20 April 2020

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 Hampton Roads Connector Partners (HRCP) 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 Hampton Roads Bridge-Tunnel Expansion Project in Virginia. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 20 March 2020 notice (85 Fed. Reg. 16194) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

HRCP plans to expand the Hampton Roads bridges and tunnels (HRBT). This incidental harassment authorization would cover one year of activities, with a forthcoming rulemaking to cover activities into 2025. During this year's activities, operators would install up to 1,070 piles including 24- to 42-in steel pipe piles and 24- to 54-in concrete piles[1] using a vibratory hammer, impact hammer, and/or down-the-hole (DTH) hammer. HRCP could use multiple hammers simultaneously to install the various piles. Pile installation would occur at North Trestle, North Island, Willoughby Bay, South Trestle, and South Island. HRCP expects activities to take up to 312 days, weather permitting.

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—

[1] Concrete test piles would be removed by cutting them below the mudline.

- using a sound attenuation device (i.e., bubble curtain) during impact driving of a portion of the 36-in steel pipe piles[2] and implementing various measures regarding performance standards;
- ceasing heavy machinery activities if any marine mammal comes within 10 m of the equipment;
- using standard soft-start, delay, and shut-down procedures[3];
- using land-based protected species observers (PSOs) 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 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 A or B harassment zone;
- reporting injured and dead marine mammals to the Office of Protected Resources and the Greater Atlantic Region New England/Mid-Atlantic Regional Stranding Coordinator, as soon as feasible; and
- submitting a draft and final report.

Extents of the Level A and B harassment zones

Source levels in general—The Commission informally noted multiple issues regarding the source levels described or used by NMFS. Those issues included—

- NMFS used incorrect proxy source levels[4] for impact installation of 30- and 54-in concrete piles based on MacGillivray et al. (2007)[5]. Those errors resulted in the underestimation of the various Level A and B harassment zones[6] noted in Tables 11[7] and 12 of the *Federal Register* notice and Tables 2 and 3 in the draft authorization. NMFS also omitted the fact that source levels for impact installation of 36-in concrete piles were used as a proxy for the 30- and 54-in concrete piles in the *Federal Register* notice.

[2] For the two temporary Jet Grouting Trestles at the South Island. Water depths are deeper around South Island where bubble curtains can be deployed.
[3] The Commission informally noted that NMFS's requirement that HRCP delay or shut down its activities if a harbor seal comes within 627 or 821 m could prohibit HRCP from completing its activities, particularly since HRCP requested Level A harassment takes. The Commission suggested that NMFS decrease the shut-down zone to 100 m, and NMFS agreed to revise the *Federal Register* notice for authorization issuance and the final authorization accordingly.
[4] NMFS used source levels of 192 dB re 1 μPa_{peak}, 176 dB re 1 $\mu Pa_{root\text{-}mean\text{-}square\ (rms)}$, and 174 dB $\mu Pa^2\text{-}sec_{single\text{-}strike\ (s\text{-}s)}$ at 10 m based on MacGillivray et al. (2007). The Commission indicated that source levels based on sound pressure level root-mean-square (SPL_{rms}) and single-strike sound exposure level ($SEL_{s\text{-}s}$) never differ by only 2 dB, they differ by 10–14 dB on average. In addition, the Commission noted that the SPL_{rms} source level for 30- and 54-in piles would never be the same as the source level for 24-in piles, as noted in Table 5 of the notice.
[5] The source levels should be 193 dB re 1 μPa_{peak}, 187 dB re 1 μPa_{rms}, and 177 dB $\mu Pa^2\text{-}sec_{s\text{-}s}$ at 10 m based on MacGillivray et al. (2007).
[6] The Level A harassment zones should be 652 rather than 412 m for low-frequency (LF) cetaceans, 23 rather than 15 m for mid-frequency cetaceans, 777 rather than 490 m for high-frequency (HF) cetaceans, and 349 rather than 221 m for phocids for impact installation of 30- and 54-in concrete piles.
[7] The input parameters for NMFS's user spreadsheet also are incorrect in Table 10 of the notice.

- NMFS incorrectly noted that the source levels for unattenuated and attenuated impact installation of 36-in piles originated from Chesapeake Tunnel Joint Venture (CTJV; 2018) and Department of the Navy (2015) rather than California Department of Transportation (Caltrans; 2015) in Table 5 of the *Federal Register* notice.
- NMFS indicated that three *or more* hammers could be used simultaneously in the *Federal Register* notice (85 Fed. Reg. 16215). However, it did not specify what the resulting source levels would be if up to four vibratory hammers were used in Table 7 of the *Federal Register* notice, what the Level B harassment zone[8] would be for the combined source level[9] when four hammers are used in Table 13[10], whether multiple hammers of the same type would be used at a given site[11], or what the worst-case scenario[12] would be. The extents of the Level B harassment zones, similar to Table 3 in the draft authorization, must be specified to ensure the appropriate zones are used to extrapolate the number of Level B harassment takes during simultaneous use of vibratory hammers, particularly since the monitoring zones[13] are much smaller than the Level B harassment zones.

