



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

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 (16 U.S.C. 1371(a)(5)(D)) and 50 CFR 216.107, to harass small numbers of marine mammals incidental to a marine seismic survey conducted by the R/V *Marcus G. Langseth* in the northeast Pacific Ocean, August - October, 2009:

1. This Authorization is valid from August 19 through October 13, 2009.
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) The Endeavour Marine Protected Area (MPA) in the northeast Pacific Ocean, approximately 250 kilometers (km) off the coast of Vancouver Island, British Columbia. The overall area for the marine geophysical survey will encompass the area 47°30'–48°30'N, 128°30'–130°W which is in the Exclusive Economic Zone of Canada. Water depths in the survey area range from 1200 meters (m) (feet (3937 ft)) to 3000 m (9842 ft).
3. Species Impacted and Level of Takes
 - (a) The incidental taking of marine mammals, by Level B behavioral harassment only, is limited to the species listed under condition 3(b)(i-ii) of this Authorization.
 - (b) The species authorized for takings by incidental harassment are:
 - (i) Mysticetes – blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata*), and sei whale (*Balaenoptera borealis*).
 - (ii) Odontocetes – Baird's beaked Whale (*Berardius bairdii*), Blainville's beaked whale (*Mesoplodon densirostris*), Dall's porpoise (*Phocoenoides dalli*), Hubbs' beaked whale (*Mesoplodon carlhubbsi*), killer whale (*Orcinus orca*), northern right whale dolphin (*Lissodelphis borealis*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), pygmy sperm whale (*Kogia*



breviceps), Risso's dolphin (*Grampus griseus*), sperm whale (*Physeter macrocephalus*), short-beaked common dolphin (*Delphinus delphis*), and Stejneger's beaked whale (*Mesoplodon stejnegeri*).

(iii) Pinnipeds – northern fur seal (*Callorhinus ursinus*).

(c) The taking by Level A harassment, serious injury, or death of any of the species listed in 3(b)(i and ii) 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.

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

- (i) a 36-Bolt airgun array that may range in size from 40 to 360 cubic inches (in³) a total volume of approximately 6,600 in³ as an energy source;
- (ii) a multi-beam echosounder;
- (iii) a sub-bottom profiler; and
- (iv) the acoustic release transponder used to communicate with the Ocean Bottom Seismometers (OBS).

4. The taking of any marine mammal in a manner prohibited under this Authorization must be reported within 48 hours (hr) to the Director, Office of Protected Resources, 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. NMFS encourages NSF and L-DEO to coordinate with Canadian government regarding the proposed seismic activity.

7. Mitigation Requirements

L-DEO must suspend the seismic survey if a dead or injured marine mammal is found in the vicinity of the project area and the serious injury or mortality, and are judged to result from these activities.

L-DEO must schedule seismic operations and ocean bottom seismometer (OBS) operations in deep waters during daylight hours, whenever possible.

In addition, the holder of this Authorization must follow the conditions listed below when conducting the seismic survey to achieve the least practicable adverse impact on affected marine mammal species or stocks:

(a) Safety Zones

- (i) L-DEO will establish a 180-dB, 1,120 m (3,674 ft) radius safety zone for marine mammals before the 4-string airgun array (6,600 in³) is in operation;

and a 180-dB 40 m (131 ft) radius safety zone before a single air gun (40 in³) is in operation, respectively. See Table 2 for distances and safety radii.

- (ii) NMFS-qualified marine mammal visual observers (MMVO) will visually observe the entire extent of the safety radius (180 dB for cetaceans) for at least 30 minutes prior to starting the airgun (day or night) to ensure that no marine mammals are seen within the safety zone before a seismic survey commences.
- (iii) If the MMVO finds a marine mammal within the safety zone, L-DEO must delay the seismic survey until the marine mammal has left the area. If the MMVO sees a marine mammal that surfaces, then dives below the surface, the observer shall wait 30 minutes. If the MMVO sees no marine mammals during that time, they should assume that the animal has moved beyond the safety zone.
- (iv) If for any reason the MMVO cannot see the entire radius for the entire 30 minutes (i.e., rough seas, fog, darkness), or if marine mammals are near, approaching, or in the safety radius, L-DEO may not start up the airguns. 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 safety radius for 30 minutes prior, provided that no marine mammals are known to be near the safety radius.

