



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

MAR 31 2009

Meagan J. Cummings  
Marine Environmental & Safety Coordinator  
Department of Marine Operations  
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P.O. Box 1000  
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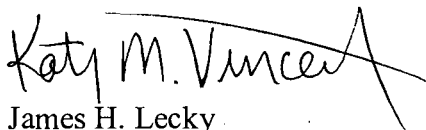
Dear Ms. Cummings:

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 incidental to the R/V *Marcus G. Langseth's* marine seismic survey in Southeast Asia during March-July, 2009.

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 Howard Goldstein or Ken Hollingshead, Office of Protected Resources, NMFS, at 301-713-2289.

Sincerely,



for

James H. Lecky  
Director  
Office of Protected Resources

Enclosures



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National Oceanic and Atmospheric Administration  
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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*) in Southeast Asia, March-July, 2009:

1. This Authorization is valid from March 31 through August 20, 2009.
2. This Authorization is valid only for the *Langseth's* activities associated with seismic survey operations that will occur in the area 17° 30'-26° 30' N, 113° 30'-126° E within the Exclusive Economic Zones of Taiwan, Japan, and the Philippines, as specified in L-DEO's Incidental Harassment Authorization application and Supplemental Environmental Assessment. The survey transect lines will be within the South and East China seas as well as the Philippine Sea, with the majority of survey effort occurring in the South China Sea.
3. This Authorization does not permit incidental takes of marine mammals in the territorial sea of foreign nations, as the MMPA does not apply in those waters. The territorial sea extends at the most 22.2 km (12 nautical mi) from the baseline of a coastal State.

4. 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 off Southeast Asia:

- (i) Mysticetes – see Table 2 (attached) for authorized species and take numbers.
- (ii) Odontocetes – see Table 2 (attached) for authorized species and take numbers.

(b) The taking by Level A harassment (injury, serious injury or death), of any of the species listed in 3(a) above 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.



5. 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.

6. The Authorization 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 with a total capacity of 6,600 in<sup>3</sup> (or smaller);
- (ii) a multi-beam echosounder;
- (iii) a sub-bottom profiler; and
- (iv) an acoustic release transponder used to communicate with ocean bottom seismometers (OBS).

7. 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.

8. NMFS expects the National Science Foundation (NSF) and L-DEO to coordinate with the governments of Taiwan, Japan, and the Philippines regarding the marine geophysical activity.

9. NMFS expects NSF and L-DEO to adhere to local conservation laws and regulations of nations while in foreign waters, and known rules and boundaries of Marine Protected Areas (MPA). In the absence of local conservation laws and regulations or MPA rules, L-DEO will continue to use the monitoring and mitigation measures identified in the IHA.

10. Mitigation and Monitoring Requirements

The Holder of this Authorization is required to:

(a) Utilize two (except meal times), NMFS-qualified, vessel-based marine mammal visual observers (MMVOs) 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. The *Langseth's* vessel crew will also assist in detecting marine mammals, when practicable. MMVOs will have access to reticle binoculars (7 X 50 Fujinon), big-eye binoculars (25 X 150), and night vision devices. MMVO shifts will last no longer than 3 hours 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.

(b) MMOs 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, cloud cover, and sun glare; and

(iii) the data listed under 10(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 NMFS-qualified marine mammal observer (MMO) and/or bioacoustician will monitor the PAM at all times in shifts of 1-6 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 MMVO immediately of a vocalizing marine mammal so a power-down or shutdown 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 safety radius (190 dB for pinnipeds, 180 dB for cetaceans; see Table 1 [attached] for distances) using NMFS-qualified MMVOs, for at least 30 minutes prior to starting the airgun (day or night). If the MMVO finds a marine mammal within the safety zone, L-DEO must delay the seismic survey until the marine mammal(s) 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. 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 safety radius, 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 safety radius for 30 min prior, provided no marine mammals are known to be near the safety radius (in accordance with condition 10(h) below).

(g) Establish a 180 dB safety zone for marine mammals before the 4-string airgun array (6,600 in<sup>3</sup>) is in operation; and a 180 dB safety 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-min period. During ramp-up, the MMVOs will monitor the safety radius, 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 MMVOs be able to view the full safety zone as described in 10(f).

