from their training and testing activities for more than two decades using a combination of activity-based mitigation (activity-based mitigation was referred to as "Procedural Mitigation" in the 2018 Hawaii-Southern California Training and Testing [HSTT] and 2022 Point Mugu Sea Range [PMSR] Environmental Impact Statement/Overseas Environmental Impact Statements [EIS/OEISs]) and geographic mitigation. Current activity-based mitigation measures (which apply throughout the Study Area) and geographic mitigation measures that apply to specific areas are reflected in the December 18, 2018, Record of Decision (ROD) for the HSTT EIS/OEIS.

All mitigation measures (activity-based and geographic) presented in this EIS/OEIS apply to both Alternative 1 and Alternative 2 and would be implemented as part of the Proposed Action, as discussed in Chapter 2 (Description of the Proposed Action and Alternatives). These mitigation measures are considered in the Chapter 3 (Affected Environment and Environmental Consequences) environmental analyses for each relevant biological resource and are discussed in detail in Chapter 5 (Mitigation).

Activity-based mitigation measures are tailored to specific training and testing activities and are implemented whenever and wherever those activities take place within the Study Area. The Action Proponents'[1] methods for developing activity-based mitigation measures for each specific activity are detailed in Chapter 5 (Mitigation) of the 2018 HSTT EIS/OEIS.

In addition to activity-based mitigation measures, the Navy implements specific mitigation measures in designated geographic locations within the Study Area, referred to as "mitigation areas." This appendix demonstrates the Navy's thorough consideration of specific mitigation areas during the planning process. This appendix contains background information and lays out the methodology used by the Navy in its scientific and operational analysis for assessing and developing proposed mitigation areas within the Hawaii-California Training and Testing (HCTT) Study Area to further avoid or reduce potential effects on marine mammals in key areas of biological importance.

For the purposes of this assessment, the term "geographic mitigation" means mitigation, beyond the activity-based mitigation described above, that has been tailored to geographic locations (mitigation areas), designed to benefit particular species and stocks of marine mammals, and which can include provisions to apply measures either year-round or seasonally, depending on the unique characteristics of the area. When committed to, for a particular species, such mitigation measures can also serve to provide benefits to other marine species, such as sea turtles, fish, corals, or other marine mammals. The mitigation areas assessed in this appendix are described in Section K.1.1 (Mitigation Areas Analyzed). Information on the approach to analysis is contained in Section K.2.1 (Approach to Analysis). The mitigation area assessments are presented in Sections K.3 (Biologically Important Areas Within the Hawaii Study Area) and K.4 (Biologically Important Areas Within the California Study Area).

[1] The Action Proponents include the U.S. Department of the Navy (Navy) (including both the U.S. Navy and the U.S. Marine Corps [USMC]) jointly with the U.S. Coast Guard (USCG), U.S. Army (Army), and U.S. Air Force (USAF). The Navy is the lead agency.

All final activity-based mitigation measures and geographic mitigation measures are coordinated with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS), as appropriate, through the consultation and permitting process and will be documented and committed to in the Action Proponents' and NMFS RODs, NMFS Marine Mammal Protection Act (MMPA) Final Rule and Letters of Authorization (LOA), and the Endangered Species Act (ESA) Biological Opinions.

K.1.1 MITIGATION AREAS ANALYZED

K.1.1.1 Biologically Important Areas

In 2011, the Cetacean Density and Distribution Mapping Working Group identified and categorized areas of importance for cetaceans. Areas identified through this process were termed "Biologically Important Areas" (BIAs) (Ferguson et al., 2015b; Van Parijs, 2015). The BIAs located in the main Hawaiian Islands (Kratofil et al., 2023), and off California (Calambokidis et al., 2024), have since been reviewed and revised based on new data and information collected since the original BIAs were defined based on how species use these areas. The original BIAs defined by Ferguson et al. (2015b) and Van Parijs et al. (2015), and those recently revised (Calambokidis et al., 2024; Kratofil et al., 2023), are defined as biologically important for a particular species or stock and for an associated behavior exhibited by the species in that area. The four types of BIAs are reproductive, feeding, migratory, and small and resident, as described below (Harrison et al., 2023).

- Reproductive Areas – Areas and times within which a particular species selectively mates, gives birth, or are found with neonates or calves.
- Feeding Areas – Areas and times within which aggregations of a particular species preferentially feed. These either may be persistent in space and time or associated with ephemeral features that are less predictable but are located within a larger area that can be delineated.
- Migratory Corridors – Areas and times within which a substantial portion of a species is known to migrate; the corridor is spatially restricted.
- Small and Resident Population – Areas and times within which small and resident populations occupy a limited geographic extent. (Note: for this category, the Cetacean Density and Distribution Mapping Working Group delineated biologically important areas for "populations or stocks whose range spans only a bay, an area around one or several islands, or a portion of what the Cetacean Density and Distribution Mapping Working Group define as a region. Each regional chapter provides an explicit definition of 'resident' for each small and resident biologically important area delineated").

BIAs are also delineated for a specific time during which the important behavior is occurring in the area (e.g., while the species is migrating through the area). However, BIAs are not regulatorily mandated exclusionary zones (closure areas) and are not analogous to marine protected areas or critical habitat under the ESA, but rather were identified as resource management tools to "aid the National Oceanic and Atmospheric Administration and other federal agencies in… analyses and planning as required under multiple U.S. statutes," such as the National Environmental Policy Act (NEPA), MMPA, and ESA, "to characterize and minimize the impacts of anthropogenic activities on cetaceans and to achieve conservation and protection goals" (Ferguson et al., 2015b).

Although NMFS considers each area's boundary to be dynamic and subject to change based on new information (Ferguson et al., 2015a), the Action Proponents' assessments in this appendix are based on

the areas as they were originally described in 2015 and recently revised in Calambokidis et al. (2024) and Kratofil et al. (2023). As new data become available, the Action Proponents and NMFS will continue to reassess the data via the adaptive management process discussed in Section 5.5 (Monitoring, Research, and Adaptive Management) of Chapter 5 (Mitigation) of this EIS/OEIS.

Two new aspects of the BIA II delineation protocol are the options for identifying transboundary BIAs and "hierarchical" BIAs. Transboundary BIAs are BIAs that span more than one of the seven BIA regions (east coast, gulf of Mexico, west coast, Hawaii, gulf of Alaska, Aleutian islands and Bering sea, and arctic), and thus allow for continuity in a species' important area among BIA regions if necessary (e.g., for migration corridors). Delineated BIA boundaries can extend into international waters if supporting data is available (i.e., BIAs were not truncated at the U.S. Exclusive Economic Zone (EEZ), but BIAs were not identified solely within international waters (Harrison et al., 2023). Hierarchical BIAs are for situations where high-resolution data are available and it is appropriate and helpful to identify a gradation in animal use, available information, certainty in the spatial and/or temporal aspects of the boundary, or ecological characteristics across a broader area. For many species considered here, data were available to support the existence of core areas of use, or areas used notably more intensely, identified within a larger important area, which is termed "parent BIA" (Harrison et al., 2023) or "child BIA in Kratofil et al. (2023). In these cases and throughout this manuscript, these areas are referred to as "core BIAs" to more clearly represent that these areas were identified as a portion of the parent BIA with intensified use (e.g., higher density) by the given species and corresponding higher intensity scores based on the criteria evaluated. One exception to this was the delineation of the hierarchical migration BIA for (primarily) Eastern North Pacific gray whales, where one parent BIA temporally and spatially spans both northbound and southbound migrations, with a transboundary extension to the Gulf of Alaska. The parent BIA encompasses several smaller (spatially) and shorter (temporally) phase-specific BIAs (i.e., southbound, northbound phase for adults/juveniles, northbound phase for cow/calf pairs). In this situation, such nested BIAs are referred to as "child BIAs".

As discussed in Section C.6.1.2 (Habitat Use) of Appendix C of this EIS/OEIS, 35 BIAs were identified in Hawaii for 12 cetacean species (Figure K-1); these included 33 small resident BIAs for 11 odontocetes and 2 reproductive BIAs for humpback whales in the main Hawaiian Islands (Kratofil et al., 2023). Hierarchical BIAs were defined for 9 of the 12 species yielding between 1 and 3 child BIAs for each of the 9 parent BIAs, depending on the species. 10 non-hierarchical BIAs were defined for 6 species.

Twenty-eight BIAs were identified for four species off the U.S. West Coast in 2015 (Calambokidis et al., 2015c), with 5 of those areas located within or overlapping the California portion of the 2018 HSTT Study Area. The BIAs included 4 feeding areas for blue whales and a migration area for gray whales (Calambokidis et al., 2015c). NMFS recently updated the BIAs for cetaceans on the U.S. West Coast (Figure K-2) resulting in BIAs for two additional species, fin whales and Southern Resident killer whales that were not delineated in the original effort in 2015 (Calambokidis et al., 2024).

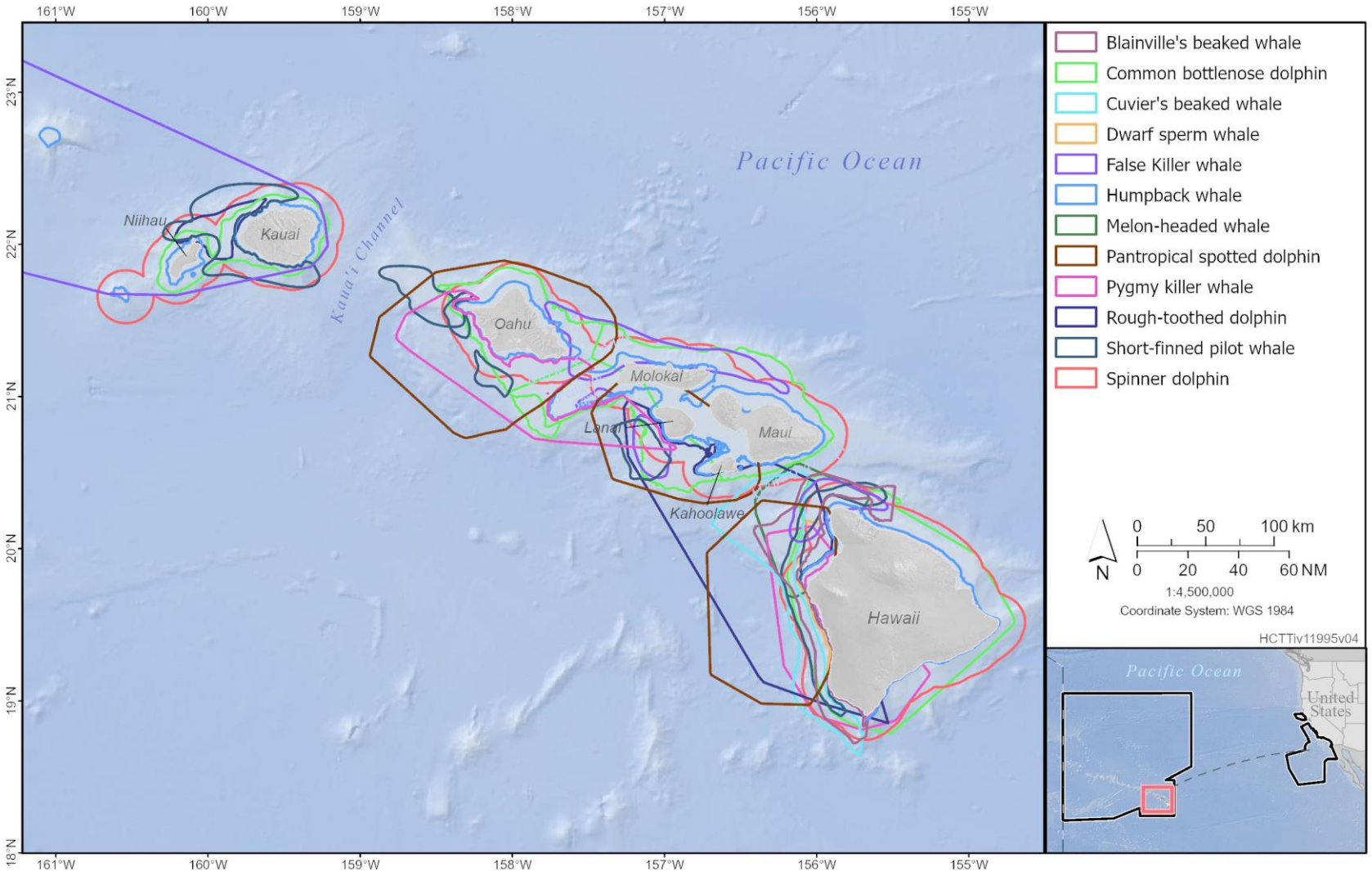

Figure K-1: Biologically Important Areas in the Hawaii Study Area

Note: Discrete maps of the individual areas are presented in the following subsections where those areas are discussed for each species.

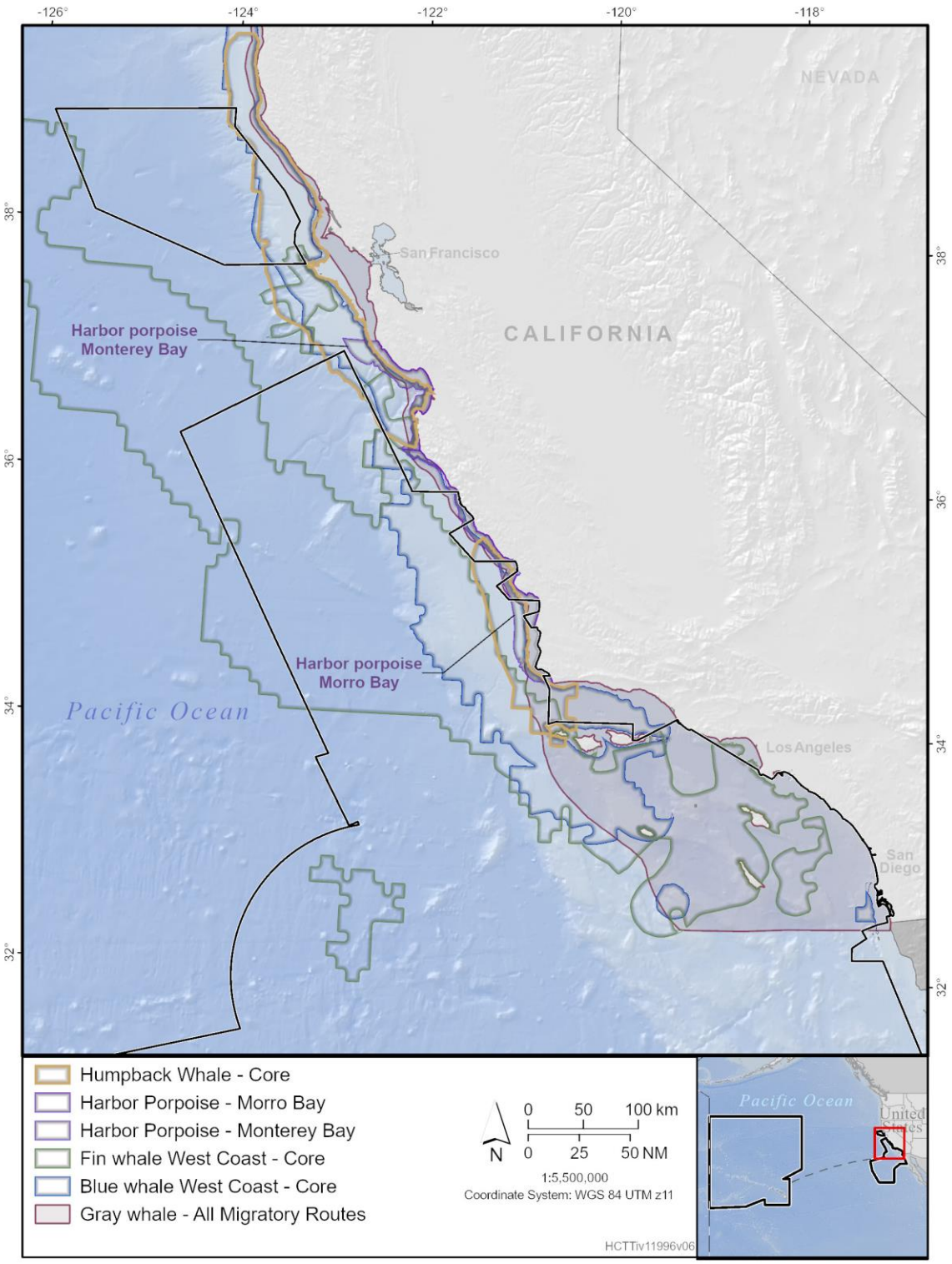

Figure K-2: Biologically Important Areas in the California Study Area

Note: Discrete maps of the individual areas are presented in the following subsections where those areas are discussed for each species.

For this assessment, the Action Proponents used the revisions to the Cetacean Density and Distribution Mapping Working Group source literature (Calambokidis et al., 2024; Kratofil et al., 2023) in combination with Navy marine species monitoring reports, available tagging data, and the most up-to-date scientific literature, to assess the potential likelihood that additional mitigation in these areas would be warranted. In many instances, data from the Navy's marine mammal tagging studies were particularly helpful in providing context about the full extent of habitats used by cetaceans for biologically important behaviors in the Study Area, since oftentimes the biologically important areas identified in Calambokidis et al. (2024) and Kratofil et al. (2023) represent only a portion of the habitats used by marine mammals throughout their range.

K.1.1.2 Areas Suggested During the Public Involvement Process

<<Placeholder until the conclusion of the public involvement process>>

K.1.1.2.1 Additional Mitigation Measures Suggested during the Draft EIS/OEIS Public Involvement Process

<<Placeholder until the conclusion of the public involvement process>>

K.1.1.3 Mitigation Areas Currently Implemented

During the 2018 HSTT EIS/OEIS (Phase III), seafloor resource mitigation areas (Table K-1, Figure K-3, and Figure K-4), as well as seven geographic mitigation areas (four in the Hawaii [Table K-2 and Figure K-5] and three in the Southern California [Table K-3 and Figure K-6] portions of the HSTT Study Area) were and continue to be implemented. In addition, the California Large Whale Real-Time Notification Mitigation Area (Table K-4) from the HSTT Biological Opinion reinitiation is currently being implemented.

The Northern California (NOCAL) Range Complex and the PMSR were not part of the HSTT Study Area and therefore no mitigation areas were implemented for those areas during Phase III. In addition, there was no geographic mitigation incorporated into the 2022 PMSR EIS/OEIS.

K.1.1.3.1 Mitigation Areas for Seafloor Resources

As outlined in Table K-1 and shown in Figure K-3 and Figure K-4, the Navy is currently implementing mitigation from Phase III to avoid or reduce potential effects on biological or cultural resources that are not observable by lookouts from the water's surface (i.e., resources for which activity-based mitigation measures cannot be implemented).

Table K-1: Mitigation Areas for Seafloor Resources in the Study Area

Mitigation Area Description
Stressor or Activity • Explosives • Physical disturbance and strikes
Resource Protection Focus • Shallow-water coral reefs • Precious coral beds • Live hard bottom • Artificial reefs • Shipwrecks
Mitigation Area Requirements (year-round) • **Within the anchor swing circle of shallow-water coral reefs, precious coral beds, live hard bottom, artificial reefs, and shipwrecks:** – The Navy will not conduct precision anchoring (except in designated anchorages in the Hawaii Range Complex and California Study Area, such as areas adjoining the boat lanes off Silver Strand Training Complex and Naval Amphibious Base Coronado). • **Within a 350-yd. radius of live hard bottom, artificial reefs, and shipwrecks:** – The Navy will not conduct explosive mine countermeasure and neutralization activities or explosive mine neutralization activities involving Navy divers (except in designated areas in the Hawaii Range Complex and California Study Area, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practicable). – The Navy will not place mine shapes, anchors, or mooring devices on the seafloor (except in designated areas in the Hawaii Range Complex and California Study Area, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practicable). • **Within a 350-yd. radius of shallow-water coral reefs and precious coral beds:** – The Navy will not conduct explosive or non-explosive small-, medium-, and large-caliber gunnery activities using a surface target; explosive or non-explosive missile and rocket activities using a surface target; explosive or non-explosive bombing and mine laying activities; explosive or non-explosive mine countermeasure and neutralization activities; and explosive or non-explosive mine neutralization activities involving Navy divers (except in designated areas in the Hawaii Range Complex and California Study Area, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practicable). – The Navy will not place mine shapes, anchors, or mooring devices on the seafloor (except in designated areas in the Hawaii Range Complex and California Study Area, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practicable).

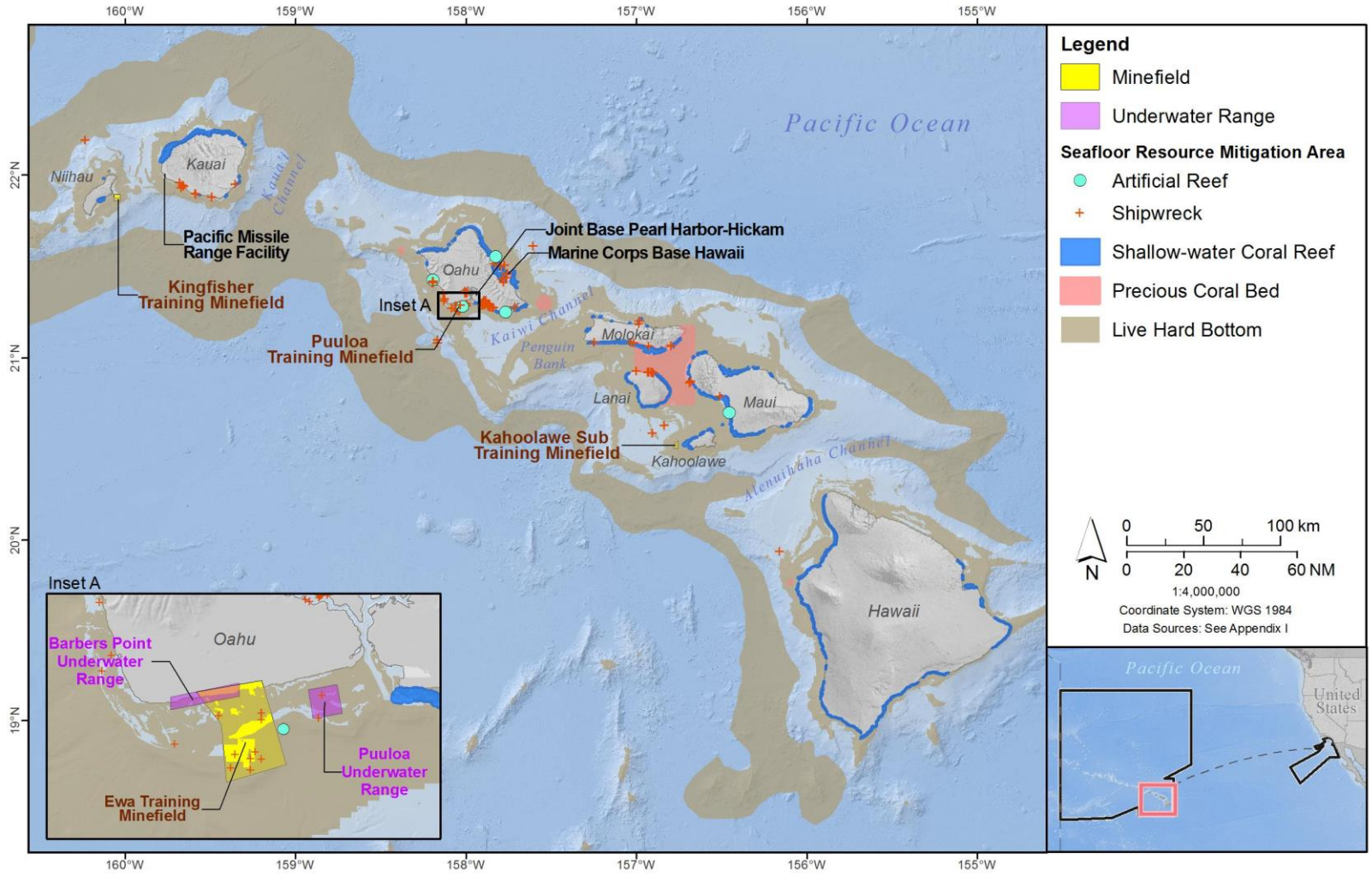

Figure K-3: Phase III Seafloor Resource Mitigation Areas off the Hawaiian Islands

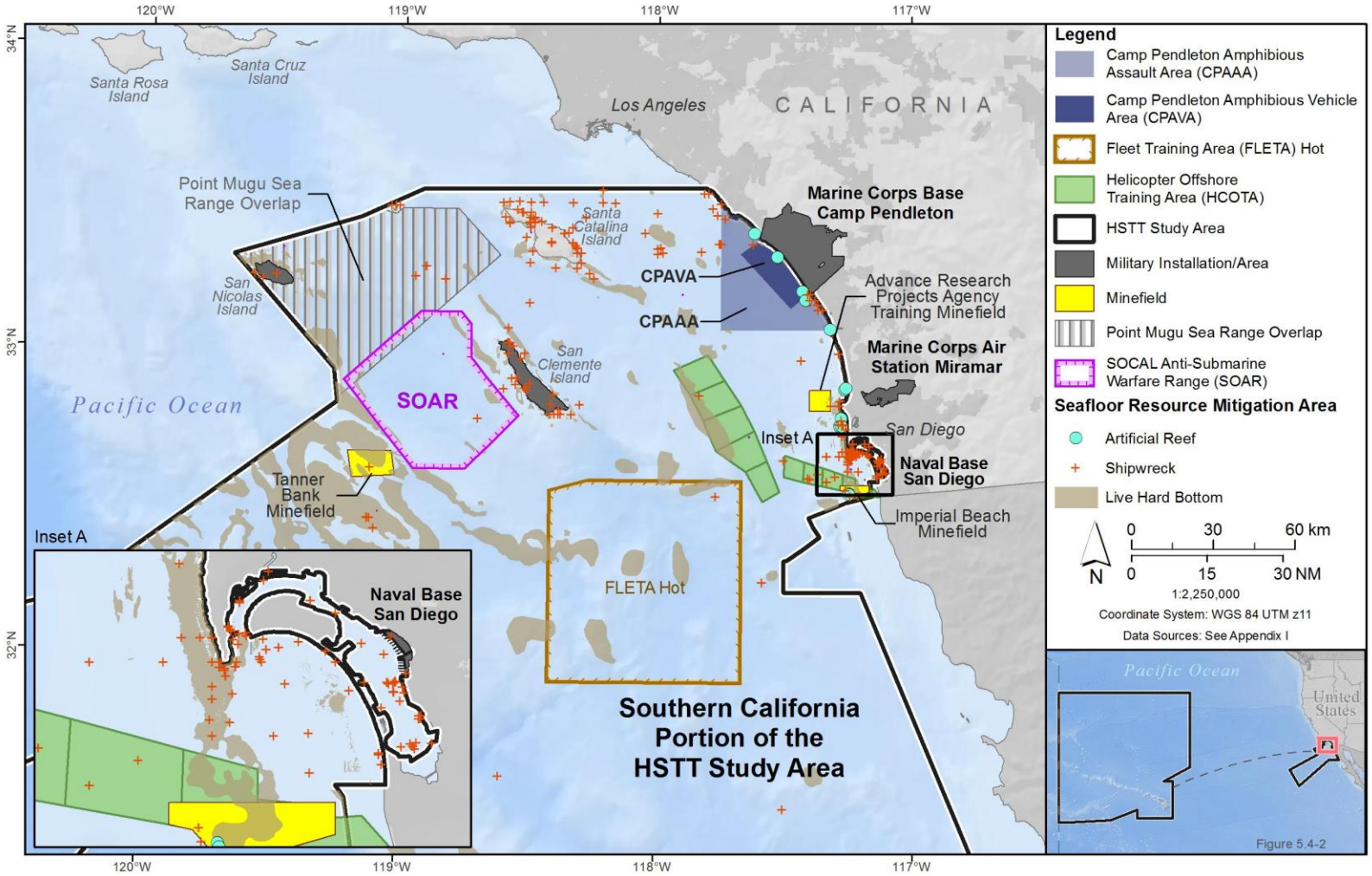

Figure K-4: Phase III Seafloor Resource Mitigation Areas off Southern California

Notes: HSTT = Hawaii-Southern California Training and Testing; MCAS = Marine Corps Air Station; MCB = Marine Corps Base; NB = Naval Base; SOCAL = Southern California

K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area

As described in Table K-2 and shown in Figure K-5, the Navy is currently implementing mitigation areas from Phase III in the Hawaii Study Area to, in combination with activity-based mitigation measures, effect the least practicable adverse impact on marine mammal species or stocks and their habitat and to provide additional mitigation for Endangered Species Act (ESA)-listed marine mammal species.

Table K-2: Mitigation Areas for Marine Mammals in the Hawaii Study Area

Mitigation Area Description
Stressor or Activity • Sonar • Explosives • Vessel strikes
Resource Protection Focus • Marine mammals
Mitigation Area Requirements • **Hawaii Island Marine Mammal Mitigation Area (year-round):** – The Navy will not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of mid frequency dipping sonar, or use explosives that could potentially result in takes of marine mammals during training and testing. Should national security present a requirement to conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar, or use 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 and include the information (e.g., sonar hours or explosives usage) in its annual activity reports submitted to NMFS. • **4-Islands Region Mitigation Area (November 15 – April 15 for active sonar; year-round for explosives):** – The Navy will not use MF1 surface ship hull-mounted mid-frequency active sonar or explosives that could potentially result in takes of marine mammals during training and testing. Should national security present a requirement to use MF1 surface ship hull-mounted mid-frequency active sonar or 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 and include the information (e.g., sonar hours or explosives usage) in its annual activity reports submitted to NMFS. • **Humpback Whale Special Reporting Areas (December 15 – April 15):** – The Navy will report the total hours of surface ship hull-mounted mid-frequency active sonar used in the special reporting areas in its annual training and testing activity reports submitted to NMFS. • **Humpback Whale Awareness Notification Message Area (November – April):** – The Navy will issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, including humpback whales. – To maintain safety of navigation and to avoid interactions with large whales during transits, the Navy will instruct vessels to remain vigilant to the presence of large whale species (including humpback whales), that when concentrated seasonally, may become vulnerable to vessel strikes. – Platforms will use the information from the awareness notification message to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of activity-based mitigation measures.

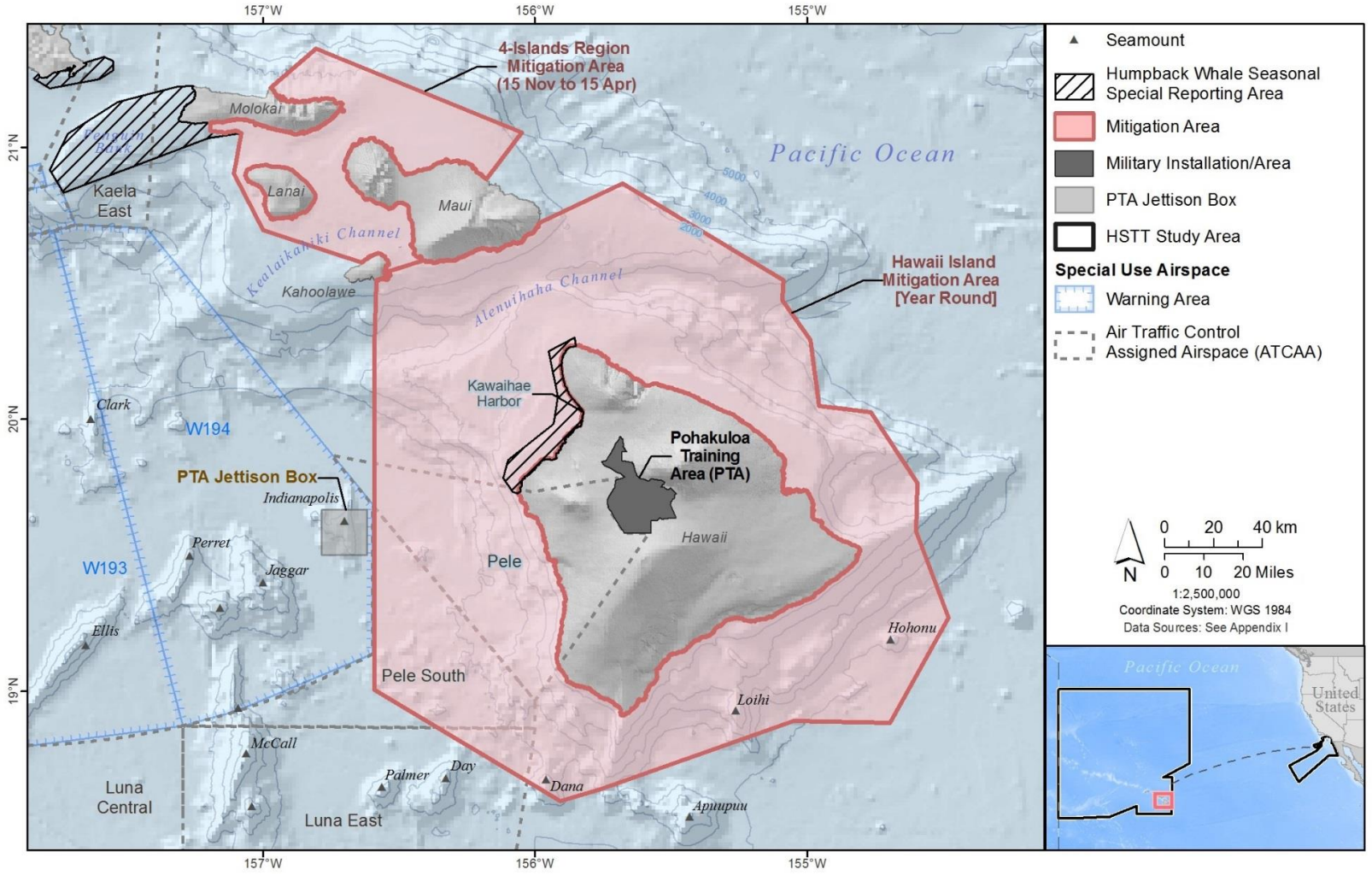

Figure K-5: Phase III Marine Mammal Mitigation Areas off the Hawaiian Islands

Notes: HSTT = Hawaii-Southern California Training and Testing

K.1.1.3.3 Mitigation Areas for Marine Mammals in the California Study Area

As described in Table K-3 and Figure K-6, the Navy is currently implementing mitigation areas from Phase III in the California Study Area to, in combination with activity-based mitigation measures, effect the least practicable adverse impact on marine mammal species or stocks and their habitat and to provide additional mitigation for ESA-listed marine mammal species.

Table K-3: Mitigation Areas in the California Study Area

Mitigation Area Description
Stressor or Activity • Sonar • Explosives • Vessel strikes
Resource Protection Focus • Marine mammals
Mitigation Area Requirements • **San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas (June 1 – October 31):** – The Navy will not conduct more than a total of 200 hours of MF1 surface ship hull-mounted mid-frequency active sonar in the combined areas, excluding normal maintenance and systems checks, during training and testing. Should national security present a requirement to conduct more than 200 hours of MF1 surface ship hull-mounted mid-frequency active sonar in the combined areas during training and testing (excluding normal maintenance and systems checks), 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 and include the information (e.g., sonar hours) in its annual activity reports submitted to NMFS. – Within the San Diego Arc Mitigation Area, the Navy will not use explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during training and testing. Should national security present a requirement to use explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities 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 and include the information (e.g., explosives usage) in its annual activity reports submitted to NMFS. – Within the San Nicolas Island Mitigation Area, the Navy will not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during training. Should national security present a requirement to use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during training, 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 and include the information (e.g., explosives usage) in its annual activity reports submitted to NMFS. – Within the Santa Monica/Long Beach Mitigation Area, the Navy will not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during training and testing. Should national security present a requirement to use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities 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 and include the information (e.g., explosives usage) in its annual activity reports submitted to NMFS. • **Santa Barbara Island Mitigation Area (year-round):** – The Navy will not use MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during training. Should national security present a requirement to use MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during training, 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 and include the information (e.g., sonar hours or explosives usage) in its annual activity reports submitted to NMFS.

Mitigation Area Description
• **Blue Whale (June – October), Gray Whale (November – March), and Fin Whale (November – May) Awareness Notification Message Areas:** – The Navy will issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, including blue, gray, or fin whales. – To maintain safety of navigation and to avoid interactions with large whales during transits, the Navy will instruct vessels to remain vigilant to the presence of large whale species, that when concentrated seasonally, may become vulnerable to vessel strikes. Platforms will use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of activity-based mitigation measures.

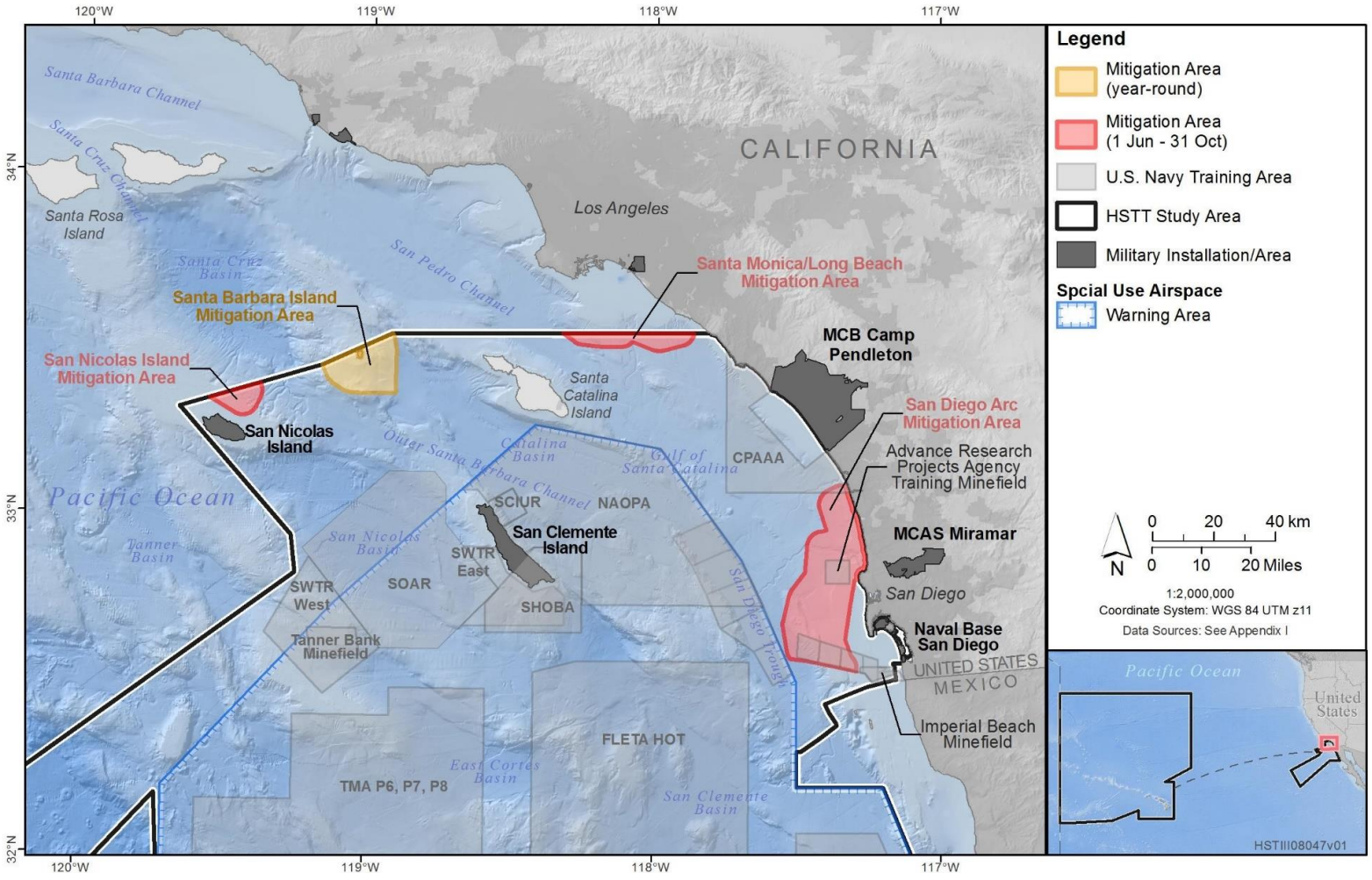

Figure K-6: Phase III Marine Mammal Mitigation Areas off Southern California

Notes: MCAS = Marine Corps Air Station; MCB = Marine Corps Base; NWS = Naval Weapons Station

K.1.1.3.4 California Large Whale Real-Time Notification Mitigation Area

Table K-4 details real-time notification requirements for a designated area within the SOCAL Range Complex. The mitigation is a continuation from National Marine Fisheries Service (2024).

Table K-4: California Large Whale Real-Time Notification Mitigation Area

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

K.2 MITIGATION AREA ASSESSMENT

K.2.1 APPROACH TO ANALYSIS

In developing mitigation areas, the Action Proponents considered the manner and degree to which a potential mitigation measure was likely to reduce effects on species and stocks, while still being practical and safe to implement, and not impacting the effectiveness of military readiness activity in an impractical manner. The Action Proponents used a qualitative assessment process when considering potential geographic mitigation areas based on the best available science, the analyses from Chapter 3 (Affected Environment and Environmental Consequences), available tagging data, Navy marine species monitoring data, and input from the training and testing community.

Potential mitigation options within specific geographic areas include reducing or modifying activities in order to reduce effects on marine species or stocks and their habitat. For example, mitigation could include: limiting the total amount of activity in an area, limiting activities such that a certain number of sonar hours would not be exceeded, using an area less often or for a shorter duration, complete restriction of certain activities or the use of certain systems that result in a stressor, limiting the time of year that an activity is conducted, limiting certain activities to daylight hours only, limiting or restricting major training exercises in certain areas, implementing special reporting requirements, or requiring approval from a designated Command authority for conducting activities in certain areas or during certain times of year. The Action Proponents' mitigation objectives in this assessment are to:

- Ensure that the Proposed Action has only a negligible impact on marine mammal species, stocks, and populations;
- Identify means of effecting the least practicable adverse impact upon the affected marine mammal species or stocks and their habitat (as required by Section 101(a)(5)(A) of the MMPA);

- Ensure that the Proposed Action does not jeopardize the continued existence of endangered or threatened species, or result in destruction or adverse modification of critical habitat (as required under ESA); and
- Avoid or reduce the level of impact of incidental take to individuals and their habitat to the extent reasonable and prudent.

