



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

NOV 23 2011

Meagan J. Cummings / Jeff Rupert  
Marine Environmental & Safety Coordinator  
Department of Marine Operations  
Lamont-Doherty Earth Observatory  
P.O. Box 1000  
Palisades, New York 10964-8000

Dear Ms. Cummings:

Enclosed is an Incidental Harassment Authorization (IHA) issued to the Lamont-Doherty Earth Observatory, under the authority of Section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*), to harass small numbers of marine mammals, by Level B harassment, incidental to the R/V *Marcus G. Langseth's* marine seismic survey in the central Pacific Ocean during November, 2011 through January, 2012.

You are required to comply with the conditions contained in the IHA. In addition, you must cooperate with any Federal, state, or local agency monitoring the impacts of your activity and submit a report to the National Marine Fisheries Service's (NMFS) Office of Protected Resources within 90 days of the completion of the cruise. The IHA requires monitoring of marine mammals by qualified individuals before, during, and after seismic activities and reporting of marine mammal observations, including species, numbers, and behavioral modifications potentially resulting from this activity.

If you have any questions concerning the IHA or its requirements, please contact Jeannine Cody, Office of Protected Resources, NMFS, at 301-427-8415.

Sincerely,

James H. Lecky  
Director  
Office of Protected Resources

Enclosures



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DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL MARINE FISHERIES SERVICE

Incidental Harassment Authorization

The Lamont-Doherty Earth Observatory (L-DEO), Columbia University, P.O. Box 1000, 61 Route 9W, Palisades, New York 10964-8000, is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1371(a)(5)(D)) and 50 CFR 216.107, to harass small numbers of marine mammals incidental to a marine geophysical survey conducted by the R/V *Marcus G. Langseth* (*Langseth*) in the central Pacific Ocean, November, 2011 through January, 2012.

1. This Authorization is valid from November 26, 2011 through January 19, 2012.
2. This Authorization is valid only for specified activities associated with the R/V *Marcus G. Langseth's* (*Langseth*) seismic operations as specified in L-DEO's Incidental Harassment Authorization (IHA) application and environmental analysis in the following specified geographic area:

(a) In the central Pacific Ocean in international waters, bounded by 7-12°N and 148-142°W.

3. Species Authorized and Level of Takes

(a) The incidental taking of marine mammals, by Level B harassment only, is limited to the following species in international waters in the central Pacific Ocean:

- (i) Mysticetes – see Table 2 (attached) for authorized species and take numbers.
- (ii) Odontocetes – see Table 2 (attached) for authorized species and take numbers.
- (iii) If any marine mammal species are encountered during seismic activities that are not listed in Table 2 (attached) for authorized taking and are likely to be exposed to sound pressure levels (SPLs) greater than or equal to 160 dB re 1  $\mu$ Pa (rms), then the Holder of this Authorization must alter speed or course, power-down or shut-down the airguns to avoid take.

(c) The methods authorized for taking by Level B harassment is limited to the following acoustic sources without an amendment to this Authorization:

- (i) an 36-airgun array that may range in size from 40 to 360 cubic inches (in<sup>3</sup>) with a total volume of approximately 6,600 cubic inches (in<sup>3</sup>) as an energy source;
- (ii) a multi-beam echosounder;
- (iii) a sub-bottom profiler; and
- (iv) an acoustic release transponder used to communicate with ocean bottom seismometers (OBS).

- 4. The taking of any marine mammal in a manner prohibited under this Authorization must be reported immediately to the Office of Protected Resources, National Marine Fisheries Service (NMFS), at 301-427-8401.
- 5. The Holder of this Authorization is required to cooperate with NMFS and any other Federal, state or local agency monitoring the impacts of the activity on marine mammals.
- 6. Mitigation and Monitoring Requirements

The Holder of this Authorization is required to implement the following mitigation and monitoring requirements when conducting the specified activities to achieve the least practicable adverse impact on affected marine mammal species or stocks:

(a) Utilize two, NMFS-qualified, vessel-based Protected Species Visual Observers (PSVOs) (except during meal times and restroom breaks, when at least one PSVO will be on watch) to visually watch for and monitor marine mammals near the seismic source vessel during daytime airgun operations (from civil twilight-dawn to civil twilight-dusk) and before and during start-ups of airguns day or night. The *Langseth's* vessel crew will also assist in detecting marine mammals, when practicable. PSVOs will have access to reticle binoculars (7x50 Fujinon), big-eye binoculars (25x150), and night vision devices. PSVO shifts will last no longer than 4 hours at a time. PSVOs will also make observations during daytime periods when the seismic system is not operating for comparison of animal abundance and behavior, when feasible.

