



# MARINE MAMMAL COMMISSION

3 December 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 City of Juneau (the City) seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act (the MMPA) to take small numbers of marine mammals by harassment. The taking would be incidental to harbor improvements at Statter Harbor in Juneau, Alaska. This is a multi-year project, but the incidental harassment authorization would be valid for one year. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 17 October 2018 notice (83 Fed. Reg. 52394) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

## Background

During the first year of activities, the City plans to demolish or remove various structures, dredge, and conduct confined blasting activities. The City would remove 4 12.75-in steel pipe piles and 16 12- to 16-in timber piles by direct pull or using a vibratory hammer. Pile-removal activities would occur on up to 10 days. Dredging would be conducted using a clamshell bucket or excavator on up to 45 days. In addition, confined blasting could involve up to 73 individual charges with a maximum net explosive weight of 93.5 lbs/delay that would be detonated every 8 msec for a total of 1 sec. The blasting activities would occur on two days. All activities would occur during daylight hours<sup>1</sup> only.

NMFS preliminarily has determined that, at most, the proposed activities could cause Level A and/or B harassment of small numbers of four 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 as stipulated in the *Federal Register* notice included—

- using various delay and shut-down procedures;

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<sup>1</sup> From 30 minutes after sunrise until 30 minutes before sunset.

- ceasing pile-removal and dredging activities if any marine mammal comes within 10 m of the equipment;
- using multiple NMFS-approved protected species observers (PSOs) to monitor the Level A and B harassment zones before, during and after pile-removal, dredging, and confined blasting 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 are met, approaches or is observed within the Level B harassment zone;
- reporting injured and dead marine mammals to NMFS and the Alaska 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 numerous issues in both the City's application and NMFS's *Federal Register* notice. Specifically, those issues included—

- omitting the ranges to the mortality and injury<sup>2</sup> thresholds for blasting activities in the *Federal Register* notice;
- refraining from including Level B harassment (behavior) takes of marine mammals subsequent to blasting activities<sup>3</sup>;
- incorrectly estimating the ranges<sup>4</sup> to the various thresholds for blasting activities and basing the takes of pinnipeds on unrealistic assumptions<sup>5</sup>—both of which resulted in vast

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<sup>2</sup> For slight lung and gastrointestinal tract injuries.

<sup>3</sup> Which is discussed in a subsequent section herein.

<sup>4</sup> The City used incorrect source levels for the various metrics (impulse, peak and root-mean-square sound pressure levels ( $SPL_{peak}$  and  $SPL_{rms}$ , respectively), and cumulative sound exposure level ( $SEL_{cum}$ )) and an unsubstantiated weighting factor adjustment of 1 kHz. The City also utilized NMFS's user spreadsheet to estimate the extents of the various zones. Although the Commission supports action proponents using NMFS's user spreadsheet in general, the spreadsheet should not be used to estimate the relevant zones for explosives or underwater detonations due to their underlying complexities. NMFS has since remodeled the zones using (1) a confined blasting model based on data collected by U.S. Army Corps of Engineers (USACE), (2) frequency weighting based on spectral analysis of exponential decay/Fourier transform functions, and (3) frequency-specific absorption based on seawater and salinity measurements from Auke Bay. Given that the re-estimated Level A and B harassment (permanent threshold shift (PTS) and temporary threshold shift (TTS), respectively) zones for otariids still appeared seemingly small, the Commission indicated that the zones should be increased—they were doubled to 93 m for PTS and 140 m for TTS.

<sup>5</sup> In the proposed authorization, NMFS and the City assumed that nearly the same number of Steller sea lions and harbor seals (10 and 11, respectively, per day) could be taken by Level A harassment (PTS), even though the extent of the PTS zone for harbor seals was seven times the extent for Steller sea lions (71 vs 10 m in Table 5 of the notice, respectively).