K.2.1.1 Stressors Considered for Analysis

The Action Proponents considered, when combined with the activity-based mitigation measures currently implemented, if the addition of geographic mitigation would avoid or further reduce adverse effects to marine mammals for the following stressors:

- Acoustic: Sonar and other transducers
- Explosives: In-water (applies only to those activities for which the Action Proponents seek MMPA authorization)

Active sonar and other transducers have the potential to result in incidental takes of marine mammals by behavioral harassment, temporary hearing loss or auditory injury. Explosives may result in takes by behavioral harassment, temporary hearing loss, auditory injury, non-auditory injury, or mortality.

Geographic mitigation only applies to activities which could result in acoustic and explosive stressors, and this appendix specifically discusses the potential impacts from those stressors on marine mammals in the revised BIAs off the Hawaiian Islands and California discussed in Section K.1.1.1 (Biologically Important Areas). Mitigation not specific to sonar and other transducers, and in-water explosives, for species other than marine mammals, are discussed in Chapter 5 (Mitigation) of the HCTT Draft EIS/OEIS.

K.2.1.2 Biological Effectiveness Assessment

The first step of the mitigation area assessment was a biological effectiveness assessment (presented in the Biological Considerations sections) of each area identified in Section K.1.1 (Mitigation Areas Analyzed). This assessment considered if implementing geographic mitigation in these areas, in addition to activity-based mitigation measures which are implemented throughout the Study Area, would be effective at reducing adverse effects on marine mammal species or stocks and their habitat. Assessments of overlapping areas were combined whenever possible. The Action Proponents considered a specific mitigation area to be biologically effective if it met the following criteria:

1. The best available science suggests that the area is of biological importance to one or more species or resources for a biologically important life process (e.g., foraging, migration, or reproduction) or ecological function, year-round or for part of the year.
2. Implementing the mitigation would likely result in avoiding or minimizing injury or mortality; limiting interruption of known feeding, breeding, migratory, mother/young, or resting behaviors; minimizing the abandonment of important habitat (temporally and spatially); minimizing the number of individuals subjected to these types of disruptions; and limiting degradation of habitat.
3. Implementing the mitigation would not shift or transfer adverse effects from one species to another, or to a more vulnerable or sensitive species.

K.2.1.3 Operational Assessment

A second step, an operational assessment (presented in the Action Proponent Requirements for Area-Specific Training and Testing sections), considered what activities are conducted in specific geographic areas and assessed the importance of those areas for those specific activities. The Action Proponents assessed how and to what degree a specific mitigation measure would be compatible with planning, scheduling, and conducting military readiness activities under the Proposed Action in order to meet each military service's respective national defense missions in accordance with their Congressionally mandated requirements.[2]. In its operational assessment, the Action Proponents considered such things as cost, impact on operations, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity in accordance with 16 U.S.C. 1371(a)(5)(A)(ii). This part of the assessment also considered information from annual training exercise reports, testing event reports, monitoring reports, and feedback from members of the training and testing community who are responsible for implementing the mitigation.

It is vital that the Action Proponents effectively execute readiness activities to ensure forces can effectively execute military operations. The ability to schedule and locate training and testing without excessively burdensome restrictions within the Study Area is crucial to ensure those activities are practical, effective, and safe to execute. To meet their military readiness requirements, the Action Proponents require consistent access to a variety of realistic, tactically-relevant oceanographic and environmental conditions (e.g., bathymetry, topography, surface fronts, and variations in sea surface temperature), and sea space and airspace that is large enough or situated in a way that allows activities to be completed without physical or logistical obstructions, in order to achieve the highest skill proficiency and most accurate testing results possible in areas analogous to where the military operates. Some of the elements considered in selecting training and testing locations include:

- Proximity to training ranges, testing facilities, air squadrons, home ports, and existing infrastructure (e.g., instrumented underwater and land ranges);
- Availability of aircraft emergency landing fields;
- Access to a variety of realistic or unique tactical environments required to ensure training and testing effectiveness and meet testing program requirements;
- Ability to de-conflict participants (e.g., ships, aircraft, or submarines) or other users of the water and air space (e.g., commercial shipping, recreational boating, fishing, and commercial air traffic routes) during military activities to ensure the various training and testing events do not encroach on each other or other users.

The Action Proponents considered mitigation to be practical to implement if it met all criteria listed below (see Table 5-1 in Section 5.1, Practicality Assessment Criterion, for more details):

- Implementing mitigation must be safe: The mitigation must not increase safety risks to U.S. military personnel and equipment or the general public.

[2] See Title 10, Sections 8062 (Navy), 8063 (USMC), 7062 (Army), 9062 (USAF) United States Code (U.S.C.) and Title 14, Sections 101 and 102 U.S.C. (USCG) for each service's specific language. Army and USAF are included only for their activities in Hawaii with potential in-water impacts.

- Implementing mitigation must sustainable for the duration of the Proposed Action: The mitigation would not result in excessive time away from homeport or base for military personnel or an impracticable increase in resource requirements, such as wear and tear on equipment, additional fuel, additional personnel, additional funding, or undue shifting of time spent on operational obligations to other tasks (e.g., increased reporting requirements that take disproportionate time away from focusing on mission requirements).
- Implementing mitigation must allow for the Action Proponents to continue meeting mission objectives and statutory mandates: When assessing whether implementing mitigation would allow the Action Proponents to continue meeting their Congressionally mandated obligations, each individual measure was evaluated based on itsimpact to the effectiveness of the military readiness activity.

K.3 Biologically Important Areas Within the Hawaii Study Area

K.3.1 Main Hawaiian Islands Humpback Whale Reproduction Area

K.3.1.1 Biological Considerations Applicable to all Humpback Whale Reproduction Areas

NMFS recognizes 14 distinct population segments (DPS) of humpback whales worldwide, with four DPSs occurring in the North Pacific (Carretta et al., 2023). Humpback whales that occur seasonally in the HCTT Study Area are from three of the four DPSs identified by low-latitude wintering habitats: Hawaii DPS, Mexico DPS, and Central America DPS (Bettridge et al., 2015; Carretta et al., 2023; National Marine Fisheries Service, 2016b; Young, 2023). The three previously defined stocks of North Pacific humpback whales did not align with the DPS structure, so NMFS reevaluated the stock structure to incorporate both the locations of foraging and overwintering areas and population demographics. As a result, NMFS defined five stocks in the North Pacific:

1. Central America/Southern Mexico-California-Oregon-Washington stock
2. Mainland Mexico-California-Oregon-Washington stock
3. Mexico-North Pacific stock
4. Hawaii stock
5. Western North Pacific stock

Of the five stocks listed above, only the Hawaii stock is found in the Hawaii Study Area. Humpback whales wintering in Hawaii are identified as the Hawaii DPS and comprise the Hawaii stock. Humpback whales from the Hawaii DPS/stock forage across the North Pacific. Humpback whales in the Hawaii DPS are not listed under the ESA, because the population is believed to have fully recovered to its pre-whaling abundance (Barlow et al., 2011; Bettridge et al., 2015; Muto et al., 2017; National Marine Fisheries Service, 2016a; Wade et al., 2016).

Humpback whales that breed in Hawaii generally migrate to northern British Columbia and southeast Alaska to feed (Bettridge et al., 2015; Calambokidis et al., 2008). In the Hawaii portion of their range, peak densities are from February through March, although the breeding season typically spans December through April (Baird et al., 2015d; Mobley et al., 1999; Mobley et al., 2001; Norris et al., 1999). New survey data collected in offshore waters of the Main Hawaiian Islands in 2020 supported the development of the first habitat-based density model for humpback whale for the Hawaiian Islands EEZ (Becker et al., 2022b). This model provided further evidence that peak numbers of humpback whales occur within these waters from approximately 19 February through 22 March. Acoustic recordings near

the northwestern Hawaiian Islands indicate that humpback whales were present in the Hawaii Study Area from early December through early June (Lammers et al. 2011). It is not yet known if this represents a previously undocumented breeding stock or if the whales occurring at the northwestern Hawaiian Islands are part of the same population that winters near the Main Hawaiian Islands (Bettridge et al., 2015). Acoustic recordings over multiple years (including 2016) using the Pacific Missile Range Facility hydrophones have demonstrated a seasonal presence of humpback whales off Kauai from November to May (Martin et al., 2016; Martin et al., 2017). The majority of humpback whales in Hawaii during the breeding season have been detected within the 200 m isobath (Mobley, 2005; Mobley et al., 2015; Mobley & Pacini, 2013; Mobley et al., 2001). This presence may include very nearshore and inland water areas (Richie et al., 2016).

There have been six locations identified in the main Hawaiian Islands as a single reproductive area for humpback whales (Baird et al. 2015). The greatest densities of humpback whales (including calves) have been in the four-island region consisting of Maui, Molokai, Kahoolawe, and Lanai, as well as Penguin Bank (Mobley et al., 2001) and around Kauai (Mobley, 2005). A March 2007 pilot survey across the Northwest Hawaiian Islands documented the existence of extensive wintering habitat used by humpback whales in the Northwest Hawaiian Islands (Johnston et al., 2007).

Two humpback whale reproductive BIAs (a parent and a child BIA) have been delineated in the main Hawaiian Islands during the overwintering breeding season (Kratofil et al., 2023)(Figure K-9). The BIAs were updated from the original BIAs (Baird et al., 2015b) based on satellite tag data collected from 1995 to 2019. The parent BIA encompasses 23,042 km^2 and the child BIA encompasses 6,679 km^2, including what are likely the most important reproductive areas for humpback whales in the Main Hawaiian Islands (Kratofil et al., 2023). The BIAs are in effect from December through May.

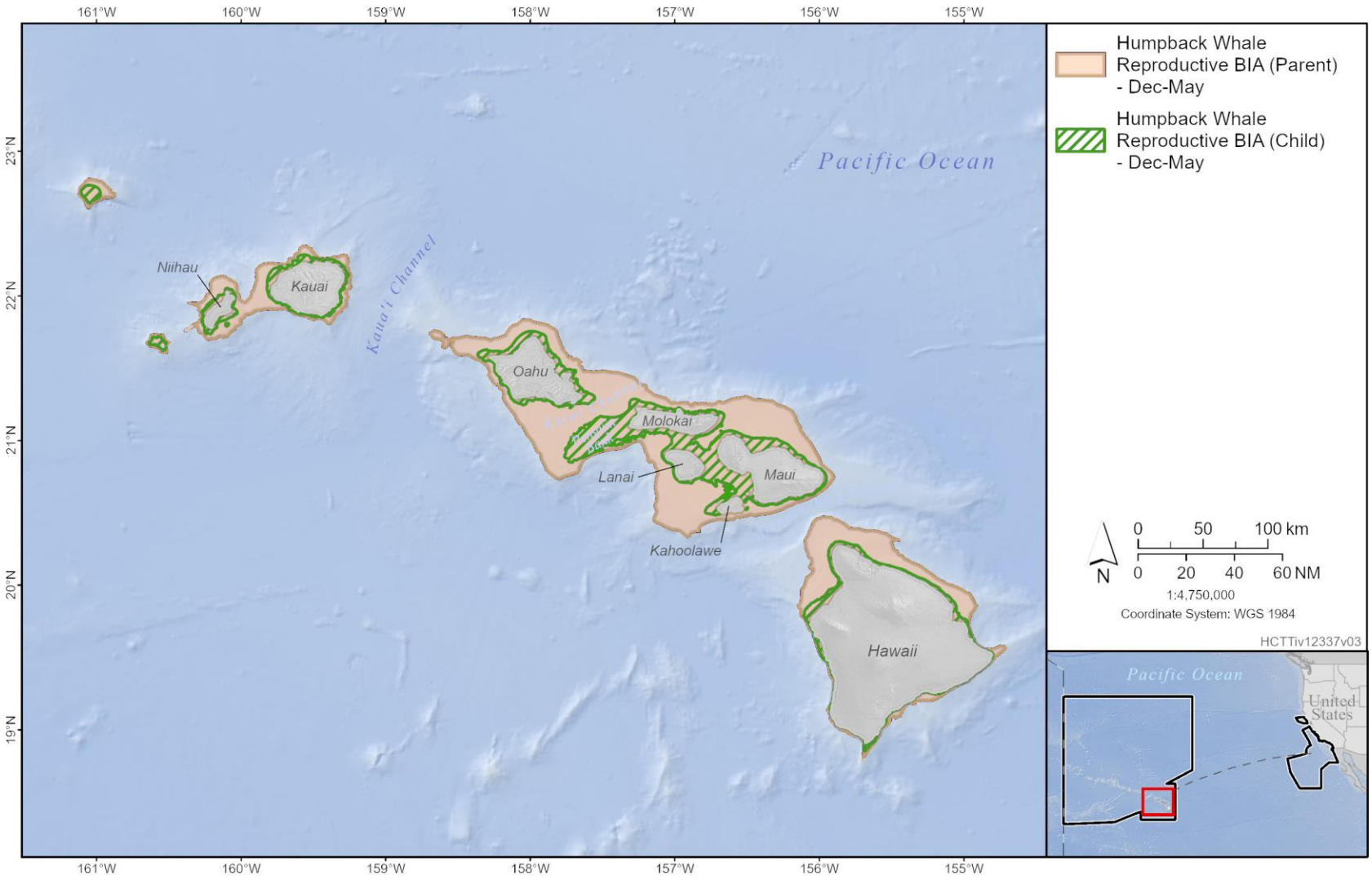

Figure K-7: Main Hawaiian Islands Humpback Whale Reproductive BIAs Off the Hawaiian Islands

K.3.1.2 Stressor Analysis

K.3.1.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other transducers create underwater acoustic energy potentially impacting humpback whales and their reproductive behavior. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 97 percent of effects are predicted to occur in the Hawaii Range Complex during the cold season. 93 percent of the behavioral, 95 percent of the temporary threshold shift, and 63 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Only one take (behavioral) is predicted from the training and testing activities involving air guns.

On average, individuals in the Hawaii stock would be impacted less than once per year. These effects are most likely to occur in the cold season when humpbacks would be seasonally present in the area and engaged in breeding behavior. The average risk of injury is low, although it is likely that some auditory injuries could occur, particularly from sonar activities during Navy training events. The risk of injury may be reduced through activity-based mitigation.

The limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals, although individuals who suffer an auditory injury may experience minor energetic costs. Most predicted effects are temporary auditory effects that are unlikely to contribute to any long-term effects to individuals. Long-term consequences to the stock are unlikely.

K.3.1.3 Action Proponent Requirements for Area-Specific Training and Testing

The main Hawaiian Islands humpback whale reproductive BIAs encompass waters around the islands of Hawaii, Oahu, Kauai, Maui, Molokai, Lanai, Kahoolawe, and Niihau within the Hawaii Study Area. These waters encompass many of the primary training sites within the Hawaii Range Complex. Spatially, Humpback whales may be present anywhere within the waters surrounding the Hawaiian Islands. Temporally, Humpback whales may be present most of the year, however breeding season (December through April) is when they are most likely to be present.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like Oahu, HI.

The training and testing areas encompassed by the humpback whale BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Hawaii and are not available elsewhere. They include the following: Pacific Range Missile Facility, shallow water training range and barking sands tactical underwater range west of Kauai, Ewa training minefield and Puuloa underwater

range south of Oahu, the Kahoolawe sub training minefield, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

K.3.1.4 Humpback Whale Reproduction Area Mitigation Considerations

As discussed in Section K.3.1.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that the overwhelming majority of effects to humpback whales that would occur in the Hawaii Range Complex are from training and testing activities involving sonar during the cold season as humpback whales breed in the waters surrounding the Hawaiian Islands. Most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals.

Existing geographic mitigation areas resulting from the 2018 HSTT EIS/OEIS are currently in place in the waters surrounding the Hawaiian Islands and include the existing Hawaii 4-Islands Region Mitigation Area, Hawaii Island Marine Mammal Mitigation Area, and the Hawaii Humpback Whale Special Reporting Area (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area). These mitigation areas, as shown in Figure K-26, encompass some of the revised main Hawaiian Islands humpback whale child BIA and will continue to be implemented because they provide a benefit to the Hawaii stock of humpback whales during their breeding season. In addition, the Hawaii Humpback Whale Special Reporting Area will be expanded based on the revised humpback whale child BIA.

K.3.2 Hawaii Island Dwarf Sperm Whale Small and Resident Population Area

K.3.2.1 Biological Considerations Applicable to the Hawaii Island Dwarf Sperm Whale Small and Resident Population Area

NMFS recognizes two stocks of dwarf sperm whales within the Pacific U.S. Exclusive Economic Zone: the Hawaiian stock and the California, Oregon, and Washington stock (Carretta et al., 2023). Only the Hawaiian stock is present in the Hawaii Study Area.

There were a total of six pygmy sperm whale sightings during systematic ship surveys within the Hawaiian Islands EEZ in 2002, 2010, and 2017, and none of the sightings were in waters within 140 km of the Main Hawaiian Islands (Bradford et al., 2021). During small boat surveys between 2002 and 2012 in the main Hawaiian Islands, this species was the fifth most frequently encountered species of odontocete in waters shallower than 1,000 m with a strong peak in the sighting rate where depths are between 500 and 1,000 m (Baird et al., 2013b; Oleson et al., 2013a). Dwarf sperm whales have been seen near Niihau, Kauai, Oahu, Lanai, and Hawaii. Photo-identification of individuals off Hawaii Island since 2003 has provided evidence of long-term site fidelity, with a third of identified individuals being seen in more than one year, and therefore suggesting the existence of an island-resident population (Baird et al., 2015c; Oleson et al., 2013a).

BIAs were redefined for a year-round Small and Resident Population area for dwarf sperm whales off the west coast of the Island of Hawaii (Kratofil et al., 2023) which incorporated additional sighting data not available when the original BIA was defined (Baird et al., 2015c). The parent BIA is 1,341 km^2 in size and encompasses all sighting locations in waters less than 2,000 m (Figure K-10). The child BIA represents an area of intensified use relative to the entire range of this island-associated population and encompasses 457 km^2.

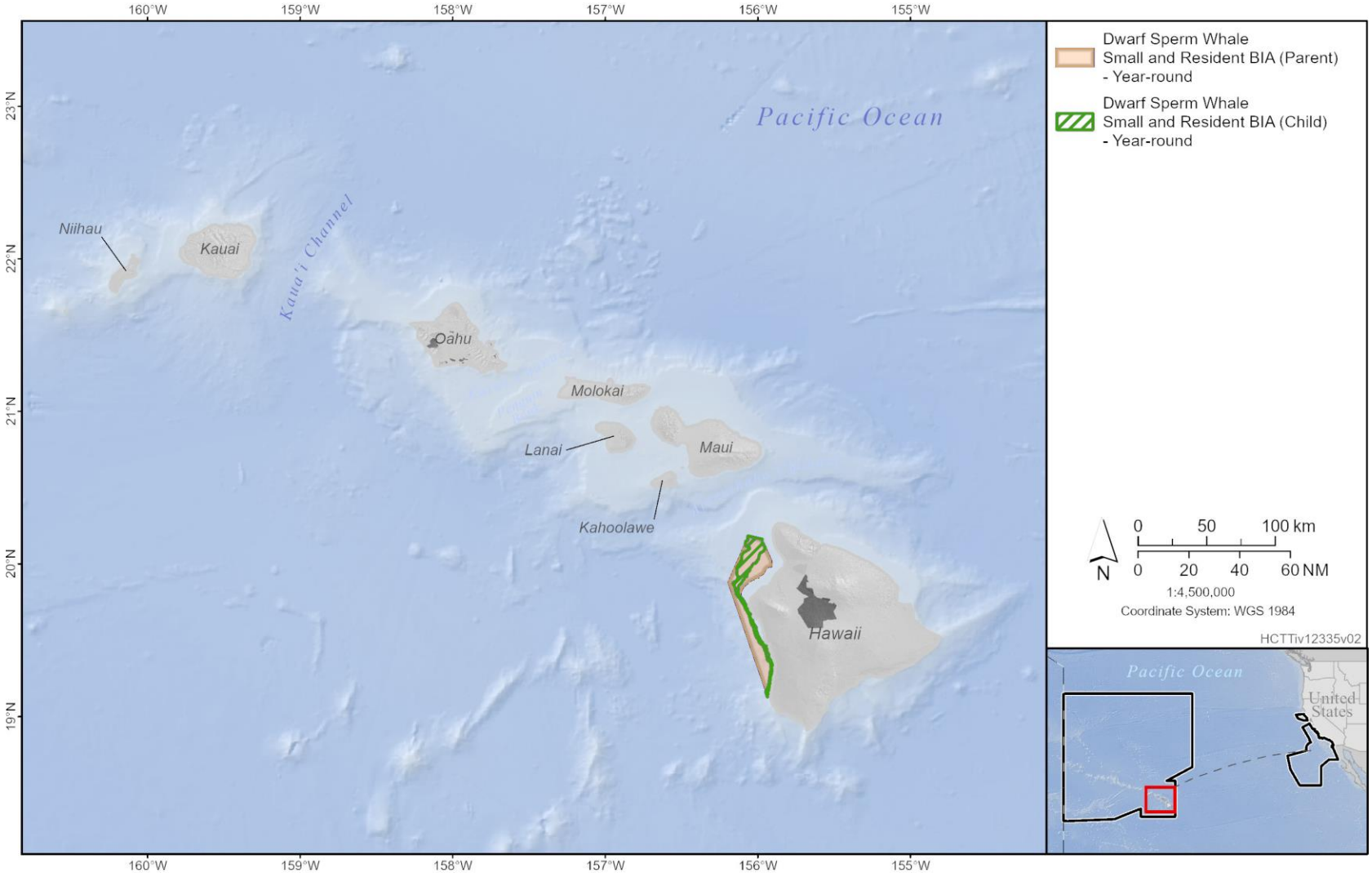

Figure K-8: Dwarf Sperm Whale Small and Resident BIAs Off Hawaii

K.3.2.2 Stressor Analysis

K.3.2.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting dwarf sperm whales. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 50 percent of effects are predicted to occur in Hawaii Range Complex during the cold season, and 43 percent would occur in the warm season. The remaining 7 percent would occur on the high seas, split approximately evenly between the cold and warm seasons. 96 percent of the behavioral, 98 percent of the temporary threshold shift, and 77 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Behavioral, temporary threshold, and acoustic injury takes are predicted to occur from the training and testing activities involving air guns, however, they would also be extremely infrequent.

On average, individuals in the Hawaii stocks could be impacted about once per year. The average risk of injury is low, although a few auditory and non-auditory injuries are predicted. The risk of any air gun auditory injury is negligible (less than one) in any year for the Hawaii stock of dwarf sperm whales, but an auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Likewise, the risk of a non-auditory injury from explosives is also incredibly low (less than one) in any year for the stock, but an auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach. These auditory and non-auditory injuries are shown in the maximum year of effects per the summation and rounding approach discussed above. Therefore, the risk of non-auditory injury from any source is unlikely. The risk of injury may be reduced through activity-based mitigation, although dwarf sperm whales have low sightability.

The limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals, although individuals who suffer an auditory or non-auditory injury may experience minor energetic costs. Most predicted effects are temporary auditory effects that are unlikely to contribute to any long-term effects to individuals. Long-term consequences to these stocks are unlikely.

K.3.2.3 Action Proponent Requirements for Area-Specific Training and Testing

Hawaii Island is unique in that it is provides the only capable air-to-ground range able to conduct carrier and expeditionary strike group activities near a channel with unfettered access to the open ocean. Open ocean areas support strike group maneuvering, using mid-frequency active sonar to prosecute (detect/track) a submarine in the vicinity of a high value unit (e.g., carrier) as aircraft execute strikes into Pohakuloa Training Area. The area around Hawaii Island is also used by surface ships with anti-submarine warfare capability to train for clearing the sea space of any submarine threat before Marines

go ashore at Kawaihae Harbor (part of Rim of the Pacific and Marine Corps unit-level training scenarios). There are limited locations for amphibious landings in Hawaii due to existing environmental concerns. The west coast of Hawaii is one of the best locations for integrated joint marine amphibious operations because of its close proximity to the Pohakuloa Training Area which is the only range in the Hawaii Range Complex that supports ground force and aviation live-fire training.

The Hawaii Island Dwarf Sperm Whale Small and Resident Population Area is adjacent to waters approaching Kawaihae Harbor, the point of amphibious insertion for forces proceeding to the live-fire range at Pohakuloa Training Area.

Activities utilizing explosives, such as underwater detonations, bombing or torpedo exercises, are not conducted in the waters within the Dwarf Sperm Whale Small and Resident Population Area since it is not within a designated underwater training range or within Special Use Airspace, typically necessary for explosive usage.

K.3.2.4 Dwarf Sperm Whale Small and Resident Population Area Mitigation Assessment

The Action Proponents have been training and testing in the area with the same basic systems for over 40 years and there is no evidence of any adverse effects having occurred, and there are multiple lines of evidence demonstrating the population's high site fidelity to the area. The revised small and resident population area only takes up a very small portion of the Hawaii Range Complex, and sonar use in this area would be infrequent and typically only last for a short duration. Few, if any, Navy vessels are likely to be within the designated area using active mid-frequency sonar or other transducers. However, during the occasional use of mid-frequency active acoustic sonar during Undersea Warfare training, Independent Deployer Certification training, and Rim of the Pacific training, a small number of significant behavioral responses from dwarf sperm whales could occur within the small and resident population area. The majority of predicted effects on individuals in the dwarf sperm whale resident population are expected to be result in behavioral and temporary threshold shift takes as a result of military readiness activities that use sonar and other transducers.

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for dwarf sperm whales and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area (Figure K-26) (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area), which overlaps the entire revised small and resident child BIA. While this mitigation area is designed to provide additional protection for humpback whales, false killer whales and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including dwarf sperm whales without compromising military readiness. The Action Proponents will continue to implement this existing mitigation area to the benefit of the Hawaii stock of the dwarf sperm whales. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised Hawaii Island dwarf sperm whale child BIA are not being proposed.

K.3.3 False Killer Whale Small and Resident Population Area: Main Hawaiian Island Insular Stock

K.3.3.1 Biological Considerations Applicable to the Main Hawaiian Islands Insular Stock False Killer Whales Small and Resident Population Area

NMFS currently recognizes three stocks of false killer whale in Hawaiian waters: the Hawaii pelagic stock, the Northwestern Hawaiian Islands stock, and the Main Hawaiian Islands insular stock (Bradford et al., 2015; Carretta et al., 2015; Carretta et al., 2023; Forney et al., 2010; National Oceanic and Atmospheric Administration, 2012; Oleson et al., 2010). The Hawaii Pelagic stock and the Northwestern Hawaiian Islands stock of false killer whales are not listed as threatened or endangered under the ESA. The Main Hawaiian Islands insular stock is listed as endangered under the ESA as a DPS (National Oceanic and Atmospheric Administration, 2012).

The ranges and stock boundary descriptions for false killer whales in the Hawaiian Islands are complex and overlapping. For example, all three stocks are known to overlap in the vicinity of Kauai and Niihau, which is where the Navy's underwater instrumented range has been in use since the 1980s. All significant information regarding the range of the three stocks was presented in Bradford et al. (2015), and later updated for the pelagic stock (Bradford et al., 2020). A summary of the data used to delineate the stock boundaries, and the research supporting those data are provided in the Final 2022 Pacific Stock Assessment Report (Carretta et al., 2023) that is synthesized in the next few paragraphs for the stocks in the Hawaiian Islands.

The Main Hawaiian Islands insular stock is considered resident to the main Hawaiian Islands consisting of Kauai, Oahu, Molokai, Lanai, Kahoolawe, Maui, and Hawaii, although they have been satellite tracked as far as 115 km from the main Hawaiian Islands (Bradford et al., 2020; Bradford et al., 2012; Bradford et al., 2015; Carretta et al., 2015; Forney et al., 2010; National Oceanic and Atmospheric Administration, 2012; Oleson et al., 2010). The Main Hawaiian Islands insular stock boundary is a 72-km radius extending around the main Hawaiian Islands, with the offshore extent of the radii connected on the leeward sides of Hawaii Island and Niihau to encompass the offshore movements of Main Hawaiian Islands insular stock animals within that region.

False killer whales in the Northwestern Hawaiian Islands stock have been seen as far as 93 km from the Northwestern Hawaiian Islands and near shore around Kauai and Oahu (Baird et al., 2012; Bradford et al., 2015). The Northwestern Hawaiian Islands stock boundary is defined by a 93-km radius around Kauai, Niihau, and the Northwestern Hawaiian Islands, with the boundary around the Northwestern Hawaiian Islands expanded latitudinally at the eastern end to encompass animal movements observed outside the 93-km radius

Given new telemetry data that indicated that pelagic stock animals occurred within 5.6 km of the main Hawaiian Islands and throughout the Northwestern Hawaiian Islands, the previous inner pelagic stock boundary at 11 km from shore around each of the main Hawaiian Islands was removed (Bradford et al., 2020). The pelagic stock now has no inner or outer boundary within the Hawaiian Islands EEZ. There is now an overlap zone between the entirety of the Main Hawaiian Islands insular stock area and the pelagic stock area. There is also now an overlap zone between the entirety of the Northwestern Hawaiian Islands stock area and the pelagic stock area. All three stock boundaries overlap out to the Main Hawaiian Islands insular stock boundary between Kauai and Niihau and the Northwestern Hawaiian Islands stock boundary between Kauai and Oahu (Carretta et al., 2023).

Two year-round Small and Resident Population BIAs (a parent and a child BIA) have been delineated in the main Hawaiian Islands for the insular stock of false killer whales (Kratofil et al., 2023) (Figure K-11). The BIAs were updated from the original BIAs published by (Baird et al., 2015b) based on additional analysis of photo-identification, satellite tracking, and genetic studies. The parent BIA encompasses 94,217 km^2 and the child BIA encompasses 7,775 km^2, the latter representing the core high-use areas in the Main Hawaiian Islands (Kratofil et al., 2023). In addition, a year-round non-hierarchical Small and Resident Population BIA was delineated for the Northwestern Hawaiian Islands and encompasses 138,001 km^2 (Kratofil et al., 2023) (Figure K-11).

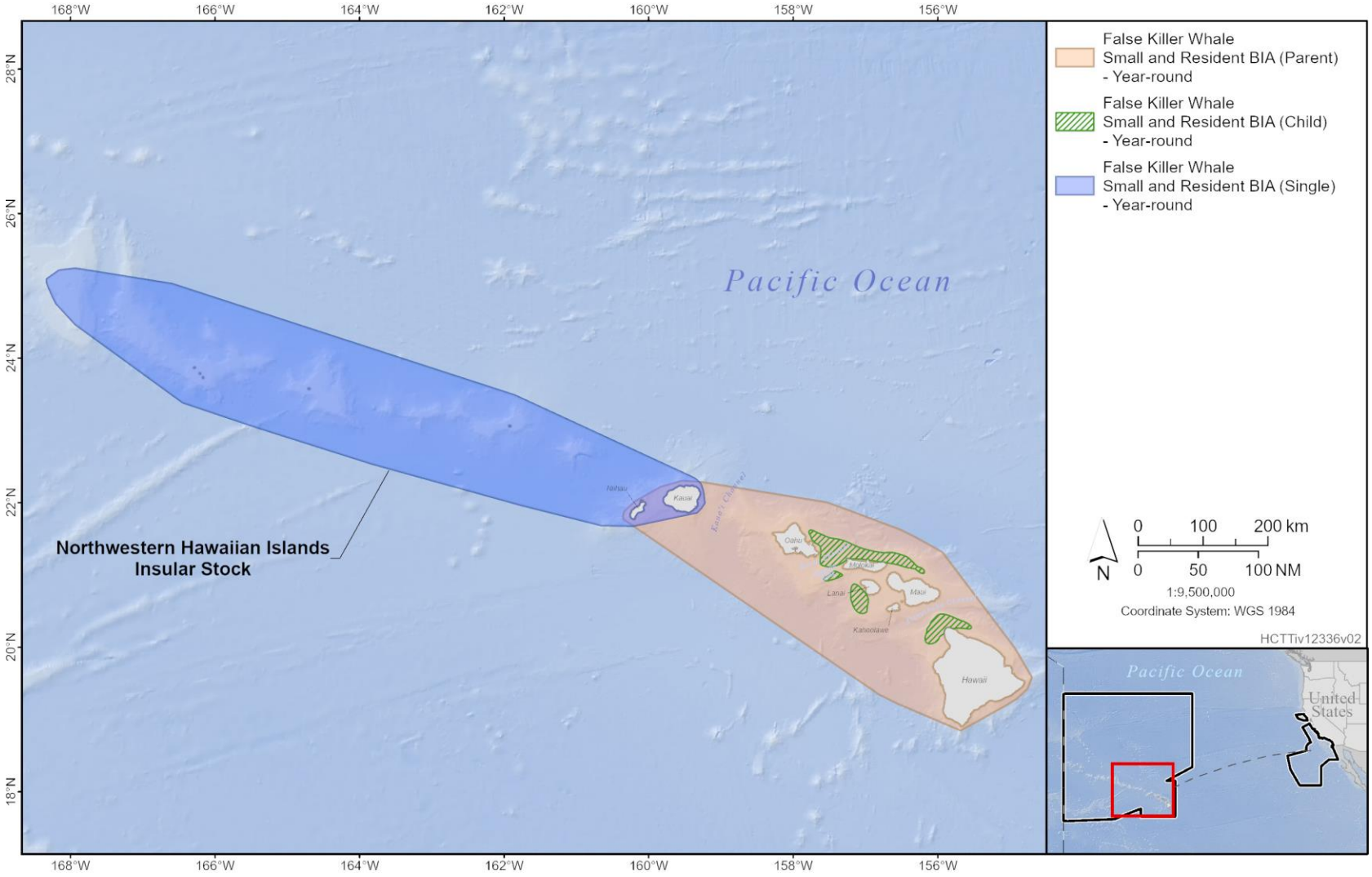

Figure K-9: False Killer Whale Small and Resident BIAs off the Hawaiian Islands

K.3.3.2 Stressor Analysis

K.3.3.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting false killer whales. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, the effects that are predicted to occur in Hawaii Range Complex to the three stocks of false killer whales present in the waters surrounding the Hawaiian Islands are distributed relatively evenly between the cold and warm seasons. The northwestern Hawaiian Islands stock has the biggest difference in effects between seasons, with 68 percent occurring during the cold season and 32 percent occurring during the warm season. For all the main Hawaiian Island insular stock and the Hawaii pelagic stock, 99 percent of the behavioral and 98 percent of the temporary threshold shift takes would result from training and testing activities involving sonar. 100 percent of behavioral and temporary threshold shift takes for the northwestern Hawaiian Islands stock would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. No effects are predicted to occur from the training and testing activities involving air guns to any of the three stocks.

On average, individuals in the Hawaii Pelagic stock and the Northwestern Hawaiian Islands stock would be impacted less than once per year. On average, individuals in the Main Hawaiian Islands insular stock would be impacted about once per year. The average individual risk of injurious effects in these three stocks is negligible, if even applicable. No auditory or non-auditory injuries are predicted for the Northwest Hawaiian Islands or the Main Hawaiian Islands Insular stocks, but a single auditory injury could occur to individuals in the Hawaii Pelagic stock. However, the risk of a non-auditory injury in Hawaii from explosive training is low (less than one) in any year, but single mortalities (from sonar testing in Hawaii) are shown in the maximum year of effects per the summation and rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of any auditory injury is unlikely for these stocks of false killer whales in the HCTT Study Area. The risk of auditory injury may also be reduced through activity-based mitigation.

The limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals. Long-term consequences to the Main Hawaiian Islands Insular, Hawaii Pelagic, and the Northwestern Hawaiian Islands stocks of false killer whales are unlikely.

K.3.3.3 Action Proponent Requirements for Area-Specific Training and Testing

The revised false killer whale small and resident BIAs within the Hawaii Study Area encompass every primary training site within the Hawaii Range Complex. Spatially, false killer whales may be present anywhere within the waters off surrounding the Hawaiian Islands. Temporally, false killer whales may be present throughout the year.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Action Proponent readiness depends on access to the training and testing areas in close proximity to force concentration areas like Oahu, HI.

The training and testing areas encompassed by the revised false killer whale BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Hawaii and are not available elsewhere. They include the following: Pacific Range Missile Facility, shallow water training range and barking sands tactical underwater range west of Kauai, Ewa training minefield and Puuloa underwater range south of Oahu, the Kahoolawe sub training minefield, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

The Alenuihaha Channel and the waters west of Kawaihae Harbor are used for a broad spectrum of naval and amphibious training. Excessively limiting or restricting mid-frequency active sonar training in the Alenuihaha Channel could force the relocation of portions of Undersea Warfare training, Independent Deployer Certification training, Rim of the Pacific, and unit level training exercises to other channels in the Hawaiian Operating Areas (OPAREAs) further from the Pohakuloa Training Area range. Undersea Warfare certification training occurs up to three times per year, Rim of the Pacific occurs once every two years, and Independent Deployer Certification training occurs once per year. While the North and West of Hawaii Island False Killer Whale Small and Resident Population Area is not considered an area of high use for mid-frequency active sonar during these major training exercises, segmenting the scenarios within each of these training events over time and space would result in an unacceptable loss of training realism, degrade the training and would erode strike group readiness.

As it relates to anti-submarine warfare, the training value within the 4-Islands Region is much higher compared to other near shore environments within the Hawaii Range Complex, including the ranges at the Pacific Missile Range Facility, due to the challenging bathymetry. Shifting the location for Submarine Command Course would result in a loss of shallow water operating experience for prospective submarine Commanding Officers, which is an absolutely vital skill for these commanders to master. Such a shift in location would result in a loss of shallow water operating experience and would compromise a submarine crew's ability to retain and improve their capabilities and to train with new emerging technologies.

K.3.3.4 False Killer Whale Small and Resident Population Area Mitigation Assessment

While the Action Proponents have been training and testing in the area with the same basic systems for over 40 years, there is no evidence of any adverse effects having occurred, and there are multiple lines of evidence demonstrating the population's high site fidelity to the area. Individuals within the False Killer Whale Small and Resident Population Area could be exposed to sound from sonar or other transducers and some behavioral or temporary effects could occur as a result of sonar or other transducers.

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for false killer whales and other species, and therefore implemented the Hawaii Island Marine Mammal Mitigation Area and the Hawaii 4-Islands Region Mitigation Area (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area). These mitigation areas as shown in Figure K-26 both overlap some of the revised small and resident child BIA. While these mitigation areas are designed to provide additional protection to false killer whales and other species such as humpback whales and some beaked whale species, these

measures will also reduce the number and level of effects to other species or stocks occurring within the area, including dwarf sperm whales, short-finned pilot whales, melon-headed whales, pantropical spotted dolphins, pygmy killer whales, and spinner dolphins occurring without compromising military readiness. The Action Proponents will continue to implement these existing mitigation areas to the benefit of the three stocks of false killer whales present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised false killer whale child BIA are not being proposed.

K.3.4 Hawaii Island Pygmy Killer Whale Small and Resident Population Area

K.3.4.1 Biological Considerations Applicable to the Pygmy Killer Whales Small and Resident Population Area

The pygmy killer whale is generally an open ocean deepwater species (Davis et al., 2000; McSweeney et al., 2009; Oleson et al., 2013a; Würsig et al., 2000). Movement patterns for this species are poorly understood. During a NMFS 2014 systematic ship survey off the U.S. west coast, when there were unusually warm water conditions, a group of 27 pygmy killer whales was sighted in offshore waters of southern California (Barlow, 2016). Given that there is a remote likelihood for this species to occur regularly off the U.S. west coast, the 2022 Pacific Stock Assessment report does not include pygmy killer whales as a managed stock in California waters (Carretta et al., 2023).

This species' range in the open ocean generally extends to the southern regions of the North Pacific Gyre and the southern portions of the North Pacific Transition Zone. Many sightings have occurred from cetacean surveys of the eastern tropical Pacific (Au & Perryman, 1985; Barlow & Gisiner, 2006; Wade & Gerrodette, 1993). This species is also known to be present in the western Pacific (Wang & Yang, 2006). Its range is generally considered to be south of 40° N and continuous across the Pacific (Donahue & Perryman, 2008; Jefferson et al., 2008). There was a total of 11 sightings of pygmy killer whales during three systematic ship surveys of the Hawaiian Islands EEZ in 2002 (3 sightings), 2010 (5 sightings), and 2017 (3 sightings), with average group size ranging from 14.6 to 25.7 animals (Bradford et al., 2021) .

A year-round Small and Resident Population area has been identified for pygmy killer whales off the Island of Hawaii (Baird et al., 2015a). The delineated area extends along the coast of Hawaii Island from northwest of Kawaihae to South Point and along the southeast coast of the island, as determined by locations from two satellite-tagged individuals, photo-identification data, extensive vessel-based survey data, and expert judgment (Baird et al., 2015a). Two year-round, non-hierarchical Small and Resident Population BIAs have been delineated in the main Hawaiian Islands for pygmy killer whales (Kratofil et al., 2023) (Figure K-12). The BIAs were updated from the original BIAs (Baird et al., 2015b) based on additional analyses. One BIA encompasses 7,416 km^2 of waters surrounding Oahu and Maui Nui, and the second BIA encompasses 5,201 km^2 around the Island of Hawaii (Kratofil et al., 2023).

