22 May 2019

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 application submitted by the U.S. Navy, Naval Air Warfare Center Weapons Division (the Navy) seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act (the MMPA) to take small numbers of marine mammals by harassment. The taking would be incidental to target and missile launches from San Nicolas Island (SNI), California. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 2 May 2019 notice (84 Fed. Reg. 18809) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

The Navy proposes to continue to conduct up to 40 target or missile launches at SNI. Up to 10 of those launches may occur at night. The Navy launches targets and missiles from the Alpha and Building 807 Launch Complexes on the western side of SNI. The Navy also conducts aircraft and helicopter overflights. NMFS preliminarily has determined that, at most, the proposed activities could cause Level B harassment of California sea lions, harbor seals, and elephant seals. NMFS anticipates that any impact on the affected species and stocks would be negligible. NMFS also does not anticipate any take of marine mammals by death or serious injury and believes that the potential for disturbance will be at the least practicable level because of the proposed mitigation measures. The proposed mitigation, monitoring, and reporting measures include—

- avoiding, to the maximum extent practicable, launch activities during the harbor seal pupping season of February through April;
- limiting, to the maximum extent practicable, launch activities during the elephant seal pupping season of January through February and the California sea lion pupping season of June through July;
- restricting launch activities at elevations less than 305 m over pinniped haul-out sites;
- limiting launch activities during nighttime hours to no more than 10 launches per year;
- maintaining a minimum aircraft and helicopter flight path of 305 m from recognized pinniped haul-out sites and rookeries, except in emergencies or for real-time security incidents;

- using three autonomous digital video cameras (including forward-looking infrared cameras) to monitor pinnipeds at least 2 hours prior to, during, and at least 1 hour after launch activities;
- conducting calibrated in-situ sound measurements at three different locations for each launch activity;
- using delay and shut-down procedures, if a species for which authorization has not been granted or if a species for which authorization has been granted but the authorized takes are met, approaches or is observed within the Level A and/or B harassment zone[1];
- reporting injured and dead marine mammals to the Office of Protected Resources and the West Coast Regional Stranding Coordinator using NMFS's phased approach and suspending activities, if appropriate; and
- submitting draft and final monitoring reports.

In-air thresholds

Auditory thresholds—For the proposed incidental harassment authorization, NMFS proposed to use various impulsive in-air thresholds based on Department of the Navy (2017) that it had not implemented previously. Although Department of the Navy (2017) included in-air thresholds, the Navy has not used those thresholds or enumerated in-air takes for any of its training or testing activities. NMFS did use Department of the Navy (2017) as the basis for its "Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing: Underwater acoustic thresholds for onset of permanent and temporary threshold shifts" (NMFS 2016 and 2018). However, as the title denotes, NMFS did not review, assess, propose, or finalize *in-air* thresholds for PTS and TTS.

For permanent threshold shift (PTS; see Table 6 in the *Federal Register* notice), NMFS stipulated cumulative sound exposure level (SEL_{cum}) thresholds of 161 and 138 dB re 20 μPa^2-sec for otariids and phocids[2], respectively, and peak sound pressure level (SPL_{peak}) thresholds of 176 and 161 dB re 20 μPa for otariids and phocids[3], respectively, based on Department of the Navy (2017). The temporary threshold shift (TTS) thresholds[4] based on SEL_{cum} were 146 and 123 dB re 20 μPa^2-sec for otariids and phocids, respectively, and 170 and 155 dB re 20 μPa for otariids and phocids, respectively, based on SPL_{peak}. In addition to those thresholds not being reviewed or finalized by NMFS, those thresholds are based on out-of-date information. Southall et al. (2019) recently indicated that, based on best available science, the PTS and TTS thresholds for SPL_{peak}[5] are in fact 9 dB lower for otariids[6] and 17 dB lower for phocids[7] than those reported in Department of the Navy

