INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the "take" of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the Lamont-Doherty Earth Observatory and NMFS' Office of Protected Resources Permits and Conservation Division so that they become binding conditions for the exemption in section 7(o)(2) to apply. Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA and the proposed action may incidentally take individuals of listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species. To minimize such impacts, reasonable and prudent measures and terms and conditions to implement the measures, must be provided. Only incidental take resulting from the agency actions and any specified reasonable and prudent measures and terms and conditions identified in the incidental take statement are exempt from the taking prohibition of section 9(a), pursuant to section 7(o) of the ESA.

Section 7(b)(4)(C) of the ESA specifies that in order to provide an incidental take statement for an endangered or threatened species of marine mammal, the taking must be authorized under section 101(a)(5) of the MMPA. One of the federal actions considered in this Opinion is NMFS' Permits and Conservation Division's proposed authorization of the incidental taking of blue, fin, sei, humpback and sperm whales and Steller sea lions pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act. With this authorization, the incidental take of blue, fin, sei, humpback and sperm whales and Steller sea lions is exempt from the taking prohibition of section 9(a), pursuant to section 7(o) of the ESA.

NMFS anticipates the incidental harassment of blue whales (*Balaenoptera musculus*), fin whales (*Balaenoptera physalus*), humpback whales (*Megaptera novaeangliae*) sei whales (*Balaenoptera borealis*), sperm whales (*Physeter macrocephalus*), Steller sea lions (*Eumetopias jubatus*), as well as leatherback sea turtles (*Dermochelys coriacea*) during the proposed survey activities.

Amount or Extent of Take

NMFS anticipates the proposed action to conduct seismic surveys in the Northeastern Pacific Ocean might result in the incidental take of listed species. Blue whales, fin whales, humpback whales, sei whales, sperm whales, Steller sea lions, as well as leatherback sea turtles may be

exposed to seismic sounds at received levels above 160 dB re 1 μPa. Table 1 below lists the numbers of whales and Steller sea lions that might be taken during conduct of the proposed activities.

Table 1 Number of Individuals by Species Taken by Harassment During Conduct of the Cascadia Thrust Zone Survey and the Cascadia Subduction Margin Survey.

Species	Number of Individuals Taken
Blue	3
Fin	18
Sei	2
Humpback	11
Sperm	15
Steller sea lions	187

Take might occur by exposure of individuals to received levels greater than 160 dB re 1 μPa. These estimates are based on the best available information on whale densities in the area to be ensonified above 160 dB re 1 μPa during the proposed activities. This incidental take would result from exposure to acoustic energy during seismic operations, would be in the form of harassment, and is not expected to result in the death or injury of any individuals that are exposed.

We also expect the proposed action might also take individual leatherback sea turtles as a result of exposure to acoustic energy during seismic surveying, and we expect this take would also be in the form of harassment, with no death or injury expected for individuals exposed. Harassment of leatherback sea turtles is expected to occur at received levels of seismic sounds above 166 dB re 1 μPa. Because density estimates of leatherback sea turtles in the survey area are unknown, we estimate take as all the sea turtles that occur within the geographical extent of sound equal to and above 166 dB re 1 μPa during the proposed activities. These turtles could be of all ages and life stages in the survey area.

Harassment of blue whales, fin whales, humpback whales, sei whales and sperm whales and Steller sea lions exposed to seismic surveys at levels less than 160 dB re 1 μPa, or of leatherback sea turtles at levels less than 166 dB re 1 μPa, is not expected.

While Southern green sturgeon and Pacific eulachon may be disturbed by survey activities, we do not expect that this disturbance will rise to the level of harassment. No take of Southern Resident killer whales is expected, and therefore, no take of these whales is authorized.

We do not expect listed species to be taken by operation of the multibeam echosounder or the sub-bottom profiler. However, if overt adverse reactions (for example, dive reactions, or rapid departures from the area) by listed whales and pinnipeds or sea turtles are observed outside of the

160 dB re 1 μPa, or 166 dB re 1 μPa isopleths, respectively, while airguns are operating, incidental take may be exceeded. Additionally, if such reactions by listed species are observed while the multibeam echosounder, or the sub-bottom profiler are in operation, this may constitute take that is not covered in this Incidental Take Statement. If such overt adverse reactions are observed the Lamont-Doherty Earth Observatory and NMFS' Permits and Conservation Division must contact the Endangered Species Act Interagency Cooperation Division within 48 hours of the incident at 301-427-8403 and/or by email to kellie.foster-taylor@noaa.gov to determine whether reinitation of consultation is required.

