



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*) marine geophysical survey in the Atlantic Ocean, July through August, 2014.

1. EFFECTIVE DATES

This Authorization is valid from July 1, 2014 through August 17, 2014.

2. SPECIFIED GEOGRAPHIC REGION

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 (Authorization) application and the National Science Foundation's Environmental Assessment (EA) in the following specified geographic area:

- (a) In the Atlantic Ocean, approximately 25 to 85 kilometers (km) off the coast of New Jersey. The area is within the following coordinates: between approximately 39.3° – 39.7° North and approximately 73.2° - 73.8° West, as specified in the Observatory's application and the National Science Foundation's EA.

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) Pinnipeds – see Table 1 (attached) for authorized species and take numbers.
- (b) During the seismic activities, if the Holder of this Authorization encounters any marine mammal species not listed in Table 1 (attached) for authorized taking and may expose that species to sound pressure levels greater than or equal to 160 decibels (dB) re: 1 μ Pa, then the Holder must alter the *Langseth's* speed or course or shut-down the airguns to avoid take.
- (c) 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.

- (d) This Authorization limits the methods authorized for taking by Level B harassment to the following acoustic sources:
 - (i) A single airgun with a total discharge capacity of 40 cubic inches (in³);
 - (ii) A 4-airgun subarray with a total discharge capacity of 700 in³;
 - (iii) An 8-airgun subarray with a total discharge capacity of 1,400 in³;
 - (iv) A multibeam echosounder (MBES);
 - (v) A sub-bottom profiler (SBP); and
 - (vi) A 75-kHz acoustic current Doppler profiler (ADCP).

4. PROHIBITED TAKE

The Holder of this Authorization must immediately report the taking of any marine mammal in a manner prohibited under this Authorization to the Office of Protected Resources, National Marine Fisheries Service, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Jeannine.Cody@noaa.gov.

5. COOPERATION

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:

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) Visual observer shifts will last no longer than four hours at a time.
 - (iii) Visual observers will have access to reticle binoculars (7x50 Fujinon), and big-eye binoculars (25x150).
 - (iv) Visual observers will also conduct monitoring while the *Langseth* crew deploys and recovers the airgun array and streamers from the water.
 - (v) When feasible, visual observers will conduct observations during daytime periods when the researchers are not operating the seismic system. This monitoring will

help in the comparison of sighting rates and behavioral reactions during, between, and after airgun operations.

- (vi) The *Langseth*'s crew will also assist in detecting marine mammals, when practicable.

Exclusion Zones

- (b) Establish a 177-dB or 187-dB exclusion zone for cetaceans and pinnipeds, respectively, before starting either the 4-airgun (700 in³); the 8-airgun (1,400 in³) subarray; or the single airgun (40 in³). Observers will use the predicted radius distance for the 177-dB and 187-dB exclusion zones for cetaceans and pinnipeds, respectively.
- (c) See Table 2 (attached) for the distances of the exclusion zones.

Visual Monitoring at the Start of Airgun Operations

- (d) Monitor the entire extent of the exclusion zones listed in Table 2 (attached) for at least 30 minutes (day or night) prior to the ramp-up of airgun operations after a shutdown.
- (e) If a visual observer sees a marine mammal within the 177-dB or 187-dB exclusion zone for cetaceans or pinnipeds, respectively, the Holder of this Authorization must delay the start of airgun operations 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 visual 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 177-dB or 187-dB exclusion zones for cetaceans and pinnipeds, respectively.
 - (ii) If for any reason the visual observer cannot see the full 177-dB or 187-dB exclusion zone for cetaceans or pinnipeds, respectively, for the entire 30 minutes (*i.e.*, rough seas, fog, darkness), or if marine mammals are near, approaching, or within the exclusion zone, the Holder of the Authorization may not resume airgun operations.
 - (iii) If one airgun is already running at a source level of at least 177 dB re: 1 μ Pa, the Holder of the Authorization may start the second gun—and subsequent airguns—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)).

Passive Acoustic Monitoring

- (f) 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 visual observer 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.

- (g) Do and record the following when an animal is detected by the PAM:
 - (i) Notify the visual observer immediately of a vocalizing marine mammal so that the Holder of the Authorization can initiate a power-down or shut-down, if required; and
 - (ii) Enter the information regarding the vocalization into a database. The data includes 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.

Ramp-Up Procedures

- (h) Implement a “ramp-up” procedure when starting the airguns at the beginning of seismic operations or anytime after the entire array has been shutdown, 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 visual observers will monitor the exclusion zone, and if they sight marine mammals, the *Langseth* will implement a course/speed alteration, power-down, or shutdown as though the full array were operational.

Recording Visual Detections

- (i) 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.

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.

Power-Down Procedures

- (k) Power down the airguns if a visual observer detects a marine mammal within, approaching, or entering the relevant exclusion zones (as defined in Table 2, attached). A power-down

means reducing the number of operating airguns to a single operating 40 in³ airgun. This would reduce the exclusion zone to the degree that the animal(s) is outside of it.