[1] The Commission informally noted that this standard measure was not included in the preamble or the proposed incidental harassment authorization. NMFS indicated it would be included in the final authorization.
[2] All SEL_{cum} thresholds also are weighted by the respective otariid and phocid weighting function.
[3] All SPL_{peak} thresholds are unweighted.
[4] The Commission also notes that the preamble incorrectly characterized previous sound levels. Specifically, the Coyote supersonic sea-skimming targets exhibited sound levels at the nearshore locations where pinnipeds occur that were at least 138 dB re 20 μPa^2-sec, which is much greater than the 119 dB re 20 μPa^2-sec stated in the preamble (84 Fed. Reg. 18821). This trend applies to the other metrics as well and could exceed the current TTS thresholds.
[5] The SEL_{cum} thresholds and associated weighting functions are the same in both Southall et al. (2019) and Department of the Navy (2017).
[6] 167 and 161 dB re 20 μPa for PTS and TTS, respectively.
[7] 144 and 138 dB re 20 μPa for PTS and TTS, respectively.

(2017)[8]. Southall et al. (2019) did not indicate why the thresholds have been reduced but it appears that the SPL_{peak} thresholds stipulated in Department of the Navy (2017) were in error. The previous version of the criteria and thresholds indicated that the SPL_{peak} threshold was 149 dB re 20 μPa for PTS and 143 dB re 20 μPa for TTS for all pinnipeds (Finneran and Jenkins 2012). It stands to reason that the thresholds in Southall et al. (2019) are correct, since the phocid thresholds are a bit lower than the general pinniped thresholds and the otariid thresholds are a bit higher than the general pinniped thresholds reported in Finneran and Jenkins (2012)—phocids, particularly harbor seals, are more sensitive to sound than otariids.

These inconsistencies and errors aside, it is unclear why NMFS would suddenly implement thresholds that have not been implemented previously, including in the U.S. Air Force's (the Air Force) recent proposed and final rule involving rocket launches (84 Fed. Reg. 335 and 14321). This is particularly concerning since the Department of the Navy (2017) has been available to NMFS for more than three years. Based on best available science, the Commission recommends that NMFS (1) use the SPL_{peak} thresholds for PTS and TTS based on Southall et al. (2019) rather than Department of the Navy (2017) and (2) before any in-air PTS and TTS thresholds are deemed NMFS's in-air auditory thresholds to be used by all applicants, NMFS provide proposed thresholds and associated weighting functions to the public for review and comment as it did for its in-water auditory thresholds.

Behavior thresholds—For behavioral harassment, NMFS indicated that it had helped develop the Department of the Navy (2017) criteria and thresholds and determined that the unweighted in-air behavior threshold of 100 dB 20 μPa^2-sec was appropriate for the Navy to use for its launch activities (Table 5 in the *Federal Register* notice)[9] rather than the 90-dB re 20 μPa threshold for harbor seals and the 100-dB 20 μPa threshold for pinnipeds other than harbor seals that have been used for many years. Similar to the PTS and TTS thresholds, it is unclear why, if NMFS thought this metric[10] and threshold was appropriate, it hadn't used it in its recent proposed and final rule for the Air Force (84 Fed. Reg. 335 and 14321) or other recent proposed rules or authorizations involving other launch activities (83 Fed. Reg. 57434, 82 Fed. Reg. 49334, 82 Fed. Reg. 6463, 81 Fed. Reg. 18584, etc.). NMFS also did not use the 100-dB 20 μPa^2-sec threshold for all pinnipeds under the previous proposed rule for Navy launch activities at SNI, instead it noted that it made an additional adjustment for harbor seals that are known to react strongly to SELs below 100 dB (79 Fed. Reg. 13030). Moreover, the Navy indicated in its application for the currently proposed activities that the behavior thresholds were based on a *weighted* 90-dB 20 μPa^2-sec threshold for harbor seals and a *weighted* 100-dB 20 μPa^2-sec threshold for sea lions.