Any incidental take of blue, fin, humpback, sei or sperm whales, Steller sea lions or leatherback sea turtles is restricted to the permitted action as proposed. If the actual incidental take meets or exceeds the predicted level, the Lamont-Doherty Earth Observatory and NMFS' Permits and Conservation Division must reinitiate consultation. All anticipated takes would be "takes by harassment", as described previously, involving temporary changes in behavior.

Reasonable and Prudent Measures

NMFS believes the reasonable and prudent measure described below is necessary and appropriate to minimize the amount of incidental take of listed whales, Steller sea lions and leatherback sea turtles resulting from the proposed actions. This measure is non-discretionary and must be a binding condition of the Lamont-Doherty Earth Observatory and NMFS' authorization for the exemption in section 7(o)(2) to apply. If the Lamont-Doherty Earth Observatory or NMFS fail to ensure compliance with this reasonable and prudent measure and its implementing terms and conditions, the protective coverage of section 7(o)(2) may lapse.

> The Lamont-Doherty Earth Observatory must implement and monitor the effectiveness of mitigation measures incorporated as part of the proposed authorization of the incidental taking of blue, fin, sei, humpback and sperm whales and Steller sea lions pursuant to section 101(a)(5)(D) of the MMPA and as specified below for leatherback sea turtles.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, NMFS' Permits and Conservation Division and the Lamont-Doherty Earth Observatory must comply with the following terms and conditions, which implement the Reasonable and Prudent Measure described above. These terms and conditions are non-discretionary.

To implement the Reasonable and Prudent Measure, the Lamont-Doherty Earth Observatory and NMFS' Permits and Conservation Division shall ensure that the following mitigation, monitoring and reporting requirements are followed:

<u>Mitigation and Monitoring Requirements</u>

1. The Lamont-Doherty Earth Observatory shall:
   (a) Utilize two, NMFS-qualified, vessel-based Protected Species Visual Observers (PSVOs) (except during meal times and restroom breaks, when at least one PSVO shall be on watch) to visually watch for and monitor marine mammals and leatherback sea turtles near the seismic source vessel during daytime airgun operations (from nautical

twilight-dawn to nautical twilight-dusk) and before and during start-ups of airguns day or night. The *Langseth*'s vessel crew shall also assist in detecting marine mammals and leatherback sea turtles, when practicable. PSVOs shall have access to reticle binoculars (7 x 50 Fujinon), big-eye binoculars (25 x 150), laser range-finding binoculars, and thermal imaging cameras. PSVO shifts shall last no longer than 4 hours at a time. PSVOs shall also make observations during daytime periods when the seismic system is not operating for comparison of animal abundance and behavior, when feasible.

(b) PSVOs shall conduct monitoring while the airgun array and streamer(s) are being deployed or recovered from the water.

(c) Record the following information when a marine mammal or leatherback sea turtle 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), Beaufort sea state and wind force, visibility, and sun glare; and

(iii) The data listed under Condition 1(c)(ii) shall 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 Protected Species Observer (PSO) and/or expert bioacoustician (i.e., Protected Species Acoustic Observer [PSAO]) shall monitor the PAM at all times in shifts no longer than 6 hours. An expert 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 on-duty PSVO(s) immediately of the presence 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. The acoustic detection can also be recorded for further analysis.

(f) Visually observe the entire extent of the exclusion zone (EZ) (180 dB re 1 μPa [rms] for cetaceans and leatherback sea turtles and 190 dB re 1 μPa [rms] for Steller sea lions; using NMFS-qualified PSVOs, for at least 30 minutes prior to starting the airgun array (day or night). If the PSVO finds a marine mammal within the EZ, 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 PSVO shall wait 30 minutes. If the PSVO sees no marine mammals or leatherback sea turtles during that time, they should assume that the animal has moved beyond the EZ. If for any reason the entire radius cannot be seen for the entire 30 minutes (i.e., rough seas, fog, darkness), or if marine mammals or leatherback sea turtles are near, approaching, or in the EZ, the airguns may not be ramped-up. If one airgun is already running at a source level of at least 180 dB re 1 μPa (rms), L-DEO may start the second airgun without observing the entire EZ for 30 minutes prior, provided no marine mammals or leatherback sea turtles are known to be near the EZ (in accordance with Condition 1[h] below).