(b) PSVOs will conduct monitoring while the airgun array and streamers are being deployed or recovered from the water.

(c) Record the following information when a marine mammal is sighted:

- (i) species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), and behavioral pace; and
- (ii) time, location, heading, speed, activity of the vessel (including number of airguns operating and whether in state of ramp-up or power-down), sea state, visibility, and sun glare; and
- (iii) the data listed under 6(c)(ii) will also be recorded at the start and end of each observation watch and during a watch whenever there is a change in one or more of the variables.

(d) Utilize the passive acoustic monitoring (PAM) system, to the maximum extent practicable, to detect and allow some localization of marine mammals around the *Langseth* during all airgun operations and during most periods when airguns are not operating. One PSVO and/or bioacoustician will monitor the PAM at all times in shifts no longer than 6 hours. A bioacoustician shall design and set up the PAM system and be present to operate or oversee PAM, and available when technical issues occur during the survey.

(e) Do and record the following when an animal is detected by the PAM:

- (i) notify the PSVO immediately of a vocalizing marine mammal so a power-down or shut-down can be initiated, if required;
- (ii) enter the information regarding the vocalization into a database. The data to be entered include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position, and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information.

(f) Visually observe the entire extent of the exclusion zone (180 dB for cetaceans; see Table 1 [attached] for distances) using NMFS-qualified PSVOs, for at least 30 minutes prior to starting the airgun (day or night). If the PSVO finds a marine mammal within the exclusion zone, L-DEO must delay the seismic survey until the marine mammal(s) has left the area. If the PSVO sees a marine mammal that surfaces, then dives below the surface, the observer shall wait 30 minutes. If the PSVO sees no marine mammals during that time, they should assume that the animal has moved beyond the exclusion zone. If for any reason the entire radius cannot be seen for the entire 30 minutes (min) (i.e., rough seas, fog, darkness), or if marine mammals are near, approaching, or in the exclusion zone, the airguns may not be started up. If one airgun is already running at a source level of at least 180 dB, L-DEO may start the second gun without

observing the entire exclusion zone for 30 min prior, provided no marine mammals are known to be near the exclusion zone (in accordance with condition 6(h) below).

(g) Establish a 180-dB exclusion zone for marine mammals before the 36-airgun array (6,600 in<sup>3</sup>) is in operation; and a 180-dB exclusion zone before a single airgun (40 in<sup>3</sup>) is in operation, respectively. See Table 1 (attached) for distances and safety radii.

(h) Implement a “ramp-up” procedure when starting up at the beginning of seismic operations or anytime after the entire array has been shutdown for more than 8 min, which means start the smallest gun first and add airguns in a sequence such that the source level of the array will increase in steps not exceeding approximately 6 dB per 5-minute period. During ramp-up, the PSVOs will monitor the exclusion zone, and if marine mammals are sighted, a course/speed alteration, power-down, or shut-down will be implemented as though the full array were operational. Therefore, initiation of ramp-up procedures from shut-down requires that the PSVOs be able to view the full exclusion zone as described in 6(f) (above).

(i) Alter speed or course during seismic operations if a marine mammal, based on its position and relative motion, appears likely to enter the relevant exclusion zone. If speed or course alteration is not safe or practicable, or if after alteration the marine mammal still appears likely to enter the exclusion zone, further mitigation measures, such as power-down or shut-down, will be taken.

(j) Power-down or shut-down the airgun(s) if a marine mammal is detected within, approaches, or enters the relevant exclusion zone (as defined in Table 1, attached). A shut-down means all operating airguns are shut-down. A power-down means reducing the number of operating airguns to a single operating 40 in<sup>3</sup> airgun, which reduces the exclusion zone to the degree that the animal(s) is outside of it.

