

**National Science Foundation
Geosciences Directorate
Division of Ocean Sciences
Alexandria, Virginia**

**FINDING OF NO SIGNIFICANT IMPACT (FONSI)
PURSUANT TO
EXECUTIVE ORDER 12114
AND DECISION DOCUMENT (DD)**

**Marine Geophysical Surveys by R/V *Marcus G. Langseth*
in the Eastern Tropical Pacific, 2026**

Award: OCE 2427181

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Award: OCE 2427182

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Project Title: Collaborative Research: Seismic Reflection Imaging of Volcanic Cycles at the East Pacific Rise 9 50'N on Decadal and Milankovic Timescales

A Final Environmental Assessment (Final EA) was prepared for the above noted proposed research project funded by the National Science Foundation (NSF) (Proposed Action). The Proposed Action would involve marine geophysical surveys (or “seismic surveys”) in the Eastern Tropical Pacific or ETP in February-March 2026. The research vessel (R/V) *Marcus G. Langseth (Langseth)* is owned and operated by Lamont-Doherty Earth Observatory (L-DEO) of Columbia University, and the Proposed Action would involve the Principal Investigators (PI) noted above and referred to herein as the “Proposing Institutions”, and the work would be conducted in collaboration with the Institut de Physique du Globe de Paris.

The Final EA entitled, “*Final Environmental Analysis of Marine Geophysical Surveys by R/V Marcus G. Langseth in the Eastern Tropical Pacific, January 2026*”, (Attachment 1) analyzed the potential impacts on the human and natural environment associated with the Proposed Action pursuant to the National Environmental Policy Act (NEPA). The Draft EA tiers to the Final Programmatic Environmental Impact Statement (PEIS)/Overseas Environmental Impact Statement (OEIS) for Marine Seismic Research funded by the National Science Foundation or Conducted by the U.S. Geological Survey (NSF and USGS 2011) and Record of Decision (NSF 2012), referred to herein as the PEIS. This Finding of No Significant Impact/Decision Document (FONSI/DD) also incorporates by reference the analyses and conclusions set forth in the Incidental Harassment Authorization (IHA) and Biological Opinion/Incidental Take Statement (ITS) issued by the U.S. National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NMFS) for this Proposed Action. The conclusions from the Final EA, and other federal regulatory processes, were consistent with the conclusions of the PEIS and were used to inform NSF management of potential environmental impacts of the surveys. NSF has reviewed and concurs with the Final EA findings. The Final EA is incorporated into this FONSI/DD by reference as if fully set forth herein.

Project Objectives and Context

The primary goals of the high-energy seismic surveys are to collect seismic reflection data of volcanic cycles and to examine the active magmatic system at the East Pacific Rise.

In order to study volcanic cycles on decadal timescales, the proposed project would consist of 3-D MCS surveys at the 9°50'N segment of the EPR, thereby repeating the same experiment conducted in 2008 onboard R/V *Langseth*. The two datasets would be processed together using the latest elastic full waveform inversion techniques, in order to obtain high-resolution imagery that would be used to investigate how the magmatic and hydrothermal plumbing systems beneath this submarine volcanic ridge have changed since 2008, thereby allowing for a unique four-dimensional (4-D) time-lapse study. The time-lapse imagery would allow the PIs to test long-debated hypotheses about the eruption cycle for the first time, by distinguishing characteristic changes in the shape and melt content of the magmatic system. The proposed surveys would occur in International Waters, in water depths ranging from 2500 to 3200 meters (m), as illustrated in the Final EA (Attachment 1, Figure 1).

Summary of Proposed Action and Alternatives

The procedures to be used for the proposed marine geophysical surveys would be similar to those used during previous surveys conducted by L-DEO and would use conventional seismic methodology. The surveys would involve one source vessel, R/V *Langseth*, which would tow two 18-airgun arrays with a discharge volume of ~3300 in³ each, at a depth of 7.5 m. The two linear airgun arrays would fire in an alternate “flip-flop” mode every 37.5 m (~16 s). The main receiving system would consist of four 5850-m long solid-state hydrophone streamers, separated by 150 m (solid flexible polymer – not gel nor oil filled). As the airgun arrays are towed along the survey lines, the hydrophone streamers will receive the returning acoustic signals and transfer the data to the on-board processing system. In addition to the operations of the airgun arrays, other acoustic sources, including a multibeam echosounder (MBES), sub-bottom profiler (SBP), and an Acoustic Doppler Current Profiler (ADCP), would be operated from R/V *Langseth* continuously during the seismic surveys.