The basis for use of the *unweighted* 100 dB 20 μPa^2-sec is unclear. Department of the Navy (2017) did not specify where the in-air behavior threshold for pinnipeds originated but merely noted in Table C.5 that it should be 100 dB 20 μPa^2-sec *unweighted*. To seek the origination of that threshold, the Commission reviewed Finneran and Jenkins (2012). Two issues are striking. First,

[8] Both documents were based on thresholds derived by J. Finneran.
[9] The Commission understands these statements to be mutually exclusive. NMFS helped develop the in-water criteria and thresholds as described in Department of the Navy (2017) but did not review or assess the in-air auditory thresholds, let alone the in-air behavior thresholds, presumably since the Navy's in-air thresholds generally have not been used. It can only be inferred that NMFS must have determined very recently that the unweighted 100 dB 20 μPa^2-sec threshold was appropriate because it was not used in rulemaking for similar activities just a few months ago.
[10] Previous behavior thresholds were based on root-mean-square SPL rather than SEL_{cum}.

Finneran and Jenkins (2012) used the same numeric threshold but stipulated that it (1) was based on data compiled in Southall et al. (2007), (2) is *weighted* based on the Type I weighting function[11], and (3) should be used for *multiple* pulses[12]. However, Southall et al. (2007) had noted that the data were limited[13] and that the *weighted* 100-dB 20 μPa^2-sec threshold should only be applied to *single* pulses. Due to the limited data, Southall et al. (2007) did not include specific thresholds for *multiple* pulses or launches.

Second, the 100-dB 20 μPa^2-sec threshold stipulated in the *Federal Register* notice is 10 dB higher[14] than NMFS's 90-dB 20 μPa threshold that has been used historically for harbor seals. However, even the 90-dB 20 μPa threshold is not reflective of more recent data. The Navy's own monitoring reports from SNI state that 90 dB is more appropriate for harbor seals, which showed a strong response to most launches. The same reports have indicated that during previous launches some harbor seals leave the haul out site and/or enter the water at weighted SELs as low as 60 dB based on Holst et al. (2008). The Navy's 2016 monitoring report specified that harbor seals responded to the launch of a Coyote supersonic sea-skimming target at unweighted sound levels of 87.7 to 88.5 dB 20 μPa[15]. The Navy's 2017 monitoring report indicated that harbor seals responded to the launch of another Coyote target at an unweighted sound level of 79.8 dB 20 μPa[16]. Similarly, according to two of the recent monitoring reports from Vandenberg Air Force Base, harbor seals behaviorally responded during Falcon 9 rocket launches at haul-out sites that were estimated to be ensonified between 80 and 90 dB re 20 μPa[17]. Moreover, the Navy's monitoring reports also noted that California sea lions responded at sound levels less than 100 dB. Given the inconsistencies and lack of substantiation for NMFS's in-air behavior thresholds for pinnipeds, the Commission recommends that NMFS use the 90-dB re 20 μPa threshold for harbor seals and the 100-dB 20 μPa threshold for pinnipeds other than harbor seals rather than 100 dB 20 μPa^2-sec for all pinnipeds.

The Commission agrees that NMFS's 90- and 100-dB re 20 μPa behavior thresholds need to be revised. As noted herein, those thresholds are not based on best available science. However, the Commission does not agree that higher thresholds should be used. As such and consistent with its 17 December 2018 letter, the Commission recommends that NMFS compile all in-air response data and determine whether the in-air thresholds can be revised now or whether additional paired visual and acoustic monitoring data are necessary to refine the in-air thresholds. If the thresholds cannot be revised with data currently available, the Commission recommends that NMFS (1) ensure that the Navy, the Air Force, and any other relevant entities collect the necessary data to inform in-air thresholds and (2) make a concerted effort to revise and finalize those thresholds in the next five years.

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[11] Which is synonymous with the M-weighting function for pinnipeds in air from Southall et al. (2007).
[12] Since the Navy continues to assert that behavior threshold for impulsive sources *only* applies to multiple pulses, detonations, or launches.
[13] Data originated 15–20 years ago, which did not include paired acoustic data from the haul-out sites and responses of pinnipeds from those sites. Most measurements were taken from bluffs overlooking the haul-out sites, effectively overestimating the received levels of the animals below and farther from the recorders.
[14] Based on a 1 sec pulse.
[15] Since those measurements were made at the bluffs overlooking the haul-out site, the sound levels where the seals were located when they responded would be even lower. The unweighted SELs were 93.8 to 94.9 dB 20 μPa^2-sec, and the weighted SELs were even less.
[16] The unweighted SEL was 89.3 dB 20 μPa^2-sec, and the weighted SEL was even less.
[17] Unfortunately, acoustic monitoring did not occur subsequent to visual monitoring during these or many launches in general. However, in-situ measurements generally are less than those estimated by both of the Air Force's models.