(k) Following a power-down, if the marine mammal approaches the smaller designated exclusion zone, the airguns must then be completely shut-down. Airgun activity will not resume until the PSVO has visually observed the marine mammal(s) exiting the exclusion zone and is not likely to return, or has not been seen within the exclusion zone for 15 min for species with shorter dive durations (small odontocetes) or 30 min for species with longer dive durations (mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales).

(l) Following a power-down or shut-down and subsequent animal departure, airgun operations may resume following ramp-up procedures described in 6(h).

(m) Marine geophysical surveys may continue into night and low-light hours if such segment(s) of the survey is initiated when the entire relevant exclusion zones are visible and can be effectively monitored.

(n) No initiation of airgun array operations is permitted from a shut-down position at night or during low-light hours (such as in dense fog or heavy rain) when the entire relevant exclusion zone cannot be effectively monitored by the PSVOs on duty.

(o) To the maximum extent practicable, schedule seismic operations (i.e., shooting airguns) during daylight hours.

## 7. Reporting Requirements

The Holder of this Authorization is required to:

(a) Submit a draft report on all activities and monitoring results to the Office of Protected Resources, NMFS, within 90 days of the completion of the *Langseth's* central Pacific ocean cruise. This report must contain and summarize the following information:

- (i) Dates, times, locations, heading, speed, weather, sea conditions (including Beaufort sea state and wind force), and associated activities during all seismic operations and marine mammal sightings;
- (ii) Species, number, location, distance from the vessel, and behavior of any marine mammals, as well as associated seismic activity (number of power-downs and shut-downs), observed throughout all monitoring activities.
- (iii) An estimate of the number (by species) of marine mammals that: (A) are known to have been exposed to the seismic activity (based on visual observation) at received levels greater than or equal to 160 dB re 1  $\mu$ Pa (rms) and/or 180 dB re 1  $\mu$ Pa (rms) with a discussion of any specific behaviors those individuals exhibited; and (B) may have been exposed (based on modeling results) to the seismic activity at received levels greater than or equal to 160 dB re 1  $\mu$ Pa (rms) and/or 180 dB re 1  $\mu$ Pa (rms) with a discussion of the nature of the probable consequences of that exposure on the individuals that have been exposed.
- (iv) A description of the implementation and effectiveness of the: (A) terms and conditions of the Biological Opinion's Incidental Take Statement (ITS) (attached); and (B) mitigation measures of the Incidental Harassment Authorization. For the Biological Opinion, the report will confirm the implementation of each Term and Condition, as well as any conservation recommendations, and describe their effectiveness, for minimizing the adverse effects of the action on Endangered Species Act listed marine mammals.

(b) Submit a final report to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, within 30 days after receiving comments from NMFS on the draft report. If NMFS decides that the draft report needs no comments, the draft report will be considered to be the final report.

## 8. Reporting Prohibited Take

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), L-DEO shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and ITP.Cody@noaa.gov and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov).

The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities will not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with L-DEO to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. L-DEO may not resume their activities until notified by NMFS via letter, email, or telephone.

## 9. Reporting an Injured or Dead Marine Mammal with an Unknown Cause of Death

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSVO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), L-DEO will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and ITP.Cody@noaa.gov and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov).

The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with L-DEO to determine whether modifications in the activities are appropriate.

10. Reporting an Injured or Dead Marine Mammal not Related to L-DEO Activities

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSVO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), L-DEO will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and ITP.Cody@noaa.gov and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov), within 24 hours of the discovery. L-DEO will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS.

11. L-DEO is required to comply with the Terms and Conditions of the Incidental Take Statement (ITS) corresponding to NMFS' Biological Opinion issued to both NSF and NMFS' Office of Protected Resources (attached).

12. A copy of this Authorization and the ITS must be in the possession of all contractors and protected species observers operating under the authority of this Incidental Harassment Authorization.



