



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

APR 06 2011

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Marine Environmental & Safety Coordinator  
Department of Marine Operations  
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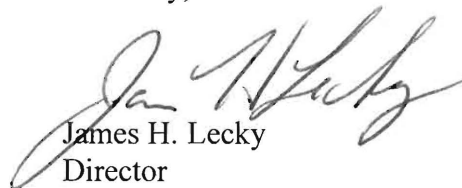
Dear Ms. Cummings:

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 offshore Costa Rica in the eastern tropical Pacific Ocean during April through June, 2011.

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 301-713-2289.

Sincerely,



James H. Lecky  
Director  
Office of Protected Resources

Enclosures



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

Incidental Harassment Authorization

Lamont-Doherty Earth Observatory, 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*) offshore from Costa Rica in the Pacific Ocean April through June 2011.

1. This Authorization is valid from April 7, 2011 through June 6, 2011.
2. This Authorization is valid only for specified activities associated with the R/V *Marcus G. Langseth's* (*Langseth*) seismic operations in the following specified geographic area:
  - (a) Offshore Costa Rica, bounded by 8.5–9° N, 83.75–84.25° W offshore in the Pacific Ocean, as specified in L-DEO's Incidental Harassment Authorization application and Environmental Analysis.

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 the waters offshore from Costa Rica in the 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 authorizing 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.



(b) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in 3(a) or the taking of any kind of any other species of marine mammal is prohibited and may result in the modification, suspension or revocation of this Authorization.

(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 18-airgun subarray that may range in size from 40 to 360 cubic inches (in<sup>3</sup>) with a total volume of approximately 3,300 cubic inches (in<sup>3</sup>) as an energy source;
- (ii) a multi-beam echosounder; and
- (iii) a sub-bottom profiler.

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 301-713-2289.
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 18-airgun subarray (3,330 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* Costa Rica cruise. This report must contain and summarize the following information:

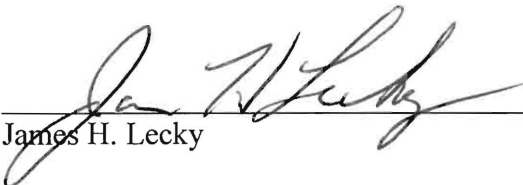
- (i) Dates, times, locations, heading, speed, weather, sea conditions (including Beaufort sea state and wind force), and associated activities during all seismic operations and marine mammal sightings;
- (ii) Species, number, location, distance from the vessel, and behavior of any marine mammals, as 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 listed marine mammals.

(b) Submit a final report to the Chief, Permits, Conservation, and Education 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. In the unanticipated event that any taking of a marine mammal in a manner prohibited by this Authorization occurs, such as an injury, serious injury or mortality, and are judged to result

from these activities, L-DEO will immediately report the incident to the Chief of the Permits, Conservation, and Education Division, Office of Protected Resources, NMFS, at 301-713-2289. L-DEO will postpone the research activities until NMFS is able to review the circumstances of the take. NMFS will work with L-DEO to determine whether modifications in the activities are appropriate and necessary, and notified the permit holder that they may resume sound source operations.

9. In the event that L-DEO discovers an injured or dead marine mammal that is judged to not have resulted from these activities, L-DEO will contact and report the incident to the Chief of the Permits, Conservation, and Education Division, Office of Protected Resources, NMFS, at 301-713-2289 within 24 hours of the discovery.
10. 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).
11. 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.

  
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James H. Lecky  
Director  
Office of Protected Resources  
National Marine Fisheries Service

**APR 06 2011**

\_\_\_\_\_  
Date

Attachments

**Attachment**

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

Source and Volume	Water Depth	<u>Predicted RMS Distances (m)</u>	
		<b>180 dB</b>	<b>160 dB</b>
Single Bolt airgun (40 in <sup>3</sup> )	Shallow < 100 m	296	1,050
	Intermediate 100 – 1,000 m	60	578
	Deep > 1,000 m	40	385
18-Airgun subarray (3,300 in <sup>3</sup> )	Shallow < 100 m	1,030	19,500
	Intermediate 100 – 1,000 m	675	5,700
	Deep > 1,000 m	450	3,800



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

<b>Species</b>	<b>Authorized Take</b>
Humpback whale ( <i>Megaptera novaeangliae</i> )	18
Bryde's whale ( <i>Balaenoptera brydei</i> )	10
Sei whale ( <i>Balaenoptera borealis</i> )	0*
Fin whale ( <i>Balaenoptera physalus</i> )	0*
Blue whale ( <i>Balaenoptera musculus</i> )	8
Sperm whale ( <i>Physeter macrocephalus</i> )	40
Pygmy/Dwarf sperm whale ( <i>Kogia breviceps</i> )	0
Cuvier's beaked whale ( <i>Ziphius cavirostris</i> )	15
<i>Mesoplodon spp.</i>	4
Rough-toothed dolphin ( <i>Steno bredanensis</i> )	45
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	366
Pantropical spotted dolphin ( <i>Stenella attenuata</i> )	954
Spinner dolphin ( <i>Stenella longirostris</i> )	1,468
Striped dolphin ( <i>Stenella coeruleoalba</i> )	622
Short-beaked common dolphin ( <i>Delphinus delphis</i> )	3,077
Risso's dolphin ( <i>Grampus griseus</i> )	91
Melon-headed whale ( <i>Peponocephala electra</i> )	258 <sup>2</sup>
Pygmy killer whale ( <i>Feresa attenuata</i> )	30 <sup>2</sup>
False killer whale ( <i>Pseudorca crassidens</i> )	0
Killer whale ( <i>Orcinus orca</i> )	52
Short-finned pilot whale ( <i>Globicephala macrorhynchus</i> )	114

\* The Incidental Take Statement does not authorize take for 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 the NMFS as an act which actually kills or injures wildlife, which may include significant habitat modification or degradation which actually kills or injures fish or wildlife 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 NSF and the Permits Division so that they become binding conditions for L-DEO 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, the 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 agencies 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 the Permits Division’s proposed authorization of the incidental taking of blue, humpback, and sperm whales pursuant to Section 101(a)(5)(D) of the MMPA. 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.

