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Staff Report/Findings:	7/26/2018
Hearing on Findings:	8/8/2018

ADOPTED FINDINGS ON CONSISTENCY DETERMINATION

Consistency Determination No.:	**CD-0001-18**
Applicant:	**Department of the Navy**
Location:	Southern California (SOCAL) Range Complex, a 120,000 square nautical mile (nmi) area including Santa Barbara, Santa Catalina, San Nicolas, and San Clemente Islands, and offshore waters, as well as offshore waters at the Silver Strand Training Complex (SSTC), Coronado (**Exhibits 1-3**)
Project Description:	California portion of Hawaii-Southern California Training and Testing Program – Continuation of and modifications to ongoing Navy training and testing activities
Commission Action:	Objection
Prevailing Commissioners:	Commissioners Aminzadah, Brownsey, Howell, Luevano, Padilla, Peskin, Uranga, Groom, and Chair Bochco

SUMMARY OF COMMISSION ACTION

The U.S. Department of the Navy (Navy) has submitted a consistency determination for the . Navy for 5-Year Military Readiness Training and Testing Program Activities in the California portion of the Hawaii-Southern California Training and Testing (HSTT) Study Area, southern California. The Commission has reviewed three previous Navy consistency determinations for similar Southern California testing and training activities: CD-008-13 (Commission objection in March, 2013), CD-049-08 (Commission conditional concurrence in October, 2008), and CD-86-06 (Commission conditional concurrence in January, 2007). The first of these reviews (CD-086-06) was for a 2-year period; subsequent authorizations covered 5-year periods. (The Navy's associated NEPA documents and NMFS authorizations are for similar time periods.)

The program involves a very large number of training and testing activities, primarily within existing offshore Navy range complexes and ocean operating areas (OPAREAs), as well as at Navy piers, ports, and shipyards. The program does not include training and testing activities on land (i.e., *onshore* activities at San Clemente Island or the Silver Strand Training Complex).

Briefly, the training elements involve anti-air warfare, amphibious warfare, strike warfare, anti-surface warfare, anti-submarine warfare, electronic warfare, and mine warfare activities. The testing activities involve Naval Air Systems Command Testing, Naval Sea Systems Command Testing, Space and Naval Warfare Systems Command Testing, and Office of Naval Research and Naval Research Laboratory Testing.

Based on the Navy's modeled estimates under the Marine Mammal Protection Act (MMPA), the proposed activities could result in the behavioral harassment (qualifying as "Level B take" under the MMPA) of an annual average of 2.37 million marine mammals/year, and "Level A take" (injury or potential injury) of 576 marine mammals/yr. Despite these modeled numbers, and the large number of "takes" requested in the Navy's application to the National Marine Fisheries Service (NMFS), the Navy concludes that, with the mitigation measures it is including (discussed on pages 27-31 of this report) the activities would not result in population-level effects to any species, and would be consistent with Coastal Act Section 30230. The Navy also asserts that its approach appropriately balances its multiple responsibilities, stating:

> *The Navy's 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, be it humanitarian assistance or disaster relief to deterring war or defeating an adversary. The training and testing under the Proposed Action allows for just that and is balanced with the Navy's commitment to environmental stewardship.*

The Commission found the activities inconsistent with Section 30230. This finding was based on: (1) the limited effectiveness of Navy detection and monitoring measures; (2) uncertainties in assessing whether population-level effects on marine species may be occurring; (3) the fact that the vast majority of marine mammal behavioral harassments will occur outside the preclusion zones adopted by the Navy; and (4) the Navy's unwillingness to limit, in a meaningful way, its

sonar and explosives testing and training in areas of special biological significance for certain marine species (blue, fin, and beaked whales).

The Commission considered the conditional concurrence recommended by staff, but concluded that the approach (i.e., a conditional concurrence) was unwarranted, given the Navy's stated unwillingness to implement the measures Commission staff had recommended in its June 23, 2018, staff report, as well as any of the measures recommended in the letter to the Commission submitted by the Natural Resources Defense Council (NRDC), dated May 24, 2018 (**Exhibit 15**). This Commission objection includes measures, as provided for in 15 CFR 930.43(a)(3) (see pages 7-8 below), which, if adopted by the Navy, would allow the activity to proceed in a manner consistent to the maximum extent practicable with Section 30230 of the Coastal Act. These alternative measures would include:

(1) establishing larger shutdown areas (up to 2 km) (i.e., shut down if a marine mammal or sea turtle is detected within 2 km of the mid-frequency sonar source);

(2) prohibiting use of mid-frequency sonar and in-water explosives in sensitive areas, which would include Marine Protected Areas, the National Marine Sanctuary, seasonal (June thru October) blue whale areas shown on DEIS Figure K.1.2 (and **Exhibit 6**), year-round beaked and fin whale areas shown on **Exhibit 5**, nearshore areas, and any biologically sensitive area NMFS may designate at a future date;

(3) reducing sound intensity under low-visibility conditions;

(4) limiting typical vessel speeds in sensitive areas to 10 knots (unless higher speeds are critical to meet training needs); and

(5) improving observer effectiveness through the use of NMFS-certified marine mammal observers.

The Commission also urged the Navy to consider providing or including additional (or in some cases, alternative) measures and information discussed in the NRDC letter (**Exhibit 15**), which can be summarized as follows:

Information Requests:

(1) Determine sub-populations of Cuvier's beaked whales; (2) provide data used in the measurements of "effectiveness training"; (3) provide greater specificity identifying areas in which training occurs; and (4) provide analyses of potential population-level impacts on marine mammals from cumulative injuries and behavioral disruptions, such as by using the methodology employed by the State Lands Commission, in 2012, in assessing the Central Coastal California Seismic Imaging Project.

Mitigation Measures:

(1) Replace the Commission staff recommended exclusion area west of San Clemente Island with three beaked whale "refuge" areas to the north of the SOAR range; (2) extend the blue whale exclusion season to the end of December, prohibit hull-mounted mid-frequency sonar (except for system checks), and prohibit helicopter/aircraft "dipping" sonar, within the San Diego Arc during the blue whale season; (3) observe 10 knot speed restrictions, seasonally, within the San Diego Arc and the blue whale habitat at Tanner-Cortez Bank; (4) add seasonal fin whale cautionary measures within the 200 to 1000 meter isobaths, from November 1 to May 31; (5) increase protection for gray whales by limiting vessel transit speeds to 10 knots, within 10 n mi of the mainland, from December 1 to May 20; (6) exclude testing and training from all NM Sanctuaries and Marine Protected Areas; (7) allow for "derogation" (i.e., provide for deviations from the marine species protection measures where the Navy determines, "at the highest command authority" that national defense needs necessitate such deviation, including a "transparency" procedure that would involve reporting to the Commission of any such deviation determinations); (8) avoid in-water detonations in low-visibility conditions, and with annual reporting to the Commission of any non-compliance; (9) use SOAR passive acoustic instruments to monitor marine mammal vocalizations, with reporting to trainers/testers using sonar or in-water detonation activities; (10) establish a pilot "thermal monitoring" marine mammal detection program; (11) conduct research on sonar signal modifications having the potential to reduce the severity or onset of behavioral responses; and (12) conduct research to further delineate beaked whale habitats.

The Commission found the project as proposed to be consistent with the commercial and recreational fishing, and public access and recreation policies of the Coastal Act.

The staff recommends that the Commission adopt the findings set forth below to support its objection to the Navy's consistency determination. The motion and resolution are on **Page 6** of this report. The standard of review for this Commission review of federal consistency determinations is whether the project described in the consistency determination is consistent to the maximum extent practicable with the enforceable policies of the California Coastal Management Program (i.e., with Chapter 3 of the Coastal Act).

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Exhibit 2 – SCI Nearshore Training Areas
Exhibit 3 – Silver Strand Training Complex (SSTC) Nearshore Areas
Exhibit 4 – Navy Mitigation Areas
Exhibit 5 – Commission Staff Recommended Mitigation Areas
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Exhibit 8 – Navy DEIS Substrate Types Map
Exhibit 9 – Navy LOA Application, Tables 5-2 and 5-3
Exhibit 10 – Navy DEIS Appendix E, Tables E-1 thru E-14
Exhibit 11 – Navy/CCC Settlement Agreement
Exhibit 12 – Viejas Band of Kumeyaay Indians, DEIS Comment Letter to Navy
Exhibit 13 – Navy LOA Application Tables 1-7 to 1-15
Exhibit 14 – Exhibit from CD-008-13 (CCC Conditions, CD-049-08 and CD-086-06)
Exhibit 15 – NRDC Letter dated May 24, 2018

I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

The Department of the Navy has determined the project consistent to the maximum extent practicable with the California Coastal Management Program (CCMP).

II. COMMISSION ACTION, MOTION AND RESOLUTION

A. OBJECTION

On June 6, 2018, by a vote of nine in favor of objection, and none opposed, the Commission objected to the consistency determination submitted by the Navy on the grounds that the project would not be consistent to the maximum extent practicable with the policies of Chapter 3 of the Coastal Act.

B. MOTION AND RESOLUTION

Staff recommends that the Commission adopt the following motion in support of its decision:

Motion

I move that the Commission adopt the following findings in support of its objection to the Navy's consistency determination CD-0001-18.

The staff recommends a YES vote on this motion. Pursuant to section 30315.1 of the Coastal Act, adoption of findings adoption of findings requires a majority vote of the members from the prevailing side who were also present at the August 8, 2018, hearing, with at least three of the prevailing members voting. Only those Commissioners on the prevailing side of the Commission's action are eligible to vote. A majority vote by the prevailing Commissioners listed on page 1 of this report will result in adoption of the findings.

Resolution to Adopt Revised Findings

The Commission hereby adopts the findings set forth below for consistency determination CD-0001-18 submitted by the Navy for the proposed project on the grounds that the findings support and accurately reflect the reasons for the Commission's June 6, 2018, objection and determination that the project would not be consistent to the maximum extent practicable with the CCMP.

III. APPLICABLE LEGAL AUTHORITIES

Standard of Review

The federal Coastal Zone Management Act ("CZMA"), 16 U.S.C. § 1451-1464, requires that federal agency activities affecting coastal resources be "carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." Id. at § 1456(c)(1)(A). The implementing regulations for the CZMA ("federal consistency regulations"), at 15 C.F.R. § 930.32(a)(1), define the phrase "consistent to the maximum extent practicable" to mean:

> *… fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the Federal agency.*

This standard allows a federal activity that is not fully consistent with California's Coastal Management Program ("CCMP") to proceed, if full compliance with the CCMP would be "prohibited by existing law." In its consistency determination, the Navy did not argue that full consistency is prohibited by existing law or provide any documentation to support a maximum extent practicable argument. Therefore, there is no basis to conclude that existing law applicable to the Federal agency prohibits full consistency. Since the Navy has raised no issue of practicability, as so defined, the standard before the Commission is full consistency with the enforceable policies of the CCMP, which are the policies of Chapter 3 of the Coastal Act (Cal. Pub. Res. Code §§ 30200-30265.5).

State Agency Objections

The federal consistency regulations (15 CFR **§** 930.43) provide:

> *(a) In the event the State agency objects to the Federal agency's consistency determination, the State agency shall accompany its response to the Federal agency with its reasons for the objection and supporting information. The State agency response shall describe:*
>
> *(1) How the proposed activity will be inconsistent with specific enforceable policies of the management program; and*
>
> *(2) The specific enforceable policies (including citations).*
>
> *(3) The State agency should also describe alternative measures (if they exist) which, if adopted by the Federal agency, would allow the activity to proceed in a manner consistent to the maximum extent practicable with the enforceable policies of the management program. Failure to describe alternatives does not affect the validity of the State agency's objection.*
>
> *(b) If the State agency's objection is based upon a finding that the Federal agency has failed to supply sufficient information, the State agency's response must describe the nature of the information requested and the necessity of having such information to determine the consistency of the Federal agency activity with the enforceable policies of the management program.*
>
> *(c) State agencies shall send to the Director a copy of objections to Federal agency consistency determinations.*
>
> *(d) In the event of an objection, Federal and State agencies should use the remaining portion of the 90-day notice period (see § 930.36(b)) to attempt to resolve their differences. If resolution has not been reached at the end of the 90-day period, Federal agencies should consider using the dispute resolution mechanisms of this part and postponing final federal action until the problems have been resolved. At the end of the*

90-day period the Federal agency shall not proceed with the activity over a State agency's objection unless:

(1) the Federal agency has concluded that under the "consistent to the maximum extent practicable" standard described in section 930.32 consistency with the enforceable policies of the management program is prohibited by existing law applicable to the Federal agency and the Federal agency has clearly described, in writing, to the State agency the legal impediments to full consistency (See §§ 930.32(a) and 930.39(a)), or

(2) the Federal agency has concluded that its proposed action is fully consistent with the enforceable policies of the management program, though the State agency objects.

(e) If a Federal agency decides to proceed with a Federal agency activity that is objected to by a State agency, or to follow an alternative suggested by the State agency, the Federal agency shall notify the State agency of its decision to proceed before the project commences.

IV. FINDINGS AND DECLARATIONS

A. PROJECT LOCATION AND DESCRIPTION

The Navy's Proposed Action is to conduct military readiness activities within existing range complexes and operating areas (OPAREAs) located along the coast of Southern California (**Exhibit 1**). Navy OPAREAs include a transit corridor and designated ocean areas near fleet homeports. These military readiness activities include the use of active sonar and explosives at sea off the coasts of Southern California, and at select Navy pierside and harbor locations. These military readiness activities are generally consistent with those analyzed in the HSTT Final EIS/OEIS completed in December 2013 and are representative of training and testing that the Navy has been conducting in the Southern California portion of the HSTT Study Area for decades.

The Navy states that the purpose of the Proposed Action: "… is to ensure that the Navy meets its mission, which is to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is achieved in part by conducting training and testing within the Southern California portion of the HSTT Study Area in accordance with established Navy military readiness requirements."

Consistent with past submittals, the Navy divides the project components into "Training" and "Testing" Activities. Briefly, the training elements involve anti-air warfare, amphibious warfare, anti-submarine warfare, electronic warfare, mine warfare, and surface warfare activities. The testing activities involve a broad spectrum of activities in support of the fleet, including (but not limited to), basic and applied scientific research and technology development; testing, evaluation, and maintenance of systems (e.g., missiles, radar, and sonar) and platforms (e.g., surface ships, submarines, and aircraft); and acquisition of systems and platforms to support Navy missions and give a technological edge over adversaries. Testing may also involve use of unmanned systems (both surface and underwater), vessel evaluations, and acoustic and oceanographic research.

The project area is the SOCAL Range Complex, Point Mugu Sea Range Overlap, and the Silver Strand Training Complex (SSTC). The SOCAL Range Complex is an offshore area situated between Dana Point and San Diego, extending more than 600 nautical miles (nm, or nmi) southwest into the Pacific Ocean (**Exhibit 1**). The two primary components of the SOCAL Range Complex are the OPAREAs and the special use airspace. These components encompass 120,000 square nautical miles (nmi^2) of sea space; 113,000 nmi^2 of special use airspace; and over 56 $mi.^2$ of land area on San Clemente Island and the SSTC (however, land activities are not part of the proposed activities). Most activities would occur in the eastern portion of the range complex, as they would be closer to established range infrastructure and facilities.

Rather than repeat the descriptions of the voluminous activities proposed under the program, this description summarizes the changes in the current submittal (compared to the 2013 submittal from the Navy), and provides a listing of the numbers of hours per year, by activity, that generate potential effects on marine species (see **Exhibit 13**, which includes these figures in Tables 1-12 to 1-15 – Summary of Acoustic and Explosives Sources Analyzed for Training and Testing). A full description of the proposed activities can be found in Chapter 2, Navy's Draft EIS – Description of Proposed Action and Alternatives[1].

In comparing the proposed activities to those of the last 5-Year period reviewed by the Commission (CD-008-13)[2], the Navy summarizes the changes as including:

- Refined analysis of anti-submarine warfare activities, resulting in reduced levels of active sonar and fewer hours of sources of underwater sound.

- Reduced number of sinking exercises.

- Increases in training for maritime security operations, such as drug interdiction and anti-piracy operations.

- Increases in testing of some new vessels, aircraft, weapons systems, and unmanned vehicles, and decreases in other testing activities.

- Improved acoustic models, updated marine mammal and sea turtle densities, and updated marine species criteria and thresholds.

- Review of procedural mitigations, where appropriate, and consideration of additional geographic and/or temporal mitigations, where applicable.

The paragraphs below summarize more specifically where the Navy's currently proposed activities would differ from those the Commission reviewed in CD-008-13:

[1] https://hstteis.com/portals/hstteis/files/hstteis_p3/deis/HSTT_DEIS_Volume_1_October_2017.pdf
[2] The Commission's findings on CD-008-13 can be accessed at on the Commission's website at https://documents.coastal.ca.gov/reports/2013/4/W13a-4-2013.pdf

1. Types and levels of activities to be conducted.

2. Reduction in hull-mounted mid-frequency active sonar.

3. New proposed mitigation areas.

1. Types and Levels of Activities to be Conducted

The 2013 HSTT Final EIS/OEIS (for the Southern California portion of the HSTT Study Area) and the 2013 Consistency Determination analyzed at-sea training and testing activities (ongoing activities) that are the baseline for this Consistency Determination. A comparison between the level of proposed activities analyzed in this Consistency Determination and ongoing activities is provided in Appendix A of the Navy's consistency determination (contained in **Appendix B** to this staff report, pp. 137-164) (Navy Training and Testing Activities in the Southern California Portion of the HSTT Study Area), Tables A-1 through A-5. As described in those tables, some activities have increased, some have decreased, and some have remained consistent. In addition, some activities have been discontinued or combined with other activities and some new activities are proposed. The following testing activities have been discontinued and have not been analyzed here:

- Decoy Testing
- Pierside Integrated Swimmer Defense
- Shipboard Protection Systems Testing
- Acoustic Communications Testing

Some training and testing activities analyzed in this Consistency Determination may appear as new activities. However, most of these activities are new in name only, and in fact are very similar to activities that have been conducted in Southern California for decades. The only changes that introduce new weapons or new stressors are activities that test: (1) high-energy lasers, (2) large unmanned surface vehicles, and (3) marine vessel stopping systems that use biodegradable polymer to affect a vessel's propulsion system.

2. Reduction in Hull-Mounted Mid-Frequency Active Sonar

To simplify a comparison between the proposed level of activity (referred to as "Phase III") and the amount of training analyzed in the previous consistency determination (referred to as "Phase II"), the Navy focused on the type of sonar source that resulted in the greatest number of exposures to marine mammals: hull-mounted mid-frequency active sonar. The differences between use of this system from Phase II to Phase III are best identified in three ways: (1) completion of some unit-level training via synthetic means (i.e. not involving sonar use in the ocean) or through other training exercises, (2) reduction of total sonar hours associated with each Composite Training Unit Exercise, and (3) reduction in the total number of Composite Training Unit Exercises expected over a five-year period.

During Phase II, all unit-level training using hull-mounted mid-frequency sonar was assumed to be conducted during discrete training events. However, current practice indicates that up to 50% of unit-level training is completed through synthetic training, as well as concurrent with other training exercises (e.g., unit-level training can be completed simultaneously during an integrated

training exercise). The proposed reduced level of activity therefore accounts for this use of synthetic training and concurrent unit-level training within other exercises - although this assumes risk in the event additional live training is necessary.

Composite Training Unit Exercises are major exercises that involve multiple platforms and numerous hours of sonar to meet mission objectives. During Phase II, each Composite Training Unit Exercise was assumed to require 1,000 hours of hull-mounted mid-frequency sonar. Through analysis of data collected during the Phase II permit period, the Navy determined that this assumption overestimated the amount of hull-mounted mid-frequency sonar that was typically used in a Composite Training Unit Exercise by 400 hours. As such, an estimated 600 hours of hull-mounted mid-frequency sonar is included for each Composite Training Unit Exercise.

Comparisons of proposed hull-mounted mid-frequency sonar hours to the hours permitted from 2013– 2018 are depicted in Figure 2-6 and Figure 2-7 (reproduced below).

The Fleet Response Plan, in place during Phase II, identified a requirement to conduct four Composite Training Unit Exercises per year in the Pacific Fleet. For Phase III, the number of Composite Training Unit Exercises to be conducted is reduced. The Navy proposes to reduce (from the 2013 to 2018 permitted level) the number of Composite Training Unit Exercises to be conducted during any five-year period by analyzing representative years (in addition to maximum planned years) of training activity to account for the variability of training cycles and deployment schedules. Over the next five-year period, the analysis considers two years of three Composite Training Unit Exercises (maximum years) and three years of two Composite Unit Training Exercises (representative years) for a total of 12, a 40 percent reduction from the 2013–2018 permit period. A comparison of the number of Composite Training Unit Exercises from the 2013–2018 permitted levels to the proposed level is provided in Figure 2-8.

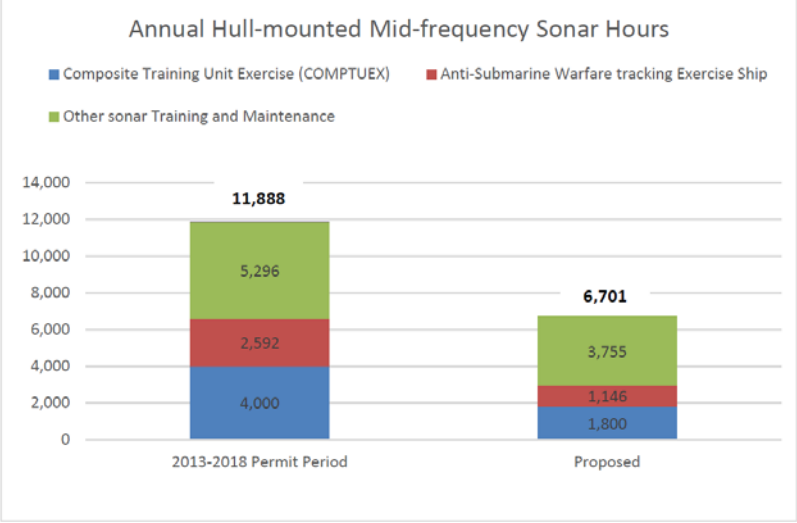


Figure 2-6: Proposed Maximum Year of Hull-Mounted Mid-Frequency Sonar Hour Use by Activity During Training Compared to the Number Authorized in the 2013–2018 Marine Mammal Protection Act Permit

Note: As represented here, the proposed level of activity assumes three Composite Unit Training Exercises, conducted at a lower level of hull-mounted active sonar used and where 50 percent of requirements are met

through synthetic training or other training exercises, and where all annual and non-annual training and testing activities are carried out in any given year of the five-year period.

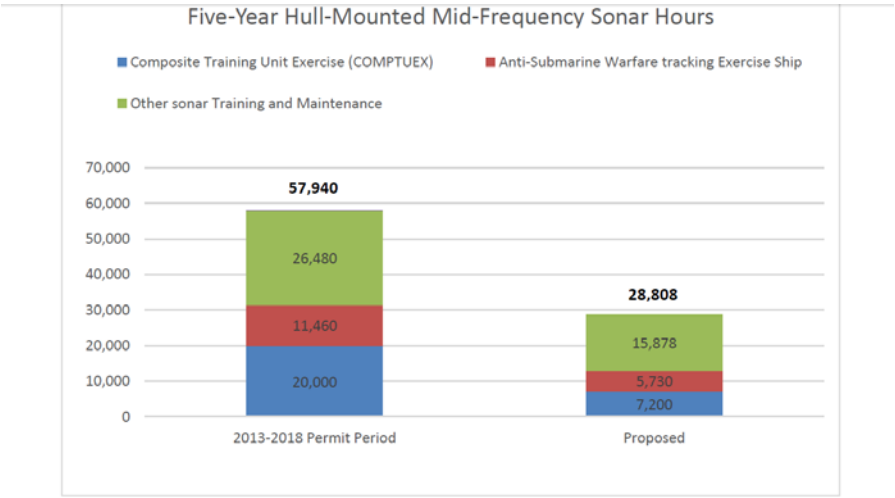


Figure 2-7: Proposed Five-Year Total Hull-Mounted Mid-Frequency Sonar Hour Use by Activity During Training Compared to the Number Authorized in the 2013–2018 Marine Mammal Protection Act Permit

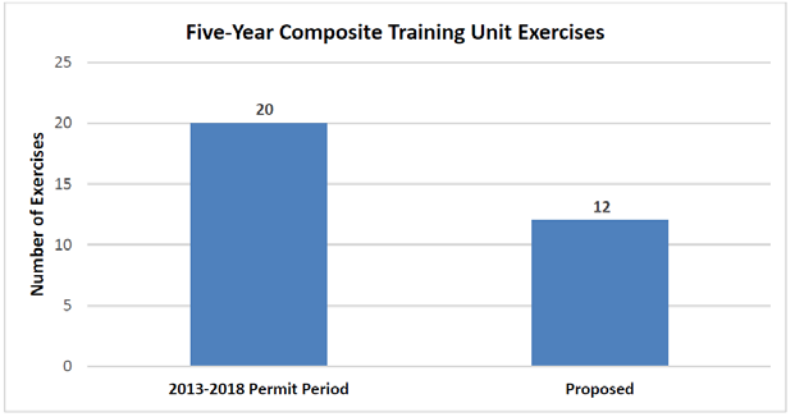


Figure 2-8: Proposed Number of Composite Training Unit Exercises over a Five-Year Period Compared to Number Authorized in the 2013–2018 Marine Mammal Protection Act Permit

3. New Proposed Mitigation Areas

In addition to reducing the authorized activities as described above, the Navy has included new mitigation areas compared to those included in the previous review; these include **seafloor avoidance** and minimization measures, and **mitigation areas** for marine mammals. The entire suite of marine resource avoidance, minimization, and monitoring measures is included in Appendix C of the Navy's consistency determination (**Appendix C** to this report). The Navy's Environmental Impact Statement (EIS)/Overseas EIS (OEIS)[3] for the proposed activities included an Appendix K (Geographic Mitigation Assessment),[4] which considered additional potential mitigation measures and analyzed their feasibility.

[3] See https://hstteis.com/Documents/2017-Hawaii-Southern-California-Training-and-Testing-Draft-EIS-OEIS/Draft-EIS-OEIS

Seafloor Resources
The Navy will implement mitigation to avoid impacts on seafloor resources from explosives and physical disturbance and strikes from military expended materials and anchorages in mitigation areas throughout the Southern California portion of the HSTT Study Area. These measures include maintaining a 350 yd. (radius) buffer when using explosives, to avoid damage from vibrations and avoid expendable material being deposited on sensitive seafloor resources. The seafloor mitigation areas are depicted on Consistency Determination Figure 2-9 (**Exhibit 7**). Hard bottom habitats are depicted on **Exhibit 8**.

Mitigation Areas
Concerning mitigation areas for marine mammals, the Navy has provided areas of Planning and Cautionary Awareness and Notification, which it notes are "more protective of species than the areas agreed to with the California Coastal Commission in 2016." In these areas the Navy has committed to "implement additional mitigation within these mitigation areas to further avoid or reduce impacts on marine mammals from acoustic and explosive stressors and vessel strikes from the Proposed Action." These areas are:

- The San Diego Arc
- A 3 nmi area around each island in the Channel Islands NMS; and
- The area within 3 nmi from the mainland between Del Mar northward to the northern boundary of SOCAL (offshore Laguna Beach)

The additional measures to be provided in these areas are discussed on page 28-30 below, and CD Appendix C (Mitigation (**Appendix C** to this staff report) provides a full list of mitigation measures for all activities. The mitigation areas described above are depicted on the map below:

[4] https://hstteis.com/portals/hstteis/files/hstteis_p3/deis/HSTT_DEIS_Volume_4_October_2017.pdf (Appendix K begins on page 155 of the Vol. 4 document at this link)

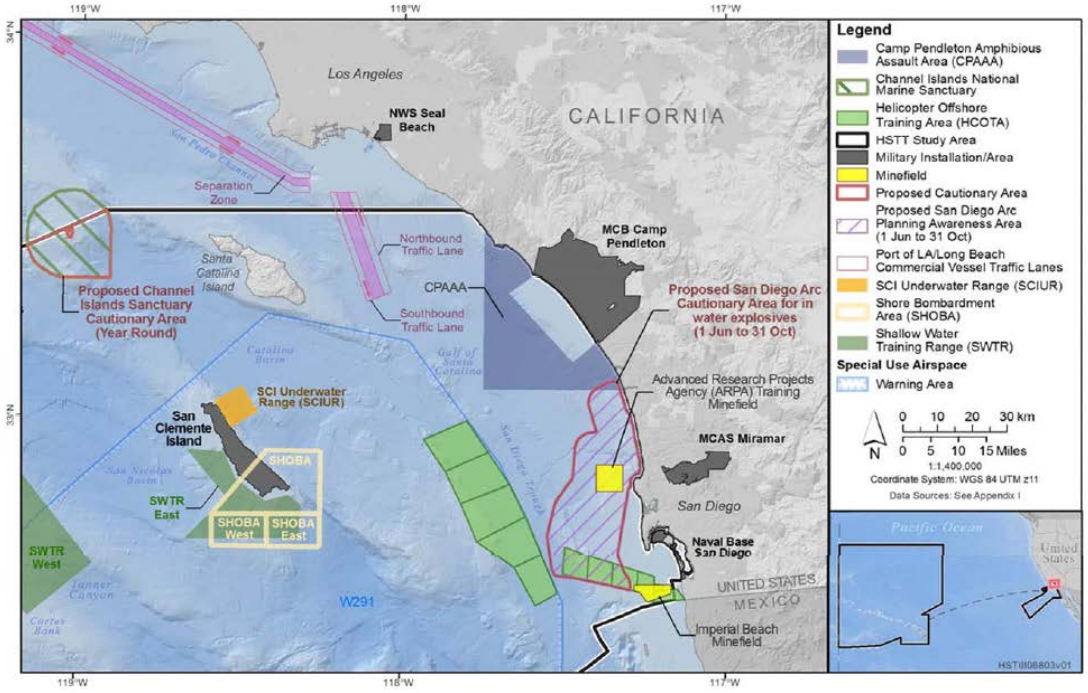


Figure 2-10: Mitigation Areas for Marine Mammals

B. PREVIOUS COMMISSION ACTIONS

On January 10, 2007, the Commission conditionally concurred with the Navy's consistency determination for offshore and onshore military training and testing exercises in SOCAL offshore waters for a 2 year period (CD-086-06). The Commission's conditions focused primarily on the need for additional protection for marine mammals from Navy active sonar use, including increasing the size of the safety zones (including a shutdown zone of at least 2 km) around the sonar source, avoiding sonar use within areas with high concentrations of marine mammals to the maximum extent feasible, and increasing protection (reduced sonar intensity) under low visibility and surface ducting conditions (surface ducting can result in amplification of sound levels or cause sounds to disperse farther than anticipated). That authorization ended in December 2008. Because the Navy did not agree to comply with most of the Commission's conditions, the Commission's action was treated as an objection under the federal consistency procedures. (15 C.F.R. § 930.4(b).) The Navy informed the Commission it intended to proceed without agreeing to most of the conditions, and in March 2007 the Commission filed a lawsuit in federal court, the outcome of which is described in the following section of this report.

On October 15, 2008, the Commission conditionally concurred with a follow-up Navy consistency determination (CD-049-08) for the next round of Navy SOCAL training and testing exercises, covering the period from January 1, 2009, through December 31, 2013. The Commission adopted conditions similar to those in CD-086-06 (**Exhibit 14**, which contains both sets of Commission conditions). On January 16, 2009, the Navy again indicated its intent to

proceed without agreeing to the conditions. By this time the U.S. Supreme Court had published its ruling in the case described below arising from the earlier training and testing, and in this instance the Commission did not file a lawsuit.

On March 8, 2013, the Commission objected to the Navy's consistency determination for the following 5-year period (CD-008-13). The Commission's objection to this consistency determination was based on lack of information:

> *…because the Navy's analysis: (1) only looked at population-level effects; (2) arbitrarily limited its analysis to only 10 of the 32 coastal species present in the southern California study area; (3) did not include the type of population-level analysis Pacific Gas and Electric Company had provided in its high energy seismic survey consistency certification (CC-027-12); (4) provided no explanation as to why significant intensification of use of mid-frequency sonar was needed for military training and testing; and (5) failed to analyze and consider alternatives such as implementing "time-area" closures, as well as other mitigation measures previously adopted by the Commission or identified by Commission staff in its report on the present consistency determination.*

The Navy provided additional information to staff following the Commission's objection. Nevertheless, the staff did not agree that the Navy had adequately addressed the concerns raised by the Commission in its objection. On December 17, 2013, the Navy informed the Commission that it intended to proceed despite the objection. In the meantime, litigation brought by other parties challenging the Navy's program proceeded (based on NEPA, MMPA, ESA claims) in Hawaii federal district court. In July 2014, the California Attorney General informed the Navy the Commission intended to pursue its own litigation, and the parties entered into negotiations. On March 31, 2015, while those negotiations were ongoing, the Hawaii district court issued an order granting summary judgment to two of the plaintiffs in that case[5]; however, subsequent to that, the parties entered into a settlement agreement. On May 15, 2016, the Commission and the Navy also agreed to a Settlement Agreement (**Exhibit 11**), under which the Commission agreed not to pursue litigation through the remainder of the 5-Year period (i.e., until late December 2018).

Federal Court, CEQ, and Presidential Actions in 2007-2008

As noted above, litigation arose over the first of the above-described projects, with the Commission challenging the Navy under the CZMA, and environmental groups led by the Natural Resources Defense Council ("NRDC") challenging the Navy under the Marine Mammal Protection Act (MMPA), the CZMA, the National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA). Over a seven-month period from mid-2007 to early 2008, the Federal District Court and Ninth Circuit Court of Appeals considered more than half-a-dozen orders, mostly related to NRDC's motion for a preliminary injunction. At the end of that period,

[5] Conservation Council for Hawaii et al. v. NMFS et al. and Natural Resources Defense Council et al. v. NMFS et al.

the result of these lower court actions was the issuance of a preliminary injunction[6] requiring that the Navy comply with a set of mitigation measures, consisting of: (1) imposing a 12-mile "exclusion zone" from the coastline; (2) using lookouts to conduct additional monitoring for marine mammals; (3) restricting the use of "helicopter-dipping" sonar; (4) limiting the use of mid-frequency active (MFA) sonar in geographic "choke points"; (5) shutting down MFA sonar when a marine mammal is spotted within 2,200 yards of a vessel; and (6) powering down MFA sonar by 6 decibels (dB) during significant surface ducting conditions.

Within days following the district court's issuance of its revised injunction, the Navy: (1) sought (and received) an exemption from the President under the CZMA[7]; and (2) sought (and received) an emergency authorization from the Council on Environmental Quality ("CEQ") for "alternative NEPA arrangements"[8]. The Navy moved to vacate the district court's preliminary injunction in light of these actions, but on February 4, 2008, the district court refused to do so, and the Court of Appeals affirmed, finding, among other things, that the plaintiffs were likely to succeed on the merits of their claims, but focusing solely on the NEPA claims.

In *Winter v. Natural Res. Def. Council, Inc., 129 S. Ct. 365 (2008)*, the U.S. Supreme Court reversed the lower court rulings and vacated the preliminary injunction. The Supreme Court's ruling did not address the merits of the NEPA claims but only addressed the standard for issuance of a preliminary injunction, the application of that standard to the facts of this case, and the appropriate remedy under NEPA. The ruling did not address CZMA grounds.

C. OTHER AGENCY APPROVALS AND CONSULTATIONS

National Marine Fisheries Service (NMFS)
Pursuant to the Marine Mammal Protection Act (MMPA) (16 U.S.C. § 1371(a)(5)), the Navy has submitted a request for two Letters of Authorization (LOA) from NMFS (one LOA for the training and one LOA for the testing) for the incidental taking of marine mammals, under the MMPA (the LOAs would also include species protected under the Endangered Species Act). On

[6] "Modified Preliminary Injunction" issued on January 10, 2008, in the case of *NRDC v. Winter*, N.D. Cal. Case No. 8:07-cv-00335-FMC-FMO.

[7] CZMA §307(c)(1)(B) (16 U. S. C. §1456(c)(1)(B)) provides, in part:

> *After any final judgment, decree, or order of any Federal court that is appealable under section 1291 or 1292 of title 28, United States Code, or under any other applicable provision of Federal law, that a specific Federal agency activity is not in compliance with subparagraph (A), and certification by the Secretary that mediation under subsection (h) is not likely to result in such compliance, the President may, upon written request from the Secretary, exempt from compliance those elements of the Federal agency activity that are found by the Federal court to be inconsistent with an approved State program, if the President determines that the activity is in the paramount interest of the United States.*

[8] NEPA (40 CFR §1506.11) provides:

> *Where emergency circumstances make it necessary to take an action with significant environmental impact without observing the provisions of these regulations, the Federal agency taking the action should consult with the Council about alternative arrangements. Agencies and the Council will limit such arrangements to actions necessary to control the immediate impacts of the emergency. Other actions remain subject to NEPA review.*

October 20, 2017, NMFS published a proposed rule, requesting comments on its proposal to issue regulations and Letters of Authorization to the Navy for the proposed activities (as well as the Hawaii activities, which are not before the Commission). The public comment period closed on November 20, 2017. NMFS has not yet released its proposed rule.

