

**DETERMINATION  
FOR THE ISSUANCE OF AN INCIDENTAL HARASSMENT AUTHORIZATION TO THE  
NATIONAL SCIENCE FOUNDATION (NSF) AND ADOPTION OF THE NSF FINAL  
ENVIRONMENTAL ANALYSIS**

**I. INTRODUCTION**

The National Marine Fisheries Service (NMFS) received an application from the Lamont-Doherty Earth Observatory (L-DEO) requesting authorization to take marine mammals incidental to marine geophysical surveys of the Guerrero Gap off the Pacific coast of Mexico, which was analyzed in the National Science Foundation’s (NSF’s) 2022 Final Environmental Analysis, “*Final Environmental Analysis of Marine Geophysical Surveys by R/V Marcus G. Langseth off Western Mexico, Eastern Tropical Pacific Ocean*” (Final Environmental Analysis). NMFS is required to review applications and, if appropriate, issue Incidental Take Authorizations<sup>1</sup> (ITAs) pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.). In addition, the National Environmental Policy Act (NEPA; 42 U.S.C. § 4332(C)), Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) §§ 1500 – 1508), and National Oceanic and Atmospheric Administration (NOAA) policy and procedures<sup>2</sup> require all proposals for major federal actions be reviewed with respect to environmental consequences on the human environment. Therefore, the purposes of this document are twofold. First, this document explains NMFS’ determination to adopt the NSF’s Final Environmental Analysis for the NEPA review that NMFS is required to conduct for its consideration of whether to issue an Incidental Harassment Authorization (IHA) for L-DEO geophysical surveys of the Guerrero Gap in the Eastern Tropical Pacific. Second, this document explains NMFS’ rationale for its finding that issuance of the IHA for this survey will not significantly impact the quality of the human environment.

NMFS proposes to issue an IHA to L-DEO pursuant to Section 101(a)(5)(D) of the MMPA and 50 CFR Part 216. This IHA will be valid for one year from the date of issuance and authorizes the take, by Level A and/or Level B harassment, of small numbers of marine mammals incidental to L-DEO’s geophysical surveys of the Guerrero Gap. NMFS’ proposed action is a direct outcome of L-DEO’s request for an IHA for conducting marine geophysical survey activities. The surveys involve collecting seismic reflection and refraction data that reveal the structure and stratigraphy of the crust and overlying sediment of the seafloor. The surveys will be conducted aboard a vessel towing an array of airguns<sup>3</sup> that produce low frequency sound pulses that penetrate deep into the subsurface and are then reflected and recorded by receivers to image deep geological features. The use of airgun arrays has the potential to result in behavioral harassment (Level B harassment) of 30 species of marine mammals in the form of startling or avoidance reactions, increased swimming speed, increased surfacing time, or decreased foraging, and for 3 species, auditory injury (Level A harassment).

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<sup>1</sup> ITAs may be issued as either (1) regulations and the associated Letter of Authorization (LOA) or (2) an Incidental Harassment Authorization (IHA). LOAs may be issued for a maximum period of five years and IHAs may be issued for a maximum period of one year. Detailed information about the MMPA is available at <https://www.fisheries.noaa.gov/topic/laws-policies#marine-mammal-protection-act>.

<sup>2</sup> NOAA Administrative Order (NAO) 216-6A “*Compliance with the National Environmental Policy Act, Executive Orders 12114, Environmental Effects Abroad of Major Federal Actions; 11988 and 13690, Floodplain Management; and 11990, Protection of Wetlands*” issued April 22, 2016 and the Companion Manual for NAO 216-6A “*Policy and Procedures for Implementing the National Environmental Policy Act and Related Authorities*” issued January 13, 2017.

<sup>3</sup> Two-dimensional (2-D) data acquisition involves a single vessel towing a single acoustic array. The receiver(s) is towed behind the vessel on a long cable (streamer) or is placed on the ocean bottom.

Therefore, the action requires an authorization from NMFS for incidental taking pursuant to the MMPA. An authorization for incidental takings shall be granted if NMFS finds that the taking will be of small numbers, have a negligible impact<sup>4</sup> on the species or stock(s), and, where relevant, will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses. In addition, the IHA must set forth the permissible methods of taking, other means of effecting the least practicable adverse impact on the species or stock and its habitat, and requirements pertaining to the monitoring and reporting of such takings.

NMFS' issuance of this IHA allowing the taking of marine mammals, consistent with provisions under the MMPA and incidental to an applicant's lawful activities, is considered a major federal action. Therefore, NMFS conducted an environmental review of L-DEO's application and the NSF's Final Environmental Analysis and determined adopting this Environmental Analysis and preparing its own Determination is appropriate for NMFS' consideration to issue an IHA to L-DEO. This Determination evaluates the context and intensity of the impacts on marine mammals associated with NMFS' consideration to issue this IHA to L-DEO and documents NMFS' determination to adopt the NSF's Final Environmental Analysis.