NMFS indicated that it would rectify some of these issues in the *Federal Register* notice for authorization issuance and the final authorization. However, issues involving the appropriateness and consistent use of source levels have been ongoing for years. As another example, NMFS used a proxy source level for vibratory installation of 24-in steel piles based on source levels from 16- and 24-in piles specified in Department of the Navy (2015). The Commission informally noted that those proxy data were based on 16-in piles and much fewer data points (n=13)[14] than source levels from vibratory installation of 24-in piles recently compiled and analyzed by NMFS (n=100). The median source level of the recently analyzed data is 162 dB re 1 μPa_{rms} at 10 m. Although the median source level is only 1 dB greater than the proxy source level NMFS used, it is based on source levels solely associated with 24-in piles and an order of magnitude more data. More importantly, the median source level results in a Level B harassment zone that is nearly 1 km more than the one estimated by NMFS[15]. Because decibels are based on a log scale, differences of only a few decibels can have massive effects on the extents of the harassment zones. For these reasons, the Commission recommends that NMFS (1) ensure all of the aforementioned issues are resolved in the *Federal Register* notice for authorization issuance and the final authorization, including ensuring the Level A harassment zones are correct and adding the extents of the Level B harassment zones during

[8] The Level B harassment zone would be 39.8 km based on a maximum source level of 174 dB re 1 μPa_{rms} at 10 m if four vibratory hammers were to be used simultaneously to install 42-in steel piles. To determine the combined source level of four hammers installing the same size pile, one adds 10log(n) to the source level where n is the number of hammers. 168 dB re 1 μPa_{rms} at 10 m + 10log(4)= 174 dB re 1 μPa_{rms} at 10 m. Based on Figure 6-1 in HRCP's application, the extent of the Level B harassment zone appears to be clipped by land at approximately 25 km.
[9] Or whether the Level B harassment zones even overlap if up to four hammers are used simultaneously. Source levels only add to one another when the Level B harassment zones overlap.
[10] The information in Table 13 was omitted from the draft authorization.
[11] If so, the Level A harassment zones for impact pile driving and DTH drilling must account for multiple hammers being used simultaneously. When multiple hammers are used in the same general area, the Level A harassment zones must incorporate the total number of strikes from the multiple hammers.
[12] E.g., three hammers installing 36-in piles simultaneously, four hammers installing 36-in piles simultaneously, three hammers installing 42-in piles simultaneously, etc.
[13] The Core Monitoring Area, which would be observed during times when two or more vibratory hammers are used simultaneously, extends to approximately 10 km to the southwest.
[14] Only five of which were based on 24-in piles.
[15] 6,310 m compared to 5,412 m.

simultaneous use of vibratory hammers to the authorization and (2) use 162 rather than 161 dB re 1 μPa_{rms} at 10 m for vibratory installation of 24-in piles and re-estimate the Level A and B harassment zones accordingly.

To improve consistency and appropriateness of proxy source levels and to address the Commission's recommendation from nearly four years ago that NMFS had agreed to address (82 Fed. Reg. 17211), the Commission recommends that NMFS (1) have its experts in underwater acoustics and bioacoustics review and finalize in the next month its recommended proxy source levels for impact pile driving of the various pile types and sizes, (2) compile and analyze the source level data for vibratory pile driving of the various pile types and sizes in the near term, and (3) ensure action proponents use consistent and appropriate proxy source levels in all future rulemakings and proposed incidental harassment authorizations. If a subset of source level data is currently available (i.e., vibratory pile driving of 24-in steel piles), those data should be reviewed immediately and used—the data should not be retained until the other vibratory source levels are finalized.

In response to a similar Commission recommendation that NMFS finalize its proxy source levels (85 Fed. Reg. 10418**),** NMFS indicated that, until those data are available, it had advised applicants *and* the Commission that Caltrans (2015) represents the most complete pile-driving source level compilation, and applicants should defer to these data absent any project site-specific data. NMFS has never advised the Commission of this and refuted using Caltrans (2015) data for HRCP's activities, particularly when the source levels from Caltrans (2015) were greater than those proposed for use by HRCP (Table 5; 85 Fed. Reg. 16212). NMFS has neither a consistent approach regarding which proxy source levels should be used nor quality control measures in place to ensure that its proposed notices conform to its own recent guidance regarding using Caltrans (2015) data. Both shortcomings reinforce the need for NMFS to finalize its proxy source levels.

DTH drilling—NMFS's characterization of DTH drilling for HRPC's authorization is inconsistent with other recent authorizations. NMFS characterized DTH drilling as an impulsive, *intermittent* source rather than an impulsive, continuous source[16] as referenced in other recent authorizations (City of Astoria, 84 Fed. Reg. 68133). Although NMFS accurately deemed DTH drilling impulsive and estimated the Level A harassment zones in a seemingly accurate manner[17], it vastly underestimated the Level B harassment zone. The Level B harassment zone was estimated based on (1) the 160-dB re 1 μPa_{rms} threshold for *intermittent* sources rather than the 120- dB re 1 μPa_{rms} threshold for *continuous* sources and (2) a source level that accounted for the energy associated with a single strike (Denes et al. 2019) rather than a 1-second average of the sound levels (Warner and Austin 2016 and Denes et al. 2016[18]). NMFS estimated the Level B harassment zone to be 215 m

[16] In-situ measurements obtained by the Federal Aviation Administration (FAA) at Bioka Island (Guan pers. comm.) and White Pass and Yukon Route (Reyff and Heyvaert 2019) also have confirmed impulsive, *continuous* aspects of DTH drilling, as depicted in the spectrograms and time-series waveform data.