U.S. Fish and Wildlife Service (USFWS)
The Navy is consulting with the U.S. Fish and Wildlife Service under Section 7 of the ESA for three listed seabird species under USFWS' jurisdiction.

State of Hawaii
The Navy has submitted a consistency determination to the Hawaii Coastal Zone Management Program for the portions of the training and testing located off that state.

Tribal Consultation
The Navy sent scoping letters (dated November 12, 2015) to representatives of 18 federally recognized tribes, and two additional tribes on the California Native American Heritage Consultation List. The Tribes contacted were Barona Band of Mission Indians, Campo Kumeyaay Nation (Formerly Campo Band of Mission Indians), Ewiiaapaayp Band of Kumeyaay Indians, Iipay Nation of Santa Ysabel, Inaja-Cosmit Band of Mission Indians, Jamul Indian Village, La Jolla Band of Luiseno Mission Indians of the La Jolla Reservation, La Posta Band of Mission Indians, Los Coyotes Band of Cahuilla & Cupeno Indians, Manzanita Band of Mission Indians, Mesa Grande Band of Mission Indians, Pala Band of Luiseno Mission Indians, Pauma Band of Luiseno Mission Indians of the Pauma & Yuima Reservation, Pechanga Band of Luiseno Mission Indians, San Pasqual Band of Diegueno Indians, Soboba Band of Luiseno Indians, Sycuan Band of the Kumeyaay Nation, Viejas Band of Mission Indians, Fernandeño Tataviam Band of Mission Indians, and Gabrielino-Tongva Tribe. The Navy received a letter from one tribe: the Viejas Band of Mission Indians (**Exhibit 12**).

D. MARINE RESOURCES

Coastal Act Section 30230 states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Overview
The Commission has been consistent for over two decades in expressing concerns over the effects of anthropogenic sounds on the marine environment, particularly on marine mammals. Anthropogenic noise is a recognized, but largely unregulated, form of ocean pollution that can deafen, disturb, injure, and kill marine life. Many species of marine mammals are known to be highly sensitive to sound and rely upon sound to navigate, find food, locate mates, avoid predators, and communicate with one another. A combination of noise sources, including shipping, oil and gas exploration and production, dredging, construction, and military activities, has resulted in dramatic increases in noise levels

throughout the oceans. Over the last ten years, a growing body of evidence has shown that some forms of ocean noise can kill, injure, and deafen whales and other marine mammals. In particular, a sequence of marine mammal mass strandings and mortalities has been linked to exposure to mid-frequency sonar. There is also evidence that some affected animals do not strand but die at sea. This has increased public concern about the effects of anthropogenic noise on marine mammals, which has been acknowledged in a variety of domestic and international fora.

Marine mammals have evolved over millions of years and rely on sound for vital life functions and have specialized sensory capabilities to take advantage of the physics of sound in the ocean. Anthropogenic noise in the oceans has increased since the start of the industrial revolution and increases in ambient noise levels, as well as individual sound sources, can cause adverse effects, the extent and type of which are not well understood. Military technology and scientific research using low frequency active acoustics attempting to cover large distances have specifically targeted the ecological sound niches that low frequency specialist whales have evolved to rely on, necessarily competing with those marine mammal species. Peer-reviewed scientific literature indicates that marine mammals are affected by exposure to anthropogenic noise in a variety of ways that can be harmful or even lethal. However, there are significant gaps in information available to understand and manage these effects. This is particularly the case because marine mammals are extremely difficult to study and the marine environment is extraordinarily complex and dynamic. In addition, this is a relatively new field of concern and the amount of research undertaken to date has been limited in scope and duration.

In light of these concerns,[9] during its first two reviews of Navy SOCAL offshore testing and training (CD-049-08 and CD-086-06), the Commission adopted conditions intended to increase protection for marine mammals, seeking, among other things, larger preclusion areas around sonar sources, avoidance of sonar use within biologically sensitive areas, and lowering of maximum sound levels under low-visibility conditions. In its more recent review (CD-008-13), the Commission objected, based on lack of information (see page 14 above,) about a variety of key details, including consideration and analysis of the types of adverse impact avoidance measures identified in the previous sentence. The Commission subsequently settled with the Navy, based on the terms of the settlement agreement attached in **Exhibit 11**. In the agreement the Navy committed to:

1. An agreement on the duration of the agreement (to end Dec. 25, 2018).
2. Identify 3 areas in which hull mounted mid-frequency sonar is "not typically used" during Major Training Events (MTEs) [if they were used, the Navy would notify the Commission (subject to any classification restrictions)]:
   - The San Diego Arc
   - A 3 nmi area around each island in the Channel Islands NMS; and
   - The area within 3 nmi from the mainland between Del Mar northward to the northern boundary of SOCAL (offshore Laguna Beach)
3. Limit explosives >20 lbs. to daytime use, and provide Commission staff with post detonation notifications.

[9] As previously noted by the Commission in CD-008-13, and originally contained in the Commission's December 13, 2005, comments to the Marine Mammal Commission's Advisory Committee on Acoustic Impacts on Marine Mammals.

4. Fund research and coordinate annually with the Commission staff over "areas of mutual interest" relating the marine mammals in SOCAL waters.
5. Consider deployment of additional passive acoustic monitoring devices.
6. Provide briefings to Commission staff on related matters
7. Continue participating in and funding CalCOFI oceanographic research.[10]
8. Provide Commission staff with 72 hour courtesy notices of MTE's in SOCAL.
9. Provide Commission staff with annual exercise and monitoring reports.
10. Provide briefings to Commission staff on Unusual Stranding Events.
11. Consider Commission-recommended reports in ongoing Adaptive Management meetings held with NMFS.
12. Take "appropriate corrective action" if lookout effectiveness study results warrant corrective action.

Notwithstanding the terms of this settlement (which were temporary), the Navy and the Commission have not historically agreed as to the adequacy of the preclusion zones the Navy has proposed around mid-frequency sonar sources, or the scope of activities to be conducted within areas of particular sensitivity (such as areas of seasonal concentrations of marine mammals). In its past and current consistency determinations, the Navy has maintained that its suite of mitigation and monitoring measures are adequate to protect marine mammals (and other marine species). The Navy's position has been that the lack of documented population-level effects, combined with the mitigation measures it has agreed to implement and the results of its monitoring results (reported annually) - which have not documented significant adverse marine mammal reactions to its activities - support its conclusion that its activities are consistent with Section 30230 of the Coastal Act.

Marine Mammal Protection Act (MMPA)

The Navy has also historically cited its MMPA authorizations issued by NMFS under the MMPA as further evidence of lack of adverse effects on marine resources. The MMPA sets forth the regulatory mechanisms for NMFS' authorizations of "takes" or "harassment" under that law. The Commission notes that the standard NMFS relies on under the MMPA differs from the Coastal Act's marine resource policies. The following excerpts from NMFS' 2013 review of the Navy's activities illustrates the determinations NMFS must make under the MMPA:

- Whether the "taking" will have a negligible impact on the species or stock(s),
- Whether the "taking will have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant),
- Whether the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such takings are set forth.

NMFS defines ''negligible impact'' in 50 CFR 216.103 as ''an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.''

[10] http://calcofi.org/about-calcofi.html

The MMPA was amended in 2004 to modify what constitutes a "take" or "harassment" in the context of "military readiness activities." Under the MMPA, for military readiness activities, the relevant definition of harassment is any act that:

> • Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (also referred to as "Level A harassment"); or
>
> • Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered (also referred to as "Level B harassment") [16 U.S.C. § 1362(18)(B)(i) and (ii)].

Navy Consistency Analysis

The Navy's consistency determination (and supporting DEIS) analyzed a number of marine resources that could be adversely affected by the Proposed Action such as sensitive marine resources and habitats (e.g., eelgrass and kelp), commercial and recreational fish stocks, and protected marine species (i.e., sea turtles, marine mammals, and abalones). For each marine resource analyzed, and with the mitigation, minimization, avoidance, and/or monitoring measures included, "the Navy has determined that there are no long-term consequences for populations of any species of biological or economic significance as a result of the Proposed Action."

Marine Mammals and Sea Turtles

The Navy's consistency determination, lists 30 marine mammal species in the project area, including 7 mysticetes (baleen whales), 18 odontocetes (dolphins and toothed whales), 4 pinnipeds (seals and sea lions), and the southern sea otter. The document further notes the presence of five species of sea turtles (green, hawksbill, loggerhead, olive ridley, and leatherback sea turtles) that may occur off Southern California and are listed as endangered under the Endangered Species Act. (Hawksbill sightings are rare and would most likely occur during an El Niño event, when waters along the California current are unusually warm (NMFS and USFWS 2007).)

The Navy states the stressors that could affect marine mammals and sea turtles include the following:

- Acoustic (sonar and other transducers; air guns; pile driving; vessel noise; aircraft noise; and weapons noise)
- Explosive
- Energy (in-water electromagnetic devices, high-energy lasers)
- Physical disturbance and strikes (vessels and in-water devices; military expended materials; seafloor devices; pile driving)

- Entanglement (wires and cables; decelerators/parachutes; biodegradable polymers)
- Ingestion (military expended materials – munitions; military expended materials other than munitions)
- Secondary (impacts on habitat; impacts on prey availability)

Concerning effects on mysticetes (blue, Bryde's, fin, gray, humpback, minke, and sei whales), which have the best low-frequency hearing, the Navy states (CD, p. 3-71):

> *Impacts from Sonar and Other Transducers*
>
> *Mysticetes*
> *A few behavioral reactions in mysticetes resulting from exposure to sonar could take place at distances of up to 20 km. Behavioral reactions, however, are much more likely within a few kilometers of the sound source. The quantitative analysis very likely overestimated the numbers of behavioral reactions due to the underlying nature of the data used to derive the behavioral response functions. Research shows that if mysticetes do respond they may react in a number of ways, depending on the characteristics of the sound source, their experience with the sound source, and whether they are migrating or on seasonal grounds (i.e., breeding or feeding). Behavioral reactions may include alerting, breaking off feeding dives and surfacing, or diving or swimming away. Overall, mysticetes have been observed to be more reactive to acoustic disturbance when a noise sources is located directly on their migration route. Mysticetes disturbed while migrating could pause their migration or route around the disturbance. Animals disturbed while engaged in other activities such as feeding or reproductive behaviors may be more likely to ignore or tolerate the disturbance and continue their natural behavior patterns.*

The Navy maintains that:

(1) most behavioral reactions from mysticetes "…are likely to be short-term and low to moderate severity;"

(2) "Behavioral research indicates that mysticetes most likely avoid sound sources at levels that would cause any hearing loss (i.e., TTS [Temporary Threshold Shift])";

(3) "it is likely that the quantitative analysis overestimates PTS [Permanent Threshold Shift] and TTS in marine mammals because it does not account for animals avoiding sound sources at closer ranges;"

(4) "A single or even a few minor TTS (less than 20 dB of TTS) to an individual mysticete per year are unlikely to have any long-term consequences for that individual;"

(5) most anti-submarine warfare activities are "geographically dispersed and last for only a few hours, often with intermittent sonar use even within this period;" and

(6) while some degree of "masking" (Navy sound interfering with an animal's ability to perceive other sounds) may occur, "A single or even a few short periods of masking, if it were to occur, to an individual mysticete per year are unlikely to have any long-term consequences for that individual."

The Navy's analysis of effects on odontocetes (sperm whales, beaked whales, and dolphins), acknowledges the current understanding that beaked whales have been shown to be particularly sensitivity to military sonar worldwide.[11] The DEIS Technical Report ("Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III), June 2017) similarly acknowledges the particular sensitivity of beaked whales:

> *Beaked Whales (family Ziphiidae) are a generally cryptic group, difficult to observe at the surface and tending to avoid vessels and underwater noise (Barlow & Gisiner, 2006). Beaked whales are deep divers, diving to depths of over 1-2 km to forage on squid and mesopelagic fish (Reeves et al., 2002; Schorr et al., 2014). Due to several mass stranding events of beaked whales in proximity to Navy training events (D'Amico et al., 2009), this group has been deemed highly sensitive to sonar and other active acoustics and they are considered separately from the other odontocetes.* [p. 62]

The Navy states:

> *A few behavioral reactions in odontocetes (except beaked whales) resulting from exposure to sonar could take place at distances of up to 20 km. Beaked whales have demonstrated a high level of sensitivity to human made noise and activity; therefore, the quantitative analysis assumes that some beaked whales could experience significant behavioral reactions at distance of up to 40 km and 50 km from the sound source, respectively. Behavioral reactions, however, are much more likely within a few kilometers of the sound source for most species of odontocetes such as delphinids and sperm whales. On the other hand, beaked whales have generally demonstrated a high level of sensitivity to human made sound and disturbance. Even for beaked whales, the quantitative analysis very likely overestimated the numbers of behavioral reactions due to the underlying nature of the data used to derive the behavioral response functions.*

The Navy's conclusions for odontocetes (as well as those for pinnipeds) are similar to those described above for mysticetes, which is that the effect would be temporary and relatively minor. Specifically concerning beaked whales, the Navy states:

> *Some odontocetes may avoid larger activities such as a major training exercise as it moves through an area, although these activities typically do not use the same training locations day-after-day during multi-day activities. Sensitive species of odontocetes, such as beaked whales, may avoid the area for the duration of the event. Displaced animals would likely return after the sonar activity subsides within an area, as seen in Blainville's*

[11] See Marine Mammal Strandings Associated with U.S. Navy Sonar Activities (June 2017) at: https://hstteis.com/Documents/2017-Hawaii-Southern-California-Training-and-Testing-Draft-EIS-OEIS/Supporting-Technical-Documents

beaked whales in the Bahamas (Tyack et al., 2011) and Hawaii (Henderson et al., 2015; Henderson et al., 2016; Manzano-Roth et al., 2016). This would allow the animal to recover from any energy expenditure or missed resources, reducing the likelihood of long-term consequences for the individual. It is unlikely that most animals would encounter a major training exercise more than once per year. Outside of Navy instrumented ranges and homeports, the use of sonar and other transducers is transient and is unlikely to expose the same population of animals repeatedly over a short period. However, a few behavioral reactions per year from a single individual are unlikely to produce long-term consequences for that individual.

Acoustic Modeling/Estimates of Harassments and Mortalities

DEIS Pages 3.7-166 et seq. (DEIS Section 3.7.3.1.2) summarize the Navy's approach to estimating impacts on marine mammals from sonar and other active acoustic transducers. [12] Similar to distinctions made during the Commission's past review, the Navy divides impacts into MMPA Criteria for thresholds, which includes mortality, "Level A" harassments, and "Level B" harassments. The Navy also divides marine mammals into four overall groups for purposes of its analysis - odontocetes, mysticetes, beaked whales, and pinnipeds, with differing behavioral response functions for each group, as shown in the graphs below:

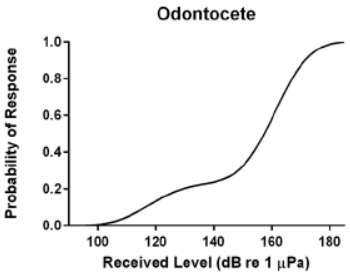


Figure 3.7-7: Behavioral Response Function for Odontocetes.

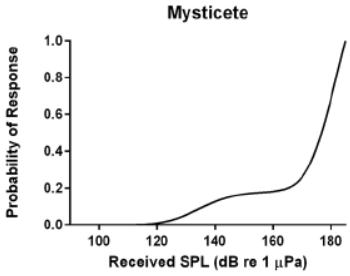


Figure 3.7-9: Behavioral Response Function for Mysticetes.

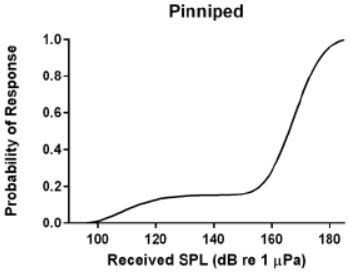
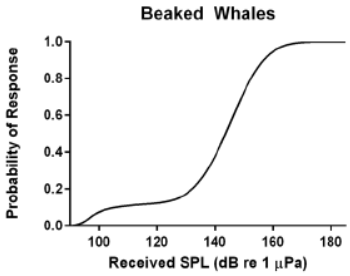


Figure 3.7-8: Behavioral Response Function for Pinnipeds.



The Navy's analysis then differentiates significant from non-significant behavioral responses (DEIS pp. 3.7-172-3.7-174), estimates species affected based on its models of marine mammal spatial density, attempts to account for mitigation (discussed in the following section of this

[12] The Navy's acoustic model is described in detail in DEIS Technical Report "Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III), June 2017), which can be found at https://hstteis.com/Documents/2017-Hawaii-Southern-California-Training-and-Testing-Draft-EIS-OEIS/Supporting-Technical-Documents.

report) by assuming its shut-off criteria will generally reduce "PTS" impacts to "TTS" impacts, and estimates ranges to PTS and TTS impacts from various representative sonar systems (see DEIS Table 3.7-11 on page 44 below for ranges to the most intense mid-frequency sonar (Sonar Bin MF-1)).

Using these data, the Navy has provided several charts, in both its MMPA application to NMFS and in Appendix E of its DEIS (**Exhibit 10**), quantifying marine mammals being "harassed" (predominantly due to behavioral, or Level B, harassment). The Navy maintains that its estimates of Level B harassment are "overestimated"; DEIS Page 3.7-189 states:

> *Although the statutory definition of Level B harassment for military readiness activities under the MMPA requires that the natural behavior patterns of a marine mammal be significantly altered or abandoned, the current state of science for determining those thresholds is somewhat unsettled. Therefore, in its analysis of impacts associated with acoustic sources, the Navy is adopting a conservative approach that overestimates the number of takes by Level B harassment. …*

This paragraph concludes with the following statement:

> *It is likely that many of the estimated behavioral reactions within the Navy's quantitative analysis would not constitute significant behavioral reactions; however, the numbers of significant verses non-significant behavioral reactions are currently impossible to predict. Consequently, there is a high likelihood that significant numbers of marine mammals exposed to acoustic sources are not significantly altering or abandoning their natural behavior patterns. As such, the overall impact of acoustic sources from military readiness activities on marine mammal species and stocks is negligible, i.e., cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stocks through effects on annual rates of recruitment or survival.*

The Navy's application (LOA Application) to NMFS (Tables 5-2 and 5-3) (**Exhibit 9**), as well as Appendix E of the DEIS (Tables E-1 through E-14) (**Exhibit 10**), contain a number of charts estimating marine mammal and sea turtle impacts both annually, and over the entire 5-Year. All but the first table shown below (Table 5-1), in both the LOA and Appendix E, separate out California versus Hawaii population stocks affected. The LOA charts divide impacts into Level B and Level A harassment. The Appendix E charts (**Exhibit 10**) divide impacts into Behavioral Responses, TTS, and PTS.

The overall combined Southern California PLUS Hawaii activity authorization request is contained in LOA Application Table 5-1, which lists total numbers of potential mortalities, Level A takes, and Level B takes, for both Hawaii and SOCAL activities, as follows:

In summary, over the 5-year LOA period being requested, the Navy's quantitative analysis for acoustic and explosive sources in HSTT estimates 10 total mortalities to specific species (see Section 5.1.1 and 5.1.2 for details), 3,335 Level A exposures, and 12,692,365 Level B exposures.

Table 5-1: Summary of Annual and 5-Year Take Request from Acoustic and Explosive Sources for HSTT Training and Testing Activities

MMPA Category	*Source*	*Annual Authorization Sought*		*5-Year Authorization Sought*	
		Training Activities[1]	*Testing Activities*[2]	*Training Activities*	*Testing Activities*
Mortality	Explosive	2 Species-specific mortalities discussed in 5.1.1	1 Species-specific mortalities discussed in 5.1.2	7 Species-specific mortalities discussed in 5.1.1	3 Species-specific mortalities discussed in 5.1.2
Level A	Acoustic & Explosive	478 Species-specific shown in Table 5-2	234 Species-specific shown in Table 5-3	2,231 Species-specific shown in Table 5-2	1,095 Species-specific shown in Table 5-3
Level B	Acoustic & Explosive	1,707,014 Species-specific shown in Table 5-2	1,061,143 Species-specific shown in Table 5-3	7,619,879 Species-specific shown in Table 5-2	5,072,486 Species-specific shown in Table 5-3

[1] Take estimates for acoustic and explosive sources for training activities are based on the maximum number of activities in a 12-month period.
[2] Take estimates for acoustic and explosive sources for testing activities are based on the maximum number of activities in a 12-month period.

Since it includes Hawaii activities, the above table includes activities the Commission is not reviewing. However, it is provided here to provide cumulative context for the proposed activity. For the Commission's purposes, the more relevant data are in Tables 5-2 and 5-3, which separate California from Hawaii activity estimates. When the Level A and Level B takes listed in the LOA Tables 5-2 (Training) and 5-3 (Testing) are combined (i.e., adding Training and Testing activities together, and reducing the totals to exclude the Hawaii stocks), the Commission estimates that the Navy's LOA to NOAA requests authorization for the following MMPA "takes" (Level A and Level B) of marine mammals in California waters over the entire 5 year period, based on the Navy's modeling estimates (note: average annual estimates would be 1/5 of each number below):

Species	Level B	Level A
Blue Whales	9,041	3
Fin Whales	10,141	3
Humpback Whales	5,042	3
Minke Whales	4,229	4
Sei Whales	360	0
Gray Whales	21,137	26
Sperm Whales (Physeteridae family)	11,516	0
Sperm Whales (Kogiidae family)	42,009	172
Baird's Beaked Whales	9,462	0

Cuvier's Beaked Whales[13]	0	0
Mesoplodon spp (beaked whale guild)[14]	81,701	0
Bottlenose dolphins (CA coastal)	8,844	0
Bottlenose dolphins (CA/OR/WA offshore)	255,376	13
Killer whale (Eastern N. Pacific)	492	0
Killer whale (Eastern N Pacific Transient/West Coast Transient)	915	0
Long-beaked common dolphin	1,127,560	93
Northern right whale dolphin	451,985	55
Pacific white-sided dolphin	345,882	27
Risso's dolphin	579,206	45
Short-beaked common dolphin	6,834,714	444
Short-finned pilot whale	8,932	5
Striped dolphin	813,909	13
Dall's porpoise	282,847	972
CA sea lion	565,006	478
Guadalupe fur seal (Mexico stock CA/HI study area)	6,743	0
Northern fur seal	70,185	4
Harbor seal	24,894	39
Northern Elephant seal	278,269	480
TOTAL (5 Year Total)	**11,850,397**	**2,879**

Navy Mitigation Measures

The complete suite of mitigation measures the Navy will implement is contained in Appendix C of its consistency determination (**Appendix C** to this staff report). DEIS Table 5.6-1 provides a chart listing the measures, by stressor or activity, including the radius around the activity that will be monitored and avoided (or modified). The most pertinent parts[14] of this chart are reproduced below:

[13] The Navy has clarified that the 2 figures for beaked whales are being revised, and that annual MPA "takes" of Cuvier's beaked whales would be 11,426, and of Mesoplodon would be 6,152. Over 5 years, the Navy's revised estimate is 53,104 (Cuvier's) and 28,591 (Mesoplodon) beaked whales subject to Level B harassment (no Level A).

[14] For example, measures to protect coral reefs off Hawaii are not included here.

Table 5.6-1: Summary of Procedural Mitigation to be Implemented

Stressor or Activity	*Summary of Mitigation Requirements*	*Resource Protection Focus*
Environmental Awareness and Education	Afloat Environmental Compliance Training program for applicable personnel	Marine mammals, sea turtles
Active Sonar	Depending on sonar source: 1,000 yd. power down, 500 yd. power down, and 200 yd. shut down; or 200 yd. shut down	Marine mammals, sea turtles
Air Guns	150 yd.	Marine mammals, sea turtles
Pile Driving	100 yd.	Marine mammals, sea turtles
Weapons Firing Noise	30° on either side of the firing line out to 70 yd.	Marine mammals, sea turtles
Explosive Sonobuoys	600 yd.	Marine mammals, sea turtles
Explosive Torpedoes	2,100 yd.	Marine mammals, sea turtles
Explosive Medium-Caliber and Large-Caliber Projectiles	1,000 yd. (large-caliber projectiles), 600 yd. (medium-caliber projectiles during surface-to-surface activities), or 200 yd. (medium-caliber projectiles during air-to-surface activities)	Marine mammals, sea turtles
Explosive Missiles and Rockets	900 yd. (0.6–20 lb. net explosive weight), or 2,000 yd. (21–500 lb. net explosive weight)	Marine mammals, sea turtles

Explosive Bombs	2,500 yd.	Marine mammals, sea turtles
Sinking Exercises	2.5 NM	Marine mammals, sea turtles
Explosive Mine Countermeasure and Neutralization Activities	600 yd. (0.1–5 lb. net explosive weight), or 2,100 yd. (6–650 lb. net explosive weight)	Marine mammals, sea turtles, birds
Explosive Mine Neutralization Activities Involving Navy Divers	500 yd. (0.1–20 lb. net explosive weight for positive control charges), or 1,000 yd. (21–60 lb. net explosive weight for positive control charges and all charges using time-delay fuses)	Marine mammals, sea turtles, birds, fish (hammerhead sharks)
Underwater Demolition Multiple Charge – Mat Weave and Obstacle Loading	700 yd.	Marine mammals, sea turtles
Maritime Security Operations – Anti-Swimmer Grenades	200 yd.	Marine mammals, sea turtles
Vessel Movement	500 yd. (whales), or 200 yd. (other marine mammals)	Marine mammals
Towed In-Water Devices	250 yd.	Marine mammals
Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions	200 yd.	Marine mammals, sea turtles
Non-Explosive Missiles and Rockets	900 yd.	Marine mammals, sea turtles
Non-Explosive Bombs and Mine Shapes	1,000 yd.	Marine mammals, sea turtles

Mitigation Areas for Seafloor Resources	
Live hard bottom, Artificial reefs, Shipwrecks	• The Navy will not conduct precision anchoring (except in designated anchorages). • The Navy will not conduct explosive mine countermeasure and neutralization activities, or mine neutralization activities involving Navy divers.
Mitigation Areas for Marine Mammals	
San Diego Arc Planning Awareness Area (June 1 – October 31)	• The Navy will not conduct more than a combined total of three Major Training Exercises – Large Integrated Anti-Submarine Warfare activities or Major Training Exercises – Medium Integrated Anti-Submarine Warfare activities per applicable season using surface ship hull-mounted mid-frequency active sonar. • If additional activities are required for national security, the Navy will provide NMFS with advance notification and include the information in associated reports.
San Diego Arc Cautionary Area (June 1 – October 31)	• The Navy will not use in-water explosives during large-caliber gunnery, torpedo, bombing, and missile (including 2.75" rockets) activities during unit-level training, major training exercises, or testing events. • If required for national security, naval units will obtain permission from a Command-delegated authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include the information in associated reports.
Channel Islands National Marine Sanctuary Cautionary Area	• The Navy will not use surface ship hull-mounted mid-frequency active sonar and in-water explosives used in small-, medium-, and large-caliber gunnery; torpedo; bombing; and missile (including 2.75" rockets) activities during unit-level training, major training exercises, or testing events. • If required for national security, naval units will obtain permission from a Command-delegated authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include the information in associated reports.

Overall, the measures include: (1) using trained Navy monitors to observe and implement the protection measures; (2) limiting most weapons firing to daytime hours; (3) conducting weapons firing that involve the deployment or retrieval of targets typically during daylight hours in low sea states; (4) recovering targets "and any associated decelerators/parachutes to the maximum extent practicable consistent with personnel and equipment safety"; (5) avoiding collisions during the use of towed in-water devices (6) searching the intended path of the device for any floating debris, objects, or animals (e.g., driftwood, concentrations of floating vegetation, marine mammals) that have the potential to obstruct or damage the device; (7) commencing pile driving using "soft starts"; (8) ceasing or reducing activity as specified in the above charts when marine mammals/sea turtles are present; and (9) observing and implementing the following "Awareness" and "Cautionary" areas and measures as described above (the areas are depicted on **Exhibit 4** and shown on page 13 above):

- San Diego Arc Planning Awareness Area
- San Diego Arc Cautionary Area
- Channel Islands National Marine Sanctuary Cautionary Area

The Navy will also provide seasonal Awareness Notifications for blue, gray, and fin whales, as follows:

- Blue Whale Awareness Notification Message Area – out to 20 nmi offshore, from June thru October
- Gray Whale Awareness Notification Message Area – out to 10 nmi offshore, from November thru March
- Fin Whale Awareness Notification Message Area – out to 20 nmi offshore, from November thru May

The "Planning Awareness" area would be used by the Navy for a more limited set of activities involving mid-frequency active sonar, unless NMFS is provided with advanced notification. Specifically, the Navy describes the San Diego Arc Planning Awareness Area as follows:

> *A San Diego Arc Planning Awareness Area (Figure K.2-3) would be established where the Navy would not exceed 200 hours of mid-frequency active anti-submarine warfare major sensor MF1 (with the exception of active sonar maintenance and systems checks) annually within the area from June 1 through October 31.*
>
> *If a naval unit needs to conduct additional anti-submarine warfare major training exercises with surface ship hull-mounted mid-frequency active sonar in this area for national security, the Navy would provide NMFS with advance notification and include the activity exceedance information (e.g., total sonar usage) in the annual training and testing reports.*

A San Diego Arc Planning Awareness Area (Figure K.2-3) would be established where the Navy would not conduct more than a combined total of three (3) large or medium integrated anti-submarine warfare major training exercises (e.g., Composite Training Unit Exercise or Fleet Exercise/Sustainment Exercise) using surface ship hull-mounted mid-frequency active sonar per season from June 1 through October 31.

If a naval unit needs to conduct additional anti-submarine warfare major training exercises with surface ship hull-mounted mid-frequency active sonar in this area for national security, the Navy would provide NMFS with advance notification and include the activity exceedance information (e.g., total sonar usage) in the annual training and testing reports.

This measure is designed to provide additional protection for Endangered Species Act-listed blue whales which have been documented foraging in this area seasonally.

Within the two proposed "Cautionary" areas, the Navy will limit or avoid the use of in-water explosives and/or mid-frequency active sonar – unless permission is granted by the Naval Command authority and prior notice is provided to NMFS. Specifically, the Navy describes their activities in these two areas as follows:

A San Diego Arc Cautionary Area (Figure K.2-5) would be established from June 1 to October 31 where the Navy would not use in-water explosives during gunnery (large-caliber), torpedo, bombing, and missile exercises (including 2.75 inch rockets) during testing, unit-level training, and major training exercises.

If a naval unit needs to conduct gunnery (large-caliber), torpedo, bombing, or missile exercises (including 2.75 inch rockets) using in-water explosives in this area for national security during testing, unit-level training, and major training exercises, permission shall be required from the appropriate delegated Command authority prior to their use in the Cautionary Area. The Navy would provide NMFS with advance notification and include the activity information (e.g., explosive usage) in the annual training and testing reports.

This measure is designed to provide additional protection for Endangered Species Act-listed blue whales which have been documented foraging in this area seasonally.

…

A Channel Island Sanctuary Cautionary Area (Figure K.2-6) surrounding Santa Barbara Island out to 6 NM (the only Sanctuary area within the Southern California portion of the HSTT Study Area) would be established where the Navy would not use any surface ship hull-mounted mid-frequency active sonar or in-water explosives used in gunnery (all calibers), torpedo, bombing, and missile exercises (including 2.75 inch rockets) during testing, unit-level training, and major training exercises year round.

If a naval unit needs to use surface ship hull-mounted mid-frequency active sonar and in-water explosives in gunnery (all calibers), torpedo, bombing, or missile exercises (including 2.75 inch rockets) during unit-level and major training exercises in this area

> *for national security, permission shall be required from the appropriate delegated Command authority prior to their use in the Cautionary Area. The Navy would provide NMFS with advance notification and include the activity information (e.g., sonar and explosive usage) in the annual training and testing reports.*
>
> *This measure is designed to provide additional protection for all protected marine species in the portion of the Channel Island National Marine Sanctuary that falls within the boundary of the Southern California portion of the HSTT Study Area.*

Conversely, the Navy is not proposing to limit its activities within "Notification" areas, but will be more vigilant and aware of the possible presence of large whales:

> *While not specifically mitigation, the Navy will issue awareness notification messages seasonally to alert ships and aircraft to the possible presence of concentrations of large whales in portions of the Study Area. In order to maintain safety of navigation and to avoid interactions with large whales during transit, vessels will be instructed to remain vigilant to the presence of certain large whale species, that when concentrated seasonally, may become vulnerable to vessel strikes. Lookouts will use the information from the awareness notification messages to assist their visual observations of mitigation zones and to aid in implementing procedural mitigation. The Navy anticipates that providing Lookouts additional information about the possible presence of concentrations of large whales in certain locations seasonally will likely help the Navy further avoid interactions with these animals during vessel transits, when training and testing activities are conducted in these areas.*

Outgrowth of Settlement Agreement

These additional "Awareness," "Cautionary," and "Notification" measures for the bulleted list above can be considered an extension of the agreements the Navy made during the settlement agreement with the Commission referenced earlier. Part of the settlement agreement involved identification of three areas of SOCAL within which hull mounted mid-frequency sonar during Major Training Exercises (MTE) "is not typically used":

- The San Diego Arc
- A 3 nmi area around each island in the Channel Islands NMS; and
- The area within 3 nmi from the mainland between Del Mar northward to the northern boundary of SOCAL (offshore Laguna Beach)

Under the terms of the settlement agreement, the Navy agreed to notify the Commission in the event it were to use hull mounted mid-frequency sonar during an Major Training Event within these areas, at least until the Navy's current authorizations under the Marine Mammal Protection Act and Endangered Species Act expire on December 25, 2018 (or superseding environmental compliance documents are issued).

Additional Navy Considerations for Biologically Important Areas

As noted earlier, as part of the current DEIS the Navy considered these and other areas as potential candidates for "Biologically Important Areas" that may warrant additional protection.

Working with the National Oceanic and Atmospheric Administration's Cetacean Density and Distribution Mapping Working Group, the Navy identified, mapped and considered areas that could have particular biological importance. This was also done as part of a larger scientific effort to synthesize existing information and understanding about whale and dolphin biology and spatial use patterns (as discussed in Ferguson et al. (2015)). DEIS Appendix K, Geographic Mitigation Assessment, analyzes these areas. Areas were deemed "biologically important" if they met one or more of the following criteria:

> *1. Reproductive Areas – Areas and times within which a particular species selectively mates, give birth, or are found with neonates or calves.*
>
> *2. 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.*
>
> *3. Migratory Corridors – Areas and times within which a substantial portion of a species is known to migrate; the corridor is spatially restricted.*
>
> *4. 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. …)*

Based on scoping comments received during the EIS process the Navy considered adding several areas, in addition to those identified above by the Commission, to qualify: beaked whale habitats in the San Nicolas and Catalina Basins, the area west of the Tanner-Cortez Bank, an area for Perrin's beaked whales in the northern Catalina and San Clemente Basins, and, seasonally when fin whales are most likely to be present - November through February, SOCAL waters between 200m and 1000m isobaths.

Although it identified several Biologically Important Areas designated them as "Awareness" and "Cautionary" areas, the Navy nevertheless cautions in Appendix K (p. 2) that these:

> *Biologically important areas as defined in Ferguson et al. (2015b) <u>are not 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</u> 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).* [Emphasis added by CCC staff]

The Navy amplifies this statement by indicating that "The agreement did not constitute a concession by any party as to the potential impacts of Navy activities on marine mammals, or any other marine species." Furthermore, the Navy states its agreement "as part of a relatively short-term settlement" is not meant to be interpreted that the Navy concedes "that those restrictions are necessarily supported by the best available science or practicable to implement for the Navy's military readiness activities in the HSTT study area over a longer term." Concerning this last point, the Navy states:

> *In summary, further restrictions on the level, number, or timing (seasonal or time of day) of training or testing 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; operational costs due to increased fuel, maintenance, and time required to complete activities. Constraints on training and testing have the potential to increase safety risks by extending activity locations further distances 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, technics and procedures in the shallow water environment.*
>
> *The Navy's 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, be it humanitarian assistance or disaster relief to deterring war or defeating an adversary. The training and testing under the Proposed Action allows for just that and is balanced with the Navy's commitment to environmental stewardship.*

The Navy is correct that the Biologically Important Areas designation does not, by itself, carry with it special protections or establish new regulations or restrictions. The designation was created to synthesize decades of scientific research, monitoring and marine mammal surveys and to serve as a tool for resource management agencies responsible for integrating the best available scientific understanding into decision making. Each Biologically Important Area (BIA) was established as a result of a four year long process involving scores of scientific experts and decades of research results and data on marine mammal biology, behavior, and spatial use trends. The BIA sites represent spatially explicit migratory corridors, feeding grounds, breeding aggregations, and critical habitats for small resident populations of marine mammals. The only sites that received the designation are those for which an overwhelming amount of data and scientific consensus is available. As noted in the report describing the BIA designation process and intent of the designation (Calambokidis et al, 2015):

> *The goal of identifying BIAs is to synthesize existing biological information in a transparent format that is easily accessible to scientists, managers, policymakers, and the public for use during the planning and design phase of anthropogenic activities for which U.S. statutes require the characterization and minimization of impacts on marine mammals.*

As such, the BIAs identified off the coast of California represent areas of special biological significance under Section 30230 of the Coastal Act and are therefore required to be provided with special protection.