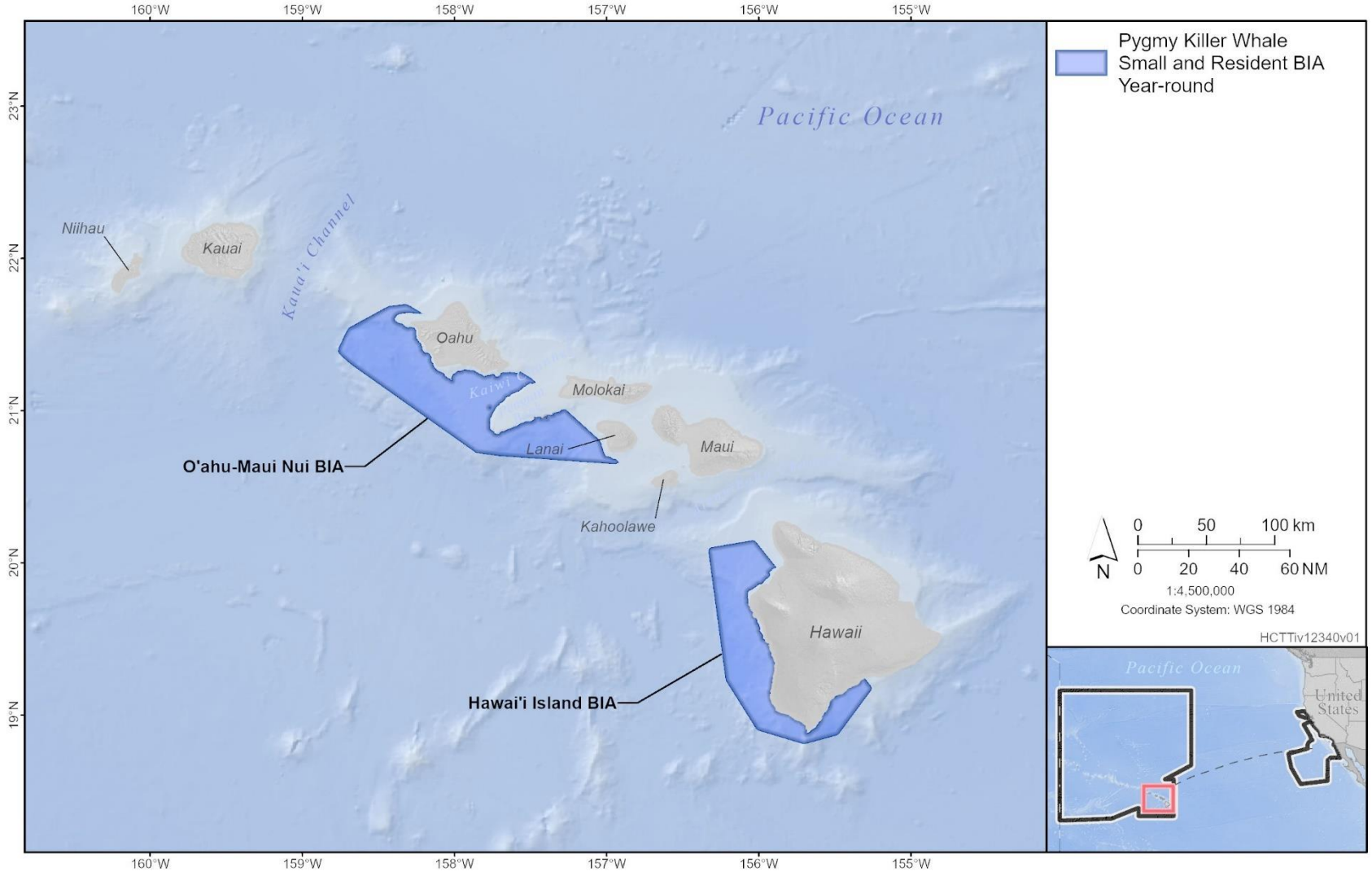

Figure K-10: Pygmy Killer Whale Small and Resident BIA Off the Hawaiian Islands

K.3.4.2 Stressor Analysis

K.3.4.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting pygmy killer whales. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 48 percent of effects are predicted to occur in Hawaii Range Complex during the cold season, and 47 percent would occur in the warm season. The remaining five percent would occur on the high seas, split evenly between the cold and warm seasons. 99 percent of the behavioral, 99 percent of the temporary threshold shift, and 66 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIA, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. No effects are predicted to occur from the training and testing activities involving air guns.

On average, individuals in the Hawaii stock would be impacted less than once per year. The average individual risk of injurious effects is negligible. A small number of auditory injuries could occur to individuals in Hawaii, however, the risk of auditory injuries in Hawaii from explosive training or sonar testing is low (less than one) in any year. For each stressor, a single auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of auditory injury is unlikely. The risk of injury may be reduced through activity-based mitigation.

A few instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals that experience auditory injury may incur energetic costs. Based on the above analysis, long-term consequences for the Hawaii stock of pygmy killer whales are unlikely.

K.3.4.3 Action Proponent Requirements for Area-Specific Training and Testing

The revised Hawaii Island Pygmy Killer Whale Small and Resident Population Area includes the area south and west of Kawaihae Harbor, as well as the waters west of Lanai in the 4-islands area, and the waters south and west of Oahu. Spatially, pygmy killer whales may be present anywhere within these waters, and temporally, pygmy killer whales may be present throughout the year.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like Oahu, HI.

The waters west of Hawaii and Kawaihae Harbor provide access for a broad spectrum of naval and amphibious training. Kawaihae Harbor is the point of amphibious insertion for forces proceeding to the live-fire range at Pohakuloa Training Area, and this training area is the only live-fire range in the Hawaii Range Complex that supports ground force and aviation live-fire training. Training in this area allows for

the integration of carrier strike group operations and amphibious landings. Sea, air, and land-based units work in conjunction with one another in controlled airspace in close proximity to the Pohakuloa Training Area range, the only range of its kind in Hawaii. This is also an area outside of civilian air traffic corridors approaching the Honolulu International Airport which is necessary to safely de-conflict with civilian air traffic.

Carrier strike group training can include a full spectrum of the force – various ships, submarines, aircraft, and Marine Corps forces – –to ensure such forces obtain the required proficiency to conduct anti-submarine warfare in a controlled and observed environment prior to deployment to international straits across the globe, where operational Commanders require Naval forces to be able to conduct a range of military operations, including anti-submarine warfare. This required proficiency cannot be replicated by simulation and is most effectively obtained when conducted in a strait. Commanding Officers cannot be expected to effectively conduct such operations in a deployed environment if the first time they encounter a submarine in a strait is in a deployed setting. Access to the waters west of Kawaihae Harbor is vital for amphibious training. The west coast of Hawaii is one of the best locations for integrated joint marine amphibious operations because of its close proximity to the Pohakuloa Training Area. Also, due to its proximity to the Alenuihaha Channel, waters west of Hawaii and Kawaihae Harbor have strategic importance during portions of Undersea Warfare training, Independent Deployer Certification training, Rim of the Pacific, and unit level training and other exercises The area provides a unique and irreplaceable capability within the Hawaii Range Complex that allows naval forces to conduct realistic, integrated training in an environment that replicates the actual areas where they will be called to serve.

The training value within the 4-Islands Region is much higher compared to other near shore environments within the Hawaii Range Complex, including the ranges at the Pacific Missile Range Facility, due to the challenging bathymetry. Shifting the location for Submarine Command Course would result in a loss of shallow water operating experience for prospective submarine Commanding Officers, which is an absolutely vital skill for these commanders to master. Such a shift in location would result in a loss of shallow water operating experience and would compromise a submarine crew's ability to retain and improve their capabilities and to train with new emerging technologies.

K.3.4.4 Hawaii Island Pygmy Killer Whales Small and Resident Population Area Mitigation Assessment

As discussed in Section K.3.4.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that the overwhelming majority of effects to pygmy killer whales that would occur in the Hawaii Range Complex are from training and testing activities involving sonar during both the cold and warm seasons. Most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals.

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for pygmy killer whales and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area and the Hawaii 4-Islands Marine Mammal Mitigation Area (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area). The Hawaii Island Marine Mammal Mitigation Area, as shown in Figure K-26, overlaps all of the Hawaii Island BIA, and the Hawaii 4-Islands Marine Mammal Mitigation Area overlaps some of the Mau Nui BIA. While these mitigation areas are designed to provide additional protection for humpback whales, false killer whales and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including pygmy killer whales, without compromising military readiness. The Action Proponents will continue to

implement these existing mitigation areas to the benefit of the pygmy killer whales present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised Hawaii Island pygmy killer whale BIAs are not being proposed.

K.3.5 Hawaii Island Short-Finned Pilot Whale Small and Resident Population Area

K.3.5.1 Biological Considerations Applicable to the Hawaii Island Short-finned Pilot Whales Small and Resident Population Area

Short-finned pilot whales in the Hawaiian Islands were the most commonly encountered species of odontocete during near-shore surveys in depths over 2,000 meters and were one of the most common species encountered during the NMFS 2002 (25 sightings), 2010 (36 sightings), and 2017 (35 sightings) systematic ship surveys of the Hawaiian Exclusive Economic Zone (Baird et al., 2013b; Barlow, 2006; Bradford et al., 2013; Bradford et al., 2021; Oleson et al., 2013a). Small boat surveys from 2003 through 2007 photo-identified 250 individuals seen in more than one year, suggesting site fidelity (Abecassis et al., 2015; Mahaffy et al., 2015; Oleson et al., 2013a). Habitat-based models developed from systematic ship survey data collected in the central North Pacific show some of the highest short-finned pilot whale densities around the Hawaiian Islands (Becker et al., 2012b; Forney et al., 2015). Sighting data from systematic ship surveys conducted within waters of the Hawaiian Islands EEZ from 2000 to 2020 supported the development of an updated habitat-based density model for short-finned pilot whale and confirmed the strong island association indicated from the previous models (Becker et al., 2022a).

A year-round Small and Resident Population parent BIA and three child BIAs have been delineated for short-finned pilot whales in waters of the Main Hawaiian Islands (Kratofil et al., 2023) (Figure K-13). The BIAs were updated from the original BIA (Baird et al., 2015b) based on additional analyses. The parent BIA encompasses 58,999 km^2 of waters surrounding all of the Main Hawaiian Islands. The child BIAs encompass three communities representing core habitat in the Main Hawaiian Islands: a western community (4,040 km^2), a central community (2,427 km^2), and an eastern community (2,658 km^2) that encompass waters mainly on the leeward sides of Kauai, Oahu. Lanai, and the Island of Hawaii (Kratofil et al., 2023) (Figure K-13).

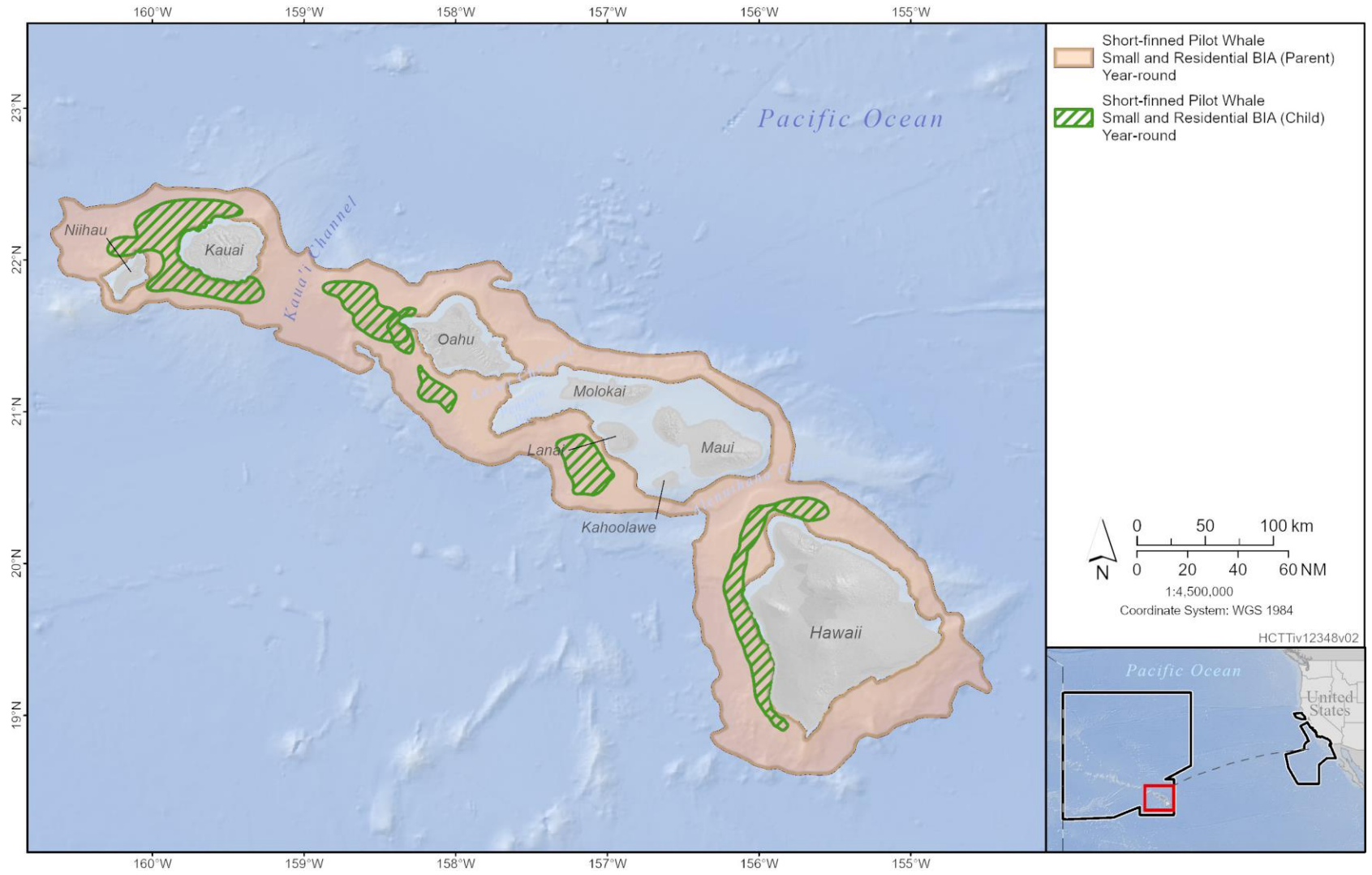

Figure K-11: Short-Finned Pilot Whale Small and Resident BIAs Off the Hawaiian Islands

K.3.5.2 Stressor Analysis

K.3.5.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting short-finned pilot whales. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 51 percent of effects are predicted to occur in Hawaii Range Complex during the cold season, and 46 percent would occur in the warm season. The remaining three percent would occur on the high seas, split approximately evenly between the cold and warm seasons. 99 percent of the behavioral, 99 percent of the temporary threshold shift, and 50 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Only one take (behavioral) resulting from testing activities involving air guns is predicted to occur.

On average, individuals in the Hawaii stock could be impacted less than once per year. The average individual risk of injurious effects is very low, although a small number of auditory and non-auditory injuries could occur to individuals. The risk of a non-auditory injury in Hawaii from explosive training is low (less than one) in any year, but a single mortality from explosive training is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of any non-auditory injury is unlikely for the Hawaii stock of short-finned pilot whales. The risk of injury or mortality may be reduced through activity-based mitigation.

A few instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who experience auditory or non-auditory injury would incur energetic costs. Based on the above analysis, long-term consequences for the Hawaii stock of short-finned pilot whales are unlikely.

K.3.5.3 Action Proponent Requirements for Area-Specific Training and Testing

The main Hawaii Island short-finned pilot whale small and resident BIAs encompass waters around the islands of Hawaii, Oahu, Kauai, Maui, Molokai, Lanai, Kahoolawe, and Niihau within the Hawaii Study Area. These waters encompass many of the primary training sites within the Hawaii Range Complex. Spatially, Hawaii Island short-finned pilot whales may be present anywhere within the waters off surrounding the Hawaiian Islands. Temporally, the stock is present throughout the year.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like Oahu, HI.

The training and testing areas encompassed by the Hawaii Island short-finned pilot whale small and resident BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Hawaii and are not available elsewhere. They include the following: Pacific Range Missile Facility, shallow water training range and barking sands tactical underwater range west of Kauai, Ewa training minefield and Puuloa underwater range south of Oahu, the Kahoolawe sub training minefield, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

K.3.5.4 Hawaii Island Short-finned Pilot Whales Small and Resident Population Area Mitigation Assessment

The has Action Proponents have been training and testing in the Hawaiian Islands with the same basic systems for over 40 years and there is no evidence of any adverse effects having occurred, and there are multiple lines of evidence demonstrating the population's high site fidelity to the area. As discussed in Section K.3.5.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that the overwhelming majority of effects to short-finned pilot whales that would occur in the Hawaii Range Complex are from training and testing activities involving sonar during both the cold and warm seasons. Most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals.

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for short-finned pilot whales and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area and the Hawaii 4-Islands Marine Mammal Mitigation Area (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area). These mitigation areas, as shown in Figure K-26, overlap some of revised Hawaii Island short-finned pilot whales small and resident child BIAs. While these mitigation areas are designed to provide additional protection for humpback whales, false killer whales and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including short-finned pilot whales without compromising military readiness. The Action Proponents will continue to implement these existing mitigation areas to the benefit of short-finned pilot whales present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised Hawaii Island short-finned pilot whale child BIAs are not being proposed.

K.3.6 Hawaii Island Melon-Headed Whales Small and Resident Population Area

K.3.6.1 Biological Considerations Applicable to the Hawaii Island Melon-Headed Whales Small and Resident Population Area

NMFS recognizes two stocks of melon-headed whales within the Hawaiian Islands Exclusive Economic Zone: the Kohala Resident stock, which includes melon-headed whales off the Kohala and west coast of Hawaii Island in waters less than 2,500 m deep; and the Hawaiian Islands stock, which includes melon-headed whales inhabiting waters throughout the U.S. Exclusive Economic Zone of the Hawaiian Islands (Aschettino et al., 2012; Baird et al., 2015d; Carretta et al., 2017; Carretta et al., 2023; Oleson et al., 2013a).

The melon-headed whale is regularly found within Hawaiian waters (Baird et al., 2010; Baird et al., 2015e; Baird et al., 2003a; Baird et al., 2003b; Mobley et al., 2000; Shallenberger, 1981). Large groups are seen regularly, especially off the Waianae coast of Oahu, the north Kohala coast of Hawaii, and the leeward coast of Lanai (Baird, 2006; Oleson et al., 2013a; Shallenberger, 1981). There was a total of nine

sightings of melon-headed whales during three systematic ship surveys of the Hawaiian Islands EEZ in 2002 (one sighting), 2010 (one sighting), and 2017 (seven sightings) (Bradford et al., 2021). The single sightings in 2002 and 2010 included groups of 89 (Baird, 2006) and 153 melon-headed whales (Bradford et al., 2013), respectively, and the mean group size in 2017 was 187.9 animals (Bradford et al., 2021).

A year-round, non-hierarchical Small and Resident Population BIA has been delineated for melon-headed whales off the Island of Hawaii (Kratofil et al., 2023) (Figure K-14). The BIA was updated from the original BIA (Baird et al., 2015b) based on additional analyses and encompasses 3,816 km^2 off the northwest coast of the Island of Hawaii (Kratofil et al., 2023).

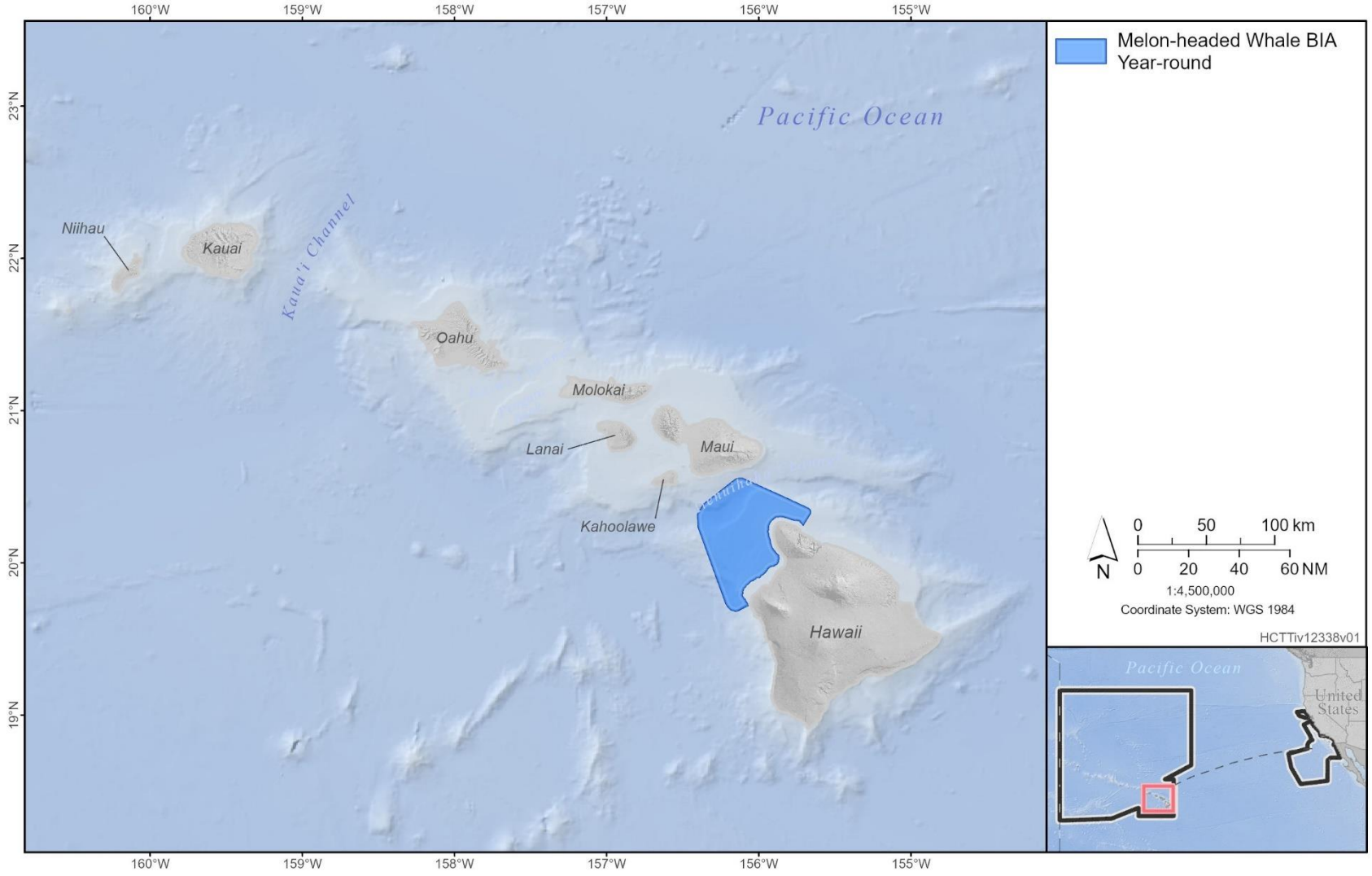

Figure K-12: Melon-Headed Whale Small and Resident BIA Off Hawaii

K.3.6.2 Stressor Analysis

K.3.6.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting melon-headed whales. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 51 percent of effects are predicted to occur in Hawaii Range Complex during the cold season, and 45 percent would occur in the warm season for the Hawaiian Islands stock. The remaining four percent would occur on the high seas, split evenly between the cold and warm seasons. 99 percent of the behavioral, 99 percent of the temporary threshold shift, and 77 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIA, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

For the Kohala Resident stock, 77 percent of effects are predicted to occur in Hawaii Range Complex during the warm season, and 23 percent would occur in the cold season. 98 percent of the behavioral and 93 percent of the temporary threshold shift takes would result from training and testing activities involving sonar.

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Only one take (behavioral) resulting from testing activities involving air guns is predicted to occur to the Hawaiian Islands stock and no effects from air guns are predicted for the Kohala Resident stock.

On average, individuals in the Hawaiian Islands stock and the Kohala Resident stock would be impacted less than once per year. The average individual risk of injurious effects in both populations is negligible. No auditory or non-auditory injuries are predicted for the Kohala Resident stock, but a small number of auditory injuries could occur to individuals in the Hawaiian Islands stock. However, the risk of an auditory injury in Hawaii from explosive testing is low (less than one) in any year, but a single auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of receiving an auditory injury from explosive testing activities is unlikely for melon-headed whales in the Hawaiian Islands stock. The risk of injury may be reduced through activity-based mitigation especially since melon-headed whales tend to travel in large groups.

A few instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who experience auditory injury may incur energetic costs. Based on the above analysis, long-term consequences for the Hawaiian Islands and Kohala resident stocks of melon-headed whales are unlikely.

K.3.6.3 Action Proponent Requirements for Area-Specific Training and Testing

The Alenuihaha Channel, as well as the waters north and west of Hawaii Island, provides a unique training capability that does not exist elsewhere in the Hawaii Range Complex. The Alenuihaha Channel is an ideal location for strait transits using mid-frequency active sonar during training. The Alenuihaha

Channel is an actual channel that provides a vital and realistic analog for similar straits or restricted maneuvering areas where the Action Proponents operate worldwide, such as the East or South China seas. For example, transit training in the Alenuihaha Channel replicates these types of strait environments that meet the Navy's requirement to deploy Naval forces to ensure the free flow of commerce and the freedom of navigation by combatting piracy or mine threats. Naval forces are required to train to counter a submarine threat before deployment, to ensure such forces obtain the required proficiency to conduct anti-submarine warfare in a controlled and observed environment prior to deployment to international straits across the globe, where operational Commanders require Naval forces to be able to conduct a range of military operations, including anti-submarine warfare. This required proficiency cannot be replicated by simulation and is most effectively obtained when conducted in a strait. Commanding Officers cannot be expected to effectively conduct such operations in a deployed environment if the first time they encounter a submarine in a strait is in a deployed setting. There are few geographic areas that enable forces to do this type of training outside of the HCTT Study Area.

While there are other channels within the Hawaii Range Complex used for strait transit training and anti-submarine warfare training, none provide the important attributes of the Alenuihaha Channel. The Alenuihaha Channel's proximity to the Pohakuloa Training Area allows for realistic training and reduces time and fuel costs between these training areas. The channel between Niihau and Kauai is also acceptable from a training perspective, but this would add at least two days of transit during each Under Sea Warfare training exercise (time required to move through a different channel and reposition to operating areas near Pohakuloa Training Area). The Kaiwi Channel between Oahu and Molokai is also acceptable from some mid-frequency active sonar training perspective, but it is also a significant civilian air corridor, and raises safety concerns for anti-submarine warfare aircraft flying in that channel. In addition, the channel between Nihau and Kauai is proximate to the Pacific Missile Range Facility instrumented range) which would result in problems de-conflicting multiple activities and hazardous operations, raising safety concerns. For these reasons, Alenuihaha Channel is still the most suitable for anti-submarine warfare training during certain training scenarios. The Hawaii Island Melon-headed Whale Small and Resident Population Area is adjacent to waters approaching Kawaihae Harbor, the point of amphibious insertion for forces proceeding to the range at Pohakuloa Training Area, which is the only range in the Hawaii Range Complex that supports ground force and aviation live-fire training. Training in this area allows for the integration of carrier strike group operations and amphibious landings, working in conjunction within a controlled airspace west of Hawaii Island for military training near the Pohakuloa Training Area range. Carrier strike group training can include a full spectrum of the force–various ships, submarines, aircraft, and Marine Corps forces—to train in the complex command, control operational coordination, and logistics functions designed to prepare forces for deployment. As an air to ground range, Pohakuloa Training Area supports carrier strike group activities near a channel and near large open water areas for strike group maneuvering and submarine activities. Mid-frequency active sonar conducted to support strike maneuver and protect high value units (e.g., carrier) as aircraft go to strike at Pohakuloa Training Area is vital.

Access to both the Alenuihaha Channel and the waters west of Kawaihae Harbor is vital for a broad spectrum of naval and amphibious training. These areas provide a unique and irreplaceable capability within the Hawaii Range Complex that allows naval forces to conduct realistic, integrated training in an environment that replicates the actual areas where they will be called to serve.

K.3.6.4 Hawaii Island Melon-Headed Whale Small and Resident Population Area Mitigation Assessment

The Action Proponents have been training and testing in the Hawaiian Islands with the same basic systems for over 40 years and there is no evidence of any adverse effects having occurred, and there are multiple lines of evidence demonstrating the population's high site fidelity to the area. As discussed in Section K.3.6.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that the overwhelming majority of effects to melon-headed whales that would occur in the Hawaii Range Complex are from training and testing activities involving sonar during both the cold and warm seasons. Most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals.

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for melon-headed whales and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area) which overlaps all of the revised small and resident population area (Figure K-26). While this mitigation area is designed to provide additional protection for false killer whales and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including melon-headed whales without compromising military readiness. The Action Proponents will continue to implement this existing mitigation areas to the benefit of melon-headed whales present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised Hawaii Island melon-headed whale BIAs are not being proposed.

K.3.7 Common Bottlenose Dolphins Small and Resident Population Areas: Hawaiian Islands Stock Complex

K.3.7.1 Biological Considerations Applicable to all Common Bottlenose Dolphins Small and Resident Population Areas

NMFS recognizes five stocks of common bottlenose dolphins that occur in the Hawaii Study Area: the Kauai and Niihau, Oahu, Maui Nui, Hawaii Island, and the Hawaii Pelagic stock (Carretta et al., 2024). None of these stocks are listed under the ESA.

Common bottlenose dolphins occur throughout the Hawaiian Islands, and they are typically observed throughout the main islands and from the Island of Hawaii to Kure Atoll (Baird et al., 2013a; Shallenberger, 1981). In the Hawaiian Islands, this species is found in both shallow coastal waters and deep offshore waters (Baird et al., 2003b; Barlow et al., 2008; Bradford et al., 2013; Mobley et al., 2000). The offshore variety is typically larger than the inshore. Photo-identification and genetics indicate the presence of island associated populations of bottlenose dolphins in the Hawaiian Islands (Martien et al., 2012). During three systematic surveys of the Hawaiian Islands EEZ in 2002, 2010, and 2017, there were a total of 38 sightings of bottlenose dolphins, of which 27 groups were identified as members of the Hawaii pelagic stock and the rest identified as members of one of the four island-associated stocks (Bradford et al., 2021). Habitat-based models developed from systematic ship survey data collected in the central North Pacific show some of the highest common bottlenose dolphin densities around the Hawaiian Islands (Becker et al., 2012b; Forney et al., 2015). More recently, habitat-based density models were developed using systematic survey data collected within waters of the Hawaiian Islands EEZ from 2000 to 2020 using only those common bottlenose dolphin sightings identified as members of the

Hawaii pelagic stock (Becker et al., 2022a). Model predictions showed a strong island association for the pelagic stock, with highest densities occurring near all the islands within the EEZ.

Five year-round Small and Resident Population BIAs (a parent BIA, three child BIAs, and one non-hierarchical BIA) have been delineated in the main Hawaiian Islands for the populations of common bottlenose dolphins (Kratofil et al., 2023) (Figure K-15). The BIAs were updated from the original BIAs (Baird et al., 2015b) based on additional analyses. The parent BIA encompasses 36,634 km^2 of waters surrounding Niihau to the west and extending east to surround the island of Maui. The child BIAs encompass 2,772 km^2 around Kauai/Niihau, 8,487 km^2 around Oahu, and 10,622 km^2 around Maui Nui. In addition, a year-round non-hierarchical Small and Resident Population BIA was delineated and encompasses 8,299 km^2 around the Island of Hawaii (Kratofil et al., 2023) (Figure K-15).

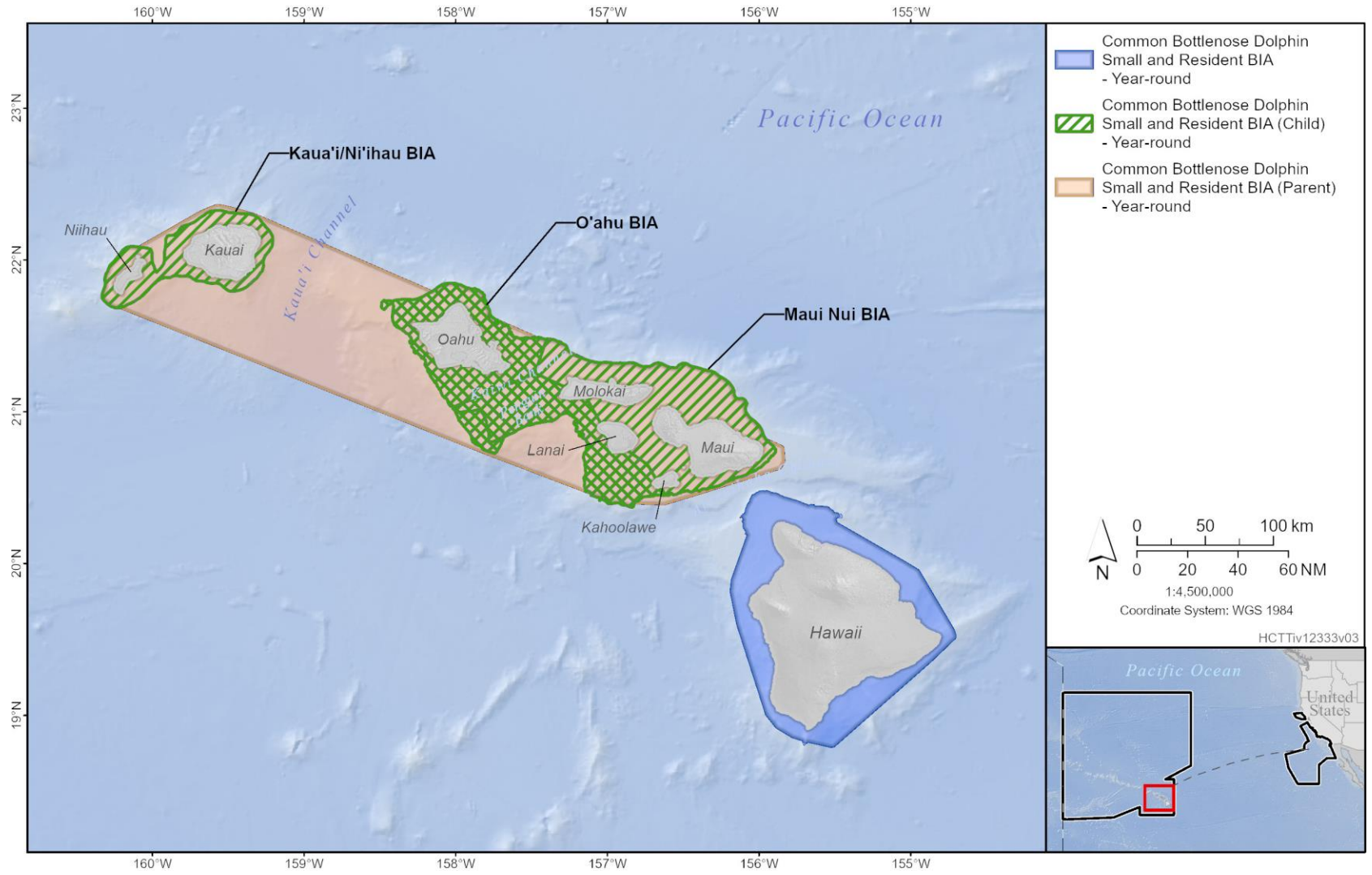

Figure K-13: Common Bottlenose Dolphin Small and Resident BIAs Off the Hawaiian Islands

K.3.7.2 Stressor Analysis

K.3.7.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting common bottlenose dolphins. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, the percent of effects that are predicted to occur in Hawaii Range Complex to the Oahu, Maui Nui, Hawaii Pelagic, and Kauai and Niihau stocks are split relatively evenly between the cold and warm seasons. For the Hawaii Island stock, 80 percent of the effects that are predicted to occur in the Hawaii Range Complex would occur during the cold season and 20 percent would occur during the warm season. Table K-4 provides a breakout of the percentage of takes that would result from training and testing activities involving sonar for each of the five stocks. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Table K-5: Common Bottlenose Dolphin Percent of Behavioral, Temporary Threshold Shift, and Auditory Injury Takes by Stock

Stock	Percent of Behavioral Takes	Percent of Temporary Threshold Shift Takes	Percent of Auditory Injury Takes
Oahu	99%	82%	20%
Maui Nui	99%	82%	100%
Hawaii Island	100%	75%	N/A
Hawaii Pelagic	99%	98%	17%
Kauai and Niihau	100%	99%	0%

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Only the Hawaii Pelagic stock has predicted takes resulting from testing activities involving air guns, however effects would be limited to one behavioral take annually.

On average, individuals in the Oahu stock would be impacted over 60 times per year, although most of these effects would be behavioral. A small number of auditory and non-auditory injuries could occur to individuals in Oahu, although the average risk of injurious effects to individuals is negligible. The risk of a non-auditory injury or mortality from this activity is low (less than one) in any year for this stock, but a single non-auditory injury and mortality are shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Therefore, the risk of any non-auditory injury or mortality is unlikely for bottlenose dolphins in Oahu. The risk of injury or mortality may be reduced through activity-based mitigation.

On average, individuals in the Maui Nui stock and Kauai Niihau stock could be impacted several times per year, individuals in the Hawaii Pelagic stock would be impacted less than twice per year, and individuals in the Hawaii Island stock could be impacted less than once per year. There are no annual injuries predicted in the Maui Nui stock, Kauai Niihau stock, or the Hawaii Island stock. The average individual risk of injury is negligible in all four stocks, but a small number of injuries and one mortality could occur in the Hawaii Pelagic stock. For the Hawaii Pelagic stock, the risk of mortality is low (less than one) in any year, but a single mortality is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of a mortality is unlikely for the Hawaii Pelagic stock. The risk of injury or mortality may be reduced through activity-based mitigation, as bottlenose dolphins have relatively higher sightability.

Several instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who suffer a slight recoverable injury or an auditory injury may experience minor energetic costs. Because bottlenose dolphins are resilient to limited instances of disturbance, long-term consequences are unlikely for any stock in the Hawaii Study Area.

K.3.7.3 Action Proponent Requirements for Area-Specific Training and Testing

The main common bottlenose dolphin small and resident BIAs encompass waters around the islands of Hawaii, Oahu, Kauai, Maui, Molokai, Lanai, Kahoolawe, and Niihau within the Hawaii Study Area. These waters encompass many of the primary training sites within the Hawaii Range Complex. Spatially, common bottlenose dolphins may be present anywhere within the waters off surrounding the Hawaiian Islands. Temporally, all stocks of the species in the Hawaii Study Area are present throughout the year.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like Pearl Harbor, HI.

The training and testing areas encompassed by the common bottlenose dolphin small and resident BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Hawaii and are not available elsewhere. They include the following: Pacific Range Missile Facility, shallow water training range and barking sands tactical underwater range west of Kauai, Ewa training minefield and Puuloa underwater range south of Oahu, the Kahoolawe sub training minefield, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

K.3.7.4 Common Bottlenose Dolphins Small and Resident Population Area Mitigation Considerations

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for common bottlenose dolphins and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area and the Hawaii 4-Islands Marine Mammal Mitigation Area (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area), which overlap some of the revised small and resident population areas (Figure K-26). While these mitigation areas are designed to provide additional protection for humpback whales,

false killer whales, and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including common bottlenose dolphins without compromising military readiness. The Navy will continue to implement this existing mitigation area to the benefit of common bottlenose dolphins present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised common bottlenose dolphin BIAs are not being proposed.

K.3.8 Pantropical Spotted Dolphins Small and Resident Population Areas

K.3.8.1 Biological Considerations Applicable to all Pantropical Spotted Dolphin Small and Resident Population Areas

NMFS recognizes four stocks of pantropical spotted dolphins within the Hawaiian Islands Exclusive Economic Zone: the Oahu; Maui Nui; Hawaii island; and Hawaii Pelagic stocks. None of the stocks are listed under the ESA.

Based on sightings during small boat surveys from 2000 to 2012 in the main Hawaiian Islands, pantropical spotted dolphins were the most abundant species of cetacean, although they were frequently observed leaping out of the water which likely increased their detectability (Baird et al., 2013a). This species was also one of the most abundant based on analyses of line-transect data collected in the Hawaiian Exclusive Economic Zone in 2002, 2010, and 2017, with a total of 39 sightings during the three surveys (Barlow, 2006; Bradford et al., 2013; Bradford et al., 2021). Known habitat preferences and sighting data indicate the primary occurrence for the pantropical spotted dolphin in Hawaiian waters is shallow coastal waters to depths of 5,000 m, although the peak sighting rates occur in depths from 1,500 to 3,500 m (Baird et al., 2013c; Bradford et al., 2013; Oleson et al., 2013a). Habitat-based models developed from systematic ship survey data collected in the central North Pacific show relatively high pantropical spotted dolphin densities around the Hawaiian Islands, particularly around the Main Hawaiian Islands (Becker et al., 2012a; Forney et al., 2015). More recently, sighting data from systematic ship surveys conducted in waters of the Hawaiian Islands EEZ from 2000 to 2020 allowed for the development of separate habitat models for the pelagic and combined insular stocks of pantropical spotted dolphins (Becker et al., 2022a). Consistent with past observations (Baird et al., 2013c; Bradford et al., 2013; Oleson et al., 2013a), the model for the combined insular stocks showed peak abundance in depths from 1,500 to 3,500 m. The habitat model for the pelagic stock predicted low to mid-range density estimates for offshore waters of the Hawaiian Islands EEZ, with highest densities near all the islands, but particularly around the Main Hawaiian Islands (Becker et al., 2022a).

A year-round Small and Resident Population parent BIA and three child BIAs have been delineated in the main Hawaiian Islands for the populations of Pantropical spotted dolphins (Kratofil et al., 2023) (Figure K-16). The BIAs were updated from the original BIAs (Baird et al., 2015b) based on additional analyses. The parent BIA encompasses 57,711 km^2 of waters surrounding Oahu, Maui Nui, and the Island of Hawaii. The child BIAs encompass 12,952 km^2 around Oahu, 6,743 km^2 around Maui Nui, and 10,768 km^2 around the Island of Hawaii (Kratofil et al., 2023).

