31 July 2025

Mr. Benjamin Laws, Supervisor
Incidental Take Program
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910-3226

Dear Mr. Laws:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the National Marine Fisheries Service's (NMFS) 16 July 2025 notice (90 Fed. Reg. 32118) and the letter of authorization (LOA) application submitted by the U.S. Navy (the Navy)[1] seeking issuance of regulations under section 101(a)(5)(A) of the Marine Mammal Protection Act (the MMPA). The taking would be incidental to conducting training and research, development, test, and evaluation (testing) activities within the Hawaii-California Training and Testing (HCTT) study area (Phase IV activities). The Commission reviewed and provided recommendations in its 14 January 2025 letter on the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS) for conducting training and testing activities in the HCTT study area, which underpins the Navy's LOA application. NMFS authorized the Navy to conduct similar activities first under the Tactical Training Theater Assessment and Planning (TAP I) LOA applications and then again under Phase II and III LOA applications.

Background

The Navy's HCTT study area is in the Pacific Ocean and encompasses the waters along the coast of California, around the Hawaiian Islands, and the associated transit corridor, including pierside locations and port transit channels, bays, harbors, inshore waterways, amphibious approach lanes, and civilian ports. The activities would involve the use of low-, mid-, high- and very high frequency active sonar, weapons systems, explosive and non-explosive practice munitions and ordnance, high-explosive underwater detonations (including a single ship shock trial), expended materials, vibratory and impact hammers, airguns, electromagnetic devices, high-energy lasers, vessels, underwater vehicles, and aircraft. In addition to some time-area closures, mitigation measures would include visual monitoring to implement delay and shut-down procedures.

[1] Including the U.S. Marine Corps and on behalf of the U.S. Coast Guard (USCG) and Army.

Density estimates

Guadalupe fur seals—Department of the Navy (2024c) used an unpublished upper bound estimate of Guadalupe fur seal abundance from Norris (2022) rather than the peer-reviewed abundance estimate from Juárez-Ruiz et al. (2022) that published just six months later (48,780 vs. 72,631 fur seals[2], respectively). The Navy indicated that it chose to use the greater of the two abundance estimates provided by Norris (2022; 37,940 and 48,780 fur seals) instead of the mean estimate (43,360 fur seals) to calculate the various densities in Table 9-1 and that the greater density also accounted for any pups missed during counts (Department of the Navy 2024c). That is a reasonable approach. However, the published abundance estimates should have been used in that manner, as they have been available for 2.5 years, rather than the unpublished abundance estimates. The Navy also indicated that it had used the mean abundance estimate of 43,360 to account for the lower in-water abundance expected from July–March to account for pups remaining on land or outside of the Study Area. Again, this is a reasonable approach, but the mean abundance estimate of 63,850 fur seals from Juárez-Ruiz et al. (2022) should have been used.

In addition, the Navy estimated that 50 to 100 percent of Guadalupe fur seals occur in the core area and 10 to 50 percent occur in the geographic area, depending on seasonal fluctuations in distribution. The Navy used the mid-points of each area (i.e., 75 and 30 percent) to estimate the number of fur seals in each area—the mid-points effectively increased the abundance estimates used by 5 percent (for a total of 105 percent; Department of the Navy 2024c). Since the abundance estimates from Juárez-Ruiz et al. (2022) are from the 2019 dataset and the researchers estimated the annual growth rate to be 8.4 percent for the 1991–2019 period, the higher end of the abundance estimates and the mid-points of each area would yield lower density estimates than had the Navy used the mean abundance estimate and the 8.4 percent growth rate projected to 2025, when the FEIS and final rule are expected to be issued. As such, the Commission recommends that at the very least NMFS should use an abundance estimate of 72,631 rather than 48,780 for April–June and 63,850 rather than 43,360 for July–March, along with the 75 percent assumption for the core area and 30 percent assumption for the geographic area to revise the density estimates and resulting numbers of takes of Guadalupe fur seals for the final rule.

Hawaiian monk seals—Department of the Navy (2024c) used the island-specific monk seal abundance estimates from the 2021 stock assessment report rather than the 2022 stock assessment report[3] (compare Table 9-17 in Department of the Navy (2024c) to Table 1 in the 2022 stock assessment report[4]) to derive its monk seal densities. The estimated number of monk seals increased from 1,437 to 1,465 between the 2021 and 2022 stock assessment reports. The Commission pointed out a similar issue for HSTT Phase III activities. The Commission recommends that NMFS use the monk seal abundance estimates from the 2022 stock assessment report to derive its density estimates and re-estimate the numbers of takes for the final rule.

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[2] Both of which are based on the higher end of the abundance range.
[3] The abundance estimate from the 2023 stock assessment report was not available when Department of the Navy (2024c) was finalized.
[4] https://www.fisheries.noaa.gov/s3/2023-08/Monk-Seal-2022.pdf.

Northern elephant seals—The Navy appears to have assumed that due to the molt no female elephant seals would be in the ocean from May–June[5] and that males would not be present off California from April–June (see Table 9-14 in Department of the Navy 2024c). These assumptions resulted in zero densities for elephant seals in nearshore waters from April–June and in offshore waters from May–June. The Navy indicated that it used kernel density distributions from Robinson et al. (2012) to estimate in-water occurrence of females in the HCTT study area (Department of the Navy 2024c). However, Figure 4 in Robinson et al. (2012) clearly shows that from May–June female elephant seals are concentrated in the waters of the HCTT study area, apparently in higher distributed densities than at any other time of year. The Commission notes that Robinson et al. (2012) included tagging data only from females instrumented at Año Nuevo Island. If females had been tagged at Pt. Reyes, Piedras Blancas, and the Channel Islands as well, the proportion of instrumented females in the water would have been even higher throughout the HCTT study area.

While the Navy assumed that no females and males would be in the water during the molt, it assumed that 25 percent of them would be in the water during the breeding season (see Table 9-14 in Department of the Navy 2024c). Seals come and go from the beach at different times during both the breeding and molting seasons and may spend more time in the water during the overall molting season[6]. All of the seals do not remain on the beach for the entire molting season. Further, the Navy's assumptions in Table 9-14 appear to be based on adult males and females rather than pups or juveniles. The Navy did not use age tables to differentiate the various densities, as it did for multiple species of otariids (Department of the Navy 2024c). As such, the Navy's assumptions that only 5 percent of females and 0–10 percent of males occur off California in September and October (Table 9-14 in Department of the Navy 2024c) underestimate the actual proportions at sea because the Navy did not appear to account for yearlings and juveniles that are present along the California beaches in those months[7]. Moreover, the Navy assumed that 100 percent of the males would be off California from January–February but that only 80 percent of the females would be off California during that same timeframe[8]. The entire California stock of elephant seals is expected to be off California during the breeding season[9], with the highest concentration of female elephant seals occurring off the California beaches in January and February, similar to the molt in May (Robinson et al. 2012).

For all of these reasons, the Commission recommends that NMFS (1) revise the elephant seal density estimates by increasing the (a) in-water percentage of females from 0 to 25 percent for May and June, (b) percentage of females off California from 80 to 100 percent for January, February, and May, (c) in-water percentage of males from 0 to 25 percent for August, and (d) percentage of females off California in September and October from 5 percent and males off California in April,

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[5] Resulting in an in-water percentage of 0. The Navy estimated elephant seal densities based on sex, in-water percentages, off-California percentages, and nearshore vs. offshore strata (and a Baja stratum).
[6] See Charlanne et al. (2024) as an example for southern elephant seals. This has yet to be studied and published for northern elephant seals.
[7] Nor did it account for juvenile males that are on shore to molt.
i.e., https://visitsansimeonca.com/what-to-do/elephant-seals-san-simeon/#:~:text=Starting %20in%20April%2C%20females%20and,arrive%20to%20begin%20their%20molt, https://www.nps.gov/pore/planyourvisit/wildlife_viewing_elephantseals.htm#:~:text=By%20mid%2DApril%2C%20most%20of,and%20beach%20on%20the%20left.
[8] The Navy similarly assumed that 100 percent of the males would be off California in August for the molt but only 80 percent of the females were assumed to be off California in May for the molt.
[9] As well as the molting season.

May, June, and October from 0–10 percent to the percentage of the population expected to be comprised of yearlings and juveniles and the sex-based ratios provided in Table 9-12 of Department of the Navy (2024c) and (2) re-estimate the numbers of takes accordingly for the final rule. These revisions are particularly important, because NMFS relies on the Navy's density estimates for authorizing the taking associated with many other activities off California and will do so for at least the next 7 years until the Phase V densities are available.

Harbor seals and bottlenose dolphins—The Navy used various seasonal in-water percentages in Table 9-20 of Department of the Navy (2024c) to estimate in-water abundances of harbor seals. First, the Navy used just the San Nicolas Island correction factor of 2.44[10] from Stewart and Yochem (1983) to estimate the total abundance of seals for all of the Channel Islands in Table 9-21 of Department of the Navy (2024c). Harvey and Goley (2011) provide a more reliable correction factor of 2.86 for all of Southern California, including four Channel Islands and Pt. Mugu, not just a single island and include a much greater sample size than Stewart and Yochem (1983; n=60 vs 10). The Navy also provided no justification for assuming that 87 percent of the harbor seals were estimated to be onshore at Pt. Mugu and La Jolla, resulting in a correction factor of 1.15 (Department of the Navy 2024c). Both correction factors are less than the 2.86 correction factor from Harvey and Goley (2011).

Additional in-water percentages from Table 9-20 in Department of the Navy (2024c) were used to estimate in-water abundances from the total abundance estimate at each location in Table 9-21. An in-water percentage was not provided for September–February for San Nicolas Island, so it is unclear what percentage was used. However, the Navy did assume that the 59 percent in-water from San Nicolas Island (Stewart and Yochem 1983) applied to all of the Channel Islands rather than use the 65 percent from Harvey and Goley (2011) that was derived from data from multiple Channel Islands and Pt. Mugu. The Navy also used the lower in-water percentage of 17 percent from Huber et al. (2001) for Southern California for March–August rather than the 65 percent from Harvey and Goley (2011). This too is puzzling since Huber et al. (2001) is applicable only to Santa Barbara County, while Harvey and Goley (2011) is based on data throughout Southern California. All such assumptions result in underestimated harbor seal densities.

In addition, the Navy assumed that harbor seals only occur up to 20 km from shore or within the 120-m isobath. None of the references cited in Department of the Navy (2024c) substantiate either the distance from shore or the isobath delineation. Calambokidis (2004) has shown that harbor seals have been observed much farther than 20 km from shore (see Figure 7), which appears to coincide with the 40-km offshore stratum used for harbor seals in the Northwest Training and Testing Range (NWTT) Phase II documents (Department of the Navy 2014b). Stewart and Yochem (1994) has shown that harbor seals can forage at depths of up to 446 m and at a modal depth of 280 m in the Channel Islands.

Moreover, the Navy assumed in Figures 9-27 and 9-28 that harbor seals do not occur on or near Santa Catalina Island, from La Jolla to Pt. Mugu, and from Pt. Mugu around past Pt. Conception (Department of the Navy 2024c). Those assumptions are refuted by Lowry et al.

[10] Which equates to 41 percent onshore and 59 percent in water from Table 9-20 in Department of the Navy (2024c).

