



# MARINE MAMMAL COMMISSION

21 January 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 National Science Foundation (NSF) Office of Polar Programs<sup>1</sup> 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 incidental to conducting a marine geophysical survey in the Amundsen Sea in February 2020. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 19 December 2019 notice announcing receipt of the application and proposing to issue the authorization, subject to certain conditions (84 Fed. Reg. 69950).

## Background

NSF proposes to conduct a low-energy geophysical survey in the Amundsen Sea. The purpose of the survey is to assist in establishing boundary conditions seaward of the Thwaites Glacier grounding line, obtain records of external drivers of change, improve knowledge of the processes leading to the collapse of the Thwaites Glacier, and determine history of past change in the grounding line migration and conditions at the glacier's base. The survey would be conducted with either a single airgun or a two-airgun array<sup>2</sup> and a single 100- to 300-m hydrophone streamer along approximately 1,600 km of tracklines. The RVIB *Nathaniel B. Palmer* (*Palmer*) would operate the airgun arrays at a tow depth of 2 to 4 m in waters 100 m to greater than 1,000 m in depth<sup>3</sup>. In addition, the RVIB *Palmer* would operate acoustic Doppler current profilers and multi-, single, and split-beam echosounders. The survey could occur on up to 8 days, with an additional 2 days for operational contingencies (i.e., weather delays, equipment failure, etc.).

NMFS preliminarily has determined that the proposed activities could cause Level B harassment of small numbers of numerous species or stocks of marine mammals and that any impact on the affected species or stocks would be negligible. NMFS does not anticipate any take of marine mammals by death or serious injury. It also has preliminarily determined that the proposed

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<sup>1</sup> On behalf of the University of Houston.

<sup>2</sup> Ranging from a combined total discharge volume of 150 to 420 in<sup>3</sup>.

<sup>3</sup> 65 percent of the survey would occur in intermediate waters (100–1,000 m in depth) and 35 percent would occur in deep waters (> 1,000 m in depth). NSF did not specify the deepest water depth but noted that it exceeded 1,000 m.

mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks. Those measures include (1) using protected species observers to monitor the Level A<sup>4</sup> and B harassment zones for 30 minutes before, during, and for 60 minutes after the survey, (2) implementing speed and course alterations, and (3) using shut-down and ramp-up procedures. In addition, NSF would shut down the airguns immediately if (1) a beaked whale or southern right whale, (2) a large whale<sup>5</sup> with a calf, or (3) an aggregation<sup>6</sup> of large whales is observed within 500 m of the *Palmer*. Ramp-up procedures would not be initiated until the animal(s) has not been seen for 30 minutes. NSF would report any injured or dead marine mammal to NMFS's Office of Protected Resources using its phased approach.

### General comments

The Commission informally noted a number of issues with the *Federal Register* notice<sup>7</sup> and draft incidental harassment authorization<sup>8</sup>. Those included—

- lack of information regarding whether the proposed activities would occur in international waters (or the high seas) as included in other NSF-related authorizations (e.g., Scripps Institution of Oceanography (SIO) surveys off Namibia, 84 Fed. Reg. 51886 and the Falkland Islands, 84 Fed. Reg. 39896) and incidental harassment authorizations in general. Incidental taking of marine mammals is authorized under section 101(a)(5) of the MMPA for activities that occur within U.S. territorial waters, within the U.S. exclusive economic zone (EEZ), or in international waters<sup>9</sup>. This information is essential for determining whether an authorization for NSF's activities is necessary.
- lack of information regarding the deepest water depth that the survey could occur as included in other NSF-related authorizations (e.g., SIO surveys off Namibia, 84 Fed. Reg. 51886 and the Falkland Islands, 84 Fed. Reg. 39896<sup>10</sup>). As noted in the *Federal Register*

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<sup>4</sup> And a standard exclusion zone of 100 m.

<sup>5</sup> A sperm whale or mysticete.

<sup>6</sup> Six or more individuals that do not appear to be traveling and are feeding, socializing, etc.