James H. Lecky

11/23/11

Date

Director  
Office of Protected Resources  
National Marine Fisheries Service

Attachments



**Attachment**

**Table 1. Exclusion Zone Radii for Triggering Mitigation.**

<b>Source and Volume</b>	<b>Water Depth</b>	<b><u>Predicted RMS Distances (m)</u></b>	
		<b>160 dB</b>	<b>180 dB</b>
Single Bolt airgun (40 in <sup>3</sup> )	Deep (> 1,000 m)	385	40
36-Airgun Array		3,850	940

**Table 2. Authorized Take Numbers for Each Marine Mammal Species in the Central Pacific Ocean Survey Area.**

<b>Species</b>	<b>Authorized Take</b>
Bryde's whale ( <i>Balaenoptera brydei</i> )	8
Blue whale ( <i>Balaenoptera musculus</i> )	2
Sperm whale ( <i>Physeter macrocephalus</i> )	41
Dwarf sperm whale ( <i>Kogia sima</i> )	105
Cuvier's beaked whale ( <i>Ziphius cavirostris</i> )	91
Longman's beaked whale ( <i>Indopacetus pacificus</i> )	14
<i>Mesoplodon</i> spp. Includes unidentified, ginkgo-toothed and Blainville's beaked whales.	5
Rough-toothed dolphin ( <i>Steno bredanensis</i> )	17
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	68
Pantropical spotted dolphin ( <i>Stenella attenuata</i> )	1,651
Spinner dolphin ( <i>Stenella longirostris</i> )	2,516
Striped dolphin ( <i>Stenella coeruleoalba</i> )	226
Fraser's dolphin ( <i>Lagenodelphis hosei</i> )	182
Risso's dolphin ( <i>Grampus griseus</i> )	14
Melon-headed whale ( <i>Peponocephala electra</i> )	101
False killer whale ( <i>Pseudorca crassidens</i> )	9
Killer whale ( <i>Orcinus orca</i> )	5
Short-finned pilot whale ( <i>Globicephala macrorhynchus</i> )	69

\* The Incidental Take Statement does not authorize take for humpback, sei, or fin whales.

## INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the “take” of endangered and threatened species, respectively, without special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the Lamont-Doherty Earth Observatory and NMFS’ Office of Protected Resources Permits and Conservation Division so that they become binding conditions for the exemption in section 7(o)(2) to apply. Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA and the proposed action may incidentally take individuals of listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. To minimize such impacts, reasonable and prudent measures, and term and conditions to implement the measures, must be provided. Only incidental take resulting from the agency actions and any specified reasonable and prudent measures and terms and conditions identified in the incidental take statement are exempt from the taking prohibition of section 9(a), pursuant to section 7(o) of the ESA.

Section 7(b)(4)(C) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the MMPA. One of the federal actions considered in this Opinion is NMFS’ Permits and Conservation Division’s proposed authorization of the incidental taking of blue whales and sperm whales pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act. With this authorization, the incidental take of listed whales is exempt from the taking prohibition of section 9(a), pursuant to section 7(o) of the ESA.

NMFS anticipates the incidental harassment of the blue whales (*Balaenoptera musculus*), and sperm whales (*Physeter macrocephalus*), as well as green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), olive ridley (*Lepidochelys olivacea*) and leatherback sea turtles (*Dermochelys coriacea*) during the proposed survey activities.

### **Amount or Extent of Take**

NMFS anticipates the proposed action to conduct a seismic survey in the central North Pacific Ocean might result in the incidental take of listed species. Blue and sperm whales as well as green, hawksbill, olive ridley and leatherback sea turtles may be exposed to seismic sounds at received levels above 160 dB re 1  $\mu$ Pa. The proposed action might take 2 blue whales and 41 sperm whales by exposing individuals to received levels greater than 160 dB re 1  $\mu$ Pa. These

estimates are based on the best available information on whale densities in the area to be ensonified above 160 dB re 1  $\mu$ Pa during the proposed activities. This incidental take would result from exposure to acoustic energy during seismic operations, would be in the form of harassment, and is not expected to result in the death or injury of any individuals that are exposed.

