



MARINE MAMMAL COMMISSION

30 May 2018

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 Chesapeake Tunnel Joint Venture (CTJV) seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act to take small numbers of marine mammals by harassment. The taking would be incidental to construction activities for the Parallel Thimble Shoal Tunnel Bridge Project in Virginia. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 30 April 2018 notice (83 Fed. Reg. 18802) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

CTJV plans to construct a second tunnel under the Chesapeake Bay during a multi-year project. During this year's activities, operators would install up to 272 36-in steel pipe piles and 1,936 sheet piles¹ using a vibratory and/or impact hammer². CTJV expects activities to take up to 202 days, weather permitting. It would limit pile-driving activities to daylight hours only.

NMFS preliminarily has determined that, at most, the proposed activities could cause Level A and B harassment of small numbers of five marine mammal species. 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—

- using a sound attenuation device (e.g., pile caps/cushions and/or bubble curtains) during impact driving and implementing various performance standards measures³;
- ceasing heavy machinery activities if any marine mammal comes within 10 m of the equipment;

¹ NMFS included the maximum number of piles to be driven based on a mixture of both upland and in-water activities. It has since clarified that 1,936 sheet piles would be installed in the water.

² Up to two hammers could be used simultaneously.

³ The Commission informally noted that this measure, which is standard for other authorizations involving bubble curtains, was not included in the *Federal Register* notice. NMFS indicated it would be included in the final authorization.

- using standard soft-start, delay, and shut-down procedures;
- using two qualified land-based protected species (PSOs) observers to monitor the Level A and B harassment zones for 30 minutes before, during, and for 30 minutes after the proposed activities;
- using delay and shut-down procedures, if a species for which authorization has not been granted (including but not limited to North Atlantic right and fin whales) or if a species for which authorization has been granted but the authorized number of takes already has been met, approaches or is observed within the Level B harassment zone;
- reporting injured and dead marine mammals to the Office of Protected Resources and the Greater Atlantic Regional Stranding Coordinator using NMFS's phased approach and suspending activities, if appropriate; and
- submitting a final report.

General concerns and comments

The Commission informally noted multiple errors⁴, missing information⁵, and unclear information⁶ in the preamble text, proposed authorization text, and various tables throughout the *Federal Register* notice. Those included—

- using the lower reported source level⁷ for estimating the various Level A and B harassment zones during vibratory pile driving, which resulted in underestimating the Level A and B harassment zones, associated ensonified areas, and number of takes of bottlenose dolphins;
- using incorrect assumptions⁸ for estimating the various Level A and B harassment zones when multiple hammers are used, which resulted in underestimating the Level A harassment zones and overestimating the Level B harassment zones, associated ensonified areas, and number of takes of bottlenose dolphins;
- not accounting for the possibility that the proposed in-water activities would not be finished by 31 March and underestimating the numbers of Level A and B harassment takes of harbor seals⁹;

⁴ Including outdated background information (numbers and/or timing) regarding harbor and gray seals that haul out at the project site or near it and incorrect inclusion of impact driving (plumb) of a single pile. There also were typographical and mathematical errors throughout the notice.

⁵ Including omitting that measures apply to gray, as well as harbor seals.

⁶ Including stipulating the number of piles to be driven in the water.

⁷ The vibratory source levels based on root-mean-square sound pressure levels (SPL_{rms}) and sound exposure levels metrics were not the same value, neither were the source levels based on 1-sec and 10-sec averages. These metrics should be represented by the same value. When a difference is reported, it likely is due to the operator averaging decibels rather than taking the linear average of the pressures/intensities and then converting to dB. Thus, the higher source level should have been used in this instance.

⁸ To estimate the extents of the Level A harassment zone during simultaneous impact driving of two piles, NMFS incorrectly added 3-dB to the impact driving source levels rather than assuming the proxy source level (186 vs. 183 dB re 1 μ Pa, respectively) and doubling the number of strikes per pile. In addition, NMFS should have just assumed the proxy source level of 183 dB re 1 μ Pa when estimating the extent of the Level B harassment zone during simultaneous impact driving of two piles.