(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 safety zone. If speed or course alteration is not safe or practicable, 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.

(j) Power-down or shut-down the airguns if a marine mammal is detected within, approaches, or enters the relevant safety radius (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 safety radius to the degree that the animal(s) is outside of it.

(k) Following a power-down, if the marine mammal approaches the smaller designated safety radius, the airguns must then be completely shut down. Airgun activity will not resume until the MMVO has visually observed the marine mammal(s) exiting the safety radius and is not likely to return, or has not been seen within the radius for 15 min (species with shorter dive durations - small odontocetes and pinnipeds) or 30 min (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-procedures described in 10(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 safety 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 safety zone cannot be effectively monitored by the MMVOs on duty.

(o) When operating the sound source(s), minimize approaches to slopes, submarine canyons, seamounts, and other underwater geologic features, if possible, because of sensitivity of beaked whales.

(p) If concentrations or groups of beaked whales are observed (by visual or passive acoustic detection) at a site such as on the continental slope, submarine canyon, seamount, or other underwater geologic feature just prior to or during the airgun operations, those operations will be powered/shut-down and/or moved to another location along the site, if possible, based on recommendations by the on-duty MMO aboard the *Langseth*.

(q) If concentrations or groups of humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), and/or dugongs (*Dugong dugon*) are observed (by visual or passive acoustic detection) prior to or during the airgun operations, those operations will be powered/shut-down and/or moved to another location, if possible, based on recommendations by the on-duty MMO aboard the *Langseth*.

(r) Avoid the areas (Ogasawara and Ryuku Islands in southern Japan and the Batan and Babuyan Islands in Luzon Strait in the northern Philippines) at the time of peak occurrence (February-April), where concentrations of humpback whales are known to winter, calve, and nurse. Seismic survey lines will be scheduled for as late as possible (June-July) to avoid potential effects of the surveys on humpback whales, particularly mothers and calves on breeding grounds or during the beginning of migration to summer feeding grounds.

(s) Avoid shallow water areas near the China coast and Taiwan Strait during Western Pacific gray whale (*Eschrichtius robustus*) wintering period and migration (December-April).

(t) Avoid shallow, coastal waters of the South China Sea to avoid populations of finless porpoises (*Neophocaena phocaenoides*).

(u) Limit seismic survey lines to water depths greater than 200 m (656 ft) in the South China Sea, and greater than 150 km (93.2 mi) from the mainland side of the Taiwan Strait to reduce potential for effects on Western Pacific gray whales, Indo-Pacific humpback dolphins (*Sousa chinensis*), and finless porpoises.

(v) If a North Pacific right whale (*Eubalaena japonica*), Western Pacific gray whale, humpback whale mother/calf pair, Indo-Pacific humpback dolphin, Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), and/or finless porpoise 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 and 15 min after the last documented dolphin/porpoise visual sighting.

(w) Limit seismic survey lines to take place at least 20 km (12.4 mi) from the west coast of Taiwan, particularly the central western coast (~ from Taixi to Tongshiao), to minimize the potential for exposing Indo-Pacific humpback dolphins, finless porpoise, and other coastal species to SPLs greater than or equal to 160 dB re 1 microPa (rms).

(x) The seismic survey line paralleling the east coast of Taiwan will be moved offshore at least 20 km (12.4 mi) to decrease potential impacts on species that occur in coastal waters and over the continental slope.

(y) To the maximum extent practicable, schedule seismic operations in inshore and shallow waters during daylight hours and OBS operations to nighttime hours.

(z) To the maximum extent practicable, seismic surveys (especially inshore) will be conducted from the coast (inshore) and proceed towards the sea (offshore) in order to avoid trapping marine mammals in shallow water.

(aa) Seismic operations will not occur in water depths less than 50 m (164 ft) and within at least 3 km (1.9 mi) from the Taiwanese shoreline.

## 11. 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* SE Asia cruise. This report must contain and summarize the following information:

(i) Dates, times, locations, heading, speed, weather during, 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 (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 (B) 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 (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.