## II. BACKGROUND

The NSF is the federal agency that supports all fields of science and engineering (except medical sciences), and therefore, funds a variety of research projects across a wide-range of scientific disciplines, including oceanography. The NSF does this through grants and cooperative agreements issued to colleges, universities, businesses, scientific research organizations, and other federal agencies throughout the United States. The NSF does not own and operate research facilities or laboratories but does support National Research Centers, user facilities, certain oceanographic vessels, and Antarctic research stations. To support and fund scientific research, the NSF established several programs focused on basic and applied science and engineering research, for example, Geosciences. Each of their research programs forms the basis for specific research areas and projects, like the Division of Ocean Sciences-Marine Geology and Geophysics program in which the NSF may fund geophysical surveys in support of this program's priorities and objectives. Details about the NSF and their research programs is available at <https://www.nsf.gov/about/> and [https://www.nsf.gov/about/research\\_areas.jsp](https://www.nsf.gov/about/research_areas.jsp).

The NSF has funded marine-related research for over 50 years and identified the need to continue funding marine-related geophysical surveys to enable scientists to collect data essential to understanding the complex Earth processes beneath the ocean floor. The NSF funds research based on proposals reviewed under its merit review process and identified as program priorities. Information about the NSF processes, procedures and outcomes, including the merit review process and results of NSF-funded research is available on the Internet at <https://www.nsf.gov/od/transparency/transparency.jsp>. Examples of NSF-funded marine-related research include:

- Studying source mechanisms, fault locations, and hazard potentials for large earthquakes and tsunamis along faults and segments of tectonic plate boundaries, allowing prioritization of tsunami and earthquake warning systems;

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<sup>4</sup> NMFS defines "negligible impact" as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." (50 CFR § 216.103)

- Imaging to indicate how erosion and sedimentation have impacted and changed the size and shapes of the continental shelves over time;
- Examining the formation and evolution of volcanic islands, mid-ocean ridges, and igneous provinces;
- Studying the evolution and movement of tectonic plates; and
- Mapping the seafloor and its topographic relief and understanding the causes of submarine geologic structures.

The NSF is also responsible for environmental reviews of the research they propose to fund, associated with investigating the geology and geophysics of the seafloor. Therefore, the NSF prepares analyses under NEPA and/or Executive Order (EO) 12114 for these research activities. Historically, the NSF prepared Environmental Assessments and/or Analyses for each research cruise on a project-specific basis. However, over time the NSF concluded that this approach was not conducive to a comprehensive assessment that considered funding multiple geophysical survey activities over larger geographical areas. The NSF determined a programmatic<sup>5</sup> approach was appropriate for a number of reasons. Data obtained from geophysical surveys can occur over large geographical areas, in any given ocean area, and there is inherent uncertainty regarding the timing, locations of site-specific surveys, survey specifics (*e.g.*, equipment and vessels), as well as which research organization will conduct the survey<sup>6</sup>. In addition, the NSF and the U.S. Geological Service (USGS) determined a programmatic document would minimize duplication of effort when preparing environmental documentation because the USGS conducts the same or similar research activities and, as a federal agency, is also required to complete environmental reviews under NEPA.

Therefore, in June 2011, the NSF completed a Programmatic Environmental Impact Statement/ Overseas Environmental Impact Statement for marine-related research funded by the NSF or conducted by the USGS (herein “NSF/USGS 2011 Final PEIS”) and issued a Record of Decision in June 2012. The analysis in the NSF/USGS 2011 Final PEIS supports the NSF planning-level decisions associated with their continuing need to fund marine-related research conducted by USGS and other research organizations and establishes the framework and parameters for subsequent analyses based on the programmatic review. While the level of activity proposed may vary from one year to the next, the action alternatives analyzed in the NSF/USGS 2011 Final PEIS represent the average range and level of marine-related research the NSF anticipates funding and for which ITAs and other permits or authorizations may be required. The NSF collaborated with the USGS and NMFS as cooperating agencies to prepare the evaluation of potential impacts of geophysical surveys on the human environment, including impacts to marine mammals. Information about the NSF’s programmatic approach is in Chapter 1, Section 1.4 of the NSF/USGS 2011 Final PEIS and the potential effects to marine mammals and the estimates of marine mammal acoustic exposures are in Chapter 3, Sections 3.1- 3.9. A copy of the NSF/USGS 2011 Final PEIS is available at [https://www.nsf.gov/geo/oce/envcomp/usgs-nsf-marine-seismic-research/nsf-usgs-final-eis-oeis\\_3june2011.pdf](https://www.nsf.gov/geo/oce/envcomp/usgs-nsf-marine-seismic-research/nsf-usgs-final-eis-oeis_3june2011.pdf).

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<sup>5</sup> The concept of “programmatic” NEPA analysis is included in the 1978 CEQ Regulations, which addresses analyses of “broad actions” and the “tiering” process. Programmatic NEPA reviews add value and efficiency to the decision-making process when they inform the scope of decisions and subsequent tiered NEPA reviews. Programmatic NEPA analyses can facilitate decisions on agency actions that precede project-specific decisions and action. They also provide information and analysis that can be incorporated by reference in future, tiered NEPA reviews.

