



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

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

INCIDENTAL HARASSMENT AUTHORIZATION

We hereby authorize the Lamont-Doherty Earth Observatory (Observatory), Columbia University, P.O. Box 1000, 61 Route 9W, Palisades, New York 10964-8000, 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 incidentally 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, May-June, 2012.

1. This Authorization is valid from May 1, 2012 through June 11, 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 the Observatory's Incidental Harassment Authorization (IHA) application and environmental analysis in the following specified geographic area:
 - (a) In the central Pacific Ocean in the Exclusive Economic Zones of the United States and the Republic of Kiribati, within the boundary of approximately 0.5–8° S by 156–162° W specified in the Observatory's application and the National Science Foundation's environmental analysis.

3. SPECIES AUTHORIZED AND LEVEL OF TAKES

- (a) This authorization limits the incidental taking of marine mammals, by Level B harassment only, to the following species in the area described in Condition 2(a):
 - (i) Mysticetes – see Table 1 (attached) for authorized species and take numbers.
 - (ii) Odontocetes – see Table 1 (attached) for authorized species and take numbers.
 - (iii) During the seismic activities, if the Holder of this Authorization encounters any marine mammal species that are not listed in Table 1 (attached) for authorized taking and are likely to be exposed to sound pressure levels greater than or equal to 160 decibels (dB) re: 1 μ Pa, then the Holder must alter speed or course or shut-down the airguns to avoid take.
- (b) This Authorization prohibits the taking by injury (Level A harassment), serious injury, or death of any of the species listed in Condition 3(a) or the taking of any kind of any other species of marine mammal. Thus, it may result in the modification, suspension or revocation of this Authorization.



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

- (i) a low-energy Sercel Generator Injector (GI) 2-airgun array that may range in size from 45 or 105 cubic inches (in³) with a total volume of approximately 210 in³ at a tow depth of 3 meters (m).
- (ii) an acoustic Doppler current profiler;
- (iii) a multi-beam echosounder; and
- (iv) a sub-bottom profiler.

4. The Holder of this Authorization must report the taking of any marine mammal in a manner prohibited under this Authorization immediately to the Office of Protected Resources, National Marine Fisheries Service, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and ITP.Cody@noaa.gov and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 (David.Schofield@noaa.gov).
5. We require the Holder of this Authorization to cooperate with the Office of Protected Resources, National Marine Fisheries Service and any other Federal, state or local agency monitoring the impacts of the activity on marine mammals.

6. MITIGATION AND MONITORING REQUIREMENTS

We require the Holder of this Authorization 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:

6. VISUAL OBSERVERS

(a) Utilize two, National Marine Fisheries Service-qualified, vessel-based Protected Species Visual Observers (visual observers) to 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.

- (i) At least one visual observer will be on watch during meal times and restroom breaks.
- (ii) Observer shifts will last no longer than four hours at a time.
- (iii) Visual observers will also conduct monitoring while the Langseth crew deploy and recover the airgun array and streamers from the water.
- (iv) When feasible, visual observers will conduct observations during daytime periods when the seismic system is not operating for comparison of sighting rates and behavioral reactions during, between, and after airgun operations.
- (v) The *Langseth's* vessel crew will also assist in detecting marine mammals, when practicable. Visual observers will have access to reticle binoculars (7x50 Fujinon), big-eye binoculars (25x150), and night vision devices.

6. EXCLUSION ZONES

(b) Establish a 180-dB exclusion zone (zone) for cetaceans and a 190-dB exclusion zone for pinnipeds before starting the two GI airgun array (90 in³ through 210 in³ in total volume). See Table 2 (attached) for distances of the exclusion zones. Observers will use the predicted radius distance for the 180-dB zone for cetaceans and the predicted distance for the 190-dB zone for pinnipeds.

6. VISUAL MONITORING AT THE START OF AIRGUN OPERATIONS

(c) Monitor the entire extent of the zones listed in Table 2 (attached) for at least 30 minutes (day or night) prior to the ramp-up of airgun operations or after an extended shutdown (*i.e.*, 15 minutes).

(d) Delay airgun operations if the visual observer sees a cetacean within the 180-dB zone for cetaceans or the 190-dB zone for pinnipeds until the marine mammal(s) has left the area.