12. 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.

In the event that L-DEO discovers an injured or dead marine mammal that are 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.

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



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

*Katy M. Vimmer*

3/31/09  
Date

*for*

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

Attachments

**Attachment**

**Table 1. Safety Radii for Triggering Mitigation.**

Source and Volume	Tow Depth (m)	Water Depth	Predicted RMS Distances (m)		
			Shut-down Zone for Pinnipeds 190 dB	Shut-down Zone for Cetaceans 180 dB	Level-B Harassment Zone 160 dB
Single Bolt airgun 40 in <sup>3</sup>	6-9	Deep (>1,000 m)	12	40	385
		Intermediate (100-1,000 m)	18	60	578
		Shallow (<100 m)	150	296	1,050
4 strings 36 airguns 6,600 in <sup>3</sup>	6-7	Deep	220	710	4,670
		Intermediate	330	1,065	5,189
		Shallow	1,600	2,761	6,227
4 strings 36 airguns 6,600 in <sup>3</sup>	8-9	Deep	300	950	6,000
		Intermediate	450	1,425	6,667
		Shallow	2,182	3,694	8,000

**Table 2. Authorized Take Numbers for Each Marine Mammal Species in Southeast Asia.**

Species	Authorized Take in Southeast Asia
<b>Mysticetes</b>	
North Pacific right whale ( <i>Eubalaena japonica</i> )	0
Western Pacific gray whale ( <i>Eschrichtius robustus</i> )	0
Humpback whale ( <i>Megaptera novaeangliae</i> )	6
Minke whale ( <i>Balaenoptera acutorostrata</i> )	0
Bryde's whale ( <i>Balaenoptera brydei</i> )	43
Omura's whale ( <i>Balaenoptera omurai</i> )	4
Sei whale ( <i>Balaenoptera physalus</i> )	4
Fin whale ( <i>Balaenoptera borealis</i> )	4
Blue whale ( <i>Balaenoptera musculus</i> )	4
<b>Odontocetes</b>	
Sperm whale ( <i>Physeter macrocephalus</i> )	4
Pygmy sperm whale ( <i>Kogia breviceps</i> )	-
Dwarf sperm whale ( <i>Kogia sima</i> )	703
Unidentified <i>Kogia</i> sp. whale (pygmy and dwarf sperm whale)	38
Cuvier's beaked whale ( <i>Ziphius cavirostris</i> )	58
Longman's beaked whale ( <i>Indopacetus pacificus</i> )	-
Blainville's beaked whale ( <i>Mesoplodon densirostris</i> )	153
Ginkgo-toothed beaked whale ( <i>Mesoplodon ginkgodens</i> )	-
Unidentified <i>Mesoplodon</i> sp. beaked whale (Blainville's, ginkgo-toothed beaked whales)	268

Unidentified beaked whale (Cuvier's, Blainville's, ginkgo-toothed, and Longman's beaked whales)	118
Rough-toothed dolphin ( <i>Steno bredanensis</i> )	212
Indo-Pacific humpback dolphin ( <i>Sousa chinensis</i> )	0
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	4,021
Indo-Pacific bottlenose dolphin ( <i>Tursiops aduncus</i> )	0
Pacific white-sided dolphin ( <i>Lagenorhynchus obliquidens</i> )	0
Pantropical spotted dolphin ( <i>Stenella attenuata</i> )	20,169
Spinner dolphin ( <i>Stenella longirostris</i> )	9,485
Striped dolphin ( <i>Stenella coeruleoalba</i> )	38
Fraser's dolphin ( <i>Lagenodelphis hosei</i> )	16,749
Short-beaked common dolphin ( <i>Delphinus delphis</i> )	0
Long-beaked common dolphin ( <i>Delphinus capensis</i> )	10
Risso's dolphin ( <i>Grampus griseus</i> )	7,209
Melon-headed whale ( <i>Peponocephala electra</i> )	2,173
Pygmy killer whale ( <i>Feresa attenuata</i> )	327
False killer whale ( <i>Pseudorca crassidens</i> )	789
Killer whale ( <i>Orcinus orca</i> )	171
Short-finned pilot whale ( <i>Globicephala macrorhynchus</i> )	630
Finless porpoise ( <i>Neophocaena phocaenoides</i> )	0
<b>Sirenians</b>	
Dugong ( <i>Dugong dugon</i> )	-

## 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 National Science Foundation and the NMFS’ Office of Protected Resources Permits, Conservation and Education Division so that they become binding conditions for Lamont-Doherty Earth Observatory (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, 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 the NMFS’ Permits, Conservation and Education Division’s proposed authorization of the incidental taking of blue, fin, humpback, sei 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.