<sup>6</sup> Approximately four to seven NSF-funded marine-related research cruises involving geophysical surveys are conducted annually, across the world’s oceans including the Northeast Pacific, Eastern Tropical Pacific, and Southwest Pacific, Gulf of Mexico, Caribbean Sea, Mid-Atlantic Ridge, North Atlantic, Norwegian Sea, Arctic Ocean, Bering Sea, and Gulf of Alaska, by research organizations and government agencies. However, details and specifics are unknown until proposals are submitted, reviewed, and approved under the NSF’s merit process. For example, the final determination of specific cruise tracks depends on research objectives of proposals recommended for award during merit reviews, the NSF’s research budget for a given fiscal year, and other factors such as vessel availability and environmental considerations.

Regarding the current IHA application submitted by L-DEO, the NSF prepared a Final Environmental Analysis under EO 12114 in March 2022 that tiers to the NSF/USGS 2011 Final PEIS and provides the geophysical survey and site-specific level of analysis addressing potential impacts associated with the NSF's proposal to fund L-DEO to conduct geophysical surveys of the Guerrero Gap in the Eastern Tropical Pacific Ocean. Impacts of the proposed geophysical survey activities to 30 species of marine mammals, including 6 listed as threatened or endangered, estimates of take based on NMFS-recommended criteria, and identification of mitigation and monitoring measures were the primary foci of the 2022 Final Environmental Analysis. The analysis in this document also supports the ESA Section 7 consultation and the IHA application processes. NMFS determined the NSF's Environmental Analysis satisfies all the requirements of an environmental assessment under the CEQ regulations and includes adequate information analyzing the effects on the human environment of issuing the IHA and is suitable to adopt.

### **III. PROPOSED ACTION AND ALTERNATIVES SUMMARY**

#### **A. The NSF's Proposed Action**

The NSF is proposing to fund L-DEO to conduct two-dimensional (2-D) geophysical surveys of the Guerrero Gap off the coast of Mexico in the Eastern Tropical Pacific. The majority of the proposed surveys would occur within the Exclusive Economic Zone (EEZ) of Mexico, including territorial seas, and a small portion would occur in International Waters. The surveys would occur in waters up to 5,560 meters (m) deep. Most of the survey effort (94 percent) would occur in deep water (>1000 m), and 6 percent would occur in intermediate water (100-1000 m deep); no effort would occur in shallow water (<100 m deep). The proposed research cruise would be expected to last for 48 days, including up to 25 days of seismic survey operations. The remainder of the survey duration would be involved in equipment deployment and retrieval and vessel transit. The surveys will use a 36-airgun towed array with a total discharge volume of ~6,600 in<sup>3</sup>, towed by the R/V *Marcus G. Langseth* (*Langseth*). Survey protocols generally involve a predetermined set of survey track lines. The vessel travels down a linear track for some distance until a line of data is acquired, then turns and acquires data on a different track. L-DEO proposes to conduct two different methods of seismic acquisition, multi-channel seismic (MCS) using a hydrophone streamer and refraction surveys using ocean bottom seismometers (OBSs). A total of 3,600 kilometers (km) of transect lines would be surveyed (2,230 km of 2-D MCS reflection data and 1,370 km of OBS refraction data). Representative survey tracklines are shown in Figure 1 of the NSF's 2022 Final Environmental Analysis for this project, but there may be deviation from these tracklines due to scientific drivers, poor data quality, inclement weather, or mechanical issues with the research vessel and/or equipment.

#### **B. NMFS' Proposed Action**

Sections 101(a)(5)(A) and (D) of the MMPA give NMFS the authority to authorize the incidental, but not intentional, take of small numbers of marine mammals by harassment, provided certain determinations are made and statutory and regulatory procedures are met. To authorize the incidental take of marine mammals, NMFS evaluates the best available scientific and commercial information to determine whether the take would have a negligible impact on marine mammal species or stocks, will be limited to small numbers of the relevant species or stocks' abundance, and whether the activity would have an unmitigable adverse impact on the availability of affected marine mammal species for subsistence use. NMFS cannot issue an ITA if it would result in more than a negligible impact on marine mammal species or stocks or would result in an unmitigable

adverse impact on subsistence uses. NMFS must also prescribe the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. Where applicable, NMFS must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. ITAs will include additional requirements or conditions pertaining to monitoring and reporting.

Since NMFS' proposed action of issuing an IHA to L-DEO authorizes the take of marine mammals incidental to a subset of the activities analyzed in the NSF's Final Environmental Analysis, these components of the NSF's proposed action are the subject of NMFS' proposed action. Therefore, NMFS' issuance of an IHA to L-DEO is a direct outcome of L-DEO's request for an IHA and will authorize take of marine mammals incidental to a subset of the activities analyzed in the NSF's Final Environmental Analysis and specified in the application submitted by L-DEO.

### C. Alternatives Considered by the NSF

The NSF analyzed two alternatives in their Final Environmental Analysis including their proposed or preferred action and the No Action alternative. These alternatives include NMFS' consideration to grant or deny permit applications pursuant to the MMPA (*i.e.*, conducting the geophysical surveys with issuance of an associated IHA or not conducting the geophysical surveys and the IHA is not issued).