<sup>7</sup> In addition to noting omission of some basic information (e.g., the header for Tables 6 and 8 in the *Federal Register* notice and the related preamble text should indicate that the information is for the 2 x 210 in<sup>3</sup> array, which is the worst-case scenario, columns of Table 6 must be labeled for the various functional hearing groups), errors (e.g., Table 6 in the *Federal Register* notice is not applicable to Figure 2 as noted—Table 10 in the application contains the relevant data except that the adjustment for phocids is not N/A but -24.14 as noted in Figure 2, Figure 2 was included in error as NMFS's user spreadsheets are never included in NMFS's notices and the header incorrectly noted that the information was related to the 2 x 150 in<sup>3</sup> array rather than the 2 x 210 in<sup>3</sup> array, pygmy sperm whales were included in the 30-minute clearance time requirement but do not occur in the Antarctic, ramp-up procedures are not just specific to the 45-in<sup>3</sup> airguns but apply to the 105-in<sup>3</sup> airguns too), and unnecessarily confusing information (e.g., both 'calculated' and 'proposed' Level B harassment takes were included in Tables 11 and 13—calculated takes resulted from the basic mathematical computational method used, while proposed takes represent those *originally proposed* by NSF that have no bearing on the proposed authorization rather than the numbers of takes NMFS *is proposing* to authorize, omission of 'proposed' Level B harassment takes of strap-toothed beaked whales (which NMFS termed Layard's beaked whale), long-finned pilot whales, Gray's beaked whales, and elephant seals in Tables 11 and 13 because NSF did not propose to include them).

<sup>8</sup> In addition to the omission of necessary information or requirements (e.g., the various Level B harassment zones) and errors (e.g., ramp-up procedures apply to both the 45-in<sup>3</sup> and 105-in<sup>3</sup> airguns).

<sup>9</sup> Or in another country's EEZ but beyond its territorial waters.

<sup>10</sup> Both notices indicated that the water depths extended to approximately 5,700 m, which is more specific than > 1,000 m.

notice, the model used for NSF's geophysical survey truncates the resulting harassment radii at 2,000 m in depth (84 Fed. Reg. 69969). This information is necessary for determining the applicability of the model, the accuracy of the estimated Level B harassment zones, and sufficiency of Level B harassment takes.

- use of underestimated Level B harassment zones based on a tow depth of 3 m rather than the maximum tow depth of 4 m consistent with other NSF-related authorizations (e.g., Appendices A in SIO applications<sup>11</sup> and Attachment B in previous NSF applications<sup>12</sup>). When a range of tow depths is proposed, the maximum tow depth is and has been used by NSF and its related entities<sup>13</sup> to estimate the relevant Level B harassment zones. Based on the circuitous manner in which NSF determines its Level A harassment zones<sup>14</sup>, it is unclear by how much an underestimated tow depth would change the Level A harassment zones. Given that NSF's method for determining both Level A and B harassment zones is based on a single shot, the tow depth (as well as airgun spacing) should have an effect on the Level A harassment zones as well. Thus, both the Level A and B harassment zones were underestimated, as were the Level B harassment takes. It is imperative that the Level A and B harassment zones and ensonified areas are based on the operational parameters that NSF plans to employ and that the Level B harassment takes are sufficient.
- use of an underestimated humpback whale density of 0.0001000 whales/km<sup>2</sup> from the Navy's marine species density database (NMSDD) in Table 9 of the *Federal Register* notice rather than 0.0001365 whales/km<sup>2</sup> from Gohl (2010). In other situations, when multiple densities were available, NMFS used the maximum density (e.g., for minke whales). That approach should have been used for humpback whales too. Thus, the Level B harassment takes of humpback whales were underestimated in Tables 11 and 13 of the *Federal Register* notice. It is imperative that the Level B harassment takes are based on best available science and are sufficient.
- use of an under-representative distance of 160 km to be surveyed each day in Table 10 of the *Federal Register* notice rather than 200 km<sup>15</sup>, which is the trackline distance that would be surveyed on a given day based on a vessel traveling 2.315 m/sec<sup>16</sup>. The ensonified areas<sup>17</sup> associated with Level B harassment in Table 10 and resulting numbers of Level B harassment takes were underestimated in Table 11 of the *Federal Register* notice. It is imperative that the Level B harassment zones and ensonified areas are based on the operational parameters and that the Level B harassment takes are sufficient.
- omission of the method for estimating the Level B harassment zone for ice-breaking activities in the *Federal Register* notice<sup>18</sup>, which differs from the method in NSF's application<sup>19</sup>. This information is essential for evaluating the applicability of the Level B harassment zone.

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<sup>11</sup> <https://www.fisheries.noaa.gov/webdam/download/97476752> and <https://www.fisheries.noaa.gov/webdam/download/94496063>.