⁹ The Commission informally noted that CTJV's pile-driving schedule was optimistic at best. As such, NMFS should have used the maximum haul-out count and the number of days of proposed activities to estimate the number of harbor seal takes rather than monthly sighting rates and abbreviated months of activities. Since that time, CTJV also has delayed its start date by a month, which further hinders its ability to complete the in-water activities by 31 March.

- using inconsistent assumptions regarding estimating Level A harassment takes¹⁰; and
- incorrectly specifying that two PSOs would be monitoring *only* during simultaneous pile driving—two PSOs would be monitoring during all activities.

Based on these issues, numerous errors were present in Tables 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, and 16. Although NMFS plans to fix the various omissions, errors, and inconsistencies in the final incidental harassment authorization, these issues should have been discovered and corrected prior to publishing the *Federal Register* notice. Other proposed authorizations published in recent years have had similar issues¹¹. In this instance, many of the issues should have been addressed when the original application was reviewed internally by NMFS¹².

These omissions from and errors in *Federal Register* notices undermine the ability of the public to review and comment on proposed authorizations in full confidence that what is provided is accurate and complete. At some point, NMFS should publish corrections to the proposed authorization rather than correcting the omissions and errors when the final authorization is published. To address these issues, the Commission recommends that NMFS review more thoroughly the applications prior to deeming them complete and its notices prior to submitting them for publication in the *Federal Register*.

Another issue informally raised by the Commission was that the proposed 50-m exclusion zone for phocids was unnecessarily large for vibratory pile driving (the Level A harassment zones were estimated to be 7 m based on the revisions stated herein). This could put CTJV in a situation in which it is implementing numerous unnecessary delays or shut downs for pinnipeds. In response, CTJV and NMFS agreed to reduce the size of the exclusion zone for phocids from 50 to 15 m during vibratory pile driving.

The Commission has pointed out similar concerns for other recent proposed authorizations¹³, which included the possibility of numerous delays or shut downs for pinnipeds and/or unnecessarily large exclusion/shut-down zones based on the estimated extents of the Level A harassment zones for certain species. Although NMFS agreed to adjust the size of the exclusion/shut-down zones in most of these instances, these issues should have been identified and addressed prior to publication of the proposed authorization in the *Federal Register*. To ensure both that marine mammals are sufficiently protected from Level A harassment and that activities can be completed within an appropriate timeframe, the Commission recommends that NMFS better evaluate the proposed exclusion/shut-down zones that are to be implemented for each proposed incidental take authorization prior to publication in the *Federal Register*.

¹⁰ For harbor porpoises, NMFS assumed that 40 percent of the total number of takes would equate to Level A harassment based on the large size of the Level A harassment zones—this topic is further discussed at length herein. The Commission noted that the same assumption was not made for harbor and gray seals but should have been. NMFS plans to amend the pinniped takes based on this and the previous issue, resulting in 3,232 Level A harassment takes and 4,848 Level B harassment takes for harbor seals and 27 Level A harassment takes and 40 Level B harassment takes for gray seals in the final authorization.

¹¹ For example, see the Commission's [21 May 2018](#), [8 May 2018](#), [2 January 2018](#), and [5 September 2017](#) letters.

¹² During NMFS's early review team meetings.

¹³ For example, see the Commission's [21 May 2018](#), [8 May 2018](#), [2 April 2018](#), and another [2 April 2018](#) letters.

Appropriateness of the Level A harassment zones

As the Commission has indicated in previous letters, it supports NMFS's use of the updated permanent threshold shift (PTS) thresholds and associated weighting functions used to estimate the Level A harassment zones. However, shortcomings need to be addressed regarding the methodology for determining the extent of the Level A harassment zones based on the associated PTS cumulative sound exposure level (SEL_{cum}) thresholds for the various types of sound sources, including stationary sound sources. For determining the range to the SEL_{cum} thresholds, NMFS uses a baseline accumulation period of 24 hours unless an activity would occur for less time (e.g., 8 hours). The Commission supports that approach *if* an action proponent is able to conduct more sophisticated sound propagation and animal modeling. However, that approach is less than ideal for action proponents that either are unable, or choose not, to conduct more sophisticated modeling.