- (i) If the visual observer sees a marine mammal that surfaces, then dives below the surface, the observer shall wait 30 minutes. If the observer sees no marine mammals during that time, he/she should assume that the animal has moved beyond the 180-dB zone for cetaceans or the 190-dB zone for pinnipeds.
- (ii) If for any reason the visual observer cannot see the full 180-dB zone for cetaceans or the full 190-dB zone for pinnipeds for the entire 30 minutes (*i.e.*, rough seas, fog, darkness), or if marine mammals are near, approaching, or within zone, the *Langseth* may not resume airgun operations.
- (iii) If one airgun is already running at a source level of at least 180 dB re: 1 μ Pa, the *Langseth* may start the second gun without observing relevant exclusion zones for 30 minutes, provided that the observers have not seen any marine mammals near the relevant exclusion zones (in accordance with Condition 6(b)).

6. RAMP-UP PROCEDURES

(e) Implement a “ramp-up” procedure when starting the airguns at the beginning of seismic operations or anytime after the entire array has been shut down for more than 15 minutes. Start with a single GI airgun and add the second GI airgun after five minutes.

(f) Monitor the full 180-dB zone for cetaceans and the full 190-dB zone for pinnipeds during ramp-up. If the observer sees a marine mammal within or about to enter the relevant zone, then the *Langseth* will implement a course/speed alteration or shutdown as though the full array (both GI airguns) were operational. Initiation of ramp-up procedures requires that the observers can effectively monitor the full exclusion zones described in Condition 6(b).

6. RECORDING VISUAL DETECTIONS

(g) Visual observers must record the following information when they have sighted a marine mammal:

- (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 shut-down), Beaufort sea state and wind force, visibility, and sun glare; and
- (iii) The data listed under 6(g)(ii) 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.

6. PASSIVE ACOUSTIC MONITORING

(h) Utilize the passive acoustic monitoring system (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.

- (i) One visual observer and/or bioacoustician will monitor the system at all times in shifts no longer than six hours.
- (ii) A bioacoustician shall design and set up the system and be present to operate or oversee it. He/she shall be available when technical issues arise during the survey.

(i) The bioacoustician must record the following when the passive acoustic monitoring system detects an animal:

- (i) Notify the visual observers immediately of a vocalizing marine mammal so that the *Langseth* can initiate a power-down or shut-down, if required;
- (ii) Enter the information regarding the vocalization into a database. This includes:
 - an acoustic encounter identification number;
 - any linkages to a visual sighting;
 - the date/time of the first and last signal detected;
 - the position, water depth when first detected, and bearing if determinable,
 - the species or species group (*e.g.*, unidentified dolphin, sperm whale);
 - the types and nature of sounds heard (*e.g.*, clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.); and
 - any other notable information.

6. SPEED OR COURSE ALTERATION

(j) 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, the Holder of this Authorization will implement further mitigation measures, such as a shutdown.

6. SHUTDOWN PROCEDURES

(k) Shutdown the airgun(s) if a visual observer detects a marine mammal within, approaching, or entering the relevant exclusion zones (as defined in Table 2, attached). A shutdown means that the *Langseth* turns off each operating airgun.

6. RESUMING AIRGUN OPERATIONS AFTER A SHUTDOWN

(l) Following a shutdown, the *Langseth* shall not resume airgun activity until the visual observer has seen the marine mammal(s) exiting the relevant exclusion zone and the animal is not likely to return or the observer has not seen the animal within the relevant exclusion zone for 15 minutes for species with shorter dive times (*i.e.*, small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (*i.e.*, mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales).

(m) Following shut-down and subsequent animal departure, the *Langseth* may resume airgun operations following ramp-up procedures described in Conditions 6(e) and 6(f).

6. SURVEY OPERATIONS AT NIGHT

(n) The *Langseth* may continue marine geophysical surveys into night and low-light hours if the Holder of the Authorization initiates these segment(s) of the survey when the observers can view and effectively monitor the full relevant exclusion zones.

(o) This Authorization does not permit the Holder of this Authorization to initiate airgun array operations from a shut-down position at night or during low-light hours (such as in dense fog or heavy rain) when the visual observers cannot view and effectively monitor the full relevant exclusion zones.

(p) To the maximum extent practicable, the Holder of this Authorization should schedule seismic operations (*i.e.*, shooting the airguns) during daylight hours.