(b) Direction, Speed, and Course Alteration:

- (i) To the maximum extent possible, L-DEO will conduct inshore seismic surveys starting from upstream (inshore) and proceeding towards the sea (offshore) in order to avoid trapping marine mammals in shallow water.
- (ii) Alter speed or course during seismic operations if a marine mammal, based on its position and relative motion, appears likely to enter the relevant safety zone. If speed or course alteration is not safe or practical, or if after alteration the marine mammal still appears likely to enter the safety zone, further mitigation measures, such as power-down or shutdown, will be taken.
- (iii) If concentrations of beaked whales are observed (by MMVOs or passive acoustic detection) at a continental slope site just prior to or during the airgun operations, L-DEO will move those operations to another location along the slope based on recommendations by the on-duty MMVO aboard the *Langseth*.
- (iv) If concentrations of blue, humpback, fin, Sei or sperm whales are observed (by MMVOs or passive acoustic detection) prior to or during the airgun operations, L-DEO will power-down/shut down and/or move the operations to another location based on recommendations by the on-duty MMVO aboard the *Langseth*.

(c) Power-down and Shut-down Procedures:

- (i) Shutdown or power-down the airguns if a marine mammal is detected within, approaches, or enters the relevant safety radius (as defined in Table 2, attached). A shutdown means all operating airguns are shut down. A power-down means shutting down one or more airguns and reducing the safety radius to the degree that the animal is outside of it.
- (ii) Following a power-down, if the marine mammal approaches the smaller designated safety radius, L-DEO must completely shut down the airguns. L-DEO will not resume the airgun activity until the marine mammal has cleared the safety radius. That is: the MMVO visually observed the marine mammal exiting the safety radius or the MMVO sees no marine mammals within the radius for 15 minutes (small odontocetes and pinnipeds) or 30 minutes (mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales).
- (iii) Following a power-down or shut-down and subsequent animal departure, L-DEO may resume airgun operations following ramp-up procedures described below in 6(d).
- (iv) If a North Pacific right whale (*Eubalaena japonica*) is visually sighted, the airgun array will be shut-down regardless of the distance of the animal(s) to the sound source. The array will not resume firing until 30 min after the last documented whale visual sighting.

(d) Ramp-up Procedures:

- (i) 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 9 minutes, which means start the smallest gun in the array first and add airguns in a sequence such that the source level of the array (40 in³) will increase in steps not exceeding approximately 6 dB per a five-minute period.
- (ii) During ramp-up, the MMVO will monitor the safety radius. If a MMVO sights a marine mammal, he/she will implement decisions about course/speed alteration, power-down, or shutdown as though the full array were operational. Therefore, initiation of ramp-up procedures from shutdown requires that the MMVO can view full safety zone as described in 6(a)(iv).

(e) Night-time and Low-light Hour Operations

- (i) L-DEO may continue marine geophysical surveys into night and low-light hours if such segment of the survey is initiated when the entire relevant safety zones are visible and can be monitored.

- (ii) No initiation of airgun array operation is permitted from a shut-down position at night or during low-light hours (such as in dense fog) when the full safety zone cannot be monitored by the MMOs.
- (iii) If L-DEO wishes to conduct marine geophysical surveys at night or during low-light hours, a small airgun with the source level of at least 180 dB re μPa (rms) shall be initiated during the day-time with good visibility when no marine mammal is in the safety zone, and be kept on and monitored before ramping up for the survey.

