



MARINE MAMMAL COMMISSION

15 October 2019

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 Scripps Institution of Oceanography (SIO)¹ 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 South Atlantic Ocean in November and December 2019. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 30 September 2019 notice² announcing receipt of the application and proposing to issue the authorization, subject to certain conditions (84 Fed. Reg. 51886).

Background

SIO proposes to conduct a low-energy geophysical survey in international waters in the South Atlantic Ocean. The purpose of the survey is to investigate volcanic and tectonic development of the Walvis Ridge and Rio Grande Rise and to support a future International Ocean Discovery Program project. The survey would be conducted with either a single airgun or a two-airgun array³ and a single 200-m to 1.6-km hydrophone streamer⁴ along approximately 2,175 km of tracklines. The R/V *Thomas G. Thompson* (*Thompson*) would operate the airgun arrays at a tow depth of 2 to 4 m in waters 500 to 5,700 m in depth. In addition, the *Thompson* would operate a multibeam echosounder and subbottom profiler. The survey could occur on up to 14 days, with an additional 3.5 days for operational contingencies (i.e., weather delays, equipment failure, etc.).

NMFS preliminarily has determined that the proposed activities could cause Level A and/or 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 mitigation measures provide the means of effecting the least practicable impact on the affected

¹ And funded by the National Science Foundation (NSF).

² The Commission notes that NMFS published responses to previous Commission recommendations regarding another SIO geophysical survey one business day before this letter was sent to NMFS. As such, NMFS's responses were not able to be considered for this letter.

³ With a maximum discharge volume of 90 in³.

⁴ Portions of the survey would operate at 5 knots, while the other portion would operate at 8 knots.

species or stocks. Those measures include (1) using protected species observers to monitor the Level A⁵ and B harassment zones for 30 minutes before, during, and for 60 minutes⁶ after the survey, (2) implementing speed and course alterations, and (3) using shut-down⁷ and ramp-up procedures. In addition, SIO would shut down the airguns immediately if (1) a beaked whale, *Kogia* spp., or southern right whale, (2) a large whale⁸ with a calf, or (3) an aggregation⁹ of large whales is observed within 500 m of the *Thompson*. Ramp-up procedures would not be initiated until the animal(s) has not been seen for 30 minutes. LDEO would report any injured or dead marine mammal to NMFS's Office of Protected Resources using its phased approach.

Similar to NMFS's omission of the standard post-activity monitoring requirement of 60 minutes from the preamble, NMFS did not consistently include the 30-minute clearance time requirement for dwarf and pygmy sperm whales, Risso's dolphins, and/or pilot whales in the preamble or proposed authorization. The *Federal Register* notice did not stipulate that the 30-minute requirement applied to Risso's dolphins or pilot whales (84 Fed. Reg. 51922). Sections 4.e.i.B and 4.e.iii of the proposed authorization are missing pilot whales. In addition, section 4.e.ii of the proposed authorization needs to specify that the 30-minute clearance time applies to dwarf and pygmy sperm whales and Risso's dolphins, as they are considered 'small cetaceans' for which the 15-minute clearance time would apply. The Commission already noted these issues informally. And, although NMFS indicated that the preamble to and the final authorization would be amended accordingly, the Commission has identified similar errors regarding standard mitigation and monitoring measures in other recent proposed authorizations for NSF-funded surveys. These issues should be recognized and addressed prior to NMFS publishing the proposed authorization in the *Federal Register*.

Flaws in modeling methodology

For more than 9 years, the Commission has raised concerns regarding Lamont-Doherty Earth Observatory's (LDEO) model used by SIO 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 model¹⁰ and LDEO's other 'modeling' approaches. 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, even though the survey in this instance would occur in waters up to 5,700 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.

⁵ And a standard exclusion zone of 100 m.

⁶ The Commission informally noted that this standard requirement was omitted from the preamble but was included in the proposed authorization. NMFS indicated the requirement would be included in the preamble to the final authorization.