[17] Denes et al. (2019) determined that approximately 7 pulses occurred during a 1-sec waveform, which was the reference used for the DTH drilling source levels. Assuming 7 pulses per second, HRPC estimated that it would take approximately 2 hours to install each pile, with up to three piles installed per day. That amount of time is more reasonable than assuming only 1 hour of DTH drilling would occur per day.

[18] Warner and Austin (2016) provide all of the relevant data and information for source level measurements at Kodiak that include DTH drilling; whereas, Denes et al. (2016) is the comprehensive report for measurements taken at Kodiak, Ketchikan, Kake, and Auke Bay that denote the median source level.

(Table 12 in the *Federal Register* notice) rather than more than 12 km[19] as estimated in numerous other recent authorizations for DTH drilling (e.g., 85 Fed. Reg. 12533).

For complex sources like DTH hammers, sound levels must be analyzed in two separate manners. Individual pulses must be analyzed to estimate the source levels associated with the impulsive aspects of the sound[20]; while a specific time series of the sound must be averaged to estimate the source levels associated with the continuous aspects of the sound[21], similar to vibratory pile driving. Because none of the monitoring reports have included the appropriate analyses or provided DTH drilling source level data in both manners, NMFS must use source levels analyzed in the two separate manners from two different monitoring reports until additional data are available and analyzed appropriately *or* until previous data are reanalyzed accordingly. Until the relevant data have been analyzed appropriately, the Commission recommends that, for *all authorizations* involving DTH drilling including HRCP's final incidental harassment authorization and proposed rulemaking, NMFS use (1) source level data from Denes et al. (2019)[22], its Level A harassment thresholds for impulsive sources, and the relevant expected operating parameters[23] to estimate the extents of the Level A harassment zones and (2) source level data from Denes et al. (2016)[19] and its Level B harassment threshold of 120-dB re 1 μPa_{rms} for continuous sources to estimate the extents of the Level B harassment zones. If NMFS does not revise the Level B harassment zones based on a more appropriate proxy source level and the Level B harassment thresholds for continuous sources, the Commission recommends that NMFS justify its decision not consider a DTH hammer to be an impulsive, *continuous* sound source.

Bubble curtain efficacy—The Commission has commented numerous times on the assumptions used by NMFS regarding the efficacy of bubble curtains. NMFS has adopted a standard 7-dB source level reduction when bubble curtains are to be used during impact pile driving. Although variability in attenuation levels can result from differences in device design and site and environmental conditions and from difficulties in properly installing and operating sound attenuation devices, bubble curtains that are placed immediately around the pile do not achieve consistent reductions in sound levels because they cannot attenuate ground-borne sound[24]. That is, appreciable attenuation is not observed for the sound that resonates through the ground into the far field or for low-frequency sound in general.

In response to the Commission's recommendation that NMFS refrain from using a source level reduction factor until such time that it consults with various experts regarding the appropriate source level reduction factor to use to minimize far-field effects on marine mammals (see the Commission's 6 November 2019 letter), NMFS indicated that it would evaluate the appropriateness of using an alternative source level reduction factor for sound attenuation device implementation

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[19] Based on a source level of 166.2 dB re 1 μPa_{rms} at 10 m from Kodiak as noted in Denes et al. (2016).
[20] As was done for Denes et al. (2019), Reyff and Heyvaert (2019), and Guan (pers. comm.).
[21] As was done for Denest et al. (2016; 1-sec averages) and Dazey et al. (2012; 30-sec averages).
[22] 190 dB re 1 μPa_{peak} and 164 dB μPa^2-$sec_{s\text{-}s}$ at 10.
[23] Level A harassment zones for impulsive sources are based on the number of pulses expected to be emitted in a given day. The number of pulses should be based on the operational parameters (i.e., pulses per minute and minutes of drilling per shaft to yield pulses per shaft) and the number of shafts to be drilled in a given day, not based on unsubstantiated assumptions (e.g., a 50-percent reduction in pulses expected to be emitted; 84 Fed. Reg. 64863 or the assumption that an animal would remain in the area for only one hour).
[24] Bubble curtains also attenuate high-frequency rather than low-frequency sound.

during pile driving for all relevant incidental take authorizations *as more data become available* and contact experts as appropriate (84 Fed. Reg. 64834). NMFS has compiled the relevant data that refute the appropriateness of the 7-dB source level reduction. However, NMFS again indicated in its response that, at approximately 10 m, Austin et al. (2016) measured reductions in mean source levels for impact pile driving of 10 dB (or higher) when comparing two piles driven using a hydraulic hammer with and without a bubble curtain (84 Fed. Reg. 64834). Highlighting a few references of individual piles that show an appreciable near-field reduction stands in stark contrast to the plethora of data that NMFS has compiled that shows attenuated and unattenuated median source levels measured in the field differ by only 1 to 6 dB at 10 m. A 7-dB source level reduction factor is unsubstantiated by the data currently available.

Although it is unclear why NMFS is not consulting with the relevant experts, including acousticians at the University of Washington-Applied Physics Laboratory (UW-APL), to resolve this issue, it is clear that NMFS is not basing its use of the 7-dB source level reduction factor on best available science, particularly since it has the necessary data to address this issue. As such, the Commission again recommends that NMFS (1) consult with acousticians, including those at UW-APL, regarding the appropriate source level reduction factor to use to minimize near-field (<100 m) and far-field (>100 m) effects on marine mammals[25] or (2) use the data NMFS has compiled regarding source level reductions at 10 m for near-field effects and assume no source level reduction for far-field effects for all relevant incidental take authorizations. The Commission has made this recommendation, with supporting justification and responses to NMFS's previous responses, since mid-December 2019—NMFS has yet to address it. NMFS has directed the Commission to NMFS's response from before the Commission made this specific recommendation[26] and to a *Federal Register* notice that does not even pertain to NMFS[27]. The Commission explicitly requests a detailed response to both parts of this recommendation if NMFS does not follow or adopt it, as required under section 202(d) of the MMPA.