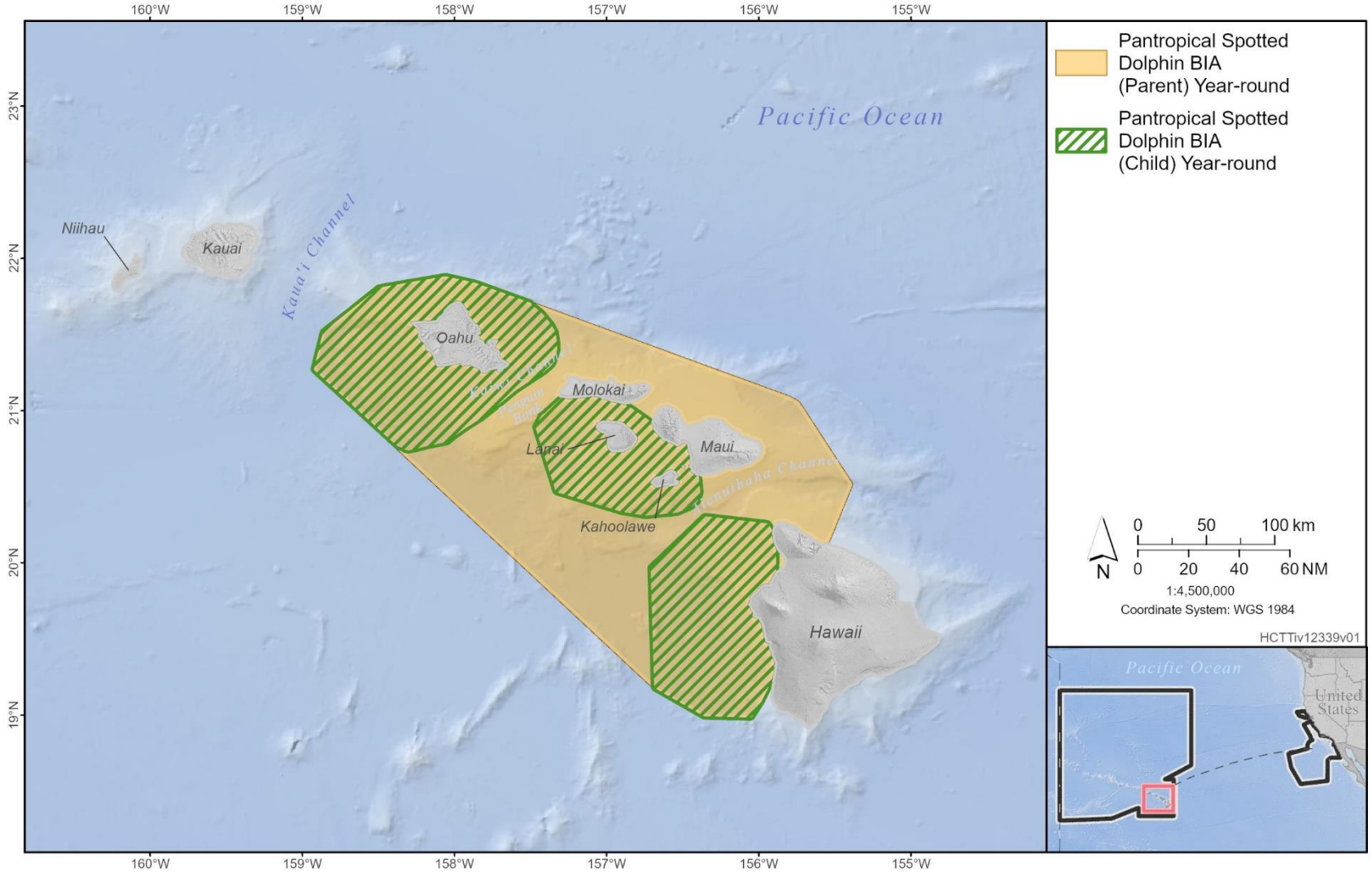

Figure K-14: Pantropical Spotted Dolphin Small and Resident BIAs Off the Hawaiian Islands

K.3.8.2 Stressor Analysis

K.3.8.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting pantropical spotted dolphins. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, the percent of effects that are predicted to occur in Hawaii Range Complex to the Oahu, Maui Nui, Hawaii Island, and Hawaii Pelagic stocks are split relatively evenly between the cold and warm seasons. Table K-5 provides a breakout of the percentage of takes that would result from training and testing activities involving sonar for each of the four stocks. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Table K-6: Pantropical Spotted Dolphin Percent of Behavioral, Temporary Threshold Shift, and Auditory Injury Takes by Stock

Stock	Percent of Behavioral Takes	Percent of Temporary Threshold Shift Takes	Percent of Auditory Injury Takes
Oahu	99%	91%	40%
Maui Nui	99%	94%	25%
Hawaii Island	99%	99%	50%
Hawaii Pelagic	99%	99%	69%

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Only the Hawaii Island and Hawaii Pelagic stocks have predicted takes resulting from testing activities involving air guns, however effects would be limited to one behavioral take annually per stock.

On average, individuals in the Oahu stock could be impacted several times per year, and individuals in the Maui Nui stock, the Hawaii Island stock, and the Hawaii Pelagic stock would be impacted less than once per year. The average individual risk of injury is negligible in all four stocks, but a small number of injuries could occur to individuals in any of the four stocks of pantropical spotted dolphins in the Hawaii Study Area. In addition, one or two mortalities could occur to individuals in the Hawaii Pelagic stock. However, the risk of a mortality from explosive testing and training is low (less than one) in any year, but single mortalities are shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of any mortality is unlikely for all stocks pantropical spotted dolphins in the HCTT Study Area. Similarly, the risk of non-auditory injuries is low (less than one) in any year, but single non-auditory injuries are shown in the

maximum year of effects due to summing risk across seven years and following the rounding approach discussed above. The risk of injury and mortality may be reduced through activity-based mitigation, especially since Pantropical spotted dolphins tend to travel in large groups.

A few instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who experience auditory or non-auditory injury may incur energetic costs. The risk of mortality is extremely unlikely. Based on the above analysis, long-term consequences for the Maui Nui stock, the Hawaii Island stock, the Hawaii Pelagic stock, and the Oahu stock of Pantropical spotted dolphins are unlikely.

K.3.8.3 Action Proponent Requirements for Area-Specific Training and Testing

The pantropical spotted dolphin small and resident BIAs encompass waters around the islands of Hawaii, Oahu, Maui, Molokai, Lanai, and Kahoolawe within the Hawaii Study Area. These waters encompass many of the primary training sites within the Hawaii Range Complex. Spatially, pantropical spotted dolphins may be present anywhere within the waters off surrounding the Hawaiian Islands. Temporally, all stocks of the species in the Hawaii Study Area are present throughout the year.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like Oahu, HI.

The training and testing areas encompassed by the pantropical spotted dolphin small and resident BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Hawaii and are not available elsewhere. They include the following: Shipboard Electronic Systems Evaluation Facility and a small portion of the Fleet Operational Readiness Accuracy Check Site Range west of Oahu, waters approaching Kawaihae Harbor, Ewa training minefield and Puuloa underwater range south of Oahu, the Kahoolawe sub training minefield, waters approaching Kawaihae Harbor, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

K.3.8.4 Pantropical Spotted Dolphins Small and Resident Population Area Mitigation Considerations

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for pantropical spotted dolphins and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area and the Hawaii 4-Islands Marine Mammal Mitigation Area, (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area), which, as shown in Figure K-26, both overlap some of the revised small and resident population child BIAs. While these mitigation areas were designed to provide additional protection for humpback whales, false killer whales, and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including pantropical spotted dolphins, without compromising military readiness. The Navy will continue to implement these existing mitigation areas to the benefit of pantropical spotted dolphins present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised pantropical spotted dolphin child BIAs are not being proposed.

K.3.9 Spinner Dolphins Small and Resident Population Areas: Hawaiian Islands Stock Complex

K.3.9.1.1 Biological Considerations Applicable to all Spinner Dolphin Small and Resident Population Areas

NMFS recognizes six stocks of spinner dolphins within the Hawaii Study Area: the Hawaii Island, Oahu/4-Islands, Kauai and Niihau, Hawaii Pelagic, Kure and Midway, and the Pearl and Hermes Reef stocks (Carretta et al., 2023).

In the Hawaiian Islands, spinner dolphins occur along the leeward coasts of all the major islands and around several of the atolls northwest of the main Hawaiian Islands. Spinner dolphins occur year-round throughout the Hawaiian Islands, with primary occurrence from the shore to 4,000 m depth. This considers nearshore resting habitat and offshore feeding areas. Spinner dolphins are expected to occur in shallow water resting areas (about 50 m deep or less) throughout the middle of the day, moving into deep waters offshore during the night to feed (Heenehan et al., 2016; Heenehan et al., 2017; Norris & Dohl, 1980). Some of these resting areas are in proximity to bathymetric features that result in localized concentration of spinner dolphin prey. For example, there is an escarpment off Hawaii Island's Keahole Point that produces a locally enriched area that spinner dolphins exploit during nightly foraging trips from the nearby Makeko Bay (Heenehan et al., 2017; Norris & Dohl, 1980). Primary resting areas are along the west side of Hawaii, including Makako Bay, Honokohau Bay, Kailua Bay, Kealakekua Bay, Honaunau Bay, and Kauhako Bay, and off Kahena on the southeast side of the island (Heenehan et al., 2016; Heenehan et al., 2017; Norris & Dohl, 1980; Ostman-Lind et al., 2004; Tyne et al., 2017; Tyne et al., 2015). Along the Waianae coast of Oahu, Hawaii, spinner dolphins rest along Makua Beach, Kahe Point, and Pokai Bay during the day (Lammers, 2004). Kilauea Bay on Kauai is also a popular resting areas for Hawaiian spinner dolphins (U.S. Department of the Navy, 2006). Monitoring for the Rim of the Pacific Exercise in 2006 resulted in daily sightings of spinner dolphins within the offshore area of Kekaha Beach, Kauai, near the Pacific Missile Range Facility (U.S. Department of the Navy, 2006). Spinner dolphins have been observed during Navy monitoring surveys at Kaula Island in 2000, 2003, and 2009-2011 (Richie et al., 2012). Although sightings have been recorded around the mouth of Pearl Harbor, Hawaii, spinner dolphin occurrence is rare there (Lammers, 2004; Richie et al., 2016). Occurrence patterns are assumed to be the same throughout the year.

During three systematic ship surveys of waters within the Hawaiian Islands EEZ in summer/fall of 2002, 2010, and 2017, there was a total of 15 sightings of spinner dolphin, the majority from the pelagic stock (Bradford et al., 2021). Habitat-based models developed from systematic ship survey data collected in the central North Pacific show the strong island association of spinner dolphins (Becker et al., 2012b; Forney et al., 2015), consistent with previously documented distribution patterns (Barlow, 2006).

Five year-round, non-hierarchical Small and Resident Population BIAs have been delineated for spinner dolphins in Hawaiian waters (Kratofil et al., 2023) (Figure K-17). The BIAs were based on the current insular stock boundaries and include Kuaihelani/Holaniku (4,841 km^2), Manawai (2,094 km^2), Kauai/Niihau (7,233 km^2), Oahu/Maui Nui (14,651 km^2), and the Island of Hawaii (9,477 km^2).

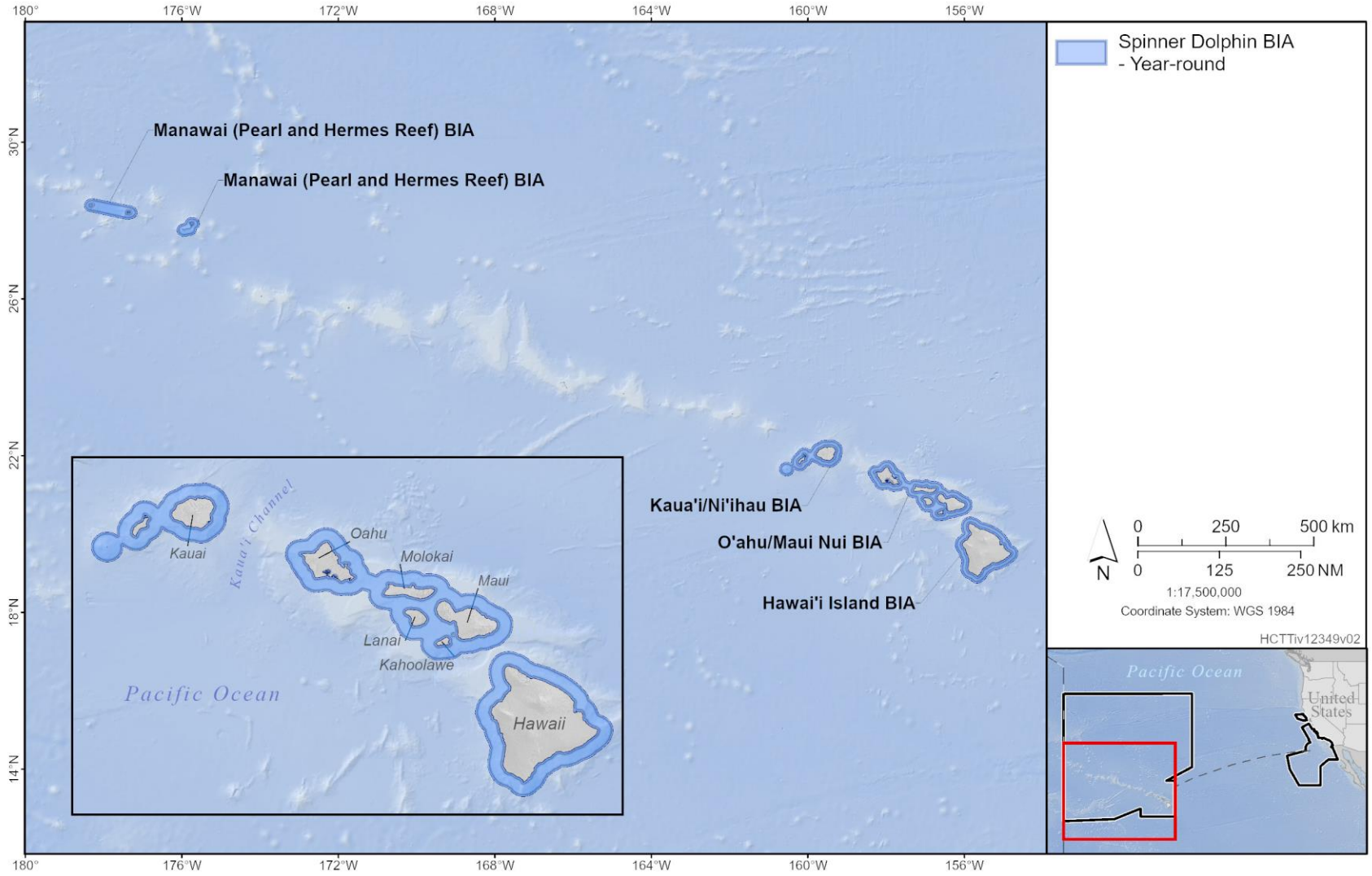

Figure K-15: Spinner Dolphin Small and Resident BIA Off the Hawaiian Islands

K.3.9.2 Stressor Analysis

K.3.9.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting spinner dolphins. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, there are no predicted effects to the Kure and Midway or the Pearl and Hermes Reef stocks. The percent of effects that are predicted to occur in Hawaii Range Complex to the Hawaii Island and Oahu/4-islands stocks is split with approximately 60 percent occurring during the warm season and 40 percent occurring during the cold season. For the Hawaii Pelagic and the Kauai and Niihau stocks, a greater percentage of the effects predicted to occur in the Hawaii Range Complex (65 percent for the Kauai and Niihau stock, and 52 percent for the Hawaii Pelagic stock) would occur during the cold season. Table K-6 provides a breakout of the percentage of takes that would result from training and testing activities involving sonar for each of the four stocks. For the quantitative analysis of effects to the species within the revised BIA, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Table K-7: Spinner Dolphin Percent of Behavioral, Temporary Threshold Shift, and Auditory Injury Takes by Stock

Stock	Percent of Behavioral Takes	Percent of Temporary Threshold Shift Takes	Percent of Auditory Injury Takes
Oahu/4-Islands	99%	91%	1%
Kauai and Niihau	99%	99%	50%
Hawaii Island	98%	98%	0%
Hawaii Pelagic	99%	99%	99%

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. None of the four stocks have predicted takes resulting from testing activities involving air guns.

On average, individuals in the Hawaii Island stock and Hawaii Pelagic stock would be impacted less than once per year, and individuals in the Kauai and Niihau stock and the Oahu/ 4-Islands stock could be impacted several times per year. The average individual risk of injury is negligible in all four stocks, but a small number of auditory injuries could occur. However, in four out of six instances of auditory injury, the risk of an injury is low (less than one) in any year, but single injuries are shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS. Therefore, the risk of any auditory injury from an explosive activity is unlikely for all stocks of spinner dolphins in the HCTT Study Area, and the risk of an auditory injury from

sonar testing is unlikely for spinner dolphins in the Hawaii pelagic stock. The risk of injury may be reduced through activity-based mitigation, as spinner dolphins have relatively higher sightability.

A few instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who experience auditory injury may incur energetic costs. Based on the above analysis, long-term consequences for the Hawaii Island stock, Hawaii Pelagic stock, the Kauai and Niihau stock, and the Oahu/ 4-Islands stock of spinner dolphins are unlikely.

K.3.9.3 Action Proponent Requirements for Area-Specific Training and Testing

The Manawai small and resident BIAs are in the Hawaii Temporary OPAREA, which is composed of 2.1 million NM^2 of sea and airspace north and west of Kauai used predominately for research, development and test activities. It is mostly used for missile defense testing, which is not a part of the Proposed Action. Activities in the Temporary OPAREA that are covered in this EIS may include air, surface, and anti-submarine warfare activities. The training and testing activities that typically occur within the area include opportunistic training by individual ships transiting to and from the Western Pacific on deployment or occasional positioning of ships supporting testing or other events and are likely to occur in deeper waters of the large temporary operating area and would not overlap with the small and resident population area.

The Kauai/Niihau, Oahu/Maui Nui, and Hawaii Island small and resident BIAs encompass waters around the islands of Hawaii, Oahu, Kauai, Maui, Molokai, Lanai, Kahoolawe, and Niihau within the Hawaii Study Area. These waters encompass many of the primary training sites within the Hawaii Range Complex. Spatially, spinner dolphins may be present anywhere within the waters off surrounding the Hawaiian Islands. Temporally, spinner dolphins are present most of the year.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like Oahu, HI.

The training and testing areas encompassed by the spinner dolphin small and resident BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Hawaii and are not available elsewhere. They include the following: Pacific Range Missile Facility, shallow water training range and barking sands tactical underwater range west of Kauai, Ewa training minefield and Puuloa underwater range south of Oahu, the Kahoolawe sub training minefield, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

K.3.9.4 Spinner Dolphin Small and Resident Population Areas Mitigation Assessment

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for spinner dolphins and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area and the Hawaii 4-Islands Marine Mammal Mitigation Area, (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area), which, as shown in Figure K-26, both overlap some of the revised small and resident population area. While these mitigation areas were designed to provide additional protection for humpback whales, false killer whales, and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including spinner dolphins, without compromising military readiness. The Navy will continue to implement these existing mitigation areas to the benefit of spinner dolphins present in the Hawaii Study Area. However, because

most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised spinner dolphin BIAs are not being proposed.

K.3.10 Hawaii Island Rough-Toothed Dolphins Small and Resident Population Area

K.3.10.1 Biological Considerations Applicable to the Rough-toothed Dolphins Small and Resident Population Area

Rough-toothed dolphins are among the most widely distributed species of tropical dolphins, and NMFS recognizes one stock of rough-toothed dolphins found within the U.S. Exclusive Economic Zone of the Hawaiian Islands: Hawaii stock (Carretta et al., 2023). Rough-toothed dolphins are not listed under the ESA.

Rough-toothed dolphins are well known in deep ocean waters off the Hawaiian Islands but are also seen relatively frequently during nearshore surveys (Baird et al., 2015f; Baird et al., 2008; Barlow et al., 2008; Bradford et al., 2013; Carretta et al., 2015; Pitman & Stinchcomb, 2002; Shallenberger, 1981; Webster et al., 2015). During three systematic ship surveys of waters within the Hawaiian Islands EEZ in summer/fall of 2002, 2010, and 2017, there was a total of 67 sightings of rough-toothed dolphin, with yearly mean group size estimates ranging from 15.7 to 25.3 animals (Bradford et al., 2021). Based on density estimates derived from these survey data, rough-toothed dolphin was one of the most abundant species present in the study area in each of the three years. Habitat-based models developed from systematic ship survey data collected in the central North Pacific show the strong island association of rough-toothed dolphins (Becker et al., 2012b; Forney et al., 2015). Sighting data from systematic ship surveys conducted within waters of the Hawaiian Islands EEZ from 2000 to 2020 supported the development of an updated habitat-based density model for rough-toothed dolphin and confirmed the strong island association indicated from the previous models (Becker et al., 2022a). Over a 10-day near-shore survey effort off Kauai in 2014, rough-toothed dolphins were encountered on two occasions and 7 of the 8 individuals photo-identified had been observed in previous years (Baird et al., 2015e). Data from 14 satellite tags deployed off Kauai between 2011–2015 on rough-toothed dolphins indicated a large portion of the core area for those animals overlaps the Pacific Missile Range Facility range and the channel between Kauai and Niihau (Baird et al., 2015e). The data presented by Baird et al. (2015e) and Webster et al. (2015) are indicative of residency on or near the Pacific Missile Range Facility range by some of those animals (see also (Baird et al., 2008).

A year-round Small and Resident Population parent BIA and child BIA have been delineated for waters off Kauai, Niihau, and Oahu for rough-toothed dolphins (Kratofil et al., 2023) (Figure K-18). A BIA was not identified for this population in the original BIA effort because there were insufficient data available at that time (Baird et al., 2015d). The parent BIA encompasses 25,083 km^2 of waters extending from the west coast of Oahu to the northwest and surrounding both Kauai and Niihau. The child BIA encompass 1,098 km^2 off the west coast of Kauai to capture the core range for this population (Kratofil et al., 2023). In addition, a year-round, non-hierarchical BIA was delineated for rough-toothed dolphins associated with Maui Nui and the Island of Hawaii. This BIA encompasses 15,112 km^2 of waters from the west coast of the Island of Hawaii, extending north to encompass waters off Maui Nui (Kratofil et al., 2023) (Figure K-18).

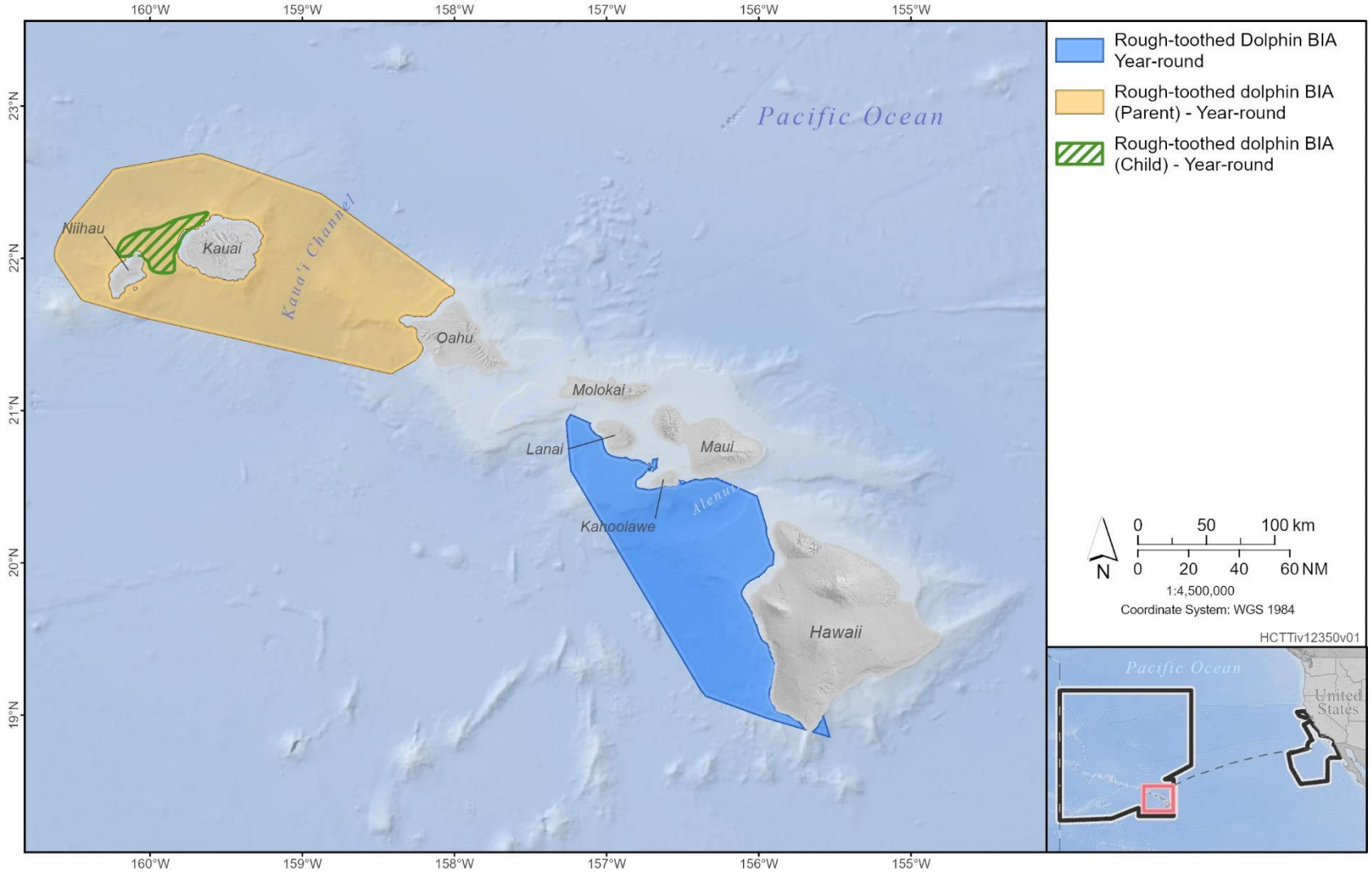

Figure K-16: Rough-Toothed Dolphin Small and Resident BIAs Off the Hawaiian Islands

K.3.10.2 Stressor Analysis

K.3.10.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting rough-toothed dolphins. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, the effects that are predicted to occur in Hawaii Range Complex to the Hawaii stock of rough-toothed dolphins present in the waters surrounding the Hawaiian Islands are distributed relatively evenly between the cold and warm seasons. 99 percent of the behavioral, 99 percent of the temporary threshold shift, and 68 percent of the auditory injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Only one take (behavioral) is predicted to occur from the training and testing activities involving air guns to rough-toothed dolphins annually in the Hawaii Study Area.

On average, individuals would be impacted less than once per year. A small number of auditory and non-auditory injuries could occur to individuals, although the average individual risk of injury is negligible. In addition, a mortality could occur from explosive testing and training activities. However, the risk of a single mortality from either activity is low (less than one) in any year, but a mortality for both explosive activities is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of any mortality is unlikely for rough-toothed dolphins in the HCTT Study Area. The risk of injury may be reduced through activity-based mitigation, as rough-toothed dolphins are moderately sightable.

A few instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who experience injury may incur energetic costs. The risk of mortality is extremely unlikely. Based on the above analysis, long-term consequences for the Hawaii stock of rough-toothed dolphins are unlikely.

K.3.10.3 Action Proponent Requirements for Area-Specific Training and Testing

The rough-toothed dolphin small and resident BIAs encompass waters in the vicinity of the islands of Hawaii, Oahu, Kauai, Maui, Lanai, Kahoolawe, and Niihau within the Hawaii Study Area. These waters encompass many of the primary training sites within the Hawaii Range Complex. Spatially, rough-toothed dolphins may be present anywhere within the waters off surrounding the Hawaiian Islands. Temporally, all stocks of the species in the Hawaii Study Area are present throughout the year.

The waters surrounding the Hawaiian Islands have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like Oahu, HI.

The training and testing areas encompassed by the rough-toothed dolphin small and resident BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Hawaii and are not available elsewhere. They include the following: Pacific Range Missile Facility, shallow water training range and barking sands tactical underwater range west of Kauai, the Kahoolawe sub training minefield, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

K.3.10.4 Rough-toothed Dolphin Small and Resident Population Area Mitigation Assessment

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for rough-toothed dolphins and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area and the Hawaii 4-Islands Marine Mammal Mitigation Area (see Section K.1.1.3.2 Mitigation Areas for Marine Mammals in the Hawaii Study Area), which, as shown in Figure K-26, both overlap some of the revised rough-toothed dolphin small and resident population areas. While these mitigation areas were designed to provide additional protection for humpback whales, false killer whales, and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including rough-toothed dolphins without compromising military readiness. The Navy will continue to implement these existing mitigation areas to the benefit of rough-toothed dolphins present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised Hawaii Island rough-toothed dolphin BIAs are not being proposed.

K.3.11 Hawaii Island Cuvier's Beaked Whale Small and Resident Population Area

K.3.11.1 Biological Considerations Applicable to the Cuvier's Beaked Whale Small and Resident Population Area

NMFS recognizes a Hawaii stock of Cuvier's beaked whale that occurs in the Hawaii Study Area (Carretta et al., 2023). The stock is not listed under the ESA.

Cuvier's beaked whales are regularly found in waters surrounding the Hawaiian Islands (Baird et al., 2015d; Baird et al., 2009; Baird et al., 2013b; Barlow, 2006; Baumann-Pickering et al., 2010; Baumann-Pickering et al., 2014; Bradford et al., 2013; Lammers et al., 2015; Mobley, 2004; Oleson et al., 2013a; Oleson et al., 2015b; Shallenberger, 1981). In Hawaii, Cuvier's beaked whales have been occasionally observed breaching and this along with their large size and visible blows likely increases their detectability (Baird et al., 2013b). There was a total of 40 Cuvier's beaked whale sightings during systematic ship surveys within the Hawaiian Islands EEZ in 2002, 2010, and 2017, and none of the sightings were in waters within 140 km of the Main Hawaiian Islands (Bradford et al., 2021). Sightings have been reported off the Hawaiian Islands of Lanai, Maui, Hawaii, Niihau, and Kauai, providing strong evidence for both insular and offshore populations of Cuvier's beaked whales in waters of the Hawaiian Islands EEZ (Baird, 2013; Baird et al., 2015b; Baird et al., 2009; Mobley, 2004; Oleson et al., 2013b; Oleson et al., 2015a; Shallenberger, 1981).

BIAs were redefined for a year-round Small and Resident Population area for Cuvier's beaked whales in Hawaiian waters (Kratofil et al., 2023). The parent BIA is 37,157 km^2 in size and the child BIA encompasses 5,400 km^2 within this region (Figure K-19) The child BIA was defined based on occurrence data that indicate that Cuvier's beaked whales spend the majority of their time between the 2,000- and 3,500-meter isobaths off the leeward side of the Island of Hawaii.

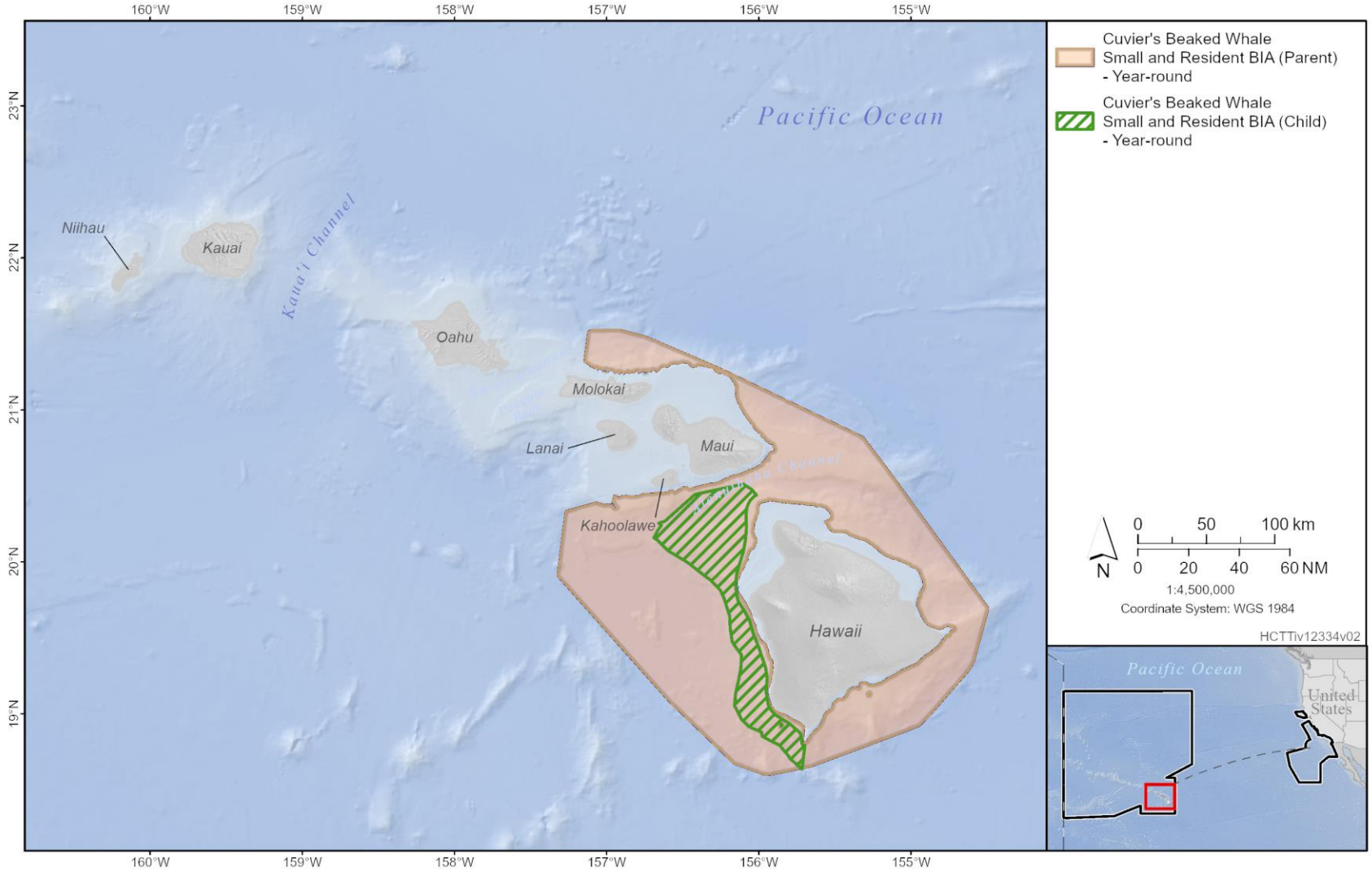

Figure K-17: Cuvier's Beaked Whale Small and Resident Population BIAs Off the Hawaiian Islands

K.3.11.2 Stressor Analysis

K.3.11.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting Cuvier's beaked whales. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, the effects that are predicted to occur in Hawaii Range Complex to the Hawaii stock of the Cuvier's beaked whale present in the waters surrounding the Hawaiian Islands are distributed relatively evenly between the cold and warm seasons. 99 percent of the behavioral, 98 percent of the temporary threshold shift, and zero percent of the auditory injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Only one take (behavioral) is predicted to occur from the training and testing activities involving air guns to Cuvier's beaked whales annually in the Hawaii Study Area.

On average, individuals in the Hawaii stock would be impacted several times per year, primarily due to behavioral responses. The average risk of injury for either stock is negligible, although a few auditory injuries are predicted. The risk of auditory injury from explosive training is low (less than one) in any year, but a couple auditory injuries are shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). These auditory injuries are shown in the maximum year of effects per the summation and rounding approach discussed above. Therefore, the risk of auditory injury from any source is unlikely. The risk of injury may be reduced through activity-based mitigation, although beaked whales have low sightability.

Several instances of behavioral disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who suffer an auditory injury may experience minor energetic costs. Most predicted effects are behavioral responses in an open ocean basin that are unlikely to contribute to any long-term effects to individuals. Long-term consequences to these stocks are unlikely.

K.3.11.3 Action Proponent Requirements for Area-Specific Training and Testing

The Alenuihaha Channel, as well as the waters north and west of Hawaii Island, provides a unique training capability that does not exist elsewhere in the Hawaii Range Complex. The Alenuihaha Channel is an ideal location for strait transits using mid-frequency active sonar during training. The Alenuihaha Channel is an actual channel that provides a vital and realistic analog for similar straits or restricted maneuvering areas where the Navy operates worldwide, such as the East or South China seas. For example, transit training in the Alenuihaha Channel replicates these types of strait environments that meet the Navy's requirement to deploy Naval forces to ensure the free flow of commerce and the freedom of navigation by combatting piracy or mine threats. Naval forces are required to train to counter a submarine threat before deployment, to ensure such forces obtain the required proficiency to

conduct anti-submarine warfare in a controlled and observed environment prior to deployment to international straits across the globe, where operational Commanders require Naval forces to be able to conduct a range of military operations, including anti-submarine warfare. This required proficiency cannot be replicated by simulation and is most effectively obtained when conducted in a strait. Commanding Officers cannot be expected to effectively conduct such operations in a deployed environment if the first time they encounter a submarine in a strait is in a deployed setting. There are few geographic areas that enable forces to do this type of training outside of the HCTT Study Area.

While there are other channels within the Hawaii Range Complex used for strait transit training and anti-submarine warfare training, none provide the important attributes of the Alenuihaha Channel. The Alenuihaha Channel's proximity to the Pohakuloa Training Area allows for realistic training and reduces time and fuel costs between these training areas. The channel between Niihau and Kauai is also acceptable from a training perspective, but this would add at least two days of transit during each Under Sea Warfare training exercise (time required to move through a different channel and reposition to operating areas near Pohakuloa Training Area). The Kaiwi Channel between Oahu and Molokai is also acceptable from some mid-frequency active sonar training perspective, but it is also a significant civilian air corridor, and raises safety concerns for anti-submarine warfare aircraft flying in that channel. In addition, the channel between Nihau and Kauai is proximate to the Pacific Missile Range Facility instrumented range) which would result in problems de-conflicting multiple activities and hazardous operations, raising safety concerns. For these reasons, Alenuihaha Channel is still the most suitable for anti-submarine warfare training during certain training scenarios. The Hawaii Island Cuvier's Beaked Whale Small and Resident Population Area is adjacent to waters approaching Kawaihae Harbor, the point of amphibious insertion for forces proceeding to the range at Pohakuloa Training Area, which is the only range in the Hawaii Range Complex that supports ground force and aviation live-fire training. Training in this area allows for the integration of carrier strike group operations and amphibious landings, working in conjunction within a controlled airspace west of Hawaii Island for military training near the Pohakuloa Training Area range. Carrier strike group training can include a full spectrum of the force–various ships, submarines, aircraft, and Marine Corps forces—to train in the complex command, control operational coordination, and logistics functions designed to prepare forces for deployment. As an air to ground range, Pohakuloa Training Area supports carrier strike group activities near a channel and near large open water areas for strike group maneuvering and submarine activities. Mid-frequency active sonar conducted to support strike maneuver and protect high value units (e.g., carrier) as aircraft go to strike at Pohakuloa Training Area is vital.

Access to both the Alenuihaha Channel and the waters west of Kawaihae Harbor is vital for a broad spectrum of naval and amphibious training. These areas provide a unique and irreplaceable capability within the Hawaii Range Complex that allows naval forces to conduct realistic, integrated training in an environment that replicates the actual areas where they will be called to serve.

K.3.11.4 Cuvier's Beaked Whale Small and Resident Population Area Mitigation Assessment

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for Cuvier's beaked whale and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area (see Section K.1.1.3.2, Mitigation Areas for Marine Mammals in the Hawaii Study Area), which, as shown in Figure K-26, overlaps all of the revised small and resident population child BIA. While this mitigation area was designed to provide additional protection for false killer whales and some beaked whale species, these

measures will also reduce the number and level of effects to other species or stocks occurring within the area, including Cuvier's beaked whales without compromising military readiness. The Navy will continue to implement these existing mitigation areas to the benefit of Cuvier's beaked whales present in the Hawaii Study Area. However, because most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals, additional mitigation areas based on the revised Hawaii Island Cuvier's beaked whale child BIA are not being proposed.

K.3.12 Hawaii Island Blainville's Beaked Whale Small and Resident Population Area

K.3.12.1 Biological Considerations Applicable to the Blainville's Beaked Whale Small and Resident Population Area

NMFS recognizes one stock of Blainville's beaked whale in the waters surrounding the Hawaiian Islands: Hawaii stock (Carretta et al., 2023). The stock is not listed under the ESA.

Blainville's beaked whales are regularly sighted in Hawaiian waters (Baird et al., 2015a; Baird et al., 2003b; Baird et al., 2006; Barlow, 2006; Bradford et al., 2017; McSweeney et al., 2007), and their vocalizations have been routinely detected in acoustic monitoring in the Hawaiian Islands (Henderson et al., 2015; Klinck et al., 2015; Lammers et al., 2015; Manzano-Roth et al., 2016; Manzano-Roth et al., 2013; Rankin & Barlow, 2007). There were a total of 15 Blainville's beaked whale sightings during systematic ship surveys within the Hawaiian Islands EEZ in 2002, 2010, and 2017, and none of the sightings were in waters within 140 km of the Main Hawaiian Islands (Bradford et al., 2021).

Blainville's beaked whale has been detected off the coast of Oahu, Hawaii for prolonged periods annually, and this species is consistently observed in the same site off the west coast of the Island of Hawaii (Abecassis et al., 2015; Baird et al., 2006; McSweeney et al., 2007). Thirteen Blainville's beaked whales were satellite tagged off Hawaii Island between 2006 and 2012 with data records ranging from 15 to 159 days (Baird et al., 2015a; Baird et al., 2011). One tagged individual ranged from approximately 18 km to 573 km from land and moved a total of over 900 km from the initial tag location in 20 days. Similar data over an 8-day period for an individual tagged off Kauai showed movement on and off the Navy's instrument range at PMRF three times before transiting to the southwest over a distance of approximately 100 km from the original tag location (Baird et al., 2015e).

BIAs were redefined for a year-round Small and Resident Population area for Blainville's beaked whales off the west coast and North Kohala portion of the Island of Hawaii, extending to the west and north to encompass waters off Maui Nui and Oahu (Kratofil et al., 2023). The parent BIA is 78,714 km^2 in size and the child BIA encompasses 4,214 km^2 within this region, representing an area of intensified use off the west coast and North Kohala portion of the Island of Hawaii (Figure K-20).