⁷ Shut downs would not be required for small delphinids (*Delphinus* spp., *Tursiops* spp., *Stenella* spp., *Steno* spp., *Lissodelphis* spp., *Lagenorhynchus* spp., and *Lagenodelphis* spp.) that are traveling and voluntarily approaching the source vessel to interact with the vessel and/or airgun array.

⁸ A sperm whale or mysticete.

⁹ Six or more individuals that do not appear to be traveling and are feeding, socializing, etc.

¹⁰ Which should be reviewed in conjunction with this letter (see the Commission's [2 May 2016 letter](#)) and are not reiterated herein.

Many studies, including multiple LDEO-associated studies (Tolstoy et al. 2004, Diebold et al. 2006, Tolstoy et al. 2009, Diebold et al. 2010, and Crone et al. 2014 and 2017), have emphasized the importance of incorporating site-specific environmental and operational parameters into estimating Level A and B harassment zones that could very well be underestimated in deep water by LDEO's model. For example, Tolstoy et al. (2009) noted the effect that the sound speed profile had on refracting the sound downward in the Gulf of Mexico, and NSF's Programmatic Environmental Impact Statement regarding marine seismic research described even more prevalent sound channels with downward refraction at both the mid-Atlantic Ridge and sub-Antarctic sites (Appendix B), similar to SIO's survey site. Tolstoy et al. (2009) also indicated that only the direct arrivals were included in the analysis of the deep-water site and that seafloor reflections, which may become significant at greater distances, were not considered. Thus, the harassment zones may in fact not be sufficient, which is alluded to in Diebold et al. (2006) as well. For deep and intermediate water depths, NMFS has additionally stated that LDEO's in-situ measurements cannot be used to readily derive Level A and Level B harassment zones because the calibration hydrophone was located at a roughly constant depth of 350–500 m, which likely did not intersect all the sound pressure level (SPL) isopleths at their widest point (Tolstoy et al. 2004). Therefore, in intermediate waters (100–1,000 m), LDEO assumes 1.5 times the estimated Level B harassment zones in deep water. Based on these shortcomings, the Commission recommends that NMFS specify (1) why it believes that sound channels with downward refraction, as well as seafloor reflections, are not likely to occur during SIO's 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 depths.

More than 35 Commission letters on this matter have yet to sway NSF to follow methods that are widely agreed to constitute the best available science. LDEO's modeling approach has not changed in more than a decade and the refusal to change appears to contradict NSF's mission to *advance the progress of science*. In more recent years, several stakeholders¹¹ have expressed similar concerns regarding the inappropriateness of LDEO's modeling methods to no avail (80 Fed. Reg. 67713).

Three years ago, these issues were further complicated with finalization of NMFS's updated acoustic thresholds for permanent threshold shift (i.e., Level A harassment). LDEO continues to claim that its model cannot incorporate more than a single shot and thus cannot readily estimate ranges to the cumulative sound exposure level (SEL_{cum}) thresholds. To estimate the Level A harassment zones, LDEO computed 'modified' frequency-weighted, farfield source levels, which are essentially back-calculated source levels¹² based on the distance to the relevant frequency-weighted Level A harassment threshold for a single shot. LDEO similarly estimated modified farfield source levels for peak sound pressure levels (SPL_{peak}), which also are back-calculated source levels based on the distance to the Level A harassment threshold for a single shot. For the two-airgun array operating at an 8-m separation, NMFS denoted the SPL_{peak} source levels as N/A for mid-frequency (MF) cetaceans and otariids in Table 6 of the *Federal Register* notice. NMFS indicated that the maximum SPL_{peak} source level is 221 dB re 1 µPa, which is below the thresholds for MF cetaceans and otariids, and thus it could not provide radial distances¹³ (84 Fed Reg. 51916).

¹¹ Natural Resources Defense Council and Whale and Dolphin Conservation.

¹² Assuming spherical propagation loss.

¹³ i.e., isopleths.