We also expect the proposed action might also take individual green, hawksbill, olive ridley and leatherback sea turtles as a result of exposure to acoustic energy during seismic surveying, and we expect this take would also be in the form of harassment, with no death or injury expected for individuals exposed. Harassment of these sea turtles is expected to occur at received levels of seismic sounds above 166 dB re 1  $\mu$ Pa. Because density estimates of sea turtles in the survey area are unknown, we estimate take as the number of turtles exposed to seismic operations above 166 dB re 1  $\mu$ Pa during the proposed activities. These turtles could be of all ages and life stages in the survey area.

Harassment of blue and sperm whales exposed to seismic surveys at levels less than 160 dB re 1  $\mu$ Pa, or of green, hawksbill, olive ridley or leatherback sea turtles at levels less than 166 dB re 1  $\mu$ Pa, is not expected. We do not expect listed species to be taken by operation of the multibeam echosounder or the sub-bottom profiler. However, if overt adverse reactions (for example, dive reactions, or rapid departures from the area) by listed whales or listed sea turtles are observed outside of the 160 dB re 1  $\mu$ Pa, or 166 dB re 1  $\mu$ Pa isopleths, respectively, while airguns are operating, incidental take may be exceeded. Additionally, if such reactions by listed species are observed while the multibeam echosounder or the sub-bottom profiler are in operation, this may constitute take that is not covered in this Incidental Take Statement. If such overt adverse reactions are observed the Lamont-Doherty Earth Observatory and NMFS' Permits and Conservation Division must contact the Endangered Species Act Interagency Cooperation Division within 48 hours of the incident at 301-427-8403 and/or by email to [kellie.foster-taylor@noaa.gov](mailto:kellie.foster-taylor@noaa.gov) to determine whether reinitiation of consultation is required.

Any incidental take of blue whales, sperm whales, or green, hawksbill, olive ridley and leatherback sea turtles is restricted to the permitted action as proposed. If the actual incidental take meets or exceeds the predicted level, the Lamont-Doherty Earth Observatory and NMFS' Permits and Conservation Division must reinitiate consultation. All anticipated takes would be "takes by harassment", as described previously, involving temporary changes in behavior.

### **Reasonable and Prudent Measures**

NMFS believes the reasonable and prudent measure described below is necessary and appropriate to minimize the amount of incidental take of listed blue and sperm whales and green, hawksbill, olive ridley and leatherback sea turtles resulting from the proposed action. This measure is non-discretionary and must be a binding condition of the Lamont-Doherty Earth Observatory and NMFS' authorization for the exemption in section 7(o)(2) to apply. If the Lamont-Doherty Earth Observatory or NMFS fail to ensure compliance with this term and conditions and its implementing terms and conditions, the protective coverage of section 7(o)(2) may lapse.

The Lamont-Doherty Earth Observatory must implement and monitor the effectiveness of mitigation measures incorporated as part of the proposed authorization of the incidental taking of blue and sperm whales pursuant to section 101(a)(5)(D) of the MMPA.

### **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the ESA, NMFS' Permits and Conservation Division and the Lamont-Doherty Earth Observatory must comply with the following terms and conditions, which implement the Reasonable and Prudent Measure described above. These terms and conditions are non-discretionary.

To implement the Reasonable and Prudent Measure, Lamont-Doherty Earth Observatory and NMFS' Permits and Conservation Division shall ensure that:

1. Mitigation and Monitoring Requirements

The Lamont-Doherty Earth Observatory is required to implement the following mitigation and monitoring requirements when conducting this survey to achieve the least practicable adverse impact on affected marine mammal species or stocks:

(a) Utilize two, NMFS-qualified, vessel-based Protected Species Visual Observers (PSVOs) (except during meal times and restroom breaks, when at least one PSVO will be on watch) to visually watch for and monitor marine mammals near the seismic source vessel during daytime airgun operations (from civil twilight-dawn to civil twilight-dusk) and before and during start-ups of airguns day or night. The *Langseth's* vessel crew shall also assist in detecting marine mammals, when practicable. PSVOs will have access to reticle binoculars (7x50 Fujinon), big-eye binoculars (25x150), and night vision devices. PSVO shifts shall last no longer than 4 hours at a time. PSVOs will also make observations during daytime periods when the seismic system is not operating for comparison of animal abundance and behavior, when feasible.

(b) PSVOs will conduct monitoring while the airgun array and streamer(s) are being deployed or recovered from the water.