7. REPORTING REQUIREMENTS

This Authorization requires the Holder of this Authorization to:

(a) Submit a draft report on all activities and monitoring results to the Office of Protected Resources, National Marine Fisheries Service, 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 shutdowns), observed throughout all monitoring activities.
- (iii) An estimate of the number (by species) of marine mammals with known exposures to the seismic activity (based on visual observation) at received levels greater than or equal to 160 dB re: 1 μ Pa and/or 180 dB re 1 μ Pa for cetaceans and 190 dB re 1 μ Pa for pinnipeds and a discussion of any specific behaviors those individuals exhibited.

- (iv) An estimate of the number (by species) of marine mammals with estimated exposures (based on modeling results) to the seismic activity at received levels greater than or equal to 160 dB re: 1 μ Pa and/or 180 dB re 1 μ Pa for cetaceans and 190 dB re 1 μ Pa for pinnipeds with a discussion of the nature of the probable consequences of that exposure on the individuals.
- (v) A description of the implementation and effectiveness of the: (A) terms and conditions of the Biological Opinion's Incidental Take Statement (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, National Marine Fisheries Service, within 30 days after receiving comments from us on the draft report. If we decide that the draft report needs no comments, we will consider the draft report 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 this Authorization, such as an injury (Level A harassment), serious injury or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), the Observatory shall immediately cease the specified activities and immediately report the incident to the Acting Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@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).

The Observatory will not resume their activities until we are able to review the circumstances of the prohibited take. We will work with the Observatory to determine what is necessary to minimize the likelihood of further prohibited take and ensure Marine Mammal Protection Act compliance. The Observatory may not resume their activities until we notify them by letter, email, or telephone.

9. REPORTING AN INJURED OR DEAD MARINE MAMMAL WITH AN UNKNOWN CAUSE OF DEATH

In the event that the Observatory discovers an injured or dead marine mammal, and the lead visual observer 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 Observatory will immediately report the incident to the Acting Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@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 Condition 8. Activities may continue while we review the circumstances of the incident. We will work with the Observatory to determine whether modifications in the activities are appropriate.

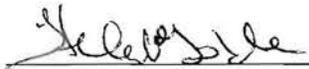
10. REPORTING AN INJURED OR DEAD MARINE MAMMAL NOT RELATED TO THE ACTIVITIES

In the event that the Observatory discovers an injured or dead marine mammal, and the lead visual observer determines that the injury or death is not associated with or related to the activities authorized in the Authorization (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the Observatory will report the incident to the Acting Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@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 Observatory will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to us.

11. ENDANGERED SPECIES ACT BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The Observatory is required to comply with the Terms and Conditions of the Incidental Take Statement corresponding to the Endangered Species Act Biological Opinion issued to both the National Science Foundation and the National Marine Fisheries Service's Office of Protected Resources, Permits and Conservation Division (attached).

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



Helen M. Golde
Acting Director,
Office of Protected Resources
National Marine Fisheries Service

4/30/12
Date

Attachments

Attachment

Table 1. Authorized Level B take for the Observatory’s seismic survey in the central Pacific Ocean, during May through June, 2012.

Species	Requested Take Authorization
Bryde's whale	4
Sperm whale	8
Dwarf sperm whale	18
Cuvier’s beaked whale	16
Longman’s beaked whale	14
<i>Mesoplodon</i> spp.	4
Rough-toothed dolphin	13
Bottlenose dolphin	12
Pantropical spotted dolphin	279
Spinner dolphin	425
Striped dolphin	46
Fraser’s dolphin	182
Risso’s dolphin	14
Melon-headed whale	101
False killer whale	9
Short-finned pilot whale	24

Table 2. Distances to which sound levels $\geq 160, 180, 190$ dB re: $1 \mu\text{Pa}$ (rms) could be received in deep water

Source and Volume	Tow Depth (m)	Water Depth (m)	Predicted RMS Radii Distances (m)		
			160 dB	180 dB	190 dB
Two GI airguns (105 in ³)	3	Deep (> 1,000)	670	70	20

during the proposed seismic survey in the central Pacific Ocean, May through June, 2012.