<sup>12</sup> Including the application for the 2015 geophysical survey in the Ross Sea.

<sup>13</sup> Including SIO, Lamont-Doherty Earth Observatory (LDEO), and U.S. Geological Survey (USGS).

<sup>14</sup> Which is discussed at length in the Commission's 15 October 2019 letter.

<sup>15</sup> Resulting in a total ensonified area of 3,741 km<sup>2</sup> rather than 3,000 km<sup>2</sup> as noted in Table 10.

<sup>16</sup> See Table 5 in the *Federal Register* notice.

<sup>17</sup> NSF included the correct ensonified area on page 3 of its application.

<sup>18</sup> NMFS used a proxy source level of 196.2 dB re 1 μPa at 1 m and 20logR propagation loss to yield a Level B harassment zone of 6,456 m.

<sup>19</sup> See attachment D.

- use of the daily ensonified area of 937.87 km<sup>2</sup> rather than the total ensonified area of 9,379.75 km<sup>2</sup> to estimate the Level B harassment takes during ice-breaking activities. Thus, the numbers of Level B harassment takes in Table 13 of the *Federal Register* notice are underestimated by a factor of 10. It is imperative that the Level B harassment zone and ensonified area are based on the operational parameters and that the Level B harassment takes are sufficient.
- omission of a table in the *Federal Register* notice that includes the total number of takes for each species or stock and the percentage of each that could be taken during the proposed activities<sup>20</sup>. This information is essential for evaluating whether NMFS can make the necessary findings under the MMPA.
- omission of the requirement to implement the 500-m exclusion zone for the relevant species and in the relevant circumstances in the shut-down and ramp-up procedure sections of the preamble (84 Fed. Reg. 69974) and in sections 4(e)(ii), 4(e)(iii), 4(e)(v), and 4(f) of the draft authorization<sup>21</sup>. The 500-m exclusion zone would supersede the 100-m zone in all of those sections. It is imperative that the mitigation measures be correct and sufficient to ensure NSF would be effecting the least practicable impact on the affected species or stock.
- underestimation of numbers of Level B harassment takes in Table 1 of the draft authorization as compared to other NSF-related authorizations (e.g., SIO surveys off the Falkland Islands, 84 Fed. Reg. 51920 and Namibia, 84 Fed. Reg. 39200) and based on the potential presence in the project area. Level B harassment takes should have been increased to group size for blue whales, sei whales, strap-toothed and Gray's beaked whales, and long-finned pilot whales and based on known occurrence in the project area for killer whales, humpback whales, and Arnoux's beaked whales and all pinniped species, except elephant seals that were likely vastly overestimated<sup>22</sup>. It is imperative that the number of Level B harassment takes be sufficient to allow NSF to conduct its survey without having to shut down its activities if the authorized number of takes is met.
- inappropriate proposal to authorize fractions of takes in Table 1 of the draft authorization as compared to any other incidental harassment authorization. NMFS does not authorize fractions of takes, it authorizes takes of whole numbers of animals (e.g., 6.77 vs. 7 takes of fin whales)<sup>23</sup>.

NMFS indicated that it would fix some of the aforementioned issues. In some instances, its attempts to do so are still not appropriate. For example, NMFS indicated it would increase the humpback whale density to 0.0001048 whales/km<sup>2</sup>, which is the fin whale density based on Gohl (2010), rather than 0.0001365 whales/km<sup>2</sup> for humpback whales. NMFS also provided its revised take spreadsheet to the Commission. The Commission recalculated the numbers of takes based on the issues that NMFS indicated it would fix, including the fact that 200 km are surveyed per day

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<sup>20</sup> NMFS indicated this table would be included in the notice for the authorization issuance.

<sup>21</sup> NMFS indicated that the notice for the authorization issuance and the final authorization would be amended accordingly.

<sup>22</sup> When density data are scant, not site-specific, or underestimated based on known occurrence of a species in the project area, NMFS routinely uses either group size or anecdotal information on relative presence to inform its take estimates. It then multiplies the estimated number of animals that could be taken on a given day by the number of days of activities.