(2021)[11] and (2008), Huber et al. (2001), Hanan (1986), and monitoring reports for numerous construction activities that have occurred along the Southern California coast (one such example is ManTech-AECOM Joint Venture (2022))[12]. The Commission therefore recommends that NMFS (1) revise the harbor seal density estimates by using (a) the 2.86 correction factor from Harvey and Goley (2011) rather than 2.44 for the Channel Islands and 1.15 for Pt. Mugu and La Jolla to estimate the total abundances at the various locations in Table 9-21 of Department of the Navy (2024c), (b) the 65 percent in-water percentage from Harvey and Goley (2011) for Pt. Mugu, La Jolla, and all of the Channel Islands except for San Nicolas and San Miguel Islands for the entire year[13], and (c) 40 km from shore from Calambokidis (2004) and the 200-m isobath based on Stewart and Yochem (1994) rather than 20 km from shore and the 120-m isobath as stratum demarcations for areas where harbor seals could occur, and (2) re-estimate the numbers of takes accordingly for the final rule. The Commission further recommends that NMFS (1) contact the Southwest Fisheries Science Center to obtain the maximum harbor seal abundance estimate from Santa Catalina Island during which the relevant haul-out sites were surveyed and use the 2.86 correction factor to estimate the total abundance at Santa Catalina Island, (2) estimate the total abundance of harbor seals from La Jolla to Pt. Mugu and from Pt. Mugu around past Pt. Conception based on the number of harbor seals of the 30,968 abundance estimate for the California stock from Harvey and Goley (2011) that remains after subtracting the Channel Islands, Pt. Mugu, and La Jolla abundance estimates, (3) use the 65 percent in-water percentage from Harvey and Goley (2011), 40 km from shore from Calambokidis (2004), and the 200-m isobath based on Stewart and Yochem (1994) to estimate the harbor seal density for Santa Catalina Island, from La Jolla to Pt. Mugu, and from Pt. Mugu around past Pt. Conception, and (4) re-estimate the numbers of takes accordingly for the final rule.

Lastly for harbor seals, Department of the Navy (2024c) did not derive a density for San Diego Bay or the Silver Strand Training Complex (SSTC) Area as it did for California sea lions. Figures 9-27 and 9-28 in Department of the Navy (2024c) appear to show zero densities for these areas. Department of the Navy (2024c) indicated that the California sea lion is the only pinniped that occurs regularly within San Diego Bay. That statement is simply untrue. The Navy has been conducting construction activities, as well as underwater detonation activities in and around San Diego Bay for many years. In fact, NMFS has issued the Navy 15 incidental taking authorizations involving just construction activities issued for San Diego Bay in the last decade[14]. The Navy has been authorized to take and has reported harbor seal takes in and around San Diego Bay for more than a decade (see as a recent example, Naval Facilities Engineering Command Southwest (NAVFAC SW; 2024b)). The Commission therefore recommends that NMFS work with the Navy to derive harbor seal density estimates for both within San Diego Bay and the SSTC area based on

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[11] The Commission further notes that Lowry et al. (2017) clarified that not all of the Channel Islands are surveyed for each of the pinniped species. No harbor seals observed would mean that the harbor seal beaches may not have been surveyed during the various overflights rather than zero harbor seals are expected to occur on Santa Catalina Island.
[12] https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities.
[13] Both the March–August and September–February timeframes.
[14] https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities.

sightings data from the numerous monitoring reports, while also considering the area beyond the Coronado Bridge[15] in San Diego Bay.

Bottlenose dolphins occur in San Diego Bay and the SSTC area as well (as two examples, see NAVFAC SW (2024a, b)), but separate densities were not provided in Department of the Navy (2024c). The Commission recommends that NMFS work with the Navy to derive density estimates in the same manner for bottlenose dolphins as recommended for harbor seals within San Diego Bay and the SSTC area. Similar to the elephant seal densities, the Navy and other action proponents will use the density estimates from Department of the Navy (2024c) for compliance documents until the Phase V densities are provided in 2031. Thus, it is imperative that the harbor seal and bottlenose dolphin density estimates be accurate and reflective of where they are known and expected to occur.

California sea lions—Although Department of the Navy (2024c) indicated that the density for California sea lions south of the Coronado Bridge was zero (see Figures 9-29 and 9-30), NAVFAC SW (2024a) specified that 237 individual sightings of California sea lions occurred south of the Coronado Bridge. The Navy relied on surveys conducted by Graham and Saunders (2015) to derive the sea lion density estimate and to support the supposition that sea lions do not occur south of the Coronado Bridge. However, Graham and Saunders (2015) did not conduct any survey transects south of the Coronado Bridge (Figure 3). Lack of observation effort does not equate to lack of species occurrence. The Commission recommends that NMFS work with the Navy to derive the California sea lion density estimates south of the Coronado Bridge based on sightings data from the numerous monitoring reports rather than Graham and Saunders (2015).

Other pinniped density issues—The Commission notes the following outstanding issues with the pinniped densities provided in Department of the Navy (2024c)—

- The Navy stated that, on average, post-partum female northern fur seals spent 180 hours in the water for every 40 hours on land, equating to 78 percent of time in the water, which equated to 78 percent of adult females being in the water from June through November. The in-water percentage would be 82[16] rather than 78 percent.
- The Navy incorrectly identified the various in-water percentages for California sea lions in Table 9-25 as haul-out correction factors in the table heading and underlying text. The heading and text should indicate that those are indeed in-water percentages, similar to Table 9-20 for harbor seals.
- The Navy did not include the California sea lion juveniles and pups specified in Table 9-25 in the non-breeding season abundance estimate for the California breeding strata. Juveniles and pups should be included in the abundance estimate as was done for the breeding season density.
- The Navy specified that the in-water percentages for Steller sea lions were correction factors for estimation of the in-water abundances. The percentages should be specified as in-water percentages rather than correction factors, similar to harbor seals.

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[15] Department of the Navy (2024c) specified that the density of California sea lions south of the Coronado Bridge was zero, even though numerous monitoring reports refute this (as one example see, NAVFAC SW 2024a). The report also specified that 86 bottlenose dolphins and 2 harbor seals were observed in this area south of the bridge, while both species were even more abundant north of the bridge.

[16] 180/220=82 percent.

Since the densities will inform the numbers of takes for the final rule and other incidental take authorizations for activities conducted by the Navy and other action proponents, the Commission recommends that NMFS work with the Navy to revise Department of the Navy (2024c) to clarify and address these issues.

Auditory thresholds

As the Commission has noted in letters related to NMFS's *Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing: Underwater and in-air criteria for onset of auditory injury and temporary threshold shifts* (AUD INJ and TTS, respectively; NMFS 2024)[17], the Commission supports the weighting functions and associated thresholds as stipulated in Finneran (2024), which are the same as were used for Navy Phase IV activities (Department of the Navy 2025). However, new data have become available since NMFS and the Navy updated the weighting functions and thresholds. For example, Kastelein et al. (2024a) provided additional TTS data for harbor porpoises exposed to one-sixth octave band sound at 8 kHz[18]. Although the Kastelein et al. (2024a) manuscript likely was 'in prep' at the time Finneran (2024) was drafted, it is unclear why the data were not included, as other data that were part of 'in prep' manuscripts (i.e., Kastelein et al. 2024b, Reichmuth et al. 2025) were incorporated in Finneran (2024)[19]. The Commission recommends that NMFS determine whether inclusion of the data from Kastelein et al. (2024a, 2025a, 2025b) would alter the weighting functions and/or thresholds for the various functional hearing groups and if so, whether those modifications are sufficient to warrant revision of the current weighting functions and associated thresholds for non-impulsive sources as stipulated in Department of the Navy (2025).

For mysticetes, more recent data were incorporated into the weighting function for Phase IV activities. The first hearing tests were conducted on minke whales in 2023 and showed that the whales were sensitive to frequencies much higher than expected—at least 45 kHz and potentially as high as 90 kHz (National Marine Mammal Foundation (NMMF) 2023, Houser et al. 2024a and 2024b). As such, the Navy split the low-frequency (LF) cetacean functional hearing group into very low-frequency (VLF) and LF cetaceans[20], with the LF cetacean weighting function shifted to the right to encompass higher frequencies. Additional hearing data from 2024 showed that minke whales were the most sensitive at 32 kHz for the frequencies that were tested[21]. Department of the Navy (2025) based various VLF and LF parameters that inform the composite audiograms, weighting functions, and thresholds on the mean or median parameters of the other functional hearing groups. In its 31 August 2015 letter on NMFS's technical guidance and the Navy's original Phase III criteria and thresholds, the Commission recommended that the phocid (PCW) weighting

[17] The Commission appreciates that the Navy, and in turn NMFS, incorporated its recommendations from the Commission's 26 June 2023 letter to (1) include the California sea lion hearing threshold data from Kastelein et al. (2021, 2022a and b, and 2024b) in the derivation of the otariid composite audiogram and revise the weighting function accordingly and (2) fix the rounding issues for *K* to ensure that the impulsive AUD INJ thresholds were 15 dB greater than the TTS thresholds.

[18] Kastelein et al. (2025a) also provided additional TTS data for California sea lions exposed to sound at 40 kHz; while Kastelein et al. (2025b) provided TTS data for harbor seals exposed to sound at 8 kHz.

[19] As well as NMFS (2024) and Department of the Navy (2025).

[20] VLF cetaceans include right, bowhead, fin, and blue whales; whereas, LF cetaceans include minke, sei, Bryde's, Rice's, Omura's, humpback, gray, and pygmy right whales.

[21] Which is part of another in prep manuscript.

and exposure function parameters be used to inform the LF cetacean weighting and exposure functions[22]. Recently, others[23] also have suggested that mysticete hearing appears to be more similar to that of phocids. Therefore, the Commission recommends that NMFS determine whether the LF cetacean weighting function has been shifted far enough to the higher frequencies to reflect that 32 kHz was the most sensitive frequency tested in minke whales, determine whether use of the PCW composite audiogram, weighting function, and threshold parameters are more representative of VLF and LF cetaceans than medians and means of the five other functional hearing groups, and work with the Navy to revise the VLF and LF cetacean composite audiograms, weighting functions, and thresholds as needed for impulsive and non-impulsive sources for the final rule and FEIS.

Behavior thresholds for acoustic sources

To further define its behavior thresholds for acoustic sources (i.e., sonars and other transducers), the Navy developed multiple[24] Bayesian biphasic dose-response functions[25] (Bayesian BRFs) for Phase IV activities. The Bayesian BRFs were a generalization of the monophasic functions previously developed[26] and applied to behavioral response data[27] (see Department of the Navy 2025 for specifics). The biphasic portions of the functions are intended to describe both level- and context-based responses as proposed in Ellison et al. (2011). At higher amplitudes, a level-based response relates the received sound level to the probability of a behavioral response; whereas, at lower amplitudes, sound can cue the presence, proximity, and approach of a sound source and stimulate a context-based response based on factors other than received sound level[28]. The Commission agrees that the general method by which Bayesian BRFs have been derived is reasonable. The Commission, however, questions whether best available data were used to inform them.

In its review of Department of the Navy (2025)[29], the Commission notes the following in regard to the BRFs—

- The Navy justified increasing the upper bound of the BRFs from 185 to 200 dB re 1 μPa for Phase IV to account for higher level exposures close to 185 dB re 1 μPa that did not lead to a response.