Under the NSF's Proposed Action (Preferred Alternative), the NSF would fund L-DEO to conduct the geophysical surveys using the *Langseth* off the coast of Mexico in the Eastern Tropical Pacific. The purpose of conducting these geophysical surveys is to collect data on plate boundary properties and the distribution of fluids in both the incoming Pacific oceanic plate and within the subduction zone in and around the Guerrero Gap of the Middle America Trench to better understand what the factors and processes that control the ability of a subduction zone to generate large earthquakes. Detailed explanations concerning the survey objectives, protocols, equipment and locations along with how geophysical surveys are conducted is in Section 2.1 of the 2022 Final Environmental Analysis.

Under the "No Action" alternative, the NSF would not fund L-DEO to conduct the marine geophysical surveys in the Eastern Tropical Pacific, and L-DEO would not conduct the surveys. The consideration and analysis of this alternative is included for presenting a comparative analysis to the action alternative, in accordance with 40 CFR 1502.14. Additional explanation concerning the No Action Alternative is in Section 2.2 of the 2022 Final Environmental Analysis.

### D. Alternatives Considered by NMFS

In accordance with NEPA and the 1978 CEQ Regulations, NMFS is also required to consider a reasonable range of alternatives to a Proposed Action. Since NMFS is adopting the NSF's Final Environmental Analysis, it reviewed this document to determine whether it met this requirement. NMFS determined the NSF's analysis of alternatives in their Final Environmental Analysis is adequate for purposes of NEPA and the CEQ regulations. However, based on the statutory framework explained in Section III, paragraph B above, NMFS considers two alternatives, a No Action alternative in which NMFS denies L-DEO's application and an action alternative in which it

issues an IHA to L-DEO. Thus, the alternatives analysis in Section 2 in the NSF's Final Environmental Analysis supports NMFS' alternatives described below.

No Action Alternative: For NMFS, denial of an MMPA authorization constitutes the NMFS No Action alternative, which is consistent with our statutory obligation under the MMPA to grant or deny ITA requests and to prescribe mitigation, monitoring, and reporting with any authorizations. Under NMFS' No Action alternative, NMFS would not issue the IHA to L-DEO, and NMFS assumes L-DEO would not conduct the geophysical surveys as described in their application and the NSF's Final Environmental Analysis. The No Action Alternative served as a baseline against which the impacts of the Preferred Alternative were compared and contrasted.

Action Alternative: NMFS issues the IHA to L-DEO authorizing take of marine mammals incidental to the subset of activities described under the NSF's Preferred Alternative (Section 2.1 in the Final Environmental Analysis), with the mitigation and monitoring in Section 2.1.3 of the Final Environmental Analysis and in NMFS' *Federal Register* notice of proposed IHA under "Summary of Request" and "Description of Proposed Activity" and the "Proposed Mitigation" and "Proposed Monitoring and Reporting" sections.

#### IV. ENVIRONMENTAL REVIEW

NMFS independently reviewed the NSF's Final Environmental Analysis and concluded that impacts evaluated by the NSF are substantially the same as the impacts of NMFS' issuance of an IHA for the take of marine mammals incidental to L-DEO's geophysical surveys. In particular, the Final Environmental Analysis contains an adequate evaluation of the direct, indirect, and cumulative impacts on marine mammals, including species listed under the Endangered Species Act (ESA) and the marine environment. The Final Environmental Analysis also addresses NOAA's required components for adoption because it meets the requirements for an adequate environmental assessment under the CEQ regulations and NOAA policy and procedures, and reflects comments and expert input provided by NMFS as a cooperating agency. For example, the Final Environmental Analysis includes:

- a discussion of the NSF's proposed action and purpose and need for the action and a discussion of the MMPA authorization process necessary to support implementation of the action;
- evaluation of a reasonable range of alternatives to the proposed action, including a no action alternative, and alternatives to mitigate adverse effects to marine mammals;
- a description of the affected environment including the status of all marine mammals species likely to be affected;
- a description of the environmental impacts of the proposed action and alternatives, including direct, indirect, and cumulative impacts on marine mammals and projected estimate of incidental take;
- identification and evaluation of reasonable mitigation measures to avoid or minimize adverse impacts to marine mammals; and
- a listing of agencies consulted.

As a result of this review, the Office of Protected Resources has determined that it is not necessary to prepare a separate environmental assessment or environmental impact statement to issue an IHA to L-DEO and that the adoption of the NSF's Final Environmental Analysis is appropriate.

## V. PUBLIC INVOLVEMENT

NMFS relied substantially on the public involvement process pursuant to the MMPA to develop and evaluate information relevant to an analysis under NEPA. NMFS made the IHA application and a draft of the proposed IHA available for public review and comment and, separately, published notice of the proposed IHA in the *Federal Register* on January 12, 2022 (87 FR 1992). NMFS alerted the public it intended to use the MMPA public review process for the proposed IHA to solicit relevant environmental information and provide the public an opportunity to submit comments. In addition, NMFS indicated that it believed it was appropriate to adopt the NSF's document to comply with NEPA and made available a copy of the NSF's draft Environmental Analysis.