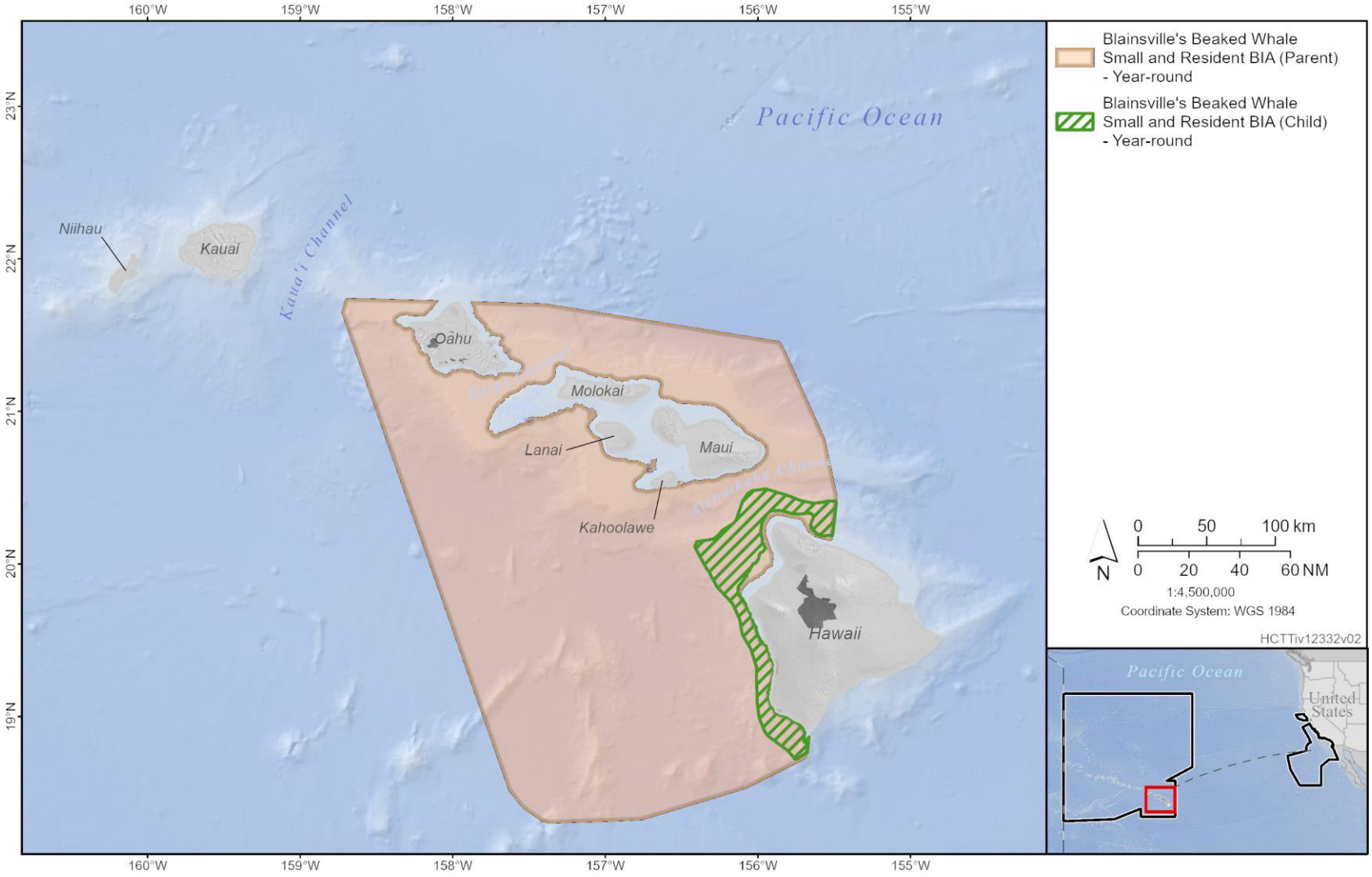

Figure K-18: Blainville's Beaked Whales Small and Resident BIAs Off the Hawaiian Islands

K.3.12.2 Stressor Analysis

K.3.12.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting Blainville's beaked whales. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, the effects that are predicted to occur in Hawaii Range Complex to the Hawaii stock of Blainville's beaked whale present in the waters surrounding the Hawaiian Islands are distributed relatively evenly between the cold and warm seasons. 99 percent of the behavioral and 97 percent of the temporary threshold shift takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. No effects are predicted to occur from the training and testing activities involving air guns.

On average, individuals in the Hawaii stock of Blainville's beaked whales could be impacted several times per year, primarily due to behavioral responses from training and testing activities involving the use of sonar. There are no predicted effects resulting in auditory injury, physical injury, or mortality takes.

A few instances of disturbance over a year are unlikely to have any long-term consequences for individuals, although individuals who suffer an auditory injury may experience minor energetic costs. Based on the above analysis, long-term consequences for the Hawaii stock of Blainville's beaked whales are unlikely.

K.3.12.3 Action Proponent Requirements for Area-Specific Training and Testing

The Alenuihaha Channel, as well as the waters north and west of Hawaii Island, provides a unique training capability that does not exist elsewhere in the Hawaii Range Complex. The Alenuihaha Channel is an ideal location for strait transits using mid-frequency active sonar during training. The Alenuihaha Channel is an actual channel that provides a vital and realistic analog for similar straits or restricted maneuvering areas where the Navy operates worldwide, such as the East or South China seas. For example, transit training in the Alenuihaha Channel replicates these types of strait environments that meet the Navy's requirement to deploy Naval forces to ensure the free flow of commerce and the freedom of navigation by combatting piracy or mine threats. Naval forces are required to train to counter a submarine threat before deployment, to ensure such forces obtain the required proficiency to conduct anti-submarine warfare in a controlled and observed environment prior to deployment to international straits across the globe, where operational Commanders require Naval forces to be able to conduct a range of military operations, including anti-submarine warfare. This required proficiency cannot be replicated by simulation and is most effectively obtained when conducted in a strait. Commanding Officers cannot be expected to effectively conduct such operations in a deployed environment if the first time they encounter a submarine in a strait is in a deployed setting. There are few geographic areas that enable forces to do this type of training outside of the HCTT Study Area.

While there are other channels within the Hawaii Range Complex used for strait transit training and anti-submarine warfare training, none provide the important attributes of the Alenuihaha Channel. The Alenuihaha Channel's proximity to the Pohakuloa Training Area allows for realistic training and reduces time and fuel costs between these training areas. The channel between Niihau and Kauai is also acceptable from a training perspective, but this would add at least two days of transit during each Under Sea Warfare training exercise (time required to move through a different channel and reposition to operating areas near Pohakuloa Training Area). The Kaiwi Channel between Oahu and Molokai is also acceptable from some mid-frequency active sonar training perspective, but it is also a significant civilian air corridor, and raises safety concerns for anti-submarine warfare aircraft flying in that channel. In addition, the channel between Nihau and Kauai is proximate to the Pacific Missile Range Facility instrumented range) which would result in problems de-conflicting multiple activities and hazardous operations, raising safety concerns. For these reasons, Alenuihaha Channel is still the most suitable for anti-submarine warfare training during certain training scenarios. The Hawaii Island Blainville's Beaked Whale Small and Resident Population Area is adjacent to waters approaching Kawaihae Harbor, the point of amphibious insertion for forces proceeding to the range at Pohakuloa Training Area, which is the only range in the Hawaii Range Complex that supports ground force and aviation live-fire training. Training in this area allows for the integration of carrier strike group operations and amphibious landings, working in conjunction within a controlled airspace west of Hawaii Island for military training near the Pohakuloa Training Area range. Carrier strike group training can include a full spectrum of the force–various ships, submarines, aircraft, and Marine Corps forces—to train in the complex command, control operational coordination, and logistics functions designed to prepare forces for deployment. As an air to ground range, Pohakuloa Training Area supports carrier strike group activities near a channel and near large open water areas for strike group maneuvering and submarine activities. Mid-frequency active sonar conducted to support strike maneuver and protect high value units (e.g., carrier) as aircraft go to strike at Pohakuloa Training Area is vital.

Access to both the Alenuihaha Channel and the waters west of Kawaihae Harbor is vital for a broad spectrum of naval and amphibious training. These areas provide a unique and irreplaceable capability within the Hawaii Range Complex that allows naval forces to conduct realistic, integrated training in an environment that replicates the actual areas where they will be called to serve.

K.3.12.4 Blainville's Beaked Whale Small and Resident Population Area Mitigation Assessment

During the 2018 HSTT EIS/OEIS, the Navy balanced the need for the use of the area to meet training and testing requirements with the biological importance of the area for Blainville's beaked whale and other species. The Navy implemented the Hawaii Island Marine Mammal Mitigation Area (see Section K.1.1.3.2, Mitigation Areas for Marine Mammals in the Hawaii Study Area), which, as shown in Figure K-26, overlaps all of the revised small and resident child BIA. While these mitigation areas were designed to provide additional protection for humpback whales, false killer whales and some beaked whale species, these measures will also reduce the number and level of effects to other species or stocks occurring within the area, including Blainville's beaked whales without compromising military readiness. Therefore, because the Hawaii Island Marine Mammal Mitigation Area overlaps all of the revised small and resident child BIA, and because most effects to Blainville's beaked whales from military readiness activities in the Hawaii Study Area are expected to be behavioral, non-injurious, and are unlikely to result in any long-term effects to individuals, the Navy will continue to implement the existing mitigation

area to the benefit of Blainville's beaked whales present in the Hawaii Study Area and is not proposing additional mitigation areas.

K.4 Biologically Important Areas within the California Study Area

K.4.1 Blue Whale Feeding Areas

K.4.1.1 Biological Considerations Applicable to Blue Whale Feeding Areas

NMFS recognizes two stocks of blue whales in the North Pacific: the Eastern North Pacific and Central North Pacific stocks (Carretta et al., 2023). Both stocks of blue whales are listed as endangered under the ESA, but only the Eastern North Pacific stock could be present in the California Study Area.

The Eastern North Pacific Stock of blue whales includes animals found in the eastern north Pacific from the northern Gulf of Alaska to the eastern tropical Pacific (Carretta et al., 2023). Based on habitat models derived from line-transect survey data collected between 1991 and 2018 off the U.S. west coast, relatively high densities of blue whales are predicted off southern California during the summer and fall (Barlow et al., 2009b; Becker et al., 2010; Becker et al., 2016; Forney et al., 2012). Data from year-round surveys conducted off southern California from 2004 to 2013 show that the majority of blue whales were sighted in summer (62 sightings) and fall (9 sightings), with only single sightings in winter and spring (Campbell et al., 2015). In the Southern California Bight in summer and fall, the highest densities of blue whales occurred along the 200-m isobath in waters with high surface chlorophyll concentrations (Redfern et al., 2013). Campbell et al. (2015) documented blue whale sightings along both the Southern California shelf, and over deep ocean water (>2,000 m).

Abrahms et al. (2019) documented higher blue whale occurrence north of the Southern California (SOCAL) Range Complex and with critical areas located along shipping routes within the Santa Barbara Channel that provide access to the Ports of Los Angeles and Long Beach. Szesciorka et al. (2020) investigated the timing of blue whale migrations in association with environmental conditions and prey concentrations off southern California over a 10-year period. Their findings showed that blue whales were arriving up to one month earlier off southern California at the end of the study than they had been 10 years prior. However, the whales did not depart any earlier, leading to longer residency times in the Southern California Bight. Based on acoustic call detections, blue whales arrived in May and depart in November, remaining at the feeding grounds an average of 8.4 months. Blue whales demonstrated a flexible response to prey availability on an interannual basis based strongly on sea surface temperatures which are also correlated with krill biomass.

In 2015, feeding BIAs were delineated off the U.S. west coast for the Eastern North Pacific stock of blue whales (Calambokidis et al., 2015c). The BIAs were redefined for blue whale feeding behavior off the U.S. West Coast by Calambokidis et al. (2024) (Figure K-21) and incorporated tagging and additional line-transect survey data not previously considered (Calambokidis et al., 2015c). The parent BIA encompass 173,000 km^2 equivalent to 21 percent of the U.S. West Coast EEZ and include coastal, shelf beak, and offshore waters (Figure K-21). The core BIA, which is approximately 54,000 km^2, is 30 percent of the parent BIA but still larger than the previous blue whale feeding BIAs defined in 2015. The BIAs are in effect from June through November.

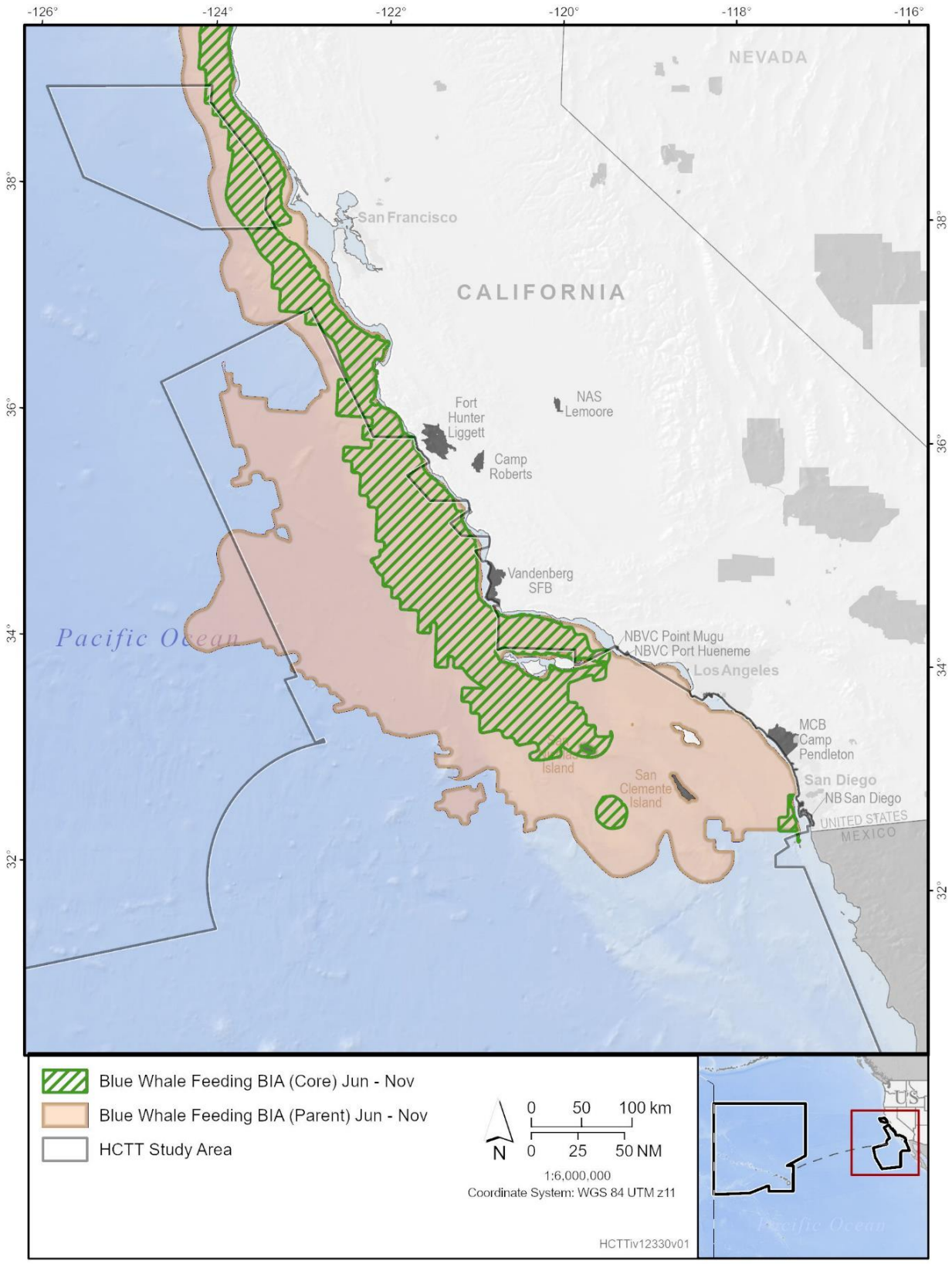

Figure K-19: Blue Whale Feeding Areas Off California

K.4.1.2 Stressor Analysis

K.4.1.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting blue whales and their feeding behavior. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 87 percent of effects are predicted to occur in the SOCAL Range Complex, with 44 percent occurring during the warm season as the whales spend time at feeding grounds in the Southern California Bight. 43 percent are predicted to occur in the cold season because the whales typically spend about 8 months at the feeding grounds before migrating farther south to breed in colder months. 94 percent of the behavioral, 97 percent of the temporary threshold shift, and 89 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Negligible effects are predicted from the training and testing activities involving air guns because less than one behavioral take is predicted per year.

On average, individuals in the Eastern North Pacific stock could be impacted a couple times a year. There are no non-auditory injuries predicted and the average individual risk of auditory injury is low. The risk of auditory injury may be reduced through activity-based mitigation because blue whales are moderately sightable.

A case study examined long-term effects of changing environmental conditions and exposure to military sonar for Eastern North Pacific blue whales on the SOCAL Range Complex based on the description of sonar use in the previous action (2018 Hawaii-Southern California Training and Testing EIS/OEIS). According to the model, only a ten-fold increase in sonar activity combined with a shift in geographical location to overlap with main feeding areas of blue whales would result in a moderate decrease in lifetime reproductive success. Even in such extreme instances, there was still no effect on survival (Pirotta et al., 2022).

The limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals, although individuals who suffer an auditory injury may experience minor energetic costs. Most predicted effects are temporary auditory effects that are unlikely to contribute to any long-term effects to individuals. Long-term consequences to the stock are unlikely.

Additionally, the same hull-mounted active sonar systems present on ships homeported in the HCTT Study Area and elsewhere have been in common use for over 40 years. Blue whales have been feeding in the California Study Area for the past 40 years and there has been no evidence of any disruption to blue whale feeding caused by Navy training and testing activities. Recent information suggests blue whales in the Eastern North Pacific Stock have recovered and are at a stable level. In short, there has been no evidence to suggest any effect, let alone any significant impact, to blue whale feeding activity

resulting from decades of Navy training and testing off California involving the use of sonar and other transducers. There is no evidence to suggest that limiting the use of sonar and other transducers in portions of the California Study Area that overlap with the revised blue whale BIAs would be beneficial to those behaviors. Therefore, the predicted temporary auditory effects on blue whales and behavioral responses by blue whales as they feed in the Study Area would be short-term and mild to moderate and are not expected to significantly disrupt feeding behaviors or impact overall species survivability.

K.4.1.3 Action Proponent Requirements for Area Specific Training and Testing

The portion of the revised blue whale BIAs within the California Study Area extends over 100 mi. from the coastline and encompasses every primary training site within the California Study Area. Spatially, blue whales may be present anywhere within the waters off California. Temporally, blue whales may be present for approximately 8 months of the year at feeding grounds in the Southern California Bight, mainly between June and November, before migrating farther south (Gulf of California) in colder months to breed.

The waters offshore of California have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like San Diego, CA.

The training and testing areas encompassed by the revised blue whale BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Southern California are not available elsewhere. They include the following: PMSR, the instrumented Southern California Offshore Anti-Submarine Warfare Range (SOAR); Shallow Water Training Range (SWTR); established helicopter sonar dipping areas, proximate to Naval Air Station North Island; Tanner Bank Minefield and mine training ranges; a sonobuoy test area; the Camp Pendleton Amphibious Assault Area; amphibious approach lanes; and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

Given the operating tempo requirements for maintaining continual cycles of training and testing in the California Study Area, rescheduling activities outside of the 6 months when blue whales would be accessing feeding grounds within the waters off California or reducing the number of training or testing activities during the warm season would not allow Navy to meet its readiness requirements. Similarly, Navy offshore instrumented ranges are typically used and scheduled for most of the year. There are no alternative instrumented ranges in the SOCAL Range Complex or PMSR, or elsewhere within close proximity to units homeported in Southern California, and there is insufficient excess capacity to avoid or reschedule training and testing cycles at these locations to occur outside the 6-months of the year when blue whales are feeding in the area.

K.4.1.4 Blue Whale Feeding Area Mitigation Assessment

As discussed in Section K.4.1.2.1. (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that the overwhelming majority of effects to blue whales would occur in the SOCAL Range Complex from training and testing activities involving sonar, split evenly between the warm and cold seasons. However, most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals. Scientific data does not support a conclusion that significant effects on blue whale feeding behavior are occurring from Navy training and testing activities. Therefore halting, reducing, or otherwise limiting the use of explosives, air guns, or sonar and

other transducers in the area when blue whales may be generally present would not be effective at reducing effects on blue whale feeding activity.

As discussed in Section K.6 (Mitigation Areas to be Implemented), the existing California Large Whale Awareness Message Mitigation Area and Southern California Blue Whale Mitigation Area (Figure K-27), and the California Large Whale Real-Time Notification Mitigation Area, will continue to be implemented as they provide a benefit to blue whales when in the area feeding. In addition, the proposed Northern and Central California Large Whale Mitigation Areas (Figure K-27) would be implemented as described in Section K.6.1.1.1 (Northern and Central California Large Whale Mitigation Areas) to the benefit of multiple large whale species, including blue whales, when in the area.

K.4.2 Gray Whale Migratory and Reproductive Areas

K.4.2.1 Biological Considerations Applicable to the Gray Whale Migration and Reproduction Biologically Important Areas

NMFS recognizes two stocks of gray whales in the North Pacific: the Eastern North Pacific stock and the Western North Pacific stock (Weller et al., 2013). Both stocks could be present in the California Study Area during their northward and southward migrations (Mate et al., 2015a; Sumich & Show, 2011). The Western North Pacific Stock has previously been known as the Korean-Okhotsk population (Carretta et al., 2023). This stock is critically endangered, shows no apparent signs of recovery, and should be very rare in the California Study Area given their low abundance; however, gray whales from this stock are known to migrate along the West Coast (Calambokidis et al., 2024).

Gray whales are known to make one of the longest annual migrations of any mammal, 15,000–20,000 km roundtrip (Jefferson et al., 2015; Jones & Swartz, 2009). Eastern North Pacific gray whales begin their migration from breeding areas off Mexico and along the coast of North America in late fall through early spring to reach foraging areas by summer (Carretta et al., 2023; Urbán et al., 2021; Weller et al., 2012) and would only be present in the California Study Area during northbound and southbound migrations. A year-long (2013-2014) survey effort in the nearshore waters off San Diego within the HCTT Action Area encountered gray whales in January, February, and in the April-June timeframe (Graham & Saunders, 2015).

The timing of the October-July gray whale migrations that pass through the California Study Area can be loosely categorized into three phases (Calambokidis et al., 2015b; Jones & Swartz, 2009; Mate et al., 2013; Mate et al., 2015a; Mate & Urban-Ramirez, 2003; Rugh et al., 2008; Rugh et al., 2005; Urbán et al., 2021). Calambokidis et al. (2015b) noted these migration phases are not distinct; the timing for a phase may vary based on environmental variables, and that a migration phase typically begins with a rapid increase in migrating whales, followed by moderate numbers over a period of weeks, and then slowly tapering off. A southward migration from summer feeding areas includes all age classes as they migrate primarily to the nearshore waters and lagoons of Baja California, Mexico. During this southward migration from October through March, the whales generally are within 10 km of the coast (Calambokidis et al., 2015b) although there are documented exceptions where migrating gray whales have bypassed the coast by crossing sections of the open ocean (Mate et al., 2015a; Mate & Urban-Ramirez, 2003). In the HCTT Action Area, migrating gray whales may deviate farther from the mainland as some are routinely seen near the Channel Islands and to the west of San Clemente Island (Sumich & Show, 2011)

In 2015, four migratory BIAs were delineated off the U.S. West Coast for the Eastern North Pacific stock of gray whales (Calambokidis et al., 2015c). The four areas were defined by season as well as age and

sex classes to capture the variation in migratory behavior of the species. Calambokidis et al. (2024) modified the BIA delineations by incorporating new data and historical sightings, focusing on regional differences in migratory behavior, considering that the Phase B northbound migration used by mother-calf pairs should also be treated as a reproductive BIA, and applying the new parent-child hierarchy to further define areas of use by migrating whales. The revised migratory BIAs are listed below in Table K-8 and shown in Figure K-22:

Table K-8: Gray Whale Revised BIAs

BIA Level	BIA Name	BIA Time Period	BIA Size (sq. km)
Parent	West Coast to Gulf of Alaska	June – November	167,103
Child	Southbound	November – February	70,112
Child	Northbound Phase A	January – May	65,048
Child	Northbound Phase B	March – May	51,949

The parent migratory BIA was revised from the original southbound BIA defined by Calambokidis et al. (2015c) and extended north to connect with the Gulf of Alaska migratory BIA (Wild et al., 2023). The revised BIA is also referred to as the transboundary migratory BIA. The southbound (child) BIA is for all age and sex classes and extends 10 km from shore off California (and broadens to 15 km off Oregon and 30 km off Washington). The Northbound Phase A (child) BIA, primarily for adults and juveniles, extends 8 km from shore off California, and broadens to 15 km off Oregon and 20 km off Washington. The Northbound Phase B (child) BIA is primarily for mother-calf pairs and extends 5 km from shore north of the Southern California Bight and falls entirely within the Northbound Phase A (child) BIA.

Calambokidis et al. (2024) noted that two satellite-tagged Western North Pacific gray whales were documented using migratory corridors off the U.S. West Coast; however, the data used to delineate the BIAs were almost entirely from gray whales in the Eastern North Pacific stock.

In addition to the migratory BIAs, a reproductive BIA was delineated to coincide with the Northbound Phase B (child) migratory BIA for mother-calf pairs (Figure K-23), and a feeding BIA, which is located north of the Action Area, off the coast of the Pacific Northwest.

Based on the identified migratory seasons, gray whales should occur off the California coast for most of the year with the exception of the July – October timeframe (Calambokidis et al., 2024; Calambokidis et al., 2015b).

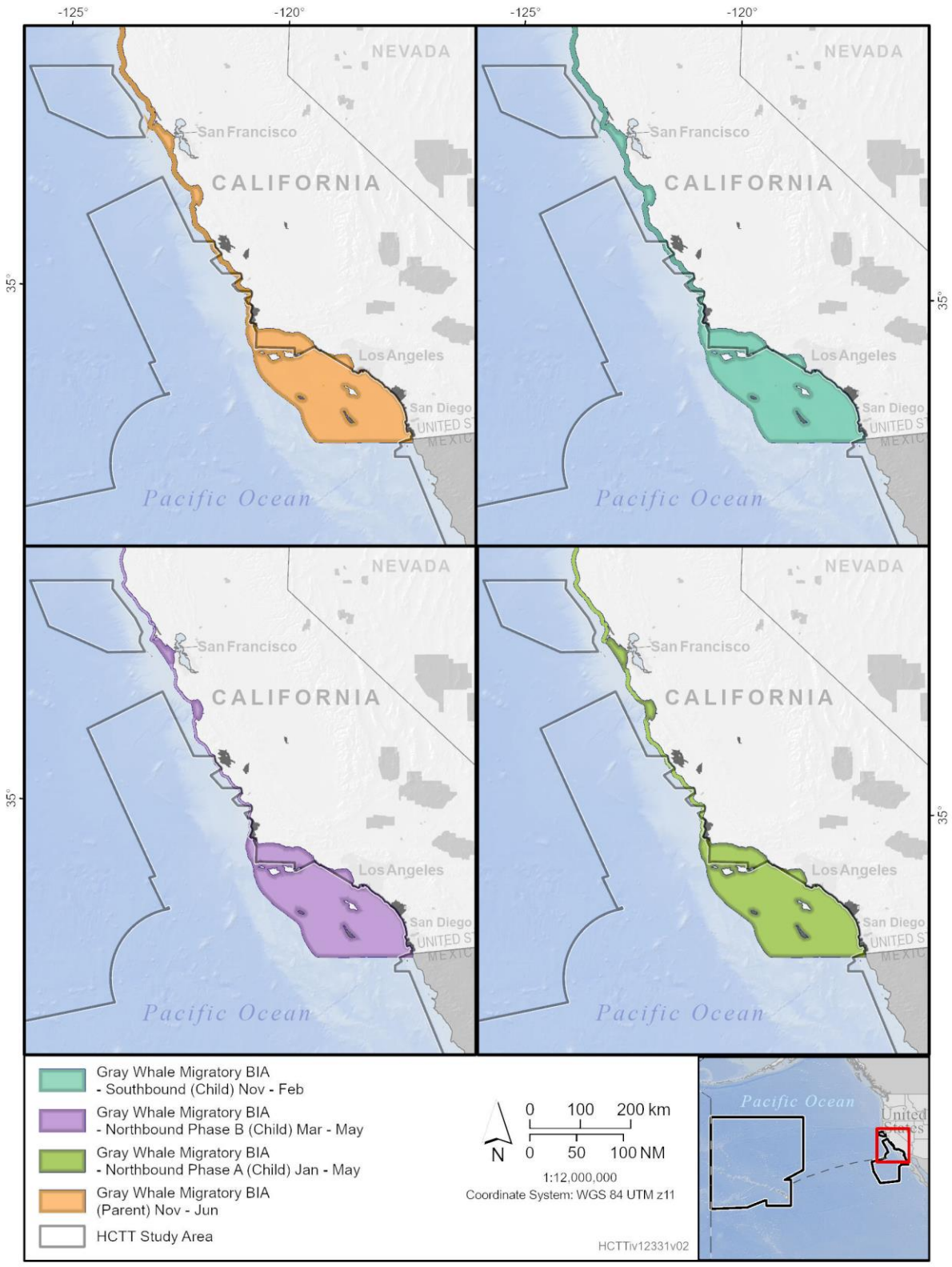

Figure K-20: Gray Whale Migratory BIAs Off California

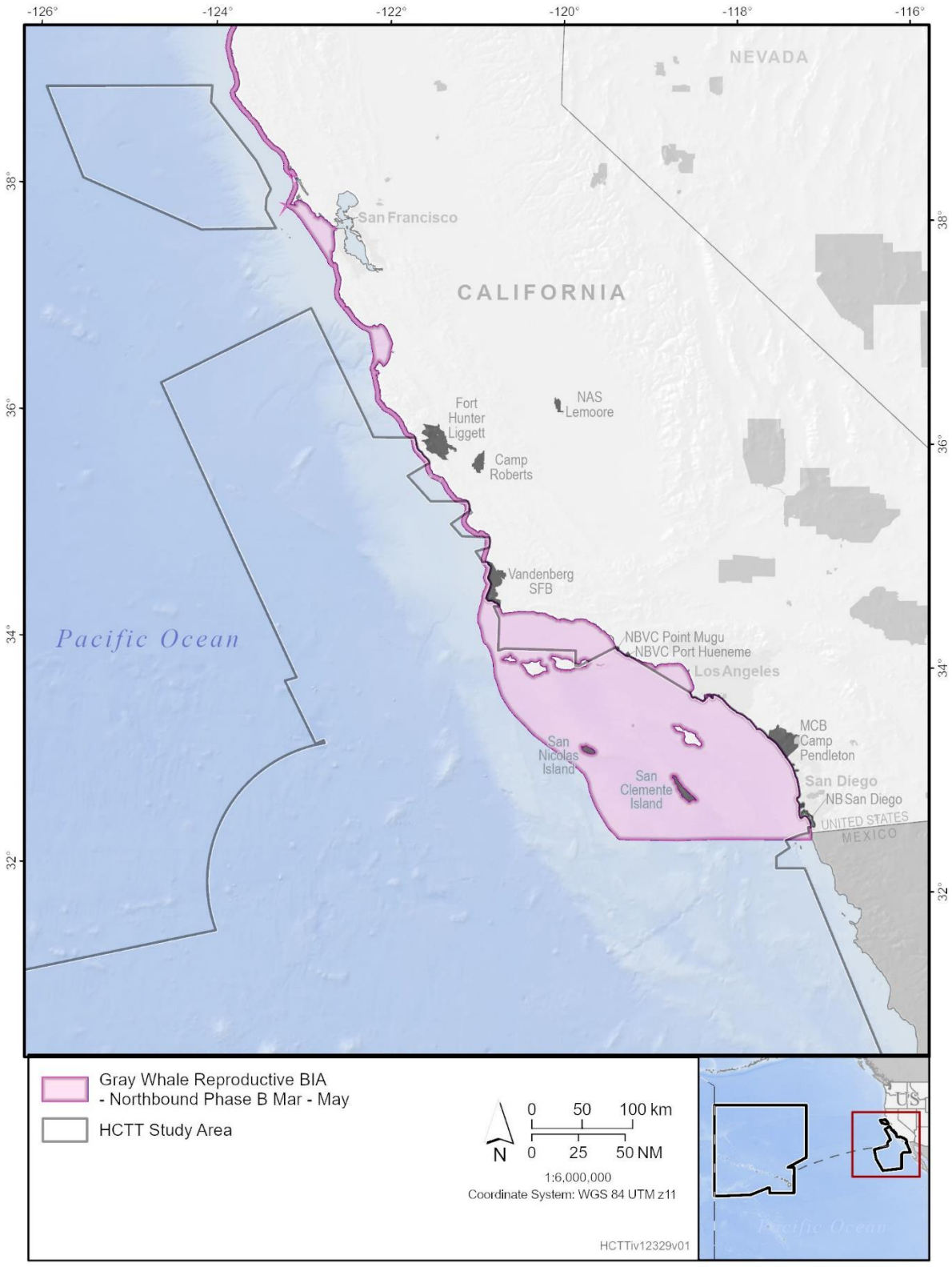

Figure K-21: Gray Whale Reproductive BIA Off California

K.4.2.2 Stressor Analysis

K.4.2.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting gray whales and their migration and reproductive behavior. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 97 percent of effects are predicted to occur in the SOCAL Range Complex during the cold season as the whales migrate north towards the Bering Sea to forage in the summer. 95 percent of the behavioral, 95 percent of the temporary threshold shift, and 77 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. No effects are predicted from the training and testing activities involving air guns.

On average, individuals in the Eastern North Pacific stock would be impacted less than once per year. The average risk of injury is very low, although it is likely that some auditory injuries could occur, particularly from sonar during anti-submarine warfare activities. The risk of injury for this stock of gray whales may be reduced through activity-based mitigation. The risk of repeated effects on individuals and consequences to populations from disturbances of individuals can be mediated by certain life history traits of a species. Gray whales are large capital breeders with a slow pace of life.

The limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals, although individuals who suffer an auditory injury may experience minor energetic costs. Most predicted effects are temporary auditory effects that are unlikely to contribute to any long-term effects to individuals. Long-term consequences to the stock are unlikely.

Additionally, the same hull-mounted active sonar systems present on ships homeported in the HCTT Study Area and elsewhere have been in common use for over 40 years. Gray whales have been migrating directly through the California Study Area twice a year during the past 40 years and there has been no evidence of any disruption to gray whale migration or reproduction caused by Navy training and testing activities. During that time, gray whales in the Eastern North Pacific Stock have recovered to the point where they are no longer listed under the ESA. In short, there has been no evidence to suggest any effect, let alone any significant impact, to gray whale migration or reproduction activity resulting from decades of Navy training and testing off California involving the use of sonar and other transducers. There is no evidence to suggest that limiting the use of sonar and other transducers in portions of the California Study Area that overlap with the revised gray whale migratory and reproductive BIAs would be beneficial to those behaviors. Therefore, the predicted temporary auditory effects on gray whales and behavioral responses by gray whales as they migrate through the Study Area, almost exclusively on their northward migration, would be short-term and mild to moderate and are not expected to significantly disrupt migratory or reproductive behaviors.

K.4.2.3 Action Proponent Requirements for Area-Specific Training and Testing

The portion of the revised gray whale BIAs within the California Study Area extends over 100 mi. from the coastline and encompasses every primary training site within the California Study Area. Spatially, migrating gray whales may be present anywhere within the waters off California. Temporally, gray whales may be present most of the year, migrating north January through May and south November through February. While not illustrated or addressed in Calambokidis et al. (2024) these migration routes extend south of the U.S. border with Mexico along the Baja California Peninsula, Mexico and mostly shoreward of the SOCAL Range Complex (U.S. Department of the Navy, 2024).

The waters offshore of California have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like San Diego, CA.

The training and testing areas encompassed by the revised gray whale BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Southern California are not available elsewhere. They include the following: PMSR, the instrumented SOAR; SWTR; established helicopter sonar dipping areas, proximate to Naval Air Station North Island; Tanner Bank Minefield and mine training ranges; a sonobuoy test area; the Camp Pendleton Amphibious Assault Area; amphibious approach lanes; and other complex bathymetric features necessary to challenge anti-submarine warfare skills. South of the U.S. – Mexico border, the migration route overlaps the Tactical Maneuvering Areas and Missile Range Areas located offshore of the gray whale calving areas adjacent to the Baja California Peninsula.

Given the operating tempo requirements for maintaining continual cycles of training and testing in the California Study Area, rescheduling activities outside of the 5 months of the gray whale migration (cold season when most predicted effects would occur) or reducing the number of training or testing activities during that migration season would not allow Navy to meet its readiness requirements. Similarly, Navy offshore instrumented ranges are typically used and scheduled for most of the year. There are no alternative instrumented ranges in the SOCAL Range Complex or PMSR, or elsewhere within close proximity to units homeported in Southern California, and there is insufficient excess capacity to avoid or reschedule training and testing cycles at these locations to occur outside the 5-months of the year when gray whales are migrating through the area.

K.4.2.4 Gray Whale Migration and Reproduction Area Geographic Mitigation Assessment

As discussed in Section K.4.2.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that the overwhelming majority of effects to gray whales would occur in the SOCAL Range Complex from training and testing activities involving sonar during the cold season as the whales migrate north towards the Bering Sea to forage in the summer. However, most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals. Scientific data does not support a conclusion that significant effects on gray whale migratory or reproductive behavior are occurring from Navy training and testing activities. Therefore halting, reducing, or otherwise limiting the use of explosives, air guns, or sonar and other transducers in the area when gray whales may be generally present would not be effective at reducing effects on gray whale migration or reproduction.

Navy training and testing require the use of the California Study Area throughout the year. Restricting use of that area when gray whales are present would have significant effects on the Navy mission and

readiness requirements. Geographic mitigation would not be effective at reducing significant effects on gray whale migration and reproduction within the California Study Area since none are occurring regardless of implementing mitigation. Therefore, based on the analysis presented above, additional specific geographic mitigation for gray whales is not recommended beyond what is currently being implemented.

As discussed in Section K.6 (Mitigation Areas to be Implemented), the existing California Large Whale Awareness Message Mitigation Area (Figure K-27) and the California Large Whale Real-Time Notification Mitigation Area will continue to be implemented as they provide a benefit to gray whales when migrating through the area or when engaged in reproductive activity in the area. In addition, the proposed Northern and Central California Large Whale Mitigation Areas (Figure K-27) would be implemented as described in Section K.6.1.1.1 (Northern and Central California Large Whale Mitigation Areas) to the benefit of multiple large whale species, including gray whales, when in the area.

K.4.3 Fin Whale Feeding Areas

K.4.3.1 Biological Considerations Applicable to the Fin Whale Feeding Areas

NMFS recognizes three stocks of fin whales in the North Pacific, all of which are listed as endangered under the ESA: the Northeast Pacific stock in Alaska; the California, Oregon, and Washington stock; and the Hawaii stock (Carretta et al., 2023; Young, 2023). Although some fin whales migrate seasonally (Falcone et al., 2011; Mate et al., 2016; Mate et al., 2015b), only the California, Oregon, and Washington stock could be present in the California Study Area.

Fin whales calls have frequently been recorded in waters within the California Study Area (Barlow & Forney, 2007; Campbell et al., 2015; Jefferson et al., 2014; Mate et al., 2016, 2017; Mizroch et al., 2009; Širović et al., 2016; Širović et al., 2004; Širović et al., 2015; Smultea & Jefferson, 2014). As demonstrated by satellite tags and discovery tags[3], fin whales make long-range movements along the entire U.S. west coast (Falcone et al., 2011; Mate et al., 2015b; Mizroch et al., 2009). However, photo-identification studies of fin whales off the U.S. west coast suggest that not all fin whales undergo long seasonal migrations, but instead make short seasonal trips in spring and fall (Falcone et al., 2011; Falcone & Schorr, 2011).

Based on predictive habitat-based density models derived from line-transect survey data collected between 1991 and 2018 off the U.S. west coast, relatively high densities of fin whales are predicted off southern California during the summer and fall with fewer occurring in winter and spring (Barlow et al., 2009a; Becker et al., 2020; Becker et al., 2012a; Becker et al., 2022a; Calambokidis et al., 2024; Forney et al., 2012). Aggregations of fin whales are present year-round in southern and central California (Campbell et al., 2015; Douglas et al., 2014; Forney & Barlow, 1998; Forney et al., 1995; Jefferson et al., 2014), although their distribution shows seasonal shifts. Sightings from year-round surveys off southern California from 2004 to 2013 show fin whales farther offshore in summer and fall and closer to shore in winter and spring (Campbell et al., 2015; Douglas et al., 2014).

[3] As a means of data collection starting in the 1930s, discovery tags having a serial number and return address were shot into the blubber of the whale by scientists and if that whale was later harvested by the whaling industry and the tag "discovered" during flensing, it could be sent back to the researchers providing data on the movement of individual whales.

During the first phase of BIA development, the best available science was not sufficient to define BIAs for fin whale behavior off California (Calambokidis et al., 2015b). A combination of sightings, satellite tagging data, and habitat-based distribution models has since enabled researchers to define fin whale feeding BIAs along the west coast (Calambokidis et al., 2024) (Figure K-24). The parent BIA encompasses approximately 315,000 km^2 and 38 percent of the U.S. West Coast EEZ and is the largest BIA designated off the West Coast. The core BIA is 49 percent of the parent BIA (approximately 155,000 km^2) (Calambokidis et al., 2024). The BIAs are in effect from June through November.