<sup>23</sup> NMFS indicated it would include takes based on whole numbers in the notice for the authorization issuance and the final authorization.

during the geophysical survey<sup>24</sup> and the ensonified area for ice-breaking activities was underestimated by 10 fold. However, NMFS's revised numbers of takes are still underestimated. NMFS appears to have used reduced ensonified areas based on subtracting the relevant Level A harassment zones from the Level B harassment zones rather than using the full Level B harassment zones<sup>25</sup> to inform the total ensonified area for the geophysical survey. It is unclear by how much the ensonified area would increase if NSF had used the tow depth of 4 m rather than 3 m for the geophysical survey. For ice-breaking activities, NMFS similarly used a reduced ensonified area rather than the 9,379 km<sup>2</sup> as specified in Table 12 of the *Federal Register* notice. It appears that NMFS originally used an incorrect trackline length per day for estimating the ensonified area for Level B harassment during ice-breaking activities. Table 12 of the *Federal Register* notice indicated that 62.50 km could be transited per day during ice-breaking activities and that the activities could occur on each day. However, Attachment D of NSF's application indicated that ice breaking would not exceed 445 km. Thus, 55.63 km of ice-breaking could occur on each of the survey days<sup>26</sup>, not 62.50 km as included in Table 12. In NMFS's revised calculations, it assumed that all ice-breaking activities would occur on two days for up to 222.5 km per day plus the 25-percent contingency, which would result in a smaller total ensonified area of 7,509 km<sup>2</sup>. If ice-breaking activities could occur on any of the planned eight survey days or either of the two contingency days, then NMFS's revised total ensonified area has again been underestimated.

In addition, NMFS indicated that it would increase the various cetacean takes to the relevant group size. Those adjustments still are insufficient. For example, NMFS proposed to authorize two takes of blue whales and two of humpback whales, which are less than those authorized for other NSF-related authorizations for the same species<sup>27</sup>. NMFS noted in the *Federal Register* notice that 44 humpback whales were observed in the Amundsen Sea based on Gohl (2010; 84 Fed. Reg. 69955). More humpback whales were sighted in the Amundsen Sea than any other cetacean except minke whales. Yet NMFS is proposing to authorize only two humpback whale takes, which is the least number of takes for any cetacean species. The Commission also is not convinced that the number of takes of killer whales<sup>28</sup> is sufficient. Gohl (2010) observed multiple pods of killer whales near the ice shelf in the Amundsen Sea<sup>29</sup>.

In response to the Commission's informal assertion that the pinniped takes were vastly underestimated<sup>30</sup> based on data provided by NMFS in the *Federal Register* notice from Gohl (2010) and based on the known distribution of the species in Antarctica, NMFS did not include takes of Ross seals at all, rounded the leopard seal takes to 1, increased the Weddell seal takes from 1 to 5,

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<sup>24</sup> Equating to 130 km of tracklines that would occur in intermediate water and 70 km of tracklines in deep water.

<sup>25</sup> When NMFS does not authorize Level A harassment takes, the Level B harassment takes are based on the entire Level B harassment zone, *not* the Level B harassment zone minus the Level A harassment zone (see Table 9 for SIO's survey off the Falkland Islands; 84 Fed. Reg. 54860).

<sup>26</sup> Resulting in an ensonified area of 8,492 km<sup>2</sup>.

<sup>27</sup> Group size estimates were used as the basis for 3 takes of blue whales (84 Fed. Reg. 60068 and 84 Fed. Reg. 54860) and 20 takes of humpback whales (84 Fed. Reg. 60068), some of which are from the same references.

<sup>28</sup> Either the 16 takes calculated by NMFS or the 19 takes calculated by the Commission.

<sup>29</sup> Gohl (2010) noted that one pod of four killer whales was observed from the vessel and three others were observed from the helicopter. It is unclear if three pods or three whales were observed from the aircraft though.

<sup>30</sup> The densities used were vast underestimations, as NMFS assumed the sightings were relative to the estimated area of the Amundsen Sea continental shelf (315,000 km<sup>2</sup>) rather than the effective area surveyed (i.e., an effective strip width of less than 1 km and the linear kilometers of tracklines surveyed) and NMFS did not correct the sightings based on a haul-out correction factor or incorporate  $g(0)$  or  $f(0)$  values.

and rounded the crabeater seal takes to 85. As noted by NMFS, crabeater seals were the most frequently observed pinniped—2,400 crabeater seals were observed by Gohl (2010) in the Amundsen Sea, followed by 40 Weddell seals, 15 leopard seals, and 4 Ross seals (84 Fed. Reg. 69957). However, Gohl (2010) also indicated that the numbers of those three species were likely underestimates, due to the difficulty of detecting them intermingled in groups of 100 or more crabeater seals. Conversely, southern elephant seals were not observed by Gohl (2010) in the Amundsen Sea and yet NMFS plans to authorize 11,570 takes of southern elephant seals. The numbers of takes of pinnipeds known to occur in the Amundsen Sea have been vastly underestimated and could limit NSF's ability to complete its survey if the numbers NMFS authorizes are met.