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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 sperm whales pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act. With this authorization, the incidental take of sperm 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 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. 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 μ Pa. The proposed action might take 8 sperm whales by exposing

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individuals to received levels greater than 160 dB re 1 μ Pa. These estimates are based on the best available information on whale densities in the area to be ensounded above 160 dB re 1 μ 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 μ Pa. Because density estimates of sea turtles in the survey area are unknown, we estimate take as all the sea turtles that occur within the geographical extent of sound above 166 dB re 1 μ Pa during the proposed activities. These turtles could be of all ages and life stages in the survey area.

Harassment of sperm whales exposed to seismic surveys at levels less than 160 dB re 1 μ Pa, or of green, hawksbill, olive ridley or leatherback sea turtles at levels less than 166 dB re 1 μ Pa, is not expected. We do not expect listed species to be taken by operation of the multibeam echosounder, the sub-bottom profiler or the acoustic Doppler current 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 μ Pa, or 166 dB re 1 μ 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, the sub-bottom profiler or the acoustic Doppler current 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 to determine whether reinitiation of consultation is required.

Any incidental take of 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 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.

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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 sperm whales pursuant to section 101(a)(5)(D) of the MMPA and as specified below for sea turtles.

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:

Mitigation and Monitoring Requirements

1. Visual Observers

The Lamont-Doherty Earth Observatory shall:

- (a) utilize two, National Marine Fisheries Service-qualified, vessel-based Protected Species Visual Observers (visual observers) to watch for and monitor marine mammals and sea turtles 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.
 - (i) At least one visual observer will be on watch during meal times and restroom breaks.
 - (ii) Observer shifts will last no longer than four hours at a time.
 - (iii) Visual observers will also conduct monitoring while the Langseth crew deploy and recover the airgun array and streamers from the water.
 - (iv) When feasible, visual observers will conduct observations during daytime periods when the seismic system is not operating for comparison of sighting rates and behavioral reactions during, between, and after airgun operations.
 - (v) The *Langseth's* vessel crew will also assist in detecting marine mammals and sea turtles, when practicable. Visual observers will have access to reticle binoculars (7x50 Fujinon), big-eye binoculars (25x150), and night vision devices.

2. Exclusion Zones

The Lamont-Doherty Earth Observatory shall:

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- (a) Establish a 180-dB exclusion zone (EZ) for cetaceans and sea turtles before starting the two GI airgun array (90 in³ or 210 in³ in total volume). Observers will use the predicted radius distance for the 180-dB EZ for cetaceans and sea turtles.

3. Visual Monitoring at the Start of Airgun Operations

The Lamont-Doherty Earth Observatory shall:

- (a) Monitor the entire extent of the EZ for at least 30 minutes (day or night) prior to the ramp-up of airgun operations or after an extended shutdown (*i.e.*, 15 minutes) for marine mammals and 15 minutes for sea turtles.
- (b) Delay airgun operations if the visual observer sees a cetacean or sea turtle within the 180-dB EZ for cetaceans until the animal(s) has left the area.
 - (i) If the visual observer sees a marine mammal that surfaces, then dives below the surface, the observer shall wait 30 minutes. If the observer sees no marine mammals during that time, he/she should assume that the animal has moved beyond the 180-dB EZ for cetaceans.
 - (ii) If for any reason the visual observer cannot see the full 180-dB EZ for cetaceans for the entire 30 minutes or 15 minutes for sea turtles (*i.e.*, rough seas, fog, darkness), or if marine mammals or sea turtles are near, approaching, or within zone, the *Langseth* may not resume airgun operations.
 - (iii) If one airgun is already running at a source level of at least 180 dB re: 1 μ Pa, the *Langseth* may start the second gun without observing relevant EZ for 15 or 30 minutes for sea turtles and marine mammals, respectively, provided that the observers have not seen any sea turtles or mammals near the relevant EZ (in accordance with Condition 2(a)).

4. Ramp-Up Procedures

The Lamont-Doherty Earth Observatory shall:

- (a) Implement a "ramp-up" procedure when starting the airguns at the beginning of seismic operations or anytime after the entire array has been shut down for more than 15 minutes. Start with a single GI airgun and add the second GI airgun after five minutes.
- (b) Monitor the full 180-dB zone for cetaceans and sea turtles during ramp-up. If the observer sees a marine mammal or sea turtle within or about to enter the relevant zone, then the *Langseth* will implement a course/speed alteration or shutdown as though the full array (both GI airguns) were operational. Initiation of ramp-up procedures requires that the observers can effectively monitor the full exclusion zones described in Condition 2(a).