As an example, the Level A harassment zone for high-frequency (HF) cetaceans was estimated to be much greater than the Level B harassment zone (2,474 vs. 1,585 m, respectively) for impact driving (battered) of 36-in piles¹⁴. Based on the extent of those zones, it is assumed that an animal would experience PTS before behaviorally responding and avoiding the area. That notion runs counter to the logic that permanent and temporary physiological effects are expected to occur closest to the sound source, with behavioral responses triggered at lower received levels, and thus at farther distances¹⁵. Thus, the Level A and B harassment zones do not make sense biologically or acoustically due to NMFS's unrealistic assumption that the animals remain stationary throughout the entire day of the activity.¹⁶ This is particularly problematic when action proponents are using a simple area x density method for take estimation. By assuming a stationary receiver, all of the energy emitted during a 24-hour period is accumulated for the SEL_{cum} thresholds.

The Commission continues to believe that it would be prudent for NMFS to consult with scientists and acousticians to determine the appropriate accumulation time that action proponents should use to determine the extent of the Level A harassment zones based on the associated SEL_{cum} thresholds in such situations. Those zones should incorporate more than a few hammer strikes (or acoustic pulses) but less than an entire workday's worth of strikes (or pulses). This recommendation is the same as those made in the Commission's [11 July 2017 letter](#) on NMFS's final Technical Guidance and multiple previous letters¹⁷. Other federal partners, including the Navy, have made similar recommendations. Since the Commission and other federal partners have determined that this issue needs resolution, the Commission recommends that NMFS make it a *priority* to resolve in

¹⁴ Similar trends were observed for (1) low-frequency (LF) cetaceans during impact driving (battered) of 36-in piles, (2) HF and LF cetaceans and phocids (PW) during impact driving of two piles simultaneously (one at each island), and (3) HF, LF, and PW during impact driving of one pile at one island and vibratory driving of one pile at the other island (see Tables 6 and 7 in the *Federal Register* notice and the comments noted herein on relevant revisions to the harassment zones). These trends would have been even more pronounced had NMFS not assumed a 10-dB source level reduction based on bubble curtain implementation.

¹⁵ Numerous Navy environmental impact statements (with which NMFS is a cooperating agency), as well as a National Research Council (NRC) report (Figure 4-1; NRC 2005), support this logic.

¹⁶ Which generally has been more of an issue for stationary sound sources. However, this also could be an issue for moving sound sources that have short distances between transect lines, in which the user spreadsheet may not be appropriate for use unless the source level could be adjusted accordingly.

¹⁷ Including its 11 May 2017, 11 April 2017, and 31 August 2015 letters.

the near future. The Commission further recommends that NMFS consult with both internal¹⁸ and external scientists and acousticians to determine the appropriate accumulation time that action proponents should use to determine the extent of the Level A harassment zones based on the associated SEL_{cum} thresholds for the various types of sound sources, including stationary sound sources, when simple area x density methods are employed. Estimated swimming speeds of various species and behavior patterns (including residency patterns)¹⁹ should be considered. Evaluating various scenarios using animat modeling should help address this issue as well.

Bubble curtain efficacy

The Commission had previously commented on the assumptions NMFS has used regarding efficacy of bubble curtains²⁰. NMFS has been inconsistently applying presumed source level reductions when bubble curtains are used during impact pile driving. In some instances, source level reductions are assumed to be 10 dB (for the proposed authorization) when bubble curtains are to be employed, while 0 dB (83 Fed. Reg. 22640, 81 Fed. Reg. 15082), 6 dB (81 Fed. Reg. 26647), and 8 dB (81 Fed. Reg. 19342) have been used in other instances. Some of the variability in attenuation levels is based on differences in device design, site and environmental conditions, and difficulties in properly installing and operating sound attenuation devices—the latter which could be alleviated with the requirement for CTJV to implement various bubble curtain performance standards²¹. However, the main reason why bubble curtains do not achieve consistently reduced sound levels is because sound resonates through the ground into the far field.