Hydroacoustic monitoring—HRCP plans to conduct more than five years of in-water activities. At present—

- the source levels for 54-in concrete piles have been underestimated based on proxy source levels of 36-in piles;
- the extents of the Level B harassment zones have not been substantiated, particularly when multiple hammers are used;
- the source levels for DTH drilling have yet to be analyzed appropriately for a single dataset; and
- the presumed 7-dB source level reduction has yet to be proven when the bubble curtain is implemented.

[25] Which also includes Level A harassment in some instances.
[26] In at least two instances (85 Fed. Reg. 16063 and 6921), NMFS directed the Commission to its response on 25 November 2019 (84 Fed. Reg. 64833) for a letter the Commission sent on 5 November 2019.
[27] In 85 Fed. Reg. 19302, NMFS directed the Commission to its response from 29 November 2019 (84 Fed. Reg. 64483). None of NMFS's notices from 29 November 2019 pertain to incidental taking authorizations, and 84 Fed. Reg. 64483 involves the Under Secretary of Defense for Research and Engineering's notice of adoption of the personnel demonstration project flexibilities by the U.S. Army Research Institute for the Behavioral and Social Sciences.

Based on these issues, it is apparent that HRPC should be conducting hydroacoustic monitoring to determine both source levels and the extents of the various Level A and B harassment zones. The Commission recommends that NMFS require HRCP to (1) conduct hydroacoustic monitoring (a) during impact installation of 54-in concrete piles, (b) when multiple vibratory hammers are used simultaneously and multiple DTH hammers are used simultaneously, (c) when only one DTH hammer is used, and (d) when 36-in steel piles are installed both with and without the bubble curtain, (2) ensure that signal processing is conducted appropriately[28] for DTH drilling, and (3) adjust the Level A and B harassment zones accordingly.

Appropriate accumulation time for Level A harassment zones—As the Commission has indicated in previous letters, there are some shortcomings that need to be addressed regarding the method NMFS uses for determining the extent of the Level A harassment zones based on the cumulative sound exposure level (SEL_{cum}) thresholds for the various types of sound sources, including stationary sound sources[29]. 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). In instances when action proponents either are unable or choose not to conduct more sophisticated modeling[30], the receiver is assumed to be stationary and all of the energy emitted during that period is accumulated for the SEL_{cum} thresholds. For HRCP's activities, that assumption results in the Level A harassment zones for LF and HF cetaceans being greater than the Level B harassment zones during impact pile driving. Based on the extent of those zones, it is assumed that an animal would experience permanent threshold shift (PTS) before responding behaviorally and leaving or 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 distances.

The Commission understands that NMFS has formed an internal committee to address this issue and is consulting with external acousticians and modelers as well. In the absence of relevant recovery time data for marine mammals, the Commission continues to believe that animat modeling that considers various operational and animal scenarios should be used to inform the appropriate accumulation time and could be incorporated into NMFS's user spreadsheet that currently estimates the Level A harassment zones. The Commission recommends that NMFS continue to make this issue a *priority* to resolve in the near future and consider incorporating animat modeling into its user spreadsheet.

Takes of marine mammals

Harbor seals—The Commission informally noted that the takes of harbor seals were insufficient and that the underlying data were misinterpreted. NMFS based the number of takes on the average number of seals observed *per season* at the Chesapeake Bay Bridge Tunnel (CBBT) from Rees et al. (2016) and Jones et al. (2018) rather than the average number of seals observed *per day* (Tables 15 and 16 in the *Federal Register* notice; 85 Fed. Reg. 16219). Haul-out counts do not represent overall

[28] Sound levels associated with each pulse should be extracted and analyzed separately as single strikes to estimate the source levels used to determine the range to Level A harassment for the *impulsive* aspects of DTH drilling; while sound levels should be averaged across 1 sec to estimate the source level used to determine the range to Level B harassment for the *continuous* aspects of DTH drilling.
[29] However, this also could be an issue for moving sound sources that have short distances between transect lines.
[30] Animat modeling.

monthly or seasonal presence[31], they represent the number of animals hauled out on a given day. Based on NMFS's method, HRCP could take fewer than two harbor seals per day.

The Commission suggested that NMFS use the average daily count from 2017–2018 (n=23; Table 5 in Jones et al. 2018) based on the increasing trend in number of seals present and the number of days of activities when the seals are present (from December–May; n=156). This approach is consistent with NMFS's take estimation method for CTJV's activities, except NMFS used the maximum daily count since the activities would occur at the CBBT (n=45; Table 5 in Jones et al. 2018). NMFS indicated that it planned to use the average daily count (n=8) from 2018–2019 based on the recent Jones and Rees data (2020). The Commission again believes that those data could result in an insufficient number of takes, which could cause unnecessary shut downs and HRCP to not complete its activities.