Level B harassment takes

Criteria for determining takes—In recent years, NMFS has revised its criteria for determining when Level B harassment takes occur for hauled out pinnipeds. NMFS has determined that Level B harassment occurs when animals move at least two body lengths for Level 2 responses and when animals flush into the water for Level 3 responses (84 Fed. Reg. 14324). For the Navy's proposed authorization, NMFS indicated that Level B harassment occurs when animals move at least 10 m, which is inconsistent with its current criteria. It is unclear why NMFS is using different criteria for the Navy's launches compared to other launches, including those of the Air Force. In any case, the Commission maintains that the consistent criteria should be used for all activities involving hauled out pinnipeds, particularly those involving launch activities. Thus, the Commission recommends that NMFS use its Level B harassment criteria based on animals moving at least two body lengths rather than animals moving at least 10 m for all activities involving hauled-out pinnipeds, including the Navy's proposed launch activities at SNI.

Level B harassment takes—To estimate the proposed numbers of Level B harassment takes, the Navy and NMFS used the average number of each species reported to be taken during a given launch[18] multiplied by the number of annual launches. That method is flawed for several reasons. First and foremost, the Navy is only able to monitor at most three haul-out sites during each launch[19], which generally equate to two California sea lion haul-out sites and one harbor seal haul-out site. However, California sea lions and harbor seals also are present at several more haul-out sites on the west side of SNI. The Navy also estimates the number of pinnipeds hauled out at least 2 hours before the launch occurs. For safety reasons, the observers are not allowed to be at the haul-out sites during or at least 2 hours before a launch. The videocameras that document the responses of the hauled-out animals are able to view only a portion of the animals. Thus, it is unclear whether new animals haul out or enter the water in the more than 2 hours after the animals were last enumerated[20].

In addition, the criteria that the Navy used to enumerate takes under the previous authorization and in the previous monitoring reports was based on animals moving at least 10 m. NMFS's more recent criteria has been based on animals moving at least two body lengths. The 10-m metric is much greater than the estimated 4 or 5 m adult female and male sea lions[21] move in two body lengths[22]. If NMFS intends to use the previous monitoring reports to inform the take estimates, those estimates should be based on animals moving 'a short distance', which is stipulated numerous times throughout the reports, rather than moving at least 10 m.

NMFS further noted that, in recent years, harbor seals were not always present when the Navy has conducted its monitoring during launch events and there have not been many places to observe harbor seals during the launches (84 Fed. Reg. 18821). NMFS indicated that most of the beaches where harbor seals have been hauled out, and which the Navy has been able to monitor,

[18] Based on monitoring reports from 2015–2017.
[19] Assuming 100 percent equipment success.
[20] The Navy, and thus NMFS, used the reported numbers of animals taken based on the pre-launch survey as the basis for the take estimates.
[21] Adult females are approximately 1.8 m in length and males are 2.4 m in length. Juveniles would be even smaller.
[22] Takes of harbor seals would have been underrepresented to an even greater degree than sea lions.

occur in area O[23], which is not in the trajectory of most of the launches. That may be the case, but the animals still have responded to sound levels that range from 79–99 dB 20 re µPa at those beaches. NMFS also indicated that harbor seal presence on the haul-out sites is dependent on tides. However, the Navy can't predict whether it will conduct launches during high or low tides. Thus, NMFS should assume that harbor seals have the potential to be present during each launch irrespective of the tidal cycle. Furthermore, the Navy focuses much of its monitoring on sea lion haul-out sites, where harbor seals generally do not haul out. NMFS noted that harbor seals do not prefer beaches with California sea lions present (84 Fed. Reg. 18821). Moreover and as routinely is the case for harbor seals, previous monitoring reports from 2014–17 have indicated that for all but one launch[24] 100 percent of the hauled-out harbor seals within the view of the camera responded to the launch[25] . Thus, NMFS's presumption that only 2.39 harbor seals are taken per launch is illogical and a vast underestimation.