Beaked Whale Habitats Considered for Biologically Important Areas
Concerning beaked whale habitat areas analyzed in Appendix K (pp. K-236 – K-257), the Navy concludes that despite over a decade focused on studying Navy impacts on beaked whales in the Southern California Range Complex, "beaked whales reacting to and leaving the vicinity of a Navy training or testing activity would seem to be within the variation of their otherwise normal movements as documented by tagging data." The Navy believes these research results "do not support the need for 'habitat-based management' on the Navy's ranges to address impacts on the Cuvier's beaked whale population" because "no population-level impacts from Navy training and testing activities are evident." The Navy further states:

> *Documented identification and multi-year residency by over 100 individual Cuvier's beaked whales in the Southern California Range Complex seems to counter the notion that the whales are affected by Navy activities and argues against the suggestion that implementing some type of habitat-based management would benefit the population of Cuvier's beaked whales in southern California waters. The continued presence of the whales supports an assessment that the Navy's ongoing mitigation measures are effective and that additional mitigation as suggested in the scoping comments is not merited.*

Beaked Whale Population Trends/Recent Studies
During its last review (CD-008-13), the Commission cited a then recently-published study from which the above quote was taken, "Declining Abundance of Beaked Whales (Family Ziphiidae) in the California Current Large Marine Ecosystem" (Moore and Barlow, 2013). That study posed a hypothesis that military sonar could be resulting in potential population-level effects for several species of beaked whales, which are the SOCAL species *most* sensitive to mid-frequency sonar, most likely to incur mortalities by stranding, and most difficult to detect by on-board observers.

In its DEIS, the Navy contends that the 2013 Moore and Barlow study has been called into question by newer data that raise "…uncertainties over whether a decline in the beaked whale population occurred off the U.S. west coast between 1996 and 2014 (Barlow, 2016)." (DEIS, p. 3.7-163) The Navy continues:

> *Photo identification studies in the Southern California Range Complex have identified approximately 100 individual Cuvier's beaked whale individuals, with 40 percent having been seen in one or more prior years and re-sightings up to 7 years apart (Falcone et al., 2009; Falcone & Schorr, 2014). These results indicate long-term residency by individuals in an intensively used Navy training and testing area, which may suggest a lack of long-term consequences as a result of exposure to Navy training and testing activities, but could also be indicative of high-value resources that exceed the cost of remaining in the area. Long-term residency does not mean there has been no impact to population growth*

rates and there are no data existing on the reproductive rates of populations inhabiting the Navy range area around San Clemente Island as opposed to beaked whales from other areas.

New data since the last Commission review also includes publications of the results of Southern California Behavioral Response Studies (BRS) (SOCAL-10 thru 14), which included controlled exposure experiments, animal tagging, and measuring responses to simulated (as well as, opportunistically, actual Navy) sonar. (The Commission authorized this study in NOAA consistency determination CD-029-10.) The Navy's DEIS, Chapter 3-7, summarizes the results of these (and other relevant) studies and their implications for beaked whales on pages 3.7-143 to 3.7-149. In this discussion the Navy acknowledges that these studies support conclusions reached in previous studies regarding greater beaked whale sensitivity to military sonar:

Behavioral response studies have been conducted on odontocete species since 2007, with a focus on beaked whale responses to active sonar transmissions or controlled exposure playback of simulated sonar on various military ranges …. Through analyses of these behavioral response studies, a preliminary overarching effect of greater sensitivity to most anthropogenic exposures was seen in beaked whales compared to the other odontocetes studied ….

Observed reactions by Blainville's, Cuvier's, and Baird's beaked whales to mid-frequency sonar sounds have included cessation of clicking, termination of foraging dives, changes in direction to avoid the sound source, slower ascent rates to the surface, and other unusual dive behavior … A similar response was observed in a northern bottlenose whale, which conducted the longest and deepest dive on record for that species after the sonar exposure and continued swimming away from the source for over 7 hours (Miller et al., 2015). Responses occurred at received levels between 95 and 150 dB re 1 µPa; although all of these exposures occurred within 1-8 km of the focal animal, within a few hours of tagging the animal, and with one or more boats within a few kilometers to observe responses and record acoustic data. …

In addition, Williams et al. (2017) note that in normal deep dives or during fast swim speeds, beaked whales and other marine mammals use strategies to reduce their stroke rates, including leaping or wave surfing when swimming, and interspersing glides between bouts of stroking when diving. They determined that in the post-exposure dives by the tagged Cuvier's beaked whales described in DeRuiter et al. (2013b), the whales ceased gliding and swam with almost continuous strokes. This change in swim behavior was calculated to increase metabolic costs about 30.5 percent and increase the amount of energy expending on fast swim speeds from 27 to 59 percent of their overall energy budget. This repartitioning of energy was detected in the model up to 1.7 hours after the single sonar exposure. Therefore while the overall post-exposure dive durations were similar, the metabolic energy calculated by Williams et al. (2017) was higher.

The DEIS summary of recent research also analyzed a previously-articulated hypothesis that beaked whale responses to Navy sonar could be an "antipredator response." The Navy states:

> *Tyack et al. (2011) hypothesized that beaked whale responses to sonar may represent an anti-predator response. To test this idea, vocalizations of a potential predator—a killer whale—were also played back to a Blainville's beaked whale. This exposure resulted in a similar but more pronounced reaction than that elicited by sonar playback, which included longer inter-dive intervals and a sustained straight-line departure of more than 20 km from the area (Allen et al., 2014; Tyack et al., 2011). This anti-predator hypothesis was also tested by playing back killer whale vocalizations to pilot whales, sperm whales, and even other killer whales, to determine responses by both potential prey and conspecifics (Miller et al., 2011; Miller et al., 2012). Results varied, from no response by killer whales to an increase in group size and attraction to the source in pilot whales (Cure et al., 2012).*

The conclusion the Navy reaches for implications of the latest research (stated in the DEIS, page 3.7-148) is that:

> *Behavioral responses by odontocetes to sonar and other transducers appear to run the full gamut from no response at all to responses that could potentially lead to long-term consequences for individual animals (e.g., mother-calf separation). This is likely in part due to the fact that this taxonomic group is so broad and includes some of the most sensitive species (e.g., beaked whales and harbor porpoise) as well as some of the least sensitive species (e.g., bottlenose dolphins). This is also the only group for which both field behavioral response studies and captive controlled exposure experiments have been conducted, leading to the assessment of both contextually-driven responses as well as dose-based responses. This wide range in both exposure situations and individual- and species-sensitivities makes reaching general conclusions difficult. However, it does appear as though exposures in close proximity, with multiple vessels that approach the animal lead to higher-level responses in most odontocete species regardless of received level or behavioral state. In contrast, in more "real-world" exposure situations, with distant sources moving in variable directions, behavioral responses appear to be driven by behavioral state, individual experience or species-level sensitivities. These responses may also occur more in-line with received level such that the likelihood of a response would increase with increased received levels. However, these "real-world" responses are more likely to be short-term, lasting the duration of the exposure or even shorter as the animal assesses the sound and (based on prior experience or contextual cues) determines a threat is unlikely. Therefore, while odontocete behavioral responses to Navy sonar will vary across species, populations, and individuals, they are not likely to lead to long-term consequences or population-level effects.*

Navy Conclusion – Marine Mammals
Concerning marine mammals overall, notwithstanding the large number of marine mammal harassment authorizations the Navy has requested from NMFS (nearly 13 million), the Navy believes the mitigation measures it has committed to are adequate to protect all populations of marine mammals. The Navy therefore concludes:

> *Based on a detailed stressor analysis presented in the 2017 HSTT Draft EIS/OEIS, Chapter 3.7 (Marine Mammals), specifically section 3.7.3 (Environmental Consequences) and as summarized above, the Navy has determined that the Proposed Action would be carried out in a manner that would maintain marine resources and sustain the biological productivity of coastal waters, and no population-level impacts would be anticipated to marine mammals. As evident from the standard operating procedures and mitigation measures discussed above, the Navy's Proposed Action provides special protection to marine mammals. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.*

Sea Turtles and Other Marine Species
Concerning potential effects to the five sea turtle species in the project area (all listed as endangered under the Endangered Species Act (ESA)\), the Navy predicts impacts to only one species, the green sea turtle [*Chelonia mydas*]. Based on modeling, in Table E-14, Appendix E (**Exhibit 10**, Last page of exhibit), the Navy predicts its activities involving use of explosives would, over the 5 year period, subject 98 Green Sea Turtles to Temporary Threshold Shift (TTS), 35 to Permanent Threshold Shift (PTS), and 3 to injury. While it was unclear from the table whether these numbers represent California or Hawaii stocks, the Navy recently clarified that these would be from Hawaii, not California stocks.

As is the case described above for marine mammals, to minimize the potential for harm during activities potentially affecting sea turtles (including use of explosives, and use of mid-frequency sonar within the hearing range of sea turtles (i.e., <2 kHz), the Navy will implement mitigation measures involving monitoring and avoidance (i.e., cessation of the stressor until such time as an animal has left the area (or is believed to have left based on assumptions concerning its speed, direction and movement). With these measures, the Navy concludes:

> *Based on a detailed stressor analysis presented in the HSTT Draft EIS/OEIS, Chapter 3.8 (Reptiles), specifically section 3.8.3 (Environmental Consequences) and as summarized above, the Navy has determined that the Proposed Action would be carried out in a manner that would maintain marine resources and sustain the biological productivity of coastal waters, and no population-level impacts would be anticipated to sea turtles. As evident from the standard operating procedures and mitigation measures discussed above, the Navy's Proposed Action provides special protection to sea turtles. Therefore, the Proposed Action would be consistent to the maximum extent practicable with Section 30230 of the California Coastal Act.*

In analyzing other marine habitats (e.g., sensitive marine vegetation (e.g., kelp beds), seabirds

(including several listed species), and commercial and recreational fish stocks), the Navy also anticipates that impacts would be low. As noted earlier, the Navy has designated seafloor mitigation areas to further protect these habitats.

Commission Analysis

The Commission will begin its analysis by reiterating its previous findings concerning activities the Commission has found meet the "effect" test of the CZMA.[15] In CD-008-13, the Commission found:

> *[T]the Commission takes a broad … view … as to which activities may affect the coastal zone. Many of the species … potentially affected by the proposed training activities spend some portions of their life cycles within coastal waters….*
>
> *To support this position, during … review[of CD-86-06] the Commission cited the NOAA letter dated March 10, 1995, responding to the Commission's request from the Office of Coastal Resource Management (OCRM) to review the effects of the "ATOC" sound source[16], located 48 nmi offshore of San Mateo County. In that letter NOAA affirmed that "sounds emanating from the ATOC sound source can be reasonably expected to affect marine mammals that are resources of both the outer continental shelf ("OCS") and the coastal zone…" and "OCRM has determined that the marine animals at issue that ply the waters of the coastal zone and the OCS are coastal resources."*
>
> *… the Commission's position [is] that … virtually all of the marine mammal species identified by the Navy as present in the SOCAL area are also present within the coastal zone at some point in their life cycle, and certainly at least "occasionally." Regarding the length of time a species must be present within the coastal zone to be considered a coastal resource, the Commission is in agreement that occasional observed or recorded presence is sufficient to establish this standard. Due to the significant challenges associated with wildlife observation in the marine environment (i.e. the cost of surveys, the short period of time most species are observable at the surface, the large areas, variable climactic and weather conditions, etc.) marine mammal surveyors typically assume that the number of animals successfully observed represent a small fraction of the actual number that are likely present. As such, the Commission considers even infrequent and seemingly rare sightings of particular marine wildlife species within the coastal zone as verification of that species' status as a coastal resource.*
>
> *Finally, similar to the Commission's long held position regarding effects to commercial fishing that occur in federal waters, but which affect the coastal economy, the Commission takes a comparable position that effects on whale watching, even if occurring in federal waters outside the coastal zone, should also be considered coastal*

[15] It should be noted that the Navy has not, in this consistency determination, taken any positions contrary to the Commission's historic position over the interpretation of the "effects" test of the CZMA.

[16] ATOC is the acronym for Scripps Institution of Oceanography's Acoustic Thermometry of Ocean Climate, reviewed by the Commission as Consistency Certification CC-110-94.

> *zone effects, since whale watching tours are also an important segment of the California coastal economy, as well as an important component of coastal recreation. Whale watching tours regularly ply federal waters and commonly include sightings of many of the marine mammals present in the SOCAL area.*

As will be discussed below, the Commission's predominant concerns over the Navy's conclusions involve: (1) the limited effectiveness of Navy detection and monitoring measures; (2) uncertainties in assessing population-level effects on marine species that may be occurring; (3) the fact that the vast majority of marine mammal behavioral harassments will occur outside the 1000 m detection/source reduction zones adopted by the Navy around its sonar sources; and (4) the Navy's unwillingness to limit, in a meaningful way, its sonar and explosives testing and training in areas of special biological significance for certain marine species (blue, fin, and beaked whales).

Marine Mammal Observers

During the Commission's review of CD-018-13, the Commission staff had recommended a condition (which was not adopted, because the Commission did not adopt the recommended conditional concurrence, but instead objected)[17] requesting that the Navy "continue its Lookout Effectiveness Study in the SOCAL range to compare the abilities of Navy vessel-based lookouts and experienced, NMFS-certified marine mammal observers in detecting marine mammals." Under the recommended condition, if the results showed less than a 20% difference in effectiveness in observing marine mammals, the Commission would request that the Navy "… to the extent feasible, commit to including at least two experienced, NMFS-certified marine mammal observers on all ships during the deployment of active sonar for training or testing purposes." In response to this concern, in the settlement discussions the Navy agreed to the following language:

> *If the Navy's lookout effectiveness study demonstrates the effectiveness of Navy lookouts is inadequate, NAVY will assess the root cause of the deficiency and take appropriate remedial action, which may include changes to the lookout training/qualification process, awareness and procedures; and/or investigating new/improved equipment or technology.*

The Navy also submitted an updated report dated January 2016, entitled "Cruise Report, Marine Species Monitoring & Lookout Effectiveness Study, Submarine Commanders Course, February 2015, Hawaii Range Complex." The results in this report are similar to those from four previous studies (Watwood 2012, Watwood 2013, Vars et al. 2014, Shoemaker et al, 2014) and appear to show that the effectiveness of Navy lookouts is well below that of NMFS-trained marine mammal observers (MMOs). The 2016 study indicates that:

> *In total, 36 unique sightings comprising at least 61 individual marine mammals were recorded during the 2 days of observation. Of the 36 sightings, humpback whales (Megaptera novaeangliae) were the only species positively identified, accounting for 31% of sightings. Unidentified large whales (most likely humpback whales) accounted for*

[17] Although the objection was based on lack of information, as previously noted, among the information requested was "other mitigation measures previously adopted by the Commission or identified by Commission staff in its report on the present consistency determination." (CCC findings, page 3)

> *58% of sightings. MMOs made 26 sightings independent of the ship's watchstander team. There were 7 sightings made concurrently by both the MMO and watchstander team. There were 3 sightings by the watchstander team independent of the MMOs.*

In other words, nearly 2/3 of whales and dolphins sighted by MMOs during the 2016 effort were missed by the Navy watchstander team. Combining these results with those from the four previous efforts, MMOs made 111 of 120 sightings (92%) while the Navy watchstanders made only 29 (24%). Although the Navy teams did make several sightings that the MMOs did not, the specialized training and extensive experience of the MMOs clearly provided them with a significant advantage in detecting marine mammals.

However, the effectiveness and ability of these trained MMOs should not be overstated. As discussed in Moore and Barlow (2017) and Barlow (2016), even the most highly trained and experienced scientific observers are likely to miss the vast majority of potential sightings of many marine mammals. For example, the "detection probability" (or likelihood that a particular whale or dolphin will be observed when it is present) is below 60% for 24 of the 30 types of whale or dolphin targeted during marine mammal population surveys. This means that even experienced MMOs typically miss seeing roughly half of the animals that are present. For some species, such as most beaked whales, the detection probability is 16% or less; meaning that 84% of the time beaked whales are present, they are not being seen.

DEIS Table 3.7-11 (see page 44 below) shows the range to the likelihood of behavioral effects from the most intense of the mid-frequency sonars (Sonar Bin MF-1). At 1000 m distance, which is the distance at which the Navy's protocol would first mandate a reduction in sonar intensity (by 6 dB), if a marine mammal is observed, this table shows that the vast majority of marine mammals would likely respond in a significant behavioral manner (including 100% of beaked whales and over 90% of odontocetes in general). When these virtual certainties of a response are combined with the above-cited difficulties in detection, the data do not inspire confidence that adequate protection for marine mammals will be assured by the Navy's agreed-upon detection and avoidance measures.

Population-Level Effects

The Commission disagrees with the Navy that a conclusion can be drawn that the proposed activities would not have population-level effects on marine mammals, for several reasons. First, for all the populations of affected marine mammals, it is simply impossible to establish whether population level effects have been occurring, or would occur with the increased levels, given that the Navy has been using this technology in this area consistently for the past 40 years. As the study the Commission cited in 2013 (Moore and Barlow 2013) noted:

> *High densities are not obviously consistent with a hypothesis that declines are due to military sonar, but they do not refute the possibility that declines have occurred in these areas (i.e., that densities were previously even higher)"*[18]

[18] "Declining Abundance of Beaked Whales (Family Ziphiidae) in the California Current Large Marine Ecosystem" (Moore and Barlow, January 2013).

The Commission previously noted that that study posed a hypothesis that military sonar *could* be resulting in potential population-level effects for several species of beaked whales, which are the SOCAL species *most* sensitive to mid-frequency sonar, *most* likely to incur mortalities by stranding, and *most* difficult to detect by on-board observers. The abstract of this Moore and Barlow study states that the existing data "… provide strong evidence of declining beaked whale abundance in the study area," which consists of the eastern Pacific (i.e., off the coasts of California, Oregon, and Washington). The study considered three potential hypotheses to explain such declines: (1) mortality from fishing; (2) Navy sonar and other anthropogenic noise; and (3) ecosystem change. The study ruled out mortality from fishing as an "unlikely" cause, due to low bycatch rates. The study acknowledges the previously-discussed known links between beaked whale strandings and military sonar, but stated that:

> *Although the threats from naval acoustic activity have been described, population-level impacts have not been quantified. Mass strandings of beaked whales throughout the Northern Hemisphere have been associated with offshore military activity, but estimates of total mortality associated with these types of impacts do not exist. Certainly they exceed levels that have been recorded, however, since the probability of observing dead whales is generally low, especially for deep-water species [46]–[48].*

As noted above, the Navy has provided more recent Moore and Barlow studies (Barlow 2016, Moore and Barlow 2017) in which the authors refine their statistical analysis and indicate that previously noted declines may be levelling off. As the Navy noted, the most recent Moore and Barlow study (August 2017)[2] indicates:

> *Cuvier's beaked whales appear to have decreased in abundance from high values in 1991-93, but that decline now appears to have leveled off.*
>
> *There is some weak evidence of an increasing trend in Baird's beaked whales.*
>
> *Mesoplodon beaked whales showed markedly higher abundance in 2014, reversing a declining trend from 1991-2008 that had been noted in a previous analysis. The increase may have been driven by an influx of tropical species of Mesoplodon during the unusually warm ocean conditions in 2014.*

The study also notes that temporary modifications to stock assessment due to warm water influxes may further complicate assessment of accurate long-term trends (as noted in the previous quote above concerning Mesoplodon beaked whales). For example, concerning Mesoplodon, the study states:

[2] POPULATION ABUNDANCE AND TREND ESTIMATES FOR BEAKED WHALES AND SPERM WHALES IN THE CALIFORNIA CURRENT FROM SHIP-BASED VISUAL LINE-TRANSECT SURVEY DATA, 1991 – 2014 (August 2017)(NOAA technical Memorandum NOAA-TM-NMFS-SWFSC-585).

> *Interpreting results for Mesoplodon is difficult because this is a multi-species group that includes warm- and cold-water species, so temporal trends for one species can mask trends of another. We hypothesize that the 2014 abundance increase may reflect an influx of warm-water animals into the study area. During the 2014 survey, California Current water temperatures were anomalously high …*

In addition, the assertion in the second indented quote on the previous page concerning the decline of Cuvier's beaked whales needs to be looked at in light of the broader statement in the study in which it is included, which is that:

> *These metrics continue to provide some evidence that Cuvier's beaked whale abundance in the study area declined from 1991 to 2014. Specifically, it appears that numbers decreased between the 1993 and 1996 survey but have remained stable at this lower level since then. As noted above, because different* [detection probability] *estimates were used in the current analysis, population size estimates are lower than reported by Moore and Barlow (2013).*

Specifically, the current population size estimates (Moore and Barlow 2017) are now 40% lower than those included in NOAA's most recent (Moore and Barlow 2013 in NOAA 2013) stock/population assessment for this species along the west coast (3,928 rather than 6,590). Even though it identified a much higher abundance of Cuvier's beaked whales, that 2013 assessment nevertheless made particular note of the declining condition of the population and its likely status as being below carrying capacity and depleted. Considering that the population is now being estimated as significantly smaller than was assumed in 2013, its status would appear to be even more depleted than previously thought.

Biologically Significant Areas and Adequacy of Mitigation Measures

Even if the Navy's conclusion *were* supportable concerning a lack of population-level effects, the Commission notes that it is only one of the tests of Section 30230. The Commission finds, as it did in 2008, that compliance with Section 30230 also requires enhancement (and where feasible restoration) of the overall marine environment, as well as special protection for areas and species of special biological or economic significance. These requirements have led the Commission to previously determine that they require the avoidance of the use of very loud active acoustics in biologically important and sensitive areas, in particular areas of high, or seasonally high, concentrations of marine mammals.

DEIS Table 3.7-11 (see page 44 below) shows the range to probable effect from the most intense of the mid-frequency sonars (Sonar Bin MF-1). The Navy's mitigation measures include reducing sonar by 6 dB if an animal is observed within 1000 yds., by 10 dB (or 4 additional dB) if within 500 yds., and shut down if an animal is within 200 yds. As noted earlier (page 28 above) this measure for all mid-frequency sonar would be supplemented by designation of yearly or seasonal "awareness" "cautionary" and "notification" areas, as follows:

San Diego Arc (seasonal) and Channel Islands National Marine Sanctuary (year-round) Cautionary and Awareness Areas, in which the Navy would limit "Major Training Exercises using hull-mounted mid-frequency sonar" to three per season (during June 1 – Oct. 31), limit use of explosives in this season and area, (with potential exceptions for both if needed for national security and with notification to NMFS).

Channel Islands National Marine Sanctuary (year-round) prohibition on hull-mounted mid-frequency sonar, and explosives and missiles.

Blue, Gray, and Fin whale "awareness notification zones, in which the Navy will issue awareness notification messages to ships and aircraft to be alert for whales seasonally as follows:

Blue Whales – June 1 – Oct. 31
Gray Whales – Nov. 1 – March 31
Fin Whales – Nov. 1 – May 30

At 1000 m distance, which is the first protocol the Navy would implement in reducing sonar intensity (by 6 dB) if a marine mammal is observed, this tables shows that the vast majority of marine mammals would likely respond in a significant behavioral manner (including 100% of beaked whales and over 90% of odontocetes in general). When these virtual certainties of a response are combined with the above-noted difficulties in detection, only a small percentage of mammals will be protected under the Navy's protocols (which partially explains why the estimates of "take" (see page 25-26) are so high). Note that for beaked whales, which are most difficult to detect, the range at which the probability of a behavioral response exceeds 80% is in the order of 10s of kilometers. As noted previously, even highly trained and experienced scientific marine mammal surveyors have less than a 16% chance of observing beaked whales when they are present within four kilometers.

Table 3.7-11: Ranges to a Potentially Significant Behavioral Response for Sonar Bin MF1 over a Representative Range of Environments within the Study Area

Received Level (dB re 1 µPa)	*Minimum and Maximum Range (m)*	*Probability of Behavioral Response*			
		Odontocete	*Mysticete*	*Pinniped*	*Beaked Whale*
196	109 (100–110)	100%	100%	100%	100%
190	239 (190–250)	100%	98%	99%	100%
184	502 (310–575)	99%	88%	98%	100%
178	1,024 (550–2,025)	97%	59%	92%	100%
172	2,948 (625–5,775)	91%	30%	76%	99%
166	6,247 (625–10,025)	78%	20%	48%	97%
160	11,919 (650–20,525)	58%	18%	27%	93%
154	20,470 (650–62,025)	40%	17%	18%	83%
148	33,048 (725–63,525)	29%	16%	16%	66%
142	43,297 (2,025–71,775)	25%	13%	15%	45%
136	52,912 (2,275–91,525)	23%	9%	15%	28%
130	61,974 (2,275–100,000*)	20%	5%	15%	18%
124	66,546 (2,275–100,000*)	17%	2%	14%	14%
118	69,637 (2,525–100,000*)	12%	1%	13%	12%
112	73,010 (2,525–100,000*)	6%	0%	9%	11%
106	75,928 (2,525–100,000*)	3%	0%	5%	11%
100	78,899 (2,525–100,000*)	1%	0%	2%	8%

dB re 1 µPa: decibels referenced to 1 micropascal; m: meters
* Indicates maximum range to which acoustic model was run, a distance of approximately 100 kilometers from the sound source.
Note: Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff range for a particular hearing group. Any impacts within the cutoff range for a criteria group are included in the estimated impacts. Cut-off ranges in this table are for activities with high source levels and/or multiple platforms (see Table 3.7-3 for behavioral cut-off distances).

Thus, even setting aside the concern over areas warranting special protection, the Commission has a number of concerns over the adequacy of the mitigation measures. These concerns are over the uncertainties inherent in marine mammal detection, the uncertainties over population trends, the fact that the detection areas observed by the Navy are insufficient to protect marine mammals from significant behavioral impacts, the overall limited scientific understanding of the effects of mid-frequency sonar on marine mammals, and the extremely large number of harassments of marine mammals offshore of California expected under the Navy's activities, which, on an annualized average are estimated at 2.37 million marine mammals/year subject to Level B annual harassment, and 576 marine mammals/year subject to Level A harassment.

Moreover, while the Navy currently acknowledges that biologically significant areas are present within the southern California training and testing areas, the Navy's conclusions regarding the proposal's consistency with Section 30230 rest on the question of whether the Navy believes that any measures to protect these areas must be balanced against military security needs, and, ultimately, whether population effects can be documented.

As noted above, the Commission does not believe definitive conclusions can be drawn based on available data concerning whether the activities would or would not result in reductions in populations of marine species. The Commission does, however, believe sufficient information exists to determine that "areas of special biological significance" warranting strict protection under Section 30230 of the Coastal Act are present, and that the levels of protection offered by the Navy are insufficient. Accordingly, the Commission finds the activities, as proposed, would be inconsistent with the provision of Section 30230 that requires that "Special protection shall be given to areas and species of special biological or economic significance."

In order to bring the activities into consistency with Section 30230 of the Coastal Act, the Commission concludes that the Navy would need to modify the proposed activities to include the following:

(1) establishment of larger shutdown areas (up to 2 km) (i.e., shut down if a marine mammal or sea turtle is detected within 2 km of the mid-frequency sonar source);

(2) prohibition on use of mid-frequency sonar and in-water explosives in sensitive areas, which would include Marine Protected Areas, the National Marine Sanctuary, seasonal (June thru October) blue whale areas shown on DEIS Figure K.1.2 (and **Exhibit 6**), year-round beaked and fin whale areas shown on **Exhibit 5**, nearshore areas, and any biologically sensitive area NMFS may designate at a future date;

(3) reduction in sound intensity under low-visibility conditions;

(4) limitations on typical vessel speeds in sensitive areas to 10 knots (unless higher speeds are critical to meet training needs); and

(5) improvement of observer effectiveness through the use of NMFS-certified marine mammal observers.

The Commission further recommends that the Navy strongly consider the following information and mitigation recommendations made by the Natural Resources Defense Council (NRDC) prior to (in writing) and during (in its testimony) the Commission's hearing. NRDC requested that the Navy provide: (1) additional information concerning sub-populations of Cuvier's beaked whales; (2) "scores" (i.e., actual data used) in the measurements of "effectiveness training"; (3) more specificity identifying areas in which training occurs; and (4) analyses of potential population-level impacts on marine mammals from cumulative injuries and behavioral disruptions, such as by using the methodology employed by the State Lands Commission, in 2012, in assessing the Central Coastal California Seismic Imaging Project.

Considering additional or alternative mitigation measures, NRDC recommended:

1. Replacing the staff recommended exclusion area west of San Clemente Island with three "refuge" areas to the north of the SOAR range for beaked whale refuge opportunities (Areas A, B and D, Map __);

2. Extending the blue whale exclusion season to the end of December (i.e., June 1 – December 31), prohibiting hull-mounted mid-frequency sonar (except for system checks), and prohibiting helicopter/aircraft "dipping" sonar, within the San Diego Arc during the blue whale season;

3. Observing 10 knot speed restrictions, seasonally, within the San Diego Arc and the blue whale habitat at Tanner-Cortez Bank;

4. Adding seasonal fin whale cautionary measures within the 200 to 1000 meter isobaths, from November 1 to May 31;

5. Increasing protection for gray whales by limiting vessel transit speeds to 10 knots, within 10 n mi of the mainland, from December 1 to May 20;

6. Excluding testing and training from all NM Sanctuaries and Marine Protected Areas;

7. Providing for deviations from the marine species protection measures where the Navy determines, "at the highest command authority" that national defense needs necessitate such deviation, including a "transparency" procedure that would involve reporting to the Commission of any such deviation determinations;

8. Avoiding in-water detonations in low-visibility conditions, and with annual reporting to the Commission of any non-compliance;

9. Using SOAR passive acoustic instruments to monitor marine mammal vocalizations, with reporting to trainers/testers using sonar or in-water detonation activities;

10. Establishing a pilot "thermal monitoring" marine mammal detection;

11. Conducting research on sonar signal modifications having the potential to reduce the severity or onset of behavioral responses; and

12. Conducting research to define beaked whale habitats (in particular, three beaked whale "hotspots" (west of Tanner/Cortez Banks, near Catalina Island and Basin, and in the San Clemente Basin), to be used to identify potential additional areas warranting mitigation.

Shut-down Areas

The larger shutdown areas around sound sources are necessary because they would allow sound levels to attenuate further before being received, thus helping increase the likelihood that elevated levels of underwater sound are reduced or halted before they significantly affect marine mammal behavior. Compared to the one kilometer distance that the Navy is proposing, a two kilometer distance would reduce the probability of a behavioral reaction in many marine mammal species. Although an even greater distance would further reduce this probability, it may not be significantly more effective due to the fact that the likelihood of detecting a marine mammal at sea declines sharply as distance increases.

Mid-frequency Sonar Avoidance Areas
The establishment of mid-frequency sonar avoidance areas – MPAs, National Marine Sanctuary, designated Biologically Important Areas (BIAs), and other areas of likely high marine mammal concentration – is also a critical protective measure because it would help insulate marine mammals in these areas from disturbance, harassment, and take due to elevated sonar levels. The areas specified in page 46, Measure (2) are all sites known to have special biological significance. In the case of the state and federal MPAs and the National Marine Sanctuary, these sites were established at specific locations based on many years of scientific research, monitoring, and survey work that confirmed the presence of sensitive marine habitats and oceanographic features (highly productive persistent upwelling zones, seamounts, unique underwater canyons, etc.) and documented high levels of use by culturally, economically, and ecologically important species of marine wildlife (including protected seabirds, marine mammals, fish and invertebrates).

The BIAs within this area were also identified through a years-long, extensive, science-based, process focused on demarcating sites of persistent high-use and high-density of marine mammals. In many respects, the process used to identify and designate these sites was similar to that used to identify MPAs, with the primary difference being the more singular focus on whale and dolphin use rather than the wider range of habitat and wildlife use documented in the MPAs. The BIAs included within page 46, Measure (2) are particularly focused on blue whale use and their biological importance and the rationale for their designation is described in detail in the 2015 report that accompanied their establishment (Calambokidis et al. 2015, available in a special edition of the peer reviewed journal Aquatic Mammals: https://www.aquaticmammalsjournal.org/images/files/AM_41.1_Complete_Issue.pdf).

In addition to the MPAs, National Marine Sanctuary, and BIAs, page 46, Measure (2) also includes an area centered on the San Nicolas Basin that has a strong research and observational record of high use by both fin whales and beaked whales (including in Calambokidis et al. 2015, Schorr et al. 2014, Falcone and Schorr 2013). This area's importance for fin whales specifically was considered as part of the BIA designation process due to this evidence of consistent use but ultimately not carried forward in the initial round of BIA designations due to a comparative lack of information in relation to the other BIA sites and a lack of agreement between the deep ocean areas of high modeled or predicted fin whale density and those in which large numbers of fin whales have been observed closer to shore (such as the San Nicolas Basin). Nevertheless, the evaluation provides strong evidence for this area's status as one of the most common and highest use sites for fin whales within California's coastal waters.

In addition, there is also a strong record showing the importance of the San Nicolas Basin for beaked whales – in particular, for one of the species most sensitive to underwater sound - Cuvier's beaked whales. Despite the difficulty of observing and detecting this deep-diving and cryptic whale, research such as that carried out by Schorr et al. (2014) and Falcone and Schorr (2013) successfully document the high number and concentration of Cuvier's beaked whales that use the San Nicolas Basin on a consistent basis. As described by the Natural Resources Defense Council (NRDC) in its comment letter submitted in response to the DEIS:

> *Satellite telemetry data and eight years' worth of photo-identification and mark-recapture data indicate that San Nicholas Basin represents an area of high site fidelity, and possible residency, for a small population of Cuvier's beaked whales associated with San Clemente Island.[52] Data also indicate that the population is relatively small, with abundance estimated at 235 individuals, and that its sex ratio is skewed towards adult females, including individuals with calves.[53] The population's primary habitat overlaps directly with the Southern California Anti-submarine Warfare Range ("SOAR"). At times, Cuvier's beaked whale occur in higher densities on SOAR than have been reported anywhere else along the US West Coast, the region across which this population is managed;[54] its secondary habitat, apparently used, in part, when the whales are excluded from their primary range, consists of Tanner Canyon to the south and Santa Cruz Basin to the north.[55] Eight Cuvier's beaked whales tagged off the Southern California coast for periods up to three months were present within the San Nicolas Basin on 53% of days tags transmitted, and spent 71% of their time within the boundaries of SOAR when in the Basin.[56] One individual occurred inside the San Nicolas Basin on 74% of days over the three months the tag was active (see Figure 1).[57]*

Low-Visibility Conditions

As described earlier in this report, even under daylight hours with calm sea-state conditions, it is extremely difficult to detect many species of marine mammals. This likelihood of detection declines sharply as sea-state conditions and visibility deteriorates. Therefore, under these types of low-visibility conditions, the effectiveness of ship-board marine mammal observers cannot be relied on as a meaningful impact avoidance or minimization measure. As such, page 46, Measure (3) calls for sonar levels to be reduced during such situations in order to help prevent marine mammals from being exposed to high-intensity levels of underwater sound.

Vessel Speed Limit

The relationship between vessel speed and the likelihood and consequences of collisions with large whales has been closely evaluated in recent years as a result of the significant threat posed by ships to the highly endangered North Atlantic right whale and the series of ship strike mortalities recorded within the Santa Barbara Channel in 2007 (five blue whale mortalities from ship strikes within two months). This research has shown that a 10-knot speed limit reduced the risk of fatal ship strikes to right whales by 57% (Wiley et al. 2011) and that generally, vessel speed restrictions reduced total ship strike mortality risk levels to whales by 80–90% (Conn and Silber 2013). The need for the issue of ship strikes to be comprehensively and consistently addressed is increasingly recognized. For example, recent research modeling ship strike mortality for blue, fin, and humpback whales in U.S. West Coast waters indicates that even under the most conservative assumptions, "estimated mortality [is] 7.8x, 2.0x and 2.7x the U.S. recommended limit for blue, humpback and fin whales, respectively, suggesting that death from vessel collisions may be a significant impediment to population growth and recovery" (Rockwood et al. 2017). While work is currently underway to investigate opportunities for addressing ship strikes involving commercial vessels - including efforts by the Marine Shipping Working Group convened by the Channel Islands National Marine Sanctuary (CINMS) and the Voluntary Ship Speed Reduction Program developed by CINMS, the Santa Barbara County Air

Pollution Control District and the Environmental Defense Center – page 46, Measure (4) would expand them to incorporate another significant source of marine traffic, the Navy's proposed training and testing program.