The proposed surveys are scheduled to occur during February-March 2026 for a period of approximately 35 days. R/V *Langseth* would likely leave out of and return to port in Manzanillo, Mexico (nearly 1000 km north of the proposed study area). The cruise is expected to consist of up to 20 days of seismic operations, four days of equipment deployment/recovery, six days of contingency, and five days of transit. Some deviation in the duration of the surveys and ports of call may be required, depending on logistics and weather; however, research operations would only occur in the area noted and timeframe allowable under the IHA and other relevant documentation.

Another alternative to conducting the Proposed Action would be the “No Action” alternative (i.e., NSF would not provide funding to conduct the proposed research operations). The “No Action” alternative would result in no disturbance to marine species attributable to the Proposed Action, but geological data of scientific value, with the aim to examine a timelapse of crustal mantle body changes within or between volcanic cycles, would not be collected. The purpose and need for the proposed activity would not be met through the “No Action” alternative.

Summary of environmental consequences

The Final EA includes analysis on the affected environment (Chapter III) and the potential effects of the Proposed Action on the environment (Chapter IV). Potential impacts of the Proposed Action on the environment would be primarily a result of the operation of the airgun array. The potential effects of sounds from airguns on marine species, including mammals and sea turtles of particular concern, are described in detail in Attachment 1 (Chapter IV and PEIS Chapters 3 & 4) and might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, and at least in theory, temporary or permanent hearing impairment, or non-auditory physical or physiological effects. It is unlikely that the Proposed Action would result in any cases of temporary or especially permanent hearing impairment, or any significant non-auditory physical or physiological effects. Some behavioral disturbance is expected if animals are in the general area during seismic operations, but this would be localized, short-term, and involve limited numbers of animals. The potential effects from the other proposed acoustic sources were

also considered; however, they would not be likely to have a significant effect on the environment (Attachment 1, Chapter IV; and PEIS Chapter 3).

The Proposed Action includes an extensive monitoring and mitigation program to further minimize potential impacts on the environment. Mitigation efforts include pre-cruise planning activities and operational activities (Attachment 1, Chapters II and IV; and PEIS Section 2.4.1.1). Pre-cruise planning mitigation activities included consideration of energy source optimization/minimization; survey timing (i.e., environmental conditions: seasonal presence of animals and weather); and calculation of mitigation zones.

The operational mitigation program would further minimize potential impacts to marine species that may be present during the conduct of the proposed research to a level of insignificance. As detailed in Attachment 1 (Chapters II and IV), the IHA and BiOp/ITS issued by NMFS, the Proposed Action would include operational monitoring and mitigation measures, such as, but not limited to: visual observations; enforcement of exclusion and buffer zones; pre-clearance and ramp ups, shutdowns and power downs of the airguns; monitoring and reporting. The fact that the airgun array, as a result of its design, directs the majority of the energy downward, and less energy laterally, would also be an inherent mitigation measure.

Per the IHA, NMFS established a fixed operational 500-m exclusion zone (EZ) and 500-m buffer zone for the surveys, and an extended EZ of 1500 m for beaked whales, a large whale with a calf, and groups of 6 or more large whales. The shutdown requirement would be waived for small dolphins of the following genera: *Delphinus*, *Lagenodelphis*, *Stenella*, *Steno*, and *Tursiops*. The predicted distances for the Level B zones are based on the 160 dB re 1 μ Pa SPL isopleth, per current NMFS approach on Level B harassment. Mitigation, monitoring and reporting requirements were incorporated into the Final EA, the FONSI/DD, and/or the L-DEO Science Support Plan; PSOs would take the lead in ensuring compliance with all monitoring and mitigation measures. NMFS included vessel strike avoidance measures in the IHA; however, as noted in the Final EA, R/V *Langseth* (and other vessels in the U.S. Academic Research Fleet) have no history of marine mammal strikes.

The acoustic source would also be shut down in the event Endangered Species Act (ESA)-listed sea turtles and seabirds (diving/foraging) were observed within the designated exclusion zone (EZ). Observers (and vessel crew) would monitor for any impacts the acoustic sources may have on fish. L-DEO and its contractors are committed to applying these measures in order to minimize any effects on marine mammals, sea turtles, seabirds, and fish, and other potential environmental impacts.

With the planned monitoring and mitigation measures, unavoidable impacts to marine species that could be encountered would be expected to be minimal, and limited to short-term, localized changes in behavior and distribution near the seismic vessel. At most, effects on marine mammals may be interpreted as falling within the U.S. Marine Mammal Protection Act (MMPA) definition of Level B Harassment for those species managed by NMFS. Level A takes based on current NMFS Technical Acoustic Guidance¹ would not be anticipated and therefore were not requested or issued by NMFS. No long-term or significant effects would be expected on individual marine mammals, sea turtles, seabirds, fish or the populations to which they belong or on their habitats.