[22] Which incorporate the weighting functions and associated weighted thresholds.
[23] D. Houser during his presentation of minke whale hearing results at the Effects of Sound on Marine Mammals meeting.
[24] For sensitive species (beaked whales and harbor porpoises), odontocetes, mysticetes, and pinnipeds.
[25] Comprising two truncated cumulative normal distribution functions with separate mean and standard deviation values, as well as upper and lower bounds. The model was fitted to data using the Markov Chain Monte Carlo algorithm.
[26] By Antunes et al. (2014) and Miller et al. (2013).
[27] From both wild and captive animals.
[28] e.g., the animal's previous experience, separation distance between the sound source and the animal, sound source speed and heading, and behavioral state of the animal including feeding, traveling, etc.
[29] Department of the Navy (2024a) was revised to be Department of the Navy (2025) based in part on response to comments the Commission provided for the Atlantic Fleet Training and Testing (AFTT) and HCTT DEISs, which the Commission appreciates. The AFTT DEIS and proposed rulemaking has been the first published for a given phase of Navy activities, and it generally sets precedent for those that follow within a given phase (i.e., currently Phase IV).

- None of the raw behavioral data include exposures above 186 dB re 1 μPa (see Table E-1 in Department of the Navy 2025)[30], and only one individual showed no response above 177 dB re 1 μPa.
- Certain species did respond above 177 dB re 1 μPa, but their responses were not considered significant (see additional information regarding cessation of feeding in odontocetes herein).
- Although the upper bound was set by subject matter experts for Phase III (Department of the Navy 2017a), it appears to have been arbitrarily set for Phase IV. Such a change would result in the Phase IV functions moving farther to the right toward higher received levels (RLs), the 50-percent probabilities occurring at higher RLs, the slopes of the functions being less steep, and the overall BRFs for odontocetes and mysticetes[31] being less precautionary as compared to Phase III (see Figure 42 in Department of the Navy 2025 and note the flat slope between 185 and 200 dB re 1 μPa on all BRFs for Phase III).
- Additionally, Department of the Navy (2025) indicated that the 50 percent probability of a behavioral response was estimated to occur at 185 dB re 1 μPa for the mysticete BRF, 8 dB higher than the TTS threshold for LF or VLF cetaceans.

- None of the Southall et al. (2018, 2019, 2020, 2021a, 2022, 2023) data for the Atlantic behavioral response study (BRS) involving beaked whales and other odontocetes were included. However, 'in prep' data were included for auditory thresholds, and data that were underlying but not specifically included in the publications were used for the BRFs[32]. This information may have been particularly useful in assessing whether the less sensitive BRFs that were developed for Phase IV would have been supported by the Atlantic BRS data.
- Justification was not provided regarding why cessation of feeding or foraging by odontocetes, primarily sperm whales, was considered a significant behavioral response in some instances, but not in other instances[33].
  - Department of the Navy (2025) indicated that duration of response relative to the duration of exposure was factored into whether a moderate response on the Southall severity scale (Southall et al. 2021b) would equate to a significant behavioral response. Generally, moderate responses that lasted the duration of exposure were considered a significant behavioral response. However, in some instances, moderate responses that lasted less than the duration of exposure also were considered a significant behavioral response[34], while in other instances they were not[35].

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[30] The Commission notes that Appendix E in Department of the Navy (2024a) originally specified the highest received level as 185 dB re 1 μPa based on the captive studies. The Navy revised the information regarding sw19_245a in Department of the Navy (2025)—cessation of feeding with a Southall severity score of 5 apparently occurred at a received level of 186 dB re 1 μPa at 3.2 km from the XHPAS-D source rather than at 178 dB re 1 μPa and 0.92 m from the source, as specified in Department of the Navy (2024a). An 8-dB increase in received levels at a much farther distance is not insignificant.

[31] And less precautionary for sensitive species at higher received levels. The Phase IV pinniped BRF is more precautionary than the Phase III BRF, but would have been more so if the upper bound had been 185 dB re 1 μPa.

[32] i.e., data from Jacobson et al. (2022).

[33] See Sw16_126a low LFAS, Sw17_191a low LFAS, and sw19_241a HPAS-C as examples.

[34] See Sw17_191a normal LFAS as an example.

[35] See Sw16_135a normal LFAS and Sw17_182a low LFAS as examples.

  - In multiple instances, duration of exposure was not specified. Cessation of foraging was considered significant[36] for some and in other instances it was not[37].
- Data for sperm whales were not consistent with the underlying references (e.g., Curé et al. 2025), which calls into question whether other sperm whale data and BRS data in general were incorporated accurately.
  - Table E-1 in Department of the Navy (2025) was intended to include either the RL at the onset of a significant response and closest point of approach (CPA)[38] before the response *or* the maximum RL without a significant response and overall CPA for no significant response.
    - When responses occurred, *the onset RL of a given response* from the table in the Curé et al. (2025) supplemental appendix was reported as the maximum RL without a response in Table E-1[39] in some instances. In other instances, *the maximum RL of the exposure session* from Curé et al. (2025) was reported as the maximum RL without a response in Table E-1[40].
    - In yet other instances, the maximum RL without a response reported in Table E-1 cannot be located in Curé et al. (2025)[41].
    - These types of errors elevated the maximum RLs without a response in Table E-1 by 8–76 dB, which can cause the odontocete BRF to be vastly inaccurate and underrepresent the probability of response and numbers of takes.
- The odontocete BRF incorporated 30 random samples from the dose-response function developed for just the *moderate and severe responses* of captive bottlenose dolphins (Houser et al. 2013b) to ensure that the 30 captive bottlenose dolphins were represented only once.
  - Using the 30 raw data points from the captive bottlenose dolphins would be the best way of ensuring each individual was represented only once.
  - Houser et al. (2013b) included dose-response functions derived from all of the raw data. It is unclear why the Navy used only the moderate and severe responses[42] to derive a new dose-response function for captive bottlenose dolphins, as this would skew the subsequent odontocete BRF to the right, particularly at the lower response probabilities and lower RLs, as seen in Figure 42 in Department of the Navy (2025).

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[36] See Sw16_126a low LFAS and sw19_245a XHPAS-C.
[37] See sw19_241a HPAS-C, sw19_245a XHPAS-D, and sw19_254a HPASF-C.
[38] Issues with the reported CPAs are discussed in the next section herein.
[39] For example, sw19_241b HPAS-C exhibited a locomotion, dive, and vocal response of severity 3 at a RL of 150 dB re 1 μPa, with a maximum RL of 164 dB re 1 μPa for the exposure session. 150 dB re 1 μPa was included in Table E-1. This occurred in nine other instances.
[40] For example, sw19_241a MPAS-C exhibited an orientation response of severity 2 at a RL of 90 dB re 1 μPa, with a maximum RL of 166 dB re 1 μPa for the exposure session. 166 dB re 1 μPa was included in Table E-1. This occurred in three other instances.
[41] Table E-1 reported the maximum RL without a response as 186 dB re 1 μPa for sw19_245a exposed to XHPAS-D. The table in the Curé et al. (2025) supplemental appendix reported a severity 5 response at a RL of 165 dB re 1 μPa, with a maximum RL of 178 dB re 1 μPa for the exposure session. This occurred in three other instances—a total of two instances when a response occurred and two instances when no response was observed.
[42] Low-severity responses were considered non-responses.

- The sensitive species BRF incorporated 10 random samples from the generalized additive models (GAMs) that were developed from passive acoustic monitoring data in Moretti et al. (2014) and Jacobson et al. (2022)[43] and that ranged from 120 to 180 dB re 1 μPa[44].
    - Department of the Navy did not specify how it handled the fact that the Jacobson et al. (2022) GAM was based on the proportion change in the probability of detecting a group vocal period (GVP; i.e., foraging dive), while the Moretti et al. (2014) GAM included GAMs for both the decrease in the probability of a GVP and the probability of disturbance[45].
    - Department of the Navy (2025) further indicated that both the Moretti et al. (2014) and Jacobson et al. (2022) GAMs were recalculated from 100 to 200 dB re 1 μPa for subsampling purposes. For Moretti et al. (2014), that recalculation would have entailed extrapolation at both the lower and upper bounds of the GAM, since the exposure data were only applicable from 120 to 180 dB re 1 μPa. The Jacobson et al. (2022) GAM was just extrapolated from 165 to 200 dB re 1 μPa, which is not an inconsequential amount of data to be inferring.
    - Jacobson et al. (2022) specifically stated that they did not make an inference on sonar RLs above 165 dB re 1 μPa, because no GVPs were observed above this RL. Since the 10 random samples used for the BRFs were not included in Table 21 or Appendix E of Department of the Navy (2025), it is unclear whether those samples could be causing the lesser sensitivity at the higher RLs in the sensitive species BRF as compared to the Phase III BRF.
    - To weight the contributions from the 10 exposures from 3S and BRS field studies and the Moretti et al. (2014) and Jacobson et al. (2022) GAM data equally, the Navy indicated that it sampled the extrapolated GAMs ten times. However, it is unclear whether each GAM was sampled 10 times or 5 times each to total 10 samples. If the former, then the GAMs would have provided twice the amount of data to the overall BRF as the field studies.
    - It is unclear why similar passive acoustic monitoring data were not used for goose-beaked whales at the Southern California Acoustic Range and minke whales at PMRF, since those data have been collected and reported on as part of the Navy's Marine Species Monitoring Program for Phase III[46].
- For harbor porpoises, multiple RLs were noted for the same individual exposed to the same sound source (i.e., high-frequency active sonar (HFAS)) in Table E-1 of Department of the Navy (2025). Since the specific Kastelein et al. references were not provided in Table E-1, it is unclear whether the experimental scenarios differed sufficiently and the time between exposures was sufficient for the data to be considered independent or whether *only* the lowest RL for each individual per sonar type (i.e., HFAS) should have been used.
    - It is unclear why the Navy included multiple data points for an individual harbor porpoise exposed to the same sound source, when it included only a single data point for each individual exposed to a given sound source for the other captive species.

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[43] Moretti et al. (2014) included data from the range hydrophones at the Atlantic Undersea Test and Evaluation Center, and Jacobson et al. (2022) included data from the Pacific Missile Range Facility (PMRF).
[44] This range is specified in the Department of the Navy (2025) text. Table 21 stated that the exposure range was 120–180 dB re 1 μPa and the response range was 100–200 dB re 1 μPa for Moretti et al. (2014); whereas, the exposure range was specified as 90–165 dB re 1 μPa with a response range of 100–200 dB re 1 μPa for Jacobsen et al. (2022).
[45] i.e., whether the GVP GAMS were considered a one-to-one comparison between the two references.
[46] https://www.navymarinespeciesmonitoring.us/reporting/pacific/. See DiMarzio et al. (2019) as one example.

- The pinniped BRF incorporated 15 random samples from the dose-response function developed for the *moderate and severe responses* of captive California sea lions (Houser et al. 2013a).
    - It is unclear why the captive dose-response function from Houser et al. (2013a) that was derived from all of the raw data was not used for subsampling.
- Department of the Navy (2025) downgraded two individuals that previously had been considered to have exhibited a significant behavioral response in Department of the Navy (2024a), a humpback whale from the 3S study originally was denoted as exhibiting a Southall severity score of 7[47] and was downgraded to a 0 or no response.
    - Revisions made to Table E-1 in Department of the Navy (2025) were numerous. For example, the RLs at which a response occurred were revised for four of six killer whales from the 3S study and the CPAs were revised for six of the eight killer whales, with an increase in the Southall severity score for one whale. Given the number of revisions and inconsistencies with at least one of the primary references (i.e., Curé et al. 2025), it is unclear whether the correct RLs, CPAs, and Southall severity scores informed the various BRFs and the Navy's cut-off distances.
- The executive summary, Tables 21–24, Figures 43–45, and accompanying text, as well as Table E-1 in Department of the Navy (2025) included contradictory information regarding the range of RLs for both exposures and responses, distances at which the responses occurred, and the number of significant responses (see the Addendum herein). Additionally, Table 17 and Tables 21–24 included inconsistent information on the most basic data that informed the BRFs, namely the species, the study, and the associated references[48]. Further, Table E-1 does not appear to include the Blainville's beaked whale information from Moretti et al. (2014) and Jacobson et al. (2022). The table also appears to include only the raw data from Houser et al. (2013a, b), not the subsampled data from the re-derived dose-response functions that then were used for the BRFs. Absent consistent information, it is difficult to assess the appropriateness of the various BRFs and the Navy's cut-off distances.

