MARINE MAMMAL COMMISSION

6 September 2022

Ms. Jolie Harrison, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Ms. Harrison:

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) 11 August 2022 notice (87 Fed. Reg. 49656) and the revised letter of authorization (LOA) application submitted by the U.S. Navy (the Navy) seeking promulgation of regulations under section 101(a)(5)(A) of the Marine Mammal Protection Act (the MMPA). The taking would be incidental to conducting training activities in the Gulf of Alaska (GOA; Phase III activities[1]) during a seven-year period. The Commission reviewed and provided recommendations in its 4 January 2021 letter on the Navy's Draft Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement (DSEIS) regarding conducting training activities in the Temporary Maritime Activities Area (TMAA).

Background

The Navy proposes to conduct training activities in the TMAA off Kodiak, Alaska. The activities would involve the use of mid- and high-frequency sonar, weapons systems, explosive and non-explosive practice munitions and ordnance, high-explosive underwater detonations, expended materials, electromagnetic devices, vessels, and aircraft. The Navy also would conduct vessel movements and aircraft training activities[2] in the Western Maneuver Area (WMA) from the 4,000-m isobath seaward. Activities would occur intermittently for no more than 21 days from April–October. In addition to potential time-area closures[3], mitigation measures would include visual monitoring[4] to implement delay and shut-down procedures.

[1] NMFS authorized the Navy to conduct similar activities first under the Tactical Training Theater Assessment and Planning (TAP I) LOA applications and second under Phase II LOA applications.
[2] No active acoustic or explosive activities would occur in the WMA.
[3] Some of which correspond to documented biologically important areas (BIAs).
[4] Passive acoustic monitoring would occur only when Navy assets with passive acoustic monitoring capabilities are already participating in any such activity.

Density estimates

Uncertainty in density estimates—The Commission had recommended in previous letters regarding Navy Phase II activities that the Navy incorporate uncertainty and more refined data in its density estimates, including for cetaceans in regions or seasons that have not been surveyed and for pinnipeds in general. For Phase III activities in the Atlantic Fleet Training and Testing (AFTT) study area and Hawaii-Southern California Training and Testing (HSTT) study area, the Navy used more refined density estimation methods for cetaceans and accounted for uncertainty in those densities and the group size estimates[5] that seeded its animat modeling. Department of the Navy (2018) made no mention of incorporating measures of uncertainty for the TMAA, even though coefficients of variation (CVs) were stipulated for numerous underlying density estimates in Department of the Navy (2021). Department of the Navy (2021) did indicate that uncertainty was incorporated in the density estimates but did not state how it was incorporated or whether uncertainty was included in the group size estimates[6], consistent with other Navy rulemakings.

For pinnipeds, CVs were available for northern fur seal densities only (Department of the Navy 2021). However, many of the abundance estimates that informed the Navy's pinniped density estimates include other measures of uncertainty (e.g., standard error (SE), 95 percent confidence intervals (CIs) or credible intervals (CrIs)) that can be incorporated as well (see, for example, NMFS's stock assessment reports (SARs) and Fritz et al. 2016). The Commission recommends that NMFS (1) clarify how and for which species uncertainty was incorporated in the density estimates and whether and how uncertainty was incorporated in the group size estimates and specify the distribution(s) used in the preamble to the final rule and, (2) if uncertainty was not incorporated, re-estimate the numbers of marine mammal takes in the final rule based on the uncertainty inherent in the density estimates provided in Department of the Navy (2021) or the abundance estimates in the underlying references (NMFS SARs, Fritz et al. 2016, etc.) and the group size estimates provided in Department of the Navy (2020a). Furthermore, if uncertainty is not incorporated in the group size estimates, the Commission recommends that NMFS specify why it did not do so in the preamble to the final rule.

Gray whale densities—In its 4 January 2021 letter on the DSEIS, the Commission recommended that the Navy request a small number of gray whale takes in its LOA application regardless of whether its model estimated zero takes. Density estimates are not available for gray whales in the TMAA, but the whales could occur there within the timeframe that the Navy's activities would occur[7]. The Navy did not request any gray whale takes in its revised LOA application, but NMFS proposed to authorize four Level B harassment behavioral takes of the Eastern North Pacific (ENP) stock in the proposed rule based on group size from Rone et al. (2017). The Commission supports that approach but is unsure why NMFS did not also propose to authorize takes of the Western North Pacific (WNP) stock of gray whales. Palacios et al. (2021) and Mate et al. (2015) have shown that gray whales tagged off eastern Russia have been tracked through the TMAA, similar to and in about equal proportion to ENP gray whales. Telemetry, photo-identification, and genetic studies have all

[5] Using means and standard deviations that varied based on either a compound Poisson-gamma or lognormal distribution for densities and Poisson, lognormal, or inverse Gaussian distribution for group sizes.
[6] Standard deviations (SDs) relative to group sizes were included in Department of the (Navy 2020a).
[7] Gray whales have been acoustically detected (Department of the Navy 2020b and 2021), visually observed (Ferguson et al. 2015), and tracked via telemetry data (Palacios et al. 2021) in the TMMA. The TMAA also overlaps with the gray whale migratory corridor BIA (Ferguson et al. 2015).

shown movements and interchange between the WNP and ENP stocks of gray whales (Weller et al. 2012, Urbán et al. 2019, Lang et al. 2022). Therefore, the Commission recommends that NMFS include four Level B harassment behavioral takes for the ENP *and* WNP stocks of gray whales, as well as its proposed Level B harassment behavioral takes for the WNP stock of humpback whales[8], in the final rule.

Beaked whale densities—Baird's, Stejneger's, and Cuvier's beaked whales have been detected using various passive acoustic monitoring devices in the TMAA, while only Baird's and Cuvier's beaked whales have been observed visually. For the 2013 survey in the TMAA, Rone et al. (2014) documented six on-effort sightings of 49 Baird's beaked whales[9] and one sighting of a single Cuvier's beaked whale. The researchers also documented 47 acoustic encounters of Cuvier's beaked whales, 32 acoustic encounters of Baird's beaked whales, and 6 encounters of Stejneger's beaked whales (Rone et al. 2014). Yack et al. (2015) were able to derive stratum-specific[10] density estimates for Cuvier's beaked whales but were unable to do so for the other two species due to insufficient sample sizes. The Navy assumed that the pooled density estimate of 0.0021 whales/km^2 from Yack et al. (2015) should be applied to the three depth strata for Stejneger's beaked whales (Department of the Navy 2021). That approach is reasonable.

However, rather than applying the same approach for Baird's beaked whales, the Navy used a presumed density of 0.0005 whales/km^2 from Waite (2003) based on a single sighting of four Baird's beaked whales. That density estimate is of little value based on the Commission's critique of data that originated from Waite (2003)[11] in its 4 January 2021 letter. In addition, the Navy itself specified that six visual sightings and 32 acoustic detections of Baird's beaked whales occurred during the 2013 survey in the TMAA (Department of the Navy 2021). Rone et al. (2014) also noted that Baird's beaked whales often travel in large groups. The Navy further specified average group size as 8.08 for Baird's beaked whales, 2.04 for Cuvier's beaked whales, and 6 for Stejneger's beaked whales (see Table 26 in Department of the Navy 2020a). As such, the density from Waite (2003) is a vast underestimate.