The results of the cumulative impacts analysis in the PEIS indicated that there would not be any significant cumulative effects to marine resources from the proposed NSF-funded marine seismic research, including

¹ 2024 Update to: Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (version 3.0). Underwater thresholds for onset of permanent and temporary threshold shifts. Office of Protected Resources, NMFS, Silver Spring, MD.

the combined use of airguns and other acoustic sources (e.g., multibeam echosounders, etc.). However, the PEIS also stated that cruise-specific cumulative effects analysis would be conducted, “allowing for the identification of other potential activities in the area of the proposed seismic surveys that may result in cumulative impacts to environmental resources.” The potential reasonably foreseeable effects of the Proposed Action were evaluated in Section 4.1.5 of the Final EA. Due to the location of the Proposed Action, human activities in the area around the survey vessel would be anticipated to include other research, vessel traffic, fisheries activities. Fisheries activities within the region and potential impacts are described in further detail in the Final EA, Chapter IV. Considering the limited time that the planned seismic surveys would take place close to shore, and brief period of operations, and temporary nature of potential environmental impacts, the proposed project is not expected to have any significant impacts on human activities in the area.

The “No Action” alternative would remove the potential of the limited direct and indirect environmental consequences as described. However, it would preclude important scientific research from going forward that would examine a timelapse of crustal mantle body changes within or between volcanic cycles. The “No Action” alternative would result in a lost opportunity to obtain important scientific data and knowledge relevant to the geosciences and to society in general. The collaboration, involving PIs and students, would be lost along with the collection of new data, future interpretation of these data and introduction of new results into the greater scientific community. Loss of NSF support often represents a significant negative impact to the academic infrastructure, including the professional and academic careers of the researchers, students, ship technicians and crew who are part of the U.S. Academic Research Fleet. The “No Action” alternative would not meet the purpose and need of the Proposed Action.

Coordination with Other Agencies and Processes

NSF provided the draft Environmental Assessment (EA) prepared pursuant to Executive Order 12114 to NMFS to inform its review and any BiOp/ITS; the draft EA also supported documentation for the IHA application. Based on discussions with NMFS during MMPA and ESA processes, minor refinements to the information provided in the Draft EA were made. The new information, which was included in the Final EA, however, did not alter the overall conclusions of the Draft EA and remained consistent with the PEIS.

Compliance with other federal statutes and regulatory processes are summarized below and in further detail in the Final EA, Section 4.1.8.

(a) Endangered Species Act (ESA)

On 24 June 2025, NSF submitted a formal ESA Section 7 consultation request, including the Draft EA, to NMFS for the proposed activity. On 09 February 2026, NMFS transmitted a Biological Opinion and Incidental Take Statement, signed 06 February 2026 (Appendix D of the EA). Given the brevity of the proposed action and the proposed monitoring and mitigation measures, no effects were anticipated to ESA listed species under jurisdiction of the U.S. Fish and Wildlife Service.

(b) Marine Mammal Protection Act (MMPA)

On 16 June 2025, an IHA application was submitted to NMFS by L-DEO pursuant to the U.S. MMPA for “taking by harassment” (disturbance) of small numbers of marine mammals during the proposed seismic surveys. On 18 December 2025, NMFS issued in the Federal Register a notice of intent to issue an IHA for the surveys and a 30-day public comment period. NMFS issued an IHA for the proposed activity on 11 February 2026 (Appendix E of the EA).

Conclusion and Decision

NSF has reviewed and concurs with the conclusions of the Final EA (Attachment 1) that implementation of the Proposed Action will not have a significant impact on the environment. Consequently, implementation of the Proposed Action will not have a significant direct, indirect or reasonably foreseeable impact on the environment within the meaning of Executive Order 12114. Because no significant environmental impacts will result from implementing the Proposed Action, an environmental impact statement is not required and will not be prepared. Therefore, no further study under Executive Order 12114 is required. As described above, NSF's compliance with the ESA and MMPA is completed.

In sum, NSF concludes that implementation of the Proposed Action will not result in significant impacts after full consideration of the Final EA; the PEIS; the IHA and BiOp/ITS issued by NMFS; and the entire environmental compliance record. Accordingly, on behalf of NSF, I authorize the issuance of a Finding of No Significant Impact for the Proposed Action, the marine seismic surveys activities proposed to be conducted on board Research Vessel *Langseth* in the Eastern Tropical Pacific during the effective time period of the IHA, and hereby approve the Proposed Action to commence.



13 February 2026

Baris Uz
Acting Section Head
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Date

Attachment 1: *Final Environmental Analysis of Marine Geophysical Surveys by R/V Marcus G. Langseth in the Eastern Tropical Pacific, January 2026*