More concerning is the fact that the Navy's take estimation method is not consistent with either the method recently used by the Air Force for its proposed and final rule or the intent of the MMPA to estimate the numbers of marine mammals that could potentially be taken. The Air Force based its take estimates on abundance estimates of the various haul-out sites, previous response rates of the various pinniped species, and the number of launches per year. Specifically for harbor seals, NMFS should have estimated the number of takes based on a 100-percent response rate and the number of animals that have been documented in areas J through N[26] on SNI in 2015 as stipulated in Lowry et al. (2017), which was discussed within the preamble (see Figure 1 in the *Federal Register* notice) and Navy's application and was considered best available science for the Air Force's proposed and final rule. That equates to 72 harbor seals that could be taken for each of the 40 proposed launches, resulting in 2,880 harbor seal takes. For California sea lions, the response rate should be based on the number of sea lions that moved a 'short distance' in the 2014–2017 monitoring reports[27] multiplied by the number of sea lions in the same areas in 2015 from Lowry et al. (2017) and the number of launches. A similar approach should be taken for elephant seals[28]. Accordingly, the Commission recommends that NMFS (1) authorize 2,880 Level B harassment takes of harbor seals and (2) estimate Level B harassment takes of California sea lions and elephant seals based on the numbers of both species in areas J through N in 2015 as stipulated in Lowry et al. (2017), response rates based on each species moving a short distance in the 2014–2017 monitoring reports[29], and 40 proposed launches.

Mitigation and monitoring measures

In previous final rules and LOAs issued to the Navy for the same proposed launch activities, NMFS required that the Navy avoid launching multiple missiles in quick succession over haul-out

[23] Which is 2 to 5+ km from the closest point of approach of the launch trajectories.
[24] 4 of the 6 harbor seals entered the water during that launch with recorded sound levels of 79.8 dB re 20 µPa on the cliffs overlooking the haul-out site.
[25] Exhibiting mainly Level 3 responses, flushing into the water.
[26] The Navy recently has been observing harbor seals in area O as well, but Lowry et al. (2017) did not include counts of any pinniped species in area O.
[27] Based on a cursory review of the monitoring reports, the response rate for California sea lions would equate to approximately 75 percent.
[28] Based on a cursory review of the monitoring reports, the response rate for elephant seals would equate to 10 percent.
[29] 75 and 10 percent, respectively.

sites, especially when young pups are present (79 Fed. Reg. 32680). The Navy itself included a similar mitigation measure in its application (see page 11-2). It indicated that launches of multiple missiles in quick succession should be avoided. Thus, it is unclear why NMFS did not include the measure in the proposed authorization. The Navy has not documented in any of its monitoring reports that the measure is impracticable and would not have included the measure in its application if it were. As such, the Commission recommends that NMFS again require the Navy to avoid launching multiple missiles in quick succession over haul-out sites, especially when young pups are present.

The Commission informally noted that NMFS did not include in the proposed authorization the requirement for the Navy to collect and report acoustic measurements as stipulated in section 13.2 of the application. That basic requirement has become standard in all authorizations rather than reiterating all details of the proposed hydroacoustic monitoring plan. The Commission also understands that none of NMFS's technical experts has reviewed the hydroacoustic monitoring plan, which is further complicated by the various threshold issues noted previously herein. As such, the Commission recommends that NMFS (1) enlist its technical experts to review the proposed hydroacoustic monitoring plan, including the relevant metrics and thresholds to report, (2) require the Navy to revise the plan as necessary based on that review, and (3) require the Navy, in the final authorization, to collect and report its acoustic measurements consistent with any revisions to section 13.2 of the application.