Unfortunately, this could not be confirmed since SIO did not include the relevant isopleths for the 8-m airgun separation in Figures A-13 and 14 of the application¹⁴. As such, the Commission recommends that NMFS ensure that the relevant isopleth figures are included and resulting SPL_{peak} and SEL_{cum} source levels, modified source levels, and related adjustment factors¹⁵ are specified in all future NSF-funded and -affiliated¹⁶ applications prior to processing them.

The Commission is unaware of any other seismic operators using such a circuitous approach to estimate harassment zones for either metric. Generally, source levels are inputs to models rather than products of those models, and the sound field from spatially-distributed sources (e.g., airgun arrays) is modeled as sums of point sources, under the assumption that individual airgun pressures do not substantially influence each other. Such an approach is straightforward, easy to implement, and accounts for both the ‘near-field’ and ‘far-field’ effects. Another shortcoming of LDEO’s modeling approach is that its source model cuts off spectral levels at 2.5 to 3 kHz. Since airguns emit energy above 3 kHz, the frequency limits of Nucleus would affect the estimated ranges to the Level A harassment thresholds for various species (including MF and high-frequency (HF¹⁷) cetaceans). Other source models (including Gundalf Optimizer¹⁸ and JASCO’s Airgun Array Source Model (AASM)) provide sound levels into the HF range and should have been used.

The use of modified farfield source levels and truncated spectra further supports the Commission’s continued recommendation that NMFS require LDEO and other affiliated entities to revise their source and sound propagation modeling methodologies. The Commission again underscores the need for NMFS to hold LDEO, NSF, and affiliated 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), as LDEO’s model does not represent the best available science. Thus, the Commission again recommends that NMFS require LDEO to re-estimate the proposed Level A and B harassment zones and associated takes of marine mammals using (1) 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 characteristics¹⁹ at a minimum) parameters, (2) a comprehensive source model (i.e., Gundalf Optimizer) and (3) an appropriate sound propagation model (i.e., BELLHOP) for the proposed incidental harassment authorization.

Specifically, the Commission reiterates that LDEO should be using the ray-tracing sound propagation model BELLHOP—which is a free, standard propagation code that readily incorporates all environmental inputs listed herein, rather than the limited, in-house MATLAB code currently in use. Although the Commission has recommended that LDEO use BELLHOP for

¹⁴ SIO again included the figures for two airguns in the 2-m gun separation configuration rather than the 8-m gun separation configuration.

¹⁵ Table A-3 of SIO’s Appendix did not specify the adjustment factor of -24.57 for phocids, which is based on the modified SEL_{cum} source level of 206.86 dB re 1 μ Pa²-sec and results in the 0.1 m zone stated in Table 7 of the *Federal Register* notice.

¹⁶ Including U.S. Geological Survey (USGS).

¹⁷ Particularly since the Level A harassment threshold is 155 dB re 1 μ Pa²-sec.

¹⁸ <https://www.gundalf.com/environmental/>

¹⁹ 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.

several years, NMFS has yet to address the Commission's assertion that BELLHOP should be used in lieu of LDEO's model or any of the Commission's more recent points regarding the continued use of LDEO's model and other 'modeling' approaches. The Commission recommends 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 their simplicity.

Density estimates

SIO used various datasets to inform its density estimates (see Appendix B of SIO's application for specifics). Some of the datasets originated from coastal and shelf environments and others originated from the North Atlantic Ocean rather than the middle of the South Atlantic Ocean where the proposed survey would occur primarily in deep waters. The Commission understands that density data are not available for all areas where, or times when, activities may occur and that even when such data are available the densities could be underestimated if associated coefficients of variation (CVs) are large. However, the Commission continues to believe that action proponents should use the best available density estimate plus some measure of uncertainty (e.g., mean plus two standard deviations, mean plus the CV, the upper limit of the confidence interval) in those instances.