Fewer surveys occurred in 2018–2019 and fewer total number of seals, average number of seals, and maximum number of seals were observed at CBBT than in the previous four seasons (Table 3 in Jones and Rees 2020). As noted by Jones and Rees (2020), some of the differences in haul-out counts may be due to differences in sampling effort between years and across months in a given season. However, Jones and Rees (2020) estimated the mean abundance to be 159 individual seals (95% confidence interval of 148.61–168.96) based on capture-recapture data for the last four seasons at both the CBBT and Eastern Shore haul-out sites. Given the tight confidence intervals, the researchers indicated that the average abundance estimate is a reliable representation of the number of harbor seals using both the CBBT and Eastern Shore haul-out sites[32] (Jones and Rees 2020). Eight takes of harbor seals per day is insufficient based on both the haul-out counts and abundance estimates. If one harbor seal is observed within a Level B harassment zone[33], the number of Level B harassment takes could easily be exceeded based on harassment zones that range from 12 km[34] to more than 25 km[35] during vibratory pile driving and DTH drilling or when multiple hammers are used[36]. To ensure that the numbers of harbor seal takes are sufficient and that HRCP does not have to cease its activities if the numbers of takes are met, the Commission recommends that NMFS increase the number of takes from 261 to at least 3,588 takes of harbor seals[37], equating to at least 753 Level A harassment and 2,835 Level B harassment takes of harbor seals[38].

Bottlenose dolphin takes—NMFS has again underestimated the bottlenose dolphin densities in Chesapeake Bay, which resulted in an insufficient number of Level B harassment takes. Similar to the Commission's 26 December 2019 letter regarding CTJV's proposed activities, the Commission informally noted that HRCP does not appear to understand what the density data from Engelhaupt et al. (2016) mean and how they are to be used. HRCP estimated the number of bottlenose dolphin

[31] Particularly when surveys only occurred once per month in some instances and once per season in others (Rees et al. 2016, Jones et al. 2018).
[32] Seals are known to travel between the haul-out sites.
[33] They are not able to be observed beyond 1 km from the PSO.
[34] As noted herein for DTH drilling.
[35] As depicted in Figure 6-1 in HRCP's application.
[36] All such activities equate to approximately 85 percent of HRCP's proposed activities.
[37] Based on the maximum average haul-out count of 23 seals at CBBT and the 156 days that HRCP could conduct activities during the six months that seals are present in the area.
[38] NMFS estimated that on approximately 21 percent of the pile-driving days that the estimated Level A harassment zone would exceed the Level B harassment zone during DTH drilling and reduced the number of Level B harassment takes accordingly (85 Fed. Reg. 16219).

takes based on the average seasonal sighting rates of dolphins observed west of 76°10' (n=20 dolphins) rather than the actual densities from Engelhaupt et al. (2016). HRCP's method vastly underestimated the number of bottlenose dolphin takes because (1) Engelhaupt et al. (2016) did not survey the entire HRCP project area, or even a reasonable portion of it, (2) sightings were made out to only 1 km from the vessel, and (3) Engelhaupt et al. (2016) truncated the sightings data at approximately 320 m due to the detection function being unreliable beyond that distance. Furthermore, the average seasonal sightings provided in Table 14 of the *Federal Register* notice cannot be recreated based on the raw sightings data from Engelhaupt et al. (2016). For example, only 3 sightings of 156 animals (west of 76°10', as noted in the *Federal Register* notice) occurred in spring, resulting in 52 sightings per day. Table 14 indicated that there were 5 sightings of an unknown number of animals, resulting in 17.33 sightings per day in spring. The other seasonal average sightings per day similarly do not comport. Regardless, bottlenose dolphins are only sighted out to at most 1 km from the vessel, and the Level B harassment zones far exceed that distance. Thus, the HRCP's estimated Level B harassment take of 20 dolphins per day is a fraction of the number expected.

Consistent with the Commission's previous recommendation regarding CTJV's activities, which NMFS agreed with and implemented (85 Fed. Reg. 16063 and 16069), the Commission informally noted that NMFS should use the actual inshore seasonal densities[39] provided in Engelhaupt et al. (2016) to re-estimate the number of bottlenose dolphin takes for HRCP's proposed authorization. HRCP responded that it believed that a density of 1.38 dolphins/km^2 was more appropriate. That density represents the summer/fall density[40] from Table 5 in Engelhaupt et al. (2016) for the Chesapeake Bay area[41] that extends from Naval Station Norfolk to the CBBT[42]. The Commission considers that density to be reasonable.

HRCP then chose to revise the number of takes using two different methods. One method used the revised density for all ensonified areas, and the other used the original underestimated sightings of 20 dolphins in a large portion of the areas. Specifically—

- The first method resulted in 68,800 Level B harassment takes based on the year-round density of 1.38 dolphins/km^2, the Level B harassment ensonified area of 131.4 km^2 west of the HRBT[43], and 312 days of proposed activities, plus the year-round density, the Level B harassment ensonified area of 221.46 km^2 associated with activities at the South Trestle[44], and 40 days of proposed activities[45]; and

[39] Densities of 0.63 dolphins/km^2 for winter, 1.00 dolphins/km^2 for spring, 3.55 dolphins/km^2 for summer, and 3.88 dolphins/km^2 for fall.
[40] HRCP considered the winter/spring density unreliable based on low effort, few sightings, and a very high coefficient of variation of 123 percent.
[41] Which is denoted as CB in Engelhaupt et al. (2016).
[42] Which is a subset of the inshore data from Engelhaupt et al. (2016).
[43] Based on use of multiple hammers and combined sound levels that exceed 171 dB re 1 μPa_{rms}.
[44] Based on the ensonified area associated with a source level of 168 dB re 1 μPa_{rms} at 10 m and that extends east into the greater Chesapeake Bay. The source level apparently is associated with vibratory installation of the 42-in piles, since the combined source level for installing 24- and 42-in steel piles would be 169 dB re 1 μPa_{rms} at 10 m and the only other activities that would occur at the South Trestle involve impact pile driving.
[45] (131.4 km^2 * 1.38 dolphins/km^2 * 312 days) + (221.46 km^2 * 1.38 dolphins/km^2 * 40 days)=68,800 takes.

