



MARINE MAMMAL COMMISSION

3 January 2017

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 City of Unalaska's (COU) application seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act to take marine mammals by harassment. The taking would be incidental to pile driving and removal in association with a dock expansion project in Unalaska, Alaska. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 10 November 2016 notice (81 Fed. Reg. 78969) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

COU plans to replace and expand two docks at the Unalaska Marine Center in Dutch Harbor. COU would install up to 1,700 sheet piles, 195 30-in permanent steel pipe piles, and 150 18-in temporary steel pipe piles using a vibratory hammer and/or impact hammer. It also would remove up to 250 steel pipe/timber piles and the temporary piles. COU would use only one method (vibratory or impact hammer) at any given time. Activities are expected to occur on 245 days and would be limited to daylight hours only.

NMFS preliminarily has determined that, at most, the proposed activities would modify temporarily the behavior of small numbers of harbor seals, Steller sea lions, humpback whales, and killer whales. It also anticipates that any impact on the affected species and stocks would be negligible. NMFS does not anticipate any take of marine mammals by death or serious injury and believes that the potential for temporary or permanent hearing impairment would be at the least practicable level because of the proposed mitigation measures. The mitigation, monitoring, and reporting measures include—

- using soft-start, delay, and shut-down procedures;
- 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 B harassment zone;
- using 2–3 qualified protected species observers to monitor the Level A and B harassment zones for 30 minutes before, during, and for 30 minutes after pile-driving and -removal activities;

- reporting injured and dead marine mammals to NMFS and the Alaska Stranding Coordinator using NMFS's phased reporting approach and suspending activities, if appropriate; and
- submitting a final monitoring report to NMFS.

General pile driving issues

Based on the proposed incidental harassment authorization, the Commission had extensive comments regarding the appropriateness of the source levels¹ that were used to determine the extent of the Level A and B harassment zones² and the need to require use of a sound attenuation device during impact pile driving. The Commission understands that NMFS plans to include a requirement for COU to use a sound attenuation device (i.e., bubble curtain) during impact pile driving and to revise the source levels and associated Level A and B³ harassment zones for the various types of installation and removal activities. Those revisions include—

- increasing the source level from 158 to 162 dB re 1 μ Pa at 10 m for vibratory installation and removal of 18-in steel pipe piles;
- decreasing the source level from 162 to 153 dB re 1 μ Pa at 10 m for vibratory removal of timber piles;
- increasing the source level from 159 to 166 dB re 1 μ Pa at 10 m for vibratory installation of 30-in steel pipe piles; and
- increasing the source level from 185 to 190 dB re 1 μ Pa at 10 m but then assuming a 5-dB reduction for use of the mandatory bubble curtain⁴ for impact installation of 30-in steel pipe piles.

The Commission agrees that NMFS should include all the aforementioned revisions in the final incidental harassment authorization. However, these and previous issues highlight the need for NMFS to provide consistent guidance on the appropriateness of source levels for all pile driving activities and assumed source level reductions⁵ and pulse durations during impact pile driving. The Commission has made these concerns known to NMFS in recent years, including detailing the source level issues in its 3 April 2015 and 29 August 2016 letters.

The Commission reiterates that, given the amount of in-situ source level data obtained by the California Department of Transportation (Caltrans), U.S. Navy, Washington State Department

¹ Some of which originated from a freshwater lake rather than saltwater conditions and a site with a soft substrate rather than the silt, gravel, and sand present at the proposed site. Other source levels were based on only 18–82 seconds of activities, which is insufficient for determining representative source levels—those source levels also included an apparent calculation error.

² Which did not affect the estimated numbers of takes but would affect the areas to be observed in support of implementation of mitigation and monitoring measures.

³ The extent of the Level B harassment zone for vibratory pile driving would remain unchanged because it is clipped by land at 3.3 km.

⁴ COU indicated that the contractor would decide if either a bubble curtain or pile caps would be used as the sound attenuation device during impact pile driving. However, the contractor has yet to be selected. If a pile cushion would be used in lieu of a bubble curtain, NMFS indicated that the 5-dB sound reduction would not be employed and the Level A and B harassment zones would be based on the 190-dB re 1 μ Pa at 10 m source level.

⁵ Based on implementation of sound attenuation devices.

of Transportation (WSDOT), and other action proponents⁶ in the last 10 years, it believes NMFS should compile all of the in-situ pile-driving and -removal data into a central database. This would enable analysts to crosscheck data in situations like the one discussed herein, as well as in situations when action proponents are having difficulty determining proxy source levels. The Commission recognizes that the available data have limitations, but this does not preclude NMFS from compiling those data and working to ensure the quality of what is collected and available in the future.