- underestimations of the relevant zones<sup>6</sup>, numbers<sup>7</sup> and types<sup>8</sup> of marine mammal takes, and the number of PSOs required to monitor those zones<sup>9</sup>;
- including Level B harassment takes of marine mammals subsequent to dredging activities based on audibility rather than the potential to disturb<sup>3</sup> and basing the takes of pinnipeds on unrealistic assumptions<sup>10</sup>;
  - incompletely and inconsistently stipulating various mitigation and monitoring measures<sup>11</sup> in the preamble and proposed incidental harassment authorization;
  - omitting mitigation measures consistent with previous authorizations for confined blasting<sup>12</sup>; and
  - omitting any mitigation measure specific to blasting activities and the presence of pups<sup>13</sup>.

In short, NMFS was overly conservative for activities for which behavioral harassment may not even occur but insufficiently precautionary for activities that may cause injuries. Although

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<sup>6</sup> In multiple instances, the extents of the zones were underestimated by a factor of 10 to 22.

<sup>7</sup> The proposed numbers of Level A harassment takes, which could be either slight lung injury or PTS, were increased from 20 to 30 for Steller sea lions and from 22 to 104 for harbor seals. The Level B harassment (ITS) takes were increased from 100 to 212 for Steller sea lions and from 4 to 6 for harbor porpoises.

<sup>8</sup> The revised extents of the Level A harassment zones for slight lung injury range from 33 to 43 m for Steller sea lions and harbor seals, respectively. Even though neither the City nor NMFS proposed to include Level A harassment takes based on slight lung injury in the proposed authorization, NMFS indicated it would authorize both types of taking in the final authorization. The City also confirmed that it would report Level A harassment takes as either slight lung injury or PTS based on individual sightings and the extents of the zones.

<sup>9</sup> NMFS originally proposed to require the City to have only two PSOs monitoring during blasting activities. Based on informal comments from the Commission, the City has agreed to increase the number of PSOs from two to four during blasting activities. NMFS will include that requirement in the final authorization.

<sup>10</sup> Although Steller sea lions do not occur within the inner harbor on a regular basis nor would they occur in large numbers within the 100-m Level B harassment zone, the proposed number of takes for Steller sea lions was estimated to be more than double the number of takes for harbor seals that do occur in the inner harbor routinely and would occur within the 100-m zone. The City has since proposed to reduce the number of Steller sea lion takes from 62 on each day of dredging activities to 10 on half of the days of dredging activities.

<sup>11</sup> The number of PSOs required to monitor for marine mammals during dredging and pile removal was not consistent between the preamble and the proposed incidental harassment authorization. NMFS has since clarified that one PSO would monitor during dredging activities and two would monitor during pile-removal activities. Clearance times for when animals are sighted during dredging, pile-removal, and blasting activities and general mitigation measures for blasting activities were stipulated in the preamble but not in the proposed incidental harassment authorization. NMFS indicated that the measures would be included in the final authorization. NMFS also did not specify how blasting activities could occur in poor visibility conditions if the extents of the harassment zones cannot be seen but must be deemed clear in order to proceed with the detonations. However, NMFS clarified that blasting would be authorized to occur only in good visibility conditions, a requirement that *must* be included in the final authorization.

<sup>12</sup> For other confined blasting activities, action proponents are required to monitor 1 hour rather than 30 minutes after the blast. They also are required to implement stemming procedures (i.e., capping each blast hole with crushed rock) to reduce the pressure wave emitted from each detonation—this measure was included in the City's application but was not stipulated in the proposed incidental harassment authorization. In addition, action proponents are required to notify (1) NMFS and the local stranding network 24 hours before blasting is planned to occur and after it has occurred and (2) the stranding network immediately if an animal is injured or killed due to blast activities and follow any instructions that the stranding network provides. None of these measures were included in the proposed authorization, but NMFS specified that the measures would be included in the final authorization.

<sup>13</sup> Although blasting activities currently are scheduled to occur prior to the pupping season, the City indicated that explosive charges and detonators would not be placed if any marine mammal is within the Level A harassment zones. Detonations would be delayed as long as possible if marine mammals re-enter the Level A harassment zone after the charges are placed. NMFS should *explicitly* include that measure in the final authorization. The City further stated that the National Oceanic and Atmospheric Administration's Enforcement Office recommended that the fish cleaning station be

NMFS plans to fix most of these deficiencies in the final incidental harassment authorization, many of these issues should have been identified and corrected prior to publishing the *Federal Register* notice. As such, the Commission recommends that NMFS review its notices more thoroughly prior to submitting them for publication in the *Federal Register*.