NMFS's response to the Commission's recommendation in its [1 May 2019 letter](#)²⁰ regarding incorporating uncertainty in density estimates mischaracterized the facts. First, NMFS indicated that uniformly adjusting densities upward based on uncertainty *in every situation* will result in overestimates of take (and an unrealistic associated analysis; 84 Fed. Reg. 27247). The Commission has never recommended that uncertainty be incorporated in density estimates for *all* NSF-funded or -affiliated geophysical surveys. The Commission encourages NMFS to review previous Commission letters, including its two most recent letters from July and August 2019 and July²¹ and May 2018. The Commission further notes that the Navy incorporates uncertainty associated with its densities²² in *all* of its take estimates for Phase III training and testing activities (Department of the Navy 2017). It is curious how NMFS asserts that incorporating uncertainty in NSF-funded and -affiliated surveys is unrealistic but supports it wholeheartedly for Navy testing and training activities. Second, NMFS asserted that marine mammal observations during the activities conducted under the previous NSF-funded surveys in no way suggest that the surveys are resulting in unauthorized numbers of takes (84 Fed. Reg. 27247). As described in detail herein, the numbers of takes reported during NSF-funded and -affiliated surveys do not reflect the total numbers of marine mammals taken. Thus, NMFS's assertion is unfounded.

NMFS has indicated in the *Federal Register* notice that SIO's assumed 25-percent contingency accounts for both the possibility of additional seismic operations associated with airgun testing and repeat coverage of any areas where initial data quality is sub-standard *and* the recognition of the uncertainties in the density estimates (84 Fed. Reg. 51921). The latter rationale seems disingenuous

²⁰ Regarding another NSF-funded survey.

²¹ From 2 July.

²² And group size.

given that for a decade or more LDEO has included a 25-percent contingency based solely on conducting additional seismic activities and has only added the reasoning regarding uncertainty in density estimates in recent years.

The Commission has repeatedly recommended that NMFS provide policy or other guidance that sets forth a consistent approach for how action proponents should incorporate uncertainty in density estimates, particularly for NSF-funded and -affiliated geophysical surveys. In response to those recommendations, NMFS indicated *in 2013* that it was evaluating available density information and working on guidance that would outline a consistent approach for addressing uncertainty in specific situations where certain types of data are or are not available (78 Fed. Reg. 57354). It has been six years and no progress has been made to resolve this issue. In that time, the token 25-percent contingency has continued to be used in lieu of any additional correction factors.

In response to the Commission's recommendation in its May 2019 letter that NMFS convene a working group of scientists (including those from NMFS's science centers and academia) to determine how best to incorporate uncertainty in density data²³ in the near term, NMFS indicated that it may consider future action to address these issues. However, it currently intends to address these questions through ongoing interactions with the U.S. Navy (the Navy), academic institutions, and other research organizations (84 Fed. Reg. 27247). As the Commission stated in its May 2019 letter, the Navy has funded the University of St. Andrews and other collaborators to investigate various aspects of density surface modeling, including extrapolated densities, through its DenMod working group. However, products from the DenMod working group will not be available until December 2021 at the earliest, and this issue needs to be resolved before that time. By the time those results are available, this issue will have been unresolved for a decade. Furthermore, the Commission is not convinced that the products of the DenMod working group will be directly applicable to NSF-funded and -affiliated surveys. Neither NSF nor its contractors develop density surface models to inform their extrapolated densities, and DenMod is not developing those types of models in areas where NSF-funded and -affiliated surveys generally occur²⁴. Therefore, the Commission recommends that, in the next six months, NMFS develop a policy regarding how uncertainty should be incorporated in density estimates that have been extrapolated from other areas and other seasons and specify what adjustments (i.e., CVs, standard deviations, blanket correction factors) should be used for NSF-funded and -affiliated surveys.