<u>The Commission recommends</u> that NMFS require the Navy to revise Department of the Navy (2025) to clarify and address these points, as that document underpins the current and future Phase IV rulemakings. To increase efficiency for all of the agencies involved and to ensure accurate information is being provided for public comment, the Commission would welcome the opportunity to informally review future versions of the Navy's criteria and threshold documents. <u>The Commission further recommends</u> that NMFS work with the Navy to use the dose-response functions that were developed from all of the raw data rather than those that were regenerated for only moderate and severe responses and refrain from extrapolating beyond the bounds of the underlying data when revising the BRFs.

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47 Table E-1 in Department of the Navy (2024a) specified that mn12_170 had exhibited prolonged cessation of feeding for Sonar 1, with one animal feeding before the sonar was active and then it stopped feeding with a closest point of approach of 820 m at a received level of 164 dB re 1 μPa. This individual was downgraded to no response at a closest point of approach of 300 m and received level of 174 dB re 1 μPa.

48 For example, Table 17 indicated that northern bottlenose whales were part of 3S2 as referenced by Kvadsheim et al. (2020); however, Table 21 specified that northern bottlenose whales were part of 3S as referenced by Sivle et al. (2015) and Wensveen et al. (2019). As another example, minke whales were omitted from Table 17 but were included in two separate studies in Table 24.

To derive criteria and thresholds for auditory and behavioral impacts, new data are being collected and new methods to analyze existing data are continually being developed. The Navy currently implements the thresholds at the animat stage within the Navy Acoustic Effects MOdel (NAEMO; Department of the Navy 2024b) rather than at a post-processing stage after the sound propagation and animat modeling has been conducted. This means that the Navy cannot re-query the animat dosimeters using different thresholds when thresholds change, instead it must rerun the animat portion of NAEMO using the new thresholds. This is not only inefficient, but it reinforces the Navy's and NMFS's reliance on the same outdated thresholds for more than a decade. Criteria and thresholds usually are developed at least three years before a DEIS and proposed rule are finalized, and a final rule is valid for seven years[49]. When Navy-funded projects (e.g., Southall et al. 2018, 2019, 2020, 2021a, 2022, 2023) do not provide the data to the Navy by a specific deadline, those data cannot be incorporated until the next Phase under the current paradigm. Thus, the Navy is not able to benefit from the data that it has funded to be collected, sometimes for 15 years or more, by which time the thresholds are not considered best available.

The Commission understands that the Navy is implementing some NAEMO improvements based on a review conducted by Simmons et al. (2025). Although post-processing application of thresholds was not directly addressed by the Simmons et al. (2025) review, various improvements were recommended involving animat seeding within NAEMO and restructuring the NAEMO database to allow for extraction of exposure data outside of NAEMO. As such, the Commission recommends that NMFS work with the Navy in a concerted manner to incorporate data that support criteria and threshold development more often than on a decadal cycle and to revise NAEMO to implement the relevant criteria and thresholds at a true post-processing stage so that animat dosimeter data can be re-queried if thresholds change, rather than needing to remodel the animat-portion of NAEMO. Similar to the thresholds, densities are incorporated into NAEMO at the animat stage, which means that the Navy cannot change the densities should there be errors. Instead, it must rerun the animat portion of NAEMO using the new densities. This is not only inefficient, but it also has caused NMFS and the Navy to rely on erroneous densities or to scale the take estimates by the relative changes in the densities, which is not necessarily an accurate fix. The Commission additionally recommends that NMFS work with the Navy to reprogram NAEMO to implement densities at a post-processing stage so that densities can be easily revised rather than needing to remodel the animat portion of NAEMO when density estimates change. Such an improvement was recommended by Simmons et al. (2025) to be addressed through modifications to animat seeding and investigating runs by hearing group within NAEMO.

Cut-off distances for behavior takes

The Commission remains concerned that, following the development of the BRFs and consistent with Phase III, the Navy and in turn NMFS implemented various cut-off distances beyond which they considered the potential for significant behavioral responses to be unlikely (Table 4 in Department of the Navy 2025 and Table 21 in the preamble to the proposed rule). The Navy previously indicated that the context of the exposure is likely more important than the amplitude at large distances (Department of the Navy 2017a)—that is, the context-based response

[49] The same criteria and thresholds also have been used for all DEISs and rulemakings under a given Phase, meaning that the Phase IV thresholds will be used for Navy activities until the Phase IV Gulf of Alaska rulemaking expires in 2037.

dominates the level-based response. The Commission agrees with that notion but notes that the Bayesian BRFs specifically are intended to incorporate those factors. Thus, including additional cut-off distances would contradict the data underlying the Bayesian BRFs, negate the intent of the functions, and ultimately underestimate the numbers of takes.

For Phase IV activities, the Navy added a condition that if a take were to occur beyond the relevant cut-off distance but above the 50 percent probability for a given BRF (e.g., a bottlenose dolphin exposed at 18 km and at a RL where the probability of response was 65 percent), it would be considered a significant response. That condition was further qualified based on the Navy assuming that animats would avoid a sound source between the response probabilities of 50 and 90 percent (avoidance is discussed further herein). Regardless of how the cut-off distances were qualified, they remain unsubstantiated and are less than what the Navy and NMFS used for Phase III activities[50].

For harbor porpoises and pinnipeds, no data are currently available on a wild animal's response and relative distance to Navy acoustic sound sources. The sensitive species BRF, that included harbor porpoises and beaked whales, primarily was informed by the passive acoustic monitoring data of Moretti et al. (2014) and Jacobson et al. (2022), which did not include distances to the source. Data for the odonotocete and mysticete BRFs were scant. The Commission previously highlighted how, for sperm whales, the RLs for non-significant behavioral responses were overestimated in Department of the Navy (2025) based on the underlying reference for the 3S3 2019 study (Curé et al. 2025). Similar issues exist for the CPA data. For example, Table E-1 in Department of the Navy (2025) specified sw19_241a was exposed to HPAS-C at a maximum RL of 145 dB re 1 μPa and overall CPA of 7.7 km where cessation of feeding at a severity score of 5 occurred. However, the table in the Curé et al. (2025) supplemental appendix specified that cessation of feeding of sw19_241a exposed to HPAS-C occurred at a RL of 145 dB re 1 μPa at 3.8 km, with 3 km being the minimum CPA during the exposure session. There are at least four other inconsistencies between the CPAs reported in Curé et al. (2025) and Table E-1 of Department of the Navy (2025) for sperm whales that were part of the 3S3 study in 2019[51]. It is unclear how accurate the other sperm whale and BRS data in general were that informed the BRFs. Given the scant amount of paired RL and distance data, it is imperative that all such data be incorporated accurately.

In any event, Department of the Navy (2025) indicated that model selection for the final BRFs did not include range as a factor, as it was too confounded with RL. The Navy also indicated that it was not surprising given that only 21 of 196 exposures that informed the four BRFs occurred at 10 km or greater from the sound source—19 animals had no response at all, one had a minor vocal response, and one had a strong avoidance response but it did not last for the full duration of the exposure. Delving into Department of the Navy (2025), Table E-1 specified only 19 exposures occurred at 10 km or more from the sound source. Of those 19 exposures, one animal had a minor vocal response, one had a moderate change in locomotion but did not exhibit avoidance, one had a

[50] For Phase III, two different cut-off distances were used per behavioral group (one for moderate source level, single platform events and one for high source level or multiple platform events). For Phase IV, a single distance was used for all platforms and source levels for each behavioral group, but each of the four distances is less than the cut-off distance for high source level or multiple platform events from Phase III (see Table 4 in Department of the Navy 2025).
[51] See sw19_245a XHPAS-D, sw19_245a XHPAS-C, sw19_255b XHPAS-C, and sw19_259b XHPAS-C.

moderate change its dive profile and resting behavior that lasted less time than the exposure, one stopped singing for as long as or longer than the duration of exposure, one had a strong avoidance response that was considered significant and presumably lasted longer than the exposure, and another animal ceased its feeding, changed its dive and vocal behavior, and exhibited prolonged avoidance behavior. Thirteen animals exhibited no response at ranges of approximately 17 to 232 km from the source (Table E-1). Further, Figures 43–45 in Department of the Navy (2025) are missing certain data that were specified in Table E-1 and in some instances have depicted the data incorrectly in terms of response, range, RL, and/or sample size relative to Table E-1. These inconsistencies make it difficult to assess the Navy's assumptions regarding cut-off distances similar to the BRFs.

The preamble to the proposed rule and Department of the Navy (2025) are correct in stating that the probability of response at distances of 10 km and farther is not well represented (90 Fed. Reg. 32212). As such, it is unclear how either NMFS or the Navy can assert that those few data points provide support that beyond a certain distance, significant responses are unlikely to occur or that the source-receiver range must be included as a separate consideration to estimate likely significant behavioral reactions. Absence of data means just that, there are no data to support including such cut-off distances or assumptions that a significant response is unlikely to occur beyond a certain distance.

The Navy specified that the probability of significant behavioral responses occurring beyond the cut-off distances at RLs above the 50-percent probability of response is unknown, but was included as a conservative assumption due to the paucity of data (Department of the Navy 2025). In fact, none of the significant behavioral responses observed during BRS studies of sensitive species, mysticetes, and many of the odontocetes occurred above the 50-percent probability of response. Only sperm whales showed a significant behavioral response above the 50-percent probability. That primarily is due to the fact that the overwhelming majority of BRS studies that were included in the analyses did not expose animals to higher RLs. Fourteen of the 15 instances that sperm whales exhibited significant behavioral responses did so at RLs less than the 50-percent probability of response based on the information in Department of the Navy (2025)[52].

Those examples do not include animals that exhibited behavioral responses deemed insignificant by the Navy but that occurred at quite low RLs and at distances that far exceed the cut-off distance. For example, a sperm whale stopped resting and had a moderate change in its dive profile with a Southall severity score of 6 that occurred for a shorter duration than the exposure. The duration was not specified, but the response did occur 36 km from the sound source and at a RL of 116 dB re 1 μPa (Table E-1 in Department of the Navy 2025)—the cut-off distance for odontocetes is 15 km and the RL for the 50-percent probability of response is 168 dB re 1 μPa. Department of the Navy (2024a) originally specified that this animal had exhibited a significant behavioral response in Table E-1[53]. Although it has been corrected in Department of the Navy (2025), this example still confirms that responses do occur at greater distances and lower RLs than the cut-off distances and 50-percent probability of response portray. And contrary to NMFS's assertion in the preamble to the proposed rule, neither it nor the Navy erred on the cautious side

[52] The accuracy of which has been questioned herein.
[53] Originally, Table E-1 specified that Sw17_182a exhibited a significant behavioral response of 1 at a received level of 113.6 dB re 1 μPa at 37.8 km from the low LFAS source.

and counted the lower duration responses as take, thereby overestimating Level B harassment by behavioral disturbance to some degree (90 Fed. Reg. 32213). The lower duration exposures were not used to inform the BRFs and the 50-percent probabilities of response, and duration is not considered when enumerating take by behavioral disturbance from acoustic sources, which is based on the maximum received sound pressure level[54], an instantaneous metric.