For all of these reasons, the Commission recommends that NMFS (1) specify in the *Federal Register* notice whether NSF's activities would occur in international waters, the deepest water depth in which the geophysical survey would occur, and the parameters and methods used to estimate the Level B harassment zone for ice-breaking activities; (2) use the humpback whale density of 0.001365 whales/km<sup>2</sup> based on Gohl (2010) to re-estimate the numbers of takes for the geophysical survey and ice-breaking activities; (3)(a) revise the (i) Level A and B harassment zones for the geophysical survey based on a tow depth of 4 m rather than 3 m *or* restrict the airguns from being towed at a depth of more than 3 m and (ii) ensonified areas for Level B harassment based on transiting 200 km rather than 160 km per day during the geophysical survey and (b) use the total ensonified area<sup>31</sup> for Level B harassment to re-estimate the numbers of takes for the geophysical survey; (4) if ice-breaking activities could occur on any of the survey days, use the total ensonified area of 8,491 km<sup>2</sup> to estimate the numbers of Level B harassment takes but if ice-breaking activities are expected to occur for two straight days, use the reduced ensonified area<sup>32</sup> of 7,409 km<sup>2</sup> to estimate the numbers of Level B harassment takes; and (5) increase the numbers of Level B harassment takes to at least 3 blue whales, 40 humpback whales<sup>33</sup>, 40 killer whales<sup>34</sup>, 2,000 crabeater seals, 100 Weddell seals, 50 leopard seals, and 10 Ross seals<sup>35</sup> based on group size and documented occurrence in the Amundsen Sea.

Similar to other recent authorizations, the Commission asserts that action proponents should be keeping a running tally of the total Level B harassment takes to ensure that the authorized limits are not exceeded. Action proponents also should be extrapolating in real time the observed number of takes to the unobserved portions of the Level B harassment zones to estimate the total number of takes. That approach should only need to be implemented for ice-breaking activities in which the Level B harassment zone extends to more than 6 km. As such, the Commission recommends that NMFS (1) include in the notice and final authorization, if issued, the requirement to extrapolate Level B harassment takes to the unobserved portions of the Level B

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<sup>31</sup> Not the area(s) that have been reduced by the Level A harassment zones or associated ensonified areas.

<sup>32</sup> Assuming the 25-percent contingency.

<sup>33</sup> Based on a group of four whales being taken on each of the 10 days. Gohl (2010) did not specify the group size of humpback whales observed in the Amundsen Sea, but Thiele et al. (2004) documented group size of up to four humpback whales in a given group off the western Antarctic Peninsula.

<sup>34</sup> Based on a pod of four whales being taken on each of the 10 days. Gohl (2010) documented group size of up to four killer whales in a single pod in the Amundsen Sea.

<sup>35</sup> The numbers of pinniped takes were based on the relative occurrence of the various species based on Gohl (2010). 200 crabeater seals, 10 Weddell seals, 5 leopard seals, and 1 Ross seal could be taken on each of the 10 days of activities.

harassment zone and (2) ensure that NSF keeps a running tally of total Level B harassment takes based on both observed and extrapolated takes.

### **Ongoing general concerns**

The Commission has repeatedly expressed concern over errors, inconsistencies, and omissions in applications, *Federal Register* notices, and proposed authorizations involving NSF-related surveys. All of the proposed authorizations involving NSF-related surveys in the last year and a half have included incorrect densities or group sizes, errors in the estimated numbers of Level A and/or B harassment takes, and incomplete, incorrect, or inconsistent mitigation, monitoring, or reporting requirements in the proposed authorizations. Some of those authorizations also included incorrect extents of the Level A and B harassment zones and/or ensonified areas. All of these issues have been noted herein for NSF's survey in the Amundsen Sea. More concerning for this proposed authorization is the apparent lack of review of the draft notice and authorization by NMFS based on the conspicuous errors, such as authorizing fractions of takes in the draft authorization and inclusion of NMFS's user spreadsheet in the *Federal Register* notice. The presence of these simple and obvious errors casts doubt on whether NMFS undertook an adequate level of technical review to determine the sufficiency of the information provided.