NMFS-certified Marine Mammal Observers
For several years, the Navy has been periodically including trained non-Navy marine mammal observers (MMOs) on its vessels during training operations to study their effectiveness at detecting marine mammals compared to teams of Navy watchstanders. Six of these "lookout effectiveness studies" were been carried out between 2011 and 2016 and the results unequivocally show that trained MMOs are significantly more likely to detect marine mammals. Pooling the results of the five reports that Commission staff were able to access shows that out of 120 separate marine mammal observations, Navy watchstanders missed 91 of them. Given the heavy reliance placed on detecting and reacting to the presence of marine mammals as an adverse impact avoidance and minimization measure, it is clear that if this approach is to continue to be used, it must be combined with observers that are more likely to make successful detections. As such, page 46, Measure (5) calls for the Navy to commit to using NMFS-certified MMOs on all ships during the deployment of active sonar for training or testing purposes. These marine mammal observers will notify appropriate Navy personnel of all marine mammal detections and will assist in the enforcement of marine mammal safety zones.

E. COMMERCIAL AND RECREATIONAL FISHING/ACCESS AND RECREATION

Section 30234.5 states:

> *The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.*

Section 30220 states:

> *Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.*

Section 30212 states, in part:

> *(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources,*

Concerning fishing, the Navy's consistency determination notes that it has been conducting its training and testing activities in this area for decades, and that has taken and will continue to take measures to prevent interruption of commercial and recreational fishing activities. To minimize potential military/civilian interactions, the Navy publishes scheduled operation times and locations on publicly accessible Navy websites, and through U.S. Coast Guard issued Notices to

Mariners, up to six months in advance. In addition, if the Navy discovers nonparticipants present in an exclusion zone, the Navy would halt or delay (and reschedule, if necessary) all potentially hazardous activity until the nonparticipants have exited the exclusion zone.

The Navy further states:

> *Commercial and recreational interests such as fishing, boating, and beach use are only restricted temporarily. Temporary closing of areas within the Southern California portion of the HSTT Study Area (typically areas in the vicinity of San Clemente Island) for security and safety does not limit public access to surrounding areas. Areas that are temporarily closed are only closed for the duration of the activity and are re-opened at the completion of the activity.*

The only fishing-related issue the Commission has previously expressed concerns over were the need to complete and respond to a 2009 Southern California Fisheries Study, which had contained several recommendations to improve communications between the Navy and commercial and recreational fishers. The Navy has since the completion the implementation of these recommended measures, which will assist in avoiding conflicts between civilian and military activities during potentially hazardous training and testing events off of San Clemente Island.

The Commission therefore concludes that the proposed training and testing activities would be consistent with the commercial and recreational fishing policies (Section 30234.5), and public access and recreation policies (Sections 30212 and 30220) of the Coastal Act.

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W14b

CD-0001-18 (Navy, SOCAL Range)

June 25, 2018

Exhibits

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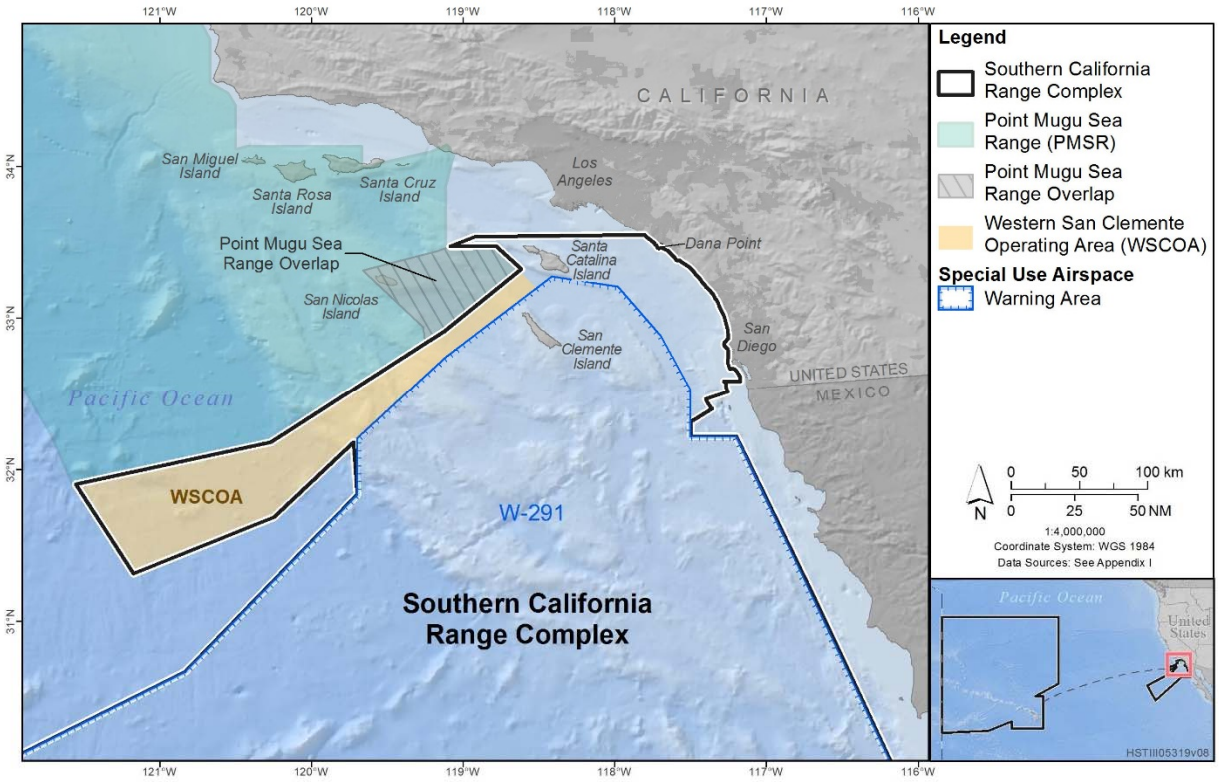


Figure 2-2: Southern California Range Complex

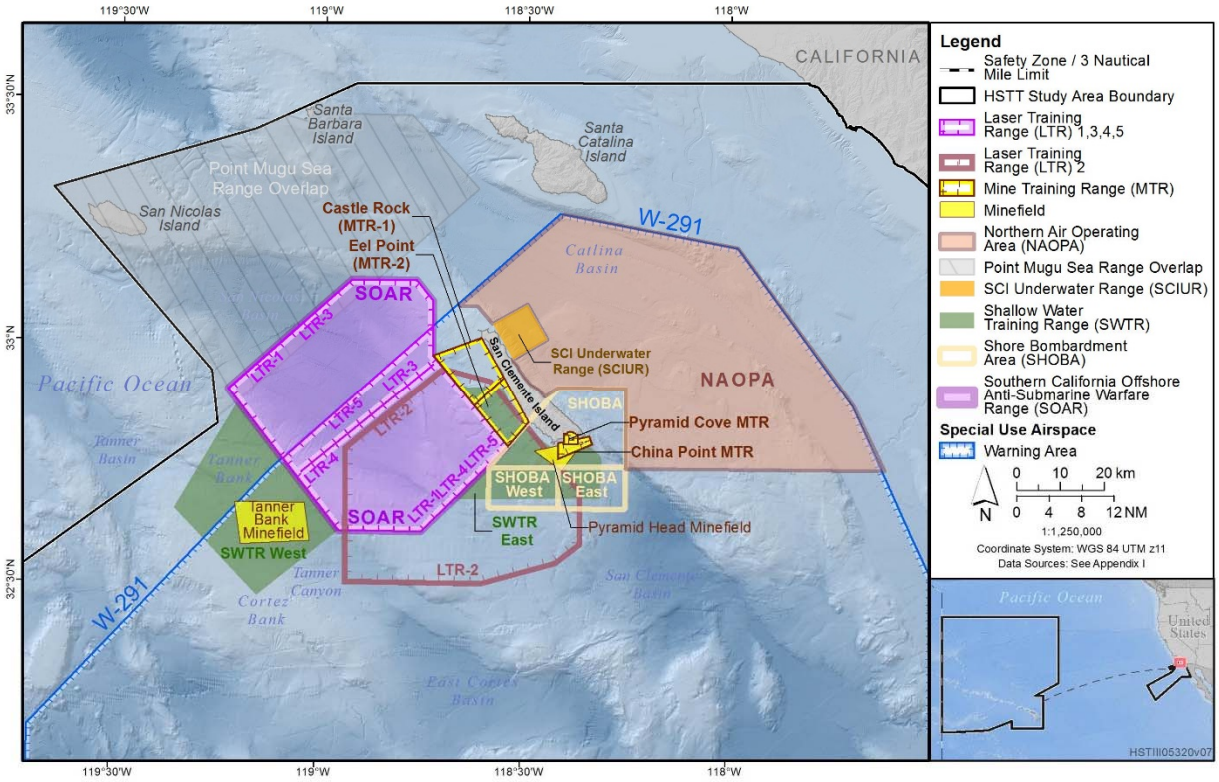


Figure 2-3: San Clemente Island Offshore Training Areas

Exhibit 1
CD-0001-18
Overall Training and SCI Training Areas

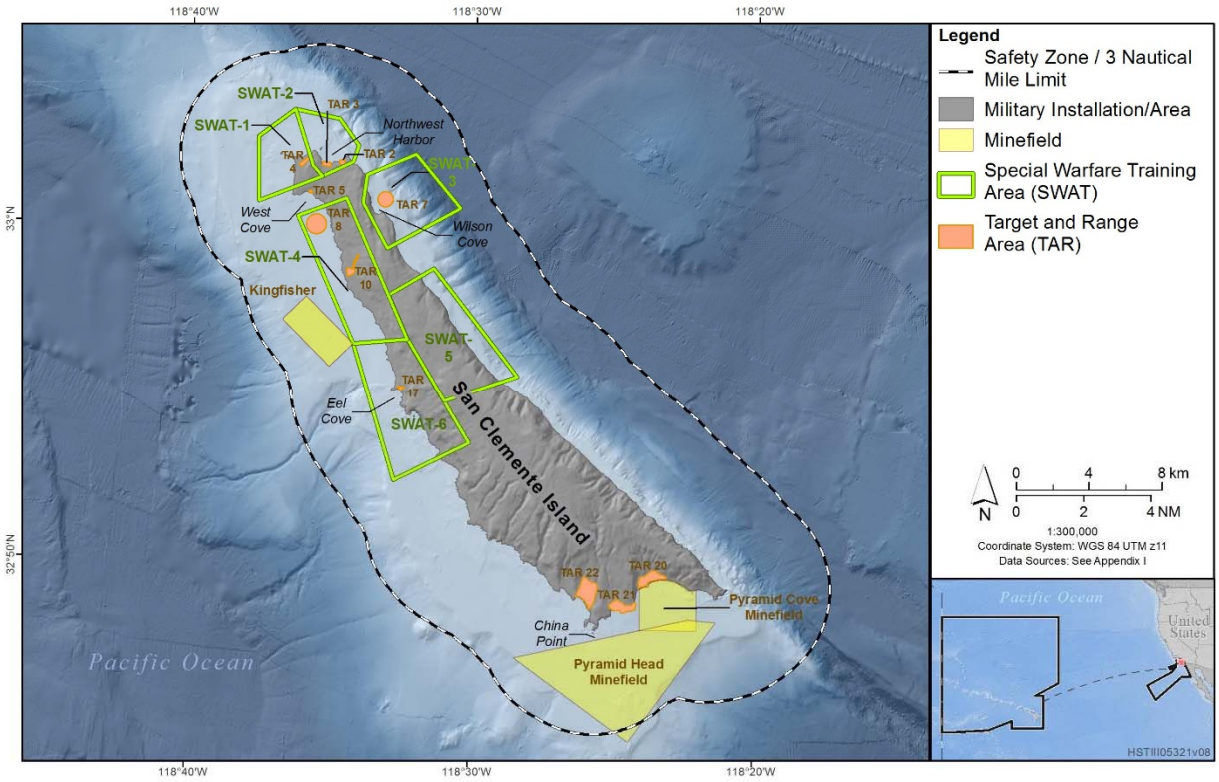


Figure 2-4: San Clemente Island Nearshore Training Areas

Most of the special use airspace in the Southern California Range Complex is defined by W-291 (Figure 2-1). Warning Area 291 extends vertically from the ocean surface to 80,000 feet (ft.) above mean sea level and encompasses 113,000 NM^2 of airspace. Airspace within or adjacent to W-291 includes the following:

- Western San Clemente OPAREA (Figure 2-1) is special use airspace that extends from the surface to 5,000 ft. above mean sea level.
- Helicopter Offshore Training Areas (Figure 2-1) located off the coast of San Diego, which extend from the surface to 1,000 ft. above mean sea level.
- Tactical Maneuvering Areas extend from 5,000 ft. to 40,000 ft. above mean sea level and provide airspace for air combat maneuvering, air intercept control aerobatics, and air-to-air gunnery. Munitions use is permitted.
- Fleet Training Area Hot extends from the ocean bottom to 80,000 ft. above mean sea level and includes airspace that is used for hazardous operations, primarily surface-to-surface, surface-to-air, and air-to-air munitions.
- Missile Ranges 1 East and 1 West extend from the ocean bottom to 80,000 ft. above mean sea level and allow rocket and missile firing activities, anti-submarine warfare, carrier and submarine operations, Fleet training, and surface and air gunnery. Munitions use is permitted.
- Encinitas Naval Electronic Test Area extends from the ocean bottom up to 700 ft. above mean sea level. Fleet training and testing occurs here. Munitions use is not permitted.

In addition, a small part of the Point Mugu Sea Range is included in the Southern California portion of the HSTT Study Area. See the Point Mugu Sea Range Overlap in Figure 2-1. This approximately

Exhibit 2
CD-0001-18
SCI Nearshore Training Areas

1,000 NM^2 area of the Point Mugu Sea Range, and only that part of the Point Mugu Sea Range, is used by the Navy for anti-submarine warfare training conducted in the course of major range events.

The SSTC is an integrated set of training and testing areas located on and adjacent to the Silver Strand, a narrow, sandy isthmus separating San Diego Bay from the Pacific Ocean. It is divided into two non-contiguous areas: SSTC-North and SSTC-South (Figure 2-5). SSTC-North includes 10 oceanside boat training lanes (numbered as Boat Lanes 1–10), ocean anchorage areas (numbered 101 through 178), bayside water training and testing areas (Alpha through Hotel), and the Lilly Ann drop zone. The boat training lanes are each 500 yd. wide, extending 4,000 yd. seaward and forming a 5,000 yd. long contiguous training and testing area. SSTC-South includes four oceanside boat training lanes (numbered as Boat Lanes 11–14) and the TA-Kilo training area. The anchorages lie offshore of Coronado in the Pacific Ocean and overlap a portion of Boat Lanes 1–10. The anchorages are each 654 yd. in diameter, and are grouped together in an area located primarily due west of SSTC-N, east of Zuniga Jetty and the restricted areas on approach to the San Diego Bay entrance.

The Southern California portion of the HSTT Study Area includes selected pierside locations where Navy testing occurs, as well as channels and routes to and from Navy ports and shipyards, where maintenance testing of sonar could occur. These areas are located at Navy ports, Navy shipyards, and contractor shipyards in San Diego, California (Figure 2-5). In addition, some training and testing activities occur throughout San Diego Bay.

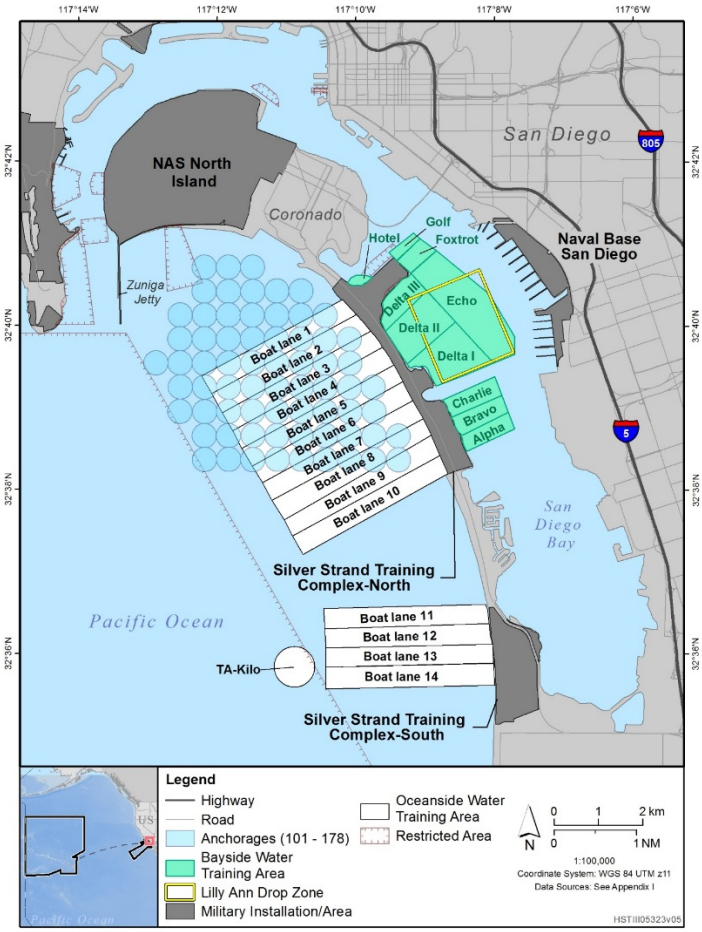


Figure 2-5: Silver Strand Training Complex

Exhibit 3
CD-0001-18
SSTC Nearshore Areas

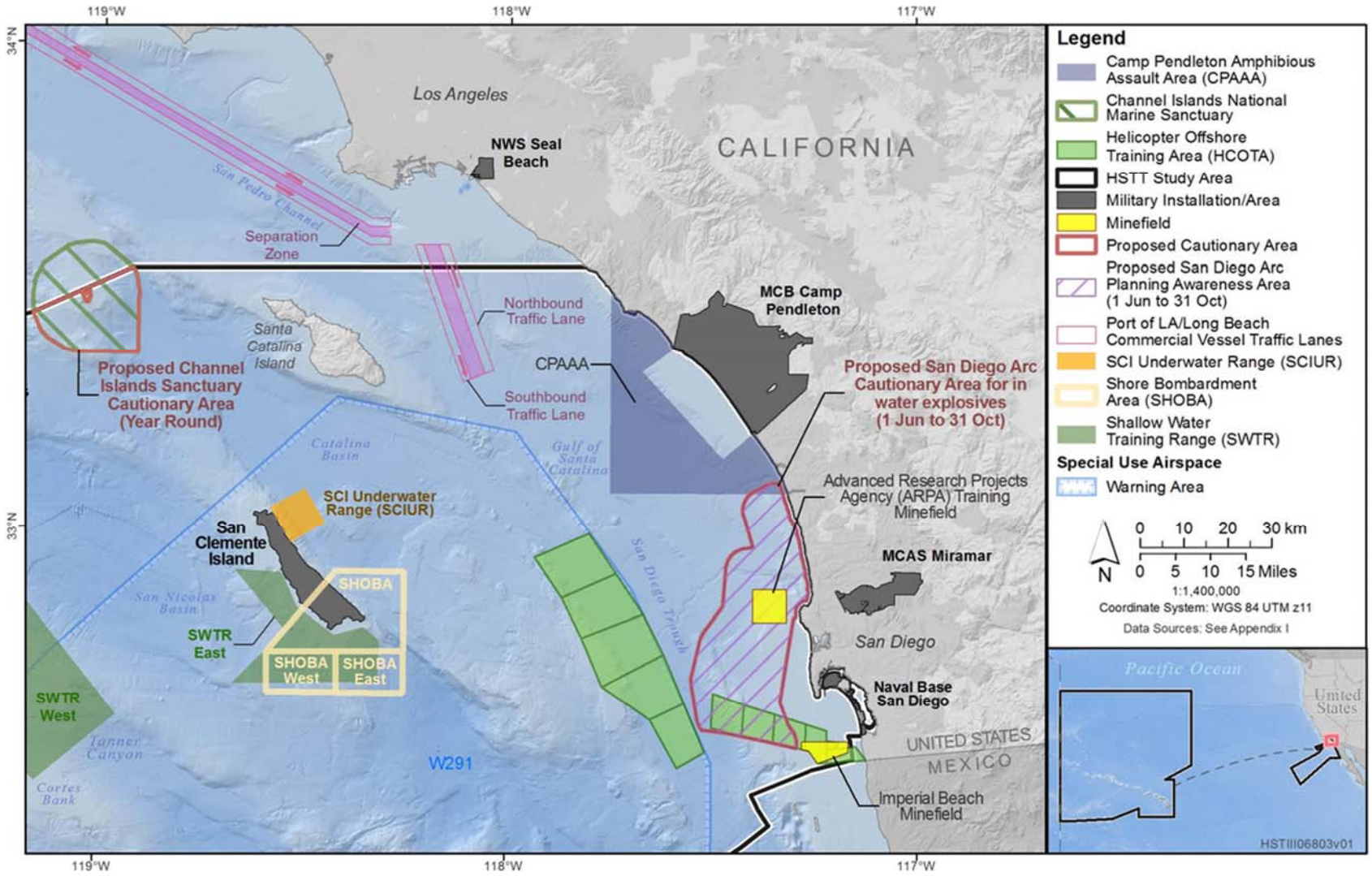


Figure 2-10: Mitigation Areas for Marine Mammals

Exhibit 4
CD-0001-18
Navy Mitigation Areas

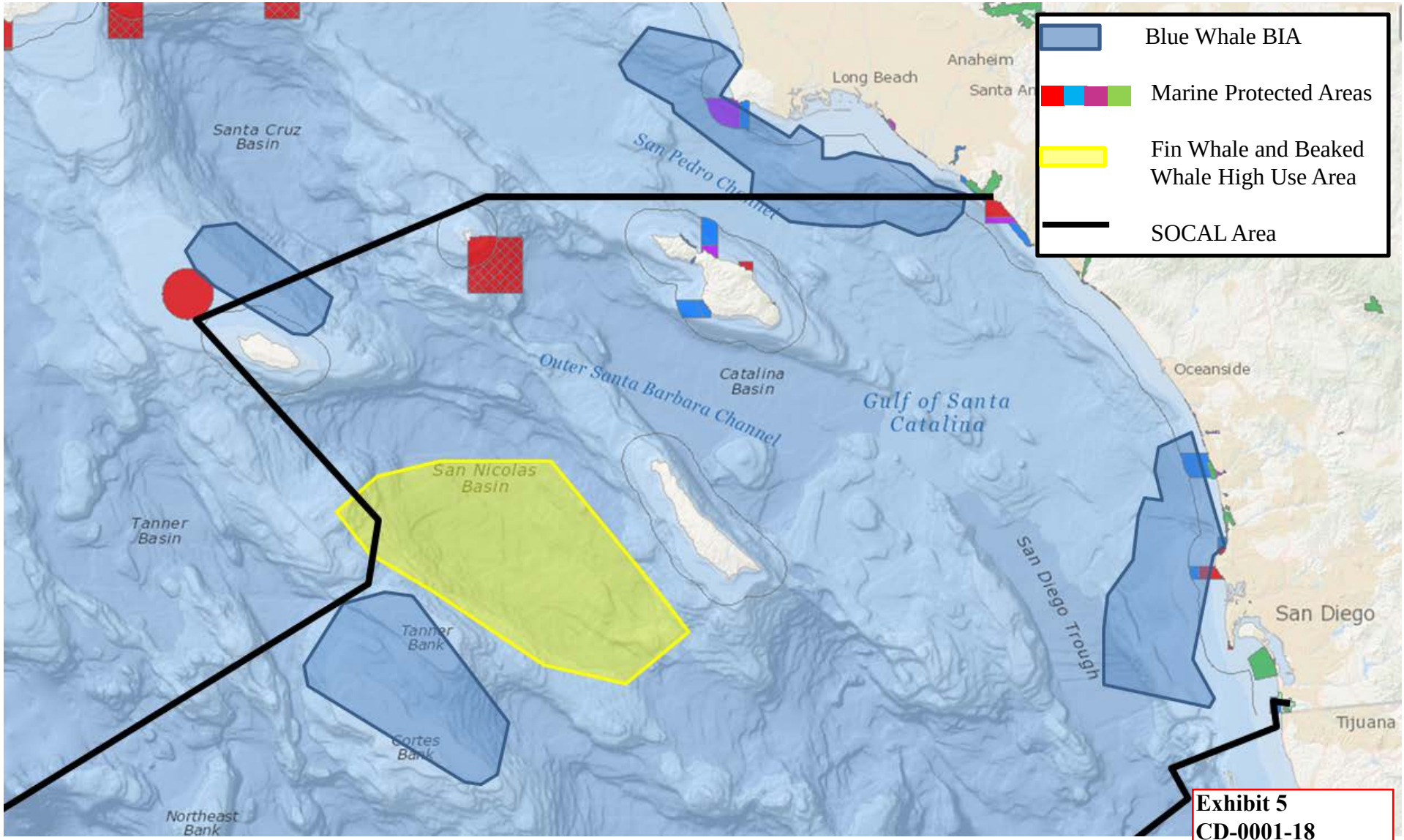


Exhibit 5
CD-0001-18
CCC
Recommended
Mitigation Areas

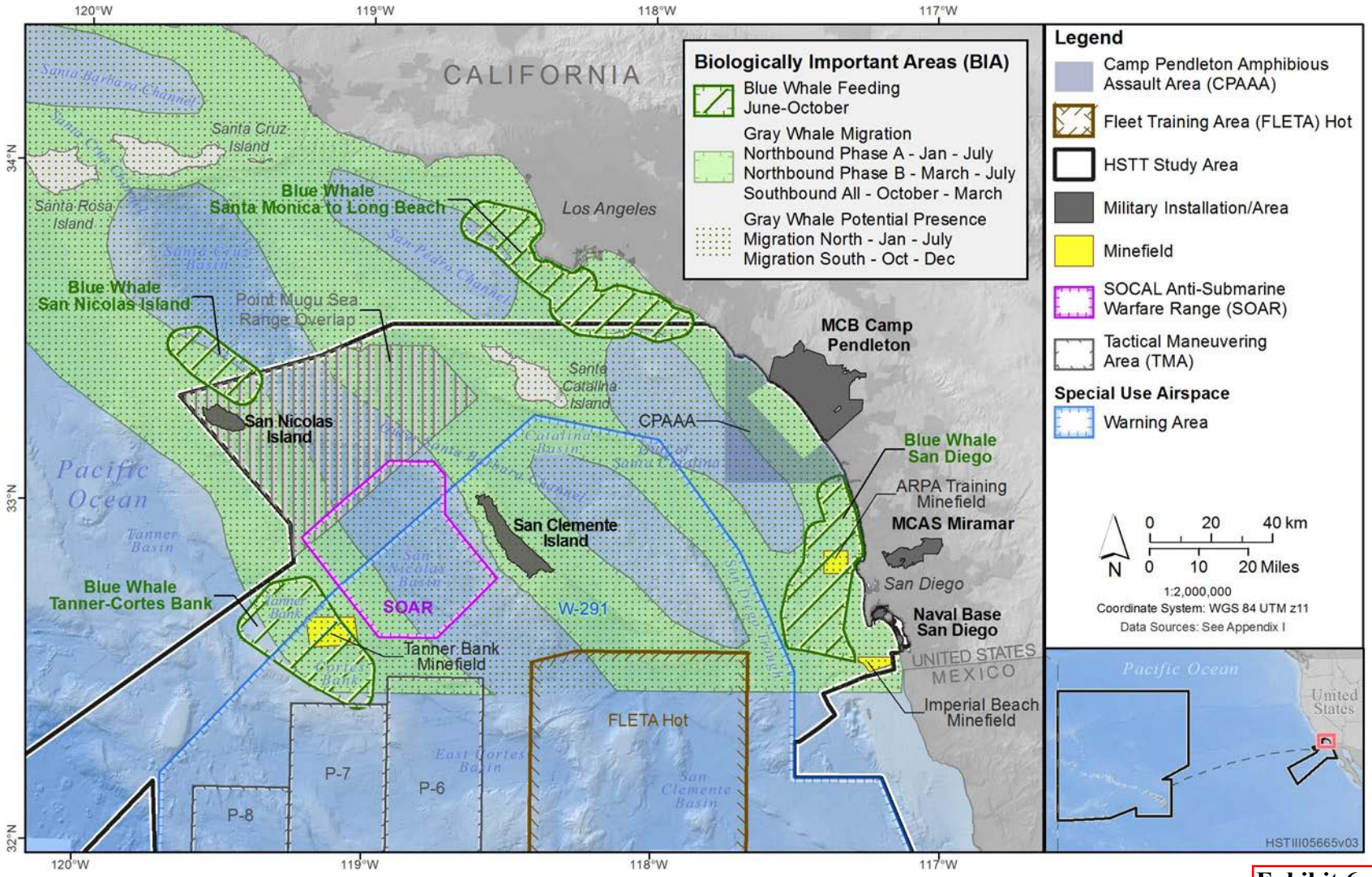


Figure K.1-2: Biologically Important Areas in the Southern California Portion of the Study Area

Exhibit 6
CD-0001-18
Appendix K Areas Considered for Mitigation Areas

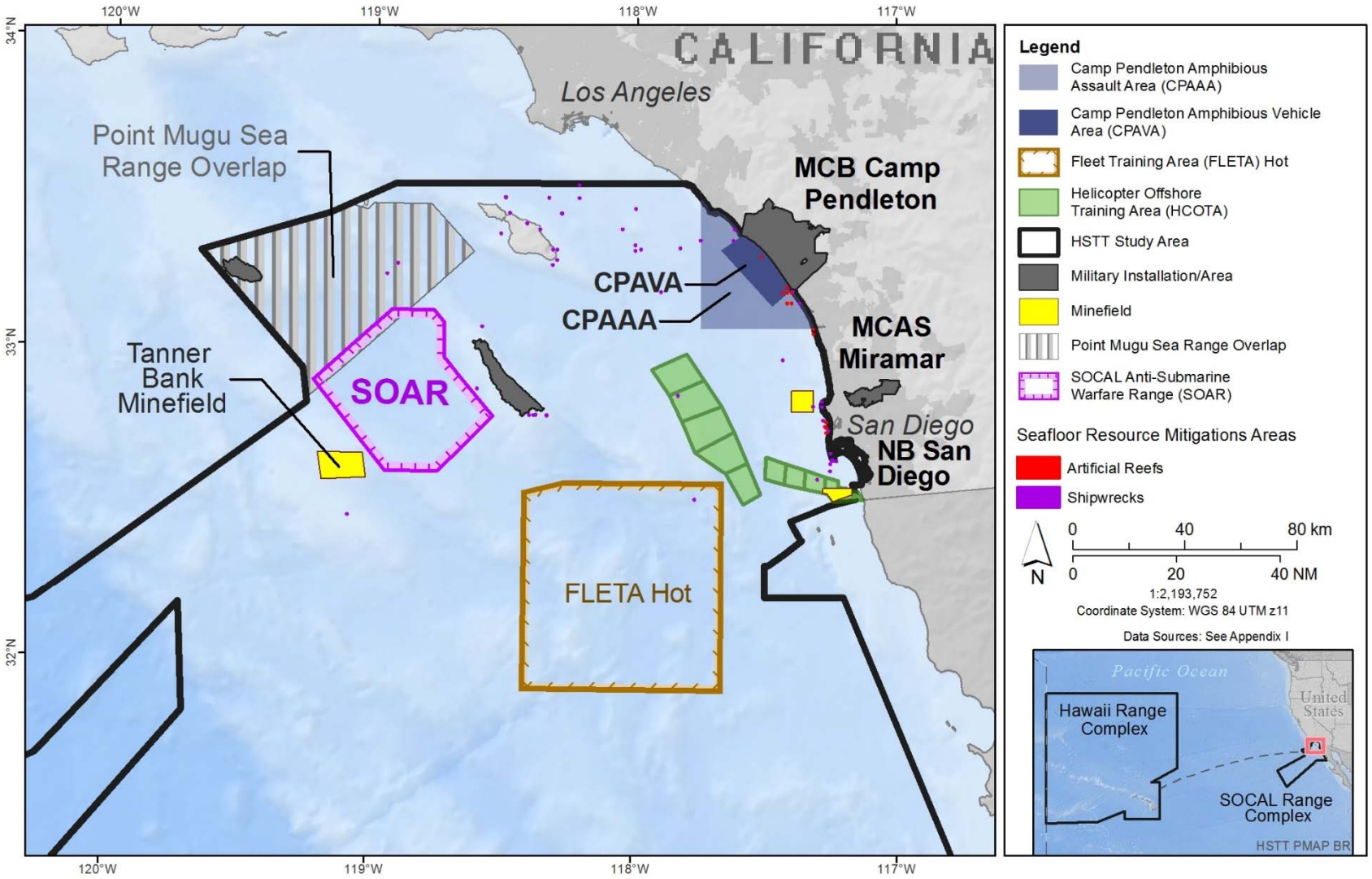
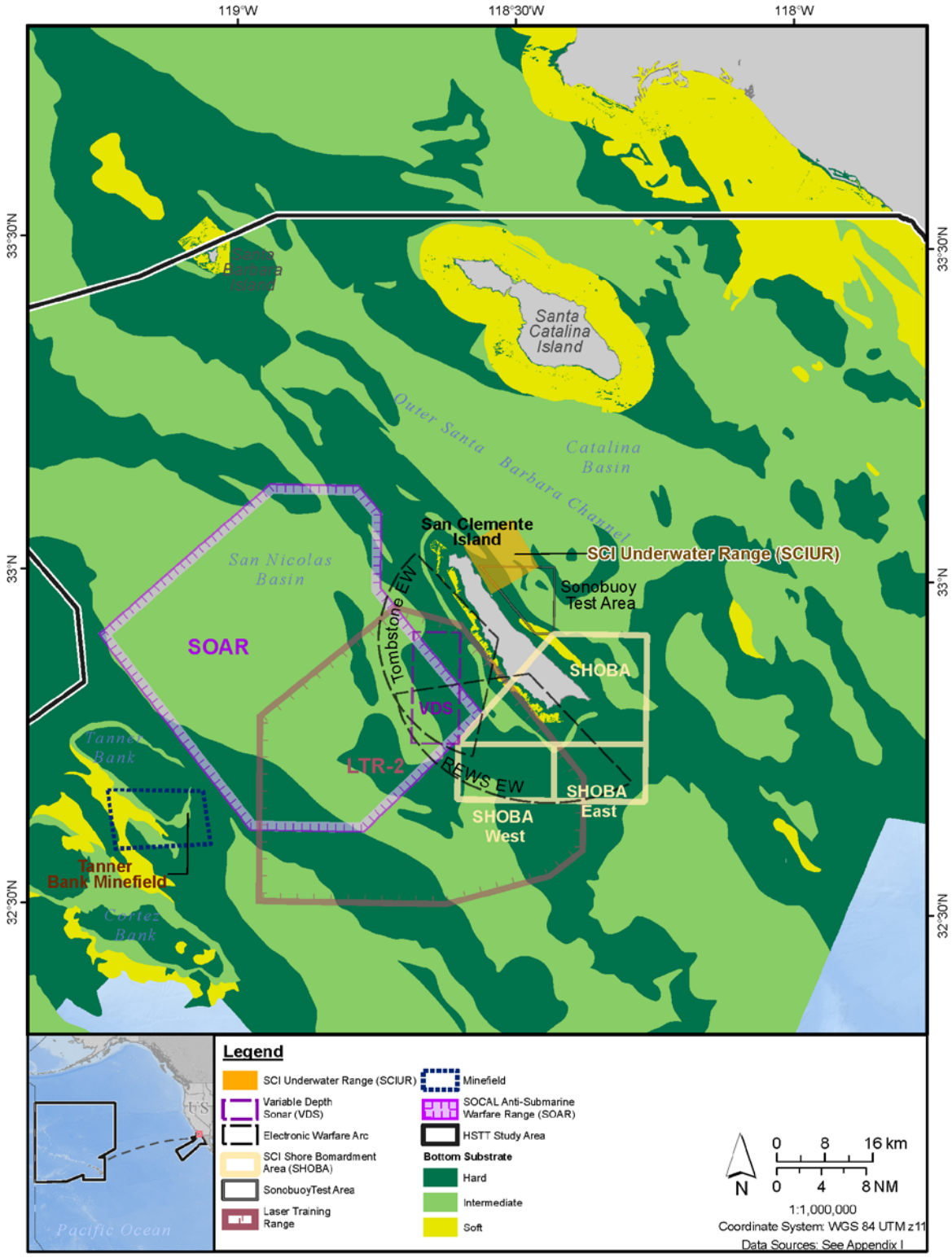


Figure 2-9: Seafloor Resource Mitigation Areas in the Southern California Portion of the HSTT Study Area

Exhibit 7
CD-0001-18
Seafloor Mitigation Areas



Notes: HSTT = Hawaii-Southern California Training and Testing; SOCAL = Southern California; SCI = San Clemente Island

Figure 3.5-7: Bottom Substrate Composition – Southern California Range Complex

Exhibit 8
CD-0001-18
Substrate Map

Table 5-2: Species-Specific Take Requests from Modeling Estimates of Acoustic and Explosive Sound Source Effects for All Training Activities