MacGillivray et al. (2007) measured attenuated and unattenuated impact pile driving of 36-in steel piles in Washington. The bubble curtain provided an approximate 21-dB reduction in peak sound pressure levels (SPL_{peak}) and an approximate 26-dB reduction in SPL_{rms} at a distance of 10 m (Table 2 in MacGillivray et al. 2007). At a distance of 100–1,100 meters, the bubble curtain provided a reduction of 6 to 7 dB for both SPL_{peak} and SPL_{rms}. MacGillivray et al. (2007) indicated that the effectiveness of the mitigation method²² was range-dependent and sound attenuation diminished with range from the pile.

The California Department of Transportation (Caltrans) also conducted performance testing of bubble curtains. Effectiveness of the bubble curtain varied with direction and distance from the pile and under different tidal conditions (Caltrans 2005). In general, the bubble curtain provided the greatest reduction in SPLs in the near field²³. At distances of 400–500 m, SPLs were reduced by only 1 to 2 dB. Although a flood tide may have had some effect on the performance of the bubble curtain, the SPL reductions were still 5 to 10 dB at distances of 45–120 m. This finding confirms that, at greater distances, more of the sound emitted during impact pile driving resonates from the

¹⁸ Including staff in the Marine Mammal and Sea Turtle Conservation Division of the Office of Protected Resources and staff in the Office of Science and Technology.

¹⁹ Results from monitoring reports, including animal responses, submitted in support of incidental harassment authorizations issued by NMFS also may inform this matter.

²⁰ See its [3 January 2017 letter](#).

²¹ As stated previously, NMFS is not including these requirements consistently for all incidental take authorizations that include bubble curtains.

²² A similar trend was observed for foam temporary noise attenuation piles.

²³ In general, the majority of the sound level measurements have been collected in the near field (well within 100 m) for studies involving unattenuated and attenuated pile driving using a bubble curtain.

ground than through the water column²⁴. Bubble curtains are not designed to, nor can they, attenuate ground-borne sound. Furthermore, Caltrans (2015) stated that, because of the uncertainties associated with the degree of attenuation that would be provided by a bubble curtain, an assumed source level reduction should be limited to 5 dB. The Commission contends that even a 5-dB reduction could lead to an underestimation of impacts to marine mammals.

Given that Level A harassment is primarily based on thresholds²⁵ associated with SEL_{cum} , it is the far-field sound that matters—particularly when the estimated ranges to Level A harassment are on the order of 500²⁶ to 1,000s²⁷ of meters. Level B harassment also would be estimated to occur at comparable or greater far-field distances. At those distances, reductions in sound levels have not been shown to consistently produce reductions of even 5 dB, let alone 10 dB²⁸. The Commission notes that bubble curtains may provide effective mitigation as compared to SPL_{peak} thresholds for fish in the near field²⁹, but they have no proven efficacy for substantially reducing sound levels in the far field for marine mammals. Therefore, the Commission recommends that NMFS refrain from using a source level reduction factor for sound attenuation device implementation during impact pile driving for all relevant incidental take authorizations.

If and when NMFS determines the appropriate accumulation time associated with its SEL_{cum} thresholds, it could consider using a source level reduction to estimate the ranges to Level A harassment, which would likely be much less than 10 dB. NMFS should then review the related literature on bubble curtain efficacy in concert with estimated ranges to the SEL_{cum} thresholds based on the revised accumulation time to determine what, if any, source level reduction would be appropriate. Source levels should not be reduced when determining the range to Level B harassment.

Rounding of take estimates

The method used to estimate the numbers of takes during the proposed activities, which summed fractions of takes for each species across project days, does not account for and negates the intent of NMFS's 24-hour reset policy. As the Commission has indicated in previous letters regarding this matter³⁰, the issue at hand involves policy rather than mathematical accuracy. The Commission understands that NMFS has nearly completed revising its draft criteria and plans to share them with the Commission in the near term. The Commission recommends that NMFS provide those criteria in a timely manner.

²⁴ This phenomenon also was noted in Caltrans (2015). If sound was primarily being emitted through the water column, comparable reductions (or greater reductions with increasing water depths) should be produced with increasing distance from the source, not lesser reductions.

²⁵ NMFS uses dual metrics for determining the range to Level A harassment, SPL_{peak} and SEL_{cum} . However, the ranges to SPL_{peak} are always less than the ranges to SEL_{cum} for impact pile-driving activities.

²⁶ As referenced in the proposed authorization.