NMFS anticipates the incidental harassment of the blue whales (*Balaenoptera musculus*), fin whales (*Balaenoptera physalus*), humpback whales (*Megaptera novaeangliae*), sei whales (*Balaenoptera borealis*) and sperm whales (*Physeter macrocephalus*), as well as the green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), and olive ridley sea turtle (*Lepidochelys olivacea*) during the proposed seismic activities.

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

NMFS anticipates the proposed action to conduct a seismic survey in the western Pacific Ocean off Southeast Asia might result in the incidental take of listed species. Blue, fin, humpback, sei and sperm whales, as well as green, hawksbill, leatherback, loggerhead, and olive ridley sea turtles may be exposed to seismic sounds at received levels above 160 dB re 1  $\mu$ Pa. The proposed action might take 4 blue whales, 4 fin whales, 6 humpback whales, and 4 sperm whales by exposing individuals to received levels greater than 160 dB re 1  $\mu$ Pa. These estimates are based on the best available information on whale densities in the area to be ensonified above 160 dB re 1  $\mu$ Pa during the proposed activities. This incidental take would result from exposure to acoustic energy during seismic operations, would be in the form of harassment, and is not expected to result in the death or injury of any individuals that are exposed.

We expect the proposed action might 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. Because density estimates of sea turtles in the survey area are unknown, we estimate take as the number of turtles exposed to seismic operations above 166 dB re 1  $\mu$ Pa during the proposed activities. These turtles could be of all ages and life stages in the survey area.

Harassment of blue, fin, humpback, sei and sperm whales exposed to seismic studies at levels less than 160 dB re 1  $\mu$ Pa, or of sea turtles at levels less than 166 dB re 1  $\mu$ Pa, is not expected. We do not expect listed species to be taken by operation of the sonars. However, 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 sonars are in operation, this may constitute take that is not covered in this Incidental Take Statement. NSF and the NMFS' Permits, Conservation, and Education 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, fin whales, humpback whales, sei whales, sperm whales, 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, NSF and NMFS' Permits, Conservation and Education 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 measures described below are necessary and appropriate to minimize the amount 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 NMFS'

authorization for the exemption in section 7(o)(2) to apply. If NSF or NMFS fail to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

1. All activities must comply with the reasonable and prudent measures for sea turtles and whales listed in this biological opinion. For listed sea turtle and marine mammal species these measures include the following: avoidance of areas with known concentrations of species as practicable, including humpback whale breeding and calving areas; immediate shutdown of all seismic sources in the event a western North Pacific gray whale, humpback whale mother/calf pair or a North Pacific right whale is detected; vessel-based visual monitoring by marine mammal and sea turtle observers; real-time passive acoustic monitoring by marine mammal and sea turtle observers; speed or course alteration as practicable; implementation of a marine mammal and sea turtle exclusion zone within the 180 dB re 1  $\mu$ Pa (rms) isopleth for power-down and shut-down procedures; emergency shut-down procedures in the event of an injury or mortality of a listed marine mammal or sea turtle; and ramp-up procedures when starting up the array. 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 National Science Foundation; NMFS' Permits, Conservation and Education 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, NSF and NMFS shall ensure that:

1. L-DEO implements the mitigation, monitoring, and reporting conditions contained in the IHA and this Biological 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 (e.g., sea turtles and blue, fin, humpback, sei and sperm whales) to NMFS' Permits, Conservation, and Education Division and to NSF.
4. NSF and NMFS' Permits, Conservation, and Education 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.