Further, Rone et al. (2014) documented the first fine-scale habitat use of a tagged Baird's beaked whale in the region. The tagged individual showed the importance of seamount habitat, remaining approximately nine days, presumably foraging, within a relatively small geographic range inside the TMAA, with approximately six of those days spent in the vicinity of a single seamount (Rone et al. 2014). The greatest density of Cuvier's beaked whales also was attributed to the seamount stratum based on Yack et al. (2015). At a minimum, the stratum-specific densities for Cuvier's beaked whales should have been used as surrogates for Baird's beaked whales, with the understanding that the Cuvier's beaked whale densities may still be an underestimate based on the

[8] NMFS proposed to increase the takes for WNP humpback whales from model-estimated zero takes to group size from Rone et al. (2017).
[9] Ranging from 2–16 whales in each group.
[10] For 0.002 whales/km^2 for the offshore stratum, 0.003 whales/km^2 for the seamount stratum, and 0.0008 whales/km^2 for the slope stratum.
[11] Department of the Navy (2009) used a single sighting from Waite (2003), for which the Navy noted the confidence in the density value was low, and f(0) and g(0) values derived from other surveys in the North Pacific, because survey-specific f(0) and g(0) values were not provided by Waite (2003). Waite (2003) data also were collected in summer (June and July) but were applied to other seasons.

larger group size of Baird's beaked whales. The Commission recommends that NMFS use the three stratum-specific densities of Cuvier's beaked whales as surrogates for Baird's beaked whales and re-estimate the numbers of takes accordingly for the final rule.

Harbor porpoise densities—The Navy indicated that it used data derived from Hobbs and Waite (2010) to characterize harbor porpoise density in various strata based on published depth distributions (Department of Navy 2021). The Navy did not stipulate where those depth strata delineations originated or what density from Hobbs and Waite (2010) was used. Hobbs and Waite (2010) provided an uncorrected density of 0.062 porpoises/km^2 for GOA and a corrected abundance of 31,046 porpoises[12] for the 158,733 km^2 area surveyed (see Table 2), which would result in a corrected density of 0.198 porpoises/km^2. Both densities are greater than the 0.0473 porpoises/km^2 that Navy used for GOA[13] (Department of the Navy 2021). If NMFS considers the data in Hobbs and Waite (2010) to be the best available science, the Commission recommends that NMFS use the corrected density of 0.198 porpoises/km^2 from Hobbs and Waite (2010) for the 100- to 200-m isobath stratum and re-estimate the numbers of takes accordingly for harbor porpoises in the final rule.

Pinniped densities—In previous Commission letters regarding Phase II activities, the Commission recommended that the Navy incorporate telemetry data, appropriate age and sex assumptions, and relevant haul-out correction factors properly[14] to better refine its density estimates. The Navy did so for Phase III activities at NWTT but to a much lesser degree for GOA. As was the case for Phase II activities for GOA, the Navy again used abundance estimates divided by given areas to estimate densities and the areas used were again inconsistent among species. For example, the Navy used—

- the GOA Large Marine Ecosystem (LME) area for northern fur seals,
- the critical habitat designated areas for the Eastern and Central GOA for western Steller sea lions (western distinct population segment (wDPS)),
- an approximation of the area of the eastern distinct population segment (eDPS) for eastern Steller sea lions,
- U.S. Geological Survey's (USGS) definition of GOA for northern elephant seals, and
- the continental shelf area extending to the 500-m isobath for harbor seals (Department of the Navy 2021).

Those areas may be appropriate for some species or stocks but not for others. Specifically, it is unclear why the Navy did not use the same area[15] for northern fur seals and elephant seals, as both density estimates incorporated telemetry data over an area representing GOA.

For northern fur seals, the Navy used 620,660 rather than the most current abundance estimate of 626,618 from NMFS's 2021 SAR (Muto et al. 2022). The information the Navy provided in the text for delineating juveniles by sex also does not match the information in Table 10-2 (Department of the Navy 2021). More importantly, the Navy assumed that juveniles would not occur in GOA after August. However, Zeppelin et al. (2019) determined that some juveniles migrate

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[12] Based on both perception and availability biases.
[13] From 100- to 200-m isobaths.
[14] Thus, the percentage of time at sea.
[15] The GOA LME is 1,491,252 km^2 and USGS's GOA is 513,158 km^2.

south in October. As such, the Navy potentially underestimated the numbers of juvenile fur seals that could be taken during September and October by assuming none would be taken. The Commission recommends that NMFS (1) specify why the Navy chose to use the GOA LME area rather than the USGS GOA area in the preamble to the final rule, (2) use the most recent northern fur seal abundance estimate of 626,618 rather than 620,660, (3) determine whether the information in the text or in Table 10-2 in Department of the Navy (2021) is correct regarding the assumed delineations of juvenile northern fur seals by sex and re-estimate the abundances provided in Table 10-3 based on the most recent abundance estimate and the correct delineation assumptions, (4) apply to September and October the same assumptions that were made regarding juveniles of both sexes for August, and (5) re-estimate the densities in Table 10-4 and the numbers of takes of northern fur seals in the final rule.

Similar to previous Commission comments on the Navy's pinniped densities, it is unclear why the Navy did not forward-project the abundance estimates of wDPS Steller sea lions to at least 2021[16], as trend data are available in NMFS's 2019 SAR and remain the same through 2021 (Muto et al. 2022). It also is unclear why the Navy used Fritz et al. (2016) for the abundance estimates for western and eastern Steller sea lions. Those abundances were from surveys conducted in 2015 and have been updated by Sweeney et al. (2018 and 2019) as referenced in NMFS's 2019, 2020, and 2021 SARs. The Commission recommends that NMFS re-estimate (1) the Steller sea lion densities for the wDPS based on abundance data from Sweeney et al. (2018 and 2019) rather than Fritz et al. (2016) and forward-project the abundance estimates into 2022 using the trend data provided in NMFS's 2021 SAR and (2) the numbers of Steller sea lion takes for the wDPS[17] in the final rule.

In addition to the Navy's use of an inconsistent geographical area for elephant seals, the Commission notes that the Navy used an outdated abundance estimate. The abundance estimate is from 12 years ago and should have been forward-projected to at least 2021 based on the growth rate included in NMFS's 2019 SAR[18]. Since then, NMFS has updated its elephant seal abundance estimate to 187,386[19] and its annual growth rate to 3.1 percent[20] based on Lowry et al. (2020; Carretta et al. 2022). The abundance that the Navy used is underestimated by more than 25,000 seals. The Commission recommends that NMFS (1) specify why the Navy chose to use the USGS GOA area rather than the GOA LME area to estimate elephant seal densities in the preamble to the final rule, (2) use the most recent abundance estimate of 187,386 rather than 179,000 and forward-project it into 2022 using the trend data provided in NMFS's 2021 SAR, and (3) re-estimate the number of elephant seal takes in the final rule.