- The second method resulted in 18,465 Level B harassment takes based on HRCP's truncated average seasonal daily sighting rate of 20 dolphins per day and 312 days of proposed activities west of the HRBT, plus the year-round density, the Level B harassment ensonified area of 221.46 km^2 associated with activities at the South Trestle, and 40 days of proposed activities[46].

Both of HRCP's revised take estimation methods are flawed. First, HRCP's second method again vastly underestimates the numbers of Level B harassment takes west of the HRBT. By assuming only 20 dolphins would be taken per day within the 131.4-km^2 ensonified area west of the HRBT, the resulting density of dolphins in that area would be only 0.152 dolphins/km^2—which is almost an order of magnitude less than the density HRCP used east of the HRBT. Given that the CB density from Engelhaupt et al. (2016) is derived based on sightings both east and west of the HRBT and within almost the entirety of HRCP's project area[47], HRCP's second method clearly is not based on best available science. More importantly, the numbers of takes need to be sufficient, particularly once the takes are extrapolated to the extents of the Level B harassment zones, so that HRCP can complete its proposed activities without having to cease them prematurely when the numbers of takes are met. Secondly, the number of days of activities that HRCP's used to estimate the number of takes at the South Trestle for both of its revised methods is incorrect. Table 1 of the *Federal Register* notice indicated that there would be approximately 42 days of activities rather than 40 days, but with only 7 of those days associated with vibratory installation of 42-in steel piles. Vibratory installation of 24-in steel piles would occur on 3 days with a Level B harassment ensonified area of 27.65 km^2 and impact installation of 54-in concrete piles would occur on 22 days with a Level B harassment ensonified area[48] of 0.87 km^2. HRCP overestimated the ensonified area on the majority of the days of activities by assuming that the Level B harassment ensonified area was 221.46 km^2 on 40 days. Had HRCP used the appropriate ensonified areas and numbers of days of activities for the first method, the number of Level B harassment takes of bottlenose dolphins would have been 58,856 rather than 68,880.

To ensure that the number of bottlenose dolphin takes is sufficient and to minimize any unnecessary delays in conducting the proposed activities, the Commission recommends that NMFS use the CB density of 1.38 dolphins/km^2 from Engelhaupt et al. (2016) and (1) the Level B harassment ensonified area of 131.4 km^2 west of the HRBT and 312 days of activities, (2) the Level B harassment ensonified area of 221.46 km^2 for vibratory installation of 42-in steel piles[49] at the South Trestle and 7 days of activities, (3) the Level B ensonified area associated of 27.65 km^2 for vibratory installation of 24-in steel piles at the South Trestle and 3 days of activities, and (4) the Level B ensonified area associated of 0.87 km^2 for impact installation of 54-in concrete piles at the South Trestle[50] and 22 days of activities to increase the numbers of Level B harassment takes of bottlenose dolphins from 6,343 to 58,856. Given that the same individuals could be taken on

[46] (20 dolphins/day * 312 days) + (221.46 km^2 * 1.38 dolphins/km^2 * 40 days)=18,465 takes.
[47] HRCP noted that the sightings used to derive the densities were based on vessel transects that covered almost the entire HRCP project area. See Figure 1 in Engelhaupt et al. (2016).
[48] Based on the revised source level of 187 dB re 1 μPa_{rms} at 10 m from MacGillivray et al. (2007).
[49] Unless multiple hammers would be used at South Trestle simultaneously. If that is the case, the ensonified area would need to be revised.
[50] Based on the revised zone of 631 m.

multiple days[51], NMFS's current statement that many of the takes would likely be repeats of the same animals and likely from a resident population of the Bay (85 Fed. Reg. 16225) would still hold true with the revised take estimates[52].

This is the second time in recent months that the Commission has pointed out that density data are being repurposed and used incorrectly for bottlenose dolphins in Chesapeake Bay. NMFS routinely uses uncorrected and untruncated density data elsewhere along the Atlantic coast (e.g., Roberts et al. 2016, 2017, 2018 within the Atlantic exclusive economic zones and Read et al. 2003 in Pamlico Sound). NMFS's repeated parsing of the bottlenose dolphin density data appears to be an attempt to reduce the number of takes rather than an effort to use the best available data. Similarly, harbor seal haul-out counts[53] have been used incorrectly in this and other recent authorizations. If NMFS is unsure whether a method proposed by an action proponent proposes is legitimate, it should consult with experts who routinely analyze and produce such data, including those experts at NMFS's Science Centers and in academia.