Species	Stock	Annual		5-Year Total**	
		Level B	Level A	Level B	Level A
Suborder Mysticeti (baleen whales)					
Family Balaenopteridae (rorquals)					
Blue whale*	Central North Pacific	34	0	139	0
	Eastern North Pacific	1,155	1	5,036	3
Bryde's whale†	Eastern Tropical Pacific	27	0	118	0
	Hawaiian†	105	0	429	0
Fin whale*	California, Oregon, & Washington	1,245	0	5,482	0
	Hawaiian	33	0	133	0
Humpback whale†	California, Oregon, & Washington†	669	1	2,864	3
	Central North Pacific	5,604	1	23,654	5
Minke whale	California, Oregon, & Washington	649	1	2,920	4
	Hawaiian	3,463	1	13,664	2
Sei whale*	Eastern North Pacific	53	0	236	0
	Hawaiian	118	0	453	0
Family Eschrichtiidae					
Gray whale†	Eastern North Pacific	2,751	5	11,860	19
	Western North Pacific†	4	0	14	0
Suborder Odontoceti (toothed whales)					
Family Physeteridae (sperm whale)					
Sperm whale*	California, Oregon, & Washington	1,397	0	6,257	0
	Hawaiian	1,714	0	7,078	0
Family Kogiidae (sperm whales)					
Dwarf sperm whale	Hawaiian	13,961	35	57,571	148
Pygmy sperm whale	Hawaiian	5,556	16	22,833	64
Kogia whales	California, Oregon, & Washington	6,012	23	27,366	105
Family Ziphiidae (beaked whales)					
Baird's beaked whale	California, Oregon, & Washington	1,317	0	6,044	0
Blainville's beaked whale	Hawaiian	3,687	0	16,364	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0
	Hawaiian	1,235	0	5,497	0

Exhibit 9
CD-0001-18
Navy LOA Application
Tables 5-2 and 5-3

Table 5-2: Species-Specific Take Requests from Modeling Estimates of Acoustic and Explosive Sound Source Effects for All Training Activities (continued)

Species	*Stock*	*Annual*		*5-Year Total*	
		Level B	*Level A*	*Level B*	*Level A*
Longman's beaked whale	Hawaiian	13,010	0	57,172	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	10,715	0	49,516	0
Family Delphinidae (dolphins)					
Bottlenose dolphin	California Coastal	214	0	876	0
	California, Oregon, & Washington Offshore	31,986	2	142,966	9
	Hawaiian Pelagic	2,086	0	9,055	0
	Kauai & Niihau	74	0	356	0
	Oahu	8,186	1	40,918	5
	4-Island	152	0	750	0
	Hawaii	42	0	207	0
False killer whale†	Hawaii Pelagic	701	0	3,005	0
	Main Hawaiian Islands Insular†	405	0	1,915	0
	Northwestern Hawaiian Islands	256	0	1,094	0
Fraser's dolphin	Hawaiian	28,409	1	122,784	3
Killer whale	Eastern North Pacific Offshore	73	0	326	0
	Eastern North Pacific Transient/West Coast Transient	135	0	606	0
	Hawaiian	84	0	352	0
Long-beaked common dolphin	California	128,994	14	559,540	69
Melon-headed whale	Hawaiian Islands	2,335	0	9,705	0
	Kohala Resident	182	0	913	0
Northern right whale dolphin	California, Oregon, & Washington	56,820	8	253,068	40
Pacific white-sided dolphin	California, Oregon, & Washington	43,914	3	194,882	12
Pantropical spotted dolphin	Hawaii Island	2,585	0	12,603	0
	Hawaii Pelagic	6,809	0	29,207	0
	Oahu	4,127	0	20,610	0
	4-Island	260	0	1,295	0
Pygmy killer whale	Hawaiian	5,816	0	24,428	0
	Tropical	471	0	2,105	0

Table 5-2: Species-Specific Take Requests from Modeling Estimates of Acoustic and Explosive Sound Source Effects for All Training Activities (continued)

Species	*Stock*	*Annual*		*5-Year Total*	
		Level B	*Level A*	*Level B*	*Level A*
Risso's dolphin	California, Oregon, & Washington	76,276	6	338,560	30
	Hawaiian	6,590	0	28,143	0
Rough-toothed dolphin	Hawaiian	4,292	0	18,506	0
	NSD[1]	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	932,453	47	4,161,283	222
Short-finned pilot whale	California, Oregon, & Washington	990	1	4,492	5
	Hawaiian	8,594	0	37,077	0
Spinner dolphin	Hawaii Island	89	0	433	0
	Hawaii Pelagic	3,138	0	12,826	0
	Kauai & Niihau	310	0	1,387	0
	Oahu & 4-Island	1,493	1	7,445	5
Striped dolphin	California, Oregon, & Washington	119,219	1	550,936	3
	Hawaiian	5,388	0	22,526	0
Family Phocoenidae (porpoises)					
Dall's porpoise	California, Oregon, & Washington	27,278	137	121,236	634
Suborder Pinnipedia					
Family Otariidae (eared seals)					
California sea lion	U.S.	69,543	92	327,136	455
Guadalupe fur seal*	Mexico	518	0	2,386	0
Northern fur seal	California	9,786	0	44,017	0
Family Phocidae (true seals)					
Harbor seal	California	3,119	7	13,636	34
Hawaiian monk seal*	Hawaiian	139	1	662	3
Northern elephant seal	California	38,169	72	170,926	349

* ESA-listed species (all stocks) within the HSTT Study Area

**5-year total impacts may be less than sum total of each year.Not all activities occur every year; some activities occur multiple times within a year; and some activities only occur a few times over course of a 5-year period

†Only designated stocks are ESA-listed

[1]NSD: No stock designation

5.1.2 INCIDENTAL TAKE REQUEST FROM ACOUSTIC AND EXPLOSIVE SOURCES FOR TESTING ACTIVITIES

Table 5-3 summarizes the Navy's take request (exposures which may lead to Level B and Level A harassment) for testing activities by species and stock breakout annually (based on the maximum number of activities per 12-month period) and the summation over a 5-year period from the quantitative analysis. The five-year total impacts may be less than the sum total of each year, given that; not all activities occur every year; some activities occur multiple times within a year; and some activities only occur a few times over the course of a 5-year period.

As previously mentioned, the quantitative analysis estimates mortalities to specific species from acoustic and explosive sources in HSTT. Table 5-3 includes estimates for mortality within the summed Level A totals per year and per 5-year period.

Specifically, over the course of a year, the quantitative analysis estimates mortality of one [1] short-beaked common dolphin as a result of exposure to explosive testing activities. Over the 5-year LOA period being requested, mortality of three [3] short-beaked common dolphins is estimated as a result of exposure to explosive testing activities.

Table 5-3: Species-Specific Take Requests from Modeling Estimates of Acoustic and Explosive Sound Source Effects for All Testing Activities

Species	*Stock*	*Annual*		*5-Year Total***	
		Level B	*Level A*	*Level B*	*Level A*
Suborder Mysticeti (baleen whales)					
Family Balaenopteridae (rorquals)					
Blue whale*	Central North Pacific	14	0	65	0
	Eastern North Pacific	833	0	4,005	0
Bryde's whale†	Eastern Tropical Pacific	14	0	69	0
	Hawaiian†	41	0	194	0
Fin whale*	California, Oregon, & Washington	980	1	4,695	3
	Hawaiian	15	0	74	0
Humpback whale†	California, Oregon, & Washington†	449	0	2,178	0
	Central North Pacific	3,522	2	16,777	10
Minke whale	California, Oregon, & Washington	276	0	1,309	0
	Hawaiian	1,467	1	6,918	4
Sei whale*	Eastern North Pacific	26	0	124	0
	Hawaiian	49	0	229	0
Family Eschrichtiidae					
Gray whale†	Eastern North Pacific	1,920	2	9,277	7
	Western North Pacific†	2	0	11	0
Suborder Odontoceti (toothed whales)					
Family Physeteridae (sperm whale)					
Sperm whale*	California, Oregon, & Washington	1,096	0	5,259	0
	Hawaiian	782	0	3,731	0
Family Kogiidae (sperm whales)					
Dwarf sperm whale	Hawaiian	6,459	29	30,607	140
Pygmy sperm whale	Hawaiian	2,595	13	12,270	60
Kogia whales	California, Oregon, & Washington	3,120	15	14,643	67
Family Ziphiidae (beaked whales)					
Baird's beaked whale	California, Oregon, & Washington	727	0	3,418	0
Blainville's beaked whale	Hawaiian	1,698	0	8,117	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0
	Hawaiian	561	0	2,675	0

Table 5-3: Species-Specific Take Requests from Modeling Estimates of Acoustic and Explosive Sound Source Effects for All Testing Activities (continued)

Species	*Stock*	*Annual*		*5-Year Total*	
		Level B	*Level A*	*Level B*	*Level A*
Longman's beaked whale	Hawaiian	6,223	0	29,746	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	6,863	0	32,185	0
Family Delphinidae (dolphins)					
Bottlenose dolphin	California Coastal	1,595	0	7,968	0
	California, Oregon, & Washington Offshore	23,436	1	112,410	4
	Hawaiian Pelagic	1,242	0	6,013	0
	Kauai & Niihau	491	0	2,161	0
	Oahu	475	0	2,294	0
	4-Island	207	0	778	0
	Hawaii	38	0	186	0
False killer whale†	Hawaii Pelagic	340	0	1,622	0
	Main Hawaiian Islands Insular†	184	0	892	0
	Northwestern Hawaiian Islands	125	0	594	0
Fraser's dolphin	Hawaiian	12,664	1	60,345	5
Killer whale	Eastern North Pacific Offshore	34	0	166	0
	Eastern North Pacific Transient/West Coast Transient	64	0	309	0
	Hawaiian	40	0	198	0
Long-beaked common dolphin	California	118,278	6	568,020	24
Melon-headed whale	Hawaiian Islands	1,157	0	5,423	0
	Kohala Resident	168	0	795	0
Northern right whale dolphin	California, Oregon, & Washington	41,279	3	198,917	15
Pacific white-sided dolphin	California, Oregon, & Washington	31,424	2	151,000	8
Pantropical spotted dolphin	Hawaii Island	1,409	0	6,791	0
	Hawaii Pelagic	3,640	0	17,615	0
	Oahu	202	0	957	0
	4-Island	458	0	1,734	0

Table 5-3: Species-Specific Take Requests from Modeling Estimates of Acoustic and Explosive Sound Source Effects for All Testing Activities (continued)

Species	*Stock*	*Annual*		*5-Year Total*	
		Level B	*Level A*	*Level B*	*Level A*
Pygmy killer whale	Hawaiian	2,708	0	13,008	0
	Tropical	289	0	1,351	0
Risso's dolphin	California, Oregon, & Washington	49,985	3	240,646	15
	Hawaiian	2,808	0	13,495	0
Rough-toothed dolphin	Hawaiian	2,193	0	10,532	0
	NSD[1]	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	560,120	46	2,673,431	222
Short-finned pilot whale	California, Oregon, & Washington	923	0	4,440	0
	Hawaiian	4,338	0	20,757	0
Spinner dolphin	Hawaii Island	202	0	993	0
	Hawaii Pelagic	1,396	0	6,770	0
	Kauai & Niihau	1,436	0	6,530	0
	Oahu & 4-Island	331	0	1,389	0
Striped dolphin	California, Oregon, & Washington	56,035	2	262,973	10
	Hawaiian	2,396	0	11,546	0
Family Phocoenidae (porpoises)					
Dall's porpoise	California, Oregon, & Washington	17,091	72	81,611	338
Suborder Pinnipedia					
Family Otariidae (eared seals)					
California sea lion	U.S.	48,665	6	237,870	23
Guadalupe fur seal*	Mexico	939	0	4,357	0
Northern fur seal	California	5,505	1	26,168	4
Family Phocidae (true seals)					
Harbor seal	California	2,322	1	11,258	5
Hawaiian monk seal*	Hawaiian	77	0	254	0
Northern elephant seal	California	22,702	27	107,343	131

* ESA-listed species (all stocks) within the HSTT Study Area

**5-year total impacts may be less than sum total of each year.Not all activities occur every year; some activities occur multiple times within a year; and some activities only occur a few times over course of a 5-year period

†Only designated stocks are ESA-listed

[1]NSD: No stock designation

Table E-1: Estimated Marine Mammals Impacts per Year from Sonar Training Activities

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Suborder Mysticeti (baleen whales)										
Family Balaenopteridae (rorquals)										
Blue whale*	Central North Pacific	9	23	0	9	25	0	11	33	0
	Eastern North Pacific	344	571	0	408	739	0	519	898	0
Bryde's whale	Eastern Tropical Pacific	7	14	0	8	18	0	9	25	0
	Hawaiian	24	72	0	25	80	0	31	101	0
Fin whale*	California, Oregon, & Washington	381	617	0	457	781	0	572	975	0
	Hawaiian	13	17	0	14	19	0	16	19	0
Humpback whale†	California, Oregon, & Washington†	50	448	0	65	591	0	73	723	1
	Central North Pacific	1,583	3,575	0	1,643	3,939	0	1,850	4,760	1
Minke whale	California, Oregon, & Washington	127	421	0	141	504	0	184	702	0
	Hawaiian	699	2,402	0	750	2,703	1	871	3,229	1
Sei whale*	Eastern North Pacific	14	30	0	15	37	0	20	48	0
	Hawaiian	26	79	0	28	90	0	34	103	0
Family Eschrichtiidae										
Gray whale†	Eastern North Pacific	441	1,595	1	573	2,122	2	616	2,372	2
	Western North Pacific†	1	2	0	1	3	0	1	3	0
Suborder Odontoceti (toothed whales)										
Family Physeteridae (sperm whale)										
Sperm whale*	California, Oregon, & Washington	1,144	33	0	1,351	43	0	1,600	53	0
	Hawaiian	1,526	21	0	1,691	23	0	1,966	27	0

Exhibit 10
CD-0001-18
A Appendix E
Tables E-1 thru E-14

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Family Kogiidae (sperm whales)										
Dwarf sperm whale	Hawaiian	2,981	9,587	12	3,124	10,700	14	3,477	13,121	16
Pygmy sperm whale	Hawaiian	1,155	3,845	5	1,214	4,296	6	1,364	5,219	6
Kogia whales	California, Oregon, & Washington	1,253	3,901	9	1,346	4,588	12	1,658	6,357	15
Family Ziphiidae (beaked whales)										
Baird's beaked whale	California, Oregon, & Washington	1,155	8	0	1,307	10	0	1,831	12	0
Blainville's beaked whale	Hawaiian	3,428	11	0	3,675	12	0	4,495	14	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0	0
	Hawaiian	1,149	2	0	1,232	3	0	1,470	3	0
Longman's beaked whale	Hawaiian	12,057	52	0	12,953	57	0	15,939	70	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	9,452	76	0	10,614	98	0	14,566	124	0
Family Delphinidae (dolphins)										
Bottlenose dolphin	California Coastal	182	5	0	189	5	0	189	5	0
	California, Oregon, & Washington Offshore	24,320	2,320	0	28,953	3,007	0	35,590	3,651	0
	Hawaiian Pelagic	1,856	82	0	1,993	92	0	2,361	104	0
	Kauai & Niihau	70	0	0	74	0	0	75	0	0
	Oahu	8,134	35	0	8,137	35	0	8,188	35	0
	4-Island	148	2	0	150	2	0	151	2	0
	Hawaii	39	3	0	39	3	0	42	5	0
False killer whale[†]	Hawaii Pelagic	622	26	0	672	29	0	819	32	0
	Main Hawaiian Islands Insular[†]	381	9	0	394	10	0	485	13	0

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
	Northwestern Hawaiian Islands	226	10	0	245	11	0	299	12	0
Fraser's dolphin	Hawaiian	25,225	772	0	27,491	910	0	31,075	1,008	0
Killer whale	Eastern North Pacific Offshore	53	8	0	63	10	0	83	15	0
	Eastern North Pacific Transient/West Coast Transient	99	15	0	117	18	0	155	27	0
	Hawaiian	74	3	0	80	4	0	92	5	0
Long-beaked common dolphin	California	89,185	7,093	0	119,518	9,324	0	130,970	11,093	0
Melon-headed whale	Hawaiian Islands	1,949	148	0	2,141	192	0	2,669	192	0
	Kohala Resident	180	2	0	180	2	0	211	4	0
Northern right whale dolphin	California, Oregon, & Washington	41,973	5,103	0	50,090	6,692	0	61,039	8,025	0
Pacific white-sided dolphin	California, Oregon, & Washington	32,075	3,999	0	38,735	5,156	0	47,145	6,355	0
Pantropical spotted dolphin	Hawaii Island	2,437	114	0	2,463	122	0	2,821	182	0
	Hawaii Pelagic	6,002	299	0	6,467	341	0	8,077	398	0
	Oahu	4,092	29	0	4,097	29	0	4,114	29	0
	4-Island	259	1	0	259	1	0	271	1	0
Pygmy killer whale	Hawaiian	5,018	268	0	5,510	305	0	6,386	354	0
	Tropical	370	30	0	433	38	0	568	47	0
Risso's dolphin	California, Oregon, & Washington	56,098	6,402	0	67,867	8,356	0	81,280	10,099	0
	Hawaiian	5,761	304	0	6,253	336	0	7,676	391	0
Rough-toothed dolphin	Hawaiian	3,717	251	0	4,012	280	0	4,806	328	0
	NSD[1]	0	0	0	0	0	0	0	0	0

Species	*Stock*	*Alternative 1 – Minimum*			*Alternative 1 – Maximum*			*Alternative 2*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Short-beaked common dolphin	California, Oregon, & Washington	705,511	75,760	1	832,626	99,397	1	1,055,419	121,779	2
Short-finned pilot whale	California, Oregon, & Washington	808	51	0	922	68	0	1,119	81	0
	Hawaiian	7,671	284	0	8,271	320	0	9,788	370	0
Spinner dolphin	Hawaii Island	86	1	0	88	1	0	90	1	0
	Hawaii Pelagic	2,753	152	0	2,972	166	0	3,815	177	0
	Kauai & Niihau	264	1	0	309	1	0	370	1	0
	Oahu & 4-Island	1,469	16	0	1,473	16	0	1,504	17	0
Striped dolphin	California, Oregon, & Washington	99,418	7,404	0	109,630	9,566	0	148,534	12,136	0
	Hawaiian	4,615	274	0	5,076	312	0	5,952	351	0
Family Phocoenidae (porpoises)										
Dall's porpoise	California, Oregon, & Washington	5,064	17,166	50	5,715	21,082	64	6,473	27,223	79
Suborder Pinnipedia										
Family Otariidae (eared seals)										
California sea lion	U.S.	59,495	3,591	0	65,455	3,709	0	75,497	3,890	0
Guadalupe fur seal*	Mexico	428	10	0	506	12	0	558	17	0
Northern fur seal	California	8,250	79	0	9,684	100	0	12,163	129	0
Family Phocidae (true seals)										
Harbor seal	California	950	1,466	1	1,138	1,937	1	1,196	2,157	1
Hawaiian monk seal*	Hawaiian	91	40	0	92	44	0	100	63	0
Northern elephant seal	California	21,498	10,452	0	24,582	13,351	1	30,109	16,784	1

*ESA-listed species (all stocks) within the HSTT Study Area. †Only designated stocks are ESA-listed. [1]NSD: No stock designation. PTS: permanent threshold shift; TTS: temporary threshold shift.

E.2 Estimated Impacts Marine Mammal Impacts per Five Year Period from Sonar and Other Transducers Under Navy Training Activities

Table E-2 provides a summary of the estimated number of marine mammal impacts from exposure to sonar and other transducers used during Navy training activities under Alternatives 1 and 2 over the course of five years.

Table E-2: Estimated Marine Mammals Impacts per Five-Year Period from Sonar Training Activities

Species	*Stock*	*Alternative 1 – 5-Year*			*Alternative 2 – 5-Year*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Suborder Mysticeti (baleen whales)							
Family Balaenopteridae (rorquals)							
Blue whale*	Central North Pacific	42	97	0	53	151	0
	Eastern North Pacific	1,827	3,171	0	2,562	4,474	0
Bryde's whale	Eastern Tropical Pacific	37	78	0	46	123	0
	Hawaiian	115	314	0	149	457	0
Fin whale*	California, Oregon, & Washington	2,049	3,400	0	2,834	4,862	0
	Hawaiian	62	71	0	73	86	0
Humpback whale†	California, Oregon, & Washington†	279	2,525	0	356	3,612	3
	Central North Pacific	7,842	15,706	0	9,101	21,776	3
Minke whale	California, Oregon, & Washington	655	2,249	0	913	3,493	0
	Hawaiian	3,462	10,161	2	4,245	14,339	2
Sei whale*	Eastern North Pacific	70	162	0	100	238	0
	Hawaiian	127	326	0	161	449	0
Family Eschrichtiidae							
Gray whale†	Eastern North Pacific	2,509	9,088	7	3,033	11,850	11
	Western North Pacific†	3	11	0	4	14	0
Suborder Odontoceti (toothed whales)							
Family Physeteridae (sperm whale)							
Sperm whale*	California, Oregon, & Washington	6,053	186	0	7,921	267	0
	Hawaiian	6,997	81	0	9,081	119	0

Species	Stock	Alternative 1 – 5-Year			Alternative 2 – 5-Year		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Family Kogiidae (sperm whales)							
Dwarf sperm whale	Hawaiian	14,946	41,963	49	17,193	59,432	68
Pygmy sperm whale	Hawaiian	5,790	16,824	20	6,739	23,609	28
Kogia whales	California, Oregon, & Washington	6,417	20,572	50	8,227	31,538	74
Family Ziphiidae (beaked whales)							
Baird's beaked whale	California, Oregon, & Washington	6,001	43	0	9,091	59	0
Blainville's beaked whale	Hawaiian	16,321	43	0	21,457	59	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0
	Hawaiian	5,488	9	0	7,028	12	0
Longman's beaked whale	Hawaiian	56,966	206	0	75,671	304	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	49,077	425	0	72,299	616	0
Family Delphinidae (dolphins)							
Bottlenose dolphin	California Coastal	752	24	0	758	24	0
	California, Oregon, & Washington Offshore	129,894	12,944	0	176,229	18,221	0
	Hawaiian Pelagic	8,711	340	0	11,168	464	0
	Kauai & Niihau	356	0	0	377	0	0
	Oahu	40,671	177	0	40,941	177	0
	4-Island	739	11	0	754	11	0
	Hawaii	194	13	0	211	27	0
False killer whale†	Hawaii Pelagic	2,906	99	0	3,858	137	0
	Main Hawaiian Islands Insular†	1,873	39	0	2,381	59	0
	Northwestern Hawaiian Islands	1,057	37	0	1,409	51	0
Fraser's dolphin	Hawaiian	119,407	3,339	0	146,716	4,564	0
Killer whale	Eastern North Pacific Offshore	282	44	0	413	73	0

Species	*Stock*	*Alternative 1 – 5-Year*			*Alternative 2 – 5-Year*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
	Eastern North Pacific Transient/West Coast Transient	524	82	0	766	136	0
	Hawaiian	338	14	0	424	21	0
Long-beaked common dolphin	California	518,773	40,017	0	647,923	55,313	0
Melon-headed whale	Hawaiian Islands	9,015	686	0	12,446	859	0
	Kohala Resident	901	12	0	1,055	21	0
Northern right whale dolphin	California, Oregon, & Washington	224,296	28,590	0	302,249	40,037	0
Pacific white-sided dolphin	California, Oregon, & Washington	172,522	22,249	0	233,540	31,717	0
Pantropical spotted dolphin	Hawaii Island	12,036	567	0	14,014	909	0
	Hawaii Pelagic	27,948	1,255	0	38,060	1,786	0
	Oahu	20,463	142	0	20,571	146	0
	4-Island	1,289	6	0	1,357	6	0
Pygmy killer whale	Hawaiian	23,304	1,121	0	29,758	1,573	0
	Tropical	1,941	164	0	2,804	234	0
Risso's dolphin	California, Oregon, & Washington	302,456	35,847	0	402,777	50,398	0
	Hawaiian	26,931	1,210	0	36,139	1,704	0
Rough-toothed dolphin	Hawaiian	17,473	1,033	0	22,716	1,454	0
	NSD[1]	0	0	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	3,734,713	424,461	6	5,223,474	607,478	8
Short-finned pilot whale	California, Oregon, & Washington	4,204	288	0	5,542	401	0
	Hawaiian	35,880	1,181	0	46,118	1,652	0
Spinner dolphin	Hawaii Island	428	5	0	448	6	0
	Hawaii Pelagic	12,322	504	0	17,530	657	0
	Kauai & Niihau	1,385	2	0	1,834	4	0
	Oahu & 4-Island	7,346	79	0	7,516	83	0
Striped dolphin	California, Oregon, & Washington	509,735	41,090	0	736,477	60,512	0
	Hawaiian	21,438	1,088	0	27,710	1,497	0

Species	Stock	Alternative 1 – 5-Year			Alternative 2 – 5-Year		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Family Phocoenidae (porpoises)							
Dall's porpoise	California, Oregon, & Washington	26,564	92,325	278	32,012	134,842	393
Suborder Pinnipedia							
Family Otariidae (eared seals)							
California sea lion	U.S.	307,054	18,188	0	375,420	19,446	0
Guadalupe fur seal*	Mexico	2,334	52	0	2,791	83	0
Northern fur seal	California	43,571	436	0	60,342	647	0
Family Phocidae (true seals)							
Harbor seal	California	5,121	8,309	4	5,898	10,778	6
Hawaiian monk seal*	Hawaiian	455	192	0	496	305	0
Northern elephant seal	California	112,002	57,762	3	149,089	83,680	4

*ESA-listed species (all stocks) within the HSTT Study Area.

†Only designated stocks are ESA-listed.

[1]NSD: No stock designation.

PTS = permanent threshold shift; TTS = temporary threshold shift.

E.3 Estimated Marine Mammal Impacts from Sonar and Other Transducers Under Navy Testing Activities

Table E-3 provides a summary of the estimated number of marine mammal impacts from exposure to sonar and other transducers used during Navy testing activities under Alternatives 1 and 2 over the course of a year.

Table E-3: Estimated Marine Mammals Impacts per Year from Sonar Testing Activities

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Suborder Mysticeti (baleen whales)										
Family Balaenopteridae (rorquals)										
Blue whale*	Central North Pacific	6	8	0	6	8	0	6	8	0
	Eastern North Pacific	367	436	0	383	444	0	383	444	0
Bryde's whale	Eastern Tropical Pacific	6	8	0	6	8	0	6	8	0
	Hawaiian	15	26	0	15	26	0	15	26	0
Fin whale*	California, Oregon, & Washington	356	583	0	378	595	0	380	596	0
	Hawaiian	7	8	0	7	8	0	7	8	0
Humpback whale†	California, Oregon, & Washington†	130	309	0	133	312	0	133	311	0
	Central North Pacific	1,145	2,284	0	1,194	2,291	0	1,193	2,289	0
Minke whale	California, Oregon, & Washington	111	154	0	118	156	0	118	156	0
	Hawaiian	467	962	0	483	966	0	485	966	0
Sei whale*	Eastern North Pacific	11	14	0	12	14	0	11	15	0
	Hawaiian	18	30	0	18	31	0	19	30	0
Family Eschrichtiidae										
Gray whale†	Eastern North Pacific	719	1,127	1	742	1,147	1	743	1,148	1
	Western North Pacific†	1	1	0	1	1	0	1	1	0
Suborder Odontoceti (toothed whales)										
Family Physeteridae (sperm whale)										
Sperm whale*	California, Oregon, & Washington	1,045	10	0	1,084	10	0	1,093	10	0
	Hawaiian	750	7	0	775	7	0	775	7	0
Family Kogiidae (sperm whales)										

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Dwarf sperm whale	Hawaiian	2,525	3,629	9	2,633	3,638	9	2,639	3,631	9
Pygmy sperm whale	Hawaiian	1,023	1,447	4	1,067	1,454	4	1,069	1,448	4
Kogia whales	California, Oregon, & Washington	1,250	1,644	5	1,365	1,678	5	1,373	1,672	5
Family Ziphiidae (beaked whales)										
Baird's beaked whale	California, Oregon, & Washington	678	4	0	723	4	0	738	4	0
Blainville's beaked whale	Hawaiian	1,638	4	0	1,694	4	0	1,688	4	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0	0
	Hawaiian	541	1	0	560	1	0	560	1	0
Longman's beaked whale	Hawaiian	5,999	23	0	6,199	23	0	6,174	23	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	6,394	20	0	6,840	20	0	6,886	20	0
Family Delphinidae (dolphins)										
Bottlenose dolphin	California Coastal	1,560	33	0	1,561	33	0	1,561	33	0
	California, Oregon, & Washington Offshore	21,798	667	0	22,747	669	0	22,868	667	0
	Hawaiian Pelagic	1,174	39	0	1,203	39	0	1,195	39	0
	Kauai & Niihau	409	31	0	460	31	0	410	31	0
	Oahu	444	15	0	460	15	0	462	15	0
	4-Island	135	7	0	197	7	0	197	7	0
	Hawaii	35	3	0	35	3	0	35	3	0
False killer whale†	Hawaii Pelagic	313	13	0	327	13	0	320	13	0
	Main Hawaiian Islands Insular†	173	6	0	178	6	0	177	6	0
	Northwestern Hawaiian Islands	115	5	0	120	5	0	117	5	0

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Fraser's dolphin	Hawaiian	11,857	368	0	12,287	369	0	12,133	368	0
Killer whale	Eastern North Pacific Offshore	33	1	0	33	1	0	34	1	0
	Eastern North Pacific Transient/West Coast Transient	61	2	0	62	2	0	64	2	0
	Hawaiian	38	2	0	38	2	0	39	2	0
Long-beaked common dolphin	California	108,573	4,399	0	113,786	4,397	0	113,672	4,399	0
Melon-headed whale	Hawaiian Islands	1,064	39	0	1,119	38	0	1,111	39	0
	Kohala Resident	149	7	0	161	7	0	151	7	0
Northern right whale dolphin	California, Oregon, & Washington	38,513	1,337	0	39,922	1,328	0	40,240	1,337	0
Pacific white-sided dolphin	California, Oregon, & Washington	29,325	919	0	30,487	916	0	30,677	920	0
Pantropical spotted dolphin	Hawaii Island	1,266	105	0	1,304	105	0	1,295	105	0
	Hawaii Pelagic	3,432	132	0	3,505	133	0	3,508	132	0
	Oahu	176	15	0	187	15	0	189	15	0
	4-Island	304	15	0	441	15	0	439	15	0
Pygmy killer whale	Hawaiian	2,548	95	0	2,612	95	0	2,617	95	0
	Tropical	258	12	0	277	12	0	274	12	0
Risso's dolphin	California, Oregon, & Washington	46,491	1,724	0	48,211	1,720	0	48,456	1,725	0
	Hawaiian	2,627	110	0	2,696	110	0	2,695	110	0
Rough-toothed dolphin	Hawaiian	2,042	92	0	2,099	92	0	2,102	92	0
	NSD[1]	0	0	0	0	0	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	515,030	18,786	0	540,773	18,796	0	542,718	18,794	0

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Short-finned pilot whale	California, Oregon, & Washington	831	56	0	867	56	0	867	56	0
	Hawaiian	4,081	110	0	4,225	110	0	4,197	110	0
Spinner dolphin	Hawaii Island	187	11	0	191	11	0	190	11	0
	Hawaii Pelagic	1,336	36	0	1,359	36	0	1,367	36	0
	Kauai & Niihau	1,249	62	0	1,374	62	0	1,253	62	0
	Oahu & 4-Island	249	13	0	314	13	0	315	13	0
Striped dolphin	California, Oregon, & Washington	50,550	2,031	0	53,992	2,022	0	54,545	2,032	0
	Hawaiian	2,247	92	0	2,302	92	0	2,316	92	0
Family Phocoenidae (porpoises)										
Dall's porpoise	California, Oregon, & Washington	7,816	8,213	17	8,312	8,182	17	8,351	8,290	17
Suborder Pinnipedia										
Family Otariidae (eared seals)										
California sea lion	U.S.	46,695	921	1	47,719	920	1	47,774	921	1
Guadalupe fur seal*	Mexico	871	3	0	936	3	0	942	3	0
Northern fur seal	California	5,219	23	0	5,479	23	0	5,501	23	0
Family Phocidae (true seals)										
Harbor seal	California	1,235	1,023	0	1,280	1,025	0	1,281	1,025	0
Hawaiian monk seal*	Hawaiian	34	12	0	48	12	0	48	12	0
Northern elephant seal	California	17,060	4,276	0	18,208	4,302	0	18,277	4,303	0

*ESA-listed species (all stocks) within the HSTT Study Area. †Only designated stocks are ESA-listed.
[1]NSD = No stock designation.
PTS = permanent threshold shift; TTS = temporary threshold shift.

E.4 Estimated Marine Mammal Impacts per Five Year Period from Sonar and Other Transducers Under Navy Testing Activities

Table E-4 provides a summary of the estimated number of marine mammal impacts from exposure to sonar and other transducers used during Navy testing activities under Alternatives 1 and 2 over the course of five years.

Table E-4: Estimated Marine Mammals Impacts per Five-Year Period from Sonar Testing Activities

Species	*Stock*	*Alternative 1 – 5-Year*			*Alternative 2 – 5-Year*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Suborder Mysticeti (baleen whales)							
Family Balaenopteridae (rorquals)							
Blue whale*	Central North Pacific	28	37	0	29	38	0
	Eastern North Pacific	1,842	2,135	0	1,904	2,171	0
Bryde's whale	Eastern Tropical Pacific	31	38	0	32	38	0
	Hawaiian	74	120	0	76	121	0
Fin whale*	California, Oregon, & Washington	1,791	2,870	0	1,885	2,926	0
	Hawaiian	35	39	0	36	39	0
Humpback whale†	California, Oregon, & Washington†	651	1,510	0	661	1,517	0
	Central North Pacific	5,768	10,838	0	5,960	10,916	0
Minke whale	California, Oregon, & Washington	562	737	0	589	746	0
	Hawaiian	2,347	4,486	0	2,418	4,536	0
Sei whale*	Eastern North Pacific	54	70	0	57	70	0
	Hawaiian	90	139	0	93	141	0
Family Eschrichtiidae							
Gray whale†	Eastern North Pacific	3,608	5,517	3	3,708	5,605	3
	Western North Pacific†	4	7	0	4	7	0
Suborder Odontoceti (toothed whales)							
Family Physeteridae (sperm whale)							
Sperm whale*	California, Oregon, & Washington	5,208	44	0	5,407	44	0
	Hawaiian	3,700	31	0	3,806	31	0

Species	Stock	Alternative 1 – 5-Year			Alternative 2 – 5-Year		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Family Kogiidae (sperm whales)							
Dwarf sperm whale	Hawaiian	12,772	16,929	42	13,208	17,059	42
Pygmy sperm whale	Hawaiian	5,174	6,737	18	5,348	6,792	18
Kogia whales	California, Oregon, & Washington	6,379	7,920	24	6,854	8,075	24
Family Ziphiidae (beaked whales)							
Baird's beaked whale	California, Oregon, & Washington	3,400	18	0	3,646	18	0
Blainville's beaked whale	Hawaiian	8,098	19	0	8,313	19	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0
	Hawaiian	2,670	5	0	2,751	5	0
Longman's beaked whale	Hawaiian	29,640	103	0	30,396	104	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	32,081	93	0	34,057	94	0
Family Delphinidae (dolphins)							
Bottlenose dolphin	California Coastal	7,802	164	0	7,806	164	0
	California, Oregon, & Washington Offshore	109,203	3,106	0	113,511	3,123	0
	Hawaiian Pelagic	5,834	179	0	5,923	180	0
	Kauai & Niihau	2,069	92	0	2,072	92	0
	Oahu	2,218	76	0	2,293	76	0
	4-Island	736	33	0	982	33	0
	Hawaii	172	14	0	173	14	0
False killer whale†	Hawaii Pelagic	1,560	62	0	1,591	62	0
	Main Hawaiian Islands Insular†	866	26	0	881	26	0
	Northwestern Hawaiian Islands	571	23	0	582	23	0
Fraser's dolphin	Hawaiian	58,632	1,673	0	59,837	1,683	0
Killer whale	Eastern North Pacific Offshore	163	3	0	169	3	0

Species	Stock	Alternative 1 – 5-Year			Alternative 2 – 5-Year		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
	Eastern North Pacific Transient/West Coast Transient	303	6	0	313	6	0
	Hawaiian	189	9	0	193	10	0
Long-beaked common dolphin	California	546,154	21,403	0	566,667	21,426	0
Melon-headed whale	Hawaiian Islands	5,271	152	0	5,466	154	0
	Kohala Resident	759	36	0	767	36	0
Northern right whale dolphin	California, Oregon, & Washington	192,644	6,132	0	199,615	6,168	0
Pacific white-sided dolphin	California, Oregon, & Washington	146,709	4,191	0	152,185	4,218	0
Pantropical spotted dolphin	Hawaii Island	6,301	490	0	6,426	491	0
	Hawaii Pelagic	17,017	591	0	17,340	604	0
	Oahu	883	74	0	937	74	0
	4-Island	1,652	74	0	2,188	74	0
Pygmy killer whale	Hawaiian	12,586	419	0	12,887	427	0
	Tropical	1,295	56	0	1,361	56	0
Risso's dolphin	California, Oregon, & Washington	232,439	7,945	0	240,360	7,982	0
	Hawaiian	12,995	492	0	13,289	499	0
Rough-toothed dolphin	Hawaiian	10,125	399	0	10,382	404	0
	NSD[1]	0	0	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	2,582,358	88,389	0	2,694,739	89,093	0
Short-finned pilot whale	California, Oregon, & Washington	4,168	272	0	4,315	272	0
	Hawaiian	20,261	484	0	20,762	490	0
Spinner dolphin	Hawaii Island	936	57	0	949	57	0
	Hawaii Pelagic	6,606	161	0	6,743	164	0
	Kauai & Niihau	6,340	190	0	6,356	190	0
	Oahu & 4-Island	1,306	65	0	1,572	65	0
Striped dolphin	California, Oregon, & Washington	253,588	9,287	0	269,681	9,428	0
	Hawaiian	11,120	417	0	11,418	423	0

Species	Stock	Alternative 1 – 5-Year			Alternative 2 – 5-Year		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Family Phocoenidae (porpoises)							
Dall's porpoise	California, Oregon, & Washington	39,593	39,225	78	41,691	39,682	78
Suborder Pinnipedia							
Family Otariidae (eared seals)							
California sea lion	U.S.	233,207	4,542	4	237,668	4,544	4
Guadalupe fur seal*	Mexico	4,344	13	0	4,641	13	0
Northern fur seal	California	26,049	105	0	27,200	106	0
Family Phocidae (true seals)							
Harbor seal	California	6,211	4,945	0	6,394	4,957	0
Hawaiian monk seal*	Hawaiian	184	45	0	240	45	0
Northern elephant seal	California	86,031	20,431	0	90,843	20,675	0

*ESA-listed species (all stocks) within the HSTT Study Area.