Full and transparent public review has not occurred, as the public is unaware of the various issues raised by the Commission. Further complicating this is the fact that NMFS never made available to the public by posting on its website, NSF's application, the draft authorization, or any other related documents<sup>36</sup>. Moreover, it took NMFS more than three weeks to respond to the Commission's informal comments, which were provided to NMFS *the day* the notice published, effectively truncating the public comment period to one week. Based on the responses received from NMFS, many of the Commission's comments remain unresolved. The Commission has repeatedly recommended that NMFS conduct a more thorough review of applications and *Federal Register* notices to ensure not only accuracy, completeness, and consistency, but also to ensure that they are based on best available science, prior to submitting them to the *Federal Register* for public comment. If NMFS continues to publish proposed authorizations with such inadequate or incomplete review, the Commission will recommend denial of the authorizations outright or that NMFS refrain from issuing the authorizations until the issues are addressed, the authorizations are revised and republished, and the public is able to comment on a complete and accurate proposed authorization.

The Commission has pointed out both formally and informally that it can take NMFS more than one week to post the relevant documents that accompany *Federal Register* notices on its website for public comment. NMFS is notified days in advance that a *Federal Register* notice is set to publish. Thus, there is no reason why the documents cannot be posted on the website the day the notice publishes. The fact that the documents for NSF's proposed authorization were never posted is wholly unacceptable. The Commission recommends that NMFS post on its website the day a draft authorization publishes in the *Federal Register* notice to solicit public comment, the application, the draft incidental harassment authorization, any hydroacoustic or marine mammal monitoring plans, its list of references, previous monitoring reports, and any other related documents.

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<sup>36</sup> Only the *Federal Register* notice was provided on NMFS's website, <https://www.fisheries.noaa.gov/action/incidental-take-authorization-thwaites-offshore-research-thor-project-amundsen-sea-antarctica>



### Subpar modeling methodology

In addition to the other issues stipulated herein, the modeling approach used by NSF is subpar. For nearly a decade, the Commission has raised concerns regarding LDEO's model used by NSF to estimate the extent of the Level A and B harassment zones and the numbers of marine mammal takes and has provided extensive comments regarding the inappropriateness of that model and LDEO's other 'modeling' approaches<sup>37</sup>. LDEO uses the Nucleus source model and a simple ray trace-based modeling approach that assumes spherical spreading, a constant sound speed, and no bottom interactions for surveys in deep water (Diebold et al. 2010). LDEO's model is essentially a MATLAB algorithm that truncates the radii at 2,000 m in depth. Environmental conditions, including the presence of a surface duct, in-water refraction, and bathymetry and sediment characteristics are *not* accounted for in LDEO's modeling approach.

In its most recent letter regarding this matter, the Commission recommended that NMFS specify (1) why it believes that sound channels with downward refraction, as well as seafloor reflections, are not likely to occur during the geophysical survey and (2) the degree to which both of those parameters would affect the estimation (or underestimation) of Level B harassment zones in deep and intermediate water. NMFS responded that LDEO's approach to modeling is generally conservative as supported by data collected from calibration and other field data along with modeling results (84 Fed. Reg. 60060). In fact, the calibration and field data have not been collected in deep water *anywhere outside of the Gulf of Mexico* and have not been sufficient to draw conclusions for intermediate water *anywhere*, including the Gulf of Mexico<sup>38</sup>. Thus, NMFS's assertion that the model is conservative is unsubstantiated.

NMFS further indicated that LDEO's approach does not rely on incorporating *every possible* environmental factor in the marine environment and, while sound channels with downward refraction or seafloor refractions could potentially occur, it disagrees with the Commission that these features need be addressed explicitly through the model given the conservative approach taken (84 Fed. Reg. 60060). LDEO's model includes *zero* environmental factors and the presumption that the model is conservative *beyond the Gulf of Mexico* for deep water has not been substantiated. Furthermore, LDEO's arbitrary correction factor of 1.5 for intermediate water has never been substantiated *at any location*. The fact of the matter is that NMFS did not actually address the Commission's recommendation and the conservative nature of the model is an unsubstantiated claim for both deep and intermediate waters, particularly in Antarctica<sup>39</sup>. NSF's own programmatic environmental impact statement (PEIS) for geophysical surveys notes that a broad sound speed minimum occurs at depths between approximately 200 and 1,200 m during austral summer, likely resulting in channeling of sound in this layer (Appendix B in the PEIS). Thus, the sound could travel much farther than predicted by LDEO's model.