Proposed one-year authorization renewals

NMFS has indicated that it may issue a second one-year[30] incidental harassment authorization renewal for this and other future authorizations if various criteria are met and after an expedited public comment period of 15 days (see 84 Fed. Reg. 18826 and the proposed authorization for details). The Commission agrees that NMFS should take appropriate steps to streamline the authorization process under section 101(a)(5)(D) of the MMPA to the extent possible. However, the Commission is concerned that the renewal process proposed in the *Federal Register* notice is inconsistent with the statutory requirements—section 101(a)(5)(D)(iii) clearly states that proposed authorizations are subject to a 30-day comment period— and Congressional expectations regarding the length of the comment period when it passed that provision[31].

Another potentially significant issue with the proposed 15-day comment period is the burden that it places on reviewers, who will need to review the original authorization and supporting documentation[32], the draft monitoring report(s), the renewal application or request[33], and the

[30] NMFS informed the Commission that the renewal would be issued as a one-time opportunity, after which time a new authorization application would be required. NMFS has yet to specify this in any *Federal Register* notice detailing the new proposed renewal process but should do so.
[31] See, for example, the legislative history of section 101(a)(5)(D), which states "…in some instances, a request will be made for an authorization identical to one issued the previous year. In such circumstances, the Committee expects the Secretary to act expeditiously in complying with the notice and comment requirements." (H.R. Rep. No. 439, 103d Cong., 2d Sess. 29 (1994)). The referenced "notice and comment requirements" specify a 30-day comment period.
[32] Including the original application, hydroacoustic and marine mammal monitoring plans, take estimation spreadsheets, etc.
[33] Including any proposed changes or any new information.

proposed authorization and then formulate comments very quickly. Depending on how frequently NMFS invokes the renewal option, how much the proposed renewal or the information on which it is based deviates from the original authorization, and how complicated the activities and the taking authorization is, those who try to comment on all proposed authorizations and renewals, such as the Commission, would be hard pressed to do so within the proposed 15-day comment period. Therefore, the Commission recommends that NMFS refrain from using the proposed renewal process for the Navy's authorization. The renewal process should be used sparingly and selectively, by limiting its use only to those proposed incidental harassment authorizations that are expected to have the lowest levels of impacts to marine mammals and that require the least complex analyses. Notices for other types of activities, including the Navy's proposed launch activities, should not even include the possibility that a renewal might be issued using the proposed foreshortened 15-day comment period. If NMFS intends to use the renewal process frequently *or* for authorizations that require a more complex review (such as the Navy's authorization) or for which much new information has been generated (e.g., multiple or extensive monitoring reports), the Commission recommends that NMFS provide the Commission and other reviewers the full 30-day comment opportunity set forth in section 101(a)(5)(D)(iii) of the MMPA.

Adequate opportunity to consider public comments

The Commission has repeatedly expressed concern over NMFS's failure to provide an adequate opportunity for public comment. The opportunity for public comment provided under section 101(a)(5)(D)(iii) of the MMPA should be a meaningful one that allows NMFS sufficient time to not only solicit public comments, but also to analyze, assess, and respond to those comments and revise, as appropriate, its proposed authorization and rationale in light of those comments. Thus, submittal of the necessary documentation by applicants and processing of applications by NMFS must be timelier, avoiding abbreviated timeframes in which NMFS is able to consider the comments received. In this instance, the public comment period closes on 3 June 2019, *the day before* the Navy's activities would be authorized to begin. Based on the extensive issues noted in this letter, some of which will set various precedents, the Commission is not convinced that NMFS has sufficient time to review the Commission's or the public's comments or to revise the proposed authorization accordingly. Therefore, the Commission recommends that NMFS (1) delay issuance of the authorization until it has thoroughly reviewed and assessed the Commission's recommendations and any comments from the public *and* revised the authorization accordingly and (2) take all steps necessary in the future to ensure that it publishes and finalizes proposed incidental harassment authorizations far enough in advance of the planned start date of the proposed activities to ensure full consideration is given to any and all comments received.

The Commission hopes you find its letter useful. Please contact me if you have questions regarding the Commission's recommendations.

Sincerely,

Peter O Thomas

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

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