For harbor seals, the Navy indicated that it derived the proportion of the total population estimates in Table 10-10 of Department of the Navy (2021) from data provided by model A in Table 2 of Hastings et al. (2012). While Hastings et al. (2012) provided survival estimates of various age

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[16] Which was when the proposed rule originally was planned to publish. Since the final rule would not publish until 2022 or 2023, the abundance estimates should be forward-projected to at least 2022.

[17] A similar recommendation would apply to the density of eDPS Steller sea lions, but the density that the Navy derived does not pertain to the TMAA. However, other action proponents have used and continue to use Navy densities for their activities in and around GOA.

[18] Which was 3.8 percent.

[19] Through January 2018.

[20] The Navy used an abundance estimate of 179,000 seals.

classes for seals on Tugidak Island in Table 2, they did not provide relative age-class proportions for the population. The Navy also used abundance estimates from 2015–2018 for the four stocks[21]. As for other pinniped species, those estimates should have been forward-projected to at least 2021 based on the trend data available in NMFS's 2019 SAR. In addition, the Navy did not provide references regarding its assumption that harbor seals would be in the water for 50 percent of the time from June through September and for 60 percent of the time in April, May, and October. Boveng et al. (2012) indicated that the proportion of seals hauled out in Cook Inlet peaked at 43 percent in June compared to 32 percent in October. Those haul-out proportions would equate to 57 percent of seals in the water in June and 68 percent of the seals in the water in October—both of which are greater than the Navy's assumptions. For simplicity, the Navy could have used 60 and 70 percent rather than 50 and 60 percent. The Commission recommends that NMFS (1) re-estimate the densities of harbor seals based on the abundance data forward-projected to 2022 using the trend data provided in NMFS's 2021 SAR and based on 60 percent of seals being in the water from June through September and 70 percent of the seals being in the water in April, May, and October as denoted in Boveng et al. (2012) and (2) re-estimate the number of harbor seal takes in the final rule.

Lastly, rather than use the older abundance estimates that informed the densities in Department of the Navy (2021), NMFS correctly used abundance estimates from the most recent SARs, including the 2021 SARs (Carretta et al. 2022, Muto et al. 2022), in its negligible impact determination analysis (Tables 41–46 in the *Federal Register* notice). NMFS specified in the preamble to the proposed rule that those 2021 SARs represent the best available science (85 Fed. Reg. 49666) and then used the associated abundances to inform its analysis. NMFS should not consider one abundance estimate the best available science for its density estimates (85 Fed. Reg. 49716)[22] and another abundance estimate best available science for its negligible impact determination analysis for the same species (85 Fed. Reg. 49666). This is inconsistent with the tack taken for other Navy rulemakings (e.g., AFTT). For its negligible impact determinations in the AFTT rulemaking, NMFS indicated that it compared the predicted takes to abundance estimates generated from the same underlying density estimate instead of certain SARs, which are not based on the same underlying data and would not be appropriate for the analysis (e.g., Tables 72–77; 83 Fed. Reg. 57076 and 57214). It is clear that the more recent SAR data[23] represent best available science, further supporting the need for NMFS to correct the various pinniped density estimates using those data. The Commission recommends that NMFS use the same species-specific abundance estimates to both derive the densities and inform its negligible impact determinations for the various pinniped species in the final rule.

Criteria and thresholds

Thresholds in general—As stated in letters related to "NMFS's Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing: Underwater acoustic thresholds for onset of permanent and temporary threshold shifts" (PTS and TTS, respectively; Technical Guidance; NMFS 2018 and 2016), the Commission has supported the weighting functions and

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[21] North Kodiak and South Kodiak stocks have increased, while Prince William Sound and Cook Inlet/Shelikof Strait stocks have decreased. However, there would be a net increase in the overall abundance.
[22] NMFS indicated that Department of the Navy (2021) represented a selection and compilation of the best available marine species density data.
[23] Including the data used in the most recent SARs (e.g., Sweeney et al. 2018 and 2019, Lowry et al. 2020, etc.).

associated thresholds used for Navy Phase III activities (Department of the Navy 2017). Numerous more recent studies provide additional information on both behavioral audiograms and TTS. The Commission understands that more recent data have been incorporated into draft revised PTS and TTS thresholds for Phase IV activities that will inform an Updated Technical Guidance that will be available for public review in the coming months. The Commission appreciates the Navy's diligence in ensuring that the PTS and TTS thresholds are updated regularly.

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 III 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 2017 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 Bayesian BRFs are reasonable and a much-needed improvement on the two dose response functions (BRFs)[29] that the Navy had used for both TAP I and Phase II activities.

The Commission, however, remains concerned that following the development of the BRFs, the Navy then implemented various cut-off distances beyond which it considered the potential for significant behavioral responses to be unlikely (Table C.4 in Department of the Navy 2017). The Navy indicated it was likely that the context of the exposure is more important than the amplitude at large distances[30] (Department of the Navy 2017)—that is, the context-based response dominates the level-based response. The Commission agrees with that notion but notes that the Bayesian BRFs specifically incorporate those factors. Thus, including the additional cut-off distances contradicts the data underlying the Bayesian BRFs, negates the intent of the functions themselves, and underestimates the numbers of takes.

The cut-off distances used by the Navy also appear to be unsubstantiated. For example, the Navy indicated that data were not available regarding the response distances of harbor porpoises to sonar or other transducers, so it based the cut-off distances on harbor porpoise responses to pile-driving activities. The Commission disagrees with that choice, given that pile driving is an impulsive rather than non-impulsive source and unrelated to the Bayesian BRFs. For pinnipeds, the Navy

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[24] For odontocetes, mysticetes, beaked whales, and pinnipeds. The Navy used the 120-dB re 1 μPa unweighted, step-function threshold for harbor porpoises as it had done for Phase II activities.
[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. (2014).
[27] From both wild and captive animals.
[28] e.g., the animal's previous experience, separation distance between the sound source and animal, and behavioral state including feeding, traveling, etc.
[29] One for odontocetes and pinnipeds and one for mysticetes.
[30] For example, the Navy indicated that the range to the basement level of 120 dB re 1 μPa for the BRFs from TAP I and Phase II sometimes extended to more than 150 km during activities involving the most powerful sonar sources (e.g., AN/SQS-53).

indicated there are limited data on pinniped behavioral responses in general, and a total lack of data beyond 3 km from the source. However, the Navy arbitrarily set the cut-off distance at 5 and 10 km depending on the source. In response to the Commission's comments regarding those cut-off distances, the Navy indicated that pinnipeds do not exhibit strong reactions to sound pressure levels up to 140 dB re 1 μPa based on Southall et al. (2007; 83 Fed. Reg. 65230). The Commission notes, as did the Navy, that data from Southall et al. (2007) were limited, based on sources that did not have characteristics similar to mid-frequency active (MFA) sonar[31], and did not include exposures at higher received levels. Data on pinniped behavioral responses now exist for both sound sources similar to MFA sonar and at higher received levels. Those data ultimately were used by the Navy to develop the Bayesian BRF for pinnipeds (see Table 3-2 in Department of the Navy 2017 for specifics), while none of the data cited in Southall et al. (2007) were used. Some of the pinnipeds did in fact exhibit 'strong' reactions based on the Southall et al. (2007) severity scale[32] to received levels less than and equal to 140 dB re 1 μPa, and those data were used to inform the context portion of the Bayesian BRF.