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<sup>37</sup> Which should be reviewed in conjunction with this letter (see the Commission's [15 October 2019 letter](#)) and are not reiterated herein.

<sup>38</sup> See Tolstoy et al. 2004, Diebold et al. 2006, Tolstoy et al. 2009, Diebold et al. 2010, Crone et al. 2014, Crone et al. 2017, which are used to support NMFS's supposition that LDEO's modeling approach is conservative (84 Fed. Reg. 54851).

<sup>39</sup> LDEO's modeling approach has been shown to be conservative only in shallow water (up to 200 m in depth), where it has vastly overestimated the Level B harassment zones. The model has provided comparable results in deep water in the Gulf of Mexico.



The Commission again underscores the need for NMFS to hold NSF and its entities to the same standard as other action proponents (e.g., Bureau of Ocean Energy Management, the oil and gas industry, the renewable energy industry, U.S. Navy, U.S. Air Force). LDEO's modeling approach does not represent the best available science, and as such the Commission recommends that NMFS require LDEO to (1) either re-estimate the proposed Level A and B harassment zones and associated takes of marine mammals using (a) both operational (including number/type/spacing of airguns, tow depth, source level/operating pressure, operational volume) and site-specific environmental (including sound speed profiles, bathymetry, and sediment characteristics<sup>40</sup> at a minimum) parameters, (b) a comprehensive source model (e.g., Gundalf Optimizer) and (c) an appropriate sound propagation model (e.g., BELLHOP) for the proposed incidental harassment authorization *or* (2) collect or provide the relevant acoustic data to substantiate that its modeling approach is conservative for both *deep* and *intermediate* waters beyond the Gulf of Mexico.

In two of its most recent letters regarding this matter, the Commission recommended that NMFS (1) specify why it believes that LDEO's model and other 'modeling' approaches provide more accurate, realistic, and appropriate Level A and B harassment zones than BELLHOP and (2) explain, if LDEO's model and other 'modeling' approaches are considered best available science, why other action proponents that conduct seismic surveys are not implementing similar methods particularly given the simplicity of LDEO's approaches. Similar to the Commission's recommendations regarding the effects of environmental parameters, NMFS did not respond to these recommendations, nor did it even include the BELLHOP model in its response (84 Fed. Reg. 54851 and 60061). Section 202(d) of the MMPA requires that any recommendations which are not followed or adopted shall be referred to the Commission together with a *detailed explanation* of the reasons those recommendations were not followed or adopted. The Commission has not received separate, detailed responses to its recommendations on these matters. Thus, the Commission again recommends that NMFS (1) explain why it believes that sound channels with downward refraction, as well as seafloor reflections, are not likely to occur during the geophysical survey *and* (2) specify the degree to which both of those parameters would affect the estimation (or underestimation) of Level B harassment zones in deep and intermediate water. The Commission also again recommends that NMFS (1) explain why it believes that LDEO's model and other 'modeling' approaches provide more accurate, realistic, and appropriate Level A and B harassment zones than BELLHOP, particularly for deep and intermediate water and (2) explain, if LDEO's model and other 'modeling' approaches are considered best available science, why other action proponents that conduct seismic surveys are not implementing similar methods particularly given their simplicity.

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

NMFS has indicated that it may issue a one-year incidental harassment authorization renewal for this and other future authorizations if various criteria are met and after an expedited public comment period of 15 days. The Commission and various other entities (e.g., 84 Fed. Reg. 31035 and 52466) have asserted and continue to consider that the renewal process is inconsistent with the statutory requirements under section 101(a)(5)(D) of the MMPA. As such, the

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<sup>40</sup> Those data can be obtained from the National Geophysical Data Center, Leviticus, and the U.S. Navy Oceanographic and Atmospheric Master Library's databases including Generalized Digital Environmental Model, Digital Bathymetric Database Variable-Resolution, Surface Marine Gridded Climatology.

Commission recommends that NMFS refrain from issuing renewals for any authorization and instead use its abbreviated *Federal Register* notice process. That process is similarly expeditious and fulfills NMFS's intent to maximize efficiencies.