NMFS received comments in response to the publication of the proposed IHA. During the 30-day public comment period, NMFS received comments submitted by the Center for Biological Diversity, Whales of Guerrero (a local research organization in Guerrero, Mexico), and the Sociedad Mexicana de Mastozoología Marina, which was written in support of and reiterated the main points from the Whales of Guerrero letter. All three letters were primarily concerned with the impacts of the survey on breeding humpback whales from the Central America DPS. Whales of Guerrero provided data from their research surveys showing that humpback whales are still present in L-DEO's survey area in large numbers through March, and referenced reports from local whale watch groups of whales present until May. All organizations recommended NMFS prohibit L-DEO from surveying until after breeding humpback whales have completed their transit through the area on their migration toward the feeding grounds. Whales of Guerrero provided data and maps showing that humpback whale occurrence in the survey area is generally concentrated in nearshore waters, with few sightings in the offshore portion of L-DEO's survey area. In consideration of this information, L-DEO agreed that it would be practicable, and NMFS required L-DEO to restrict their survey of nearshore tracklines (in this authorization, "nearshore" tracklines are defined as those tracklines planned to occur in, or where the associated estimated Level B harassment zone would overlap with, waters within 33.4 km from shore) to between May 1 and October 31, to reduce the likelihood of exposure to breeding humpback whales. There are no restrictions on the timing of L-DEO surveying the offshore tracklines (in waters greater than 1,000 m depth). All comments are posted on NMFS' website and responses to the received comments are provided in the *Federal Register* notice announcing our issuance of the IHA.

## VI. ANALYSIS SUMMARY

The environmental consequences to the marine environment and protected resources are important to the evaluation leading to the decision to issue any given ITA. In particular, because NMFS' action is specific to authorizing incidental take of marine mammals, the key factors relevant to, and considered in a decision to issue any given ITA, are related to NMFS' statutory obligations and authorities under the MMPA. The information in the following subsections discusses key factors considered in the analysis in the Final Environmental Analysis along with the evaluation and reasons why the impacts of NMFS' issuance of an IHA to L-DEO will not significantly impact the quality of the human environment.

### A. Environmental Consequences

In the Final Environmental Analysis, the NSF presented the baseline environmental conditions and impacts for affected resources in the survey area. The affected environment and environmental

consequences are in Sections 3.0 and 4.0. Since the anticipated impacts of NMFS' issuance of an IHA to L-DEO are to marine mammals, which, if affected, will be through the introduction of sound into the marine environment during geophysical surveys, the analysis in the Final Environmental Analysis specifically describes and addresses potential acoustic impacts to marine mammals, such as masking, stress, behavioral response, and auditory injury (Section 4.1.1 and Appendix A of the Final Environmental Analysis). The NSF assessed impacts to marine mammals through both acoustic exposure estimates and a qualitative assessment based on a review of literature primarily on acoustic impacts to marine mammals (Appendices B and C of the Final Environmental Analysis).

## B. Significance Evaluation

Significance of an action is analyzed in terms of the affected environment and the degree of the effects of the proposed action. NMFS considered these broad criteria along with several additional factors for determining whether the impacts of a proposed action are significant as recommended by NOAA's Companion Manual for NAO 216-6A. Each criterion is discussed below with respect to NMFS' issuance of an IHA to NSF and is considered individually as well as in combination with the others. In addition, NMFS relied on the analysis in the Final Environmental Analysis, incorporating certain material by reference in the evaluation discussed below. The NSF's Final Environmental Analysis and other information and documentation are available on NMFS' website: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-research-and-other-activities>.

*1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?*

NMFS' issuance of an IHA to L-DEO is not expected to cause either beneficial or adverse impacts resulting in any significant effects. NMFS is proposing to authorize take incidental to a geophysical survey for marine mammal species expected to occur in the survey area off the coast of Mexico. Airguns emit low-frequency noise into the water column, which has the potential to behaviorally disturb marine mammals and, for some species, cause auditory injury. In addition, noise can mask the detection or interpretation of important sounds. Given their reliance on sound for basic biological functioning (e.g., foraging, mating), marine mammals are the species most vulnerable to increased noise in the marine environment, although marine mammal prey (e.g., fish and squid) may be impacted in some of the same ways. However, NMFS only expects intermittent, localized impacts on marine mammals and their habitat because the geophysical survey duration will be limited to up to 25 days and only cover a portion of the region's coastline and surrounding waters. In addition, the prescribed mitigation and monitoring required for L-DEO will protect and lessen the potential for adverse effects to marine mammal species and their habitat. While NMFS predicts potential for direct adverse effects to individuals, it does not anticipate population-level effects that would rise to the level of significance. Effects to marine mammal populations are expected to be negligible to minor. Moderate impacts to a very limited number of animals could occur and would likely include a small degree of auditory injury in the form of permanent threshold shift (PTS). Short-term, temporary impacts would occur to the majority of animals affected in the form of behavioral disturbance, including temporary avoidance of the affected area or decreased foraging (if such activity were occurring).

*2. Can the proposed action reasonably be expected to significantly affect public health or safety?*

The issuance of this IHA to L-DEO to authorize take of marine mammals is not likely to have the potential for this kind of effect because the proposed geophysical survey will take place across a broad area of a relatively remote coastal area and is unlikely to overlap with activities conducted by the public. NMFS only authorizes the take of marine mammal species associated with this survey, which does not involve the public or expose the public directly (*e.g.*, chemicals, diseases) or indirectly (*e.g.*, food sources) to hazardous or toxic materials in a way that would be linked to the quality of the environment and well-being of humans.