Tyack and Thomas (2019) previously highlighted the shortcoming associated with assuming only a portion of the animals respond[55], including that the number of animals that are predicted to have a low probability of response may represent the dominant impact from a given sound source. In addition, use of cut-off distances has been criticized in public comments as an attempt to reduce the numbers of takes (85 Fed. Reg. 72326). Given the lack of data for certain behavioral groups in general, the Commission again recommends that NMFS refrain from using cut-off distances in conjunction with the Bayesian BRFs and re-estimate the numbers of marine mammal takes based solely on the Bayesian BRFs for the final rule.

Behavior thresholds for explosives[56]

The Navy has acknowledged that very little experimental or observational data exist regarding behavioral responses of marine mammals to underwater detonations (Department of the Navy 2025). In lieu of actual data, the Navy has again assumed and NMFS ultimately used a behavior threshold for explosives that was 5 dB less than the TTS threshold for each functional hearing group (Department of the Navy 2025, 90 Fed. Reg. 32213). The 5-dB value was derived from observed onset behavioral responses of captive bottlenose dolphins during non-impulsive TTS testing[57] (Schlundt et al. 2000). Aside from the issues associated with conducting behavioral response studies on trained animals and using a different metric than all other BRFs or behavior thresholds[58], there is no scientific basis for using data from 1-sec tones as a proxy for behavioral response to underwater detonations. The Navy itself in Department of the Navy (2017a) stated that, although data from Schlundt et al. (2000) were used to derive the TAP I/Phase II BRFs for *acoustic sources*, they were not used in the quantitative derivation of the Phase III BRFs (or Phase IV BRFs) because the study was a hearing study where animals were conditioned and reinforced to tolerate high noise levels. It is illogical that the Navy removed such data from the estimation of BRFs for acoustic sources, which are similar to the 1-sec tones used in Schlundt et al. (2000), but then continued to use the same inappropriate data—that underestimate impacts—for a completely different sound source.

Another concerning assumption is that NMFS and the Navy continue to maintain that marine mammals do not exhibit behavioral responses to single detonations (90 Fed. Reg. 32213, Department of the Navy 2025)[59]. The Navy has asserted that the most likely behavioral response

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[54] root-mean-square sound pressure level (SPL_{rms}).
[55] Which corresponds to using various arbitrary cut-off distances.
[56] The Commission appreciates that the Navy incorporated the Commission's previous recommendations and used only the onset mortality, slight lung injury, and slight gastrointestinal tract injury thresholds for estimating the numbers of takes of marine mammals rather than the 50 percent thresholds that were used in Phase III.
[57] Based on 1-sec tones.
[58] Department of the Navy (2025) used the cumulative sound exposure level (SEL_{cum}) metric for behavior thresholds for explosives rather than SPL_{rms}, which is used for behavior thresholds for all other sources. NMFS's behavior thresholds also are based on SPL_{rms} for all other sources.
[59] Including certain gunnery exercises that have several detonations of small munitions occurring within a few seconds.

would be a brief alerting or orienting response, and if a significant response were to occur from a single detonation, it would be an auditory impact, TTS and AUD INJ, rather than a behavioral response (Department of the Navy 2025). That is nonsensical, since multiple detonations and pulses are more likely to cause auditory damage than a single detonation or pulse. The Navy assumes that significant behavioral reactions would not be expected to occur because no additional detonations would follow the initial detonation, which is based on reasoning that it historically has applied to shock trials (Department of the Navy 2025) and date back to 1998. Data did not exist then and do not exist now to support the assumption that animals would not respond behaviorally to a single detonation that could be up to 58,000 lbs in net explosive weight (NEW)[60].

Larger single detonations (such as explosive torpedo testing or ship shock trials[61]) are expected to elicit 'significant behavioral responses' as described in Department of the Navy (2025). However, neither the Navy nor NMFS has yet to justify why it believes that an animal would exhibit a significant behavioral response to two 5-lb charges detonated within a few minutes of each other but would not exhibit a similar response for a single detonation of 50 lbs, let alone detonations of up to 10,000 lbs for HCTT. In response to Commission comments on the AFTT Phase III DEIS, the Navy indicated that there is no evidence to support that animals have significant behavioral reactions to temporally and spatially isolated explosions and that it has been monitoring detonations since the 1990s and has not observed those types of reactions. Due to human safety concerns, the Navy has never stationed personnel at the target site to monitor marine mammal responses during large single detonations. In other instances (i.e., bombs dropped from aircraft), lookouts are tasked with clearing the mitigation zone, not documenting an animal's behavioral response to the activity.

Although neither NMFS nor the Navy is aware of evidence to support the assertion that animals will have significant behavioral responses to temporally or spatially isolated explosions at RLs below the TTS threshold (85 Fed. Reg. 72325), a lack of evidence, particularly when concerted monitoring has not occurred in the Level B harassment zones during detonations, does not mean that takes have not occurred. Behavior takes from numerous types of activities have not been documented, but the Navy, and in turn NMFS, presumes that they could occur—essentially for all Navy acoustic sources except low- and mid-frequency active sonar. Given the lack of justification for continuing to ascribe validity to assumptions that are not based on best available science, <u>the Commission recommends</u> that NMFS include in the final rule behavior takes of marine mammals during *all* explosive activities, including those that involve single detonations and gunnery exercises that have several detonations occurring within a few seconds, and encourage the Navy to invest resources in conducting BRSs on marine mammals' responses[62], including pinniped responses, to underwater detonations for the derivation of explosive BRFs, or at the very least a source-specific step-function threshold.

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[60] Takes that were authorized under Phase III compliance documents, and ship shock trial activities for which the Navy conducted in the AFTT study area.
[61] With net explosive weights of 500 to 675 lbs (Bin E11) and 10,000 lbs (Bin E16), respectively, for Phase IV activities.
[62] Living Marine Resources has provided funding for a few opportunistic studies involving behavioral response of cetaceans exposed to underwater detonations (Falcone et al. 2024).

Avoidance and other NAEMO limitations

Avoidance—NAEMO does not use moving animats for estimating avoidance, as it does moving sound sources for the propagation model (Department of the Navy 2024b). NAEMO simply simulates an animat moving away from a sound source by mathematically reducing the received SPLs of individual exposures based on a spherical spreading calculation for the source(s) present on each unique platform. Avoidance speeds and durations were informed by a review of available exposure and baseline data (Department of the Navy 2024b). In prior Phases, avoidance was not modeled in NAEMO. Instead, 95 percent of the takes for permanent threshold shift (PTS), now referred to as AUD INJ, predicted by NAEMO were assumed to be reduced to TTS due to avoidance (Department of the Navy 2017b). This reduction was based on the assumption that an animal avoided the AUD INJ zone of a moving MF1 source (i.e., a hull-mounted surface ship sonar as defined in NAEMO).

Department of the Navy (2024b) did not justify why spherical spreading was used rather than the propagation loss resulting from NAEMO modeling for each individual event. The Navy did however specify swim speeds that were used for the various groups for avoidance (see Table 5 in Department of the Navy 2024b). Some of the assumed avoidance speeds are greater than were noted in the underlying references (see Table 8 in Department of the Navy 2024b). For example, Table 8 specified that Kastelein et al. (2018) was one of the references for harbor porpoise avoidance speeds. Even though Table 8 did not specify the speed, Kastelein et al. (2018) indicated that the highest sustainable swim speed for a harbor porpoise responding to pile-driving activities was 7.1 km/hr (or 1.97 m/s). The other harbor porpoise swim speeds mentioned were not sustainable for the duration of a Navy acoustic activity, while the baseline speed specified was 1.5 m/s (Table 8 in Department of the Navy 2024b). As such, it is unclear how a sustained swim speed of 3 m/s can be justified for harbor porpoises (Table 5 in Department of the Navy 2024b). Further, the baseline swim speed in Table 8 was 0.8 m/s for otariids, 0.4 m/s for harbor seals, and less than 1.7 m/s for northern elephant seals. No swim speeds were available for avoiding sound sources, even though the Navy assumed that pinnipeds would avoid them at 2 m/s (Table 5 in Department of the Navy 2024b). Given that harbor seals comprise the vast majority of the phocid takes and swim speeds for a given group should be based on the slowest species, pinniped swim speeds should have been no more than 1 m/s. For these reasons, the Commission recommends that NMFS work with the Navy to use an avoidance swim speed of no more than 2 m/s for harbor porpoises and 1 m/s for pinnipeds and to revise the NAEMO modeling and take estimates appropriately for the final rule.

Moving animats, as well as animat-based avoidance behavior, have been modeled for quite some time. The Navy funded the development of the publicly-available Marine Mammal Movement and Behavior (3MB)[63] model more than 25 years ago (Houser and Cross 1999, Houser 2006) that incorporated moving animats and avoidance behavior. Although never included in NAEMO, 3MB has been modified over the years to be used for geophysical surveys (Zeddies 2015) and has been used as the basis for animat modeling for offshore wind activities (e.g., Denes et al. 2020, Küsel et al. 2022). Since NAEMO's current animat modeling and avoidance processes are not considered best available science and the Navy is implementing improvements, the Commission recommends that NMFS work with the Navy to incorporate moving animats into NAEMO that can actively avoid

[63] http://oalib.hlsresearch.com/Sound%20and%20Marine%20Mammals/3MB%20HTML.htm.

sound sources based on species-specific dive profiles and swim speeds for Phase V activities and, if that is not feasible, incorporate species-specific swim speeds and the actual modeled sound propagation into NAEMO to simulate avoidance for a given event. Both creating an emulator[64] and running simulation studies outside of NAEMO, as recommended by Simmons et al. (2025), should inform how best to deal with moving animats and implementing avoidance within NAEMO.

Explosive propagation modeling—For Phase II activities, the Navy used its Refraction in Multilayered Ocean/Ocean Bottoms with Shear Wave Effects (REFMS) model to estimate sound propagation associated with underwater detonations. However, the Navy has since used Comprehensive Acoustic Simulation System/Gaussian Ray Bundle (CASS/GRAB) and a similitude equation to model underwater detonations for Phase III and IV activities (Department of the Navy 2017b, Department of the Navy 2024b). The Navy indicated that CASS/GRAB was approved by the Ocean and Atmospheric Master Library (OAML)[65], could vary environmental parameters with range, had a built-in absorption model, and was more numerically stable than REFMS (Department of the Navy 2017b). Although those assertions may be correct, the Navy also has used its Range-Dependent Acoustic Model (RAM) and the Navy's Standard Parabolic Equation (PE) model for non-impulsive sources with frequencies of less than 100 Hz[66] and for water depths of less than 50 m (Department of the Navy 2024b). It is unclear why RAM/PE was not used for underwater detonations that would occur in waters 50 m or less, where CASS/GRAB generally is not used. Further, Department of the Navy (2024b) specified that the similitude equation is valid only over a range of pressures equating to a NEW of up to 28.8 lbs.