Over the past few years, NMFS informed the Commission that a renewal would be issued as a one-time opportunity, after which time a new authorization application would be required. NMFS also has included such verbiage in its response to comments regarding renewals. Specifically, NMFS indicated that it had modified the language for future proposed incidental harassment authorizations to clarify that all authorizations, including renewal authorizations, are valid for no more than one year and that the agency will consider *only one renewal* for a project at this time (e.g., 84 Fed Reg. 36892 from 30 July 2019). However, NMFS has yet to stipulate that the agency will consider *only one renewal* or that a renewal is a *one-time opportunity* in any *Federal Register* notice requesting comments on the possibility of a renewal, on its webpage detailing the renewal process<sup>41</sup>, or in any draft or final authorization that includes a term and condition for a renewal (including section 8 of the NSF's draft authorization).

In response to the Commission's 29 November 2019 letter recommending that NMFS stipulate those specifics in the relevant documents and on its webpage, NMFS indicated that, in the 'summary' portion of its notices, it requests comments on a possible *one-year renewal* that could be issued under certain circumstances and if all requirements are met (84 Fed. Reg. 68131). However, neither the notices nor the webpage or final authorizations state that *one-year renewals are one-time opportunities*. NMFS also indicated that, for notices involving proposed renewals, it has not included an option of an additional renewal (84 Fed. Reg. 68131). Absent specifics regarding one-year renewals being a one-time opportunity in the *Federal Register* notices, on NMFS's webpage, and more importantly as a term and condition in its draft and final authorizations, NMFS appears to knowingly allow that door to remain open. If NMFS chooses to continue proposing to issue renewals, the Commission recommends that it (1) stipulate that a renewal is a *one-time opportunity* (a) in all *Federal Register* notices requesting comments on the possibility of a renewal, (b) on its webpage detailing the renewal process, and (c) in all draft and final authorizations that include a term and condition for a renewal and, (2) if NMFS refuses to stipulate a renewal being a one-time opportunity, justify why it will not do so in its *Federal Register* notices, on its webpage, and in all draft and final authorizations.

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

Sincerely,



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

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<sup>41</sup> <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-harassment-authorization-renewals>

## References

- Crone, T.J., M. Tolstoy, and H. Carton. 2014. Estimating shallow water sound power levels and mitigation radii for the R/V *Marcus G. Langseth* using an 8 km long MCS streamer. *Geochemistry, Geophysics, Geosystems* 15. <http://doi:10.1002/2014GC005420>.
- Crone, T.J., M. Tolstoy, and H. Carton. 2017. Utilizing the R/V *Marcus G. Langseth's* streamer to measure the acoustic radiation of its seismic source in the shallow waters of New Jersey's continental shelf. *PloS ONE* 12(8):e0183096. <http://doi.org/10.1371/journal.pone.0183096>.
- Diebold, J.B., M. Tolstoy, P.J. Barton, and S.P. Gulick. 2006. Propagation of exploration seismic sources in shallow water. *Eos, Transactions, American Geophysical Union* 87(36), Joint Assembly, Abstract OS41A-03. 23–26 May, Baltimore, Maryland.
- Diebold, J.B., M. Tolstoy, L. Doermann, S.L. Nooner, S.C. Webb, and T.J. Crone. 2010. R/V *Marcus G. Langseth* seismic source: Modeling and calibration. *Geochemistry, Geophysics, Geosystems* 11(12):Q12012. doi:10.1029/2010GC003216.
- Gohl, K. 2010. The expedition of the research vessel "Polarstern" to the Amundsen Sea, Antarctica, in 2010 (ANT-XXVI/3). Reports on Polar and Marine Research, Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany. 173 pages.
- Tolstoy, M., J. Diebold, S.C. Webb, D.R. Bohnstiehl, E. Chapp, R.C. Holmes, and M. Rawson. 2004. Broadband calibration of the R/V *Ewing* seismic sources. *Geophysical Research Letters* 31:L14310. doi:10.1029/2004GL020234.
- Tolstoy, M., J. Diebold, L. Doermann, S. Nooner, S.C. Webb, D.R. Bohnstiehl, T.J. Crone, and R.C. Holmes. 2009. Broadband calibration of R/V *Marcus G. Langseth* four-string seismic sources. *Geochemistry, Geophysics, Geosystems* 10:Q08011. doi:10.1029/2009GC002451.
- Thiele, D., E.T. Chester, S.E. Moore, A. Širovic, J.A. Hildebrand, and A.S. Friedlaender. 2004. Seasonal variability in whale encounters in the Western Antarctic Peninsula. *Deep-Sea Research II* 51:2311–2325.