†Only designated stocks are ESA-listed.

[1]NSD: No stock designation. PTS = permanent threshold shift; TTS = temporary threshold shift.

E.5 Estimated Marine Mammal Impacts from Air Guns Under Navy Training Activities

There are no air gun activities under training; therefore, there would be no takes.

E.6 Estimated Marine Mammal Impacts from Air Guns Under Navy Testing Activities

Table E-5 provides a summary of the estimated number of marine mammal impacts from exposure to air guns used during Navy testing activities under Alternatives 1 and 2 over the course of a year. Most species and stocks in the Study Area either do not occur in areas where air gun activities take place, or did not result in any estimated impact based on the quantitative analysis.

Table E-5: Estimated Marine Mammals Impacts per Year from Air Gun Activities

Species	*Stock*	*Alternative 1 – Minimum*			*Alternative 1 – Maximum*			*Alternative 2*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Suborder Mysticeti (baleen whales)										
Family Balaenopteridae (rorquals)										
Blue whale*	Eastern North Pacific	1	0	0	1	0	0	1	0	0
Family Eschrichtiidae										
Gray whale	Eastern North Pacific	1	0	0	1	0	0	1	0	0
Suborder Odontoceti (toothed whales)										
Family Kogiidae (sperm whales)										
Dwarf sperm whale	Hawaiian	0	6	1	0	6	1	0	6	1
Pygmy sperm whale	Hawaiian	0	3	1	0	3	1	0	3	1
Kogia whales	California, Oregon, & Washington	0	1	1	0	1	1	0	1	1
Family Delphinidae (dolphins)										
Bottlenose dolphin	California, Oregon, & Washington Offshore	6	0	0	6	0	0	6	0	0
Long-beaked common dolphin	California	51	0	0	51	0	0	51	0	0
Northern right whale dolphin	California, Oregon, & Washington	9	0	0	9	0	0	9	0	0
Pacific white-sided dolphin	California, Oregon, & Washington	6	0	0	6	0	0	6	0	0
Risso's dolphin	California, Oregon, & Washington	23	0	0	23	0	0	23	0	0
Short-beaked common dolphin	California, Oregon, & Washington	198	2	1	198	2	1	198	2	1
Family Phocoenidae (porpoises)										
Dall's porpoise	California, Oregon, & Washington	3	5	2	3	5	2	3	5	2
Suborder Pinnipedia										

Species	Stock	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Family Otariidae (eared seals)										
California sea lion	U.S.	6	0	0	6	0	0	6	0	0
Northern fur seal	California	1	0	0	1	0	0	1	0	0
Family Phocidae (true seals)										
Harbor seal	California	3	0	0	3	0	0	3	0	0
Northern elephant seal	California	9	2	0	9	2	0	9	2	0

* ESA-listed species (all stocks) within the HSTT Study Area. PTS = permanent threshold shift; TTS = temporary threshold shift.

E.7 Estimated Marine Mammal Impacts per Five year Period from Air Guns Under Navy Testing Activities

Table E-6 provides a summary of the estimated number of marine mammal impacts from exposure to air guns used during Navy testing activities under Alternatives 1 and 2 over the course of five years. Most species or stock in the Study Area either do not occur in areas where air gun activities take place, or did not result in any estimated impact based on the quantitative analysis.

Table E-6: Estimated Marine Mammals Impacts per Five-Year Period from Air Gun Activities

Species	*Stock*	*Alternative 1 – 5-Year*			*Alternative 2 – 5-Year*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Suborder Mysticeti (baleen whales)							
Family Balaenopteridae (rorquals)							
Blue whale*	Eastern North Pacific	3	0	0	3	0	0
Family Eschrichtiidae							
Gray whale	Eastern North Pacific	6	0	0	6	0	0
Suborder Odontoceti (toothed whales)							
Family Kogiidae (sperm whales)							
Dwarf sperm whale	Hawaiian	0	29	6	0	29	6
Pygmy sperm whale	Hawaiian	0	13	3	0	13	3
Kogia whales	California, Oregon, & Washington	0	4	3	0	4	3
Family Delphinidae (dolphins)							
Bottlenose dolphin	California, Oregon, & Washington Offshore	31	0	0	31	0	0
Long-beaked common dolphin	California	254	0	0	254	0	0
Northern right whale dolphin	California, Oregon, & Washington	44	0	0	44	0	0
Pacific white-sided dolphin	California, Oregon, & Washington	31	0	0	31	0	0
Risso's dolphin	California, Oregon, & Washington	113	0	0	113	0	0
Short-beaked common dolphin	California, Oregon, & Washington	992	10	7	992	10	7
Family Phocoenidae (porpoises)							

Species	Stock	Alternative 1 – 5-Year			Alternative 2 – 5-Year		
		Behavioral Response	TTS	PTS	Behavioral Response	TTS	PTS
Dall's porpoise	California, Oregon, & Washington	14	26	10	14	26	10
Suborder Pinnipedia							
Family Otariidae (eared seals)							
California sea lion	U.S.	30	0	0	30	0	0
Northern fur seal	California	6	0	0	6	0	0
Family Phocidae (true seals)							
Harbor seal	California	16	0	0	16	0	0
Northern elephant seal	California	45	10	0	45	10	0

* ESA-listed species (all stocks) within the HSTT Study Area. PTS = permanent threshold shift; TTS = temporary threshold shift.

E.8 Estimated Marine Mammal Impacts from Pile Driving Under Navy Training Activities

Table E-7 provides a summary of the estimated number of marine mammal impacts from exposure to pile driving used during Navy training activities under Alternatives 1 and 2 over the course of a year. Pile driving only occurs in the Southern California region of the Study Area, therefore species or stocks that occur near or around Hawaii would not be impacted. Most species or stocks in the Study Area either do not occur in areas where pile driving activities take place, or did not result in any estimated impact based on the quantitative analysis.

Table E-7: Estimated Marine Mammals Impacts per Year from Pile Driving Activities

Species	*Stock*	*Alternative 1 – Minimum*			*Alternative 1 – Maximum*			*Alternative 2*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Suborder Odontoceti (toothed whales)										
Family Delphinidae (dolphins)										
Bottlenose dolphin	California Coastal	20	0	0	20	0	0	20	0	0
	California, Oregon, & Washington Offshore	8	0	0	8	0	0	8	0	0
Long-beaked common dolphin	California	82	0	0	82	0	0	82	0	0
Northern right whale dolphin	California, Oregon, & Washington	12	0	0	12	0	0	12	0	0
Pacific white-sided dolphin	California, Oregon, & Washington	6	0	0	6	0	0	6	0	0
Risso's dolphin	California, Oregon, & Washington	18	0	0	18	0	0	18	0	0
Short-beaked common dolphin	California, Oregon, & Washington	238	0	0	238	0	0	238	0	0
Striped dolphin	California, Oregon, & Washington	2	0	0	2	0	0	2	0	0
Family Phocoenidae (porpoises)										
Dall's porpoise	California, Oregon, & Washington	2	2	0	2	2	0	2	2	0
Suborder Pinnipedia										
Family Otariidae (eared seals)										
California sea lion	U.S.	150	0	0	150	0	0	150	0	0
Northern fur seal	California	2	0	0	2	0	0	2	0	0

Species	*Stock*	*Alternative 1 – Minimum*			*Alternative 1 – Maximum*			*Alternative 2*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Family Phocidae (true seals)										
Harbor seal	California	2	0	0	2	0	0	2	0	0
Northern elephant seal	California	12	0	0	12	0	0	12	0	0

Notes: PTS = permanent threshold shift; TTS = temporary threshold shift

E.9 Estimated Marine Mammal Impacts per Five year Period from Pile Driving Under Navy Training Activities

Table E-8 provides a summary of the estimated number of marine mammal impacts from exposure to pile driving used during Navy training activities under Alternatives 1 and 2 over the course of five years. Pile driving only occurs in the Southern California region of the Study Area, therefore species or stocks that occur near or around Hawaii would not be impacted. Most species or stocks in the Study Area either do not occur in areas where pile driving activities take place, or did not result in any estimated impact based on the quantitative analysis.

Table E-8: Estimated Marine Mammals Impacts per Five-Year Period from Pile Driving Activities

Species	*Stock*	*Alternative 1 – 5-Year*			*Alternative 2 – 5-Year*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Suborder Odontoceti (toothed whales)							
Family Delphinidae (dolphins)							
Bottlenose dolphin	California Coastal	100	0	0	100	0	0
	California, Oregon, & Washington Offshore	40	0	0	40	0	0
Long-beaked common dolphin	California	410	0	0	410	0	0
Northern right whale dolphin	California, Oregon, & Washington	60	0	0	60	0	0
Pacific white-sided dolphin	California, Oregon, & Washington	30	0	0	30	0	0
Risso's dolphin	California, Oregon, & Washington	90	0	0	90	0	0
Short-beaked common dolphin	California, Oregon, & Washington	1190	0	0	1190	0	0
Striped dolphin	California, Oregon, & Washington	10	0	0	10	0	0
Family Phocoenidae (porpoises)							
Dall's porpoise	California, Oregon, & Washington	10	10	0	10	10	0
Suborder Pinnipedia							
Family Otariidae (eared seals)							
California sea lion	U.S.	750	0	0	750	0	0
Northern fur seal	California	10	0	0	10	0	0
Family Phocidae (true seals)							

Species	*Stock*	*Alternative 1 – 5-Year*			*Alternative 2 – 5-Year*		
		Behavioral Response	*TTS*	*PTS*	*Behavioral Response*	*TTS*	*PTS*
Harbor seal	California	10	0	0	10	0	0
Northern elephant seal	California	60	0	0	60	0	0

Notes: PTS = permanent threshold shift; TTS = temporary threshold shift

E.10 Estimated Marine Mammal Impacts from Pile Driving Under Navy Testing Activities

There are no pile driving activities under testing; therefore, there would be no takes.

E.11 Estimated Marine Mammal Impacts from Explosives Under Navy Training Activities

Table E-9 provides a summary of the estimated number of marine mammal impacts from exposure to explosives used during Navy training activities under Alternatives 1 and 2 over the course of a year. In addition to impacts listed in Table E-9, over the course of a year, the quantitative analysis estimates mortality of one short-beaked common dolphin and one California sea lion (a total of two marine mammals) as a result of exposure to explosive training activities.

Table E-9: Estimated Marine Mammals Impacts per Year from Explosive Training Activities

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Suborder Mysticeti (baleen whales)													
Family Balaenopteridae (rorquals)													
Blue whale*	Central North Pacific	0	0	0	0	0	0	0	0	0	0	0	0
	Eastern North Pacific	0	8	1	0	0	8	1	0	0	8	1	0
Bryde's whale	Eastern Tropical Pacific	0	1	0	0	0	1	0	0	0	1	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Fin whale*	California, Oregon, & Washington	0	7	0	0	0	7	0	0	0	7	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Humpback whale†	California, Oregon, & Washington†	0	13	1	0	0	13	1	0	0	13	1	0
	Central North Pacific	0	21	1	0	0	22	1	0	0	22	1	0
Minke whale	California, Oregon, & Washington	0	3	1	0	0	4	1	0	0	4	1	0
	Hawaiian	0	8	0	0	0	10	0	0	0	10	0	0
Sei whale*	Eastern North Pacific	0	1	0	0	0	1	0	0	0	1	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Family Eschrichtiidae													
Gray whale†	Eastern North Pacific	0	56	3	0	0	56	3	0	0	56	3	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
	Western North Pacific†	0	0	0	0	0	0	0	0	0	0	0	0
Suborder Odontoceti (toothed whales)													
Family Physeteridae (sperm whale)													
Sperm whale*	California, Oregon, & Washington	2	1	0	0	2	1	0	0	2	1	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Family Kogiidae (sperm whales)													
Dwarf sperm whale	Hawaiian	29	102	20	0	31	106	21	0	31	106	21	0
Pygmy sperm whale	Hawaiian	13	31	9	0	14	32	10	0	14	32	10	0
Kogia whales	California, Oregon, & Washington	32	44	11	0	33	45	11	0	33	45	11	0
Family Ziphiidae (beaked whales)													
Baird's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0	0	0	0	0
Blainville's beaked whale	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Longman's beaked whale	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	1	2	0	0	1	2	0	0	1	2	0	0
Family Delphinidae (dolphins)													
Bottlenose dolphin	California Coastal	0	0	0	0	0	0	0	0	0	0	0	0
	California, Oregon, & Washington Offshore	6	12	2	0	6	12	2	0	6	12	2	0
	Hawaiian Pelagic	0	1	0	0	0	1	0	0	0	1	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0	0	0	0	0
	Oahu	3	11	1	0	3	11	1	0	3	11	1	0
	4-Island	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaii	0	0	0	0	0	0	0	0	0	0	0	0
False killer whale†	Hawaii Pelagic	0	0	0	0	0	0	0	0	0	0	0	0
	Main Hawaiian Islands Insular†	0	1	0	0	0	1	0	0	0	1	0	0
	Northwestern Hawaiian Islands	0	0	0	0	0	0	0	0	0	0	0	0
Fraser's dolphin	Hawaiian	3	5	1	0	3	5	1	0	3	5	1	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Killer whale	Eastern North Pacific Offshore	0	0	0	0	0	0	0	0	0	0	0	0
	Eastern North Pacific Transient/West Coast Transient	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Long-beaked common dolphin	California	27	43	13	1	27	43	13	1	27	43	13	1
Melon-headed whale	Hawaiian Islands	0	0	0	0	1	1	0	0	1	1	0	0
	Kohala Resident	0	0	0	0	0	0	0	0	0	0	0	0
Northern right whale dolphin	California, Oregon, & Washington	8	18	7	1	8	18	7	1	8	18	7	1
Pacific white-sided dolphin	California, Oregon, & Washington	4	13	3	0	4	13	3	0	4	13	3	0
Pantropical spotted dolphin	Hawaii Island	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaii Pelagic	0	1	0	0	0	1	0	0	0	1	0	0
	Oahu	0	1	0	0	0	1	0	0	0	1	0	0
	4-Island	0	0	0	0	0	0	0	0	0	0	0	0
Pygmy killer whale	Hawaiian	0	1	0	0	0	1	0	0	0	1	0	0
	Tropical	0	0	0	0	0	0	0	0	0	0	0	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Risso's dolphin	California, Oregon, & Washington	8	27	6	0	8	27	6	0	8	27	6	0
	Hawaiian	0	0	0	0	0	1	0	0	0	1	0	0
Rough-toothed dolphin	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
	NSD[1]	0	0	0	0	0	0	0	0	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	47	139	38	6	50	142	38	6	50	142	38	6
Short-finned pilot whale	California, Oregon, & Washington	0	0	1	0	0	0	1	0	0	0	1	0
	Hawaiian	1	2	0	0	1	2	0	0	1	2	0	0
Spinner dolphin	Hawaii Island	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaii Pelagic	0	0	0	0	0	0	0	0	0	0	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0	0	0	0	0
	Oahu & 4-Island	1	3	1	0	1	3	1	0	1	3	1	0
Striped dolphin	California, Oregon, & Washington	6	14	1	0	7	14	1	0	7	14	1	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Family Phocoenidae (porpoises)													
Dall's porpoise	California, Oregon, & Washington	150	329	73	0	150	331	73	0	150	331	73	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Suborder Pinnipedia													
Family Otariidae (eared seals)													
California sea lion	U.S.	78	151	82	8	78	151	82	8	78	151	82	8
Guadalupe fur seal*	Mexico	0	0	0	0	0	0	0	0	0	0	0	0
Northern fur seal	California	0	0	0	0	0	0	0	0	0	0	0	0
Family Phocidae (true seals)													
Harbor seal	California	18	24	6	0	18	24	6	0	18	24	6	0
Hawaiian monk seal*	Hawaiian	0	3	1	0	0	3	1	0	0	3	1	0
Northern elephant seal	California	46	176	68	2	47	177	69	2	47	177	69	2

* ESA-listed species (all stocks) within the HSTT Study Area.

†Only designated stocks are ESA-listed.

[1]NSD = No stock designation; PTS = permanent threshold shift; TTS = temporary threshold shift.

E.12 Estimated Marine Mammal Impacts per Five year Period from Explosives Under Navy Training Activities

Table E-10 provides a summary of the estimated number of marine mammal impacts from exposure to explosives used during Navy training activities under Alternatives 1 and 2 over the course of five years. In addition to impacts listed in Table E-10, over the course of a five-year period, the quantitative analysis estimates mortality of three short-beaked common dolphins and four California sea lions (a total of seven marine mammals) as a result of exposure to explosive training activities.

Table E-10: Estimated Marine Mammals Impacts per Five-Year Period from Explosive Training Activities

Species	*Stock*	*Alternative 1 – 5-Year*				*Alternative 2 – 5-Year*			
		Behavioral Response	*TTS*	*PTS*	*Injury*	*Behavioral Response*	*TTS*	*PTS*	*Injury*
Suborder Mysticeti (baleen whales)									
Family Balaenopteridae (rorquals)									
Blue whale*	Central North Pacific	0	0	0	0	0	0	0	0
	Eastern North Pacific	0	38	3	0	0	40	3	0
Bryde's whale	Eastern Tropical Pacific	0	3	0	0	0	3	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Fin whale*	California, Oregon, & Washington	0	33	0	0	0	34	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Humpback whale†	California, Oregon, & Washington†	0	60	3	0	0	61	3	0
	Central North Pacific	0	106	5	0	0	112	5	0
Minke whale	California, Oregon, & Washington	0	16	4	0	0	17	4	0
	Hawaiian	0	41	0	0	0	51	0	0
Sei whale*	Eastern North Pacific	0	4	0	0	0	4	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Family Eschrichtiidae									
Gray whale†	Eastern North Pacific	0	263	12	0	0	263	12	0
	Western North Pacific†	0	0	0	0	0	0	0	0
Suborder Odontoceti (toothed whales)									
Family Physeteridae (sperm whale)									
Sperm whale*	California, Oregon, & Washington	12	6	0	0	12	6	0	0
	Hawaiian	0	0	0	0	0	0	0	0

Species	Stock	Alternative 1 – 5-Year				Alternative 2 – 5-Year			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Family Kogiidae (sperm whales)									
Dwarf sperm whale	Hawaiian	148	514	99	0	157	528	105	0
Pygmy sperm whale	Hawaiian	64	155	44	0	68	162	48	0
Kogia whales	California, Oregon, & Washington	160	217	55	0	162	221	56	0
Family Ziphiidae (beaked whales)									
Baird's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0
Blainville's beaked whale	Hawaiian	0	0	0	0	0	0	0	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Longman's beaked whale	Hawaiian	0	0	0	0	0	0	0	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	5	9	0	0	5	9	0	0
Family Delphinidae (dolphins)									
Bottlenose dolphin	California Coastal	0	0	0	0	0	0	0	0
	California, Oregon, & Washington Offshore	29	59	9	0	30	59	9	0
	Hawaiian Pelagic	0	4	0	0	0	4	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0
	Oahu	13	57	5	0	13	57	5	0
	4-Island	0	0	0	0	0	0	0	0
	Hawaii	0	0	0	0	0	0	0	0
False killer whale†	Hawaii Pelagic	0	0	0	0	0	0	0	0
	Main Hawaiian Islands Insular†	0	3	0	0	0	3	0	0

Species	*Stock*	*Alternative 1 – 5-Year*				*Alternative 2 – 5-Year*			
		Behavioral Response	*TTS*	*PTS*	*Injury*	*Behavioral Response*	*TTS*	*PTS*	*Injury*
	Northwestern Hawaiian Islands	0	0	0	0	0	0	0	0
Fraser's dolphin	Hawaiian	13	25	3	0	13	25	3	0
Killer whale	Eastern North Pacific Offshore	0	0	0	0	0	0	0	0
	Eastern North Pacific Transient/West Coast Transient	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Long-beaked common dolphin	California	132	208	64	5	132	208	64	5
Melon-headed whale	Hawaiian Islands	2	2	0	0	4	4	0	0
	Kohala Resident	0	0	0	0	0	0	0	0
Northern right whale dolphin	California, Oregon, & Washington	35	87	34	6	36	87	34	6
Pacific white-sided dolphin	California, Oregon, & Washington	20	61	12	0	20	61	13	0
Pantropical spotted dolphin	Hawaii Island	0	0	0	0	0	0	0	0
	Hawaii Pelagic	0	4	0	0	0	4	0	0
	Oahu	0	5	0	0	0	5	0	0
	4-Island	0	0	0	0	0	0	0	0
Pygmy killer whale	Hawaiian	0	3	0	0	0	4	0	0
	Tropical	0	0	0	0	0	0	0	0
Risso's dolphin	California, Oregon, & Washington	37	130	30	0	37	130	30	0
	Hawaiian	0	2	0	0	0	3	0	0
Rough-toothed dolphin	Hawaiian	0	0	0	0	0	0	0	0
	NSD[1]	0	0	0	0	0	0	0	0

Species	Stock	Alternative 1 – 5-Year				Alternative 2 – 5-Year			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Short-beaked common dolphin	California, Oregon, & Washington	232	687	183	27	245	697	186	28
Short-finned pilot whale	California, Oregon, & Washington	0	0	5	0	0	0	5	0
	Hawaiian	6	10	0	0	6	10	0	0
Spinner dolphin	Hawaii Island	0	0	0	0	0	0	0	0
	Hawaii Pelagic	0	0	0	0	0	0	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0
	Oahu & 4-Island	4	16	5	0	4	16	5	0
Striped dolphin	California, Oregon, & Washington	32	69	3	0	34	71	3	0
	Hawaiian	0	0	0	0	0	0	0	0
Family Phocoenidae (porpoises)									
Dall's porpoise	California, Oregon, & Washington	730	1,617	356	0	732	1,622	357	0
Suborder Pinnipedia									
Family Otariidae (eared seals)									
California sea lion	U.S.	390	754	409	38	391	754	410	38
Guadalupe fur seal*	Mexico	0	0	0	0	0	0	0	0
Northern fur seal	California	0	0	0	0	0	0	0	0
Family Phocidae (true seals)									
Harbor seal	California	80	116	30	0	80	116	30	0
Hawaiian monk seal*	Hawaiian	0	15	3	0	0	15	3	0
Northern elephant seal	California	225	877	338	8	228	882	343	8

*ESA-listed species (all stocks) within the HSTT Study Area. †Only designated stocks are ESA-listed. [1]NSD: No stock designation. PTS: permanent threshold shift; TTS: temporary threshold shift.

E.13 Estimated Marine Mammal Impacts from Explosives Under Navy Testing Activities

Table E-11 provides a summary of the estimated number of marine mammal impacts from exposure to explosives used during Navy testing activities under Alternatives 1 and 2 over the course of a year. In addition to impacts listed in Table E-11 over the course of a year, the quantitative analysis estimates mortality of one short-beaked common dolphin as a result of exposure to explosive testing activities.

Table E-11: Estimated Marine Mammals Impacts per Year for Explosive Testing Activities

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Suborder Mysticeti (baleen whales)													
Family Balaenopteridae (rorquals)													
Blue whale*	Central North Pacific	0	0	0	0	0	0	0	0	0	0	0	0
	Eastern North Pacific	0	5	0	0	0	5	0	0	0	5	0	0
Bryde's whale	Eastern Tropical Pacific	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Fin whale*	California, Oregon, & Washington	0	7	1	0	0	7	1	0	0	7	1	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Humpback whale†	California, Oregon, & Washington†	0	3	0	0	0	4	0	0	0	4	0	0
	Central North Pacific	0	37	2	0	0	37	2	0	0	37	2	0
Minke whale	California, Oregon, & Washington	0	2	0	0	0	2	0	0	0	2	0	0
	Hawaiian	0	18	1	0	0	18	1	0	0	18	1	0
Sei whale*	Eastern North Pacific	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Family Eschrichtiidae													
Gray whale†	Eastern North Pacific	0	29	1	0	0	30	1	0	0	30	1	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
	Western North Pacific†	0	0	0	0	0	0	0	0	0	0	0	0
Suborder Odontoceti (toothed whales)													
Family Physeteridae (sperm whale)													
Sperm whale*	California, Oregon, & Washington	0	1	0	0	0	2	0	0	0	2	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Family Kogiidae (sperm whales)													
Dwarf sperm whale	Hawaiian	82	100	19	0	82	100	19	0	82	100	19	0
Pygmy sperm whale	Hawaiian	34	37	8	0	34	37	8	0	34	37	8	0
Kogia whales	California, Oregon, & Washington	31	34	7	0	35	41	9	0	35	41	9	0
Family Ziphiidae (beaked whales)													
Baird's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0	0	0	0	0
Blainville's beaked whale	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Longman's beaked whale	Hawaiian	0	1	0	0	0	1	0	0	0	1	0	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	1	1	0	0	1	2	0	0	1	2	0	0
Family Delphinidae (dolphins)													
Bottlenose dolphin	California Coastal	1	0	0	0	1	0	0	0	1	0	0	0
	California, Oregon, & Washington Offshore	7	6	1	0	7	7	1	0	7	7	1	0
	Hawaiian Pelagic	0	0	0	0	0	0	0	0	0	0	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0	0	0	0	0
	Oahu	0	0	0	0	0	0	0	0	0	0	0	0
	4-Island	2	1	0	0	2	1	0	0	2	1	0	0
	Hawaii	0	0	0	0	0	0	0	0	0	0	0	0
False killer whale†	Hawaii Pelagic	0	0	0	0	0	0	0	0	0	0	0	0
	Main Hawaiian Islands Insular†	0	0	0	0	0	0	0	0	0	0	0	0
	Northwestern Hawaiian Islands	0	0	0	0	0	0	0	0	0	0	0	0
Fraser's dolphin	Hawaiian	3	5	1	0	3	5	1	0	3	5	1	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Killer whale	Eastern North Pacific Offshore	0	0	0	0	0	0	0	0	0	0	0	0
	Eastern North Pacific Transient/West Coast Transient	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0	0	0	0	0
Long-beaked common dolphin	California	20	22	4	1	21	23	5	1	21	23	5	1
Melon-headed whale	Hawaiian Islands	0	0	0	0	0	0	0	0	0	0	0	0
	Kohala Resident	0	0	0	0	0	0	0	0	0	0	0	0
Northern right whale dolphin	California, Oregon, & Washington	11	9	3	0	11	9	3	0	11	9	3	0
Pacific white-sided dolphin	California, Oregon, & Washington	6	7	2	0	7	8	2	0	7	8	2	0
Pantropical spotted dolphin	Hawaii Island	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaii Pelagic	1	1	0	0	1	1	0	0	1	1	0	0
	Oahu	0	0	0	0	0	0	0	0	0	0	0	0
	4-Island	1	1	0	0	1	1	0	0	1	1	0	0
Pygmy killer whale	Hawaiian	0	1	0	0	0	1	0	0	0	1	0	0
	Tropical	0	0	0	0	0	0	0	0	0	0	0	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Risso's dolphin	California, Oregon, & Washington	16	13	3	0	16	15	3	0	16	15	3	0
	Hawaiian	1	1	0	0	1	1	0	0	1	1	0	0
Rough-toothed dolphin	Hawaiian	1	1	0	0	1	1	0	0	1	1	0	0
	NSD[1]	0	0	0	0	0	0	0	0	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	156	174	37	4	163	188	39	4	163	187	39	4
Short-finned pilot whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaiian	2	1	0	0	2	1	0	0	2	1	0	0
Spinner dolphin	Hawaii Island	0	0	0	0	0	0	0	0	0	0	0	0
	Hawaii Pelagic	1	0	0	0	1	0	0	0	1	0	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0	0	0	0	0
	Oahu & 4-Island	2	2	0	0	2	2	0	0	2	2	0	0
Striped dolphin	California, Oregon, & Washington	8	11	2	0	9	12	2	0	9	12	2	0
	Hawaiian	1	1	0	0	1	1	0	0	1	1	0	0
Family Phocoenidae (porpoises)													
Dall's porpoise	California, Oregon, & Washington	280	254	48	0	300	289	53	0	300	289	53	0

Species	Stock	Alternative 1 – Minimum				Alternative 1 – Maximum				Alternative 2			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Suborder Pinnipedia													
Family Otariidae (eared seals)													
California sea lion	U.S.	11	7	3	0	11	9	4	1	11	9	4	1
Guadalupe fur seal*	Mexico	0	0	0	0	0	0	0	0	0	0	0	0
Northern fur seal	California	1	1	1	0	1	1	1	0	1	1	1	0
Family Phocidae (true seals)													
Harbor seal	California	9	8	1	0	9	8	1	0	9	8	1	0
Hawaiian monk seal*	Hawaiian	3	3	0	0	3	3	0	0	3	3	0	0
Northern elephant seal	California	54	98	25	0	58	123	27	0	58	122	27	0

* ESA-listed species (all stocks) within the HSTT Study Area.

†Only designated stocks are ESA-listed.

[1]NSD = No stock designation; PTS = permanent threshold shift; TTS = temporary threshold shift.

E.14 Estimated Marine Mammal Impacts per Five Year Period from Explosives Under Navy Testing Activities

Table E-12 provides a summary of the estimated number of marine mammal impacts from exposure to explosives used during Navy testing activities under Alternatives 1 and 2 over the course of five years. In addition to impacts listed in Table E-12, over the course of a five-year period, the quantitative analysis estimates mortality of three short-beaked common dolphins as a result of exposure to explosive testing activities.

Table E-12: Estimated Marine Mammals Impacts per Five-Year Period from Explosive Testing Activities

Species	*Stock*	*Alternative 1 – 5-Year*				*Alternative 2 – 5-Year*			
		Behavioral Response	*TTS*	*PTS*	*Injury*	*Behavioral Response*	*TTS*	*PTS*	*Injury*
Suborder Mysticeti (baleen whales)									
Family Balaenopteridae (rorquals)									
Blue whale*	Central North Pacific	0	0	0	0	0	0	0	0
	Eastern North Pacific	0	25	0	0	0	27	0	0
Bryde's whale	Eastern Tropical Pacific	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Fin whale*	California, Oregon, & Washington	0	34	3	0	0	34	3	0
	Hawaiian	0	0	0	0	0	0	0	0
Humpback whale†	California, Oregon, & Washington†	0	17	0	0	0	18	0	0
	Central North Pacific	0	171	10	0	0	171	10	0
Minke whale	California, Oregon, & Washington	0	10	0	0	0	11	0	0
	Hawaiian	0	85	4	0	0	85	4	0
Sei whale*	Eastern North Pacific	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Family Eschrichtiidae									
Gray whale†	Eastern North Pacific	0	146	4	0	0	152	4	0
	Western North Pacific†	0	0	0	0	0	0	0	0
Suborder Odontoceti (toothed whales)									
Family Physeteridae (sperm whale)									
Sperm whale*	California, Oregon, & Washington	0	7	0	0	0	8	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Family Kogiidae (sperm whales)									

Species	Stock	Alternative 1 – 5-Year				Alternative 2 – 5-Year			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Dwarf sperm whale	Hawaiian	392	485	92	0	392	485	92	0
Pygmy sperm whale	Hawaiian	166	180	39	0	166	180	39	0
Kogia whales	California, Oregon, & Washington	157	183	40	0	173	205	45	0
Family Ziphiidae (beaked whales)									
Baird's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0
Blainville's beaked whale	Hawaiian	0	0	0	0	0	0	0	0
Cuvier's beaked whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Longman's beaked whale	Hawaiian	0	3	0	0	0	3	0	0
Mesoplodon spp (beaked whale guild)	California, Oregon, & Washington	4	7	0	0	4	8	0	0
Family Delphinidae (dolphins)									
Bottlenose dolphin	California Coastal	2	0	0	0	2	0	0	0
	California, Oregon, & Washington Offshore	37	33	4	0	37	35	4	0
	Hawaiian Pelagic	0	0	0	0	0	0	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0
	Oahu	0	0	0	0	0	0	0	0
	4-Island	6	3	0	0	6	3	0	0
	Hawaii	0	0	0	0	0	0	0	0
False killer whale[†]	Hawaii Pelagic	0	0	0	0	0	0	0	0
	Main Hawaiian Islands Insular[†]	0	0	0	0	0	0	0	0
	Northwestern Hawaiian Islands	0	0	0	0	0	0	0	0

Species	Stock	Alternative 1 – 5-Year				Alternative 2 – 5-Year			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Fraser's dolphin	Hawaiian	15	25	5	0	15	25	5	0
Killer whale	Eastern North Pacific Offshore	0	0	0	0	0	0	0	0
	Eastern North Pacific Transient/West Coast Transient	0	0	0	0	0	0	0	0
	Hawaiian	0	0	0	0	0	0	0	0
Long-beaked common dolphin	California	99	110	21	3	103	117	23	3
Melon-headed whale	Hawaiian Islands	0	0	0	0	0	0	0	0
	Kohala Resident	0	0	0	0	0	0	0	0
Northern right whale dolphin	California, Oregon, & Washington	53	44	15	0	53	46	16	0
Pacific white-sided dolphin	California, Oregon, & Washington	31	38	8	0	33	41	10	0
Pantropical spotted dolphin	Hawaii Island	0	0	0	0	0	0	0	0
	Hawaii Pelagic	3	4	0	0	3	4	0	0
	Oahu	0	0	0	0	0	0	0	0
	4-Island	5	3	0	0	5	3	0	0
Pygmy killer whale	Hawaiian	0	3	0	0	0	3	0	0
	Tropical	0	0	0	0	0	0	0	0
Risso's dolphin	California, Oregon, & Washington	78	71	15	0	80	77	15	0
	Hawaiian	4	4	0	0	4	4	0	0
Rough-toothed dolphin	Hawaiian	4	4	0	0	4	4	0	0
	NSD[1]	0	0	0	0	0	0	0	0
Short-beaked common dolphin	California, Oregon, & Washington	786	896	188	21	813	936	194	21

Species	Stock	Alternative 1 – 5-Year				Alternative 2 – 5-Year			
		Behavioral Response	TTS	PTS	Injury	Behavioral Response	TTS	PTS	Injury
Short-finned pilot whale	California, Oregon, & Washington	0	0	0	0	0	0	0	0
	Hawaiian	8	4	0	0	8	4	0	0
Spinner dolphin	Hawaii Island	0	0	0	0	0	0	0	0
	Hawaii Pelagic	3	0	0	0	3	0	0	0
	Kauai & Niihau	0	0	0	0	0	0	0	0
	Oahu & 4-Island	10	8	0	0	10	8	0	0
Striped dolphin	California, Oregon, & Washington	42	56	10	0	45	62	10	0
	Hawaiian	4	5	0	0	4	5	0	0
Family Phocoenidae (porpoises)									
Dall's porpoise	California, Oregon, & Washington	1,421	1,332	250	0	1,499	1,443	264	0
Suborder Pinnipedia									
Family Otariidae (eared seals)									
California sea lion	U.S.	53	38	17	2	53	47	20	3
Guadalupe fur seal*	Mexico	0	0	0	0	0	0	0	0
Northern fur seal	California	4	4	4	0	5	5	4	0
Family Phocidae (true seals)									
Harbor seal	California	47	39	5	0	47	42	5	0
Hawaiian monk seal*	Hawaiian	11	14	0	0	11	14	0	0
Northern elephant seal	California	275	551	131	0	291	610	135	0

* ESA-listed species (all stocks) within the HSTT Study Area.