Tally of takes—It is unclear from the *Federal Register* notice and draft authorization whether HRCP will be keeping a running tally of the total Level A[54] and B harassment takes, including observed and extrapolated takes. However, it is imperative that HRCP do so to ensure that the takes are within the authorized limits and the authorized numbers of takes are not exceeded, particularly if NMFS does not increase the numbers of takes as recommended, and to implement effectively requirement 4(f) of the draft authorization. The Commission recommends that NMFS ensure HRCP keeps a running tally of the total takes, based on observed and extrapolated takes, for Level A and B harassment.

Mitigation, monitoring, and reporting measures

Number and location of PSOs—Neither the *Federal Register* notice nor the draft authorization specified how many PSOs would be required to monitor during the various activities at the five sites or where the PSOs would be located. Section 13.1 of HRCP's application indicated that *two or more* PSOs would be monitoring *at each project site*, while section 11.2.1 of the application noted that for Willoughby Bay only *one PSO* would be monitoring and '*an observer*' would be positioned on land to view as much of the Level B harassment zone as possible at South Trestle. It is unclear if only one PSO would be monitoring at South Trestle or if one PSO would be monitoring the Level A harassment zone and one PSO would be monitoring the Level B harassment zone, but in any case, two PSOs are insufficient for monitoring an area that extends to at least more than 15 km into Chesapeake Bay. The application, the *Federal Register* notice, and the draft authorization also did not specify where the PSOs would be located—the application indicated that PSOs would be positioned at the best practical vantage point(s). The Commission asked NMFS more than a month ago what the worst-case scenario was for pile installation[12] to ensure the Level A and B harassment zones were accurate and how many *and* where the PSOs would be positioned during the various activities at the five project sites. NMFS has yet to provide that information.

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[51] Based on the available photo-identification data, Engelhaupt et al. (2016) indicated that individuals were often observed in close proximity to their original sighting locations and were observed multiple times in the same season or same year, but rarely across years.
[52] The maximum daily take on 7 days would be 748 dolphins, which is much less than the 3,220 dolphins per day that were authorized to be taken for the CTJV authorization (see Tables 8 and 9; 85 Fed. Reg. 16069–16070).
[53] And dive data.
[54] Specifically for harbor porpoises.

HRCP indicated in its application that the proposed activities were set to begin in April 2020. It is unclear why the necessary information is unavailable for a project that was scheduled to begin immediately or why NMFS processed this application in the absence of that information. The contracts must already be in place for both the number of hammers to be used and the number of PSOs scheduled to conduct monitoring. It is unclear how NMFS preliminarily determined that HRCP is effecting the least practicable adverse impact on the affected species and stocks (85 Fed. Reg. 16221) and that the mitigation and monitoring protocols are sufficient[55] (85 Fed. Reg. 16224) if it does not know what activities are set to occur, what the Level A and B harassment zones are, whether the shut-down zones and Level A and B harassment takes are sufficient, and how many and where the PSOs are located. In lieu of the necessary information, the Commission recommends that NMFS require HRCP to use *at least* (1) *one PSO* to monitor the shut-down zones *for each hammer* that is in use *at each site*, (2) *one PSO* to monitor the Level B harassment zones during vibratory installation of piles at Willoughby Bay and to be located near the entrance of the Bay to observe animals entering and exiting the Level B harassment zone[56], (3) *one PSO* to monitor the Level A and B harassment zones during impact installation of 30- and 54-in piles at North and South Trestle[57], (4) *three PSOs* to monitor the Level B harassment zones during vibratory pile driving of 24-in piles at South Trestle[58], one PSO on the Hampton side and one on the Norfolk side of Chesapeake Bay to the east of HRBT and one PSO on the Hampton side to the west of HRBT, (5) *four PSOs* to monitor the Level B harassment zones during vibratory pile driving of 42-in piles at South Trestle[59], one on the Hampton side and one on the Norfolk side of Chesapeake Bay to the east of HRBT and one on the Hampton side and one on the Norfolk side to the west of HRBT, and (6) *four PSOs* to monitor the Level B harassment zones during vibratory pile driving and/or DTH drilling of 36- and 42-in piles and during simultaneous use of multiple hammers at North Trestle, North Island, and South Island[59], two on the Hampton side and two on the Norfolk side to the west of HRBT. These requirements must be stipulated in either section 4 or 5 of the final authorization.

Daylight and periods of low visibility—NMFS indicated that pile installation would occur during the day but may extend into evening or nighttime hours as needed to accommodate pile installation requirements (e.g., once pile driving begins—a pile will be driven to design tip elevation; 85 Fed. Reg. 16195). NMFS did not include in the draft authorization that activities must occur during daylight hours but if driving of a pile begins during daylight that it could be driven to depth during evening or nighttime hours or that driving of a new pile could not begin during evening or nighttime hours. NMFS also included as condition 4(h) in the draft authorization that all work must be conducted during periods of good visibility and, if poor environmental conditions restrict full visibility of the shut-down zone, pile installation must be delayed. That condition is not consistent with the standard condition[60] included in other recently-issued authorizations for Chesapeake Bay[61]

[55] To inform its negligible impact determination.
[56] Equaling two PSOs.
[57] Equaling two PSOs, one PSO should be monitoring east of HRBT and one should be monitoring west of HRBT.
[58] Equaling four PSOs.
[59] Equaling five PSOs.
[60] Should environmental conditions deteriorate such that marine mammals within the entire shut-down zone would not be visible (e.g., fog, heavy rain), pile driving and removal must be delayed until the PSO(s) is confident marine mammals within the shut-down zone could be detected.
[61] For the CTJV authorization. https://www.fisheries.noaa.gov/webdam/download/104970969.

or in other proposed authorizations[62].