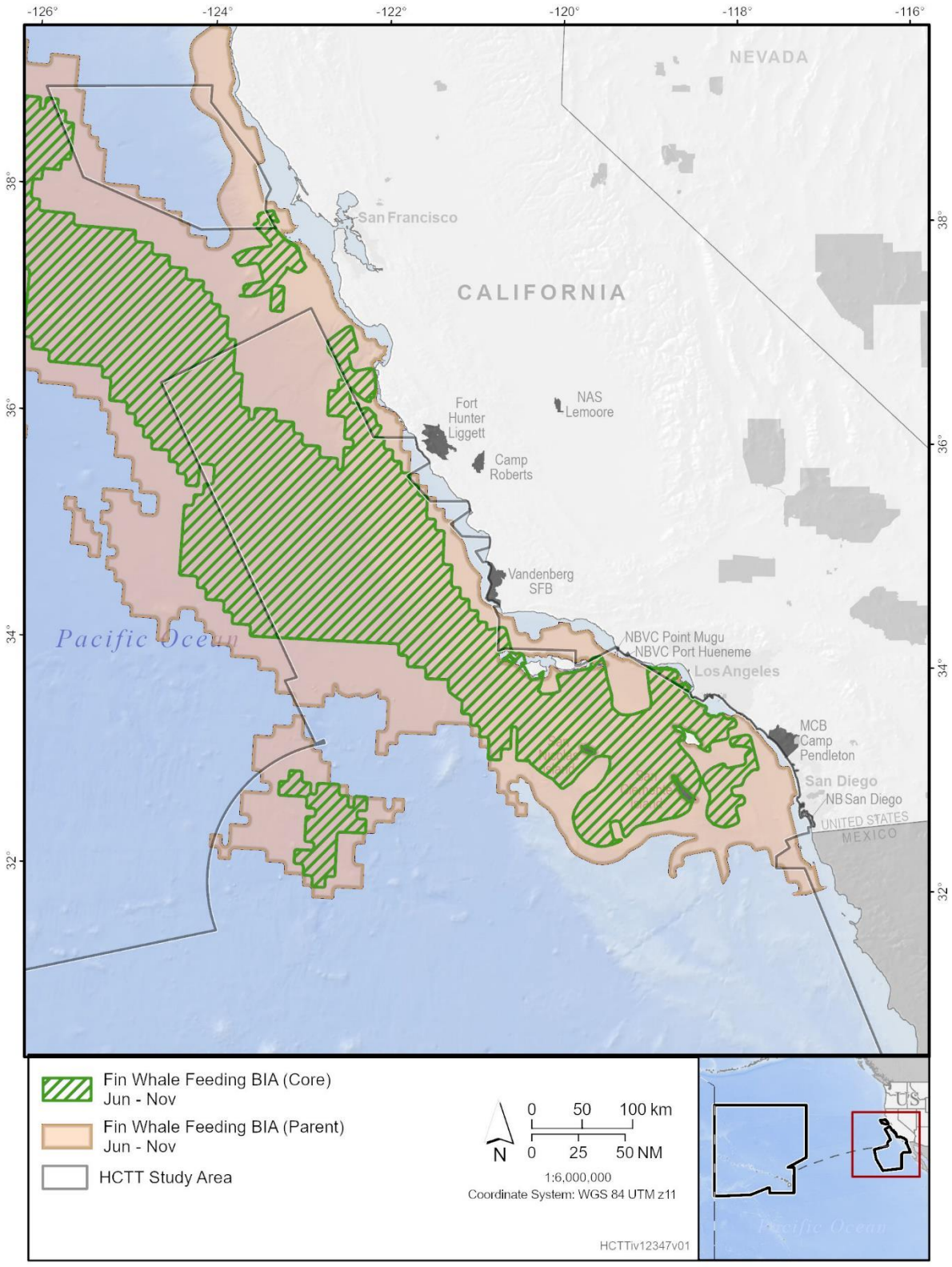

Figure K-22: Fin Whale Feeding BIAs Off California

K.4.3.2 Stressor Analysis

K.4.3.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting fin whales and their feeding behavior. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 51 percent of effects are predicted to occur in the SOCAL Range Complex, with 28 percent occurring during the warm season and 23 percent occurring during the cold season. 23 percent and 25 percent of effects are predicted to occur in PMSR and the NOCAL Range complex, respectively, with the vast majority of those effects occurring during the warm season while fin whales spend time at feeding grounds off the U.S. West Coast. 95 percent of the behavioral, 98 percent of the temporary threshold shift, and 80 percent of the acoustic injury takes would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Negligible effects are predicted from the training and testing activities involving air guns because less than one behavioral and temporary threshold shift takes are predicted per year.

On average, individuals in the California, Oregon, and Washington stock could be impacted about once a year. The average risk of injury is low, although auditory injuries are predicted for the California, Oregon, and Washington stock. The stock's risk of auditory injury from Navy testing sonar is also low (less than one) in any year, but an auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). The impact from Navy training explosives is very low (less than one) in any year, but a non-auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach. The risk of these injuries may be reduced through activity-based mitigation.

On average, the limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals, although individuals who suffer an injury may experience minor energetic costs. Most predicted effects are temporary auditory effects that are unlikely to contribute to any long-term effects to individuals. Long-term consequences to the stock are unlikely. Therefore, long-term consequences to fin whales are unlikely.

Additionally, the same hull-mounted active sonar systems present on ships homeported in the HCTT Study Area and elsewhere have been in common use for over 40 years. Fin whales have been feeding in the California Study Area for the past 40 years and there has been no evidence of any disruption to fin whale feeding caused by Navy training and testing activities. In short, there has been no evidence to suggest any effect, let alone any significant impact, to fin whale feeding activity resulting from decades of Navy training and testing off California involving the use of sonar and other transducers. There is no evidence to suggest that limiting the use of sonar and other transducers in portions of the California

Study Area that overlap with the revised fin whale BIAs would be beneficial to those behaviors. Therefore, the predicted temporary auditory effects on fin whales and behavioral responses by fin whales as they feed in the Study Area would be short-term and mild to moderate and are not expected to significantly disrupt feeding behaviors or impact overall species survivability.

K.4.3.3 Action Proponent Requirements for Area-Specific Training and Testing

The portion of the fin whale BIAs within the California Study Area extends over 100 mi. from the coastline and encompasses every primary training site within the California Study Area. Spatially, fin whales may be present anywhere within the waters off California. Temporally, fin whales may be present most of the year, but would most likely be present within the waters off California while at feeding grounds between the months of June and November.

The waters offshore of California have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like San Diego, CA.

The training and testing areas encompassed by the fin whale BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Southern California are not available elsewhere. They include the following: NOCAL Range Complex, PMSR, the instrumented SOAR; SWTR; established helicopter sonar dipping areas, proximate to Naval Air Station North Island; Tanner Bank Minefield and mine training ranges; a sonobuoy test area; the Camp Pendleton Amphibious Assault Area; amphibious approach lanes; and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

Given the operating tempo requirements for maintaining continual cycles of training and testing in the California Study Area, rescheduling activities outside of the 6 months when fin whales would be accessing feeding grounds within the waters off California (warm season when most predicted effects would occur) or reducing the number of training or testing activities during the warm season would not allow Navy to meet its readiness requirements. Similarly, Navy offshore instrumented ranges are typically used and scheduled for most of the year. There are no alternative instrumented ranges in the SOCAL Range Complex or PMSR, or elsewhere within close proximity to units homeported in Southern California, and there is insufficient excess capacity to avoid or reschedule training and testing cycles at these locations to occur outside the 6-months of the year when fin whales are feeding in the area.

K.4.3.4 Fin Whale Feeding Area Geographic Mitigation Assessment

As discussed in Section K.4.3.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that approximately 50 percent of effects to fin whales would occur in the SOCAL Range Complex from training and testing activities involving sonar during either the warm or cold season. The other 50 percent of effects are split evenly between PMSR and the NOCAL Range Complex and would predominantly occur during the warm season in both areas. However, the overwhelming majority of effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals. Scientific data does not support a conclusion that significant effects on fin whale feeding behavior are occurring from Navy training and testing activities. Therefore halting, reducing, or otherwise limiting the use of explosives, air guns, or sonar and other transducers in the area when fin whales may be generally present would not be effective at reducing effects on fin whale feeding activity.

Navy training and testing require the use of the California Study Area throughout the year. Restricting use of that area when fin whales are present would have significant effects on the Navy mission and readiness requirements. Geographic mitigation would not be effective at reducing significant effects on fin whale feeding activity within the California Study Area since none are occurring regardless of implementing mitigation. Therefore, based on the analysis presented above, additional specific geographic mitigation for fin whales is not recommended beyond what is currently being implemented.

As discussed in Section K.6 (Mitigation Areas to be Implemented), the existing California Large Whale Awareness Message Mitigation Area (Figure K-27) and the California Large Whale Real-Time Notification Mitigation Area will continue to be implemented as they provide a benefit to fin whales when feeding in the area. In addition, the proposed Northern and Central California Large Whale Mitigation Areas (Figure K-27) would be implemented as described in Section K.6.1.1.1 (Northern and Central California Large Whale Mitigation Areas) to the benefit of multiple large whale species, including fin whales, when in the area.

K.4.4 Humpback Whale Feeding Areas

K.4.4.1 Biological Considerations Applicable to the Humpback Whale Feeding Areas

NMFS recognizes 14 DPSs of humpback whales worldwide, with four DPSs occurring in the North Pacific (Carretta et al., 2023). Humpback whales that occur seasonally in the HCTT Study Area are from three of the four DPSs identified by low-latitude wintering habitats: Hawaii DPS, Mexico DPS, and Central America DPS (Bettridge et al., 2015; Carretta et al., 2023; National Marine Fisheries Service, 2016b; Young, 2023). The three previously defined stocks of North Pacific humpback whales did not align with the DPS structure, so NMFS reevaluated the stock structure to incorporate both the locations of foraging and overwintering areas and population demographics. As a result, NMFS defined five stocks in the North Pacific:

6. Central America/Southern Mexico-California-Oregon-Washington stock
7. Mainland Mexico-California-Oregon-Washington stock
8. Mexico-North Pacific stock
9. Hawaii stock
10. Western North Pacific stock

Of the five stocks listed above, two are found in the California Study Area: Central America/Southern Mexico-California-Oregon-Washington and Mainland Mexico-California-Oregon-Washington. Humpback whales from the Mainland Mexico-California-Oregon-Washington stock, which are listed as threatened under the ESA, migrate to summer foraging habitat from California northward along the U.S. West Coast, Canada, Alaska, into the Bering Sea, and off the coast of Russia. Humpback whales from the Central America/Southern Mexico-California-Oregon-Washington stock, which are listed as endangered under the ESA, forage in waters off California and the Pacific Northwest (Carretta et al., 2023).

Off the U.S. west coast, humpback whales are more abundant in shelf and slope waters (<2,000 m deep), and are often associated with areas of high productivity (Becker et al., 2020; Becker et al., 2010; Becker et al., 2012b; Becker et al., 2014; Forney et al., 2012; Redfern et al., 2013). While most humpback whale sightings are in nearshore and continental shelf waters, humpback whales frequently travel through deep oceanic waters during migration (Calambokidis et al., 2001; Clapham, 2000; Clapham & Mattila, 1990; Mate et al., 1997). Humpback whales migrating from breeding grounds in Central America to feeding grounds at higher latitudes may cross the California Study Area including the Transit Corridor

located farther offshore. While most humpback whales migrate, data from surveys conducted between 2004 and 2013 show that humpback whales occur year-round off southern California (Campbell et al., 2015). Peak occurrence during migration occurs in the California Study Area from December through June (Calambokidis et al., 2015a). During late summer, more humpback whales are sighted north of the Channel Islands, and limited occurrence is expected south of the northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz) (Carretta et al., 2010). Based on aerial survey data collected between 2008 and 2012 in the California Study Area, Smultea and Jefferson (2014) determined that humpback whales ranked eighth in relative occurrence and concluded that this species has clearly increased their representation in the Navy's SOCAL Range Complex over the last several decades

Two BIAs (parent and core) for humpback whale feeding behavior have been identified in the California Study Area (Figure K-25). The parent BIA encompasses approximately 140,000 km^2 equivalent to 20% of the area of the U.S. West Coast EEZ, and the core BIA encompasses approximately 38,000 km^2 (Calambokidis et al., 2024). The BIAs are only in effect from March through November when foraging humpback whales are expected to be present. The core BIA is 27% of the parent BIA but is still a little over 50% larger than the previous Humpback Whale feeding BIAs defined in 2015.

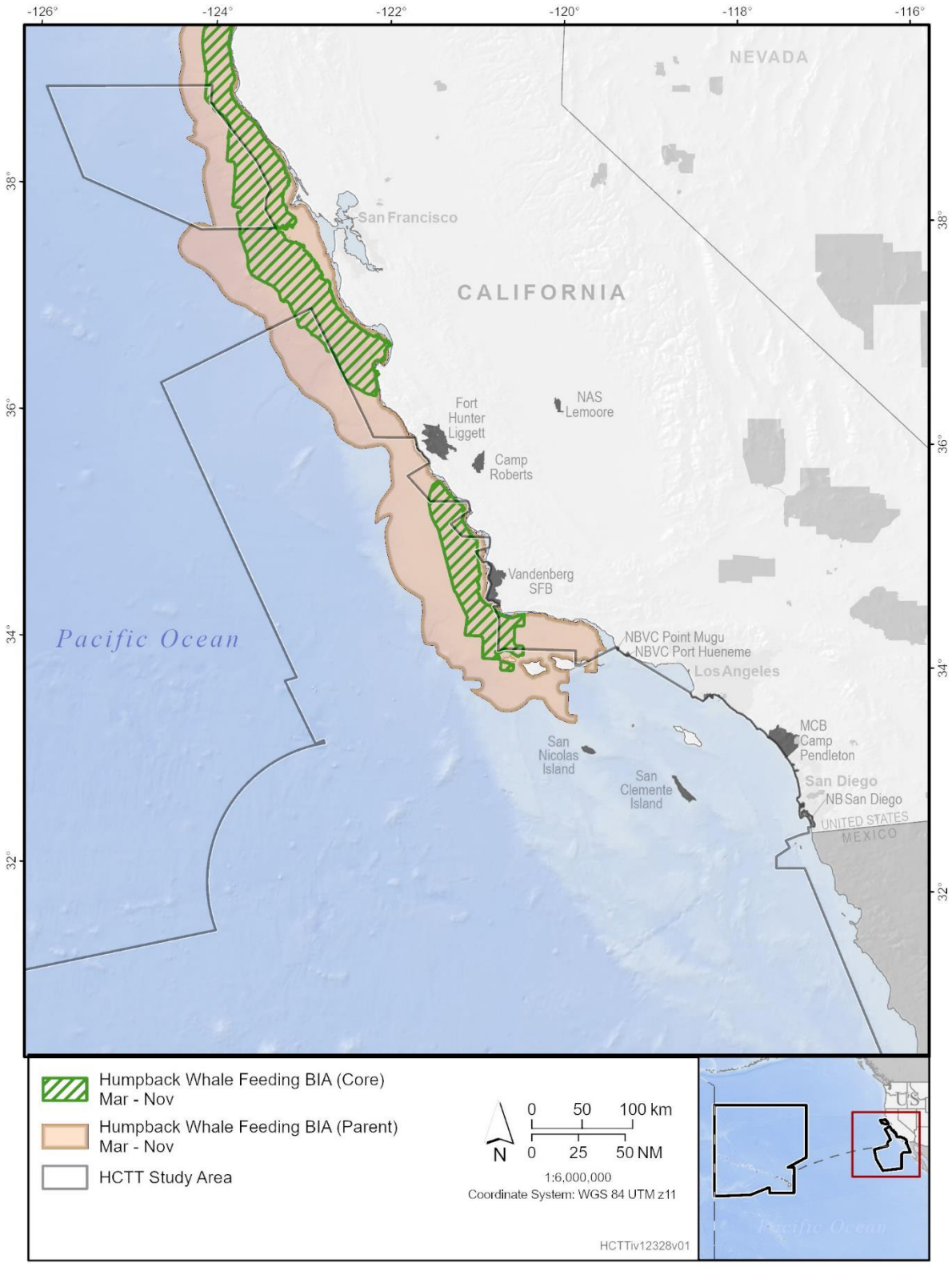

Figure K-23: Humpback Whale Feeding BIAs Off California

K.4.4.2 Stressor Analysis

K.4.4.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting humpback whales and their feeding behavior. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 51 percent of effects to the Central America/Southern Mexico-California-Oregon-Washington stock are predicted to occur in the SOCAL Range Complex during the cold season, and 5 percent would occur during the warm season. 14 percent of effects would occur in PMSR during the cold season, 6 percent would occur during the warm season, and 17 percent would occur in the NOCAL Range Complex during the warm season with 6 percent occurring during the cold season. 94 percent of the behavioral, 97 percent of the temporary threshold shift, and 89 percent of the acoustic injury takes to the Central America/Southern Mexico-California-Oregon-Washington stock would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIAs, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

For the Mainland Mexico-California-Oregon-Washington stock, 52 percent of effects are predicted to occur in the SOCAL Range Complex during the cold season, and 6 percent would occur during the warm season. 12 percent of effects would occur in PMSR during the cold season, 6 percent would occur during the warm season, and 17 percent would occur in the NOCAL Range Complex during the warm season with 6 percent occurring during the cold season. The remaining 1 percent of effects would occur on the high seas outside of the Study Area. 95 percent of the behavioral, 96 percent of the temporary threshold shift, and 91 percent of the acoustic injury takes to the Mexico-North Pacific and Mainland Mexico-California-Oregon-Washington stocks would result from training and testing activities involving sonar.

Any exposure to an explosive stressor would be highly infrequent as documented from multiple years of Navy-funded passive acoustic monitoring (Debich et al., 2014) and variable individual unit level training schedules with prolonged periods of absence at sea between successive events. In addition, modeled takes from training and testing activities involving explosives make up a small percentage of the overall takes as shown in the Acoustic and Explosive Effects Analysis Report. Negligible effects are predicted from the training and testing activities involving air guns because less than one behavioral and temporary threshold shift takes are predicted per year.

On average, individuals in the Central America/Southern Mexico-California-Oregon-Washington and Mainland Mexico-California-Oregon-Washington stocks humpback whales could be impacted about once a year. These effects are most likely to occur in the cold season when humpbacks would be feeding along California within the Study Area. The average risk of injury is low, although it is likely that some auditory injuries could occur, particularly from sonar activities during Navy training events. The risk of a single non-auditory injury from testing explosives is low (less than one) in any year for the Mainland Mexico-California-Oregon-Washington stock, but a non-auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). This auditory injury is shown in the maximum year of effects per the summation and rounding approach discussed above. The risk of injury may be reduced through activity-based mitigation.

The limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals, although individuals who suffer an auditory or non-auditory injury may experience minor energetic costs. Most predicted effects are temporary auditory effects that are unlikely to contribute to any long-term effects to individuals. Long-term consequences to the stocks are unlikely.

Additionally, the same hull-mounted active sonar systems present on ships homeported in the HCTT Study Area and elsewhere have been in common use for over 40 years. Humpback whales have been feeding in the California Study Area during the past 40 years and there has been no evidence of any disruption to humpback feeding behavior caused by Navy training and testing activities. In addition, humpback whales abundance off the U.S. west coast has appeared to increase at a rate of approximately 8% per year since 1989 (Calambokidis & Barlow, 2020). However, since multiple humpback whale stocks occur in these waters, this overall trend cannot be assumed for each of the individual stocks. In short, there has been no evidence to suggest any effect, let alone any significant impact, to humpback whale feeding activity resulting from decades of Navy training and testing off California involving the use of sonar and other transducers. There is no evidence to suggest that limiting the use of sonar and other transducers in portions of the California Study Area that overlap with the revised humpback whale feeding BIAs would be beneficial to those behaviors. Therefore, the predicted temporary auditory effects on humpback whales and behavioral responses by humpback whales as they feed within the Study Area would be short-term and mild to moderate and are not expected to significantly disrupt feeding behaviors.

K.4.4.3 Action Proponent Requirements for Area-Specific Training and Testing

The portion of the humpback whale BIAs within the California Study Area extends over 100 mi. from the coastline and encompasses some training sites within the California Study Area. Spatially, humpback whales may be present anywhere within the waters off California. Temporally, humpback whales may be present most of the year, but would most likely be present within the waters off California while at feeding grounds within the California Study Area between the months of March and November.

The waters offshore of California have supported naval training and testing for decades and are used almost daily by naval forces to conduct all phases of training and testing, from basic unit level events to complex major training exercises. Military readiness depends on access to the training and testing areas in close proximity to force concentration areas like San Diego, CA.

The training and testing areas encompassed by the humpback whale BIAs provide critical capabilities necessary to conduct military readiness activities by forces homeported in Southern California are not available elsewhere. They include the following: NOCAL Range Complex, PMSR, amphibious approach lanes, and other complex bathymetric features necessary to challenge anti-submarine warfare skills.

Given the operating tempo requirements for maintaining continual cycles of training and testing in the California Study Area, rescheduling activities outside of the 9 months when humpback whales would be accessing feeding grounds within the waters off California or reducing the number of training or testing activities during the cold season when the majority of effects would occur would not allow Navy to meet its readiness requirements. Similarly, Navy offshore instrumented ranges are typically used and scheduled for most of the year. There are no alternative instrumented ranges in the SOCAL Range Complex or PMSR, NOCAL Range Complex, or elsewhere within close proximity to units homeported in Southern California, and there is insufficient excess capacity to avoid or reschedule training and testing

cycles at these locations to occur outside the 9-months of the year when humpback whales are feeding in the area.

K.4.4.4 Humpback Whale Feeding Area Geographic Mitigation Assessment

As discussed in Section K.4.4.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that approximately 58 percent of effects to humpback whales would occur in the SOCAL Range Complex from training and testing activities involving sonar during either the warm or cold season. However, the revised humpback whale feeding BIA does not overlap the SOCAL Range Complex. The other approximately 42 percent of effects are split relatively evenly between PMSR and the NOCAL Range Complex, which do overlap the BIA, and would occur during both the warm and cold season in both areas. The overwhelming majority of effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals. Scientific data does not support a conclusion that significant effects on humpback whale feeding behavior are occurring from Navy training and testing activities. Therefore halting, reducing, or otherwise limiting the use of explosives, air guns, or sonar and other transducers in the area when humpback whales may be generally present would not be effective at reducing effects on humpback whale feeding activity.

Navy training and testing require the use of the California Study Area throughout the year. Restricting use of that area when humpback whales are present would have significant effects on the Navy mission and readiness requirements. Geographic mitigation would not be effective at reducing significant effects on humpback whale feeding activity within the California Study Area since none are occurring regardless of implementing mitigation. Therefore, based on the analysis presented above, additional specific geographic mitigation for humpback whales is not recommended beyond what is currently being implemented.

As discussed in Section K.6 (Mitigation Areas to be Implemented), the existing California Large Whale Awareness Message Mitigation Area (Figure K-27) and the California Large Whale Real-Time Notification Mitigation Area will continue to be implemented as they provide a benefit to humpback whales when feeding in the area. In addition, the proposed Northern and Central California Large Whale Mitigation Areas (Figure K-27) would be implemented as described in Section K.6.1.1.1 (Northern and Central California Large Whale Mitigation Areas) to the benefit of multiple large whale species, including humpback whales, when in the area.

K.4.5 Harbor Porpoise Small and Resident Population Area

K.4.5.1 Biological Considerations Applicable to the Harbor Porpoise Small and Resident Population Area

Calambokidis et al. (2024) defined two non-hierarchical small and resident BIAs for the Monterey Bay and the Morro Bay stocks of harbor porpoise off California (Figure K-26). The Morro Bay BIA is 4,255 km^2 in size and the Monterey Bay BIA is 3,455 km^2 in size; both encompass waters from land to the 200-meter isobath within the defined ranges for the respective stocks, and are identical in size to the original BIAs defined in 2015 (Calambokidis et al., 2015c).

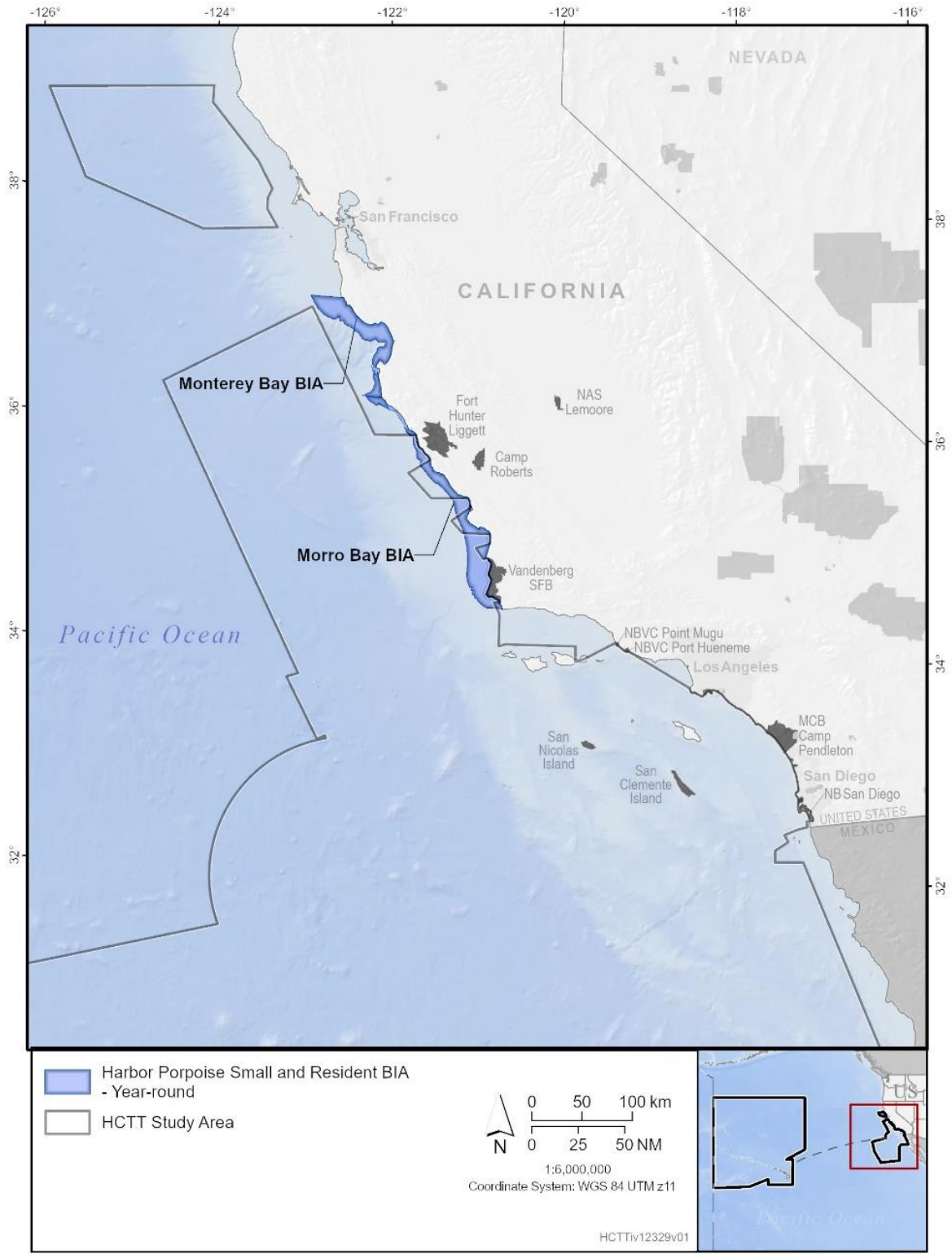

Figure K-24: Harbor Porpoise Small and Resident BIA Off California

K.4.5.2 Stressor Analysis

K.4.5.2.1 Explosives, Air Guns, and Sonar and Other Transducers

Explosives, air guns, and sonar and other active acoustic transducers create underwater acoustic energy potentially impacting the Monterey Bay and Morro Bay stocks of the harbor porpoise. Model-predicted effects from these stressors are presented in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

As shown in the Acoustic and Explosive Effects Analysis Report, 71 percent of effects to the Monterey Bay stock are predicted to occur in NOCAL Range Complex during the cold season, and the remaining 29 percent would occur in the same area during the warm season. Approximately 100 percent of effects were modeled to only result in behavioral takes, and less than one temporary threshold shift take would occur annually. No acoustic injury, physical injury, or mortality takes are expected. Additionally, approximately 100 percent of the behavioral takes to the Monterey Bay stock would result from training and testing activities involving sonar. For the quantitative analysis of effects to the species within the revised BIA, please see the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS).

For the Morro Bay stock, 73 percent of effects are predicted to occur in PMSR during the cold season, with 26 percent occurring during the warm season. The remaining one percent of effects would occur in the NOCAL Range Complex during the cold season. 98 percent of the behavioral, 22 percent of the temporary threshold shift, and 1 percent of the acoustic injury takes to the Morro Bay stock would result from training and testing activities involving sonar. The majority of temporary threshold shift and acoustic injury takes would result from training and testing activities involving explosives.

On average, individuals in the Morro Bay stock would be impacted about once per year and individuals in the Monterey Bay stock would be impacted less than once per year. The average risk of injury is negligible for both stocks, although injuries are predicted for the Morro Bay stock. The risk of a single non-auditory injury from explosive testing is low (less than one) in any year for the Morro Bay stock, but a non-auditory injury is shown in the maximum year of effects due to summing risk across seven years and following the rounding approach discussed in Section 2.4 (Species Impact Assessments) of the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS). Therefore, the risk of a non-auditory injury from explosives, is unlikely for the Morro Bay stock of harbor porpoises. The risk of auditory or non-auditory injury may be reduced through activity-based mitigation.

The limited instances of predicted behavioral and non-injurious auditory effects are unlikely to result in any long-term effects to individuals, although individuals who suffer an auditory injury in the Morro Bay stock may experience minor energetic costs. Long-term consequences to the stock are unlikely.

K.4.5.3 Action Proponent Requirements for Area-Specific Training and Testing

The portion of the harbor porpoise BIAs within the California Study Area do not extend beyond 50 nautical miles from the coastline and have limited overlap with training sites within the California Study Area. Spatially, harbor porpoises may be present within the nearshore coastal and inland waters off California north of Point Conception. Temporally, harbor porpoises may be present year-round.

The training and testing areas encompassed by the harbor porpoise BIAs are relatively small but do provide critical water space (i.e., amphibious approach lanes) necessary to conduct amphibious training by forces from sea to inland military ranges in Central California (e.g., Fort Hunter Liggett and Camp Roberts). There are no alternate routes for amphibious forces to access the shore near the inland ranges.

K.4.5.4 Harbor Porpoise Small and Resident Area Geographic Mitigation Assessment

As discussed in Section K.4.5.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that the overwhelming majority of effects to the Monterey Bay and Morro Bay stocks of the harbor porpoise would occur in the NOCAL Range Complex and PMSR from training and testing activities involving sonar during the cold season. However, most effects are expected to be behavioral and non-injurious and are unlikely to result in any long-term effects to individuals. Scientific data does not support a conclusion that significant effects on harbor porpoises are occurring from Navy training and testing activities. Therefore halting, reducing, or otherwise limiting the use of explosives, air guns, or sonar and other transducers in the area when harbor porpoises may be generally present would not be effective at reducing effects on harbor porpoises.

Navy training and testing require the use of the California Study Area throughout the year. Restricting use of the area overlapped by the harbor porpoise BIAs when harbor porpoises are present would have significant effects on the Navy mission and readiness requirements. Geographic mitigation would not be effective at reducing significant effects on harbor porpoises within the California Study Area since none are occurring regardless of implementing mitigation. Therefore, based on the analysis presented above, geographic mitigation for harbor porpoises is not being proposed.

K.4.6 Killer Whale Small and Resident Population Area

K.4.6.1 Biological Considerations Applicable to the Killer Whale Small and Resident Population Area

NMFS recognizes eight killer whale stocks in the North Pacific U.S. Exclusive Economic Zone, three of which occur in the California Study Area: the West Coast Transient stock, the Eastern North Pacific Offshore stock, and the Eastern North Pacific Southern Resident stock (Carretta et al., 2023). For the Eastern North Pacific Southern Resident stock, Calambokidis et al. (2024) defined a small and resident BIA (parent and core) off the U.S. West Coast extending from Washington State south to Point Sur, California. Only the parent BIA is located within or adjacent to the Action Area (Figure K-27); the core BIA is north of the Action Area off the coast of Washington State. The BIA is the same spatial extent as the designated critical habitat for Southern Resident killer whales. Three separate pods comprise the Southern Resident stock, identified as the J, K, and L pods (Ford et al., 2000). The Southern Resident killer whale stock or DPS is listed as endangered under the ESA listed.

Southern Resident killer whales have seasonal shifts in distribution from the inland waters of the Salish Sea and Puget Sound in Washington and British Columbia to locations that can be up to hundreds of miles from Washington waters both north (as far as Southeast Alaska) or south as far as central California (Carretta et al., 2023; National Marine Fisheries Service, 2021). Of the three pods, the K and L pods appear to have a more extensive and seasonally variable offshore coastal distribution, with rare sightings as far south as Monterey Bay and central California in recent years; and the L pod has been observed in in Chatham Strait, Southeast Alaska (Hanson et al., 2017; National Marine Fisheries Service, 2021).

To better predict the pattern of distribution of the endangered Southern Resident killer whales off the Washington, Oregon, and Northern California coasts, researchers integrated visual sightings, location data obtained between 2012 and 2016 from satellite-tagged Southern Resident killer whales, and acoustic detections from underwater hydrophones obtained from 6 to 13 recorders deployed from 2011 to 2015 off the Washington, Oregon, and California coast (Hanson et al., 2018; U.S. Department of the Navy, 2018). Along the Pacific coast, the distribution of satellite-tag locations confirms that Southern

Resident killer whales generally inhabit nearshore waters over the continental shelf in waters less than 200 m deep and typically within 34 km from shore (Hanson et al., 2017). Over multiple years the data revealed that the killer whales spent the greatest amount of time near the mouth of the Columbia River and off Westport, Washington, north of the California Study Area (Hanson et al., 2018; Hanson et al., 2017; U.S. Department of the Navy, 2018). Based on the Hanson et al. (2018) analyses, members of the K and L pods may occur within the northern coastal portion of California Study Area from January to May.

Their seasonal range and preference for nearshore habitat reduces the likelihood that Southern Resident killer whales would occur in the Study Area, and, furthermore, that their occurrence would be limited to the southeasternmost portion of the NOCAL Range Complex and inshore of the PMSR in winter and early spring.

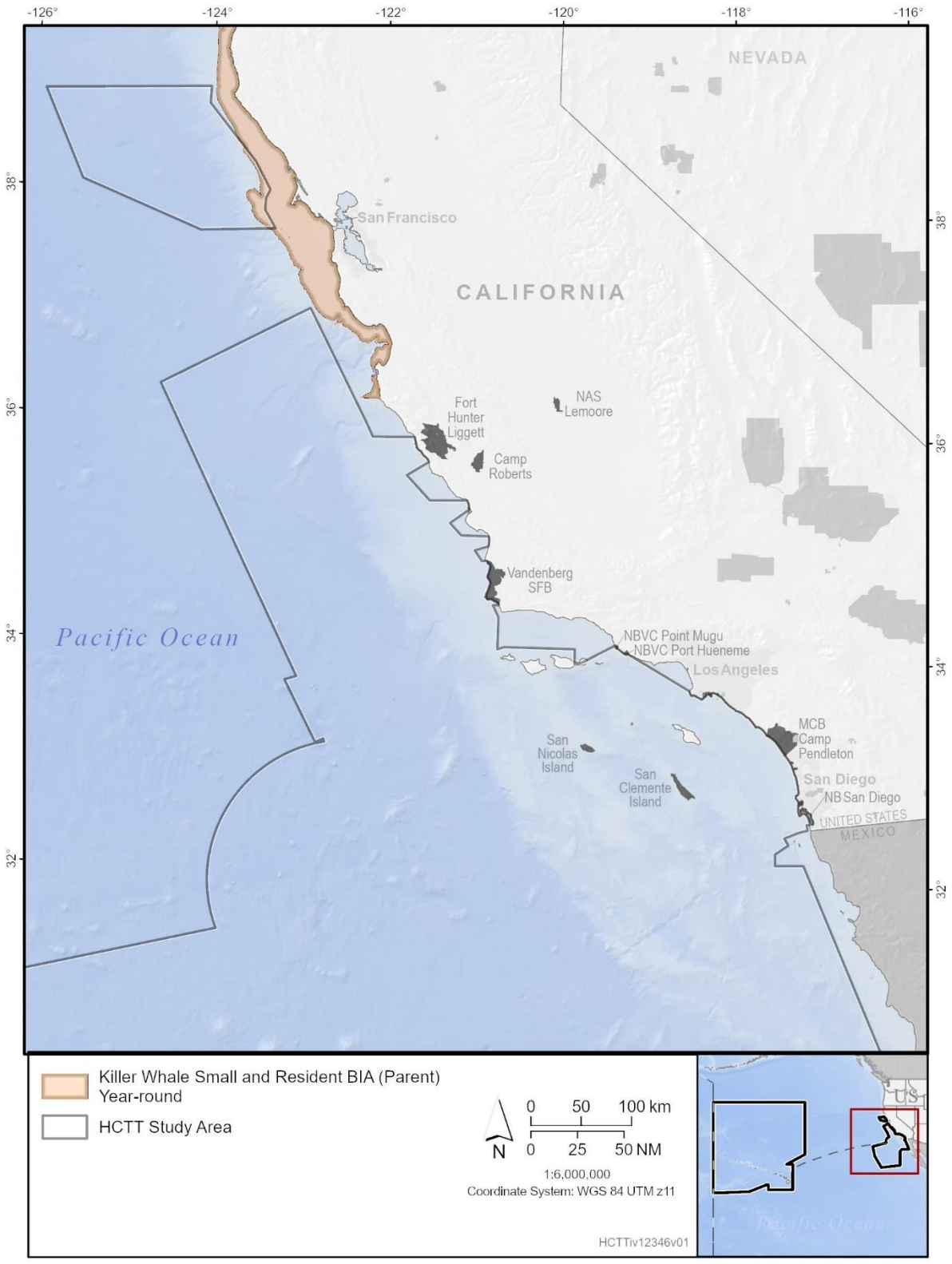

Figure K-25: Killer Whale Small and Resident BIA Off California

K.4.6.2 Stressor Analysis

K.4.6.2.1 Explosives, Air Guns, and Sonar and Other Transducers

The endangered southern resident stock of killer whales is largely residential to the Salish Sea, north of the HCTT Study Area. While a sub-set of Southern Resident killer whales (K and L pods) may travel into the NOCAL Range Complex from January to May, they typically do not travel south of Monterey, California. As shown in the Acoustic and Explosive Effects Analysis Report (Appendix E of this EIS/OEIS), there are no predicted effects to the endangered Southern Resident stock of killer whales.

K.4.6.3 Action Proponent Requirements for Area-Specific Training and Testing

The portion of the southern resident killer whale small and resident BIA within the California Study Area is only a small area the overlaps the southeasternmost portion of the NOCAL Range Complex. Spatially, this stock of killer whales may be present within the nearshore coastal waters off California north of Monterey Bay. Temporally, southern resident killer whales may be present from winter through early spring.

The training and testing areas in the NOCAL Range Complex encompassed by the southern resident killer whale BIA is relatively small but does provide critical capabilities necessary to conduct military readiness activities specific to aviation by forces homeported in Southern and Central California.

Given the operating tempo requirements for maintaining continual cycles of training and testing in the California Study Area, rescheduling activities outside or reducing the number of training or testing activities would not allow Navy to meet its readiness requirements. In addition, there is insufficient excess capacity to avoid or reschedule training and testing cycles at these locations given presence of the southern resident stock of killer whales from winter through early spring.

K.4.6.4 Killer Whale Small and Resident Area Geographic Mitigation Assessment

As discussed in Section K.4.6.2.1 (Explosives, Air Guns, and Sonar and Other Transducers), acoustic effects modeling indicates that there are no predicted effects to the southern resident stock of killer whales. Scientific data does not support a conclusion that effects on this stock of killer whales are occurring from Navy training and testing activities. Therefore halting, reducing, or otherwise limiting the use of explosives, air guns, or sonar and other transducers in the area when southern resident killer whales may be generally present would not be effective at reducing effects because none are occurring.

Navy training and testing require the use of the California Study Area throughout the year. Restricting use of the area overlapped by the southern resident killer whale BIAs when the stock is present would have significant effects on the Navy mission and readiness requirements. Geographic mitigation would not be effective at reducing effects on southern resident killer whales within the California Study Area since none are occurring regardless of implementing mitigation. In addition, the Northern California Large Whale Mitigation Area overlaps the portion southern resident killer whale BIA that is within the NOCAL Range Complex and provides benefit to the species by reducing the potential for adverse effects from military readiness activities using sonar. Therefore, based on the analysis presented above, specific geographic mitigation for southern resident killer whales is not being proposed.

K.5 Areas Identified during the NEPA Public Involvement Process

<<Placeholder until the conclusion of the public involvement process>>

K.6 MITIGATION AREAS TO BE IMPLEMENTED

The existing and proposed mitigation areas identified in this section were developed to provide further protection for marine mammals during military readiness activities in areas that the best available science suggests are particularly important to species or stocks for foraging, migrating, or reproduction either year-round or for part of the year (depending on the species). Implementing these mitigation areas off of California and Hawaii would likely be effective in avoiding or reducing adverse effects on certain marine mammal species, stocks, or populations in these areas, and were determined to be practical to implement without impacting the effectiveness of military readiness. The mitigation could also help the Action Proponents avoid or reduce effects on other marine species that are present in the mitigation area during certain times of year or year-round.

The existing and proposed mitigation areas are designed to help the Action Proponents further avoid or reduce the level of adverse effects from sonar, explosives, or physical disturbance and strike on marine mammals that inhabit, feed in, reproduce in, or migrate through the areas. However, due to training requirements, the Action Proponents do not have the flexibility to relocate, restrict, or limit all military readiness activities throughout the entirety of the HCTT Study Area. The Action Proponents acknowledge the importance of certain habitats for species and stocks of marine mammals, particularly for certain biologically important life processes (e.g., foraging, migration, or reproduction) or ecological function, and have balanced the need for certain training and testing environments needed in order to achieve readiness and meet their Congressionally mandated obligations when establishing the proposed mitigation areas.

Training requirements are designed to provide the experience needed to ensure service members are properly prepared for operational success. Training requirements have been developed through many years of iteration, lessons learned, and refinement, and are designed to ensure service members achieve the levels of readiness needed to properly respond to the many contingencies that may occur during an actual mission. The Proposed Action does not include training beyond levels required for maintaining satisfactory levels of readiness due to the need to efficiently use limited resources (e.g., fuel, personnel, and time). Reductions in training would prevent service members from achieving satisfactory levels of readiness needed to accomplish their missions and would increase risk to service members when deployed.

Major training exercises, as defined in the EIS/OEIS, are training events that bring together the component elements of a large force (e.g., Strike Group) that could include the full spectrum of the force—various ships, submarines, aircraft, and Marine Corps and other military service's forces—to train in the complex command, control, operational coordination, and logistics functions designed to prepare the force for deployment. A Strike Group may be composed of up to four to six destroyers and a cruiser, 75 aircraft, and an aircraft carrier, with 7,500 Sailors and Marines participating. They also provide partner building with other maritime nations allowing U.S. military to learn to work with foreign partners across a range of military operations, building interoperability. Therefore, during these types of training events, the Action Proponents require vast areas of sea and air space which cannot be segmented without reducing the effectiveness of the training or decreasing the safety of personnel. The Action Proponents requires access to a variety of realistic tactical oceanographic and environmental conditions (e.g., varied bathymetry and open sea space) to maximize training effectiveness, meet testing program requirements, and to train to cover and defend large areas of ocean comparable to how the military operates during a conflict. With the few number of ships deployed at any given time, the Navy

must be able to control the sea and airspace over thousands of square miles relying on sensors and networks.