Department of the Navy (2017b and 2024b) did indicate that the CASS/GRAB modeling process compared favorably with in-situ data, but the data were for small explosives at short ranges (i.e., no larger than 15-lb charges in less than 5 m of water at a range of hundreds of meters[67]; Deavenport and Gilchrest 2015). Department of the Navy (2017b) specified that data for large explosions *and* at long ranges were needed to fully validate the model. During the most recent ship shock trials off the east coast of Florida in 2021, some such data were collected. Seger et al. (2023) collected in-situ measurements of the three individual shots of a NEW of up to 58,000 lbs fired near the USS Gerald R. Ford for the purpose of validating NAEMO propagation models. The researchers conducted their own modeling using the Peregrine version of RAM/PE for optimal placement of the hydrophones and to compare with the in-situ measurements.

The measured sound levels exceeded what the Navy had estimated for Phase III modeling for the ship shock trials (Bin E17 in Tables 9-15 to 9-22 in Department of the Navy 2017b) by orders of magnitude[68]. For example, the maximum volume modeled out to a radius of 201 km was exceeded for both the SPL_{peak} and SEL_{cum} metrics for PTS and TTS for LF cetaceans[69] (Table 12 in

[64] Which is a statistical approximation of a detailed mathematical model or the simulator portion within NAEMO.
[65] The Commission notes that CASS/GRAB is OAML-approved only for frequencies higher than 100 Hz according to Department of the Navy (2017b). The Navy just uses it down to 25 Hz for impulsive sources.
[66] The main portion of an underwater detonation's energy occurs at frequencies less than 100 Hz.
[67] Parameters which are exceeded by modeled scenarios for even the smallest detonations, Bin E1 (i.e., see Table 2.5-9 in Appendix E of the DEIS).
[68] The Peregrine-modeled received levels at the various monitoring device locations were comparable to measured values (Seger et al. 2023).
[69] For unknown reasons, Seger et al. (2023) used the 160 dB re 1 μPa threshold as the behavior threshold, which the Navy has never used for underwater detonations.

Seger et al. 2023), the largest range of which was estimated by NAEMO to be 47 km. Since the Navy has yet to conduct a rigorous comparison between the radii provided by NAEMO and those measured in-situ, the total extent to which NAEMO had underestimated the zones is unknown. However, Seger et al. (2023) noted in Table 12 that the impact volumes for PTS and TTS were 16.5 times as large as the Grand Canyon and 1/40th the size of the Gulf[70]. The researchers also noted that the sound energy from the 2016 ship shock trial of only 10–11,000 lbs reached Ascension Island[71] nearly 8,200 km away at RLs of 135 dB re 1 μPa, thus the far field was a relatively very far distance in that context. For the USS Ford ship shock trial, the maximum RL at the Ascension Island hydrophones was 157 dB re 1 μPa (Seger et al. 2023). Given the comparability of the modeled zones from the Peregrine version of RAM/PE to the measured values and that RAM/PE is already used by the Navy for modeling non-impulsive sources that operate at less than 100 Hz and in shallow water, the Commission recommends that NMFS work with the Navy to use RAM/PE to model all underwater detonations for Phase IV activities for which modeling has not been completed and for all Phase V activities, until such time that CASS/GRAB and the similitude equation have been validated for the range of detonation sizes and environmental parameters (water depth and receiver range) in which it would be used. The Navy has the data to conduct a rigorous comparison of CASS/GRAB and the similitude equation and the *in situ* measurements of the USS Ford ship shock trial from Seger et al. (2023) to fulfill the project's intent and to inform future rulemakings.

Seger et al. (2023) also were tasked with determining whether vocal activity of odontocetes and mysticetes differed before and after each shot of the ship shock trial. Odontocete vocal activity decreased at four hydrophones, increased at two hydrophones, and remained the same at seven hydrophones. Mysticete vocal activity decreased at eight hydrophones, increased at one hydrophone, and remained the same at four hydrophones. Certain vocal activity changes were statistically significant. Although Seger et al. (2023) did not provide ranges from each of the detonations to the hydrophones, some hydrophones were very likely beyond the range of TTS for LF cetaceans and most definitely beyond the range of TTS for MF cetaceans (47.4 km and 6 km, respectively; Department of the Navy 2017b). Thus, contrary to the Navy and NMFS's continued presumption, behavioral responses do in fact occur at ranges beyond TTS for single detonations.

Pile-driving calculations—The Navy indicated that, based on the best available science regarding animal reactions to sound, selecting a reasonable accumulation period was necessary to accurately reflect the period that an animal is likely to be exposed to the sound (Department of the Navy 2024b). The Navy chose a 5-minute accumulation time for the SEL_{cum} thresholds for AUD INJ and TTS, because most marine mammals should be able to easily move away from the expanding AUD INJ and TTS zones within that timeframe, especially considering that soft-start procedures may warn the animals. This is an interesting justification given that the Navy does not implement, and NMFS has not proposed to require, soft-start procedures during pile-driving training activities. The Navy also suggested that the animal could avoid the zone altogether if it is outside the immediate area when pile driving begins. Those assumptions may hold if an animal avoids pile-driving activities, but many times, certain species such as pinnipeds and bottlenose dolphins do not avoid the activities. As such, the assumed 5-min accumulation time for an entire day of pile driving is insufficient.

[70] For reference, Department of the Navy (2017b) estimated that the TTS zone for the SEL_{cum} threshold was 3.7 km for MF cetaceans.
[71] Where Comprehensive Nuclear-Test-Ban Treaty Organization hydrophones are installed.

Sufficiency aside, that approach is inconsistent with all other incidental take authorizations that NMFS has issued for construction activities[72]. NMFS did not mention the 5-minute accumulation time in the preamble to the proposed rule. It is unclear whether that was an oversight. Regardless, the 5-minute accumulation time also is inconsistent with the incidental harassment authorization NMFS recently issued to the Navy for pile-driving training activities at Port Hueneme (90 Fed. Reg. 20283), which involves the same type of training activities at the same location that it highlighted it would authorize under the HCTT rulemaking (90 Fed. Reg. 32214). For the Port Hueneme authorization, NMFS and the Navy assumed that multiple piles would be driven per day[73] and animals could be exposed for longer than 5 minutes per day[74] (see Table 4 in 90 Fed. Reg. 20287). Other pile-driving parameters used to inform the proposed rule were incorrect as well. It appears that a source level of 159 dB re 1 μPa at 10 m not 11 m[75] was used for vibratory installation of 24-in sheet piles. The correct reference distance would result in a behavioral response zone of 4,379 m rather than 3,981 m in Table 30 of the preamble to the proposed rule. At most 300 strikes per pile type also appear to have been used to inform the proposed rule[76], while NMFS assumed that 1,800 strikes would be needed to install a timber pile and 500 strikes for a plastic pile for the Port Hueneme authorization (Table 4, 90 Fed. Reg. 20287).

For these reasons, the Commission recommends that for the final rule NMFS revise (1) the range to effects for TTS and AUD INJ based on the number of piles of each pile type and installation method that would be installed on a given day, the number of minutes or strikes needed to install each pile to depth, and the correct source levels, including for vibratory installation of 24-in sheet piles, (2) the range to effects for behavioral response for vibratory installation of 24-in sheet piles based on a source level of 159 dB re 1 μPa at 11 m, and (3) the numbers of takes accordingly. Such revisions could be implemented in a timely manner because NAEMO was not used for modeling purposes, NMFS's User Spreadsheet was or could easily be used based on the parameters specified in Department of the Navy (2024b). If NMFS is intent on using an accumulation time, and notwithstanding the Commission's recommendations about correct source levels, the Commission recommends that NMFS work with the Navy to review its previous monitoring reports for both construction activities and any pile-driving activities associated with TAP I or Phase II and III rulemakings or other incidental harassment authorizations to estimate the mean time an animal is expected to remain near a pile-driving activity and revise the accumulation time, range to effects, and numbers of takes accordingly for the final rule. Since NMFS has issued and the Navy currently has 11 active incidental take authorizations for construction activities and has had at least 35 incidental take authorizations issued in the last 10 years, data should be available to determine whether a 5-minute accumulation time is sufficient for species that are known to remain near pile-driving activities.

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[72] https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities and https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.
[73] Up to 12 16-in plastic piles and 30 24-in sheet piles.
[74] Up to 5 minutes per pile for 16-in plastic piles totaling 60 minutes per day and 7 minutes per pile for 24-in sheet piles totaling 210 minutes per day.
[75] See Table 4 (90 Fed. Reg. 20287), which is based on Naval Facilities Engineering Command Southwest (NAVFAC SW; 2020).
[76] Department of the Navy (2024b) specified 35–60 strikes per minute per pile for 5 minutes of activity.

Mitigation measures

Mitigation Areas—Various geographical mitigation areas in the HCTT study area were informed by biologically important areas (BIAs), critical habitat, etc. BIAs in particular are of known importance for reproduction, feeding, or migration or are areas where small and resident populations are known to occur (see Harrison et al. 2023 for details)[77]. The Navy's analysis of the various geographical mitigation areas was included in Appendix K of its DEIS. Because of revisions made to the BIA IIs (i.e., shift in the blue whale feeding BIA), the Navy decided to not carry forward the San Nicolas Island[78], Santa Monica/Long Beach, and Santa Barbara Island Mitigation Areas that originally were meant to protect blue whales. That is logical for the Santa Monica/Long Beach and Santa Barbara Island Mitigation Areas, as they do not overlap with the current core feeding BIA for blue whales. However, the current core[79] feeding BIA for blue whales (Figure K-19 in the DEIS and Figure 2 in Calambokidis et al. 2024) does overlap with the San Nicolas Island Mitigation Area that was part of the litigation settlement agreement in 2015 for *Conservation Council for Hawaii* v. *National Marine Fisheries Service*, as well as the Phase III HSTT FEIS and associated rulemaking.

Specifically, MF1 hull-mounted surface ship sonar hours were limited and explosives (i.e., mine warfare, large-caliber gunnery rounds, torpedoes, bombs, and missiles) were prohibited from 1 June through 31 October in the San Nicolas Island Mitigation Area (50 C.F.R. § 218.74(b)(2)(i)(A)). The Navy did not specify why the San Nicolas Island Mitigation Area was omitted nor why retaining it would now, nearly 10 years later, be considered impracticable to implement. NMFS also did not mention the mitigation area in the preamble to the proposed rule. Further, Calambokidis et al. (2024) and Table 16 in the preamble to the proposed rule specified that the core feeding BIA for blue whales was applicable through November, consistent with the feeding BIAs for fin and humpback whales. It is unclear why the Southern California Blue Whale, Central California Large Whale, and Northern California Large Whale Mitigation Areas are not applicable through November, as they all are intended to minimize impacts on blue, fin, and humpback whales (Table 16 in the preamble to the proposed rule and Table K-9 and K-11 in the DEIS). Therefore, the Commission recommends that NMFS include the San Nicolas Island Mitigation Area in the final rule, limit the number of sonar hours combined to no more than 300 hours of MF1 hull-mounted surface ship sonar combined for this mitigation area and the Southern California Blue Whale, the Central California Large Whale, and Northern California Large Whale Mitigation Areas from 1 June through 30 November, and prohibit explosives (i.e., mine warfare, large-caliber gunnery rounds, torpedoes, bombs, and missiles) from 1 June through 30 November. The Commission further recommends that NMFS extend the timing restrictions from 31 October to 30 November for the Southern California Blue Whale, Central California Large Whale, and Northern California Large Whale Mitigation Areas in the final rule.