Specifically, some of the relevant information is not contained within many of the various hydroacoustic monitoring reports, such as sediment composition, water depth (in terms of hydrophone placement and bathymetry), and duration over which the pressure was averaged for vibratory pile-driving sound pressure level root-mean-square (SPL_{rms}) metrics. Further, the results reported in the various reports use inconsistent integration timeframes for SPL_{rms}. Some note averages of 1-second averages, while others report averages of the maximum SPL_{rms} over 10-second or 30-second timeframes of continuous sound. In either case, reporting the median rather than the average⁷ values would be more informative and avoid the problem of skewing results by including any single value that is extremely high or low compared to the rest of the measurements. Median proxy source levels also should be used by NMFS when determining appropriate source levels from multiple projects rather than randomly choosing a proxy source level from a single project⁸. Lastly, when data are collected from multiple piles of the same type, the upper 90th percentile rather than the best-fit (or average) regression should be used to inform the range to effects at the various measured distances and associated thresholds. For these reasons, the Commission recommends that NMFS (1) compile all in-situ source level⁹ pile-driving and -removal measurements from past and future projects in a central database, (2) require each action proponent to specify the sediment composition, water depth (in terms of hydrophone placement and bathymetry), duration over which the pressure was averaged for SPL_{rms} metrics, and median values in all future hydroacoustic monitoring reports, (3) ensure consistency regarding integration timeframes used for SPL_{rms} measurements (e.g., 1-second averages, maximum over 10 seconds, or maximum over 30 seconds) in all future hydroacoustic monitoring reports, (4) require each action proponent to use median proxy source levels from all relevant sources when in-situ data are unavailable, and (5) require each action proponent to use the upper 90th percentile rather than the best-fit regression to inform the range to effects in all future hydroacoustic monitoring reports.

In addition, NMFS has been inconsistently applying presumed source level reductions based on use of sound attenuation devices (i.e., bubble curtains) during impact pile driving. In some instances, source level reductions are assumed to be 10 dB (80 Fed. Reg. 48504) when bubble curtains are to be employed, while 0 dB (81 Fed. Reg. 15082), 5 dB (current authorization), 6 dB (81 Fed. Reg. 26647), and 8 dB (81 Fed. Reg. 19342) have been used in other instances. Given that the variability in attenuation levels is based on differences in device design and site and environmental conditions and difficulties in properly installing and operating sound attenuation devices, various operators have implemented specific bubble curtain design requirements (including testing requirements for air pressure and flow prior to initial impact hammer use and a requirement for placement on the substrate). Those implementation measures should be required consistently by

⁶ Including recent data obtained by JASCO Applied Sciences (JASCO) in Alaska.

⁷ In addition to the minimum and maximum.

⁸ Which in some instances is the lowest source level reported by all relevant projects.

⁹ Including sediment composition and water depth. Transmission loss values would be valuable as well.

NMFS as well. Therefore, the Commission recommends that NMFS require each action proponent to (1) use a consistent source level reduction factor when sound attenuation devices would be used during impact pile driving and in-situ data are unavailable and (2) conduct bubble curtain testing (for air pressure and flow prior to impact hammer use) and place the bubble curtain device on the substrate in all relevant incidental take authorizations.

Further, NMFS has used both a 50- and 100-msec pulse duration when estimating ranges¹⁰ to the new Level A harassment thresholds for impact pile driving based on cumulative sound exposure levels (SEL_{cum}). The Commission has reviewed spectra from numerous in-situ measurements collected during impact pile driving¹¹ and believes 100 msec is the more appropriate pulse duration. Pulse duration is dependent on pile size and type, hammer type and energy, and seabed characteristics. By assuming a 50-msec pulse duration, some of the energy would be effectively discarded based on those in-situ measurements. The Commission recommends that NMFS require each action proponent to implement a 100- rather than 50-msec pulse duration consistently when using NMFS's user spreadsheet and SPL_{rms} -based source levels to determine ranges to the various Level A harassment SEL_{cum} thresholds for impact pile driving.

Finally, ranges to the various Level A SEL_{cum} harassment thresholds can be determined via NMFS's user spreadsheet by using source levels based on either SPL_{rms} or a single-strike SEL (SEL_{s-s}) for impact pile driving. The Commission is unaware of any guidance from NMFS advising action proponents on which metric to use when both are available or which metric is more appropriate in general. The Commission notes that ranges to the Level A harassment thresholds based on SEL_{s-s} are consistently smaller than SPL_{rms} —the SEL_{s-s} ranges are 63 percent smaller than the SPL_{rms} ranges for COU's proposed impact pile-driving activities. The Commission recommends that NMFS specify whether source levels based on SPL_{rms} or SEL_{s-s} are more appropriate for action proponents to use when both are available and require each action proponent to use that metric consistently to determine the ranges to the various Level A harassment SEL_{cum} thresholds.

The Commission would be happy to consult with NMFS on these general improvements to resolve these issues in a timely manner. Please contact me if you have questions regarding the Commission's comments and recommendations.

Sincerely,



Rebecca J. Lent, Ph.D.
Executive Director

¹⁰ Based on SPL_{rms} source levels used in concert with NMFS's user spreadsheet.

¹¹ Based on data from Caltrans, WSDOT, and JASCO.