†Only designated stocks are ESA-listed.

[1]NSD: No stock designation. PTS = permanent threshold shift; TTS = temporary threshold shift.

E.15 Estimated Sea Turtle Impacts from Sonar and Other Transducers Under Navy Training and Testing Activities

Based on the quantitative analysis, no sea turtle impacts are anticipated from exposure to sonar and other transducers used during Navy training and testing activities under Alternatives 1 and 2 over the course of a year or five years.

E.16 Estimated Sea Turtle Impacts from Air Guns Under Navy Training and Testing Activities

There are no air gun activities under training; therefore, there would be no takes. No sea turtle impacts are anticipated from exposure to air guns used during Navy testing activities under Alternatives 1 and 2 over the course of a year and over the course of five years.

E.17 Estimated Sea Turtle Impacts from Pile Driving Under Navy Training and Testing Activities

There are no pile driving activities under testing; therefore, there would be no takes. No sea turtle impacts are anticipated from exposure to pile driving used during Navy training activities under Alternatives 1 and 2 over the course of a year and over the course of five years.

E.18 Estimated Sea Turtle Impacts from Explosives Under Navy Training and Testing Activities

Table E-13 provides a summary of the estimated number of sea turtle impacts from exposure to explosives used during Navy training and testing activities under Alternatives 1 and 2 over the course of a year.

Table E-13: Estimated Sea Turtle Impacts per Year from Explosive Training and Testing Activities

Species	*Alternative 1 – Minimum*			*Alternative 1 – Maximum*			*Alternative 2*		
	TTS	*PTS*	*Injury*	*TTS*	*PTS*	*Injury*	*TTS*	*PTS*	*Injury*
Explosive Training Activities									
Family Cheloniidae (hardshell turtles)									
Green turtle*	20	7	1	20	7	1	20	7	1
Hawksbill turtle*	0	0	0	0	0	0	0	0	0
Loggerhead turtle*	0	0	0	0	0	0	0	0	0
Olive ridley turtle*	0	0	0	0	0	0	0	0	0
Family Dermochelyidae (scuteless turtles)									
Leatherback turtle*	0	0	0	0	0	0	0	0	0
Explosive Testing Activities									
Family Cheloniidae (hardshell turtles)									
Green turtle*	0	0	0	0	0	0	0	0	0
Hawksbill turtle*	0	0	0	0	0	0	0	0	0
Loggerhead turtle*	0	0	0	0	0	0	0	0	0

Species	Alternative 1 – Minimum			Alternative 1 – Maximum			Alternative 2		
	TTS	PTS	Injury	TTS	PTS	Injury	TTS	PTS	Injury
Olive ridley turtle*	0	0	0	0	0	0	0	0	0
Family Dermochelyidae (scuteless turtles)									
Leatherback turtle*	0	0	0	0	0	0	0	0	0

*ESA-listed species within the HSTT Study Area. PTS: permanent threshold shift; TTS: temporary threshold shift.

E.19 Estimated Sea Turtle Impacts per Five year Period from Explosives Under Navy Training and Testing Activities

Table E-14 provides a summary of the estimated number of sea turtle impacts from exposure to explosives used during Navy training and testing activities under Alternatives 1 and 2 per five-year period.

Table E-14: Estimated Sea Turtle Impacts per Five-Year Period from Explosive Training and Testing Activities

Species	Alternative 1 – 5-Year			Alternative 2 – 5-Year		
	TTS	PTS	Injury	TTS	PTS	Injury
Explosive Training Activities						
Family Cheloniidae (hardshell turtles)						
Green turtle*	98	35	3	98	35	3
Hawksbill turtle*	0	0	0	0	0	0
Loggerhead turtle*	0	0	0	0	0	0
Olive ridley turtle*	0	0	0	0	0	0
Family Dermochelyidae (scuteless turtles)						
Leatherback turtle*	0	0	0	0	0	0
Explosive Testing Activities						
Family Cheloniidae (hardshell turtles)						
Green turtle*	0	0	0	0	0	0
Hawksbill turtle*	0	0	0	0	0	0
Loggerhead turtle*	0	0	0	0	0	0
Olive ridley turtle*	0	0	0	0	0	0
Family Dermochelyidae (scuteless turtles)						
Leatherback turtle*	0	0	0	0	0	0

*ESA-listed species within the HSTT Study Area. PTS = permanent threshold shift; TTS = temporary threshold shift.

SETTLEMENT AGREEMENT
BETWEEN
THE CALIFORNIA COASTAL COMMISSION AND THE UNITED STATES NAVY

WHEREAS, pursuant to the Coastal Zone Management Act ("CZMA"), (16 U.S.C. 1451 *et. seq.*) the United States Navy ("NAVY") prepared and submitted a federal Coastal Consistency Determination ("CCD") to the California Coastal Commission ("CCC") on January 13, 2013;

WHEREAS, on March 8, 2013, the CCC objected to the CCD based on an alleged lack of sufficient information to determine consistency with the California Coastal Management Program, specifically California Public Resources Code Sections 30230, 30234, and 30234.5 of the California Coastal Act (15 CFR 930.43(b));

WHEREAS, on December 17, 2013, following an exchange of letters and additional information, NAVY notified CCC of its intent to proceed over the objection in accordance with the CZMA regulations (15 CFR 930);

WHEREAS, NAVY signed a Record of Decision ("ROD") on December 20, 2013, for the Hawaii-Southern California Training and Testing ("HSTT") Environmental Impact Statement/Overseas Environmental Impact Statement ("EIS") that, with other federal authorizations in place, allowed commencement of the at-sea training and testing activities, as described in the CCD, to occur in waters adjacent to California (specifically, in the SOCAL Range Complex and Silver Strand Training Complex, which are together referred to as "SOCAL" in the CCD and for purposes of this AGREEMENT);

WHEREAS, in July 2014, the California Attorney General informed NAVY of the CCC's intent to bring a lawsuit against NAVY for violation(s) of the CZMA with respect to the CCD;

WHEREAS, NAVY and the CCC wish to resolve the objection to the NAVY's CCD without litigation and agree to enter this Settlement Agreement ("AGREEMENT") without admission of any issue of fact or law or waiver of any defense; and,

WHEREAS, the Parties share the goal of improving scientific knowledge involving marine mammal presence and density in waters off the coast of Southern California in which NAVY conducts training and testing activities;

NOW, THEREFORE, in consideration of the foregoing, and of the respective promises and releases herein, the Parties agree as follows:

1. This AGREEMENT and commitments herein shall become effective on the date the AGREEMENT is executed by both Parties ("EFFECTIVE DATE") and shall be in effect until December 25, 2018 (the expiration of the HSTT Marine Mammal Protection Act ("MMPA") regulations codified at 50 CFR 218.70, *et seq.*).

Exhibit 11
CD-0001-18
Navy/CCC
Settlement Agreement

2. NAVY agrees to identify three areas in SOCAL within which hull mounted mid-frequency active sonar during Major Training Exercises (MTE) is not typically used. These areas are:

   - the "San Diego Arc;" (see attached graphic);
   - the area within SOCAL that is within 3 NM around each island of the Channel Islands National Marine Sanctuary (see attached graphic); and
   - the area within 3nm from the mainland California shore between Del Mar northward to the northern boundary of SOCAL (see attached graphic).

   For each of these areas, subject to classification restrictions, if NAVY employs hull mounted mid-frequency active sonar during a MTE (as MTE is used in the HSTT MMPA Final Rule at 50 CFR 218.75(f)(1)) NAVY will annually provide notice of such use to CCC. This notice shall provide the number of events, the area within which the event(s) occurred, and the calendar year within which the event(s) occurred. The following language is representative of the potential notice: "Navy conducted hull mounted mid-frequency active sonar during (X number) Major Training Exercises in the (identify which area) in (identify which calendar year)."

3. NAVY agrees that in the event training in SOCAL involves single underwater detonations greater than 20 pounds net explosive weight at nighttime (nighttime being defined as the time between sunset and sunrise), NAVY shall provide CCC post-event notice within 72 hours of the event. Such notice will include general location and date of event.

4. NAVY and CCC agree that the following research topic areas are of mutual interest relating to marine mammals and NAVY activities in Southern California waters:

   (1) Monitoring/Detection;
   (2) Response to sonar studies (not necessarily Behavioral Response Studies SOCAL in its current form); and
   (3) Baseline habitat use, behavior, and movement patterns.

   NAVY agrees to use its best efforts to fund projects within these three topic areas for a target goal of approximately $5 million per year, for the next three years (2015-2017), with the understanding that annual variation in funding is possible based on annual adaptive management meetings with the National Marine Fisheries Service (NMFS), start of new or completion of ongoing projects, and in consideration of the NAVY's overall budget.

   On an annual basis through 2018, NAVY agrees to provide CCC a list of NAVY funded projects within the topic areas listed in the paragraph above and any publications associated with those projects, and to provide CCC notice of planned future projects within these topic areas.

   NAVY agrees to engage annually with CCC in dialogue regarding the research areas of mutual interest in compliance with Federal Acquisition Regulations. NAVY will provide CCC with progress reviews in the form of peer-reviewed publications or annual reports or progress reports on ongoing research projects. NAVY will ensure that the final results of

these research projects are made available to the public except to the extent that any such information is classified.

5. NAVY agrees to consider deployment of additional passive acoustic devices as proposed by CCC. Any such suggested deployment, however, shall be tied to NAVY and NMFS agreements on SOCAL study questions and ongoing projects as detailed in annual reports (#4 above), be fiscally supportable, or otherwise agreed upon in support of this agreement.

6. NAVY agrees to provide CCC staff on a mutually agreeable date/time and at a mutually agreeable location with substantive briefings, site tours, and/or site visits (the briefings by a subject matter expert or experts if, in its sole discretion, NAVY determines more than one expert is required), concerning the following subjects: (a) NAVY's approach to assessing acoustic impacts – the Navy Acoustic Effects Model ("NAEMO"); (b) NAVY monitoring worldwide, including SOCAL; (c) NAVY's use of the Southern California Anti-Submarine Warfare Range ("SOAR") to collect information on marine mammals (Marine Mammal Monitoring and Reporting ("M3R")); and (d) NAVY research to understand marine mammal acoustic impacts including behavioral response field studies conducted through the Navy's Living Marine Research program (http://www.lmr.navy.mil/Home.aspx).

7. NAVY agrees to continue participating in the California Cooperative Oceanic Fisheries Investigations (http://cetus.ucsd.edu/projects-CalCOFI.html). NAVY agrees to provide approximately $100K per year for fiscal years 2015 through 2018 for the California Cooperative Oceanic Fisheries Investigations survey effort, subject to the availability of appropriations.

8. NAVY agrees to provide CCC with a 72 hour courtesy notice, at the same time notice is provided to NMFS stranding personnel, prior to each MTE conducted in SOCAL. CCC agrees to keep the advance notice of MTEs confidential (not to release the information to public media or third parties, and to transmit it only to those CCC personnel responding to Unusual Stranding Events as necessary to accomplish the CCC mission).

9. NAVY agrees to annually provide CCC with the final unclassified training reports, "Annual HSTT Exercise report" and "Annual HSTT Monitoring Report", at the same time these reports are accepted as final by NMFS.

10. NAVY agrees to provide a briefing to CCC staff on a mutually agreeable date/time and at a mutually agreeable location on Navy Region Southwest's Regional Stranding Investigation Assistance Plan ("RSIAP"). NAVY agrees to facilitate coordination with NMFS on how CCC may participate in responding to such a stranding in the Navy Region Southwest. NAVY agrees to provide CCC notice when NMFS declares an Unusual Stranding Event ("USE") during a MTE in SOCAL. CCC agrees to keep information provided confidential (not to release it to public media or third party, only transmitting it to CCC personnel responding to USEs as necessary to accomplish the CCC mission).

11. NAVY agrees to consider any science/study/report offered by CCC in the next regularly scheduled Adaptive Management meeting held pursuant to 50 CFR 218.78(c)(1) (the HSTT Final Rule) or in the next NAVY environmental planning effort for the HSTT study area (as appropriate), whichever is sooner. Should NAVY determine that the effects of its activities on a coastal use or resource will be substantially different than those effects previously identified, it shall comply with the requirements of the CZMA.

12. If the NAVY's ongoing lookout effectiveness study results demonstrate the effectiveness of NAVY lookouts is inadequate, NAVY will assess the root cause of the deficiency and take appropriate corrective action, which may include changes to the lookout training/qualification process, awareness, and procedures; and/or investigating new/improved equipment or technology.

13. CCC hereby agrees not to bring any civil or administrative action in any forum against the United States or any of its officers or agencies, challenging under any law or regulation: (1) any of the NAVY's past, ongoing, or future activities in SOCAL as described and analyzed in the CCD up through December 25. 2018, provided those activities are performed in a manner consistent with the description in the CCD; (2) the CCD and the HSTT EIS; and (3) the ROD. This provision does not limit the ability of CCC to comment on, describe, or analyze the impacts of NAVY activities in SOCAL, including in public fora.

14. CCC agrees to keep confidential all information developed for or provided by NAVY during the course of the negotiation and execution of this AGREEMENT and not release it outside of the CCC and the State of California Attorney General offices and staff. The final executed version of this AGREEMENT is not confidential.

15. This AGREEMENT was negotiated and executed by the Parties in good faith to avoid litigation. This AGREEMENT shall not constitute an admission or adjudication with respect to CCC's objection to NAVY's CCD. Moreover, this AGREEMENT shall not constitute an admission of any wrongdoing, misconduct, or liability on either Party.

16. Each Party is responsible for its own attorneys' fees and costs of any kind in connection with the CCD at issue in this AGREEMENT and with the AGREEMENT itself.

17. No Party shall be liable for any monetary damages, including, but not limited to, any incidental or consequential damages arising from a breach of this AGREEMENT.

18. No provision of this AGREEMENT shall be interpreted as constituting a commitment or requirement that the United States is obligated to pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. § 1341, or any other provision of law. No provision of this AGREEMENT shall be interpreted as constituting a commitment or requirement that the United States and/or the State of California take actions in contravention of the CZMA or any other law or regulation, either substantive or procedural.

19. This AGREEMENT constitutes the full and complete agreement of the Parties, and

supersedes all prior agreements, representations and understandings regarding the CCD, whether oral or written. This AGREEMENT may be amended or modified by the Parties in writing, provided that no supplement, modification, or amendment shall be binding unless executed by both Parties.

20. The terms of this AGREEMENT shall be binding and inure to the benefit of the Parties hereto and their successors, assigns, heirs, and representatives.

21. This AGREEMENT shall be deemed to have been drafted equally by the Parties, and shall not be interpreted for or against any Party by reason of the alleged authorship of any provision.

22. If any legal action or other proceeding is brought for the enforcement or interpretation of this AGREEMENT, or concerning an alleged dispute, breach, default, or misrepresentation in connection with any of the provisions of this AGREEMENT, each Party shall bear its own attorney fees and costs.

23. This AGREEMENT shall be governed by, construed and enforced in accordance with, and subject to Federal law.

24. The undersigned certify that they are authorized to enter into this AGREEMENT and to execute and legally bind the Party listed to the terms and conditions of this AGREEMENT.

25. This AGREEMENT may be executed in multiple counterparts, each of which shall constitute an original, and all of which taken together shall constitute one and the same agreement. This AGREEMENT may be executed by a letter, electronically, by facsimile, or by e-mail, and such an electronically delivered signature will be deemed to be as valid as an original signature.

Karnig Ohannessian
Deputy Assistant Secretary of the Navy
(Environment)

4/14/2016
Date

John Ainsworth
Acting Executive Director
California Coastal Commission

Date

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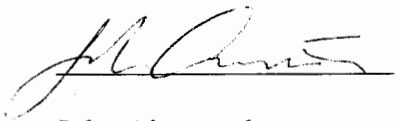
_____ _____

Karnig Ohannessian
Deputy Assistant Secretary of the Navy
(Environment)

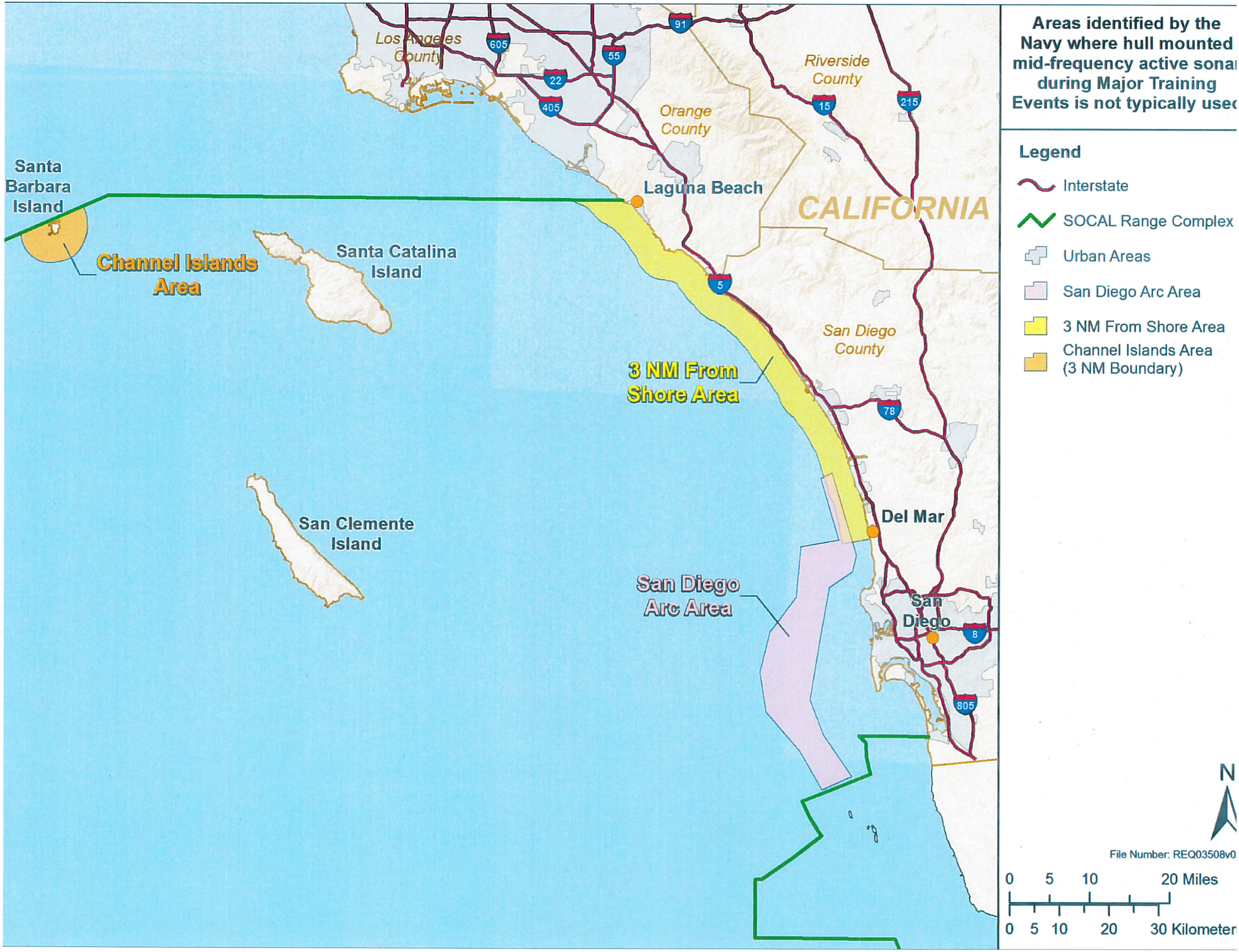
Date



3-15-2016

John Ainsworth
Acting Executive Director
California Coastal Commission

Date


Areas identified by the Navy where hull mounted mid-frequency active sonar during Major Training Events is not typically used
Legend
Interstate
SOCAL Range Complex
Urban Areas
San Diego Arc Area
3 NM From Shore Area
Channel Islands Area (3 NM Boundary)
Los Angeles County
Orange County
Riverside County
San Diego County
CALIFORNIA
Laguna Beach
Santa Barbara Island
Channel Islands Area
Santa Catalina Island
San Clemente Island
3 NM From Shore Area
San Diego Arc Area
Del Mar
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VIEJAS
TRIBAL GOVERNMENT

P.O Box 908
Alpine, CA 91903
#1 Viejas Grade Road
Alpine, CA 91901

Phone: 6194453810
Fax: 6194455337
viejas.com

November 6, 2017

Project Manager
Navai Facilities Engineering Command Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860

RE: HSTT EIS/OEIS

Dear Project Manager,

In reviewing the above referenced project the Viejas Band of Kumeyaay Indians ("Viejas") would like to comment at this time.

The project area may contain many sacred sites to the Kumeyaay people. We request that these sacred sites be avoided with adequate buffer zones.

Additionally, Viejas is requesting, as appropriate, the following

- All NEPA/CEQA/NAGPRA laws be followed
- Immediately contact Viejas on any changes or inadvertent discoveries.

Thank you for your collaboration and support in preserving our Tribal cultural resources. I look forward to hearing from you. Please call me at 619-659-2312 or Ernest Pingleton at 619-659-2314, or email, rteran@viejas-nsn.gov or epingleton@viejas-nsn.gov, for scheduling. Thank you.

Sincerely,

Ray Teran, Resource Management
VIEJAS BAND OF KUMEYAAY INDIANS

Exhibit 12
CD-0001-18
Letter Viejas Tribe to Navy

Table 1-7: Proposed Training Activities Within the Study Area

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Major Training Events – Large Integrated Anti-Submarine Warfare						
Acoustic	Composite Training Unit Exercise[1]	Aircraft carrier and carrier air wing integrates with surface and submarine units in a challenging multi-threat operational environment that certifies them ready to deploy.	ASW1, ASW2, ASW3, ASW4, ASW5, HF1, LF6, MF1, MF3, MF4, MF5, MF11, MF12	SOCAL	2-3	12
Acoustic	Rim of the Pacific Exercise[1]	A biennial multinational training exercise in which navies from Pacific Rim nations and the United Kingdom assemble in Pearl Harbor, Hawaii, to conduct training throughout the Hawaiian Islands in a number of warfare areas. Marine mammal systems may be used during a Rim of the Pacific exercise. Components of a Rim of the Pacific exercise, such as certain mine warfare and amphibious training, may be conducted in the Southern California Range Complex.	ASW2, ASW3, ASW4, HF1, HF3, HF4, M3, MF1, MF3, MF4, MF5, MF11	HRC	0-1	2
				SOCAL	0-1	2
Major Training Events – Medium Integrated Anti-Submarine Warfare						
Acoustic	Fleet Exercise/Sustainment Exercise[1]	Aircraft carrier and carrier air wing integrates with surface and submarine units in a challenging multi-threat operational environment to maintain ability to deploy.	ASW1, ASW2, ASW3, ASW4, HF1, LF6, MF1, MF3, MF4, MF5, MF11, MF12	HRC	1	3
				SOCAL	5	22

Exhibit 13
CD-0001-18
Navy LOA
Tables 1-7 to 1-15

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Major Training Events – Medium Integrated Anti-Submarine Warfare (continued)						
Acoustic	Undersea Warfare Exercise	Elements of the anti-submarine warfare tracking exercise combine in this exercise of multiple air, surface, and subsurface units, over a period of several days. Sonobuoys are released from aircraft. Active and passive sonar used.	ASW3, ASW4, HF1, LF6, MF1, MF3, MF4, MF5, MF11, MF12	HRC	3	12
Integrated/Coordinated Training – Small Integrated Anti-Submarine Warfare Training						
Acoustic	Navy Undersea Warfare Training and Assessment Course Surface Warfare Advanced Tactical Training	Multiple ships, aircraft, and submarines integrate the use of their sensors to search for, detect, classify, localize, and track a threat submarine in order to launch an exercise torpedo.	ASW3, ASW4, HF1, MF1, MF3, MF4, MF5	HRC	1	2
				SOCAL	2-3	12
Integrated/Coordinated Training – Medium Coordinated Anti-Submarine Warfare Training						
Acoustic	Submarine Commanders Course	Train prospective submarine Commanding Officers to operate against surface, air, and subsurface threats.	ASW3, ASW4, HF1, MF1, MF3, MF4, MF5, TORP1, TORP2	HRC	2	10
				SOCAL	2	2

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Integrated/Coordinated Training – Small Coordinated Anti-Submarine Warfare Training						
Acoustic	Amphibious Ready Group/Marine Expeditionary Unit Exercise Group Sail Independent Deployer Certification Exercise/Tailored Anti-Submarine Warfare Training	Small-scale, short duration, coordinated anti-submarine warfare exercises	ASW2, ASW3, ASW4, HF1, MF1, MF3, MF4, MF5, MF11	HRC	2	10
				SOCAL	10-14	58
Amphibious Warfare						
Explosive	Naval Surface Fire Support Exercise – at Sea	Surface ship uses large-caliber gun to support forces ashore; however, land target simulated at sea. Rounds impact water and are scored by passive acoustic hydrophones located at or near target area.	Large-caliber HE rounds (E5)	HRC (W188)	15	75
Acoustic	Amphibious Marine Expeditionary Unit Exercise	Navy and Marine Corps forces conduct advanced integration training in preparation for deployment certification.	ASW2, ASW3, ASW4, HF1, MF1, MF3, MF4, MF5, MF11	SOCAL	2-3	12
Acoustic	Amphibious Marine Expeditionary Unit Integration Exercise	Navy and Marine Corps forces conduct integration training at sea in preparation for deployment certification.	ASW2, ASW3, ASW4, HF1, MF1, MF3, MF4, MF5, MF11	SOCAL	2-3	12

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Amphibious Warfare (continued)						
Acoustic	Marine Expeditionary Unit Composite Training Unit Exercise	Amphibious Ready Group exercises are conducted to validate the Marine Expeditionary Unit's readiness for deployment and includes small boat raids; visit, board, search, and seizure training; helicopter and mechanized amphibious raids; and a non-combatant evacuation operation.	ASW2, ASW3, ASW4, HF1, MF1, MF3, MF4, MF5, MF11	SOCAL	2-3	12
Anti-Submarine Warfare						
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Helicopter	Helicopter crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	MF4, MF5, TORP1	HRC	6	30
				SOCAL	104	520
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	MF5, TORP1	HRC	10	50
				SOCAL	25	125
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Ship	Surface ship crews search for, track, and detect submarines. Exercise torpedoes are used during this event.	ASW3, MF1, TORP1	HRC	50	250
				SOCAL	117	585
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Submarine	Submarine crews search for, track, and detect submarines. Exercise torpedoes are used during this event.	ASW4, HF1, MF3, TORP2	HRC	48	240
				SOCAL	13	65

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Anti-Submarine Warfare (continued)						
Acoustic	Anti-Submarine Warfare Tracking Exercise – Helicopter	Helicopter crews search for, track, and detect submarines.	MF4, MF5	HRC	159	795
				SOCAL, PMSR	524	2,620
				HSTT Transit Corridor	6	30
Acoustic	Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft aircrews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	MF5	HRC	32	160
				SOCAL, PMSR	56	280
Acoustic	Anti-Submarine Warfare Tracking Exercise – Ship	Surface ship crews search for, track, and detect submarines.	ASW3, MF1, MF11, MF12	HRC	224	1,120
				SOCAL, PMSR	423	2,115
Acoustic	Anti-Submarine Warfare Tracking Exercise – Submarine	Submarine crews search for, track, and detect submarines.	ASW4, HF1, HF3, MF3	HRC	200	1,000
				SOCAL, PMSR	50	250
				HSTT Transit Corridor	7	35
Explosive, Acoustic	Service Weapons Test	Air, surface, or submarine crews employ explosive torpedoes against virtual targets.	HF1, MF3, MF6, TORP2, Explosive torpedoes (E11)	HRC	2	10
				SOCAL	1	5

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Mine Warfare						
Acoustic	Airborne Mine Countermeasure – Mine Detection	Helicopter aircrews detect mines using towed or laser mine detection systems.	HF4	SOCAL	10	50
Explosive, Acoustic	Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises	Maritime security personnel train to protect civilian ports against enemy efforts to interfere with access to those ports.	HF4, SAS2 E2, E4	Pearl Harbor, HI	1	5
				San Diego, CA	1-3	12
Explosive	Marine Mammal Systems	The Navy deploys trained bottlenose dolphins (*Tursiops truncatus*) and California sea lions (*Zalophus californianus*) as part of the marine mammal mine-hunting and object-recovery system.	E7	HRC	10	50
				SOCAL	175	875
Acoustic	Mine Countermeasure Exercise – Ship Sonar	Ship crews detect and avoid mines while navigating restricted areas or channels using active sonar.	HF4, HF8, MF1K	HRC	30	150
				SOCAL	92	460
Acoustic	Mine Countermeasure Exercise - Surface	Mine countermeasure ship crews detect, locate, identify, and avoid mines while navigating restricted areas or channels, such as while entering or leaving port.	HF4	SOCAL	266	1,330
Explosive, Acoustic	Mine Countermeasures Mine Neutralization Remotely Operated Vehicle	Ship, small boat, and helicopter crews locate and disable mines using remotely operated underwater vehicles.	HF4, E4	HRC	6	30
				SOCAL	372	1,860

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Mine Warfare (continued)						
Explosive	Mine Neutralization Explosive Ordnance Disposal	Personnel disable threat mines using explosive charges.	E4, E5, E6, E7	HRC (Puuloa)	20	100
				SOCAL (IB, TAR 2, TAR 3, TAR 21, SWAT 3, SOAR)	194	970
Acoustic	Submarine Mine Exercise	Submarine crews practice detecting mines in a designated area.	HF1	HRC	40	200
				SOCAL	12	60
Acoustic	Surface Ship Object Detection	Ship crews detect and avoid mines while navigating restricted areas or channels using active sonar.	MF1K, HF8	HRC	42	210
				SOCAL	164	820
Explosive	Underwater Demolitions Multiple Charge – Mat Weave and Obstacle Loading	Military personnel use explosive charges to destroy barriers or obstacles to amphibious vehicle access to beach areas.	E10, E13	SOCAL (TAR 2, TAR 3)	18	90
Explosive	Underwater Demolition Qualification and Certification	Navy divers conduct various levels of training and certification in placing underwater demolition charges.	E6, E7	HRC (Puuloa)	25	125
				SOCAL (TAR 2)	120	600

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Surface Warfare						
Explosive	Bombing Exercise Air-to-Surface	Fixed-wing aircrews deliver bombs against surface targets.	E12[2]	HRC	187	935
				SOCAL	640	3,200
				HSTT Transit Corridor	5	25
Explosive	Gunnery Exercise Surface-to-Surface Boat Medium-Caliber	Small boat crews fire medium-caliber guns at surface targets.	E1, E2	HRC	10	50
				SOCAL	14	70
Explosive	Gunnery Exercise Surface-to-Surface Ship Large-caliber	Surface ship crews fire large-caliber guns at surface targets.	E5	HRC	32	160
				SOCAL	200	1,000
				HSTT Transit Corridor	13	65
Explosive	Gunnery Exercise Surface-to-Surface Ship Medium-Caliber	Surface ship crews fire medium-caliber guns at surface targets.	E1, E2	HRC	50	250
				SOCAL	180	900
				HSTT Transit Corridor	40	200
Explosive, Acoustic	Independent Deployer Certification Exercise/Tailored Surface Warfare Training	Multiple ships, aircraft and submarines conduct integrated multi-warfare training with a surface warfare emphasis. Serves as a ready-to-deploy certification for individual surface ships tasked with surface warfare missions.	E1, E3, E6, E10	SOCAL	1	5

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Surface Warfare (continued)						
Explosive	Integrated Live Fire Exercise	Naval Forces defend against a swarm of surface threats (ships or small boats) with bombs, missiles, rockets, and small-, medium- and large-caliber guns.	E1, E3, E6, E10	HRC (W188A)	1	5
				SOCAL (SOAR)	1	5
Explosive	Missile Exercise Air-to-Surface	Fixed-wing and helicopter aircrews fire air-to-surface missiles at surface targets.	E6, E8, E10	HRC	10	50
				SOCAL	210	1,050
Explosive	Missile Exercise Air-to-Surface Rocket	Helicopter aircrews fire both precision-guided and unguided rockets at surface targets.	E3	HRC	227	1,135
				SOCAL	246	1,230
Explosive	Missile Exercise Surface-to-Surface	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles.	E6, E10	HRC (W188)	20	100
				SOCAL (W291)	10	50
Explosive, Acoustic	Sinking Exercise	Aircraft, ship, and submarine crews deliberately sink a seaborne target, usually a decommissioned ship made environmentally safe for sinking according to U.S. Environmental Protection Agency standards, with a variety of munitions.	TORP2, E5, E10, E12	HRC	1–3	7
				SOCAL	0–1	1
Pile driving	Elevated Causeway System	A pier is constructed off of the beach. Piles are driven into the bottom with an impact hammer. Piles are removed from seabed via vibratory extractor. Only in-water impacts are analyzed.	Impact hammer or vibratory extractor	SOCAL	2	10

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Other Training Exercises (continued)						
Acoustic	Kilo Dip	Functional check of the dipping sonar prior to conducting a full test or training event on the dipping sonar.	MF4	HRC	60	300
				SOCAL	2,400	12,000
Acoustic	Submarine Navigation Exercise	Submarine crews operate sonar for navigation and object detection while transiting into and out of port during reduced visibility.	HF1, MF3	Pearl Harbor, HI	220	1,100
				San Diego Bay, CA	80	400
Acoustic	Submarine Sonar Maintenance and Systems Checks	Maintenance of submarine sonar systems is conducted pierside or at sea.	MF3	HRC	260	1,300
				Pearl Harbor, HI	260	1,300
				SOCAL	93	465
				San Diego Bay, CA	92	460
				HSTT Transit Corridor	10	50
Acoustic	Submarine Under Ice Certification	Submarine crews train to operate under ice. Ice conditions are simulated during training and certification events.	HF1	HRC	12	60
				SOCAL	6	30

Table 1-7: Proposed Training Activities Within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Other Training Exercises (continued)						
Acoustic	Surface Ship Sonar Maintenance and Systems Checks	Maintenance of surface ship sonar systems is conducted pierside or at sea.	HF8, MF1	HRC	75	375
				Pearl Harbor, HI	80	400
				SOCAL	250	1,250
				San Diego, CA	250	1,250
				HSTT Transit Corridor	8	40
Acoustic	Unmanned Underwater Vehicle Training – Certification and Development	Unmanned underwater vehicle certification involves training with unmanned platforms to ensure submarine crew proficiency. Tactical development involves training with various payloads for multiple purposes to ensure that the systems can be employed effectively in an operational environment.	FLS2, M3, SAS2	HRC	25	125
				SOCAL	10	50

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex, HSTT = Hawaii-Southern California Training and Testing, PMRF = Pacific Missile Range Facility, BARSTUR = Barking Sands Tactical Underwater Range, BSURE = Barking Sands Underwater Range Expansion, PMSR = Point Mugu Sea Range Overlap, TAR = Training Area and Range, SOAR = Southern California Anti-Submarine Warfare Range, IB = Imperial Beach Minefield

1. Any non-antisubmarine warfare activity that could occur is captured in the individual activities.
2. For the Bombing Exercise Air-to-Surface, all activities were analyzed using E12 explosive bin, but smaller explosives are frequently used.

1.5.2 TESTING ACTIVITIES

The testing activities that the Navy proposes to conduct in the Study Area are described in Tables 1-8 through 1-11. The table includes the activity name, associated stressor(s), description of the activity, sound source bin, the areas where the activity is conducted, and the number of activities per year and per five years. Not all sound sources are used with each activity. Under the "Annual # of Activities" column, activities show either a single number or a range of numbers to indicate the number of times that activity could occur during any single year. The "5-Year # of Activities" is the maximum times an activity would occur over the 5-year period of this request. More detailed activity descriptions can be found in the HSTT Draft EIS/OEIS.