(c) Record the following information when a marine mammal is sighted:

(i) species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), and behavioral pace; and

(ii) time, location, heading, speed, activity of the vessel (including number of airguns operating and whether in state of ramp-up or power-down), Beaufort sea state and wind force, visibility, and sun glare; and

(iii) the data listed under Condition 1(c)(ii) will also be recorded at the start and end of each observation watch and during a watch whenever there is a change in one or more of the variables.

(d) Utilize the passive acoustic monitoring (PAM) system, to the maximum extent practicable, to detect and allow some localization of marine mammals around the *Langseth* during all airgun operations and during most periods when airguns are not operating. One PSVO and/or bioacoustician will monitor the PAM at all times in shifts no longer than 6 hours. A bioacoustician shall design and set up the PAM system and be present to operate or oversee PAM, and available when technical issues occur during the survey.

(e) Do and record the following when an animal is detected by the PAM:

(i) notify the on-duty PSVO(s) immediately of a vocalizing marine mammal so a power-down or shut-down can be initiated, if required;

(ii) enter the information regarding the vocalization into a database. The data to be entered include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position, and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information.

(f) Visually observe the entire extent of the exclusion zone (EZ) (180 dB re 1  $\mu$ Pa [rms] for cetaceans using NMFS-qualified PSVOs, for at least 30 minutes (min) prior to starting the airgun array (day or night). If the PSVO finds a marine mammal within the EZ, the Lamont-Doherty Earth Observatory must delay the seismic survey until the marine mammal(s) has left the area. If the PSVO sees a marine mammal that surfaces, then dives below the surface, the PSVO shall wait 30 min. If the PSVO sees no marine mammals during that time, they should assume that the animal has moved beyond the EZ. If for any reason the entire radius cannot be seen for the entire 30 minutes (i.e., rough seas, fog, darkness), or if marine mammals are near, approaching, or in the EZ, the airguns may not be ramped-up. If one airgun is already running at a source level of at least 180 dB re 1  $\mu$ Pa (rms), the Lamont-Doherty Earth Observatory may start the second airgun without observing the entire EZ for 30 min prior, provided no marine mammals are known to be near the EZ (in accordance with Condition 1[h] below).

(g) Establish a 180 dB re 1  $\mu$ Pa (rms) EZ for marine mammals before the 36 airgun array (6,600 in<sup>3</sup>) is in operation; and a 180 dB re 1  $\mu$ Pa (rms) EZ before a single airgun (40 in<sup>3</sup>) is in operation, respectively. See Table 1 in the Incidental Harassment Authorization for distances and EZs.

(h) Implement a “ramp-up” procedure when starting up at the beginning of seismic operations or anytime after the entire array has been shutdown for more than 8 min, which means start the smallest gun first and add airguns in a sequence such that the source level of the array shall increase in steps not exceeding approximately 6 dB per 5-min period. During ramp-up, the PSVOs shall monitor the EZ, and if marine mammals are sighted, a power-down, or shut-down shall be implemented as though the full array were operational. Therefore, initiation of ramp-up procedures from shut-down requires that the PSVOs be able to view the full EZ as described in Condition 1(f) (above).

(i) Alter speed or course during seismic operations if a marine mammal, based on its position and relative motion, appears likely to enter the relevant EZ. If speed or course alteration is not safe or practicable, or if after alteration the marine mammal still appears likely to enter the EZ, further mitigation measures, such as a power-down or shut-down, will be taken.

(j) Power-down or shut-down the airgun(s) if a marine mammal is detected within, approaches, or enters the relevant EZ. A shut-down means all operating airguns are shut-down (i.e., turned off). A power-down means reducing the number of operating airguns to a single operating 40 in<sup>3</sup> airgun, which reduces the EZ to the degree that the animal(s) is no longer in or about to enter it.

(k) Following a power-down, if the marine mammal approaches the smaller designated EZ, the airguns must then be completely shut-down. Airgun activity will not resume until the PSVO has visually observed the marine mammal(s) exiting the EZ and is not likely to return, or has not been seen within the EZ for 15 min for species with shorter dive durations (small odontocetes) or 30 min for species with longer dive durations (mysticetes and large odontocetes, including sperm whales).