For cetaceans other than harbor porpoises, the Navy based the cut-off distances on scant acoustic data from a single species each for beaked whales and mysticetes and tag data from Risso's dolphins. Interestingly, Risso's dolphins tens of kilometers from the source exhibited similar responses to those that were within hundreds of meters of the source (Southall et al. 2014). That is, the dolphins did not exhibit any clear, overt behavioral response to either the real MFA source or the scaled MF source at either distance, and the scaled MF source had to be shut down from full power when the dolphins entered the 200-m shut-down zone. Accordingly, the Commission remains unconvinced of the appropriateness of the Navy's proposed cut-off distances.

Depending on the activity and species, the cut-off distances eliminate a large portion of the estimated numbers of takes. For sonar bin MF1 (the most powerful MFA sonars), the estimated numbers of takes would be reduced to zero beginning where the probability of response is between 40 and 58 percent for odontocetes and 45 and 66 percent for beaked whales (Table 6–7 in the revised LOA application and Table 8 in the *Federal Register* notice). For mysticetes, takes would be eliminated for MF1 sources at a received level of 154 to 160 dB re 1 μPa equating to a probability of response of approximately 18 percent. While that percentage may seem inconsequential, the received level is in fact greater than the level at which actual context-based behavioral responses were observed for feeding blue whales (see Figure 3 in Goldbogen et al. 2013[33]). The Navy attempted to assuage the Commission's concerns[34] in its response to comments regarding the AFTT DEIS[35] by asserting that the use of the Bayesian BRFs in conjunction with the cut-off distances is currently the best-known method for providing the public and regulators with a more realistic (but still

[31] Some sources emitted sound at much lower frequencies (the acoustic thermometry of the ocean climate (ATOC) sound source emitted signals at a center frequency of 75 Hz) and at a greater repetition rate than MFA sonar (Costa et al. 2003). Other sources emitted sound at higher frequencies (the Airmar™ acoustic harassment device (AHD) emitted signals at 10 kHz or higher and acoustic communication signals were emitted at 12 kHz with higher frequency harmonics) and at a greater repetition rate with shorter pulse durations (specifically the AHD) than MFA sonar (Jacobs and Terhune 2002, Kastelein et al. 2006).
[32] Equating to significant behavioral responses as specified by the Navy.
[33] Data that also were used to derive the Bayesian BRFs. Southall et al. (2019) showed similar results.
[34] See its 2 August 2017 letter on AFTT.
[35] Similar responses were provided for HSTT, NWTT, and MITT final EIS/SEISs.

conservative where some uncertainties exist) estimate of impacts and potential takes. The Commission disagrees. Use of the Navy's cut-off distances is neither conservative nor realistic and effectively discounts the underlying data, including Goldbogen et al. (2013), upon which the BRFs are based.

Tyack and Thomas (2019) compared results between setting a threshold where 50 percent of the animals respond and using the actual Bayesian BRF—setting the threshold at a 50-percent response led to an underestimation of effect by greater than two orders of magnitude[36]. Although the arbitrary cut-off distance in the Navy's example occurred where 45 percent or more of the animals respond, the behavioral impacts and takes of the various species have been underestimated as well. As noted by Tyack and Thomas (2019), given the shape of the dose-response function and how efficiently sound propagates in the ocean, the number of animals that are predicted to have a low probability of response may in fact represent the dominant impact from a given sound source. Since Dr. Thomas developed the Bayesian BRFs for the Navy and has highlighted the shortcomings associated with assuming only a portion of the animals respond[37] rather than using the Bayesian BRFs as intended, it would be prudent for NMFS and the Navy to heed the results provided in Tyack and Thomas (2019). For all these reasons, the Commission strongly 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 in the final rule. Use of cut-off distances has been criticized in public comments as an attempt to reduce the numbers of takes (85 Fed. Reg. 72326). As such, providing better-substantiated, alternative cut-off distances is unnecessary, as their use in conjunction with the Bayesian BRFs is redundant and potentially contradictory.

Behavior thresholds for explosives—Unlike the behavior thresholds for acoustic sources, the thresholds for explosives have not been updated. The Navy continues to assume a behavior threshold 5 dB lower than the TTS threshold for each functional hearing group for explosives. As noted in Department of the Navy (2017), that value was derived from observed *onset* behavioral responses of captive bottlenose dolphins during non-impulsive TTS testing using 1-sec tones (Schlundt et al. 2000). Basing an impulsive threshold on responses of dolphins to a non-impulsive source is questionable, but more concerning is that the Navy continues to claim that marine mammals do not exhibit behavioral responses to single detonations (Department of the Navy 2017)[38]. The Navy has asserted that the most likely behavioral response would be a brief alerting or orienting response and significant behavioral reactions would not be expected to occur if no further detonations followed. Although there are no data to substantiate that assertion, the Navy has stated that the same reasoning was used in previous ship shock trial final rules in 1998, 2001, and 2008. Without such data, there is no reason to continue to ascribe validity to assumptions made 10 to 20 years ago. Larger single detonations (such as bombing exercises[39]) would be expected to elicit 'significant

[36] By a factor of 280.
[37] Which corresponds to using various arbitrary cut-off distances.
[38] Including certain gunnery exercises that involve several detonations of small munitions within a few seconds.
[39] With net explosive weights of 251–500 lbs for bin E10 and 651–1,000 lbs for bin E12.

behavioral responses'[40]. The Navy provided no evidence regarding why 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 100 lbs., let alone detonations of up to 1,000 lbs.

In response to the Commission's comments on the AFTT and HSTT DEISs[41], 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, as far as the Commission is aware, stationed personnel at the target site to monitor marine mammal responses during large single detonations. In other instances (i.e., bombs dropped from aircraft), the lookout is tasked primarily with clearing the mitigation zone and realistically only observes for animals in the central portion of that zone immediately prior to the activity commencing. Lookouts are not responsible for documenting an animal's behavioral response to the activity, but rather are responsible for minimizing serious injury to, and mortality of, any observed animal[42]. Additionally, the Navy was not required to conduct post-activity monitoring for any of its activities under the Phase II final rules (e.g., 50 C.F.R. § 218.144), and post-activity monitoring is conducted primarily to document injured and dead marine mammals, not behavioral responses during the activity.