*3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?*

Authorizing the harassment of marine mammals through this IHA has no foreseeable impact to unique areas, such as historic or cultural resources, parkland, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas. To the extent that the harassment authorized under the IHA impacts ecologically critical areas, this impact is not substantial. NMFS only anticipates marine mammals might be displaced temporarily and will not permanently vacate any areas, due to the harassment authorized in this IHA. NMFS expects natural processes and the environment to recover from any such displacement. Significant impacts in these areas are not expected; underwater noise associated with airgun usage has no impact on physical habitat features and it will be temporary and localized. Individual ecologically critical areas would be subject to noise only as the survey ship traverses across or near these locations.

*4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?*

The effects of issuing an IHA to L-DEO on the quality of the human environment are not likely to be highly controversial. Although there is some lack of agreement within the scientific and stakeholder communities about the potential effects of noise on marine mammals, there is not a substantial dispute about the size, nature, or effect of our proposed action. For several years, NMFS has assessed and authorized incidental take for multiple geophysical surveys funded by the NSF and/or conducted by L-DEO and has developed relatively standard mitigation and monitoring measures, all of which have been vetted during past public comment periods. The scope of this action is not substantially different from past geophysical surveys, is not unusually large or substantial, and would include the same or similar mitigation and monitoring measures required in past surveys. Previous projects of this type required marine mammal monitoring reports, which NMFS has reviewed to ensure that the authorized activities have a negligible impact on marine mammals.

To allow other agencies and the public the opportunity to review and comment on the action, NMFS published a notice of the Proposed IHA in the Federal Register on January 12, 2022 (87 FR 1992). NMFS received three comment letters during the 30-day public comment period, and all three comments were fully considered in preparing the final IHA and this Determination. These comments did not indicate that the proposed activities or the effects of the activities on the quality of the human environment were likely to be highly controversial. We have determined, based on the best available scientific literature, the limited duration of the project, and the low-level effects to marine mammals, that the issuance of an IHA would have a negligible impact on the affected species or stocks of marine mammals.

*5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?*

The potential risks associated with marine geophysical surveys are neither unique nor unknown, nor is there significant uncertainty about impacts. NMFS has issued authorizations for similar activities or activities with similar types of marine mammal harassment in the Atlantic, Pacific and Southern Oceans and the Mediterranean Sea, and conducted NEPA analyses on those projects. The scope of this action is not substantially different from past geophysical surveys and is not unusually large or substantial, and would include the same or similar mitigation and monitoring measures required in past surveys. Therefore, NMFS expects any potential effects from the issuance of our IHA to be similar to prior activities, which are not likely to be highly uncertain or involve unique or unknown risks.

*6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?*

The issuance of this IHA to L-DEO cannot reasonably be expected to set a precedent for future actions with significant effects nor represent a decision in principle regarding future considerations. The issuance of an IHA to take marine mammals incidental to the proposed activities is a routine process under the MMPA. To ensure compliance with statutory and regulatory standards, NMFS' actions under section 101(a)(5)(D) of the MMPA must be considered individually and be based on the best available information, which is continuously evolving. Issuance of an IHA to a specific individual or organization for a given activity does not guarantee or imply that NMFS will authorize others to conduct similar activities. Subsequent requests for incidental take authorizations would be evaluated upon their own merits relative to the criteria established in the MMPA and 50 CFR Part 216 on a case-by-case basis. The survey has no unique aspects that would suggest it would be a precedent for any future actions.

*7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?*

The Final Environmental Analysis and the documents it references, analyzed the impacts of the issuance of an IHA for the take of marine mammals incidental to the conduct of marine geophysical surveys in light of other human activities within the study area. These activities are described in Section 4.1.6 of the Final Environmental Analysis. The limited duration of the proposed seismic survey (maximum of 25 days of seismic operations) would be expected to result in only a negligible or minor increase in overall disturbance effects on marine animals and would result in no increase in serious injuries or mortality to marine mammals.

The proposed action was developed with consideration of the collective impact of other coastal geophysical research, such as existing seismometers and geodetic stations, as well as consideration of fisheries research activities conducted by the NMFS Southwest Fisheries Science Center in the Eastern Tropical Pacific. The combined effects of these actions are not expected to have significant impacts because they are unlikely to overlap spatially and temporally during the short duration of the proposed survey. After considering relevant activities in evaluating the potential for cumulatively significant impacts in the Final Environmental Analysis, NMFS concluded that impacts of the geophysical surveys, considered in context with NMFS's required mitigation, will not result in cumulatively significant impacts to marine mammals and their habitat when viewed collectively with other past, present, and reasonably foreseeable future actions.

*8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?*

No significant impacts are expected to occur in any of the above areas. No areas listed or eligible for listing on the National Register of Historic Places occur within the survey area. There are numerous shipwreck sites along the Pacific coast of Mexico but none within the survey area have been designated with any special archaeological or cultural importance.