(l) Following a power-down or shut-down and subsequent animal departure, airgun operations may resume following ramp-up procedures described in Condition 1(h).

(m) Marine geophysical surveys may continue into night and low-light hours if such segment(s) of the survey is initiated when the entire relevant EZs are visible and can be effectively monitored.

(n) No initiation of airgun array operations is permitted from a shut-down position at night or during low-light hours (such as in dense fog or heavy rain) when the entire relevant EZ cannot be effectively monitored by the PSVO(s) on duty.

## 2. Reporting Requirements

The Lamont-Doherty Earth Observatory is required to:

(a) Submit a draft report on all activities and monitoring results to the Office of Protected Resources, NMFS, within 90 days of the completion of the *Langseth*'s central North Pacific cruise. This report must contain and summarize the following information:

(i) Dates, times, locations, heading, speed, weather, sea conditions (including Beaufort sea state and wind force), and associated activities during all seismic operations and marine mammal sightings;

(ii) Species, number, location, distance from the vessel, and behavior of any marine mammals, as well as associated seismic activity (number of power-downs and shut-downs), observed throughout all monitoring activities.

(iii) An estimate of the number (by species) of marine mammals that: (A) are known to have been exposed to the seismic activity (based on visual observation) at received levels greater than or equal to 160 dB re 1  $\mu$ Pa (rms) and/or 180 dB re 1  $\mu$ Pa (rms) with a discussion of any specific behaviors those individuals exhibited; and (B) may have been exposed (based on modeling results) to the seismic activity at received levels greater than or equal to 160 dB re 1  $\mu$ Pa (rms) and/or 180 dB re 1  $\mu$ Pa (rms) with a discussion of the nature of the probable consequences of that exposure on the individuals that have been exposed.

(iv) A description of any overt adverse reactions (for example, dive reactions, or rapid departures from the area) by listed whales or listed sea turtles observed outside of the 160 dB re 1  $\mu$ Pa or 166 dB re 1  $\mu$ Pa isopleths, respectively, while airguns and/or the multibeam echosounder and sub-bottom profiler are operating.

(v) A description of the implementation and effectiveness of the: (A) terms and conditions of the Biological Opinion's Incidental Take Statement (ITS); and (B) mitigation measures of the Incidental Harassment Authorization. For the Biological Opinion, the report shall confirm the implementation of each Term and Condition, as well as any conservation recommendations, and describe their effectiveness, for minimizing the adverse effects of the action on Endangered Species Act-listed marine mammals.

(b) Submit a final report to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, within 30 days after receiving comments from NMFS on the draft report. If NMFS decides that the draft report needs no comments, the draft report shall be considered to be the final report.

### 3. Reporting Prohibited Take

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), the Lamont-Doherty Earth Observatory shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and ITP.Cody@noaa.gov and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov).



The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities will not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with the Lamont-Doherty Earth Observatory to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. the Lamont-Doherty Earth Observatory may not resume their activities until notified by NMFS via letter, email, or telephone.

4. Reporting an Injured or Dead Marine Mammal with an Unknown Cause of Death

In the event that the Lamont-Doherty Earth Observatory discovers an injured or dead marine mammal, and the lead PSVO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), the Lamont-Doherty Earth Observatory will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and ITP.Cody@noaa.gov and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov).

The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with the Lamont-Doherty Earth Observatory to determine whether modifications in the activities are appropriate.

5. Reporting an Injured or Dead Marine Mammal not Related to the Lamont-Doherty Earth Observatory Activities

In the event that the Lamont-Doherty Earth Observatory discovers an injured or dead marine mammal, and the lead PSVO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the Lamont-Doherty Earth Observatory will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and ITP.Cody@noaa.gov and the Pacific Islands

Regional Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov), within 24 hours of the discovery. The Lamont-Doherty Earth Observatory will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS.

6. The Lamont-Doherty Earth Observatory is required to comply with the Terms and Conditions of the Incidental Take Statement (ITS) corresponding to NMFS' Biological Opinion issued to both the National Science Foundation and NMFS' Office of Protected Resources Permits and Conservation Division.