²⁷ As referenced in 83 Fed. Reg. 18791 and other similar notices.

²⁸ Which would apply to Level B harassment at well.

²⁹ Bubble curtains originally were used to minimize both lethal and sub-lethal effects on fish.

³⁰ See the Commission's [29 November 2016 letter](#) detailing this issue.

Proposed one-year authorization renewals

NMFS has indicated that it may issue a second one-year³¹ incidental harassment authorization renewal for this and other future authorizations on a case-by-case basis without additional public notice or comment opportunity when (1) another year of identical, or nearly identical activities, as described in the ‘Specified Activities’ section of the *Federal Register* notice is planned or (2) the originally planned activities would not be completed by the time the incidental harassment authorization expires and a renewal would allow for completion of the authorized activities beyond the timeframe described in the ‘Dates and Duration’ section of the notice. NMFS would consider issuing a renewal only if—

- the request for renewal is received no later than 60 days prior to the expiration of the current authorization;
- the activities to be conducted either are identical to the previously analyzed and authorized activities or include changes so minor (e.g., reduction in pile size) that they do not affect the previous analyses, take estimates, or mitigation and monitoring requirements;
- a preliminary monitoring report provides the results of the required monitoring to date and those results do not indicate impacts of a scale or nature not previously analyzed or authorized;
- the status of the affected species or stocks and any other pertinent information, including the mitigation and monitoring requirements, remain the same and appropriate; and
- the original determinations under the MMPA remain valid.

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) clearly states that proposed authorizations are subject to publication in the *Federal Register* and elsewhere and that there be a presumably concurrent opportunity for public review and comment. NMFS’s proposed renewal process would bypass the public notice and comment requirements when it is considering the renewal.

The Commission further notes that NMFS recently implemented an abbreviated authorization process by publishing the required information³² via an abbreviated *Federal Register* notice and by referencing the relevant documents. The abbreviated process preserves the full opportunity for public review and comment, does not appear to be unduly burdensome on either the applicant or NMFS, and is much preferred over NMFS’s proposed renewal process³³. Thus, the Commission recommends that NMFS refrain from implementing its proposed renewal process and instead use abbreviated *Federal Register* notices and reference existing documents to streamline the incidental harassment authorization process.

³¹ 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.

³² Including any changes to the proposed activities or assumptions made and results from the draft monitoring report.

³³ See the Commission’s [30 April 2018 letter](#) detailing this matter.

If NMFS believes that its proposed renewal process is consistent with the applicable statutory requirements and intends that process to be generally applicable to all incidental harassment authorizations that meet the specified criteria, it should not seek to adopt such a process through a brief notice at the end of a specific proposed authorization. That process should be adopted through more general procedures, preferably a rulemaking, that provides NMFS's rationale and analysis regarding why it believes the proposed renewal process is consistent with the requirements of section 101(a)(5)(D) of the MMPA and adequate public notice and opportunity for comment. If NMFS adopts the proposed renewal process notwithstanding the Commission's recommendation, the Commission further recommends that NMFS provide the Commission and the public with a legal analysis supporting its conclusion that the process is consistent with the requirements under section 101(a)(5)(D) of the MMPA. Furthermore, if NMFS decides to bypass the notice and comment process in advance of issuing a renewal, it should nevertheless publish notice in the *Federal Register* whenever such a renewal has been issued.

Please contact me if you have questions regarding the Commission's recommendations.

Sincerely,



Peter O. Thomas, Ph.D.
Executive Director

References

- Caltrans. 2005. San Francisco–Oakland Bay Bridge east span seismic safety project: Hydroacoustic monitoring report. State of California Department of Transportation, Sacramento, California. 244 pages.
- Caltrans. 2015. Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. State of California Department of Transportation, Sacramento, California. 532 pages.
- MacGillivray, A., E. Ziegler, and J. Laughlin. 2007. Underwater acoustic measurements from Washington State Ferries 2006 Mukilteo ferry terminal test pile project. JASCO Research, Ltd, Victoria, British Columbia. 27 pages.
- NRC. 2005. Marine mammal populations and ocean noise: Determining when noise causes biologically significant effects. The National Academies Press, Washington, D.C. 126 pages.