For Hawaii, the various geographical mitigation areas appear unchanged from the Phase III FEIS and rulemaking. The Hawaii Island Marine Mammal Mitigation Area would limit MF1 hull-

[77] The original BIAs from 2015 (i.e., Calambokidis et al. 2015) have been modified and supplemented and are known as BIA IIs (i.e., Calambokidis et al. 2024).
[78] The only mitigation area that would be required to be implemented nearby is the San Nicolas Island Pinniped Haulout Mitigation Area, where measures would be implemented to minimize in-air launch noise and physical disturbance to hauled-out pinnipeds.
[79] Termed child BIAs.

mounted surface ship sonar to no more than 300 hours and prohibit the use of in-water explosives[80]; while the Hawaii 4-Islands Marine Mammal Mitigation Area would prohibit the use of MF1 hull-mounted surface ship sonar from 15 November–15 April and prohibit the use of in-water explosives year-round. Since Phase III, the core small and resident BIA for the Main Hawaiian Islands (MHI) insular stock of false killer whales has been refined with additional areas noted off the west coast of Oahu and Lanai and an extension around the southwest side of Molokai (see Figure 4 in Kratofil et al. 2023). For unknown reasons, those BIA areas off Oahu and the southwest side of Molokai were not depicted in Figure K-9 of the DEIS. In addition, the Navy explained in Appendix K why various other areas are important for conducting training and testing activities, but none of those training and testing areas overlap with the core BIA areas off Oahu, Lanai, and Molokai. It is unclear why the core BIAs were not included in the Hawaii 4-Islands Mitigation Area, particularly since some of the BIA areas off Lanai and Molokai are already part of the Hawaii 4-Islands Mitigation Area. Given the critically endangered status of the MHI insular stock of false killer whales and the lack of overlap with important training and testing areas per the DEIS, inclusion of the core BIA areas would both reduce the likelihood of adverse impacts on false killer whales and meet the practicability standard for NMFS's least practicable adverse impact determination under the MMPA (90 Fed. Reg. 32268-9). Thus, the Commission recommends that NMFS include in the final rule the core small and resident BIA areas off Oahu, Lanai, and Molokai in the Hawaii 4-Islands Mitigation Area, which prohibits use of MF1 hull-mounted surface ship sonar from 15 November–15 April and in-water explosives year-round.

Passive acoustic monitoring—NMFS would require the Navy to use information from passive acoustic detections (presumably from instrumented ranges, sonobuoys, etc.) to inform visual observations of lookouts when passive acoustic devices are already being used in events involving active acoustic sources (Table 57 in the preamble and sections 218.74(a)(1)(i)(B)(3) and (ii)(B)(3) of the proposed rule). Given that visual observations by Navy lookouts have proven to be ineffective (Oedekoven and Thomas 2022)—such that NMFS and the Navy have removed any 'credit' for mitigation implementation from the Phase IV proposed rule and LOA application—the currently proposed mitigation measure that still relies on a lookout's visual observations is insufficient. The Navy indicated in the DEIS that use of passive acoustic monitoring is impractical as a precise real-time indicator of a marine mammal's location for mitigation implementation absent a confirmed visual sighting. However, passive acoustic monitoring via range instrumentation and sonobuoys has reached the level of performance needed for use during military readiness activities (e.g., Department of the Navy 2013 and 2014, U.S. Air Force (USAF) 2016). And, although acoustic technologies are and have been used by the Department of National Defence (DND) in Canada[81] to supplement detections when there are visual monitoring limitations (Binder et al. 2021, Thomson and Binder 2021, Binder et al. 2024), the Navy's mitigation measures have not been supplemented from a technology standpoint[82] for more than 15 years when its original mitigation measures were proposed for TAP I activities. Therefore, the Commission recommends that NMFS require the Navy to use its instrumented ranges and sonobuoys to localize marine mammals and implement the

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[80] Those that detonate underwater and those that are deployed at surface targets.
[81] i.e., automated passive acoustic monitoring via fixed hydrophones, mobile autonomous systems, and sonobuoys; detection and tracking capabilities using bottom-mounted hydrophones on instrumented ranges; electro-optical, infrared, and space-based detection methods to supplement naked-eye monitoring.
[82] In fact, over the years some mitigation measures have been removed (i.e., visual observations for surface-to-surface missiles/rockets, passive acoustic monitoring requirements for certain explosive activities) and some of the mitigation zones have been reduced in size (i.e., explosive mine neutralization exercises not involving positive control).

relevant mitigation measures during active acoustic events for Phase IV activities in the final rule and to take a harder look at the technologies that the Canadian DND uses during its at-sea activities and incorporate those technologies accordingly for other Phase IV LOA applications.

For the DEIS, the Navy proposed to use passive acoustic detections to inform lookouts prior to initiating detonations only if the passive acoustic devices are already being used during the event. The Commission pointed out in its letter on the HCTT DEIS[83] that passive acoustic monitoring was required for explosive sonobuoys, explosive torpedoes, and sinking exercises for Phase III, had been required for prior Phases' activities, and recommended that it be included for Phase IV activities as well. The Navy did include the measures in its LOA application and NMFS included them in the proposed rule, which the Commission appreciates. However, the Commission also recommended that passive acoustic monitoring be required for ship shock trials. It is unclear why passive acoustic monitoring, particularly the use of expendable sonobuoys, has not already been a requirement for ship shock trials. The effectiveness of passive acoustic devices has not diminished nor has use of the devices become impracticable. Ship shock trials are estimated to cause mortalities (see Table A-106 in the LOA application) and would occur at most *once* over the 7-year timeframe for the rulemaking. Thus, very little effort would be required to minimize any such risk. Since mission effectiveness would not be affected, the measures are considered practicable, and their implementation would reduce the potential for the most lethal impacts on marine mammals, the Commission strongly recommends that NMFS require the Navy to use passive acoustic monitoring prior to and during activities involving ship shock trials in the final rule as it has proposed for explosive sonobuoys, explosive torpedoes, and sinking exercises.

Further, passive acoustic monitoring is not currently required for surface detonations[84] (i.e., air-to-surface explosive bombs, missiles, rockets). To better determine whether the target area is clear and remains clear until the munition is launched, multiple sonobuoys could be deployed with a surface target prior to an activity. This would supplement any pre-activity visual observations for air-to-surface exercises and would serve as the only mitigation measure for surface-to-surface detonations[85]. Specifically, Directional Frequency Analysis and Recording (DIFAR) sonobuoys[86] provide both range and bearing to vocalizing animals, can determine an animal's location and confirm its presence in a mitigation zone, and are routinely used by the Navy.

The Navy itself has drawn attention to the success of using sonobuoys to detect bottlenose dolphins in real-time during mine exercises, provides sonobuoys to researchers for the same purpose

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[83] The Commission appreciates that NMFS included in the preamble to and the proposed rule that it would require the Navy to delay various activities if floating vegetation or jellyfish were observed in the relevant mitigation zone for active acoustic sources, pile driving, airguns, and explosive activities consistent with Phase III activities and the Commission's recommendation in its letter on the HCTT DEIS.
[84] Mitigation is not required to be implemented at all for surface-to-surface detonations.
[85] The Navy indicated in the DEIS that mitigation would not be effective for vessel-deployed missiles and rockets because of the distance between the firing platform and target location and it would not be possible for vessels to conduct close-range observations due to the length of time (and associated operational costs and exercise delays) it would take to complete observations and then transit back to the firing position (typically 28 to 139 km each way).
[86] And other types of passive (e.g., Vertical Line Array Directional Frequency Analysis and Recording (VLAD)) and active (Directional Command Active Sonobuoy System (DICASS) and the Multistatic Active Coherent (MAC) system and Air Deployed Active Receiver (ADAR)) sonobuoys.

of detecting and localizing marine mammals[87], and has highlighted numerous instances of various types of sonobuoys being used to detect and localize baleen whales, delphinids, and beaked whales[88]. A broadband repertoire of frequencies, as well as narrow-band frequencies, can be monitored by sonobuoys.

In general, the Commission questions NMFS's supposition that implementing passive acoustic monitoring, particularly for explosive activities, would have significant direct negative effects on mission effectiveness and is considered impracticable, as additional mitigation measures would greatly outweigh any potential minor reduction in marine mammal impacts that might result (90 Fed. Reg. 32260). In the case of underwater and surface-level explosive activities, those additional measures could be the difference between life and death, especially since real-time visual observation of the target site immediately prior to detonation is limited. For these reasons, the Commission again strongly recommends that NMFS require the Navy to use passive acoustic devices (i.e., DIFAR and other types of passive sonobuoys, operational hydrophones) prior to explosive bombing exercises and air-to-surface and surface-to-surface explosive missile and rocket exercises to detect marine mammals and implement the necessary mitigation measures in the final rule.

Other mitigation measures—If an incident involving a marine mammal is observed after an individual detonation during a ship shock trial, NMFS would require the Navy to follow established incident reporting procedures *and* halt any remaining detonations until the Navy can consult with NMFS and review or adapt the mitigation plan (Table 68 in the preamble and section 218.74(a)(1)(xiii)(C)(3) of the proposed rule). NMFS would require the Navy to follow the incident reporting procedures for other activities but not halt those activities if still ongoing until it consults with NMFS. It is unclear why such a measure would not apply to all activities, as it is not impracticable nor would it impact mission effectiveness. Therefore, the Commission recommends that NMFS require the Navy in the final rule to follow established incident reporting procedures *and* halt any active acoustic, explosive, pile-driving, or airgun activity if a marine mammal is observed to be injured or killed during or immediately after the activity and consult with NMFS to review or adapt the mitigation measures, as necessary.

Least practicable adverse impact standard

The Commission has commented numerous times on NMFS's efforts to develop a policy to interpret and implement the least practicable adverse impact requirement under section 101(a)(5)(A)(i)(II)(aa) of the MMPA[89]. However, NMFS has discounted many of the Commission's previous comments and recommendations (e.g., see the preamble to the AFTT final rule; 83 Fed. Reg. 57117-18). Since NMFS's least practicable adverse impact section in the preamble to the proposed rule for HCTT remains substantively unchanged from previous preambles[90], the

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[87] Including DIFAR sonobuoys, which have an upper frequency cutoff of 2.4 kHz, and other types of sonobuoys, including omnidirectional sonobuoys that have a higher frequency cutoff. https://www.navymarinespeciesmonitoring.us/files/4714/0069/6940/Spr14_Sonobuoys_Reasearch_Monitoring.pdf.
[88] e.g., https://exwc.navfac.navy.mil/Portals/88/Documents/EXWC/Environmental_Security/Living%20Marine%20Resources/LMRAnnualReport2018v2.pdf.
[89] For example, see the Commission's 30 May 2017, 16 April 2018, 13 July 2018, 21 August 2019, 12 March 2020, 12 June 2020, and 6 September 2022 letters regarding this matter.
[90] Except for minor edits and inclusion of HCTT-specific information.