In response to the Commission's comments on the NWTT proposed rule, NMFS acknowledged that individuals exposed *above* the TTS threshold also may be harassed by behavioral disruption, that those potential impacts are considered in the negligible impact determination, and that neither NMFS nor the Navy is aware of evidence to support the assertion that animals will have significant behavioral responses (i.e., those that would rise to the level of a take) to temporally or spatially isolated explosions at received levels below the TTS threshold (85 Fed. Reg. 72325). Delineation of behavior takes occurring above the TTS threshold is irrelevant to those that occur below the TTS threshold[43]. Furthermore, 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 NMFS presumes that they could occur, including for lower-level activities such as those involving high-resolution geophysical and other mapping devices, pile jetting and cutting, ice breaking, etc. Moreover, the Navy routinely requests and NMFS routinely authorizes behavior takes of marine mammals associated with exposure to *single* in-air explosive events (e.g., missile launch noise and sonic booms; 84 Fed. Reg. 28462). In fact, NMFS has based its take estimates on the numbers of animals that have responded behaviorally to single launch events (e.g., 87 Fed. Reg. 13710, 84 Fed. Reg. 14314), including those conducted by the Navy (e.g., 87 Fed. Reg. 40888, 84 Fed. Reg. 28470). Continuing to deny that a single explosive event, including that of a 1,000-lb bomb, has the potential

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[40] Including the animals (1) altering their migration path, speed and heading, or diving behavior; (2) stopping or altering feeding, breeding, nursing, resting, or vocalization behavior; (3) avoiding the area near the source; or (4) displaying aggression or annoyance (e.g., tail slapping). These factors were described in Department of the Navy (2017) and used by the Navy to differentiate behavioral response severity.
[41] See its 13 November 2017 letter on the HSTT DEIS.
[42] The ability of lookouts to sight marine mammal during MFA sonar exercises has been proven to be largely ineffective (Oedekoven and Thomas 2022) and will be discussed in detail in another section herein.
[43] That is, animals are expected to respond behaviorally to stressors that also can cause auditory impairment and other types of injuries. In those instances, it is the more adverse impact that is considered.

to cause behavior takes of marine mammals underwater is absurd, given that an animal exposed to such an event is expected to exhibit the factors the Navy differentiated as a behavioral response in Department of the Navy (2017) *and* behavior takes are routinely authorized for such events when animals are exposed in air. The Commission continues to maintain that NMFS has not provided adequate justification for dismissing the possibility that single underwater detonations can cause a behavioral response and therefore again recommends that it estimate and authorize behavior takes of marine mammals during *all* explosive activities, including those that involve single detonations consistent with in-air explosive events in the final rule.

Mortality and injury thresholds for explosives—The Commission notes that the constants and exponents[44] associated with the impulse metrics for both onset mortality and onset slight lung injury have been amended from those used in TAP I and Phase II activities. The Navy did not explain why the constants and exponents have changed when the underlying data[45] have remained the same. The modifications yield smaller zones[46] in some instances and larger zones in other instances[47]. These results are counterintuitive since the Navy presumably amended the impulse metrics to account for lung compression with depth, thus the zones would be expected to be smaller rather than larger the deeper the animal dives.

The Commission provided similar comments in its letters regarding the other Phase III DEIS/DSEISs. However, the Navy did not provide an explanation regarding the constants and exponents or specify the assumptions made in final EIS/SEISs. The Navy merely directed the Commission to Department of the Navy (2017)—the document from which the Commission's comments originated. NMFS, however, did provide a response in the preamble to the NWTT final rule. It stated that the numerical coefficients are slightly larger in Phase III than in Phase II, resulting in a slightly greater threshold near the surface and the rate of increase for the Phase II thresholds with depth is greater than the rate of increase for Phase III thresholds with depth because the Phase III equations take into account the corresponding reduction in lung size with depth (making an animal more vulnerable to injury per the Goertner model; 85 Fed. Reg. 72327). NMFS's response does not explain why *lower* absolute thresholds prevail below 8 m in depth and why, if lung compression is accounted for in Phase III, the rate of *increase* of the Phase II thresholds with depth would be greater when lung compression was not accounted for. The Commission again recommends that NMFS explain why the constants and exponents for onset mortality and onset slight lung injury thresholds[48] for Phase III that consider lung compression with depth result in lower rather than higher absolute thresholds when animals occur at depths greater than 8 m in the preamble to the final rule.

Similar to previous Phase III rulemakings, the Navy used the onset[49] mortality and onset slight lung injury criteria to determine only the range to effects[50], while it used the 50 percent mortality and 50 percent slight lung injury criteria to estimate the numbers of marine mammal

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[44] The constants have increased and the exponents have decreased from 1/2 to 1/6.
[45] Based on Richmond et al. (1973), Yelverton et al. (1973), Yelverton and Richmond (1981), and Goertner (1982).
[46] When animals occur at depths between the surface and 8 m, yielding higher absolute thresholds.
[47] When animals occur at depths greater than 8 m, yielding lower absolute thresholds.
[48] Equations 11 and 12 in Department of the Navy (2017).
[49] Defined as the 1-percent risk in the HSTT FEIS.
[50] To inform the mitigation zones.

takes[51]. That approach is inconsistent with the manner in which the Navy estimated the numbers of takes for PTS, TTS[52], and behavior[53] for explosive activities. All of those takes have been and continue to be based on onset, not 50-percent values.

In addition, the circumstances of the deaths of multiple common dolphins during one of the Navy's underwater detonation events in March 2011 (Danil and St. Leger 2011) indicate that the Navy's mitigation measures are not fully effective, especially for explosive activities. Recently, Oedekoven and Thomas (2022) also confirmed the ineffectiveness of Navy lookouts to sight marine mammals at various distances during MFA sonar exercises[54]. As such, the Navy, and in turn NMFS, should estimate injuries and mortalities based on onset rather than a 50-percent incidence of occurrence. The Navy even indicated that it is reasonable to assume for its impact analysis—thus its take estimation process—that extensive lung hemorrhage[55] is a level of injury that would result in mortality for a wild animal (Department of the Navy 2017). Thus, it is unclear why the Navy did not estimate the numbers of takes based on onset rather than the 50-percent criterion.

What is clear is that using the 50-percent criteria underestimate predicted mortalities and injuries. The Navy's response in the Phase III final EIS/SEISs, and NMFS's responses in the corresponding preamble to the final rules, that overpredicting impacts by using onset values would not afford extra protection to any animal[56] is irrelevant from an impact analysis standpoint. The intent of an impact analysis is to estimate and evaluate impacts (i.e., takes) from the proposed activities accurately. There is no logical reason to estimate sublethal impacts of PTS, TTS, and behavioral response based on onset criteria and then base estimates of lethal and injurious effects on 50-percent criteria. NMFS also asserted in the preamble to the NWTT final rule that estimating takes based on the onset values would overpredict effects, because effective mitigation would preclude many of those exposures from occurring (85 Fed. Reg.72328). This is unsubstantiated as the Navy has not determined the effectiveness of its mitigation measures relative to explosive activities. Despite mitigation measures having been implemented, explosive activities have resulted multiple common dolphin deaths. <u>The Commission again recommends</u> that NMFS use onset mortality, onset slight lung injury, and onset GI tract injury thresholds rather than the 50-percent thresholds to estimate both the numbers of marine mammal takes *and* the respective ranges to effect for the final rule. If the Navy does not implement the Commission's recommendation, <u>the Commission further recommends</u> that NMFS (1) specify why it bases explosive thresholds for Level A harassment on onset PTS and Level B harassment on onset TTS and onset behavioral response, while the explosive thresholds for mortality and Level A harassment are based on the 50-percent criteria for mortality, slight lung injury, and GI tract injury, (2) provide scientific justification