Take estimates

NMFS underestimated the numbers of Level B harassment takes for numerous species. For Antarctic and common minke whales, short-beaked common dolphins, pygmy sperm whales, dwarf sperm whales and hourglass dolphins, Level A harassment takes were estimated²⁵. However, none of those species is not expected to be taken by Level A harassment during the proposed survey because of the small size of the Level A harassment zones²⁶. As has been standard practice, the

²³ Beyond those methods that can be used for extrapolating data from neighboring regions and are analytically intensive, such as Mannocci et al. (2017).

²⁴ The models are being developed primarily for U.S. Navy training and testing areas (<https://synergy.st-andrews.ac.uk/denmod/>).

²⁵ This results from NMFS's policy of summing takes across days before rounding.

²⁶ Less than or equal to 7 m for low-frequency cetaceans, 1 m for MF cetaceans, and 35 m for high-frequency cetaceans.

calculated Level A harassment takes should have been added to the calculated Level B harassment takes to determine the total number of Level B harassment takes²⁷ (see Table 11 of the most recent SIO proposed survey off the Falkland Islands; 84 Fed. Reg. 39920).

In addition, NMFS indicated in Table 11 of the *Federal Register* notice that it increased the estimated Level B harassment takes to mean group size based on the largest group size from Weir (2011²⁸), Di Tullio et al. (2016), or Bradford et al. (2017) for various species including Clymene dolphins, killer whales and false killer whales. However, mean group size of Clymene dolphins was 122, killer whales was 8, and false killer whales was 35 based on Di Tullio et al. (2016)—those estimates are greater than the proposed number of Level B harassment takes of 35 Clymene dolphins, 5 killer whales, and 19 false killer whales. The Commission informally identified these issues, and NMFS has indicated that the Level B harassment takes would be revised accordingly in the final authorization. However, the Commission believes that these issues should be recognized and addressed prior to NMFS publishing the proposed authorization in the *Federal Register*.

Monitoring measures

The Commission maintains that the monitoring and reporting requirements adopted under section 101(a)(5) of the MMPA need to be sufficient to provide a reasonably accurate assessment of the manner of taking and the numbers of animals taken incidental to the specified activity. Those assessments should account for all animals in the various survey areas, including those animals directly on the trackline that are not detected and how well animals are detected based on the distance from the observer, which is achieved by incorporating $g(0)$ and $f(0)$ values²⁹, and those animals that are not detected during nighttime hours. In response to previous Commission letters regarding this matter, NMFS requested that the Commission develop a method to improve post-survey reporting requirements—the Commission provided NMFS with that method in 2016 (see the Addendum in the Commission’s 1 May 2019 letter).

Since that time, NMFS agreed to use the Commission’s method to better estimate the numbers of marine mammals taken by Level A and B harassment during numerous geophysical surveys. NMFS also indicated that it welcomed LDEO’s input on a method to generate a similar quantitative method but, in the absence of a new method, recommended that LDEO use the Commission’s method for its geophysical surveys (84 Fed. Reg. 27249 and 35076). Although NMFS has included requirements for the action proponents to refine the total numbers of animals taken for quite some time, LDEO, SIO, and other NSF-affiliated entities³⁰ do not appear to have complied with those requirements, particularly in recent years. The numbers of marine mammals reported to be taken should include extrapolations based on relevant $f(0)$ and $g(0)$ values, the actual extents of the Level A³¹ and B harassment zones relative to the observable extents, and the periods the airguns are active during nighttime (including dawn and dusk) relative to daylight hours. Until

²⁷ The Level B harassment takes should be 404 instead of 400 for both Antarctic and common minke whales, 3,718 instead of 3,414 for short-beaked common dolphins, 18 instead of 17 for pygmy sperm whales, 13 instead of 12 for dwarf sperm whales, and 58 instead of 54 for hourglass dolphins.

²⁸ NMFS appears to have inadvertently stated 2001 rather than 2011 in footnote 6 of Table 11.

²⁹ These values vary based on, among other things, platform characteristics, observer skill, environmental conditions, and sightability and detectability of the species.

³⁰ Including USGS.