1.5.2.1 Naval Air Systems Command

Table 1-8: Naval Air Systems Command Proposed Testing Activities Within the Study Area

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Anti-Submarine Warfare						
Acoustic	Anti-Submarine Warfare Torpedo Test	This event is similar to the training event torpedo exercise. Test evaluates anti-submarine warfare systems onboard rotary-wing and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target.	MF5, TORP1	HRC	17-22	95
				SOCAL	35-71	247
Explosive, Acoustic	Anti-Submarine Warfare Tracking Test – Helicopter	This event is similar to the training event anti-submarine tracking exercise – helicopter. The test evaluates the sensors and systems used to detect and track submarines and to ensure that helicopter systems used to deploy the tracking systems perform to specifications.	MF4, MF5, E3	SOCAL	30-132	252
Explosive, Acoustic	Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft	The test evaluates the sensors and systems used by maritime patrol aircraft to detect and track submarines and to ensure that aircraft systems used to deploy the tracking systems perform to specifications and meet operational requirements.	ASW2, ASW5, MF5, MF6, E1, E3	HRC	54-61	284
				SOCAL	58-68	310

Table 1-8: Naval Air Systems Command Proposed Testing Activities within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Anti-Submarine Warfare (continued)						
Explosive, Acoustic	Sonobuoy Lot Acceptance Test	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a lot or group of sonobuoys in advance of delivery to the fleet for operational use.	ASW2, ASW5, HF5, HF6, LF4, MF5, MF6, E1, E3, E4	SOCAL	160	800
Mine Warfare						
Acoustic	Airborne Dipping Sonar Minehunting Test	A mine-hunting dipping sonar system that is deployed from a helicopter and uses high-frequency sonar for the detection and classification of bottom and moored mines.	HF4	SOCAL	0-12	12
Explosive	Airborne Mine Neutralization System Test	A test of the airborne mine neutralization system that evaluates the system's ability to detect and destroy mines from an airborne mine countermeasures capable helicopter (e.g., MH-60). The airborne mine neutralization system uses up to four unmanned underwater vehicles equipped with high-frequency sonar, video cameras, and explosive and non-explosive neutralizers.	E4	SOCAL	11-31	75
Acoustic	Airborne Sonobuoy Minehunting Test	A mine-hunting system made up of sonobuoys deployed from a helicopter. A field of sonobuoys, using high-frequency sonar, is used for detection and classification of bottom and moored mines.	HF6	SOCAL	3-9	21

Table 1-8: Naval Air Systems Command Proposed Testing Activities within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Surface Warfare						
Explosive	Air-to-Surface Bombing Test	This event is similar to the training event bombing exercise air-to-surface. Fixed-wing aircraft test the delivery of bombs against surface maritime targets with the goal of evaluating the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced.	E9	HRC	8	40
				SOCAL	14	70
Explosive	Air-to-Surface Gunnery Test	This event is similar to the training event gunnery exercise air-to-surface. Fixed-wing and rotary-wing aircrews evaluate new or enhanced aircraft guns against surface maritime targets to test that the gun, gun ammunition, or associated systems meet required specifications or to train aircrew in the operation of a new or enhanced weapons system.	E1	HRC	5	25
				SOCAL	30-60	240
Explosive	Air-to-Surface Missile Test	This event is similar to the training event missile exercise air-to-surface. Test may involve both fixed-wing and rotary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons system or as part of another systems integration test.	E6, E9, E10	HRC	18	90
				SOCAL	48-60	276

Table 1-8: Naval Air Systems Command Proposed Testing Activities within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Surface Warfare (continued)						
Explosive	Rocket Test	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of guided and unguided 2.75-inch rockets fired from a hovering or forward flying helicopter or tilt rotor aircraft.	E3	HRC	2	10
				SOCAL	18-22	102
Other Testing Activities						
Acoustic	Kilo Dip	Functional check of a helicopter deployed dipping sonar system (e.g., AN/AQS-22) prior to conducting a testing or training event using the dipping sonar system.	MF4	SOCAL	0-6	6
Acoustic	Undersea Range System Test	Post installation node survey and test and periodic testing of range Node transmit functionality.	MF9	HRC	11-28	90

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex

1.5.2.2 Naval Sea Systems Command

Table 1-9: Naval Sea Systems Command Proposed Testing Activities Within the Study Area

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Anti-Submarine Warfare						
Acoustic	Anti-Submarine Warfare Mission Package Testing	Ships and their supporting platforms (e.g., rotary-wing aircraft and unmanned aerial systems) detect, localize, and prosecute submarines.	ASW1, ASW2, ASW3, ASW5, MF1, MF4, MF5, MF12, TORP1	HRC	22	110
				SOCAL	23	115
Acoustic	At-Sea Sonar Testing	At-sea testing to ensure systems are fully functional in an open ocean environment.	ASW3, ASW4, HF1, LF4, LF5, M3, MF1, MF1K, MF2, MF3, MF5, MF9, MF10, MF11	HRC	16	78
				HRC - SOCAL	1	5
				SOCAL	20	99
Acoustic	Countermeasure Testing	Countermeasure testing involves the testing of systems that will detect, localize, and track incoming weapons, including marine vessel targets. Testing includes surface ship torpedo defense systems and marine vessel stopping payloads.	ASW3, ASW4, HF5, TORP1, TORP2	HRC	8	40
				HRC - SOCAL	4	20
				SOCAL	11	55
				HSTT Transit Corridor	2	10
Acoustic	Pierside Sonar Testing	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.	HF1, HF3, HF8, M3, MF1, MF3, MF9	Pearl Harbor, HI	7	35
				San Diego, CA	7	35

Table 1-9: Naval Sea Systems Command Proposed Testing Activities within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Anti-Submarine Warfare (continued)						
Acoustic	Submarine Sonar Testing/Maintenance	Pierside and at-sea testing of submarine systems occurs periodically following major maintenance periods and for routine maintenance.	HF1, HF3, M3, MF3	HRC	4	20
				Pearl Harbor, HI	17	85
				San Diego, CA	24	120
Acoustic	Surface Ship Sonar Testing/Maintenance	Pierside and at-sea testing of ship systems occurs periodically following major maintenance periods and for routine maintenance.	ASW3, MF1, MF1K, MF9, MF10	HRC	3	15
				Pearl Harbor, HI	3	15
				San Diego, CA	3	15
				SOCAL	3	15
Explosive, Acoustic	Torpedo (Explosive) Testing	Air, surface, or submarine crews employ explosive and non-explosive torpedoes against artificial targets.	ASW3, HF1, HF5, HF6, MF1, MF3, MF4, MF5, MF6, TORP1, TORP2, E8, E11	HRC (W188)	8	40
				HRC (W188) SOCAL	3	15
				SOCAL	8	40
Acoustic	Torpedo (Non-Explosive) Testing	Air, surface, or submarine crews employ non-explosive torpedoes against submarines or surface vessels.	ASW3, ASW4, HF1, HF6, M3, MF1, MF3, MF4, MF5, MF6, TORP1, TORP2	HRC	8	40
				HRC SOCAL	9	45
				SOCAL	8	40

Table 1-9: Naval Sea Systems Command Proposed Testing Activities within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Mine Warfare						
Explosive, Acoustic	Mine Countermeasure and Neutralization Testing	Air, surface, and subsurface vessels neutralize threat mines and mine-like objects.	HF4, E4	SOCAL	11	55
Explosive, Acoustic	Mine Countermeasure Mission Package Testing	Vessels and associated aircraft conduct mine countermeasure operations.	HF4, SAS2, E4	HRC	19	80
				SOCAL	58	290
Acoustic	Mine Detection and Classification Testing	Air, surface, and subsurface vessels detect and classify mines and mine-like objects. Vessels also assess their potential susceptibility to mines and mine-like objects.	HF1, HF8, MF1, MF5	HRC	2	10
				HRC SOCAL	2	6
				SOCAL	11	55
Surface Warfare						
Explosive	Gun Testing – Large-Caliber	Surface crews defend against surface targets with large-caliber guns.	E3	HRC	7	35
				HRC - SOCAL	72	360
				SOCAL	7	35
Explosive	Gun Testing – Medium-Caliber	Surface crews defend against surface targets with medium-caliber guns.	E1	HRC	4	20
				HRC - SOCAL	48	240
				SOCAL	4	20
Explosive	Missile and Rocket Testing	Missile and rocket testing includes various missiles or rockets fired from submarines and surface combatants. Testing of the launching system and ship defense is performed.	E6	HRC	13	65
				HRC - SOCAL	24	120
				SOCAL	20	100

Table 1-9: Naval Sea Systems Command Proposed Testing Activities within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Unmanned Systems						
Acoustic	Unmanned Surface Vehicle System Testing	Testing involves the production or upgrade of unmanned surface vehicles. This may include tests of mine detection capabilities, evaluations of the basic functions of individual platforms, or complex events with multiple vehicles.	HF4, SAS2	HRC	3	15
				SOCAL	4	20
Acoustic	Unmanned Underwater Vehicle Testing	Testing involves the production or upgrade of unmanned underwater vehicles. This may include tests of mine detection capabilities, evaluations of the basic functions of individual platforms, or complex events with multiple vehicles.	HF4, MF9	HRC	3	15
				SOCAL	291	1,455
Vessel Evaluation						
Acoustic	Submarine Sea Trials – Weapons System Testing	Submarine weapons and sonar systems are tested at-sea to meet the integrated combat system certification requirements.	HF1, M3, MF3, MF9, MF10, TORP2	HRC	1	5
				SOCAL	1	5
Explosive	Surface Warfare Testing	Tests the capabilities of shipboard sensors to detect, track, and engage surface targets. Testing may include ships defending against surface targets using explosive and non-explosive rounds, gun system structural test firing, and demonstration of the response to Call for Fire against land-based targets (simulated by sea-based locations).	E1, E5, E8	HRC	9	45
				HRC - SOCAL	63	313
				SOCAL	14-16	72

Table 1-9: Naval Sea Systems Command Proposed Testing Activities within the Study Area (continued)

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Vessel Evaluation (continued)						
Acoustic	Undersea Warfare Testing	Ships demonstrate capability of countermeasure systems and underwater surveillance, weapons engagement, and communications systems. This tests ships ability to detect, track, and engage undersea targets.	ASW4, HF4, HF8, MF1, MF4, MF5, MF6, TORP1, TORP2	HRC	7	35
				HRC SOCAL	12-16	32
				SOCAL	11	51
Acoustic	Vessel Signature Evaluation	Surface ship, submarine and auxiliary system signature assessments. This may include electronic, radar, acoustic, infrared and magnetic signatures.	ASW3	HRC	4	20
				HRC SOCAL	36	180
				SOCAL	24	120
Other Testing Activities						
Acoustic	Insertion/Extraction	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.	M3, MF9	HRC	1	5
				SOCAL	1	5
Acoustic	Signature Analysis Operations	Surface ship and submarine testing of electromagnetic, acoustic, optical, and radar signature measurements.	HF1, M3, MF9	HRC	2	10
				SOCAL	1	5

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex, HSTT = Hawaii-Southern California Training and Testing, CA = California, HI = Hawaii

1.5.2.3 Office of Naval Research

Table 1-10: Office of Naval Research Proposed Testing Activities Within the Study Area

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Acoustic and Oceanographic Science and Technology						
Explosive, Acoustic	Acoustic and Oceanographic Research	Research using active transmissions from sources deployed from ships and unmanned underwater vehicles. Research sources can be used as proxies for current and future Navy systems.	AG, ASW2, BB4, BB9, LF3, LF4, LF5, MF8, MF9, MF9, MF9, E3	HRC	2	10
				SOCAL	4	20
Acoustic	Long Range Acoustic Communications	Bottom mounted acoustic source off of the Hawaiian Island of Kauai will transmit a variety of acoustic communications sequences.	LF4	HRC	3	15

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex

1.5.2.4 Space and Naval Warfare Systems Command

Table 1-11: Space and Naval Warfare Systems Command Proposed Testing Activities Within the Study Area

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*
Acoustic	Anti-Terrorism/Force Protection	Testing sensor systems that can detect threats to naval piers, ships, and shore infrastructure.	SD1	San Diego, CA	14	70
				SOCAL	16	80
Acoustic	Communications	Testing of underwater communications and networks to extend the principles of FORCEnet below the ocean surface.	ASW2, ASW5, HF6, LF4	HRC	0-1	3
				SOCAL	10	50
Acoustic	Energy and Intelligence, Surveillance, and Reconnaissance Sensor Systems	Develop, integrate, and demonstrate Intelligence, Surveillance, and Reconnaissance systems and in-situ energy systems to support deployed systems.	AG, HF2, HF7, LF4, LF5, LF6, MF10	HRC	11-15	61
				SOCAL	49-55	253
				HSTT Transit Corridor	8	40
Acoustic	Vehicle Testing	Testing of surface and subsurface vehicles and sensor systems, which may involve Unmanned Underwater Vehicles, gliders, and Unmanned Surface Vehicles.	BB4, FLS2, FLS3, HF6, LF3, M3, MF9, MF13, SAS1, SAS2, SAS3	HRC	4	20
				SOCAL	166	830
				HSTT Transit Corridor	2	10

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex, HSTT = Hawaii-Southern California Training and Testing, CA = California

1.5.3 SUMMARY OF ACOUSTIC AND EXPLOSIVE SOURCES ANALYZED FOR TRAINING AND TESTING

Tables 1-12 through 1-15 show the acoustic source classes and numbers, air gun sources, pile driving and removal activities, and explosive source bins and numbers associated with Navy training and testing in the Study Area that were analyzed in this LOA request.

Table 1-12: Acoustic Source Classes Analyzed and Numbers Used during Training and Testing Activities

Source Class Category	*Bin*	*Description*	*Unit*[1]	*Training*		*Testing*	
				Annual[2]	*5-year Total*	*Annual*[2]	*5-year Total*
Low-Frequency (LF): Sources that produce signals less than 1 kHz	LF3	LF sources greater than 200 dB	H	0	0	195	975
	LF4	LF sources equal to 180 dB and up to 200 dB	H	0	0	589 – 777	3,131
			C	0	0	20	100
	LF5	LF sources less than 180 dB	H	0	0	1,814 – 2,694	9,950
	LF6	LF sources greater than 200 dB with long pulse lengths	H	121 – 167	668	40–80	240
Mid-Frequency (MF): Tactical and non-tactical sources that produce signals between 1 and 10 kHz	MF1	Hull-mounted surface ship sonars (e.g., AN/SQS-53C and AN/SQS-61)	H	5,779 – 6,702	28,809	1,540	5,612
	MF1K	Kingfisher mode associated with MF1 sonars	H	100	500	14	70
	MF2[3]	Hull-mounted surface ship sonars (e.g., AN/SQS-56)	H	0	0	54	270
	MF3	Hull-mounted submarine sonars (e.g., AN/BQQ-10)	H	2,080 – 2,175	10,440	1,311	6,553
	MF4	Helicopter-deployed dipping sonars (e.g., AN/AQS-22 and AN/AQS-13)	H	414 – 489	2,070	311 – 475	1,717
	MF5	Active acoustic sonobuoys (e.g., DICASS)	C	5,704 – 6,124	28,300	5,250 – 5,863	27,120

Table 1-12: Acoustic Source Classes Analyzed and Numbers Used during Training and Testing Activities (continued)

Source Class Category	*Bin*	*Description*	*Unit*[1]	*Training*		*Testing*	
				Annual[2]	*5-year Total*	*Annual*[2]	*5-year Total*
Mid-Frequency (MF): Tactical and non-tactical sources that produce signals between 1 and 10 kHz	MF6	Active underwater sound signal devices (e.g., MK 84)	C	9	45	1,141 – 1,226	5,835
	MF8	Active sources (greater than 200 dB) not otherwise binned	H	0	0	70	350
	MF9	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned	H	0	0	5,139 – 5,165	25,753
	MF10	Active sources (greater than 160 dB, but less than 180 dB) not otherwise binned	H	0	0	1,824– 1,992	9,288
	MF11	Hull-mounted surface ship sonars with an active duty cycle greater than 80%	H	718 – 890	3,597	56	280
	MF12	Towed array surface ship sonars with an active duty cycle greater than 80%	H	161 – 215	884	660	3,300
	MF13	MF sonar source	H	0	0	300	1,500
High-Frequency (HF): Tactical and non-tactical sources that produce signals between 10 and 100 kHz	HF1	Hull-mounted submarine sonars (e.g., AN/BQQ-10)	H	1,795 – 1,816	8,939	772	3,859
	HF2	HF Marine Mammal Monitoring System	H	0	0	120	600
	HF3	Other hull-mounted submarine sonars (classified)	H	287	1,345	110	549

Table 1-12: Acoustic Source Classes Analyzed and Numbers Used during Training and Testing Activities (continued)

Source Class Category	*Bin*	*Description*	*Unit*[1]	*Training*		*Testing*	
				Annual[2]	*5-year Total*	*Annual*[2]	*5-year Total*
High-Frequency (HF): Tactical and non-tactical sources that produce signals between 10 and 100 kHz	HF4	Mine detection, classification, and neutralization sonar (e.g., AN/SQS-20)	H	2,316	10,380	16,299 – 16,323	81,447
	HF5	Active sources (greater than 200 dB) not otherwise binned	H	0	0	960	4,800
			C	0	0	40	200
	HF6	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned	H	0	0	1,000 – 1,009	5,007
	HF7	Active sources (greater than 160 dB, but less than 180 dB) not otherwise binned	H	0	0	1,380	6,900
	HF8	Hull-mounted surface ship sonars (e.g., AN/SQS-61)	H	118	588	1,032	3,072
Anti-Submarine Warfare (ASW): Tactical sources (e.g., active sonobuoys and acoustic countermeasures systems) used during ASW training and testing activities	ASW1	MF systems operating above 200 dB	H	194 – 261	1,048	470	2,350
	ASW2	MF Multistatic Active Coherent sonobuoy (e.g., AN/SSQ-125)	C	688–790	3,346	4,334 – 5,191	23,375
	ASW3	MF towed active acoustic countermeasure systems (e.g., AN/SLQ-25)	H	5,005 – 6,425	25,955	2,741	13,705

Table 1-12: Acoustic Source Classes Analyzed and Numbers Used during Training and Testing Activities (continued)

Source Class Category	*Bin*	*Description*	*Unit*[1]	*Training*		*Testing*	
				Annual[2]	*5-year Total*	*Annual*[2]	*5-year Total*
Anti-Submarine Warfare (ASW): Tactical sources (e.g., active sonobuoys and acoustic countermeasures systems) used during ASW training and testing activities	ASW4	MF expendable active acoustic device countermeasures (e.g., MK 3)	C	1,284 – 1,332	6,407	2,244	10,910
	ASW5[4]	MF sonobuoys with high duty cycles	H	220– 300	1,260	522–592	2,740
Torpedoes (TORP): Source classes associated with the active acoustic signals produced by torpedoes	TORP1	Lightweight torpedo (e.g., MK 46, MK 54, or Anti-Torpedo Torpedo)	C	231–237	1,137	923 – 971	4,560
	TORP2	Heavyweight torpedo (e.g., MK 48)	C	521 – 587	2,407	404	1,948
	TORP3		C	0	0	45	225
Forward Looking Sonar (FLS): Forward or upward looking object avoidance sonars used for ship navigation and safety	FLS2	HF sources with short pulse lengths, narrow beam widths, and focused beam patterns	H	28	140	448 – 544	2,432
	FLS3	VHF sources with short pulse lengths, narrow beam widths, and focused beam patterns	H	0	0	2,640	13,200
Acoustic Modems (M): Systems used to transmit data through the water	M3	MF acoustic modems (greater than 190 dB)	H	61	153	518	2,588
Swimmer Detection Sonars (SD): Systems used to detect divers and submerged swimmers	SD1–SD2	HF and VHF sources with short pulse lengths, used for the detection of swimmers and other objects for the purpose of port security	H	0	0	10	50

Table 1-12: Acoustic Source Classes Analyzed and Numbers Used during Training and Testing Activities (continued)

Source Class Category	*Bin*	*Description*	*Unit*[1]	*Training*		*Testing*	
				Annual[2]	*5-year Total*	*Annual*[2]	*5-year Total*
Synthetic Aperture Sonars (SAS): Sonars in which active acoustic signals are post-processed to form high-resolution images of the seafloor	SAS1	MF SAS systems	H	0	0	1,960	9,800
	SAS2	HF SAS systems	H	900	4,498	8,584	42,920
	SAS3	VHF SAS systems	H	0	0	4,600	23,000
	SAS4	MF to HF broadband mine countermeasure sonar	H	42	210	0	0
Broadband Sound Sources (BB): Sonar systems with large frequency spectra, used for various purposes	BB4	LF to MF oceanographic source	H	0	0	810 – 1,170	4,434
	BB7	LF oceanographic source	C	0	0	28	140
	BB9	MF optoacoustic source	H	0	0	480	2,400

[1] H = hours; C = count (e.g., number of individual pings or individual sonobuoys).
[2] Expected annual use may vary per bin because the number of events may vary from year to year, as described in Section 1.5 (Proposed Action).
[3] MF2/MF2K are sources on frigate class ships, which were decommissioned during Phase II.
[4] Formerly ASW2 (H) in Phase II.
Notes: dB = decibel(s), kHz = kilohertz

Table 1-13: Training and Testing Air Gun Sources Quantitatively Analyzed in the Study Area

Source Class Category	*Bin*	*Unit*[1]	*Training*		*Testing*	
			Annual	*5-year Total*	*Annual*	*5-year Total*
Air Guns (AG): small underwater air guns	AG	C	0	0	284	1,420

1 C = count. One count (C) of AG is equivalent to 100 air gun firings.

Table 1-14: Summary of Pile Driving and Removal Activities per 24-Hour Period

Method	Piles Per 24-Hour Period	Time Per Pile	Total Estimated Time of Noise Per 24-Hour Period
Pile Driving (Impact)	6	15 minutes	90 minutes
Pile Removal (Vibratory)	12	6 minutes	72 minutes

Table 1-15: Explosive Source Bins Analyzed and Numbers Used during Training and Testing Activities

Bin	Net Explosive Weight (lb.)	Example Explosive Source	Modeled Underwater Detonation Depths (ft.)[1]	Training		Testing	
				Annual	5-year Total	Annual	5-year Total
E1	0.1–0.25	Medium-caliber projectiles	0.3, 60	2,940	14,700	8,916 – 15,216	62,880
E2	> 0.25–0.5	Medium-caliber projectiles	0.3, 50	1,746	8,730	0	0
E3	> 0.5–2.5	Large-caliber projectiles	0.3, 60	2,797	13,985	2,880 – 3,124	14,844
E4	> 2.5–5	Mine neutralization charge	10, 16, 33, 50, 61, 65, 650	38	190	634 – 674	3,065
E5	> 5–10	5 in. projectiles	0.3, 10, 50	4,730 – 4,830	23,750	1,400	7,000
E6	> 10–20	Hellfire missile	0.3, 10, 50, 60	592	2,872	26 – 38	166
E7	> 20–60	Demo block/ shaped charge	10, 50, 60	13	65	0	0
E8	> 60–100	Lightweight torpedo	0.3, 150	33 – 88	170	57	285
E9	> 100–250	500 lb. bomb	0.3	410 – 450	2,090	4	20
E10	> 250–500	Harpoon missile	0.3	219 – 224	1,100	30	150
E11	> 500–650	650 lb. mine	61, 150	7 – 17	45	12	60
E12	> 650–1,000	2,000 lb. bomb	0.3	16 – 21	77	0	0
E13	> 1,000–1,740	Multiple Mat Weave charges	NA[3]	9	45	0	0

[1] Net Explosive Weight refers to the amount of explosives; the actual weight of a munition may be larger due to other components.
[2] HBX refers to the high blast explosive family of binary explosives composed of royal demolition explosive (explosive nitroamine), trinitrotoluene (TNT), powdered aluminum, and D-2 wax with calcium chloride.
[3] Not modeled because charge is detonated in surf zone; not a single E13 charge, but multiple smaller charges detonated in quick succession
Notes: in. = inch(es), lb. = pound(s), ft. = feet

CD-049-08 - CCC Conditions

1. Safety Zones. The Navy shall adopt safety zones (i.e., marine mammal preclusion zones) from the sonar source out to the distance at which the sonar has attenuated to 154 dB (received level (RL), expressed in decibels (re 1 $\mu Pa^2 \cdot s$)). The Navy will monitor the area and lower sonar levels (or delay transmissions until an animal has left the safety zone) such that marine mammals and sea turtles will not be exposed to received levels greater than 154 dB. If the 154 dB level cannot be feasibly achieved, the Navy shall either (a) cease sonar transmissions whenever a marine mammal or sea turtle is detected within 2 km of the sonar dome; or (b) provide the Commission with sufficient information about the sonar intensities and attenuation rates, the maximum capabilities of its monitoring, and its proposed procedures, to enable the Commission to determine that the Navy will protect a safety zone as close as is possible to the 154 dB zone. The Navy shall provide this information to the Commission staff for review and approval by the Executive Director prior to the first exercise involving mid-frequency sonar and shall comply with the approved procedures.

2. Elimination of expanded ASW training/instrumentation in the Tanner and Cortes Banks (Exhibits 2-3)**.** The Navy shall either:

(a) eliminate from its proposed activities the proposed expansion of the shallow water training range in the Tanner and Cortes Banks; OR

(b) agree to not conduct any activities in these banks using mid-frequency sonar at levels exceeding 154 dB (source level) from May to November, the period of regularly surveyed high concentrations of foraging blue and fin whales in this area.

3. Gray Whale Migration Season. To the maximum extent feasible, the Navy shall locate and schedule training outside the gray whale migration season, where the sonar employed in the training activities would otherwise be near enough to known or observed gray whale migration paths to expose gray whales in such paths to sonar levels above 154 dB. If conducting exercises during the migration season the Navy shall avoid known gray whale migration corridors.

4. Areas of High Marine Mammal Populations. To the maximum extent feasible, the Navy shall avoid training using high-intensity mid-frequency sonar in areas with known high concentrations of marine mammals, including but not limited to avoiding any active sonar transmissions:

(a) within the National Marine Sanctuaries off California's coast (e.g., the Channel Islands NMS)(and which includes the waters around Santa Barbara Island);

(b) within the Catalina Basin (between the Catalina and San Clemente Escarpments (Exhibit 3);

Exhibit 14
CD-0001-18
(formerly Exhibit 19 from CD-008-13)

(c) seasonally (during the warm water months of May to November) in the Tanner and Cortes Banks (Exhibits 2-3, and 15) (and as defined on page 55 (i.e., within 10 nm of the 200 fathom isobath defining Tanner and Cortes Banks)); and

(d) adjacent to seamounts and coastal areas with complex, steep seabed topography, except on the Navy's instrumented range off San Clemente Island.

5. Night and low visibility conditions. The Navy shall operate mid-frequency sonar under reduced power during low visibility conditions, as follows:

Low visibility conditions (i.e., whenever the entire safety zone cannot be effectively monitored due to nighttime, high sea state, fog or other factors) – The Navy will use additional detection measures, such as infrared (IR) or enhanced passive acoustic detection. Except in extraordinary circumstances, the Navy will power down sonar by 6 dB as if marine mammals were present in the zones it cannot see.

6. Surface Ducting Conditions. During significant surface ducting conditions, as defined by NMFS (2006), the Navy shall power down the sonar source by 6 dB from the maximum level that would otherwise be allowed by these conditions. The Navy shall assess whether surface ducting conditions are present at least once hourly during periods as specified by NMFS.

7. Choke-point exercises. Prior to implementing choke-point or simulated choke-point exercises, Navy commands shall:

- Provide NMFS (Stranding Coordinator and Protected Resources, Headquarters) with information regarding the time and place for the choke-point exercises in advance of any proposed choke-point exercise.

- Not proceed unless the Navy receives NMFS' approval as to whether non-Navy observers are required.

- Coordinate a focused monitoring effort around the choke-point/simulated choke-point exercise, to include pre-exercise monitoring (2 hours), during-exercise monitoring, and post-exercise monitoring (1-2 days). This monitoring effort will include at least one dedicated aircraft or one dedicated vessel for realtime monitoring from the pre- through post-monitoring time period, except at night, with the vessel or airplane maintaining regular communication with a Tactical Officer with the authority to shutdown, power-down, or delay the start-up of sonar operations. These monitors will communicate with the Navy command to ensure the safety zones are clear prior to sonar start-up, to recommend power-down and shut-down during the exercise, and to search extensively for potentially injured or stranding animals in the area and downcurrent of the area post-exercise.

8. Baseline Monitoring. The Navy shall perform pre-exercise aerial monitoring commencing 60 minutes prior to commencement of mid-frequency sonar use, except as discussed in Condition 11, where additional pre-exercise monitoring is stipulated, in accordance with the District Court Order in its Modified Preliminary Injunction, January 10, 2007, page 4.

9. Five-Year Term for Consistency Determination. The Navy agrees that this federal consistency authorization is limited to a five-year period, from January 1, 2009 to December 31, 2013. Any Navy SOCAL training or testing scheduled to occur after that period shall be the subject of a subsequent consistency determination submitted by the Navy.

Because the Navy agreed to implement the originally-recommended Conditions 2, 4, 5, 9 and 12 into the project description, these conditions have been eliminated as conditions and are relocated to be included in the project description.

2. Surveillance. Surveillance shall include two dedicated NOAA-trained marine mammal observers at all times during use of mid-frequency sonar. NOAA training includes using qualified watchstanders who have completed marine species awareness training and who have been approved by NMFS.

4. Passive Acoustic Monitoring. The Navy shall employ passive acoustic monitoring to enforce the safety zones described in Condition 1. All personnel engaged in passive acoustic sonar operations during an exercise employing mid-frequency sonar shall monitor for marine mammals and sea turtles and report the detection of any marine mammal or sea turtle to the appropriate watch station for dissemination and appropriate action.

5. Aerial Monitoring. The Navy shall ensure that aircraft operating in the Navy's instrumented range off San Clemente will monitor the area for marine mammals and sea turtles during their assigned missions and will monitor the area throughout any mid-frequency sonar exercises on the instrumented range. All other Naval aircraft flying low enough to reasonably spot a marine mammal and sea turtles will watch for them. The Navy shall require that all aerial sightings of marine mammals and sea turtles be reported to the appropriate watch stations for appropriate action. Appropriate action means taking mitigation measures and disseminating the information to other units and watchstanders for increased situational awareness.

9. Stranding Response and Reporting/Marine Mammal Monitoring. The Navy shall coordinate with the NMFS Stranding Coordinator for any unusual marine mammal behavior, including stranding, beached live or dead cetacean(s), floating marine mammals, or out-of-habitat/milling live cetaceans that may occur at any time during or shortly after major exercises. The Navy shall submit its proposed stranding protocols being worked out with NMFS to the Commission staff, prior to commencement of the first exercise using mid-frequency sonar. These protocols shall include direct notification to NMFS' Long Beach Office when the Navy notifies NMFS of any of the above unusual behaviors. The protocols shall also include provisions for a third party scientific observer for any necropsy performed, drawn from a list to be supplied by the Commission staff, and agreed to by NMFS, with the

understanding that allowance of such observer shall not in any way interfere with or delay NMFS' necropsy procedures or activities. The Navy shall also continue to submit "after-action" reports to NMFS and to the Commission staff after the completion of a major exercises, which will include:

- An assessment of the effectiveness of these mitigation and monitoring measures with recommendations of how to improve them.

- Results of the marine species monitoring during the major exercise. As much unclassified information as the Navy can provide including, but not limited to, where and when sonar was used (including sources not considered in take estimates, such as submarine and aircraft sonars) in relation to any measured received levels, source levels, numbers of sources, and frequencies, so it can be coordinated with observed cetacean behaviors. If necessary, classified information may be provided to NMFS personnel with an appropriate security clearance and need to know.

12. Mine Shape Retrieval. To the maximum extent feasible, the Navy shall retrieve inert mine shapes dropped.

CD-086-06 - CCC Conditions

1. Safety Zones. The Navy shall adopt safety zones (i.e., marine mammal preclusion zones) out to the distance at which the sonar has attenuated to 154 dB (received level (RL), expressed in decibels (re 1 $\mu Pa^2 \cdot s$)). The Navy will monitor the area and lower sonar levels (or delay transmissions until an animal has left the safety zone) such that marine mammals and sea turtles will not be exposed to received levels greater than 154 dB. If the 154 dB level cannot be feasibly achieved, the Navy shall either cease sonar transmissions should a marine mammal be detected within 2 km of the sonar dome, as the Navy has currently agreed to for its SURTASS LFA sonar operations, or the Navy shall provide the Commission with sufficient information about the sonar intensities and attenuation rates, and the maximum capabilities of its monitoring, to enable the Commission to determine that the Navy will protect a safety zone as close as is possible to the 154 dB zone. The Navy shall provide this information to the Commission staff for review and approval by the Executive Director prior to the first exercise involving mid-frequency sonar.

2. Surveillance. Surveillance shall include two dedicated NOAA-trained marine mammal observers at all times during use of mid-frequency sonar.

3. Training. The Navy shall employ the RIMPAC-derived measures, which state:

> **NMFS-Approved Training**
> • Navy shipboard lookouts shall be qualified watchstanders who have completed marine species awareness training.
> - Navy watchstanders will participate in marine mammal observer training approved by NMFS.

4. Passive Acoustic Monitoring. Passive acoustic monitoring will be used to enforce safety zones. All personnel engaged in passive acoustic sonar operations during an exercise employing mid-frequency sonar shall monitor for marine mammals and report the detection of any marine mammal to the appropriate watch station for dissemination and appropriate action.

5. Aerial Monitoring. The Navy shall ensure that aircraft operating in the Navy's instrumented range off San Clemente will monitor the area for marine mammals during their assigned missions and will monitor the area throughout any mid-frequency sonar exercises on the instrumented range. All other aircraft flying low enough to reasonably spot a marine mammal will watch for marine mammals. The Navy shall require that all aerial sightings of marine mammals be reported to the appropriate watch stations for appropriate action. Appropriate action means taking mitigation measures and disseminating the information to other units and watchstanders for increased situational awareness.

6. Gray Whale Migration Season. To the maximum extent feasible, the Navy shall locate and schedule training outside the gray whale migration season, where the sonar is near enough to known or observed gray whale migration paths to expose gray whales to sonar levels

above 154 dB. If conducting exercises during the migration season the Navy shall avoid known gray whale migration corridors.

7. Areas of High Marine Mammal Populations. To the maximum extent feasible, the Navy shall avoid training in areas with known high concentrations of marine mammals, including but not limited to:

> avoiding active sonar transmissions within the National Marine Sanctuaries off California's coast (e.g., the Channel Islands NMS); and
>
> avoiding seamounts and coastal areas with complex, steep seabed topography, except on the Navy's instrumented range off San Clemente Island.

8. Night and low visibility conditions. The Navy shall employ the RIMPAC-derived measures, which state[1]:

> **Low visibility conditions (i.e., whenever the entire safety zone cannot be effectively monitored due to nighttime, high sea state, fog or other factors) –** The Navy will use additional detection measures, such as infrared (IR) or enhanced passive acoustic detection. Except in extraordinary circumstances, the Navy will power down sonar by 6 dB as if marine mammals were present in the zones it cannot see.

9. Stranding Response and Reporting. The Navy shall employ the RIMPAC-derived measures, which state:

> • The Navy will coordinate with the NMFS Stranding Coordinator for any unusual marine mammal behavior, including stranding, beached live or dead cetacean(s), floating marine mammals, or out-of-habitat/milling live cetaceans that may occur at any time during or shortly after major exercises.
>
> • The Navy will provide a report to NMFS after the completion of a major exercise that includes:
>
> - An assessment of the effectiveness of these mitigation and monitoring measures with recommendations of how to improve them.
>
> - Results of the marine species monitoring during the major exercise. As much unclassified information as the Navy can provide including, but not limited to, where

[1] In fact, the U.S. Marine Mammal Commission has specifically recommended that, "given the limitations of night vision devices (based on [NMFS'] assessment in its previous Federal Register notices) and passive acoustic monitoring," the Navy observe a mandatory power-down in low-visibility conditions, assuming it cannot simply avoid them (MMC 2006). (Comments from Tim Ragen, Acting Executive Director, Marine Mammal Commission, to P. Michael Payne, Chief of the Permits Division, NMFS, on the Navy's 2006 Rim of the Pacific (RIMPAC) Exercise.)

and when sonar was used (including sources not considered in take estimates, such as submarine and aircraft sonars) in relation to any measured received levels, source levels, numbers of sources, and frequencies, so it can be coordinated with observed cetacean behaviors. If necessary, classified information may be provided to NMFS personnel with an appropriate security clearance and need to know.

10. Surface Ducting Conditions. During significant surface ducting conditions, as defined by NMFS (2006), the Navy shall power down the sonar source by 6 dB. The Navy shall assess whether surface ducting conditions are present at least once hourly during periods as specified by NMFS (and as discussed on page 3 of the NMFS IHA for RIMPAC (Exhibit 13)).

11. Choke-point exercises. - Prior to approving a proposed choke-point exercise, Navy commands shall consult with OPNAV N45.

- The Navy will provide NMFS (Stranding Coordinator and Protected Resources, Headquarters) with information regarding the time and place for the choke-point exercises in advance of any proposed choke-point exercise.

- The Navy and NMFS will mutually agree upon whether non-Navy observers are required.

- The Navy will coordinate a focused monitoring effort around the choke-point exercises, to include pre-exercise monitoring (2 hours), during-exercise monitoring, and post-exercise monitoring (1-2 days). This monitoring effort will include at least one dedicated aircraft or one dedicated vessel for realtime monitoring from the pre- through post-monitoring time period, except at night, with the vessel or airplane maintaining regular communication with a Tactical Officer with the authority to shutdown, power-down, or delay the start-up of sonar operations. These monitors will communicate with the Navy command to ensure the safety zones are clear prior to sonar start-up, to recommend power-down and shut-down during the exercise, and to extensively search for potentially injured or stranding animals in the area and downcurrent of the area post-exercise.

12. Mine Shape Retrieval. To the maximum extent feasible, the Navy shall retrieve inert mine shapes dropped.

13. Monitoring Reports. In addition to the above, as agreed to previously, all monitoring results provided to NMFS (unless classified) shall be submitted to the Commission staff.

14. Baseline Monitoring. The Navy shall perform pre-exercise monitoring commencing 30 minutes prior to commencement of mid-frequency sonar use.