*9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?*

The proposed geophysical survey activities may adversely affect the following marine mammal species listed as threatened or endangered under the Endangered Species Act (ESA; 16 U.S.C. 1531 *et seq.*): the sei whale, fin whale, blue whale, sperm whale, Central America Distinct Population Segment (DPS) humpback whale, Mexico DPS humpback whale, and Guadalupe fur seal. A Biological Opinion prepared pursuant to section 7 of the ESA concluded that the proposed geophysical surveys are not likely to jeopardize the continued existence of ESA-listed blue whales, fin whales, sei whales, sperm whales, Central America DPS humpback whales, Mexico DPS humpback whales, and Guadalupe fur seals.

To reduce the potential for disturbance from the activities, NSF will implement several monitoring and mitigation measures for marine mammals (including ESA-listed species), which are enforceable through the final IHA and the Biological Opinion's Incidental Take Statement. Taking these measures into consideration, NMFS expects that the responses of marine mammals from the Preferred Alternative would primarily be in the form of temporary displacement from the area and/or short-term behavioral changes, as well as a limited amount of permanent threshold shift (PTS) in a small number of marine mammals, falling within the MMPA definition of "Level B harassment" and "Level A harassment". NMFS does not anticipate that take by serious injury or mortality will occur, nor has NMFS authorized take by serious injury or mortality. NMFS' predicted estimates for Level A harassment for some species are likely overestimates of the injury that will occur, as NMFS expects that successful implementation of the required visual and acoustic mitigation measures will avoid Level A harassment in some instances. In addition, NMFS expects that some individuals will avoid the source at levels expected to result in injury. NMFS anticipates that any PTS incurred will be in the form of only a small degree of PTS, and not total deafness. Thus, NMFS expects that impacts will be at the lowest level practicable due to the incorporation of the proposed mitigation measures.

*10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?*

The issuance of this IHA to L-DEO would not violate any federal, state, or local laws for environmental protection. NMFS' compliance with environmental laws and regulations is based on NMFS's action and the nature of the applicant's activities. NMFS complied with the MMPA's requirements in issuing this IHA. NMFS also consulted under Section 7 of the ESA to determine if the issuance of this IHA would likely jeopardize the continued existence of listed species or result in destruction or an adverse modification of critical habitat. The consultation concluded that issuance of an IHA would not jeopardize any listed species or destroy or adversely modify critical

habitat. The NSF and L-DEO fulfilled their responsibilities under the MMPA for this action and will be required to obtain any additional federal, state and local permits necessary to carry out the proposed geophysical survey activities. The NSF and L-DEO conducted all necessary consultations with the Mexican government to obtain approval to operate in Mexican waters.

*11. Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?*

To assess potential impacts of the proposed action on marine mammal species or stocks, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. The NSF calculated the estimated number of animals expected to be exposed to sound levels above the thresholds for Level B harassment and Level A harassment as described in NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018). The numbers of marine mammals that NMFS proposes for authorized take will be considered small relative to the relevant populations.

Additionally, other qualitative factors were considered in the analysis, such as the temporal or spatial scale of the activities. The proposed activity is temporary and localized. Potential adverse effects on prey species will also be temporary and spatially limited. No serious injury or mortality is anticipated or authorized. Furthermore, alternate areas of similar habitat value for affected marine mammals will be available allowing animals to temporarily vacate the survey areas to avoid exposure to sound.

For these reasons, impacts resulting from this activity are not expected to adversely affect the marine mammal species or stocks as defined in the MMPA.

*12. Can the proposed action reasonably be expected to adversely affect managed fish species?*

Subsistence and artisanal fisheries occur in the coastal and nearshore waters of the proposed survey area. Authorizing harassment to marine mammals will not adversely affect managed fish species but the underlying activity (geophysical surveys) is expected to result in short-term, minor adverse impacts to some managed fish species. Individual fish may be directly impacted by noise from geophysical surveys; however, these impacts are expected to be limited to behavioral reactions such as temporary avoidance (*i.e.*, displacement). The proposed action is not anticipated to significantly or adversely affect marine invertebrates, marine fish, and their fisheries, including artisanal or subsistence fisheries.

*13. Can the proposed action reasonably be expected to adversely affect essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act?*

There is no designated essential fish habitat in Mexican or International Waters.

*14. Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?*

NMFS does not expect the issuance of an IHA for the take of marine mammals incidental to marine geophysical survey activities would cause damage to marine habitats, coastal habitats, or deep coral

ecosystems. The IHA is limited to the take of marine mammals incidental to survey activities and does not authorize the activity itself. The authorized takes are limited to Level B harassment and some Level A harassment in the form of PTS and are not expected to have any ecosystem-level effects. Mitigation and monitoring measures required by the IHA are limited to actions that minimize take of marine mammals and improve monitoring of marine mammals. These mitigation and monitoring measures do not alter any aspect of L-DEO's proposed activity in a way that could adversely affect vulnerable marine or coastal ecosystems or deep coral ecosystems.