³¹ Which should not be an issue for SIO’s authorization.

such time that a better method is developed or SIO, LDEO, and other NSF-affiliated entities derive geophysical survey-specific $f(0)$ values, the Commission recommends that NMFS require SIO to use the Commission's method as described in the Addendum to its 1 May 2019 letter *and* apply relevant corrections for airgun activity in daylight vs. nighttime (including dawn and dusk) to better estimate the numbers of marine mammals taken by Level B harassment in the incidental harassment authorization. The Commission further recommends that NMFS require SIO to specify in the final monitoring report (1) the number of days the survey occurs and the array is active and (2) the percentage of time and total time the array is active during daylight vs. nighttime hours (including dawn and dusk)³².

Proposed one-year authorization renewals

NMFS has indicated that it may issue a second one-year³³ 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 is concerned that the renewal process proposed in the *Federal Register* notice is inconsistent with the statutory requirements—section 101(a)(5)(D)(iii) clearly states that proposed authorizations are subject to a 30-day comment period—and Congressional expectations regarding the length of the comment period when it passed that provision³⁴.

Another significant issue with the proposed 15-day comment period is the burden that it places on reviewers, who will need to review the original authorization and supporting documentation³⁵, the draft monitoring report(s), the renewal application or request³⁶, and the proposed authorization and then formulate comments very quickly. Depending on how frequently NMFS invokes the renewal option, how much the proposed renewal or the information on which it is based deviates from the original authorization, and how complicated the activities are and the taking authorization is, those who try to comment on all proposed authorizations and renewals, such as the Commission, would be hard pressed to do so within the proposed 15-day comment period. Therefore, the Commission recommends that NMFS refrain from using the proposed renewal process for SIO's authorization. The renewal process should be used sparingly and selectively, by limiting its use only to those proposed incidental harassment authorizations that are expected to have the lowest levels of impacts on marine mammals and that require the least complex analyses. Notices for other types of activities should not include the possibility that a renewal might be issued using the proposed foreshortened 15-day comment period. If NMFS

³² The Commission made this same recommendation in its [1 July 2019 letter](#) regarding an LDEO survey off Oregon and Washington. However, NMFS did not address it in the *Federal Register* notice for issuance of that authorization. The Commission expects it will be addressed and the relevant reporting requirements will be specified in SIO's authorization.

³³ 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.

³⁴ See, for example, the legislative history of section 101(a)(5)(D), which states "...in some instances, a request will be made for an authorization identical to one issued the previous year. In such circumstances, the Committee expects the Secretary to act expeditiously in complying with the notice and comment requirements." (H.R. Rep. No. 439, 103d Cong., 2d Sess. 29 (1994)). The referenced "notice and comment requirements" specify a 30-day comment period.

³⁵ Including the original application, hydroacoustic and marine mammal monitoring plans, take estimation spreadsheets, etc.

³⁶ Including any proposed changes or any new information.

intends to use the renewal process frequently *or* for authorizations that require a more complex review (such as SIO's authorization) or for which much new information has been generated (e.g., multiple or extensive monitoring reports), the Commission recommends that NMFS provide the Commission and other reviewers the full 30-day comment opportunity set forth in section 101(a)(5)(D)(iii) of the MMPA.

Ongoing general concerns

The Commission has repeatedly expressed concern over errors, inconsistencies, and omissions in applications, *Federal Register* notices, and proposed authorizations involving SIO and other NSF-funded and -affiliated surveys. Many of those issues affect the extents of the Level A and B harassment zones, numbers of Level A and B harassment takes to be authorized, and mitigation and monitoring measures to be required. In the last year³⁷, the Commission notes that all of the authorizations involving NSF-funded and -affiliated surveys 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 authorization. To a lesser degree, but still prevalent, were issues involving incorrect extents of the Level A and B harassment zones and/or ensonified areas³⁸. NMFS must take a more active and diligent role in reviewing its proposed authorizations prior to publication in the *Federal Register*. NMFS cannot rely solely on the Commission or the public to continue to catch errors that should be identified during internal review processes. Therefore, the Commission again recommends that NMFS conduct a more thorough review of the 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. Similar to another recommendation and footnote herein, the Commission made this same recommendation in its July 2019 letter. However, NMFS did not address it in the *Federal Register* notice for issuance of LDEO's authorization. The Commission asks that it be addressed for SIO's authorization.