Military readiness activities must also mimic real world conditions to ensure safety of personnel, skill proficiency, and validation of testing program requirements. Areas for military readiness activities are chosen to allow for the realistic representation of the myriad training and testing scenarios that military units are required to complete to be mission effective. Areas have been chosen and designated based on proximity to associated training ranges (e.g., Southern California Range Complex proximate to San Diego area Navy and Marine Corps bases), available airspace (e.g., avoiding airspace conflicts), unobstructed sea space, or due to safety concerns. For example, military aircraft emergency (divert) landing fields are located to allow for short transits to these fields and hopefully, allow for safe landings in the event of an emergency. These fields also are located away from populated areas in order to prevent mishaps that could put civilians in harm's way. Training areas are often also chosen to avoid areas popular for recreational boating and fishing.

Certain activities, such as deployment certification exercises using integrated warfare components, require large areas of the littorals and open ocean for realistic and safe training. The OPAREA within the Study Area represent critical sea space necessary to prepare naval forces for combat. Training and testing in these areas is vital to ensuring that Action Proponent units will be able to operate and defend the U.S. mainland from adversaries.

Expanding mitigation areas to encompass the Action Proponent's existing and proposed training and testing areas would require moving activities farther out to sea, which would reduce training and testing opportunities by taking time away from the intended activity to transit to a more distant area. This would also result in training or testing being conducted further offshore in bathymetric and oceanographic conditions that may not accurately reflect the types of environments where real world activities would occur. For example, conducting shallow water anti-submarine warfare training in deep water with simulating fathometer readings would promote bad habit patterns of ignoring critical depths, and in a real-world situation, those readings could be ignored as well, thereby jeopardizing safety and survival of the ship and crew.

Training in shallow water is necessary to develop proper crew coordination and exercise the tactics, techniques and procedures that ensure mission success. Realistic training is essential for crews to experience the effect of bottom topography (upslope vs. downslope) on sonar transmission/returns in general and when detecting targets in constrained environments that simulate environments where the Navy may operate, such as the East and South China Seas or the Strait of Hormuz. For example, transit training in the Alenuihaha Channel replicates those types of strait environments that may be contested by adversaries, and the Navy must learn to operate in them before facing hostile forces. Naval ships must train to counter submarine threats before deployment to ensure the first time a regularly rotating crew conducts anti-submarine warfare training in a strait is prior to being deployed to the Strait of Hormuz or similar areas. There are few geographic areas that enable forces to do this type of training outside of the HCTT Study Area. Newer-generation submarines, operated by more than 40 nations worldwide, continue to be a threat to global commerce, national security, and the safety of U.S. and our allied military personnel. As a result, defense against enemy submarines is a top priority for the Navy. While simulators provide early skill repetition and enhance teamwork, there is no substitute for live training in a realistic environment.

Increasing transit times would also result in additional fuel consumption, increase the Action Proponents' carbon footprint, and increase other expenditures due to wear and tear on equipment and personnel which serve as limiting factors for Action Proponent units, and could decrease valuable on-station training time. Additionally, unit-level training is constrained by the Optimized Fleet Response Plan timeline milestones and increasing time anywhere in the cycle exacerbates the challenges of meeting an already compact schedule. It is also likely that such a strategy would merely shift effects from one area or species/stock to another.

In summary, further restrictions on the level, number, or timing (seasonal or time of day) of military readiness activities could significantly impact a unit's ability to meet their individual training and certification requirements, the Navy's ability to certify strike groups for deployment in support of national security tasking, the Navy's ability to meet testing program requirements and required acquisition milestones, and operational costs due to increased fuel, maintenance, and time required to complete activities. Constraints on military readiness activities have the potential to increase safety risks when moving activity locations further offshore and accelerating the fatigue-life of aircraft and other equipment, and can reduce training and testing realism by limiting access to necessary environmental or oceanographic conditions for proper testing and training in tactics, techniques and procedures.

The Action Proponents' responsibility to the American people dictates an efficient use of fiscal resources and an approach that adapts to the evolving security environment, with the ability to make adjustments according to global events. The Action Proponents must be able to successfully operate across the range of military operations, from humanitarian assistance or disaster relief to deterring war or defeating an adversary. The military readiness activities under the Proposed Action balances the Action Proponents' need to train and test effectively with their commitment to environmental stewardship.

Based on the extensive review and analysis that is presented in sections K.3 (Biologically Important Areas Within the Hawaii Study Area) and K.4 (Biologically Important Areas within the California Study Area) of this appendix, the Action Proponents propose to continue implementing certain existing mitigation areas described in Table K-9 and shown in Figure K-26 and Figure K-27. The existing Humpback Whale Special Reporting Area in the Hawaii Study Area is proposed to be expanded, and two of the existing mitigation areas in the California Study Areas have new names: the Southern California Blue Whale Mitigation Area was previously referred to as the San Diego Arc Mitigation Area, and is proposed to be reduced; and the California Large Whale Awareness Message Mitigation Area which was previously referred to as the Blue Whale (June – October]), Gray Whale (November – March), and Fin Whale (November – May Awareness Notification Message Areas. The action proponents will also continue to implement geographic mitigation areas for seafloor resources (Table K-10) as discussed in Chapter 5.

Table K-9: Proposed Existing Mitigation Areas for Marine Mammals in the Hawaii and California Study Areas

Category	*Mitigation Requirements*	*Mitigation Benefits*
Hawaii Island Marine Mammal Mitigation Area		
Acoustic	• The Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of helicopter dipping sonar (a mid-frequency active sonar source) annually within the mitigation area.	• Mitigation is designed to reduce exposure of numerous small and resident marine mammal populations (including Blainville's beaked whales, bottlenose dolphins, Cuvier's beaked whales, dwarf sperm whales, false killer whales, melon-headed whales, pantropical spotted dolphins, pygmy killer whales, rough-toothed dolphins, short-finned pilot whales, and spinner dolphins), humpback whales within important seasonal reproductive habitat, and Hawaiian monk seals within critical

Category	*Mitigation Requirements*	*Mitigation Benefits*
		habitat, to levels of sound that have the potential to cause injurious or behavioral impacts.
Explosives	• The Action Proponents will not detonate in-water explosives (including underwater explosives and explosives deployed against surface targets) within the mitigation area.	• Mitigation is designed to prevent exposure of the species discussed above to explosives that have the potential to cause injury, mortality, or behavioral disturbance.
Hawaii 4-Islands Marine Mammal Mitigation Area		
Acoustic	• From November 15 – April 15, the Action Proponents will not use MF1 surface ship hull-mounted mid-frequency active sonar within the mitigation area.	• Mitigation is designed to minimize exposure of humpback whales in high-density seasonal reproductive habitats (e.g., north of Maui and Molokai) and Main Hawaiian Islands insular false killer whales in high seasonal occurrence areas to levels of sound that have the potential to cause injurious or behavioral impacts.
Explosives	• The Action Proponents will not detonate in-water explosives (including underwater explosives and explosives deployed against surface targets) within the mitigation area (year-round).	• Mitigation is designed to prevent exposure of humpback whales in high-density seasonal reproductive habitats (e.g., north of Maui and Molokai), Main Hawaiian Islands insular false killer whales in high seasonal occurrence areas, and numerous small and resident marine mammal populations that occur year-round (including bottlenose dolphins, pantropical spotted dolphins, and spinner dolphins, and Hawaiian monk seals) to explosives that have the potential to cause injury, mortality, or behavioral disturbance.
Hawaii Humpback Whale Special Reporting Mitigation Area		
Acoustic	• The Action Proponents will report the total hours of MF1 surface ship hull-mounted mid-frequency active sonar used December 15 – April 15 in the mitigation area in their training and testing activity reports submitted to NMFS.	• Special reporting requirements are designed to aid NMFS' and the Action Proponents' analysis of potential impacts in the mitigation area, which contains the Humpback Whale National Marine Sanctuary plus a 5-kilometer sanctuary buffer (excluding the Pacific Missile Range Facility).
Hawaii Humpback Whale Awareness Notification Mitigation Area		
Acoustic, Explosives, Physical disturbance and strike	• The Action Proponents will broadcast awareness notification messages to alert applicable assets (and their Lookouts) transiting and training or testing in the Hawaii Range Complex to the possible presence of concentrations of humpback whales from November through April. • Lookouts will use that knowledge to help inform their visual observations during military readiness activities that involve vessel movements, active sonar, in-water explosives (including underwater explosives and explosives deployed against surface targets), or the deployment of non-explosive ordnance against surface targets in the mitigation area.	• Mitigation is designed to minimize potential humpback whale vessel interactions and exposure to acoustic, explosive, and physical disturbance and strike stressors that have the potential to cause mortality, injury, or behavioral disturbance during the reproductive season. • The Hawaii Humpback Whale Awareness Notification Mitigation Area applies to the entire Hawaii Range Complex.
Southern California Blue Whale Mitigation Area		
Acoustic	• From June 1 to October 31, the Action Proponents will not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing within the combination of this	• Mitigation to limit use of MF1 active sonar is designed to reduce exposure of blue whales within important seasonal foraging habitats to levels of sound that have the potential to cause injurious or behavioral impacts.

Category	*Mitigation Requirements*	*Mitigation Benefits*
	mitigation area and the Central California Large Whale Mitigation Area.	
Explosives	• From June 1 to October 31, the Action Proponents will not detonate in-water explosives (including underwater explosives and explosives deployed against surface targets) during large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) training and testing.	• Mitigation to limit the use of in-water explosives is designed to reduce exposure of blue whales within important seasonal foraging habitats to explosives that have the potential to cause injury, mortality, or behavioral disturbance.
California Large Whale Awareness Message Mitigation Area		
Acoustic, Explosives, Physical disturbance and strike	• The Action Proponents will broadcast awareness notification messages to alert applicable assets (and their Lookouts) transiting and training or testing off the U.S. West Coast to the possible presence of concentrations of large whales, including gray whales (November–March), fin whales (November–May), and mixed concentrations of blue, humpback, and fin whales that may occur based on predicted oceanographic conditions for a given year (e.g., May–November, April–November). Notification messages may provide the following types of information which could vary annually: ○ While blue whales tend to be more transitory, some fin whales are year-round residents that can be expected in nearshore waters within 10 NM of the California mainland and offshore operating areas at any time. ○ Fin whales occur in groups of one to three individuals, 90 percent of the time, and in groups of four or more individuals, 10 percent of the time. ○ Unique to fin whales offshore southern California (including the Santa Barbara Channel and PMSR area), there could be multiple individuals and/or separate groups scattered within a relatively small area (1–2 NM) due to foraging or social interactions. ○ When a large whale is observed, this may be an indicator that additional marine mammals are present and nearby, and the vessel should take this into consideration when transiting. ○ Lookouts will use that knowledge to help inform their visual observations during military readiness activities that involve vessel movements, active sonar, in-water explosives (including underwater explosives and explosives deployed against surface targets), or the deployment of non-explosive ordnance against surface targets in the mitigation area.	• Mitigation to broadcast awareness notification messages to applicable assets, and to use that information to inform visual observations, is designed to minimize potential blue whale, gray whale, and fin whale vessel interactions and exposure to acoustic stressors, explosives, and physical disturbance and strike stressors that have the potential to cause mortality, injury, or behavioral disturbance during the foraging and migration seasons, and to resident whales.

Category	*Mitigation Requirements*	*Mitigation Benefits*
California Large Whale Real-Time Notification Mitigation Area		
Physical disturbance and strike	• The Action Proponents will issue real-time notifications to alert Action Proponent vessels operating in the vicinity of large whale aggregations (four or more whales) sighted within 1 NM of an Action Proponent vessel within an area of the Southern California Range Complex (between 32–33 degrees North and 117.2–119.5 degrees West). o The four whales that make up a defined "aggregation" would not all need to be from the same species, and the aggregation could consist either of a single group of four (or more) whales, or any combination of smaller groups totaling four (e.g., two groups of two whales each or a group of three whales and a solitary whale) within the 1 NM zone. Lookouts will use the information from the real-time notifications to inform their visual observations of applicable mitigation zones. If Lookouts observe a large whale aggregation within 1 NM of the event vicinity within the area between 32–33 degrees North and 117.2–119.5 degrees West, the watch station will initiate communication with the designated point of contact to contribute to the Navy's real-time sighting notification system.	• The real-time notification area encompasses the locations of recent (2009, 2021) vessel strikes, and historic strikes where precise latitude and longitude were known.
San Nicolas Island Pinniped Haulout Mitigation Area		
In-air vehicle launch noise	▪ Navy personnel shall not enter pinniped haulout or rookery areas. Personnel may be adjacent to pinniped haulouts and rookery prior to and following a launch for monitoring purposes. ▪ Missiles shall not cross over pinniped haulout areas at altitudes less than 305 m (1,000 ft.). ▪ The Navy may not conduct more than 10 launch events at night annually. ▪ Launch events shall be scheduled to avoid the peak pinniped pupping seasons from January through July, to the maximum extent practicable. The Navy shall implement a monitoring plan for beaches exposed to missile launch noise which that must obtain visual, video, and acoustic data during each launch event, to the maximum extent practicable.	• Mitigation is designed to minimize in-air launch noise and physical disturbance to pinnipeds hauled out on beaches, as well as to continue assessing baseline pinniped distribution/abundance and potential changes in pinniped use of these beaches after launch events.

Table K-10: Proposed Existing Mitigation Areas for Seafloor Resources in the Hawaii and California Study Areas

Category	*Mitigation Requirements*	*Mitigation Benefits*
Shallow-Water Coral Reef and Precious Coral Bed Mitigation Area		
Explosives	• The Action Proponents will not detonate any in-water explosives (including underwater explosives and explosives deployed against surface targets) within a horizontal distance of 350 yd. from shallow-water coral reefs and precious coral beds (except in designated areas of the Hawaii and California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical).	• The 350-yd. mitigation area radius for in-water explosives was conservatively designed to be several times larger than the impact footprint (e.g., crater and expelled material radius) of the largest bottom-laid explosive used in the Study Area. As described in Appendix I, that explosive is a 650-lb. NEW mine with an estimated impact footprint radius of 22.7 yd. The 350-yd. mitigation area radius is 11 times larger than the maximum estimated explosive impact footprint radius, and is even more conservatively sized when compared to the impact footprints of smaller explosives. Therefore, the mitigation will prevent direct impacts (and some level of indirect impacts) from explosives on shallow-water coral reefs and precious coral beds in the Study Area.
Physical disturbance and strike	• The Action Proponents will not set vessel anchors within the anchor swing circle radius from shallow-water coral reefs and precious coral beds (except in designated anchorages). • The Action Proponents will not place non-explosive seafloor devices or deploy non-explosive ordnance against surface targets (including aerial-deployed mine shapes) within a horizontal distance of 350 yd. from shallow-water coral reefs and precious coral beds (except in designated areas in the Hawaii and California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical).	• The anchor swing circle mitigation will ensure that vessel anchors do not come into contact with shallow-water coral reefs and precious coral beds when factoring in environmental conditions that could affect anchoring position, such as winds, currents, and water depth. • For ease of implementation, the 350-yd. mitigation area radius for explosives was also adopted for seafloor devices and non-explosive ordnance deployed against surface targets. This mitigation area radius is even more conservative when compared to the small impact footprints of these non-explosive stressors. Therefore, the mitigation will prevent direct impacts (and some level of indirect impacts) from seafloor devices and non-explosive ordnance deployed against surface targets on shallow-water coral reefs and precious coral beds.
Artificial Reef, Hard Bottom Substrate, and Shipwreck Mitigation Area		
Explosives	• The Action Proponents will not detonate explosives on or near the seafloor (e.g., explosive bottom-laid or moored mines) within a horizontal distance of 350 yd. from artificial reefs, hard bottom substrate, and shipwrecks (except in designated areas in the Hawaii California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical).	• The 350-yd. mitigation area radius will prevent direct impacts (and some level of indirect impacts) from explosives on artificial reefs, hard bottom substrate, and shipwrecks for the reasons described in Section 5.7.1.
Physical disturbance and strike	• The Action Proponents will not set vessel anchors within the anchor swing circle radius from artificial reefs, hard bottom substrate, and shipwrecks (except in designated anchorages). • The Action Proponents will not place non-explosive seafloor devices (that are not precisely placed) within a horizontal distance of 350 yd. from artificial reefs, hard bottom substrate, and shipwrecks	• Mitigation ensures that vessel anchors do not come into contact with artificial reefs, hard bottom substrate, and shipwrecks, when factoring in environmental conditions that could affect anchoring position, such as winds, currents, and water depth. • For ease of implementation, the 350-yd. mitigation area radius for explosives was also adopted for seafloor devices (that are not precisely placed), and is even more conservative when compared to the small impact footprints of non-explosive seafloor devices. • Mitigation specific to precisely placed seafloor devices was first developed and coordinated with NMFS for live hard bottom habitats

Category	*Mitigation Requirements*	*Mitigation Benefits*
	(except as described in the bullet above for vessel anchors, the bullet below for precisely placed seafloor devices, and in designated areas of the Hawaii and California OPAREAs, such as the nearshore areas of San Clemente Island and in the Silver Strand Training Complex, where these features will be avoided to the maximum extent practical). • The Action Proponents will not position precisely placed non-explosive seafloor devices directly on artificial reefs, hard bottom substrate, or shipwrecks. • The Action Proponents will avoid positioning precisely placed non-explosive seafloor devices near these resources by the largest distance that is practical to implement based on mission requirements.	during the 2022 HSTT Study Area's Essential Fish Habitat consultation reinitiation (U.S. Department of the Navy, 2022). That mitigation is being included in this document, and applied to the whole mitigation area category of hard bottom substrate as well as artificial reefs and shipwrecks, for consistency and practicality of implementation. Because precisely placed seafloor devices are deployed with a high degree of placement accuracy, the original intent of the mitigation (i.e., preventing direct physical strike and disturbance) will continue to be achieved. Therefore, the mitigation for seafloor devices that are either precisely placed or not precisely placed will collectively prevent direct impacts (and some level of indirect impacts) from seafloor devices on artificial reefs, hard bottom substrate, and shipwrecks.

In addition, the Action Proponents propose to introduce two new mitigation areas in the California Study Area: The Northern and Central California Large Whale Mitigation Areas (Table K-11 and Figure K-27). These new proposed mitigation areas are described in Section K.6.1.1.1 (Northern and Central California Large Whale Mitigation Areas). No new mitigation areas were proposed in the Hawaii Study Area, because the current areas continue to meet the biological effectiveness criteria and remain operationally practical to implement. The new proposed mitigation areas were developed because they met the biological effectiveness criteria when balanced against the operational practicality criteria noted above in Sections K.2.1.2 (Biological Effectiveness Assessment) and K.2.1.3 (Operational Assessment). As the existing and newly proposed mitigation areas will limit or prohibit a combination of acoustic and explosive sources, seasonally or year-round, all marine mammals and protected species present in the mitigation areas would benefit.

Table K-11: Proposed New Mitigation Areas for Marine Mammals in the California Study Areas

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

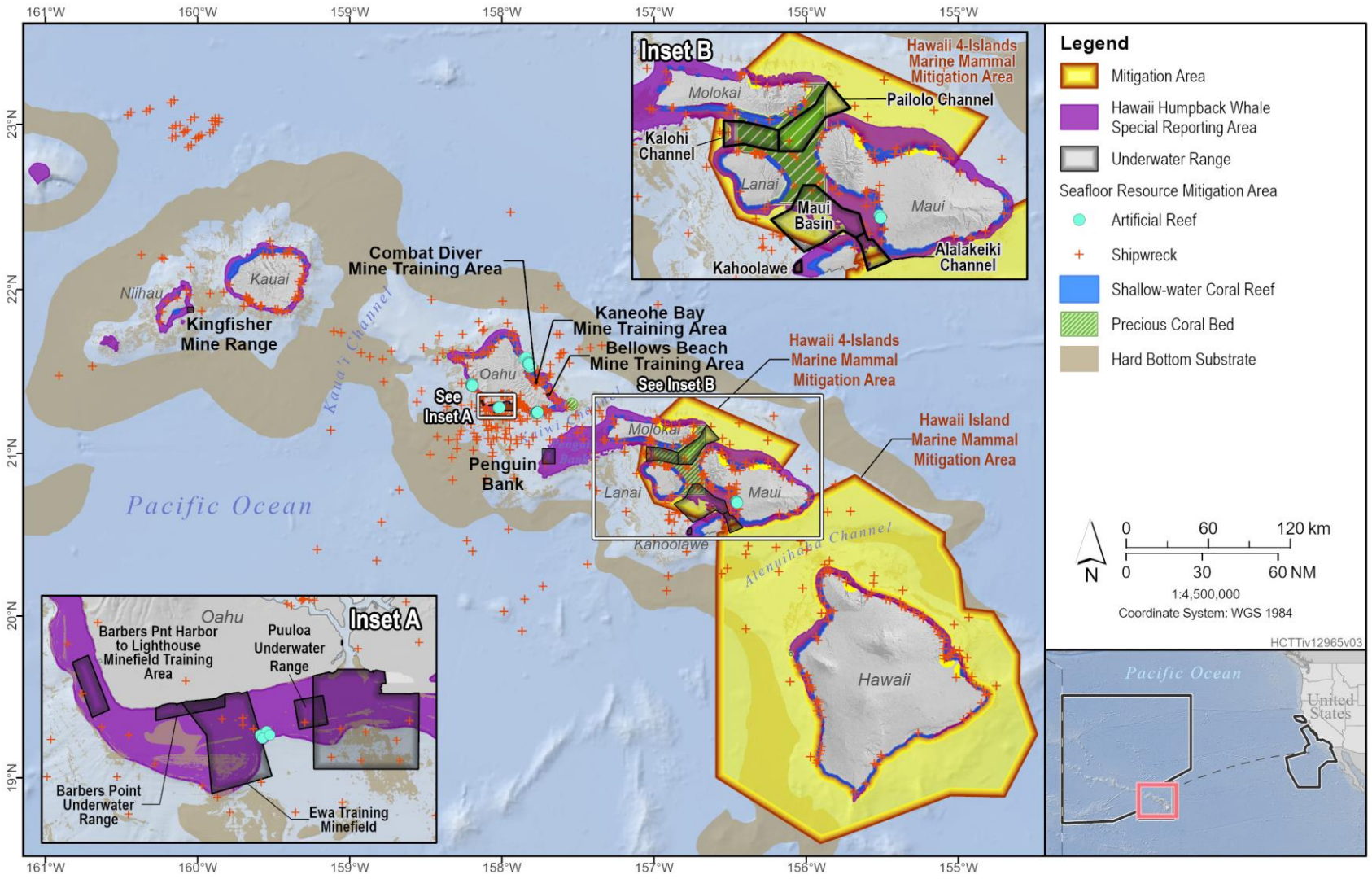

Figure K-26: Proposed Mitigation Areas in the Hawaii Study Area

K.6.1.1 Proposed New Mitigation Measures within the Mitigation Areas

The Action Proponents will limit the use of the more impactful acoustic sources (surface ship hull-mounted mid-frequency active sonar, dipping sonar, or certain types of explosives during specific activities where applicable) within proposed mitigation areas temporally or year-round when conducting military readiness activities under the Proposed Action. Annual limits for these sources within specific areas were informed by classified operational and historical reporting data. All other active sonar used by the Action Proponents is allowed within the mitigation areas. Additionally, the broadcasting of notification messages to alert applicable assets (and their lookouts) in certain proposed existing mitigation areas would help mitigate potential adverse effects from physical disturbance and strike due to vessel movements.

K.6.1.1.1 Northern and Central California Large Whale Mitigation Areas

The proposed Northern and Central California Large Whale Mitigation Areas are shown in Figure K-27. The Northern California Large Whale Mitigation Area is within the NOCAL Range Complex, generally extending from Point Arena south to an area west of the Farallon Islands. The Central California Large Whale Mitigation Area is within the PMSR and generally extends from Monterey Bay south to San Miguel Island. Within the proposed mitigation areas, the Navy would not use more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar (excluding normal maintenance and systems checks) total during training and testing.

This proposed mitigation would be active seasonally, from June 1 through October 31, and overlaps the revised BIAs of four large whale species in the California Study Area: the Blue whale, Gray Whale, Fin Whale, and Humpback whale. The revised BIAs for Blue whales, Fin whales, and Humpback whales are all feeding areas, and the proposed mitigation areas are expected to reduce the potential for adverse effects resulting from military readiness activities using sonar on these species' feeding behavior when in the areas. For Gray whales, the revised BIA in the California Study Area is a migratory and reproductive area, and the proposed mitigation areas are expected to reduce the potential for adverse effects resulting from military readiness activities using sonar on Gray whale migratory and reproductive behavior when in the areas.

The proposed Northern and Central California Large Whale Mitigation Areas overlap southern resident killer whale critical habitat, providing a benefit southern resident killer whale to the species by reducing the potential for adverse effects from military readiness activities using sonar. They also overlap four National Marine Sanctuaries (NMS) (Chumash Heritage NMS, Cordell Bank NMS, Greater Farallones NMS, and Monterey Bay NMS), providing the same benefit to species and individuals within the portions of the mitigation areas that overlap the sanctuaries.

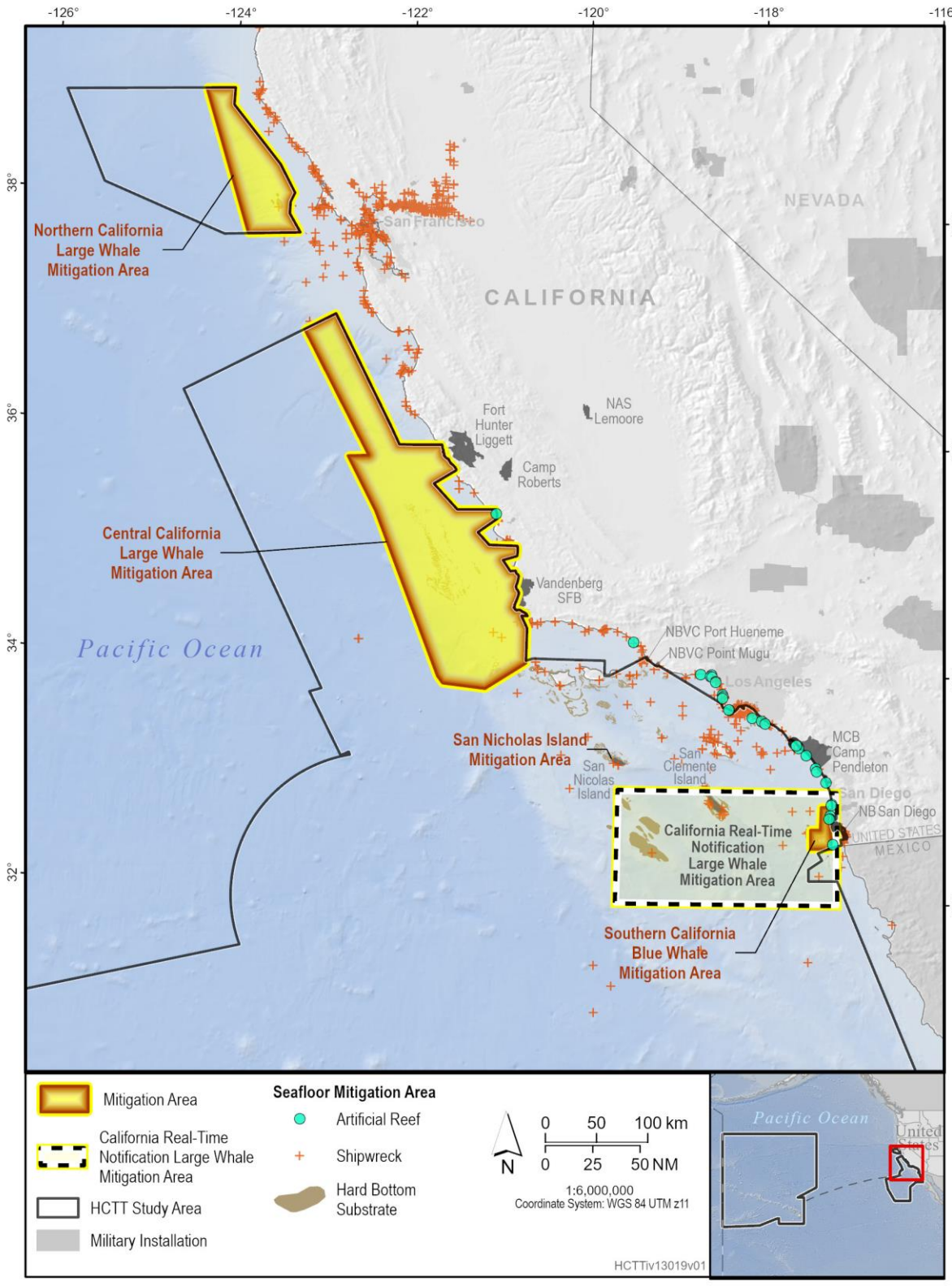

Figure K-27: Proposed Mitigation Areas in the California Study Area

K.6.1.2 Mitigation Areas Considered and Not Carried Forward

When assessing the revised BIAs in Sections K.3 (Biologically Important Areas Within the Hawaii Study Area) and K.4 (Biologically Important Areas Within the California Study Area), it was decided that the parent BIAs were too large and encompassed too much of the Hawaii and California Study Areas (Figure K-1 and Figure K-2) to be practical to implement per the mitigation considerations discussed in at the beginning of this section. NMFS also indicated that the parent BIAs provided less value to the species because the size of the areas, when compared with the child and/or core BIAs. In addition, because of the revisions made to the BIAs (e.g., blue whale core BIA geography shift) since the 2018 HSTT EIS/OEIS, the following existing mitigation areas in the California Study Area were considered and not carried forward: San Nicolas Island and Santa Monica/Long Beach Mitigation Areas, and the Santa Barbara Island Mitigation Area.

<<Placeholder, language will be updated after the public involvement process>>

K.6.1.3 Mitigation Summary

In summary, the Action Proponents have thoughtfully and thoroughly assessed each revised BIA. However, incorporating each BIA as a mitigation area in their totality would prohibit military readiness activities using sonar and explosives in much of the primary training and testing areas within the HCTT Study Area, leaving fragmented areas and timeframes that are not compatible with effective, realistic training and testing. The Action Proponents would be unable to effectively prepare their forces for operational employment without access to the ranges and locations that have been carefully developed over decades. These areas allow for military readiness activities to be conducted in a manner compatible with multiple other activities in the marine environment, such as energy exploration, alternative energy development, commercial fishing, recreational activities, and commercial shipping. As noted in Chapter 2 (Description of Proposed Action and Alternatives), the Action Proponents also require extensive sea space so that individual military readiness activities can occur at sufficiently safe distances such that these activities do not interfere with one another and so that military units can train to communicate and operate in a coordinated fashion over tens or hundreds of square miles, as they will have to do when in an operational theater.

REFERENCES

Abecassis, M., J. Polovina, R. W. Baird, A. Copeland, J. C. Drazen, R. Domokos, E. Oleson, Y. Jia, G. S. Schorr, D. L. Webster, and R. D. Andrews. (2015). Characterizing a Foraging Hotspot for Short-Finned Pilot Whales and Blainville's Beaked Whales Located off the West Side of Hawai'i Island by Using Tagging and Oceanographic Data. *PLoS ONE 10* (11): 1–22. DOI:10.1371/journal.pone.0142628

Abrahms, B., H. Welch, S. Brodie, M. G. Jacox, E. Becker, S. J. Bograd, L. Irvine, D. Palacios, B. Mate, and E. Hazen. (2019). Dynamic ensemble models to predict distributions and anthropogenic risk exposure for highly mobile species. *Diversity and Distributions 00* 1–12. DOI:10.1111/ddi.12940

Aschettino, J. M., R. W. Baird, D. J. McSweeney, D. L. Webster, G. S. Schorr, J. L. Huggins, K. K. Martien, S. D. Mahaffy, and K. L. West. (2012). Population structure of melon-headed whales (*Peponocephala electra*) in the Hawaiian Archipelago: Evidence of multiple populations based on photo identification. *Marine Mammal Science 28* (4): 666–689. DOI:10.1111/j.1748-7692.2011.00517

Au, D. W. K. and W. L. Perryman. (1985). Dolphin habitats in the eastern tropical Pacific. *Fishery Bulletin 83* 623–643.

Baird, R. (2013). Odontocete Cetaceans Around the Main Hawaiian Islands: Habitat Use and Relative Abundance from Small-Boat Sighting Surveys. *Aquatic Mammals 39* (3): 253–269. DOI:10.1578/am.39.3.2013.253

Baird, R. W. (2006). Hawaii's other cetaceans. *Whale and Dolphin Magazine 11* 28–31.

Baird, R. W., J. M. Aschettino, D. J. McSweeney, D. L. Webster, G. S. Schorr, S. Baumann-Pickering, and S. D. Mahaffy. (2010). *Melon-headed Whales in the Hawaiian Archipelago: An Assessment of Population Structure and Long-term Site Fidelity based on Photo-Identification*. La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Baird, R. W., D. Cholewiak, D. L. Webster, G. S. Schorr, S. D. Mahaffy, C. Curtice, J. Harrison, and S. M. Van Parijs. (2015a). 5. Biologically Important Areas for cetaceans within U.S. waters—Hawaii region. In S. M. Van Parijs, C. Curtice, & M. C. Ferguson (Eds.), *Biologically Important Areas for cetaceans within U.S. waters* (Vol. Aquatic Mammals (Special Issue) 41, pp. 54–64).

Baird, R. W., D. Cholewiak, D. L. Webster, G. S. Schorr, S. D. Mahaffy, C. Curtice, J. Harrison, and S. M. Van Parijs. (2015b). Biologically Important Areas for Cetaceans within U.S. Waters—Hawaii region. In S. M. Van Parijs, C. Curtice, & M. C. Ferguson (Eds.), *Biologically Important Areas for Cetaceans Within U.S. Waters* (Vol. 41, pp. 54–64). Olympia, WA: Cascadia Research Collective.

Baird, R. W., D. Cholewiak, D. L. Webster, G. S. Schorr, S. D. Mahaffy, C. Curtice, J. Harrison, and S. M. van Parijs. (2015c). Biologically important areas for cetaceans within U.S. waters - Hawai'i region. *Aquatic Mammals 41* (1): 54–64.

Baird, R. W., D. Cholewiak, D. L. Webster, G. S. Schorr, S. D. Mahaffy, C. Curtice, J. Harrison, and S. M. Van Parijs. (2015d). Biologically Important Areas for cetaceans within U.S. waters – Hawaii Region. *Aquatic Mammals 41* (1): 54–64. DOI:10.1578/am.41.1.2015.54

Baird, R. W., A. N. Dilley, D. L. Webster, R. Morrissey, B. K. Rone, S. M. Jarvis, S. D. Mahaffy, A. M. Gorgone, and D. J. Moretti. (2015e). *Odontocete Studies on the Pacific Missile Range Facility in*

February 2014: Satellite-Tagging, Photo Identification, and Passive Acoustic Monitoring. Pearl Harbor, HI: U.S. Navy Pacific Fleet.

Baird, R. W., M. B. Hanson, E. E. Ashe, M. R. Heithaus, and G. J. Marshall. (2003a). *Studies of Foraging in "Southern Resident" Killer Whales during July 2002: Dive Depths, Bursts in Speed, and the Use of a "Crittercam" System for Examining Sub-surface Behavior*. Seattle, WA: U. S. Department of Commerce, National Marine Fisheries Service, National Marine Mammal Laboratory.

Baird, R. W., M. B. Hanson, G. S. Schorr, D. L. Webster, D. J. McSweeney, A. M. Gorgone, S. D. Mahaffy, D. M. Holzer, E. M. Oleson, and R. D. Andrews. (2012). Range and primary habitats of Hawaiian insular false killer whales: Informing determination of critical habitat. *Endangered Species Research 18* (1): 47–61. DOI:10.3354/esr00435

Baird, R. W., S. D. Mahaffy, A. M. Gorgone, T. Cullins, D. J. McSweeney, E. M. Oleson, A. L. Bradford, J. Barlow, and D. L. Webster. (2015f). False killer whales and fisheries interactions in Hawaiian waters: Evidence for sex bias and variation among populations and social groups. *Marine Mammal Science 31* (2): 579–590. DOI:10.1111/mms.12177

Baird, R. W., D. J. McSweeney, G. S. Schorr, S. D. Mahaffy, D. L. Webster, J. Barlow, M. B. Hanson, J. P. Turner, and R. D. Andrews. (2009). Studies of beaked whales in Hawaii: Population size, movements, trophic ecology, social organization, and behaviour. In S. J. Dolman, C. D. MacLeod, & P. G. H. Evans (Eds.), *Beaked Whale Research* (pp. 23–25). San Sebastián, Spain: European Cetacean Society.

Baird, R. W., D. J. McSweeney, D. L. Webster, A. M. Gorgone, and A. D. Ligon. (2003b). *Studies of Odontocete Population Structure in Hawaiian Waters: Results of a Survey Through the Main Hawaiian Islands in May and June 2003*. Seattle, WA: National Oceanic and Atmospheric Administration.

Baird, R. W., G. S. Schorr, D. L. Webster, S. D. Mahaffy, D. J. McSweeney, M. B. Hanson, and R. D. Andrews. (2011). Open-ocean movements of a satellite-tagged Blainville's beaked whale (*Mesoplodon densirostris*): Evidence for an offshore population in Hawaii? *Aquatic Mammals 37* (4): 506–511.

Baird, R. W., G. S. Schorr, D. L. Webster, D. J. McSweeney, and S. D. Mahaffy. (2006). *Studies of beaked whale diving behavior and odontocete stock structure in Hawaii in March/April 2006* (Report prepared under Contract No. AB133F-06-CN-0053). Olympia, WA: Cascadia Research Collective.

Baird, R. W., D. L. Webster, J. M. Aschettino, G. S. Schorr, and D. J. McSweeney. (2013a). Odontocete Cetaceans Around the Main Hawaiian Islands: Habitat Use and Relative Abundance from Small-Boat Sighting Surveys. *Aquatic Mammals 39* (3): 253–269. DOI:10.1578/am.39.3.2013.253

Baird, R. W., D. L. Webster , J. M. Aschettino, G. S. Schorr, and D. J. McSweeney. (2013b). Odontocete cetaceans around the main Hawaiian islands: Habitat use and relative abundance from small-boat sighting surveys. *Aquatic Mammals 39* (3): 253–269. DOI:10.1578/am.39.3.2013.253

Baird, R. W., D. L. Webster, S. D. Mahaffy, D. J. McSweeney, G. S. Schorr, and A. D. Ligon. (2008). Site fidelity and association patterns in a deep-water dolphin: Rough-toothed dolphins (*Steno bredanensis*) in the Hawaiian Archipelago. *Marine Mammal Science 24* (3): 535–553. DOI:10.1111/j.1748-7692.2008.00201

Baird, R. W., D. L. Webster, S. D. Mahaffy, G. S. Schorr, J. M. Aschettino, and A. M. Gorgone. (2013c). *Movements and Spatial Use of Odontocetes in the western Main Hawaiian Islands: Results of a*

Three-year Study off O'ahu and Kaua'i (Final report under Grant No. N00244-10-1-0048 from the Naval Postgraduate School).

Barlow, J. (2006). Cetacean abundance in Hawaiian waters estimated from a Summer–Fall survey in 2002. *Marine Mammal Science 22* (2): 446–464. DOI:10.1111/j.1748-7692.2006.00032.x

Barlow, J. (2016). *Cetacean Abundance in the California Current Estimated from Ship-based Line-transect Surveys in 1991–2014.* (NOAA Administrative Report NMFS-SWFSC-LJ-1601). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Barlow, J., J. Calambokidis, E. A. Falcone, C. S. Baker, A. M. Burdin, P. J. Clapham, J. K. B. Ford, C. M. Gabriele, R. LeDuc, D. K. Mattila, T. J. Quinn, II, L. Rojas-Bracho, J. M. Straley, B. L. Taylor, J. Urbán R, P. Wade, D. Weller, B. H. Witteveen, and M. Yamaguchi. (2011). Humpback whale abundance in the North Pacific estimated by photographic capture-recapture with bias correction from simulation studies. *Marine Mammal Science 27* (4): 793–818. DOI:10.1111/j.1748-7692.2010.00444

Barlow, J., M. Ferguson, E. Becker, J. Redfern, K. Forney, I. Vilchis, P. Fiedler, T. Gerrodette, and L. Ballance. (2009a). *Predictive Modeling of Cetacean Densities in the Eastern Pacific Ocean* (NOAA Technical Memorandum NMFS-SWFSC-444). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Barlow, J., M. C. Ferguson, E. A. Becker, J. V. Redfern, K. A. Forney, I. L. Vilchis, P. C. Fiedler, T. Gerrodette, and L. T. Ballance. (2009b). *Predictive Modeling of Cetacean Densities in the Eastern Pacific Ocean* (NOAA Technical Memorandum NMFS-SWFSC-444). La Jolla, CA: Southwest Fisheries Science Center.

Barlow, J. and K. A. Forney. (2007). Abundance and population density of cetaceans in the California Current ecosystem. *Fishery Bulletin 105* 509–526.

Barlow, J. and R. Gisiner. (2006). Mitigating, monitoring and assessing the effects of anthropogenic sound on beaked whales. *Journal of Cetacean Research and Management 7* (3): 239–249.

Barlow, J., S. Rankin, A. Jackson, and A. Henry. (2008). *Marine Mammal Data Collected During the Pacific Islands Cetacean and Ecosystem Assessment Survey (PICEAS) Conducted Aboard the NOAA Ship McArthur II, July–November 2005*. NOAA.

Baumann-Pickering, S., L. K. Baldwin, A. E. Simonis, M. A. Roche, M. L. Melcon, J. A. Hildebrand, E. M. Oleson, R. W. Baird, G. S. Schorr, D. L. Webster, and D. J. McSweeney. (2010). *Characterization of Marine Mammal Recordings from the Hawaii Range Complex*. Monterey, CA: Naval Postgraduate School.