*15. Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?*

NMFS does not expect issuing an IHA to L-DEO for a geophysical survey to have a substantial impact on biodiversity or ecosystem function within the affected environment. Any harassment authorized by the IHA would be limited to temporary behavioral responses (such as brief masking of natural sounds) in marine mammals and temporary changes in animal distribution. These effects would be short-term and localized and will not have a substantial impact on biodiversity or ecosystem function. Current research indicates that some fish species and other marine mammal prey (e.g., squid, zooplankton) can be affected by ocean noise, though the degree of impact depends on many environmental and biological conditions. Any potential impacts to fish is expected to be temporary and localized, and result in short-term displacement, at most.

The current research noted above did indicate that impacts to marine mammal habitat, in the form of effects to marine mammal prey species, is possible. For example, one recent study investigated zooplankton abundance, diversity, and mortality before and after exposure to airgun noise, finding that the exposure resulted in significant depletion for more than half the taxa present and that there were two to three times more dead zooplankton after airgun exposure compared with controls for all taxa. However, in order to have significant impacts on species such as plankton, the spatial or temporal scale of impact must be large in comparison with the ecosystem concerned. Therefore, while the effect observed in this study is of concern, it would likely warrant greater concern particularly where repeated noise exposure in an area is expected (which it is not here) and, given questions about these findings, further study is warranted. Additional studies have shown that some fish and invertebrate species may experience displacement or behavioral changes from acoustic exposure from airgun surveys, such as temporary displacement or cessation in vocalization. However, impacts associated with sound in the water are expected to be sporadic, temporary and localized given a mobile sound source over a broad area. Thus, short-term minor adverse effects are likely to occur but are not expected to rise to the level of significance. There are no known impacts from airgun surveys on deep coral ecosystems. As noted, NMFS does not anticipate any physical interactions from survey gear/equipment on the environment, and does not expect that noise production from the survey would impact coastal ecosystems at all, given the required mitigation measures.

*16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?*

The issuance of an IHA to L-DEO does not have the potential to introduce or spread non-indigenous species because it does not encourage or require the R/V *Langseth* to conduct long-range vessel transit that would lead to the introduction or spread of non-indigenous species. The *Langseth* complies with all international and U.S. national ballast water requirements to prevent the spread of a non-indigenous species.

## VII. CONDITIONS – MITIGATION, MONITORING AND REPORTING

NMFS does not authorize the geophysical surveys proposed by NSF and L-DEO. However, NMFS does authorize the incidental take of marine mammals under its jurisdiction in connection with these activities and prescribes, where applicable, the methods of taking and other means of effecting the least practicable impact on the species and stocks and their habitats. NMFS' issuance of this IHA is thus conditioned upon reporting requirements and the implementation of mitigation and monitoring designed to reduce impacts to marine mammals to the level of least practicable impact. These conditions are summarized below and described in detail in the IHA. The following mitigation measures are included in the IHA:

- Restriction on timing of surveying “nearshore” tracklines, where in this IHA, “nearshore” tracklines are defined as those tracklines planned to occur in areas where humpback whale sightings been recorded during the migratory period (*i.e.*, between November 1 and May 1), or where the associated estimated Level B harassment area would overlap areas where humpback whale sightings have been recorded. This definition includes tracklines within approximately 33.4 kilometers of shore (*i.e.*, the maximum reported distance from shore of humpback whale sightings in the area);
- Implementation of a rigorous survey protocol requiring both visual and passive acoustic observation;
- Implementation of pre-start clearance and ramp-up procedures designed to ensure that animals are not within a defined zone before initiating the acoustic source and that marine mammals have the opportunity to move away before the source is operated at full power;
- Monitoring of an exclusion zone and implementation of source shutdowns if animals approach the zone in order to minimize potential for auditory injury and more severe behavioral reactions that might occur at close proximity to the source;
- Additional shutdown provisions designed to avoid adverse effects to more sensitive species or species in more sensitive contexts;
- Shutdown procedures, including a requirement to shut down the airgun array upon visual or acoustic detection of any marine mammal detected within the defined exclusion zones; and
- Vessel strike avoidance measures.

NMFS has determined that the required mitigation measures are sufficient to achieve the least practicable adverse impact on the affected species and stocks of marine mammals and their habitat, as required by the MMPA. In addition, the following monitoring and reporting requirements are included in the IHA:

- Qualified protected species observers (PSOs) will document the number and species of marine mammals exposed to sounds from the airguns, as well as the behavior and responses of marine mammals to project-related activities;
- Passive acoustic monitoring will be used to improve detection, identification, and localization of cetaceans and to alert visual observers when vocalizing cetaceans are detected;
- Monitoring results will be used to assess the effectiveness of mitigation measures to minimize disturbance of marine mammals during project-related activities; and
- A draft report will be submitted to NMFS within 90 calendar days of the completion of acoustic measurements and marine mammal monitoring. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report.

## VIII. DETERMINATION

Based on the information presented herein along with analysis in the Final Environmental Analysis prepared by the NSF and the application submitted by L-DEO, it is hereby determined the issuance of the IHA to L-DEO will not significantly impact the quality of the human environment. In addition, we have addressed all beneficial and adverse impacts of the action to reach the conclusion of no significant impacts. Accordingly, the preparation of an Environmental Impact Statement for this action is not necessary.

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Kimberly Damon-Randall  
Director, Office of Protected Resources,  
National Marine Fisheries Service