Resuming Airgun Operations After a Power-Down

- (l) Following a power-down, if the marine mammal approaches the smaller designated exclusion zone, the Holder of this Authorization must shutdown the airguns completely. Airgun activity will not resume until the visual observer sees the marine mammal(s) exiting the relevant exclusion zone and it is not likely to return, or the visual observer has not seen it within the relevant exclusion zone for 15 minutes for species with shorter dive durations (*i.e.*, small odontocetes) 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 a power-down and subsequent animal departure, the Holder of this Authorization may resume airgun operations at full power. Initiation requires that the visual observers can effectively monitor the full exclusion zones described in Condition 6(b). If the visual observer sees a marine mammal within or about to enter the relevant exclusion zone, then the *Langseth* will implement a course/speed alteration, power-down, or shutdown.

Shutdown Procedures

- (n) Shutdown the airgun(s) if a visual observer detects a marine mammal within, approaching, or entering the relevant exclusion zone (as defined in Table 2, attached). A shutdown means that the *Langseth* turns off all operating airguns.
- (o) If a visual observer sees a north Atlantic right whale (*Eubalaena glacialis*) at any distance from the *Langseth*, the Holder of this Authorization will shut down the airgun array regardless of the distance of the animal(s) to the sound source. The array will not resume firing until 30 minutes after the last documented visual sighting of a north Atlantic whale.

Resuming Airgun Operations After a Shutdown

- (p) Following a shutdown, if the visual observer has confirmed that the animal has departed the 177-dB or 187-dB exclusion zone within a period of less than or equal to 8 minutes after the shutdown, then the Holder of this Authorization may resume airgun operations at full power.
- (q) Else, if the visual observer has not seen the animal depart the 177-dB or 187-dB exclusion zone, then the Holder of this Authorization shall not resume airgun activity until 15 minutes has passed for species with shorter dive times (*i.e.*, small odontocetes and pinnipeds) or 30 minutes has passed for species with longer dive durations (*i.e.*, mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales). The Holder of this Authorization will follow the ramp-up procedures described in Conditions 6(h).

Survey Operations at Night

- (r) 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.

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

Mitigation Airgun

- (u) The *Langseth* may operate a small-volume airgun (*i.e.*, mitigation airgun) during turns and maintenance at approximately one shot per minute. During turns or brief transits between seismic tracklines, one airgun would continue to operate.

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 seismic survey. 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 177 and 187 dB re: 1 μ Pa for cetaceans and pinnipeds, respectively, 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 177 and 187 dB re: 1 μ Pa for cetaceans and pinnipeds respectively, 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 the agency decides that the draft report is sufficient, 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 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 Northeast Regional Stranding Coordinator at (978) 281-9300.

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 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 Northeast Regional Stranding Coordinator at (978) 281-9300.

The report must include the same information identified in 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

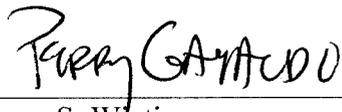
In the event that the Observatory discovers an injured or dead marine mammal, and the lead visual observer determines that the injury or death is not associated with or related to the activities authorized in the Authorization (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the Observatory will report the incident to the 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 Jeannine.Cody@noaa.gov and the Northeast Regional Stranding Coordinator at (978) 281-9300 within 24 hours of the discovery. Activities may continue while NMFS reviews the circumstances of the incident. 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.

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.





Donna S. Wieting
Director,
Office of Protected Resources
National Marine Fisheries Service

JUL - 1 2014

Date

Attachments

Attachment

Table 1 – Authorized Level B harassment take levels.

Species	Proposed Take Authorization ²
North Atlantic right whale	3
Humpback whale	2
Common minke whale	2
Sei whale	2
Fin whale	2
Blue whale	17
Sperm whale	18
Dwarf sperm whale	3
Pygmy sperm whale	3
Cuvier's beaked whale	4
Gervais' beaked whale	4
Sowerby's beaked whale	4
Unidentified Mesoplodon or Ziphid: True's, Blainville, Northern bottlenose whale	4
Rough-toothed dolphin	0
Bottlenose dolphin (pelagic)	349
Bottlenose dolphin (coastal)	
Pantropical spotted dolphin	0
Atlantic spotted dolphin	113
Spinner dolphin	0
Striped dolphin	59
Short-beaked common dolphin	23
White-beaked dolphin	0
Atlantic white-sided dolphin	19
Risso's dolphin	44
False killer whale	0
Pygmy killer whale	0
Killer whale	0
Long-finned pilot whale	12
Short-finned pilot whale	12
Harbor porpoise	3
Gray seal	15
Harbor seal	140
Harp seal	5

Table 2 –Exclusion zones (EZ) for marine mammals in the survey area.

Source and Volume (in ³)	Tow Depth (m)	Water Depth (m)	Predicted RMS Distances ¹ (m)		
			187 dB	177 dB	160 dB
Single Bolt airgun (40 in ³)	6	< 100	31	109	995
4-Airgun subarray (700 in ³)	4.5	< 100	151	561	5,240
4-Airgun subarray (700 in ³)	6	< 100	175	651	6,100
8-Airgun subarray (1,400 in ³)	4.5	< 100	190	709	6,670
8-Airgun subarray (1,400 in ³)	6	< 100	234	886	8,150