### **Behavior threshold for blasting activities**

For explosive activities, NMFS generally uses a behavior threshold that is 5 dB less than the TTS threshold. That value was derived from observed onset behavioral responses of captive bottlenose dolphins during non-impulsive TTS testing<sup>14</sup> (Schlundt et al. 2000). The justification for that threshold is a bit questionable, but more concerning is that NMFS, based on assertions from the Navy, continues to believe that marine mammals do not exhibit behavioral responses to single detonations<sup>15</sup> (83 Fed. Reg. 52407 and Department of the Navy 2017)<sup>16</sup>. Although there are no data to substantiate those assertions, the Navy's, and thus NMFS's, main justification hinges on use of the same supposition for previous ship shock trial final rules in 1998, 2001, and 2008. The Commission contends that NMFS should not continue to ascribe validity to assumptions that are not based on actual data.

In addition, NMFS provided no evidence explaining why it did not believe that an animal would exhibit a behavioral response to 93 lbs of explosives detonating, let alone 6,975 lbs of explosives detonating over 1 sec, or why it believed that only PTS and TTS<sup>17</sup> could occur. Rather, NMFS asserted in its *Federal Register* notice that behavioral harassment indeed would occur. NMFS indicated that exposure to high intensity sound may result in behavioral reactions and auditory effects such as a noise-induced threshold shift (83 Fed. Reg. 52401) and that it believes that the City's blasts are most likely to cause *behavioral harassment* (83 Fed. Reg. 52403). NMFS explicitly stated that authorized takes would primarily be by Level B harassment, as use of the explosives, vibratory pile removal, and dredging has the potential to result in *disruption of behavioral patterns* for individual marine mammals (83 Fed. Reg. 52407). NMFS further stipulated that potential effects from impulsive sound sources, like blasting, can range in severity from effects such as *behavioral disturbance* to temporary or permanent hearing impairment and that, due to the nature of the sounds involved in the City's project, *behavioral disturbance* is the most likely effect from the proposed activity (83 Fed. Reg. 52405). Although NMFS presumably included said reasoning and statements in error, the Commission agrees that the blasting activities could cause behavioral disturbance. As such, NMFS should have proposed to authorize marine mammal takes accordingly.

Furthermore, NMFS noted that avoidance is one of the most obvious manifestations of disturbance in marine mammals (Richardson et al. 1995), with animals returning to the area once the noise has ceased (83 Fed. Reg. 52404). For blasting activities, short-term avoidance of the area likely will be the main behavioral response exhibited by animals. However, if the animals are disturbed

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shut down to remove a potential pinniped attractant. The City also noted that it would simultaneously step up efforts to prevent harbor users from inappropriately disposing of fish waste in the harbor prior to blasting activities.

<sup>14</sup> Based on 1-sec tones.

<sup>15</sup> In this instance, a single detonation event consisting of up to 73 separate detonations separated by at least 8 msec each, all of which detonate in 1 sec.

<sup>16</sup> Including certain gunnery exercises that involve several detonations of small munitions within a few seconds.

<sup>17</sup> It is nonsensical to suppose that an animal could experience two types of hearing damage but would not behaviorally respond to the same sounds.

when they are resting, nursing, or feeding, those natural behavioral patterns and vital functions would be disrupted as well. Because the blasting activities have the potential to disturb marine mammals and disrupt natural behavioral patterns, the Commission recommends that NMFS estimate and ultimately authorize behavior takes of marine mammals during *all* activities involving explosives, including those that involve single detonations or single detonation events<sup>18</sup>, for this and all future incidental take authorizations.