The Commission also repeatedly has expressed concern regarding the amount of time that NMFS has to consider comments provided by both the Commission and the public regarding authorizations involving NSF-funded and -affiliated surveys. In this instance, SIO submitted its application 15 May 2019, less than six months before the R/V *Thompson* is scheduled to leave port in Uruguay on 3 November. Moreover, NMFS will have three or fewer days to consider public comments before the ship is scheduled to leave port. In response to similar concerns in the Commission's July 2019 letter, NMFS indicated that it *encourages* all action proponents to submit applications for incidental harassment authorizations five to eight months in advance of the intended project start date and that it publishes *Federal Register* notices for proposed incidental harassment authorizations as quickly as possible once the application is received and aims to allow more time on the back end of the comment period (84 Fed. Reg. 35067). NMFS further noted that there are situations when the length of processing times is driven by the exigency of an action proponent's activity start date or by the need to work with the action proponents to ensure the

³⁷ Incidental harassment authorizations that published in the *Federal Register* from June 2018 to June 2019 were reviewed.


³⁸ Which do not reflect the Commission's concerns with LDEO's subpar modeling approach. If those issues had been included, 100 percent of the authorizations would have included incorrect extents of the Level A and B harassment zones and/or ensonified areas.

agency has the necessary information to deem an application adequate and complete (84 Fed. Reg. 35067). NMFS did not specify that it cannot *require* submission of applications earlier, particularly for NSF-funded and -affiliated surveys that are planned at least one year in advance. As such, the Commission recommends that NMFS require NSF-funded and -affiliated applications and other documentation to be submitted at least eight months in advance of the vessel leaving port so that it has sufficient time to review and provide comments on the adequacy and accuracy of the application, allow action proponents to make necessary revisions or additions to the application, draft its proposed authorization, and consider the comments received from the public.

The Commission understands that NMFS aims to process the applications as quickly as possible. However, the quality of the applications and proposed authorizations have diminished in the face of NMFS's quest to issue authorizations expeditiously. Requiring action proponents to submit applications earlier would help alleviate NMFS's ongoing quality control issues, while still ensuring that action proponents receive their authorizations prior to planned start dates.

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

Sincerely,



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

References

- Bradford, A.L., K.A. Forney, E.M. Oleson, and J. Barlow. 2017. Abundance estimates of cetaceans from a line-transect survey within the U.S. Hawaiian Islands Exclusive Economic Zone. *Fishery Bulletin* 115(2):129–142.
- 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>.
- Department of the Navy. 2017b. Quantifying acoustic impacts on marine mammals and sea turtles: Methods and analytical approach for Phase III Training and Testing. Space and Naval Warfare Systems Center Pacific, San Diego and Naval Undersea Warfare Center, Newport. 91 pages.
- Di Tullio, J.C., T.B.R. Gandra, A.N. Zerbin, and E.R. Secchi. 2016. Diversity and distribution patterns of cetaceans in the subtropical Southwestern Atlantic outer continental shelf and slope. *PLoS ONE* 11(5):e0155841. <http://doi:10.1371/journal.pone.0155841>.

- 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.
- Mannocci, L., J.J. Roberts, D.L. Miller, and P.N. Halpin. 2017. Extrapolating cetacean densities to quantitatively assess human impacts on populations in the high seas. *Conservation Biology* 31: 601–614. <http://doi:10.1111/cobi.12856>.
- 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.
- Weir, C.R. 2011. Distribution and seasonality of cetaceans in tropical waters between Angola and the Gulf of Guinea. *African Journal of Marine Science* 33(1):1–15.