5. Recording Visual Detections

The Lamont-Doherty Earth Observatory shall:

- (a) Visual observers must record the following information when they have sighted a marine mammal or sea turtle:

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- (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 shut-down), Beaufort sea state and wind force, visibility, and sun glare; and
 - (iii) The data listed under 5(a)(ii) 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.
6. Speed or Course Alteration
The Lamont-Doherty Earth Observatory shall:
- (a) Alter speed or course during seismic operations if a marine mammal or sea turtle, 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 animal still appears likely to enter the exclusion zone, further mitigation measures shall be implemented, such as a shutdown.
7. Shutdown Procedures
The Lamont-Doherty Earth Observatory shall:
- (a) Shut down the airgun(s) if a visual observer detects a marine mammal or sea turtle within, approaching, or entering the relevant exclusion zones. A shutdown means that the *Langseth* turns off each operating airgun.
8. Resuming Airgun Operations After a Shutdown
The Lamont-Doherty Earth Observatory shall:
- (a) Following a shutdown, the *Langseth* shall not resume airgun activity until the visual observer has seen the marine mammal or sea turtles exiting the relevant exclusion zone and the animal is not likely to return or the observer has not seen the animal within the relevant exclusion zone for 15 minutes for species with shorter dive times (*i.e.*, small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (*i.e.*, mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales).
 - (b) Following shut-down and subsequent animal departure, the *Langseth* may resume airgun operations following ramp-up procedures described in Conditions 4(a) and 4(b).
9. Survey Operations at Night
The Lamont-Doherty Earth Observatory shall:
- (a) The *Langseth* may continue marine geophysical surveys into night and low-light hours if these segment(s) of the survey when the observers can view and effectively monitor the full relevant exclusion zones.

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- (b) Initiation of airgun array operations from a shut-down position at night or during low-light hours (such as in dense fog or heavy rain) when the visual observers cannot view and effectively monitor the full relevant exclusion zones is prohibited.
- (c) To the maximum extent practicable, seismic operations (*i.e.*, shooting the airguns) should be scheduled during daylight hours.

Reporting Requirements

1. The Lamont-Doherty Earth Observatory shall:

- (a) Submit a draft report on all activities and monitoring results to the Office of Protected Resources, National Marine Fisheries Service, 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 shutdowns), observed throughout all monitoring activities.
 - (iii) An estimate of the number (by species) of marine mammals and sea turtles with known exposures to the seismic activity (based on visual observation) at received levels greater than or equal to 160 dB re: 1 μ Pa and/or 180 dB re 1 μ Pa for cetaceans and a discussion of any specific behaviors those individuals exhibited.
 - (iv) An estimate of the number (by species) of marine mammals with estimated exposures (based on modeling results) to the seismic activity at received levels greater than or equal to 160 dB re: 1 μ Pa and/or 180 dB re 1 μ Pa for cetaceans with a discussion of the nature of the probable consequences of that exposure on the individuals.
 - (v) A description of the implementation and effectiveness of the: (A) terms and conditions of the Biological Opinion's Incidental Take Statement; 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, National Marine Fisheries Service, within 30 days after receiving comments from NMFS on the draft report. If the draft report needs no comments, NMFS will consider the draft report to be the final report.

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2. Reporting Prohibited Take

The Lamont-Doherty Earth Observatory shall:

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this Authorization, 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 Acting Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@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).

The Lamont Doherty Earth Observatory will not resume their activities until NMFS reviews the circumstances of the prohibited take. NMFS will consult with L-DEO to determine what is necessary to minimize the likelihood of further prohibited take and ensure Marine Mammal Protection Act compliance. The Lamont Doherty Earth Observatory may not resume their activities until we notify them by letter, email, or telephone.

3. 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 visual observer 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 Acting Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@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 Reporting Prohibited Take Condition above. Activities may continue while NMFS reviews the circumstances of the

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incident. The Permits and Conservation Division will work with the Lamont Doherty Earth Observatory to determine whether modifications in the activities are appropriate.

4. Reporting an Injured or Dead Marine Mammal not Related to the Activities

In the event that the Lamont Doherty Earth Observatory discovers an injured or dead marine mammal, and the lead visual observer determines that the injury or death is not associated with or related to the activities authorized in the Authorization (*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 Acting Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@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 the Permits and Conservation Division.