### **Hydroacoustic monitoring for blasting activities**

In its informal correspondence, the Commission noted that the City should be conducting hydroacoustic monitoring<sup>19</sup> during blasting activities. NMFS indicated that it would not require such monitoring due to the short duration of the activity. The Commission asserts that the duration of the activity is irrelevant to the fact that (1) the modeled confined blasting zones generally are uncertain due to complexities in the models and actual measurements being scant, (2) NMFS has required hydroacoustic monitoring for all other recent confined blasting activities due to modeling uncertainties<sup>20</sup> (83 Fed. Reg. 19706, 80 Fed. Reg. 57585), and (3) multiple pinniped species either reside within the harbor or are known to occur within the estimated injury zones. Of all the potential instances to require acoustic monitoring, the Commission believes this is one of the most appropriate<sup>21</sup>. Therefore, the Commission recommends that NMFS (1) require the City to conduct hydroacoustic monitoring<sup>22</sup> of blasting activities and provide data from the first blast event to NMFS for its review prior to conducting the second blast event and (2) adjust the various Level A and B harassment zones as necessary prior to the second event.

### **Level B harassment takes for dredging activities**

The Commission is unaware of NMFS proposing, or actually authorizing, Level B harassment takes associated with dredging activities in previous authorizations. On the contrary, NMFS has consistently asserted that dredging activities, including those associated with confined blasting, are not likely to result in marine mammal takes (e.g., 83 Fed. Reg. 11980 for USACE and 83 Fed. Reg. 15797 for California Department of Transportation (Caltrans)). For USACE's proposed confined blasting activities, NMFS specified that no takes of marine mammals were anticipated, nor were any being proposed for authorization, related to dredging activities—which could include use of both mechanical (clamshell and/or backhoe) and hydraulic equipment (hopper and/or cutter-suction; 83 Fed. Reg. 11980). The City, and subsequently NMFS, assumed an average source level of 150.5 dB re 1  $\mu$ Pa at 1 m measured over five phases of dredging<sup>23</sup> (i.e., the bucket striking the channel bottom, bucket digging, bucket closing, winching in/out as the bucket is lowered/raised,

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<sup>18</sup> Which is what NMFS ascribed as the City's proposed activity. That is, numerous explosives that are detonated over 1 sec or a few seconds.

<sup>19</sup> Primarily because NMFS based its model on fully confined charges rather than a more conservative model that included ill-confined charges measured by USACE as well.

<sup>20</sup> Which have been refined based on the measurements.

<sup>21</sup> The Commission also is aware of another authorization application that NMFS is processing for confined blasting activities in Ketchikan. That application used the same subpar modeling assumptions as the City had originally used. Hydroacoustic monitoring results could further refine NMFS's model and would inform that authorization as well.

<sup>22</sup> Using both pressure transducers and hydrophones. The original data used by the City for proxy source levels were based solely on pressure transducer data that both appeared flawed and are inappropriate for accurately estimating ranges to thresholds based on SEL<sub>cum</sub>.

<sup>23</sup> Based on an assumed maximum duration of 50 sec.

and dumping the material on a barge) based on Dickerson et al. (2001). It is well known that hydraulic dredging is louder than mechanical dredging and more importantly, the sounds emitted from the vessels transiting with the dredged materials generally are louder and/or are detectable at greater distances than actual dredging (see Jones et al. (2015) for a review of these topics). Interestingly, NMFS discounted the very activities that elicit the greatest source levels.

NMFS indicated that the substrate would be placed on a small barge and towed via a tug to the disposal site<sup>24</sup>, but that it did not consider dredge disposal an activity that could result in take of marine mammals (83 Fed. Reg. 52408). However, because the dredging activity is producing sound at levels *likely audible* to marine mammals and the sound source is concentrated in a region with resident marine mammals<sup>25</sup>, NMFS did believe those activities have the potential to harass marine mammals (83 Fed. Reg. 52408). In fact, the sounds emitted from vessels are louder and propagate farther than from a clamshell bucket removing rocks and placing them on a barge. The recreational and commercial vessels transiting the harbor emit louder sounds, as does a tug<sup>26</sup> towing a barge full of extracted substrate. NMFS itself stated that the source levels, as well as impacts from dredging and fill placement activities, generally are lower than many other sources that it considers (83 Fed. Reg. 52401). NMFS further indicated that the source levels are not thought to be dissimilar to ambient noise levels in an area with sustained anthropogenic activity and vessel traffic, such as Statter Harbor (83 Fed. Reg. 52401). Thus, it is unclear why NMFS then equated an animal's ability to hear a sound to an animal's potential to be disturbed by it. If NMFS believes that authorization for taking incidental to vessel transits by the tug is not warranted, then the Commission recommends that NMFS similarly find that authorization to take marine mammals incidental to dredging activities is not necessary either.