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[51] A similar approach was taken for gastrointestinal (GI) tract injuries.
[52] In the preamble to the NWTT final rule, NMFS appeared to conflate onset values with the amount of a threshold shift necessary to be deemed TTS, which is 6 dB (85 Fed. Reg. 72328).
[53] Contrary to NMFS's assertion that the behavior thresholds are not based on onset values in the preamble to the NWTT final rule, the Navy specified that the behavior thresholds for explosives were derived from observed *onset* behavioral responses of captive bottlenose dolphins during non-impulsive TTS testing (1-sec tones) based on Schlundt et al. (2000; see Department of the Navy 2017).
[54] They determined that lookouts are only *3 percent* effective at observing a small pod (6 or less) of small cetaceans at 183 m, with absolute effectiveness estimated to be 1 percent.
[55] i.e., onset mortality; see Table 4-1 in Department of the Navy (2017).
[56] And yet the mitigation zones are based on the onset values, so the animals would in fact be afforded 'extra protection'.

supporting the assumption that slight lung and GI tract injuries are less severe than PTS and thus the 50-percent rather than onset criteria are more appropriate for estimating Level A harassment for those types of injuries, and (3) justify why the number of estimated mortalities should be predicated on at least 50 percent rather than 1 percent of the animals dying, particularly given the ineffectiveness of lookouts in the preamble to the final rule.

Mitigation measures

The Navy's proposed mitigation zones are similar to the zones[57] previously used during Phase II activities and are intended, based on the Phase III DSEIS, to avoid the potential for marine mammals to be exposed to levels of sound that could result in injury (i.e., PTS). However, the Phase III proposed mitigation zones would not protect several functional hearing groups[58] from PTS. For example, the mitigation zone for an explosive bomb[59] is 2,286 m (Table 35 in the *Federal Register* notice), but the mean PTS zone is 4,327 m for HF cetaceans[60]. The appropriateness of such zones is further complicated by aircraft deploying bombs at surface targets directly beneath the aircraft, minimizing the ability to observe the entire extent of the zone(s). In addition, explosive projectiles (both medium-sized and large projectiles) are fired from vessels at targets 3.7 and 11.1 km away from the firing platform, respectively. Ships do not clear the target area before launching the various projectiles. In both cases, marine mammals could be present in the target area at the time of the launch unbeknownst to the Navy.

In addition, the Navy acknowledged in the DSEIS that lookouts would not be 100 percent effective at detecting all species of marine mammals for every activity because of the inherent limitations of observing marine species and because the likelihood of sighting individual animals is largely dependent on observation conditions (e.g., time of day, sea state, mitigation zone size, observation platform) and animal behavior (e.g., the amount of time an animal spends at the surface of the water). The Commission agrees and has made repeated recommendations to the Navy regarding the effectiveness of visual monitoring.

From 2010–2019, the Navy collected data in support of assessing lookout effectiveness and recently the University of St Andrews analyzed those data to determine the effectiveness. The Navy did not mention that study in its DSEIS, original LOA application, or its revised LOA application for Phase III. In response to previous recommendations from the Commission regarding the lookout effectiveness study, NMFS included a term and condition in the incidental take statements issued under the Endangered Species Act (ESA) for the Mariana Islands Testing and Training and NWTT study areas requiring the Navy to provide a final report 90 days after 31 December 2021 that includes a statistical assessment of the data available to date characterizing the effectiveness of Navy

[57] The Commission appreciates that the Navy has provided the estimated mean, minimum, and maximum distances for all impact criteria (i.e., behavior, TTS, PTS, onset slight lung injury, onset slight gastrointestinal injury, and onset mortality) for the various proposed activity types and for all functional hearing groups of marine mammals. That approach is consistent with the Commission's recommendations on Phase II activities.
[58] This routinely occurs for high-frequency (HF) cetaceans within GOA and can occur for low-frequency cetaceans and phocids in other Navy study areas.
[59] Bin E12 in the revised LOA application.
[60] The maximum range extends to 7,275 m for HF cetaceans (Table 6–30 in the revised LOA application and Table 16 in the *Federal Register* notice).

lookouts relative to trained marine mammal observers for the purposes of implementing the mitigation measures (85 Fed. Reg. 72350). The Commission appreciates that NMFS's section 7 ESA biologists believed it prudent to elicit a response from the Navy on this long-standing project. That requirement led to submittal of a final report (Oedekoven and Thomas 2022).

As expected from previous cruise reports (e.g., Department of the Navy 2010, 2012, 2013, 2014, 2016) and a preliminary analysis of the data a decade ago (Thomas et al. 2012), Oedekoven and Thomas (2022) estimated Navy lookout effectiveness[61] to be—

- 35 percent at 183 m, 21 percent at 457 m, and 13 percent at 914 m for rorquals;
- 3 percent at 183 and 457 m and 2 percent at 914 m for small cetaceans in pods of six or less; and
- 6 percent at 183 m, 4 percent at 457 m, and 3 percent at 914 m for small cetaceans in pods of more than six.

The researchers also estimated absolute effectiveness[62] to be—

- 20 percent at 183 m, 15 percent at 457 m, and 9 percent at 914 m for rorquals;
- 11 percent at 183 m, 8 percent at 457 m, and 5 percent at 914 m for sperm whales;
- 1 percent at 183 m and 0 percent at 457 and 914 m for small cetaceans in pods of six or less; and
- 6 percent at 183 m, 2 percent at 457 m, and 1 percent at 914 m for small cetaceans in pods of more than six.

These distances relate to mitigation zones[63], power-down zones[64], and shut-down zones[65] that are implemented by Navy lookouts during training activities.

Sufficient data are available regarding mitigation effectiveness for the Navy to supplement visual monitoring with other methods rather than simply reducing the size of the zones it plans to monitor, particularly since the lookouts are not able to monitor those reduced-size zones effectively. NMFS did not propose to require the Navy to supplement visual monitoring with passive acoustic monitoring during any acoustic or explosive activities. Rather, it indicated that passive acoustic monitoring would occur only when Navy assets with passive acoustic monitoring capabilities are already participating in any such activity (87 Fed. Reg. 49741). The Navy uses visual, passive acoustic, and active acoustic monitoring (via HF/M3) during SURTASS LFA sonar activities to augment its mitigation efforts over large areas. The Navy indicated in its Phase III DSEIS that it is not able to use HF/M3 during training and testing activities due to impacts on speed and

[61] Based on a simple distance-specific index of effectiveness at the various distances from a surface vessel, which likely provides an upper bound on absolute effectiveness.
[62] Which accounts for pods that pass through the mitigation zones undetected by Navy lookouts and the marine mammal observers.
[63] The mitigation zone is 2,286 m for bombing exercises and 914 m for large-caliber projectile exercises.
[64] The power-down zones for hull-mounted MFA sonar exercises are 914 and 457 m and 457 m for non-hull-mounted MFA and HF active (HFA) sonar exercises.
[65] The shut-down zones for hull-mounted and non-hull-mounted MFA and HFA sonar exercises are 183 m.

maneuverability that can affect safety and mission requirements based on costs associated with designing, building, installing, maintaining, and manning the equipment.