### **Amount or extent of take**

The NMFS anticipates the proposed seismic survey in the eastern tropical Pacific Ocean might result in the incidental take of listed species. The proposed action is expected to take 8 blue (8 exposures), 18 humpback (18 exposures), and 40 sperm whales (40 exposures) by exposing individuals to received seismic sound levels greater than 160 dB re 1  $\mu$ Pa by harassment. These estimates are based on the best available information of whale densities in the area to be ensonified above 160 dB re 1  $\mu$ Pa during the proposed activities. This incidental take would result primarily from exposure to acoustic energy during seismic operations and would be in the form of harassment. Death or injury of any individuals that are exposed is not expected.

We expect the proposed action will also take individual sea turtles as a result of exposure to acoustic energy during seismic studies, and we expect this take would also be in the form of harassment, with no death or injury expected for individuals exposed. Harassment of sea turtles is expected to occur at received levels above 166 dB re 1  $\mu$ Pa. As we cannot determine the number of individuals to which harassment will occur, we expect the extent of exposure will

occur within the 166 dB isopleth of the *Langseth's* airgun array.

Harassment of blue, humpback, and sperm whales exposed to seismic studies at levels less than 160 dB re 1  $\mu$ Pa, or of green, hawksbill, leatherback, loggerhead, and olive ridley sea turtles at levels less than 166 dB re 1  $\mu$ Pa, is not expected. If overt adverse reactions (for example, startle responses, dive reactions, or rapid departures from the area) by listed whales or sea turtles are observed outside of the 160 dB or 166 dB re 1  $\mu$ Pa isopleths, respectively, while airguns are operating, incidental take may be exceeded. If such reactions by listed species are observed while airguns, multibeam echosounder, or sub-bottom profiler are in operation, this may constitute take that is not covered in this Incidental Take Statement. The NSF and the Permits Division must contact the Endangered Species Division to determine whether reinitiation of consultation is required because of such operations.

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

### **Reasonable and prudent measures**

The NMFS believes the reasonable and prudent measures described below are necessary and appropriate to minimize the impact of incidental take of listed whales and sea turtles resulting from the proposed action. These measures are non-discretionary and must be binding conditions of the NSF funding of the proposed seismic studies and the NMFS' authorization for the exemption in section 7(o)(2) to apply. If the NSF or the NMFS fail to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

1. For listed sea turtle and marine mammal species these measures include the following: vessel-based visual monitoring by marine mammal and sea turtle observers as specified in the environmental assessment; speed or course alteration as practicable; implementation of a marine mammal and sea turtle exclusion zone within the 180 dB re 1  $\mu$ Pa<sub>rms</sub> isopleth for shut-down procedures; and emergency shutdown procedures in the event of an injury or mortality of a listed marine mammal or sea turtle. The measures for marine mammals are required to be implemented through the terms of the IHA issued under section 101(a)(5)(D) and 50 CFR 216.107.
2. The implementation and effectiveness of mitigation measures incorporated as part of the Reasonable and Prudent Measure mentioned above and the associated Terms and Conditions must be monitored.

### **Terms and conditions**

In order to be exempt from the prohibitions of section 9 of the ESA, the NSF, Permits Division, and L-DEO must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures described above. These terms and conditions are non-discretionary.

To implement the Reasonable and Prudent Measures, the NSF and the NMFS shall ensure that

1. L-DEO implements the mitigation, monitoring, and reporting conditions contained in

the IHA and this Opinion.

2. The Chief of the Endangered Species Division is immediately informed of any changes or deletions to any portions of the monitoring plan or IHA.
3. L-DEO immediately reports all sightings and locations of injured or dead endangered and threatened species to the Permits Division and the NSF.
4. The NSF and the Permits Division provide a summary of the implementation and effectiveness of the terms of the IHA to the Chief of the Endangered Species Division. This report shall confirm the implementation of each term and summarize the effectiveness of the terms for minimizing the adverse effects of the project on listed whales and sea turtles.

### **Conservation recommendations**

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

We recommend the following conservation recommendations, which would provide information for future consultations involving seismic surveys and the issuance of incidental harassment authorizations that may affect endangered large whales and endangered or threatened sea turtles

1. *Effects of seismic noise on sea turtles.* The NSF should promote and fund research examining the potential effects of seismic surveys on listed sea turtle species.

In order for the Endangered Species Division to be kept informed of actions minimizing or avoiding adverse effects on, or benefiting ESA-listed species or their habitats, the Permits Division should notify the Endangered Species Division of any conservation recommendations they implement in their final action.

### **Reinitiation notice**

This concludes formal consultation on the proposed seismic source survey to be funded by the NSF and conducted by the L-DEO on board the *R/V Langseth* in the eastern tropical Pacific, and the issuance of an incidental harassment authorization for the proposed studies pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA). As provided in 50 CFR §402.16, control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of authorized take is exceeded, section 7 consultation must be reinitiated immediately.