Commission can only conclude that NMFS has disregarded the Commission's most recent comments and recommendations from its 2022 letter as well. The Commission's rationale will not be reiterated but should be considered with the Commission's recommendations herein. The Commission once again recommends that NMFS—

- clearly separate its application of the least practicable adverse impact requirement from its negligible impact determination;
- adopt a clear decision-making framework that recognizes the species and stock component *and* the marine mammal habitat component of the least practicable adverse impact provision and always consider whether there are potentially adverse impacts on marine mammal habitat and whether it is practicable to minimize them;
- rework its evaluation criteria for applying the least practicable adverse impact standard to separate the factors used to determine whether a potential impact on marine mammals or their habitat is adverse *and* whether possible mitigation measures would be effective;
- address these shortcomings by adopting a simple, two-step analysis that more closely tracks the statutory provisions being implemented and, if NMFS is using some other legal standard to implement the least practicable adverse impact requirements, provide a clear and concise description of that standard and explain why it believes it to be "sufficient" to meet the statutory legal requirements; and
- apply these basic steps and criteria consistently for least practicable adverse impact determinations across incidental take authorizations.

Negligible impact determination

Total taking—NMFS applied both qualitative and quantitative analyses to inform its negligible impact determination. For the HCTT proposed rule, the agency used abundance estimates as determined by either the Navy's underlying density estimates from Department of the Navy (2024c) or NMFS's stock assessment reports. NMFS then estimated the maximum annual take as a percentage of the stock abundance. For example, there were 7,238[91] total takes of the 112 animals in the O'ahu stock of bottlenose dolphins[92] (Table 95, 90 Fed. Reg. 32319). This results in the Navy taking approximately 6,405 percent of the O'ahu stock of bottlenose dolphins estimated to be present in the HCTT study area. As the Commission has repeatedly stated, that percentage does not provide any information on the number of times an individual could be taken in a given year or the number of days an animal could be taken.

NMFS attempted to qualify how often certain species may be taken in the preamble to the proposed rule. For example for the O'ahu and Kaua'i/Ni'ihau[93] stocks of bottlenose dolphins, NMFS indicated that it was more likely that some number of individuals would experience a comparatively higher number of repeated takes over a potentially fair number of sequential days, given the high number of takes by harassment as compared to the stock abundance (90 Fed. Reg.

[91] With only six of those takes by Level A harassment. Such few takes calls into question the manner in which the Navy has implemented avoidance, thereby reducing the higher level takes by AUD INJ.
[92] Based on the stock assessment report. There were 113 dolphins based on the underlying density estimates from Department of the Navy (2024c).
[93] 1,292 percent of the Kaua'i/Ni'ihau stock could be taken, with similar percentages for the California/Oregon/Washington stocks of goose-beaked and *Mesoplodon* spp. whales (Table 93, 90 Fed. Reg. 32314-5).

32326). Due to the higher number of repeated takes, NMFS indicated that it was more likely that a portion of the individuals taken by harassment (approximately *50 percent of which would be female*) could be repeatedly interrupted during foraging in a manner and amount such that impacts to the energy budgets of a *limited number* of females could cause them to forego reproduction *for a year* (90 Fed. Reg. 32326). Since neither NMFS nor the Navy estimated the number of repeated exposures for a given individual, the sex ratios of those estimated to be taken, the number of animals that would be repeatedly exposed, the number of days an animal could be exposed, or the manner in which any given take impacted an animal (i.e., via loss of foraging time, decrease in energy reserves, or reductions in reproduction), it is unclear how NMFS could make such a definitive statement.

More concerning is the fact that even greater potential impacts were estimated that NMFS did not acknowledge. In fact, NMFS stated that, given the magnitude and severity of the take by harassment and any anticipated habitat impacts, and in consideration of the required mitigation measures and other information presented, the proposed activities were unlikely to result in impacts on the reproduction or survival of any individual beaked whales, much less affect annual rates of recruitment or survival (90 Fed. Reg. 32317). NMFS made a similar determination for delphinids, with the exception of the 10 stocks for which takes by mortality and serious injury (M/SI) were predicted and the 1 stock for which an increased calving interval could potentially occur[94] (90 Fed. Reg. 32326). For the Oʻahu and Kauaʻi/Niʻihau stocks of bottlenose dolphins, NMFS indicated that it did not anticipate that the relatively limited number of individuals that might be taken over repeated days within the year in a manner that results in a year of foregone reproduction would adversely affect the stock through effects on rates of recruitment or survival, given the status of the stocks (90 Fed. Reg. 32326).

Rather than continue to make qualitative statements based on relative proportions or percentages of the stock to estimate impacts on individuals from repeated exposures and population-level consequences, NAEMO should be used to model multi-day events or multiple single-day events to provide the necessary information regarding repeated exposures of individuals. Such data could easily be obtained by querying the animat dosimeters. Something similar was conducted for geophysical and geological activities in the Gulf more than a decade ago (Zeddies et al. 2015 and 2017). Simmons et al. (2025) recommended ways that NAEMO and results from NAEMO could be better used to estimate repeated takes and population-level impacts. To that end, the Commission recommends that NMFS work with the Navy to use NAEMO to conduct modeling of both multi-day events and multiple single-day events to estimate the number of repeated exposures an individual is expected to incur and to better assess repeated exposures of individuals and population-level consequences.

Mortalities and serious injuries (M/SI)—To help inform its analysis of whether M/SI should be considered negligible, NMFS evaluated whether the proposed M/SI takes would exceed the potential biological removal (PBR)[95] for each stock when those removals are added to other sources of taking by M/SI[96]. The proposed number of takes that could result in M/SI would not equal or

[94] For common dolphins.
[95] PBR is defined as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.
[96] The other sources of M/SI were based on information contained in NMFS's stock assessment reports for fisheries interactions and vessel strikes and the authorized annual taking by M/SI for the Northwest Training and Testing Phase III final rule, which overlaps with the stocks potentially affected by the Navy's activities.

exceed PBR for any affected stocks except the Eastern North Pacific stock of blue whales and the Central America/Southern Mexico—California-Oregon-Washington stock of humpback whales. NMFS proposed to authorize the taking by M/SI of one blue and one humpback whale by the Navy and one blue and one humpback whale by the USCG during the proposed seven-year period (0.14 whales per year from vessel strike for both the Navy and USCG, totaling 0.29 whales per year in Table 87 in the preamble to the proposed rule). However, PBR for these stocks would be exceeded due to other sources of M/SI, regardless of any proposed mortalities from Navy activities.

Similar to negligible impact determinations for fisheries-related taking (NMFS 2020), NMFS used a two-tiered approach for determining whether the taking by M/SI was negligible. First, it compared the total M/SI takes to PBR. Then, if the total M/SI takes exceeded PBR, the proposed M/SI takes were evaluated against a separate threshold. For the proposed rule, NMFS compared the proposed M/SI takes to 10 percent of PBR for the Eastern North Pacific stock of blue whales and Central America/Southern Mexico—California-Oregon-Washington stock of humpback whales (90 Fed Reg. 32292). Although NMFS had used 10 percent of PBR as a threshold for evaluating whether an activity would have a negligible impact since the mid 1990s, in 2020 the agency adopted a new negligible impact threshold from a single source (NIT_s) in its revised policy directive for evaluating fisheries-related M/SI (NMFS 2020). The Navy's proposed M/SI takes would be less than the NIT_s for both stocks[97]. For consistency with its own policy directive, the Commission recommends that NMFS use the two-tiered approach from NMFS (2020), including using NIT_s instead of 10 percent of PBR, for informing its negligible impact determinations that involve M/SI for the final rule and other incidental take authorizations involving M/SI.

The Commission appreciates the opportunity to provide comments on the proposed rule regarding HCTT training and testing activities. Please contact me if you have questions concerning the Commission's recommendations or rationale.

Sincerely,

Peter O. Thomas, Ph.D.,
Executive Director

cc: Amy Scholik-Schlomer, National Marine Fisheries Service
Ron Salz, National Marine Fisheries Service

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[97] 0.29 vs. 0.46 for blue whales and 0.29 vs. 0.68 for humpback whales.

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Addendum

The following are some of the errors, inconsistencies, or missing information observed in the Executive summary, Tables 21–24, Figures 43–45, and Table E-1 of Department of the Navy (2025). These issues should be addressed and the various tables, figures, and accompanying text should be revised accordingly.

Executive summary—

- The executive summary indicated that the response received levels (RLs) for sensitive species ranged from 95–138.4 dB re 1 μPa, while Tables 21 and E-1 indicated a range of 95–143 dB re 1 μPa, excluding the extrapolated GAMs data from Moretti et al. (2014) and Jacobson et al. (2022).

Table 21—

- The response RL for Tyack et al. (2011) was denoted as 138.4 dB re 1 μPa in Table 21, while Table E-1 indicated 100 dB re dB re 1 μPa.

Table 22—

- The range of exposure RLs for sperm whales was 73–179 dB re 1 μPa in Table 22, while Table E-1 indicated a range of 99.3–186 dB re 1 μPa. The distances of responses for sperm whales were 0.65–12.3 km in Table 22, while the distances at a response were 0.6–12.3 km in Table E-1.

Table 23—

- The number of significant responses for hooded seals was 12 in Table 23, while only 4 are noted in Table E-1. The range of response RLs for hooded seals was 160–170 dB re 1 μPa in Table 23, while Table E-1 noted a range of 160–169 dB re 1 μPa.

Table 24—

- The range of response RLs for blue whales from the SOCAL BRS was 105–143 dB re 1 μPa in Table 24, while Table E-1 noted a range of 111–146 dB re 1 μPa.
- The distances of responses for humpback whales were 0.1–0.4 km in Table 24, while the distances at a response were 0.26–0.83 km in Table E-1.

Figure 43—

- Although the figure includes nine exposures, the majority do not match the data provided in Table E-1. It also is unclear where the exposures from 140–155 dB re 1 μPa originated, because the RLs in Table E-1 are all less than or equal to 130 dB re 1 μPa. Further, the figure has omitted any RLs less than 98 dB re 1 μPa.

Figure 44—

- The figure specified that 101 exposures were included, whereas only 98 exposures were included in Table E-1. Given the number of exposures included in the figure, its accuracy based on Table E-1 cannot be assessed.

Figure 45—

- The figure specified that 85 exposures were included, whereas only 84 exposures were included in Table E-1.
- The figure included 11 data points indicative of a response, whereas only 9 animals were denoted as exhibiting a significant behavior response in Table E-1.

Table E-1—

- The 2019 sperm whale data from the 3S3 study must be crosschecked and revised based on the table in the Curé et al. (2025) supplemental appendix. See specific examples stipulated on page 10 of the preceding letter.
- The relevant data from Blainville's beaked whales from Moretti et al. (2014) and Jacobson et al. (2022) were not included in the table. At a minimum, the 10 data points that were randomly subsampled from the Moretti et al. (2014) and Jacobson et al. (2022) extrapolated GAMs should have been included in the table.
- The description of response for the Blainville's beaked whale exposed to MFA sonar from Tyack et al. (2011) indicated that the animal resumed foraging during the exposure, therefore the response did not rise to the level of a response. However, the Southall severity score was denoted as 6 with a 1 for significant behavioral response and a corresponding received level of response of 100 dB re 1 μPa[98].
- Data from the minke whale from the SOCAL BRS from Kvadsheim et al. (2017) was not included in the table.
- The raw data were included in the table for bottlenose dolphins and California sea lions from Houser et al. (2013a, b) rather than the subsampled data from the dose-response functions that the Navy derived specifically from the moderate and severe responses of the dolphins and sea lions.

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[98] Previously for bb12_214a in Appendix E of Department of the Navy (2024a), a RL of 138 dB re 1 μPa was specified as the maximum RL without a response, the Southall severity score was 5, and the significant behavioral response was 0.

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