Baumann-Pickering, S., M. A. Roch, R. L. Brownell, Jr., A. E. Simonis, M. A. McDonald, A. Solsona-Berga, E. M. Oleson, S. M. Wiggins, and J. A. Hildebrand. (2014). Spatio-temporal patterns of beaked whale echolocation signals in the north Pacific. *PLoS ONE 9* (1): e86072. DOI:10.1371/journal.pone.0086072

Becker, E., K. Forney, D. Miller, P. Fiedler, J. Barlow, and J. Moore. (2020). *Habitat-based density estimates for cetaceans in the California Current Ecosystem based on 1991-2018 survey data* (Technical Memorandum NMFS-SWFSC-638). Silver Spring, MD: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Becker, E. A., K. A. Forney, M. C. Ferguson, J. Barlow, and J. V. Redfern. (2012a). *Predictive Modeling of Cetacean Densities in the California Current Ecosystem based on Summer/Fall Ship Surveys in 1991–2008* (NOAA Technical Memorandum NMFS-SWFSC-499). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Becker, E. A., K. A. Forney, M. C. Ferguson, D. G. Foley, R. C. Smith, J. Barlow, and J. V. Redfern. (2010). Comparing California Current cetacean–habitat models developed using in situ and remotely sensed sea surface temperature data. *Marine Ecology Progress Series 413* 163–183. DOI:10.3354/meps08696

Becker, E. A., K. A. Forney, P. C. Fiedler, J. Barlow, S. J. Chivers, C. A. Edwards, A. M. Moore, and J. V. Redfern. (2016). Moving Towards Dynamic Ocean Management: How Well Do Modeled Ocean Products Predict Species Distributions? *Remote Sensing 8* (2): 149. DOI:10.3390/rs8020149

Becker, E. A., K. A. Forney, D. G. Foley, and J. Barlow. (2012b). *Density and Spatial Distribution Patterns of Cetaceans in the Central North Pacific based on Habitat Models* (NOAA Technical Memorandum NMFS-SWFSC-490). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Becker, E. A., K. A. Forney, D. G. Foley, R. C. Smith, T. J. Moore, and J. Barlow. (2014). Predicting seasonal density patterns of California cetaceans based on habitat models. *Endangered Species Research 23* (1): 1–22. DOI:10.3354/esr00548

Becker, E. A., K. A. Forney, D. L. Miller, J. Barlow, L. Rojas-Bracho, J. Urbán R., and J. E. Moore. (2022a). Dynamic habitat models reflect interannual movement of cetaceans within the California Current ecosystem. *Frontiers in Marine Science 9*. DOI:10.3389/fmars.2022.829523

Becker, E. A., K. A. Forney, E. M. Oleson, A. L. Bradford, R. Hoopes, J. E. Moore, and J. Barlow. (2022b). *Abundance, distribution, and seasonality of cetaceans within the U.S. Exclusive Economic Zone around the Hawaiian Archipelago based on species distribution models*. Honolulu, HI: National Marine Fisheries Service, Pacific Islands Fisheries Science Center.

Bettridge, S., C. S. Baker, J. Barlow, P. J. Clapham, M. Ford, D. Gouveia, D. K. Mattila, I. Pace, R. M. , P. E. Rosel, G. K. Silber, and W. P. R. (2015). *Status Review of the Humpback Whale (Megaptera novaeangliae) Under the Endangered Species Act*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Bradford, A. L., E. A. Becker, E. M. Oleson, K. A. Forney, J. E. Moore, and J. Barlow. (2020). *Abundance Estimates of False Killer Whales in Hawaiian Waters and the Broader Central Pacific* (NOAA Technical Memorandum NMFS-PIFSC-104). Honolulu, HI: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Fisheries Science Center.

Bradford, A. L., K. A. Forney, E. A. Oleson, and J. Barlow. (2013). *Line-Transect Abundance Estimates of Cetaceans in the Hawaiian EEZ*. Pacific Islands Fisheries Science Center.

Bradford, A. L., K. A. Forney, E. M. Oleson, and J. Barlow. (2012). *Line-transect Abundance Estimates of False Killer Whales (Pseudorca crassidens) in the Pelagic Region of the Hawaiian Exclusive Economic Zone and in the Insular Waters of the Northwestern Hawaiian Islands*. Honolulu, HI: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Fisheries Science Center.

Bradford, A. L., K. A. Forney, E. M. Oleson, and J. Barlow. (2017). Abundance estimates of cetaceans from a line-transect survey within the U.S. Hawaiian Islands Exclusive Economic Zone. *Fishery Bulletin 115* (2): 129–142. DOI:10.7755/fb.115.2.1

Bradford, A. L., E. A. Oleson, R. W. Baird, C. H. Boggs, K. A. Forney, and N. C. Young. (2015). *Revised Stock Boundaries for False Killer Whales (Psuedorca crassidens) in Hawaiian Waters* (NOAA Technical Memorandum NMFS-PIFSC-47). Honolulu, HI: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Fisheries Science Center.

Bradford, A. L., E. M. Oleson, K. A. Forney, J. E. Moore, and J. Barlow. (2021). *Line-transect Abundance Estimates of Cetaceans in U.S. Waters around the Hawaiian Islands in 2002, 2010, and 2017* (NOAA Technical Memorandum NMFS-PIFSC-115). Honolulu, HI: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Fisheries Science Center.

Calambokidis, J. and J. Barlow. (2020). *Updated abundance estimates for blue and humpback whales along the U.S. West Coast using data through 2018* (NOAA Technical Memorandum NMFS-SWFSC-634). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Calambokidis, J., E. A. Falcone, T. J. Quinn, A. M. Burdin, P. J. Clapham, J. K. B. Ford, C. M. Gabriele, R. LeDuc, D. Mattila, L. Rojas-Bracho, J. M. Straley, B. L. Taylor, J. Urbán R., D. Weller, B. H. Witteveen, M. Yamaguchi, A. Bendlin, D. Camacho, K. Flynn, A. Havron, J. Huggins, and N. Maloney. (2008). *SPLASH: Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific* (Final report for Contract AB133F-03-RP-00078). Olympia, WA: Cascadia Research.

Calambokidis, J., M. A. Kratofil, D. M. Palacios, B. A. Lagerquist, G. S. Schorr, M. B. Hanson, R. W. Baird, K. A. Forney, E. A. Becker, R. C. Rockwood, and E. L. Hazen. (2024). Biologically Important Areas II for cetaceans within U.S. and adjacent waters - West Coast Region. *Frontiers in Marine Science 11*. DOI:10.3389/fmars.2024.1283231

Calambokidis, J., G. H. Steiger, C. Curtice, J. Harrison, M. C. Ferguson, E. Becker, M. DeAngelis, and S. M. Van Parijs. (2015a). 4. Biologically Important Areas for selected cetaceans within U.S. waters – West coast region. *In S. M. Van Parijs, C. Curtice, & M. C. Ferguson (Eds.), Biologically Important Areas for cetaceans within U.S. waters Aquatic Mammals (Special Issue) 41* (1): 39–53. DOI:10.1578/AM.41.1.2015.39

Calambokidis, J., G. H. Steiger, C. Curtice, J. Harrison, M. C. Ferguson, E. Becker, M. DeAngelis, and S. M. Van Parijs. (2015b). Biologically Important Areas for Selected Cetaceans Within U.S. Waters – West Coast Region. *Aquatic Mammals 41* (1): 39–53. DOI:10.1578/am.41.1.2015.39

Calambokidis, J., G. H. Steiger, C. Curtice, J. Harrison, M. C. Ferguson, E. Becker, M. DeAngelis, and S. M. Van Parijs. (2015c). Biologically Important Areas for Selected Cetaceans Within U.S. Waters – West Coast Region. *Aquatic Mammals (Special Issue) 41* (1): 39–53. DOI:10.1578/am.41.1.2015.39

Calambokidis, J., G. H. Steiger, J. M. Straley, L. M. Herman, S. Cerchio, D. R. Salden, J. Urban R., J. K. Jacobsen, O. von Ziegesar, K. C. Balcomb, C. M. Gabriele, M. E. Dahlheim, S. Uchida, G. Ellis, Y. Miyamura, P. Ladron De Guevara, M. Yamaguchi, F. Sato, S. A. Mizroch, L. Schlender, K. Rasmussen, J. Barlow, and T. J. Quinn, II. (2001). Movements and population structure of humpback whales in the North Pacific. *Marine Mammal Science 17* (4): 769–794.

Campbell, G. S., L. Thomas, K. Whitaker, A. B. Douglas, J. Calambokidis, and J. A. Hildebrand. (2015). Inter-annual and seasonal trends in cetacean distribution, density and abundance off southern California. *Deep Sea Research Part II: Topical Studies in Oceanography 112* 143–157. DOI:10.1016/j.dsr2.2014.10.008

Carretta, J., E. M. Oleson, K. A. Forney, A. L. Bradford, A. Yano, D. Weller, A. Lang, J. Baker, A. Orr, B. Hanson, J. E. Moore, M. Wallen, and R. L. Brownell Jr. (2024). *Draft U.S. Pacific Marine Mammal Stock Assessments: 2023*. La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Carretta, J. V., K. A. Forney, M. S. Lowry, J. Barlow, J. Baker, D. Johnston, B. Hanson, R. L. Brownell, Jr., J. Robbins, D. Mattila, K. Ralls, M. M. Muto, D. Lynch, and L. Carswell. (2010). *U.S. Pacific Marine Mammal Stock Assessments: 2009* (NOAA Technical Memorandum NMFS-SWFSC-453). La Jolla, CA: Southwest Fisheries Science Center.

Carretta, J. V., E. Oleson, D. W. Weller, A. R. Lang, K. A. Forney, J. Baker, M. M. Muto, B. Hanson, A. J. Orr, H. Huber, M. S. Lowry, J. Barlow, J. Moore, D. Lynch, L. Carswell, and R. L. Brownell. (2015). *U.S. Pacific Marine Mammal Stock Assessments: 2014* (NOAA Technical Memorandum NMFS-SWFSC-549). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Carretta, J. V., E. M. Oleson, J. Baker, D. W. Weller, A. R. Lang, K. A. Forney, M. M. Muto, B. Hanson, A. J. Orr, H. Huber, M. S. Lowry, J. Barlow, J. E. Moore, D. Lynch, L. Carswell, and R. L. Brownell, Jr. (2017). *U.S. Pacific Marine Mammal Stock Assessments: 2016* (NOAA Technical Memorandum NMFS-SWFSC-561). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Carretta, J. V., E. M. Oleson, K. A. Forney, D. W. W. A. R. Lang, J. Baker, A. J. Orr, B. Hanson, J. Barlow, J. E. Moore, M. Wallen, and R. L. B. Jr. (2023). *U.S. Pacific Marine Mammal Stock Assessments: 2022* (NOAA Technical Memorandum NMFS-SWFSC-684.). Washington, DC: U.S. Department of Commerce.

Clapham, P. J. (2000). The humpback whale: Seasonal feeding and breeding in a baleen whale. In J. Mann, R. C. Connor, P. L. Tyack, & H. Whitehead (Eds.), *Cetacean Societies: Field Studies of Dolphins and Whales* (pp. 173–196). Chicago, IL: University of Chicago Press.

Clapham, P. J. and D. K. Mattila. (1990). Humpback whale songs as indicators of migration routes. *Marine Mammal Science 6* (2): 155–160.

Davis, R. W., W. E. Evans, and B. Würsig, (Eds.). (2000). *Cetaceans, Sea Turtles and Seabirds in the Northern Gulf of Mexico: Distribution, Abundance and Habitat Associations*. New Orleans, LA: U.S. Geological Survey, Biological Resource Division; and Minerals Management Service, Gulf of Mexico Region.

Debich, A. J., S. Baumann-Pickering, A. Širović, J. A. Hildebrand, A. L. Alldredge, R. S. Gottlieb, S. Herbert, S. C. Johnson, L. K. Roche, B. Thayre, J. S. Trickey, and S. M. Wiggins. (2014). *Passive Acoustic Monitoring for Marine Mammals in the Northwest Training Range Complex 2012–2013*. La Jolla, CA: Marine Physical Laboratory, Scripps Institution of Oceanography, University of California San Diego.

Donahue, M. A. and W. L. Perryman. (2008). Pygmy killer whale, *Feresa attenuata*. In W. F. Perrin, B. Wursig, & J. G. M. Thewissen (Eds.), *Encyclopedia of Marine Mammals* (2nd ed., pp. 938–939). San Diego, CA: Academic Press.

Douglas, A. B., J. Calambokidis, L. M. Munger, M. S. Soldevilla, M. C. Ferguson, A. M. Havron, D. L. Camacho, G. S. Campbell, and J. A. Hildebrand. (2014). Seasonal distribution and abundance of cetaceans off Southern California estimated from CalCOFI cruise data from 2004 to 2008. *Fishery Bulletin 112* (2–3): 198–220. DOI:10.7755/fb.112.2-3.7

Falcone, E. A., B. Diehl, A. Douglas, and J. Calambokids. (2011). *Photo-Identification of Fin Whales (Balaeanoptera physalus) along the US West Coast, Baja California, and Canada*. Olympia, WA: Cascadia Research Collective.

Falcone, E. A. and G. S. Schorr. (2011). *Distribution and demographics of marine mammals in SOCAL through photo-indentification, genetics, and satellite telemetry: a summary of surveys conducted 15 July 2010 - 24 June 20111*. Monterey, CA: U.S. Navy Postgraduate School.

Ferguson, M. C., C. Curtice, and J. Harrison. (2015a). Biologically important areas for cetaceans within U.S. waters – Gulf of Alaska region. *Aquatic Mammals (Special Issue) 41* (1): 65–78.

Ferguson, M. C., C. Curtice, J. Harrison, and S. M. Van Parijs. (2015b). Biologically important areas for cetaceans within U.S. waters – Overview and rationale. *Aquatic Mammals (Special Issue) 41* (1): 2–16. DOI:10.1578/am.41.1.2015.2

Ford, J. K. B., G. M. Ellis, and K. C. I. Balcomb. (2000). *Killer Whales: The Natural History and Genealogy of Orcinus Orca in British Columbia and Washington State (Updated Edition)*. Seattle, WA: University of Washington Press.

Forney, K. A., R. W. Baird, and E. M. Oleson. (2010). *Rationale for the 2010 Revision of Stock Boundaries for the Hawaii Insular and Pelagic Stocks of False Killer Whales, Pseudorca crassidens*. La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Forney, K. A. and J. Barlow. (1998). Seasonal patterns in the abundance and distribution of California cetaceans, 1991–1992. *Marine Mammal Science 14* (3): 460–489.

Forney, K. A., J. Barlow, and J. V. Carretta. (1995). The abundance of cetaceans in California waters. Part II: Aerial surveys in winter and spring of 1991 and 1992. *Fishery Bulletin 93* 15–26.

Forney, K. A., E. A. Becker, D. G. Foley, J. Barlow, and E. M. Oleson. (2015). Habitat-based models of cetacean density and distribution in the central North Pacific. *Endangered Species Research 27* 1–20. DOI:10.3354/esr00632

Forney, K. A., M. C. Ferguson, E. A. Becker, P. C. Fiedler, J. V. Redfern, J. Barlow, I. L. Vilchis, and L. T. Ballance. (2012). Habitat-based spatial models of cetacean density in the eastern Pacific Ocean. *Endangered Species Research 16* (2): 113–133. DOI:10.3354/esr00393

Graham, S. E. and B. Saunders. (2015). *Occurrence, Distribution, and Population Estimates of Marine Mammals near Silver Strand Training Complex and San Diego Bay, CA* (Prepared for Commander, Pacific Fleet. Submitted to Naval Facilities Engineering Command (NAVFAC) Southwest, California, February 2015). San Diego, CA: SPAWAR Systems Center Pacific.

Hanson, M. B., E. J. Ward, C. K. Emmons, and M. M. Holt. (2018). *Modeling the occurrence of endangered killer whales near a U.S. Navy Training Range in Washington State using satellite-tag locations to improve acoustic detection data*. Seattle, WA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Science Center.

Hanson, M. B., E. J. Ward, C. K. Emmons, M. M. Holt, and D. M. Holzer. (2017). *Assessing the movements and occurrence of Southern Resident Killer Whales relative to the U.S. Navy's Northwest Training Range Complex in the Pacific Northwest*. Seattle, WA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Science Center.

Harrison, J., M. C. Ferguson, L. New, J. Cleary, C. Curtice, S. DeLand, E. Fujioka, P. N. Halpin, R. B. T. Moore, and S. M. Van Parijs. (2023). Biologically Important Areas II for cetaceans within U.S. and adjacent waters - Updates and the application of a new scoring system. *Frontiers in Marine Science 10*. DOI:doi.org/10.3389/fmars.2023.1081893

Heenehan, H. L., J. A. Tyne, L. Bejder, S. M. Van Parijs, and D. W. Johnston. (2016). Passive acoustic monitoring of coastally associated Hawaiian spinner dolphins, *Stenella longirostris*, ground-truthed through visual surveys. *The Journal of the Acoustical Society of America 140* (1): 206. DOI:10.1121/1.4955094

Heenehan, H. L., S. M. Van Parijs, L. Bejder, J. A. Tyne, and D. W. Johnston. (2017). Using acoustics to prioritize management decisions to protect coastal dolphins: A case study using Hawaiian spinner dolphins. *Marine Policy 75* 84–90. DOI:10.1016/j.marpol.2016.10.015

Henderson, E. E., R. Manzano-Roth, S. W. Martin, and B. Matsuyama. (2015, 13 December 2013). *Behavioral Responses of Beaked Whales to Mid-Frequency Active Sonar on the Pacific Missile Range Facility, Hawaii*. Presented at the Society for Marine Mammalogy 20th Biennial Conference,. Dunedin, New Zealand.

Jefferson, T. A., M. A. Smultea, and C. A. Bacon. (2014). Southern California Bight marine mammal density and abundance from aerial surveys, 2008–2013. *Journal of Marine Animals and Their Ecology 7* (2): 14–30.

Jefferson, T. A., M. A. Webber, and R. L. Pitman. (2008). *Marine Mammals of the World: A Comprehensive Guide to their Identification*. London, UK: Elsevier.

Jefferson, T. A., M. A. Webber, and R. L. Pitman. (2015). *Marine Mammals of the World: A Comprehensive Guide to Their Identification* (2nd ed.). Cambridge, MA: Academic Press.

Johnston, D. W., M. E. Chapla, L. E. Williams, and D. K. Matthila. (2007). Identification of humpback whale Megaptera novaeangliae wintering habitat in the Northwestern Hawaiian Islands using spatial habitat modeling. *Endangered Species Research*. DOI:10.3354/esr00049

Jones, M. L. and S. L. Swartz. (2009). Gray whale, *Eschrichtius robustus*. In W. F. Perrin, B. Wursig, & J. G. M. Thewissen (Eds.), *Encyclopedia of Marine Mammals* (2nd ed., pp. 503–511). Cambridge, MA: Academic Press.

Klinck, H., S. L. Nieukirk, S. Fregosi, D. K. Mellinger, S. Lastuka, G. B. Shilling, and J. C. Luby. (2015). *Cetacean Studies on the Hawaii Range Complex in December 2014–January 2015: Passive Acoustic Monitoring of Marine Mammals using Gliders. Final Report* (Prepared for Naval Facilities Engineering Command Pacific under HDR Environmental, Operations and Construction, Inc. Contract No. N62470-10-D-3011, CTO KB25). Honolulu, HI: HDR Inc.

Kratofil, M. A., A. E. Harnish, S. D. Mahaffy, E. E. Henderson, A. L. Bradford, S. W. Martin, B. A. Lagerquist, D. M. Palacios, E. M. Oleson, and R. W. Baird. (2023). Biologically Important Areas II for cetaceans within U.S. and adjacent waters – Hawai'i Region. *Frontiers in Marine Science 10*. DOI:10.3389/fmars.2023.1053581

Lammers, M. O. (2004). Occurence and behavior of Hawaiian spinner dolphins (*Stenella longirostris*) along Oahu's leeward and south shores. *Aquatic Mammals 30* (2): 237–250.

Lammers, M. O., L. M. Munger, J. N. Oswald, and T. M. Yack. (2015). *Passive Acoustic Monitoring of Cetaceans in the Hawaii Range Complex Using Ecological Acoustic Recorders (EARs)*. Pearl Harbor, HI: U.S Navy Pacific Fleet.

Mahaffy, S. D., R. W. Baird, D. J. McSweeney, D. L. Webster, and G. S. Schorr. (2015). High site fidelity, strong associations, and long-term bonds: Short-finned pilot whales off the island of Hawai'i. *Marine Mammal Science 31* (4): 1427–1451. DOI:10.1111/mms.12234

Manzano-Roth, R., E. E. Henderson, S. W. Martin, C. Martin, and B. M. Matsuyama. (2016). Impacts of U.S. Navy training events on Blainville's beaked whale (*Mesoplodon densirostris*) foraging dives in Hawaiian waters. *Aquatic Mammals 42* (4): 507–518. DOI:10.1578/AM.42.4.2016.507

Manzano-Roth, R. A., E. A. Henderson, S. W. Martin, and B. Matsuyama. (2013). *Impacts of a U.S. Navy training event on beaked whale dives in Hawaiian waters*. Pearl Harbor, HI: U.S. Navy Pacific Fleet.

Martien, K. K., R. W. Baird, N. M. Hedrick, A. M. Gorgone, J. L. Thieleking, D. J. McSweeney, K. M. Robertson, and D. L. Webster. (2012). Population structure of island-associated dolphins: Evidence from mitochondrial and microsatellite markers for common bottlenose dolphins (*Tursiops truncatus*) around the main Hawaiian Islands. *Marine Mammal Science 28* (3): E208–E232. DOI:10.1111/j.1748-7692.2011.00506

Martin, C. R., S. W. Martin, E. E. Henderson, T. A. Helble, R. A. Manzano-Roth, and B. M. Matsuyama. (2016). *SSC Pacific FY15 annual report on PMRF Marine Mammal Monitoring* (Submitted in Support of the U.S. Navy's 2015 Annual Marine Species Monitoring Report for the Pacific). San Diego, CA: National Marine Mammal Foundation.

Martin, C. R., S. W. Martin, E. E. Henderson, T. A. Helble, R. A. Manzano-Roth, B. M. Matsuyama, and G. C. Alongi. (2017). *SSC Pacific FY16 annual report on PMRF Marine Mammal Monitoring. Final Report*. San Diego, CA: National Marine Mammal Foundation; and Space and Naval Warfare Systems Center Pacific.

Mate, B., A. Bradford, G. Tsidulko, and V. Ilyashenko. (2013). *Late-Feeding Season Movements of a Western North Pacific Gray Whale off Sakhalin Island, Russia and Subsequent Migration into the Eastern North Pacific* (Paper SC/63/BRG23 presented to the International Whaling Commission Scientific Committee).

Mate, B. R., R. Gisiner, and J. Mobley. (1997). Local and migratory movements of Hawaiian humpback whales tracked by satellite telemetry. *Canadian Journal of Zoology 76* 863–868.

Mate, B. R., V. Y. Ilyashenko, A. L. Bradford, V. V. Vertyankin, G. A. Tsidulko, V. V. Rozhnov, and L. M. Irvine. (2015a). Critically endangered western gray whales migrate to the eastern North Pacific. *Biology Letters 11* (4): 1–4. DOI:10.1098/rsbl.2015.0071

Mate, B. R., D. M. Palacios, C. S. Baker, B. A. Lagerquist, L. M. Irvine, T. Follett, D. Steel, C. Hayslip, and M. H. Winsor. (2016). *Baleen (Blue and Fin) Whale Tagging in Southern California in Support of Marine Mammal Monitoring Across Multiple Navy Training Areas. Preliminary Summary* (Prepared for Naval Facilities Engineering Command Pacific for Commander, U.S. Pacific Fleet under Contract Nos. N62470-10-D-3011 (KB29) and N62470-15-D-8006 (KB01) issued to HDR, Inc.). San Diego, CA: HDR Inc.

Mate, B. R., D. M. Palacios, C. S. Baker, B. A. Lagerquist, L. M. Irvine, T. Follett, D. Steel, C. Hayslip, and M. H. Winsor. (2017). *Baleen Whale Tagging in Support of Marine Mammal Monitoring Across Multiple Navy Training Areas Covering the Years 2014, 2015, and 2016. Final Report* (Submitted to Naval Facilities Engineering Command Pacific, Pearl Harbor, Hawaii under Contract No. N62470-15-8006 (FZN1) issued to HDR, Inc.). San Diego, CA: Oregon State University Marine Mammal Institute.

Mate, B. R., D. M. Palacios, L. M. Irvine, B. A. Lagerquist, T. Follett, M. H. Winsor, and C. Hayslip. (2015b). *Baleen (Blue & Fin) Whale Tagging in Southern California in Support of Marine Mammal Monitoring Across Multiple Navy Training Areas (SOCAL, NWTRC, GOA); Final Report* (Prepared for Naval Facilities Engineering Command Pacific for Commander, U.S. Pacific Fleet under Contract No. N62470-10-D-3011, Task Orders JP03 and KB27 issued to HDR, Inc.). Honolulu, HI: HDR, Inc.

Mate, B. R. and J. Urban-Ramirez. (2003). A note on the route and speed of a gray whale on its northern migration from Mexico to central California, tracked by satellite-monitored radio tag. *Journal of Cetacean Research and Management 5* (2): 155–157.

McSweeney, D. J., R. W. Baird, and S. D. Mahaffy. (2007). Site fidelity, associations, and movements of Cuvier's (*Ziphius Cavirostris*) and Blainville's (*Mesoplodon Densirostris*) beaked whales off the island of Hawaii. *Marine Mammal Science 23* (3): 666–687. DOI:10.1111/j.1748-7692.2007.00135

McSweeney, D. J., R. W. Baird, S. D. Mahaffy, D. L. Webster, and G. S. Schorr. (2009). Site fidelity and association patterns of a rare species: Pygmy killer whales (*Feresa attenuata*) in the main Hawaiian Islands. *Marine Mammal Science 25* (3): 557–572. DOI:10.1111/j.1748-7692.2008.00267

Mizroch, S. A., D. W. Rice, D. Zwiefelhofer, J. Waite, and W. L. Perryman. (2009). Distribution and movements of fin whales in the North Pacific Ocean. *Mammal Review 39* (3): 193–227. DOI:10.1111/j.1365-2907.2009.00147.x

Mobley, J. R. (2004). *Results of Marine Mammal Surveys on U.S. Navy Underwater Ranges in Hawaii and Bahamas*. Arlington, VA: Office of Naval Research.

Mobley, J. R. (2005). Assessing responses of humpback whales to North Pacific Acoustic Laboratory (NPAL) transmissions: Results of 2001–2003 aerial surveys north of Kauai. *The Journal of Acoustical Society of America 117* 1666–1773. DOI:10.1121/1.1854475

Mobley, J. R., G. B. Bauer, and L. M. Herman. (1999). Changes over a ten-year interval in the distribution and relative abundance of humpback whales (*Megaptera novaeangliae*) wintering in Hawaiian waters. *Aquatic Mammals 25* (2): 63–72.

Mobley, J. R., M. H. Deakos, S. W. Martin, and R. Manzano-Roth. (2015). *Aerial Survey Monitoring for Marine Mammals and Sea Turtles in the Hawaii Range Complex in Conjunction with a Navy Training Event: SCC 18–20 February 2014, Final Report* (Prepared for Naval Facilities Engineering Command Pacific for Commander, U.S. Pacific Fleet under Contract No. N62470-10-D-3011, CTO KB26, issued to HDR, Inc.). Honolulu, HI: HDR Inc.

Mobley, J. R. and A. F. Pacini. (2013). *Aerial Survey Monitoring for Marine Mammals and Sea Turtles in the Hawaii Range Complex in Conjunction with a Navy Training Event, SCC February 19-21 and August 12-13, 2013, Final Field Report*. Pearl Harbor, HI: U.S. Navy Pacific Fleet.

Mobley, J. R., S. Spitz, and R. Grotefendt. (2001). *Abundance of Humpback Whales in Hawaiian Waters: Results of 1993–2000 Aerial Surveys*. Honolulu, HI: Hawaiian Islands Humpback Whale National Marine Sanctuary, Department of Land and Natural Resources, State of Hawaii.

Mobley, J. R., S. S. Spitz, K. A. Forney, R. Grotefendt, and P. H. Forestell. (2000). *Distribution and Abundance of Odontocete Species in Hawaiian Waters: Preliminary Results of 1993–98 Aerial Surveys*. Pearl City, HI; Colorado Springs, CO; La Jolla, CA; North Bend, WA; and Southampton, NY: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Muto, M. M., V. T. Helker, R. P. Angliss, B. A. Allen, P. L. Boveng, J. M. Breiwick, M. F. Cameron, P. J. Clapham, S. P. Dahle, M. E. Dahlheim, B. S. Fadely, M. C. Ferguson, L. W. Fritz, R. C. Hobbs, Y. V. Ivashchenko, A. S. Kennedy, J. M. London, S. A. Mizroch, R. R. Ream, E. L. Richmond, K. E. W. Shelden, R. G. Towell, P. R. Wade, J. M. Waite, and A. R. Zerbini. (2017). *Alaska Marine Mammal Stock Assessments, 2016* (NOAA Technical Memorandum NMFS-AFSC-323). Seattle, WA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center.

National Marine Fisheries Service. (2016a). Endangered and Threatened Species; Identification of 14 Distinct Population Segments of the Humpback Whale (*Megaptera novaeangliae*) and Revision of Species-Wide Listing. *Federal Register 81* (174): 62260–62320.

National Marine Fisheries Service. (2016b). *National Marine Fisheries Service, Alaska Region Occurrence of Endangered Species Act (ESA) Listed Humpback Whales off Alaska*. Silver Spring, MD: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Region.

National Marine Fisheries Service. (2021). *Status of Stocks 2020: Annual Report to Congress on the Status of U.S. Fisheries*. Silver Spring, MD: National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

National Marine Fisheries Service. (2024). *Reinitiation of the Biological and Conference Opinion on (1) U.S. Navy Hawaii-Southern California Training and Testing, and (2) the National Marine Fisheries Service's Promulgation of Regulations and Issuance of a Letter of Authorization Pursuant to the Marine Mammal Protection Act for the U.S. Navy to "Take" Marine Mammals Incidental to Hawaii-Southern California Training and Testing Through December 2025*. Washington, DC: U.S. Department of Commerce.

National Oceanic and Atmospheric Administration. (2012). *Taking of Marine Mammals Incidental to Commercial Fishing Operations; False Killer Whale Take Reduction Plan; Final Rule*: Federal Register.

Norris, K. S. and T. P. Dohl. (1980). Behavior of the Hawaiian spinner dolphin, *Stenella longirostris*. *Fishery Bulletin 77* (4): 821–849.

Norris, T. F., M. McDonald, and J. Barlow. (1999). Acoustic detections of singing humpback whales (*Megaptera novaeangliae*) in the eastern North Pacific during their northbound migration. *The Journal of Acoustical Society of America 106* (1): 506–514.

Oleson, E. M., R. W. Baird, K. K. Martien, and B. L. Taylor. (2013a). *Island-associated stocks of odontocetes in the main Hawaiian Islands: A synthesis of available information to facilitate evaluation of stock structure* (PIFSC Working Paper WP-13-003). Pacific Islands Fisheries Science Center.

Oleson, E. M., R. W. Baird, K. K. Martien, and B. L. Taylor. (2013b). *Island-associated stocks of odontocetes in the main Hawaiian Islands: A synthesis of available information to facilitate evaluation of stock structure* (Pacific Islands Fisheries Science Center Working Paper WP-13-003). Honolulu, HI: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Fisheries Science Center.

Oleson, E. M., S. Baumann-Pickering, A. Širović, K. P. Merkens, L. M. Munger, J. S. Trickey, and P. Fisher-Pool. (2015a). *Analysis of long-term acoustic datasets for baleen whales and beaked whales within the Mariana Islands Range Complex (MIRC) for 2010 to 2013* (Pacific Islands Fisheries Science Center Data Report DR-15-002). Honolulu, HI: Pacific Islands Fisheries Science Center.

Oleson, E. M., S. Baumann-Pickering, A. Širović, K. P. Merkens, L. M. Munger, J. S. Trickey, and P. Fisher-Pool. (2015b). *Analysis of long-term acoustic datasets for baleen whales and beaked whales within the Mariana Islands Range Complex (MIRC) for 2010 to 2013* (PIFSC Data Report DR-15-002).

Oleson, E. M., C. H. Boggs, K. A. Forney, M. B. Hanson, D. R. Kobayashi, B. L. Taylor, P. R. Wade, and G. M. Ylitalo. (2010). *Status Review of Hawaiian Insular False Killer Whales (Pseudorca crassidens) under the Endangered Species Act*. U.S. Department of Commerce.

Ostman-Lind, J., A. D. Driscoll-Lind, and S. H. Rickards. (2004). *Delphinid Abundance, Distribution and Habitat Use Off the Western Coast of the Island of Hawaii*. La Jolla, CA: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Pirotta, E., C. G. Booth, J. Calambokidis, D. P. Costa, J. A. Fahlbusch, A. S. Friedlaender, J. A. Goldbogen, J. Harwood, E. L. Hazen, L. New, J. A. Santora, S. L. Watwood, C. Wertman, and B. L. Southall. (2022). From individual responses to population effects: Integrating a decade of multidisciplinary research on blue whales and sonar. *Animal Conservation*. DOI:10.1111/acv.12785

Pitman, R. L. and C. Stinchcomb. (2002). Rough-toothed dolphins (*Steno bredanensis*) as predators of mahimahi (*Coryphaena hippurus*). *Pacific Science 56* (4): 447–450.

Rankin, S. and J. Barlow. (2007). Sounds recorded in the presence of Blainville's beaked whales, *Mesoplodon densirostris*, near Hawaii. *The Journal of Acoustical Society of America 122* (1): 42–45. DOI:10.1121/1.2743159

Redfern, J. V., M. F. McKenna, T. J. Moore, J. Calambokidis, M. L. Deangelis, E. A. Becker, J. Barlow, K. A. Forney, P. C. Fiedler, and S. J. Chivers. (2013). Assessing the risk of ships striking large whales in marine spatial planning. *Conservation Biology 27* (2): 292–302. DOI:10.1111/cobi.12029

Richie, M. W., R. K. Uyeyama, J. M. Aschettino, and M. A. Fagan. (2016). *Marine Species Surveys of Pearl Harbor, Nov 2013–Nov 2015, and Historical Occurrence of Marine Species in Pearl Harbor* (Submitted to: NAVFAC Hawaii for Commander, Navy Installation Command, Joint Base Pearl Harbor Hickam). Pearl Harbor, HI: NAVFAC Pacific.

Richie, M. W., R. K. Uyeyama, and J. Fujimoto. (2012). *Final Report Ka'ula Island ship-based marine mammal survey, July 6, 2012 Hawaii Range Complex Field Report*. Pearl Harbor, HI.

Rugh, D., J. Breiwick, M. Muto, R. Hobbs, K. Shelden, C. D'Vincent, I. M. Laursen, S. Reif, S. Maher, and S. Nilson. (2008). *Report of the 2006–2007 Census of the Eastern North Pacific Stock of Gray Whales*. Seattle, WA: NOAA, NMFS, Alaska Fisheries Science Center.

Rugh, D. J., R. C. Hobbs, J. A. Lerczak, and J. M. Breiwick. (2005). Estimates of abundance of the eastern North Pacific stock of gray whales (*Eschrichtius robustus*) 1997–2002. *Journal of Cetacean Research and Management 7* (1): 1–12.

Shallenberger, E. W. (1981). *The Status of Hawaiian Cetaceans*. Kailua, HI: Manta Corporation.

Širović, A., S. Baumann-Pickering, J. A. Hildebrand, A. J. Debich, S. T. Herbert, A. Meyer-Löbbecke, A. Rice, B. Thayre, J. S. Trickey, S. M. Wiggins, and M. A. Roch. (2016). *Passive Acoustic Monitoring for Marine Mammals in the SOCAL Range Complex July 2014–May 2015* (MPL Technical Memorandum #607). La Jolla, CA: Marine Physical Laboratory, Scripps Institution of Oceanography, University of California; Department of Computer Science, San Diego State University.

Širović, A., J. A. Hildebrand, S. M. Wiggins, M. A. McDonald, S. E. Moore, and D. Thiele. (2004). Seasonality of blue and fin whale calls and the influence of sea ice in the Western Antarctic Peninsula. *Deep Sea Research II 51* (17–19): 2327–2344. DOI:10.1016/j.dsr2.2004.08.005

Širović, A., A. Rice, E. Chou, J. A. Hildebrand, S. M. Wiggins, and M. A. Roch. (2015). Seven years of blue and fin whale call abundance in the Southern California Bight. *Endangered Species Research 28* 61–76. DOI:10.3354/esr00676

Smultea, M. A. and T. Jefferson. (2014). Changes in Relative Occurrence of Cetaceans in the Southern California Bight: A Comparison of Recent Aerial Survey Results with Historical Data Sources. *Aquatic Mammals 40* (1): 32–43. DOI:10.1578/AM.40.1.2014.32

Sumich, J. L. and I. T. Show. (2011). Offshore migratory corridors and aerial photogrammetric body length comparisons of southbound gray whales, *Eschrichtius robustus*, in the Southern California Bight, 1988–1990. *Marine Fisheries Review 73* (1): 28–34.

Szesciorka, A. R., L. T. Ballance, A. Širović, A. Rice, M. D. Ohman, J. A. Hildebrand, and P. J. S. Franks. (2020). Timing is everything: Drivers of interannual variability in blue whale migration. *Scientific Reports 10* (1). DOI:10.1038/s41598-020-64855-y

Tyne, J. A., D. W. Johnston, F. Christiansen, and L. Bejder. (2017). Temporally and spatially partitioned behaviours of spinner dolphins: Implications for resilience to human disturbance. *Royal Society Open Science 4* (1): 160626. DOI:10.1098/rsos.160626

Tyne, J. A., D. W. Johnston, R. Rankin, N. R. Loneragan, L. Bejder, and A. Punt. (2015). The importance of spinner dolphin (*Stenella longirostris*) resting habitat: Implications for management. *Journal of Applied Ecology 52* (3): 621–630. DOI:10.1111/1365-2664.12434

U.S. Department of the Navy. (2006). *Rim of the Pacific Exercise After Action Report: Analysis of Effectiveness of Mitigation and Monitoring Measures as Required Under the Marine Mammals Protection Act (MMPA) Incidental Harassment Authorization and the National Defense Exemption from the Requirements of the MMPA for Mid-Frequency Active Sonar Mitigation Measures*.

U.S. Department of the Navy. (2018). *2017 U.S. Navy Annual Marine Species Monitoring Report for the Pacific: A Multi-Range-Complex Monitoring Report For Hawaii-Southern California Training and Testing (HSTT), Mariana Islands Training and Testing (MITT), Northwest Training and Testing (NWTT), and the Gulf of Alaska Temporary Maritime Activities Area (GOA TMAA)*. Silver Spring, MD: National Marine Fisheries Service, Office of Protected Resources.

U.S. Department of the Navy. (2022). *Essential Fish Habitat Reinitiation for Submarine Mine Training Around Maui*. Pearl Harbor, HI: U.S. Department of the Navy.

U.S. Department of the Navy. (2024). *U.S. Navy Marine Species Density Database Phase IV for the Hawaii-California Training and Testing Study Area. Technical Report.* Pearl Harbor, HI: U.S. Pacific Fleet, Environmental Readiness Division,.

Urbán, J. R., E. Jiménez-López, H. M. Guzmán, and L. Viloria-Gómora. (2021). Migratory Behavior of an Eastern North Pacific Gray Whale From Baja California Sur to Chirikov Basin, Alaska. *Frontiers in Marine Science 8*. DOI:10.3389/fmars.2021.619290

Van Parijs, S. M. (2015). Letter of introduction to the Biologically Important Areas Issue. *Aquatic Mammals 41* (1): 1–128. DOI:10.1578/AM.41.1.2015.1

Van Parijs, S. M., C. Curtice, and M. C. Ferguson, (Eds.). (2015). Biologically Important Areas for cetaceans within U.S. waters. *Aquatic Mammals (Special Issue) 41* (1): 128. DOI:10.1578/AM.41.1.2015.1

Wade, P. R. and T. Gerrodette. (1993). Estimates of cetacean abundance and distribution in the eastern tropical Pacific. *Reports of the International Whaling Commission 43* 477–493.

Wade, P. R., T. J. Quinn II, J. Barlow, C. S. Baker, A. M. Burdin, J. Calambokidis, P. J. Clapham, E. A. Falcone, J. K. B. Ford, C. M. Gabriele, D. K. Mattila, L. Rojas-Bracho, J. M. Straley, and B. Taylor. (2016). *Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas*.

Wang, J. Y. and S. C. Yang. (2006). Unusual cetacean stranding events of Taiwan in 2004 and 2005. *Journal of Cetacean Research and Management 8* (3): 283–292.

Webster, D. L., R. W. Baird, B. K. Rone, and D. B. Anderson. (2015, December 14–18, 2015). *Rough-toothed dolphins on a Navy range in Hawaii: using LIMPET satellite-tag data to assess movements, habitat use, and overlap with Navy activities.* Presented at the Poster presented at the 21st Biennial Conference on the Biology of Marine Mammals. San Francisco, CA. Retrieved from http://www.cascadiaresearch.org/Hawaii/Websteretal_2015_SMM.pdf.

Weller, D. W., S. Bettridge, R. L. Brownell, J. L. Laake, M. J. Moore, P. E. Rosel, B. L. Taylor, and P. R. Wade. (2013). *Report of the National Marine Fisheries Service Gray Whale Stock Identification Workshop* (NOAA Technical Memorandum NMFS-SWFSC-507). La Jolla, CA: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Weller, D. W., A. Klimek, A. L. Bradford, J. Calambokidis, A. R. Lang, B. Gisborne, A. M. Burdin, W. Szaniszlo, J. Urban, A. Gomex-Gallardo Unzueta, S. L. Swartz, and R. L. Brownell Jr. (2012). Movements of gray whales between the western and eastern North Pacific. *Endangered Species Research 18* 193–199. DOI:10.3354/esr00447

Wild, L. A., H. E. Riley, H. C. Pearson, C. M. Gabriele, J. L. Neilson, A. Szabo, J. Moran, J. M. Straley, and S. DeLand. (2023). Biologically Important Areas II for cetaceans within U.S. and adjacent waters – Gulf of Alaska Region. *Frontiers in Marine Science 10*. DOI:10.3389/fmars.2023.1134085

Würsig, B., T. A. Jefferson, and D. J. Schmidly. (2000). *The Marine Mammals of the Gulf of Mexico*. College Station, TX: Texas A&M University Press.

Young, N. C., Brower, A. A., Muto, M. M., Freed, J. C., Angliss, R. P., Friday, N. A., Boveng, P. L., Brost, B. M., Cameron, M. F., Crance, J. L., Dahle, S. P., Fadely, B. S., Ferguson, M. C., Goetz, K. T., London,

J. M., Oleson, E. M., Ream, R. R., Richmond, E. L., Shelden, K. E. W., Sweeney, K. L., Towell, R. G., Wade, P. R., Waite, J. M., and Zerbini, A. N. (2023). *Alaska Marine Mammal Stock Assessments: 2022* (NOAA Technical Memorandum NMFS-AFSC-474). Washington, DC: U.S. Department of Commerce.