The Navy also stated in the DSEIS that it did not have sufficient resources to construct and maintain additional passive acoustic monitoring systems or platforms for each training and testing activity. Monitoring systems and platforms do not need to be constructed. The Navy could simply use sonobuoys, which are already deployed and used during many of its activities. For example, multiple sonobuoys could be deployed with the target prior to an activity to better determine whether the target area is clear and remains clear until the munition is launched. The Navy also incorrectly stated that passive acoustic detections would not provide range or bearing to detected animals and therefore cannot be used to determine an animal's location or confirm its presence in a mitigation zone. Directional Frequency Analysis and Recording (DIFAR) sonobuoys[66] perform both functions 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 and provides sonobuoys to researchers for the same purpose of detecting and localizing marine mammals[67]. Contrary to NMFS's assertion in the preamble to the NWTT final rule that sonobuoys have a narrow band that does not overlap with the vocalizations of all marine mammals (85 Fed. Reg. 72349), the Navy has highlighted numerous instances of various types of sonobuoys being used to detect and locate baleen whales, delphinids, and beaked whales[67]. A broadband repertoire of frequencies can be monitored, as well as narrow-band frequencies. NMFS also indicated that bearing or distance of detections cannot be provided based on the number and type of devices typically used (85 Fed. Reg. 72349). It is unclear how that could be accurate for directional or active sonobuoys or when fields of omnidirectional sonobuoys are deployed.

The Commission further notes that personnel who monitor the hydrophones and sonobuoys used by the Navy on the operational side also have the ability to monitor for marine mammals[68]. Department of the Navy (2013) confirmed that ability exists—four independent detections were made by passive acoustic technicians, but the sightings were missed by Navy lookouts. Similarly, Department of the Navy (2014) reported that echolocation clicks of short-finned pilot whales were reported to the bridge by the sonar technician prior to mitigation being implemented. And, although some aircraft may not have passive or active acoustic capabilities, aircraft carriers or other vessels from which the aircraft originated very likely do have such capabilities. The Commission has long promoted the use of the instrumented ranges[69], operational

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[66] 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.

[67] 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.

[68] For example, the engineer monitoring the hydrophones during a U.S. Air Force (USAF) activity at PMRF also listened for any signs of marine mammal life post (aerial clearance) survey and leading up to weapon impact (USAF 2016). Oedekoven and Thomas (2022) also confirmed that sonar technicians can report acoustic detections to the bridge.

[69] Which are not an option for GOA.

hydrophones and active acoustic sources[70], and sonobuoys[71] to fulfill mitigation implementation and contends that localizing certain species (or genera) acoustically provides for more effective mitigation than localizing none at all.

Given that Navy lookouts that conduct visual monitoring have been determined to be ineffective, passive[71] and/or active acoustic[70] monitoring must be used to supplement visual monitoring, especially for activities that could injure or kill marine mammals. Therefore, the Commission again recommends that in the final rule NMFS require the Navy to use passive (i.e., DIFAR and other types of passive sonobuoys, operational hydrophones) and active acoustic (i.e., tactical sonars that are in use during the actual activity and active sonobuoys or other sources similar to fish-finding sonars) monitoring, whenever practicable, to supplement visual monitoring during the implementation of its mitigation measures for all activities that could cause injury or mortality. At a minimum, sonobuoys deployed[72] and active sources and hydrophones used during an activity should be monitored for marine mammals—ideally, the Navy should develop and refine new technologies[73] to supplement its visual monitoring, similar to the Department of National Defence in Canada (Binder et al. 2021, Thomson and Binder 2021). If NMFS does not adopt this recommendation, the Commission recommends that NMFS justify in the preamble to the final rule (1) how it concluded that the Navy's mitigation measures based on visual monitoring do not need to be supplemented for those activities involving injury when Oedekoven and Thomas (2022) have determined that Navy lookouts are ineffective at sighting numerous types of marine mammals at various distances and for those activities involving mortality when marine mammals have been killed previously and (2) how visual monitoring is sufficient for effecting the least practicable adverse impact on the numerous marine mammal species and stocks.

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[74]. However, NMFS 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). It appears that NMFS similarly disregarded the Commission's most recent comments and recommendations in its 2020 letters, since NMFS's least practicable adverse impact section in the preamble to the proposed rule for GOA remains unchanged from previous preambles[75]. 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—

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[70] Including tactical sonars that are already used during the actual activity and active sonobuoys and other sources similar to fish-finding sonars.
[71] Including DIFAR and other types of passive sonobuoys.
[72] e.g., see Binder et al. (2021).
[73] 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. Technological solutions are being developed in Canada to address the potential harm to marine mammals from sonar exercises that are difficult to mitigate using traditional approaches (e.g., visual monitoring), and such solutions are multi-modal in nature (Thomson and Binder 2021).
[74] For example, see the Commission's 30 May 2017, 16 April 2018, 13 July 2018, 21 August 2019, 12 March 2020, and 12 June 2020 letters regarding this matter.
[75] Except for minor edits and inclusion of GOA-specific information.

- 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
- adopt general regulations to govern the process and set forth the basic steps and criteria that apply across least practicable adverse impact determinations.

Level A harassment takes

The Navy used various post-model analyses to estimate the numbers of marine mammal takes during acoustic and explosive activities that are similar to methods used in its Phase II DEISs. Those analyses effectively reduced the model-estimated numbers of Level A harassment takes (i.e., PTS) to Level B harassment (TTS)[76]. The analyses were based on (1) animal avoidance, (2) mitigation effectiveness, and (3) cut-off distances. The Commission has discussed the first two aspects at length in letters regarding Phase II activities. That information is not repeated herein but should be reviewed in conjunction with this letter (see the Commission's 15 September 2014 letter). The Commission has a few additional comments on those analyses.

For avoidance, the Navy assumed that animals present beyond the range to onset PTS for the first three to four pings would avoid any additional exposures at levels that could cause PTS (Department of the Navy 2018). That assumption equated to approximately 5 percent of the total pings or 5 percent of the overall time active; therefore, 95 percent of marine mammals predicted to experience PTS due to sonar and other transducers were instead assumed to experience TTS (Department of the Navy 2018). The Navy should have been able to query the dosimeters of the animats to verify whether its 5-percent assumption was valid[77], but on its face that assumption has no scientific basis. Given that sound sources are moving, it may not be until later in an exercise that the animal is close enough to experience PTS and it is those few close pings that contribute to the potential to experience PTS. Since both sources and animals are moving during an exercise, whether an animal is initially beyond the PTS zone has no bearing on whether it will later come within close range. Behavioral response studies (BRS) have shown this as well. For example, Southall et al. (2014)

[76] Mortality takes were similarly reduced to Level A harassment (injury) takes in other rulemakings. That was not necessary for the GOA proposed rule, because the Navy's model estimated zero mortality takes (87 Fed. Reg. 49736).
[77] That is, whether the first three or four pings equated to 5 percent of the total pings *and* 5 percent of the overall time active, not whether the animals avoided the source since horizontal animal movement was not incorporated in the Navy's modeling.

indicated that Risso's dolphins and California sea lions approached the 200-m shut-down zone when a source[78] was operating at full power, resulting in having to shut down the source. Both instances occurred well after the first three or four pings. Department of the Navy (2010 and 2012) also noted multiple instances in which dolphins were observed 27 to 460 m from a vessel emitting mid-frequency active sonar, in some instances several hours after the source began transmitting. Those dolphins did not receive only the first three or four pings emitted, nor did they avoid the source. Avoidance aside, Navy vessels may move faster than animals are capable of moving to evacuate the area, which would mean the animals are exposed to pings well after the first three or four.