The Commission understands that some action proponents may want to obtain authorizations for all activities that it believes *could* impact marine mammals. NMFS, as the regulatory agency, has the final decision regarding which activities may or may not impact marine mammals and when issuing authorizations is necessary. However, NMFS must make such decisions in a consistent manner. As such, the Commission recommends that NMFS determine which activities warrant taking authorizations under the MMPA and apply that approach consistently for all action proponents.

### **Proposed one-year authorization renewals**

NMFS has indicated that it may issue a second one-year<sup>27</sup> incidental harassment authorization renewal for this and other future authorizations if various criteria are met (see 83 Fed. Reg. 42489 for details). The Commission agrees that NMFS should take appropriate steps to streamline the authorization process under section 101(a)(5)(D) of the MMPA to the extent possible. However, the Commission is concerned that the renewal process proposed in the *Federal*

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<sup>24</sup> A site just outside the harbor.

<sup>25</sup> The Commission notes that most dredging activities, including those for both USACE and Caltrans in which take authorization was not deemed warranted by NMFS, occur in regions that are limited in scope and/or inhabited by resident species.

<sup>26</sup> That can emit sounds from 165–170 dB re dB re 1 μPa at 1 m (Austin et al. 2013, Veirs et al. 2013).

<sup>27</sup> 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.

*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 information<sup>28</sup> 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 process<sup>29</sup>. 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. 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.

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

Sincerely,



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

## References

- Austin, M., A. McCrodon, C. O'Neill, Z. Li, and A. MacGillivray. 2013. Underwater sound measurements. *In*: L.N. Bisson, H.J. Reider, H.M. Patterson, M. Austin, J.R. Brandon, T. Thomas, and M.L. Bourdon. Marine mammal monitoring and mitigation during exploratory drilling by Shell in the Alaskan Chukchi and Beaufort Seas, July–November 2012: Draft 90-day report. LGL Report P1272D–1, LGL Alaska Research Associates Inc., Anchorage, Alaska, and JASCO Applied Sciences, Victoria, British Columbia, Canada. 266 pages plus appendices.
- Department of the Navy. 2017. Technical report: Criteria and thresholds for U.S. Navy acoustic and explosive effects analysis (Phase III). SSC Pacific, San Diego, California. 194 pages.
- Dickerson, C., K.J. Reine, and D.G. Clarke. 2001. Characterization of underwater sounds produced by bucket dredging operations. DOER Technical Notes Collection, ERDC TN-DOER-E14, U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi. 17 pages.

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<sup>28</sup> Including any changes to the proposed activities or assumptions made and results from the draft monitoring report.

<sup>29</sup> See the Commission's [30 April 2018 letter](#) detailing this matter.

- Jones, D., Marten, K. and Harris, K. 2015. Underwater sound from dredging activities: Establishing source levels and modelling the propagation of underwater sound. Proceedings from Central Dredging Association's Dredging Days 2015: Innovative dredging solutions for ports, Rotterdam, The Netherlands. 19 pages.
- Richardson, W.J., C.R. Greene, C.I. Malme, and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press, Inc., San Diego, California. 576 pages.
- Schlundt, C.E., J.J. Finneran, D.A. Carder, and S.H. Ridgway. 2000. Temporary shift in masked hearing thresholds of bottlenose dolphins, *Tursiops truncatus*, and white whales, *Delphinapterus leucas*, after exposure to intense tones. The Journal of Acoustical Society of America 107(6):3496–3508.
- Veirs, S., V. Veirs, and J.D. Wood. 2016. Ship noise extends to frequencies used for echolocation by endangered killer whales. PeerJ 4:e1657.