8. Monitoring Requirements

(a) Vessel-Based Monitoring

The Holder of this Authorization is required to:

- (i) Utilize two (except during meal times, where the Holder may utilize one), NMFS-qualified, vessel-based MMVOs to watch for and monitor marine mammals near the seismic source vessel during daytime airgun operations and before and during start-ups of airguns day or night. Observers will have access to reticle binoculars (7 x 50 Fujinon), big-eye binoculars (25 x 150), and night vision devices to scan the area around the vessel. MMVO shifts will last no longer than 4 hr at a time. MMVOs will also make observations during daytime periods when the seismic system is not operating for comparison of animal abundance and behavior, when feasible.
- (ii) The *Langseth's* vessel crew will also assist in detecting marine mammals, when practical.
- (iii) MMVOs will also conduct monitoring onboard the *Langseth* while the seismic array is being deployed or being pulled from the water.
- (iv) L-DEO and the MMVOs will record the following information when a marine mammal is sighted:
 1. 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
 2. 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, cloud cover, and sun glare; and

3. the data listed under 7(a)(iii)(2) 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.

(b) Passive Acoustic Monitoring (PAM)

- (i) L-DEO will 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.
- (ii) One NMFS-qualified MMVO and/or bioacoustician will monitor the PAM at all times in shifts of 1-6 hr. 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.
- (iii) Do and record the following when an animal is detected by the PAM:
 1. notify the MMVO immediately of a vocalizing marine mammal so a power-down or shutdown can be initiated, if required;
 2. 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.

9. Reporting

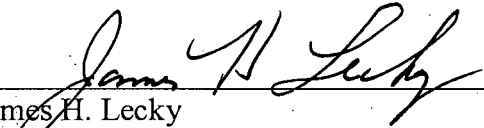
The Holder of this Authorization is required to:

- (a) submit a draft report on all activities and monitoring results to the Office of Protected Resources, NMFS, within 90 days after the expiration of the IHA. This report must contain and summarize the following information:
 - (i) Dates, times, locations, heading, speed, weather, 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 shutdowns), observed throughout all monitoring activities.

- (iii) An estimate of the number (by species) of marine mammals that: (i) are known to have been exposed to the seismic activity (visual observation) at received levels greater than or equal to 160 dB re 1 microPa (rms) and/or 180 dB re 1 microPa (rms) with a discussion of any specific behaviors those individuals exhibited and (ii) may have been exposed (modeling results) to the seismic activity at received levels greater than or equal to 160 dB re 1 microPa (rms) and/or 180 dB re 1 microPa (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 (attached), and (b) mitigation measures of the IHA. 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, Headquarters, 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.
10. 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 is judged to result from these activities, L-DEO will immediately cease operating all authorized sound sources and 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 notify L-DEO that they may resume the seismic survey operations.
 11. In the event that L-DEO discovers an injured or dead marine mammal that is judged to not result 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.
 12. L-DEO is required to comply with the Terms and Conditions of the Biological Opinion's Incidental Take Statement issued to both the National Science Foundation and NMFS' Office of Protected Resources (attached).

13. A copy of this Authorization and the Incidental Take Statement must be in the possession of all contractors and marine mammal monitors operating under the authority of this Incidental Harassment Authorization.

AUG 19 2009



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

Date

Attachments

Attachment

Table 1. Authorized Take Numbers for Each Species in the northeast Pacific Ocean.

Mysticetes	
<i>humpback whale</i>	6
Minke whale	5
<i>Sei whale</i>	1
<i>fin whale</i>	8
<i>blue whale</i>	2
Odontocetes	
Baird's beaked Whale	13
Blainville's beaked whale	2
Dall's porpoise	1081
Hubbs' beaked whale	2
killer whale	12
northern fur seal	73
northern right whale dolphin	142
Pacific white-sided dolphin	181
pygmy sperm whale	9
Risso's dolphin	95
short-beaked common dolphin	104
<i>sperm whale</i>	10
Stejneger's beaked whale	2

Table 2. Safety Radii for Triggering Mitigation.

Source and Volume	Tow Depth (m)	Predicted RMS Distances (m)		
		190 dB	180 dB	160 dB
Single Bolt airgun 40 in ³	6-15*	12	40	385
4 strings 36 airguns 6600 in ³	6	220	710	4670
	9	300	950	6000
	12	340	1120	6850
	15	380	1220	7690

*The tow depth has minimal effect on the maximum near-field output and the shape of the frequency spectrum for the single 40 in³ airgun; thus the predicted safety radii are essentially the same at each tow depth.