(g) Establish a 180 dB re 1 μPa (rms) EZ for cetaceans and leatherback sea turtles and a 190 dB re 1 μPa (rms) EZ for Steller sea lions before the 4-string airgun array (6,600 in^3) is in operation; and a 180 dB re 1 μPa (rms) EZ for cetaceans and leatherback sea turtles and a 190 dB re 1 μPa (rms) EZ for Steller sea lions before a single airgun (40 in^3) is in operation, respectively.

(h) Ramp-up procedures at the start of seismic operations or after a shut-down - Implement a "ramp-up" procedure when starting up at the beginning of seismic operations or anytime after the entire array has been shut-down for more than 8 minutes, which means start the smallest gun first and add airguns in a sequence such that the source level of the array shall increase in steps not exceeding approximately 6 dB per 5-minute period. During ramp-up, the PSVOs shall monitor the 180 dB EZ for cetaceans and leatherback sea turtles or the 190 dB EZ for pinnipeds, and if marine mammals or leatherback sea turtles are sighted within or about to enter the relevant EZ, a power-down, or shut-down shall be implemented as though the full array were operational. Therefore, initiation of ramp-up procedures from a shut-down or at the beginning of seismic operations requires that the PSVOs be able to view the full EZ as described in Condition 1(f).

(i) Alter speed or course during seismic operations if a marine mammal or leatherback sea turtle, based on its position and relative motion, appears likely to enter the relevant EZ. If speed or course alteration is not safe or practicable, or if after alteration the marine mammal or leatherback sea turtle still appears likely to enter the EZ, further mitigation measures, such as a power-down or shut-down, shall be taken.

(j) Power-down or shut-down the airgun(s) if a marine mammal or leatherback sea turtle is detected within, approaches, or enters the relevant EZ. A shut-down means all operating airguns are shut-down (i.e., turned off). A power-down means reducing the number of operating airguns to a single operating 40 in^3 airgun, which reduces the EZ to the degree that the animal(s) is no longer in or about to enter it.

(k) Following a power-down, if the marine mammal or leatherback sea turtle approaches the smaller designated EZ, the airguns must then be completely shut-down. Airgun activity shall not resume until the PSVO has visually observed the marine mammal(s) or leatherback sea turtle exiting the EZ and is not likely to return, or has not been seen within the EZ for 15 minutes for species with shorter dive durations (small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, killer, and beaked whales), or the vessel has moved outside the EZ for turtles (e.g., about 8 minutes of travel if the turtle is sighted close to the vessel and the ship speed is 7.4 km/h). Following a shut-down, the *Langseth* may resume airgun operations following ramp-up procedures described in Condition 1(h).

(l) Procedures after an extended power-down – Monitor the full 180 dB EZ for cetaceans and leatherback sea turtle and the full 190 dB EZ for Steller sea lions. The *Langseth* may resume full power operations anytime after the entire array has been powered-down for more than 8 minutes. Resuming operations at full power after an extended power-down of more than 8 minutes requires that the PSVOs be able to view the full EZ as described in Condition 1(f). If the PSVO sees a marine mammal or leatherback sea turtle within or about to enter the relevant EZs, then the *Langseth* will implement a course/speed alteration or power-down.

(m) Marine seismic surveys may continue into night and low-light hours if such segment(s) of the survey is initiated when the entire relevant EZs 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 EZ cannot be effectively monitored by the PSVO(s) on duty.

(o) If a North Pacific right whale (*Eubalaena japonica*) is visually sighted, the airgun array shall be shut-down regardless of the distance of the animal(s) to the sound source. The array shall not resume firing until 30 minutes after the last documented whale visual sighting.