Regarding mitigation effectiveness, the Commission notes that the specific mitigation effectiveness scores for the various activities were provided for Phase II but not for Phase III activities. For Phase III, the Navy included more detail regarding how the scores were determined (including species sightability, observation area extent, visibility factors, and whether sound sources were under positive control) but did not specify what the actual scores were for those four factors or as a whole. The Navy also did not include model-estimated numbers of takes. Consequently, the Commission and the public cannot assess how mitigation scores were used to reduce the model-estimated Level A harassment takes.

The Commission further points out inconsistencies in NMFS's most recent response regarding the Navy's post-model analysis. In the preamble to the NWTT final rule, NMFS indicated that it disagreed with the Commission's suggestions that there was not enough information to evaluate the Navy's post-modeling calculations or that the methods were arbitrary or non-conservative. NMFS stated that the Navy's report described how the factors were considered and that it was not necessary to view the many tables of numbers generated in the assessment to evaluate the method (85 Fed. Reg. 72333). If the *numbers or scores* associated with the Navy's post-model analysis were not provided, then clearly the public could not evaluate the *calculations*. NMFS also indicated that the information is not readily available in a format that could be shared and it would take extensive work to provide the necessary description of these data (85 Fed. Reg. 72333). Yet, the mitigation effectiveness scores and assumptions were able to be provided for Phase II. Numerous commenters have pointed out the lack of transparency and arbitrary appearance of the Navy's post-model analysis (85 Fed. Reg. 73332). The Commission agrees and reiterates the point made by another commenter that NMFS's failure to make the Navy's analysis transparent has prevented the public from effectively commenting on it, in contravention of the Administrative Procedures Act (APA) and on a matter of obvious significance to the agency's core negligible impact determination findings (85 Fed. Reg. 73332). Furthermore, the National Environmental Policy Act (NEPA), being a procedural statute, has similar requirements regarding transparency such that sufficient detail must be provided about the assumptions made to reach the agency's final conclusion. The Council on Environmental Quality repeatedly noted in its recently revised implementing regulations for NEPA that one of the goals of the revisions was to bring about greater transparency in the process (85 Fed. Reg. 43304), thus providing greater transparency and access to the underlying analyses.

Transparency issues aside, NMFS has allowed the Navy to arbitrarily reduce the numbers of Level A harassment takes based on presumed mitigation effectiveness scores that do not comport with best available science. NMFS indicated in the preamble to the proposed rule that it provided

[78] For both simulated and scaled sources. Similar results were observed with Risso's dolphins, California sea lions, and common dolphins during previous BRSs (Southall et al. 2011, 2012, 2013, and 2015).

input to, independently reviewed, and concurs with the Navy on the process and the Navy's post-modeling analysis that was used to quantify harassment takes for this rule (87 Fed. Reg. 49736). NMFS also noted that, in conducting the post-modeling quantitative assessment, the Navy erred on the side of caution in choosing a method that would more likely still overestimate the take by PTS to some degree (87 Fed. Reg. 49741). The Navy requested and NMFS proposed to authorize Level A harassment takes only for fin whales, Dall's porpoises, and elephant seals (2, 64, and 8 takes, respectively). Those numbers of takes remain unchanged from the original LOA application, confirming that neither the Navy nor NMFS considered the findings from Oedekoven and Thomas (2022) and that neither erred on the side of caution.

These issues taken together with the Commission's concerns regarding the Navy's use of cut-off distances underscore the fact that the Navy's post-model analyses underestimate the various numbers of takes. Therefore, the Commission again recommends that NMFS (1) specify the total numbers of model-estimated Level A harassment (PTS) takes in the preamble to the final rule and (2) authorize the model-estimated Level A harassment takes in the final rule, ensuring that those takes inform the negligible impact determination analyses. If NMFS does not adopt the Commission's recommendation, then the Commission recommends that in the preamble to the final rule NMFS (1) provide details on the specific mitigation effectiveness scores and how the model-estimated Level A harassment takes were reduced based on avoidance and the mitigation effectiveness scores and (2) justify how it can continue to allow the Navy to implement mitigation effectiveness scores to reduce Level A harassment takes when Navy lookouts have been determined to be ineffective at sighting marine mammals. At the very least, the estimated mitigation effectiveness scores from Oedekoven and Thomas (2022) should have been used to reduce any Level A harassment takes that were estimated to occur within 914 m[79] of a surface vessel operating MFA or HFA sonar rather than arbitrary, presumed mitigation effectiveness scores that are not supported by best available science. Reducing model-estimated takes based on mitigation effectiveness for other activities[80] remains unsubstantiated. As such, mitigation effectiveness should not be used to reduce the numbers of marine mammal takes for the final rule for GOA or any of the upcoming Phase IV rulemakings.

Administrative Procedures Act

Lastly, the Navy recently published its FSEIS for conducting the proposed training activities in GOA (2 September; 87 Fed. Reg. 54214) and requested any comments by 3 October 2022. The public comment period for NMFS's proposed rule does not close until 26 September (87 Fed. Reg. 49656). Therefore, it is unclear whether and how any changes to the proposed rule would inform the FSEIS, as it has already been drafted and determinations apparently already made. Under the APA, an agency is expected to provide a full and sufficient rationale supporting its action at the time any statutory decision is made. That rationale is comprised in part by the agency's responses to public comments, which in this case were included in Appendix G[81] of the FSEIS. Since NMFS was a

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[79] For the various species and at the specified distances.
[80] e.g., unmanned activities, aircraft- and submarine-based activities, surface vessel-based activities involving explosives, etc.
[81] https://goaeis.com/portals/goaeis/files/eis/final_seis_2022/sections/GOAFinalSEISOEISAppendixGSeptember2022.pdf. Responses to the Commission's comments and recommendations, some of which are similar to those included herein, are provided in Table G-1.

cooperating agency on the DSEIS and indicated that it plans to adopt the FSEIS that will underpin the final rule (87 Fed. Reg. 49757), it can be perceived as though decisions have been made preemptively for the various statutory determinations. Such practice runs counter to the requirements of the APA and undermines the intent of the public process.

Please contact me if you have questions concerning the Commission's recommendations or rationale.

Sincerely,

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

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