Given that the Level A harassment zones (i.e., shut-down zones) extend to more than 1.8 km, it is unclear whether PSOs would have 'full visibility' of the zone in darkness. Neither NMFS nor HRCP justified why the proposed activities would need to extend into the night, particularly since HRCP indicated in its application that pile driving could occur concurrently at up to five sites. The maximum number of piles that would be driven at a site is 504[63]. HRCP should have more than enough daylight hours to drive that number of piles during the proposed 312 days of activities. Furthermore, NMFS did not account for Level A harassment takes of the various species during night-time hours when the zones cannot be monitored effectively nor substantiate how those measures would effect the least practicable impact on the affected species and stocks of marine mammals. The Commission recommends that NMFS include in (1) section 3 of the final authorization the requirement that HRCP conduct pile-driving activities during daylight hours only and (2) section 4 of the final authorization the requirement that, if the entire shut-down zone(s) is not visible due to fog or heavy rain, HRCP delay or cease pile-driving and -removal activities until the zone(s) is visible[64].

Unauthorized taking—As noted for other recent authorizations[65], NMFS has relaxed and effectively diminished the reporting measures when unauthorized taking (i.e., an injury or death attributed to HRCP's activities) occurs. HRCP's authorization would require that it only report the unauthorized taking. When unauthorized taking occurs, action proponents should cease the associated activities until NMFS determines what additional measures are necessary to minimize additional injuries or deaths. To that end, the authorizations must include clear, concise, explicit measures to minimize any ambiguity regarding what action proponents should do in those circumstances. The Commission recommends that NMFS include in all draft and final incidental harassment authorizations the explicit requirements to cease activities if a marine mammal is injured or killed during the specified activities *until* NMFS reviews the circumstances involving any injury or death that is likely attributable to the activities *and* determines what additional measures are necessary to minimize additional injuries or deaths. In response to the Commission's previous recommendation regarding this matter, NMFS agreed with the Commission and included the requirement to cease activities should an animal be injured or killed during Halibut Point Marine Services, LLC's (HPMS) activities in condition 6(c) of the final authorization[66] (85 Fed. Reg. 21401). The Commission expects NMFS to include a similar requirement in HRCP's authorization since both HPMS and HRCP would be conducting the same activities (i.e., impact and vibratory pile driving and DTH drilling).

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[62] For the Gastineau Historical Channel Society (GHCS) authorization. https://www.fisheries.noaa.gov/webdam/download/105647341.

[63] Based on the 504 piles that could be driven at South Island (Table 1 in the *Federal Register* notice).

[64] Both of which are consistent with the CTJV and GHCS authorizations.

[65] See the Commission's 10 February 2020 letter for a more extensive rationale regarding this matter.

[66] Condition g(c) specifically states that NMFS will work with HPMS to determine what, if anything, is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. HPMS must not resume their activities until notified by NMFS (https://www.fisheries.noaa.gov/webdam/download/106019283. NMFS included a similar requirement for the Navy's construction activities in San Diego (85 Fed. Reg. 21196 and condition 6(b) in the draft authorization).

Proposed one-year authorization renewals

NMFS indicated in the 'Action' and 'Summary' section of the *Federal Register* notice that it was requesting comments on issuance of a possible one-year authorization renewal under certain circumstances and based on specific requirements as described in section 'Request for Public Comments' of the notice (85 Fed. Reg. 16194). However, NMFS omitted the 'Request for Public Comments' section of the notice from the original notice (85 Fed. Reg. 16194), as well as a correction notice that published two weeks later (85 Fed. Reg. 18921). When NMFS has omitted similar one-year authorization renewal sections from *Federal Register* notices for previous authorizations, it has not proposed to or issued a renewal at a later time because the public was not provided the necessary information upon which to comment in the notice. That also should be the case for HRCP's authorization. As such, the Commission recommends that NMFS (1) remove from the final authorization section 8 regarding the possibility of a one-year authorization renewal and (2) refrain from proposing to issue a one-year authorization renewal with the token 15-day comment period or from issuing a renewal should HRCP not be able to finish its currently proposed activities in one year.

Sufficiency of applications and notices

Based on the numerous issues noted herein, and, more significantly, the uncertainties associated with the accuracy of the Level A and B harassment zones and the vast underestimation of numbers of Level A and B harassment takes, the Commission is unable to determine whether NMFS's negligible impact determination is valid and whether the mitigation measures would effect the least practicable adverse impact on the various species and stocks. Further, the public was not made aware of these issues and was not afforded an opportunity to provide informed and meaningful comments. The Commission understands that NMFS was awaiting responses from HRCP on the majority of the issues. Regardless, these issues should have been recognized and resolved prior to publishing the notice in the *Federal Register*. As such, the Commission recommends that NMFS (1) publish a revised proposed authorization for public comment, (2) consult with HRCP regarding the numerous issues raised in this letter and direct the applicant to revise its letter of authorization application accordingly, and (3) refrain from publishing for public comment proposed incidental harassment authorizations and proposed rules based on underlying applications that contain omissions, errors, and inconsistencies and instead return such applications to action proponents as incomplete.

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

Sincerely,

Peter O. Thomas, Ph.D.
Executive Director

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