(p) If killer whales (*Orcinus orca*) are visually sighted or detected acoustically, the airguns shall be shut-down regardless of the distance of the animal(s) to the sound source. The array shall not resume firing until 30 minutes after the last documented whale visual sighting or acoustic detection within the 160 dB buffer zone and/or 180 dB exclusion

zone. If killer whales are sighted, the support vessel M/V *Northern Light* (*Northern Light*) will track them using the NMFS Northwest Region's Whale Watching Guidelines for killer whales to ensure that they leave the buffer zone and not approach within at least 100 yards, as well as not herd, chase or separate the animals.

(q) Communicate with NMFS Northwest Fisheries Science Center (Brad.Hanson@noaa.gov, 206-300-0282), NMFS Northwest Regional Office (Lynne.Barre@noaa.gov, 206-718-3807 or Brent.Norberg@noaa.gov, 206-526-6550), The Whale Museum (hotline@whalemuseum.org, 1-800-562-8832), Orca Network (info@orcanetwork.org, 1-866-672-2638), and/or other sources for near real-time reporting of the whereabouts of Southern Resident killer whales.

(r) To the maximum extent practicable, schedule seismic operations (i.e., shooting airguns) during daylight hours and OBS operations (i.e., deploy/retrieve) to nighttime hours.

(s) To the maximum extent practicable, plan to conduct seismic surveys (especially when near land) from the coast (inshore) and proceed towards the sea (offshore) in order to avoid trapping marine mammals in shallow water.

(t) Conduct a pre-survey beginning on July 11 (2 days before seismic operations commence) using the support vessel *Northern Light*, or equivalent with three PSOs onboard for purposes of monitoring for the presence of marine mammals (particularly focusing attention to Southern Resident killer whales). The pre-survey will begin upon leaving port and during transit to the Cascadia Thrust Survey northern line. The support vessel will then begin a zig-zag transect of the 160-dB buffer zone around the Thrust survey (26,350 m) to either side of the survey trackline from inshore to offshore remaining on the shelf looking for marine mammals. When the Langseth is ready to begin the seismic survey, the support vessel *Northern Light* will monitor north of the *Langseth* approximately 5 km away in the same zig-zag fashion as the pre-survey to monitor the 160 dB exclusion zone around the *Langseth* when the ship begins the survey on the continental shelf.

(u) To the maximum extent practicable, utilize a portable static hydrophone from the support vessel *Northern Light* to listen for and determine the presence of vocalizing marine mammals and assist with visual detections.

(v) Conduct seismic operations according to relevant sightings of marine mammals from the *Langseth* and the support vessel *Northern Light*. For example, if high densities of marine mammals, including Southern Resident killer whales~~,~~ are sighted in the northern region of the seismic survey area then seismic operations will begin in the southern region of the study area.

Reporting Requirements

(2) The Lamont-Doherty Earth Observatory shall:

(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 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 and leatherback sea turtle sightings;

(ii) Species, number, location, distance from the vessel, and behavior of any marine mammals and leatherback sea turtles, 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 and leatherback sea turtles 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 μPa (rms) and/or 180 dB re 1 μPa (rms) for cetaceans and leatherback sea turtles and 190 dB re 1 μPa (rms) for Steller sea lions with a discussion of any specific behaviors those individuals exhibited; and (B) may have been exposed (based on reported and corrected empirical values for the 36 airgun array and modeling measurements for the single airgun) to the seismic activity at received levels greater than or equal to 160 dB re 1 μPa (rms) and/or 180 dB re 1 μPa (rms) for cetaceans and 190 dB re 1 μPa (rms) for pinnipeds 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 number, location, distance from the vessel, and behavior of Southern Resident killer whales, if any, that have been exposed to seismic activity (based on visual or acoustic detection) at received levels greater than or equal to 160 dB re 1 μPa (rms) and followed by the support vessel. A discussion of the nature of the probable consequences of that exposure on the individuals that have been exposed should accompany this description.

(v) 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 shall 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, 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 shall be considered to be the final report.

(c) In the unanticipated event that the specified activity clearly causes the take of a marine mammal or sea turtle in a manner prohibited by this Authorization, such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), the Lamont-Doherty Earth Observatory shall immediately cease the specified activities and immediately report the incident to the 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, Jeannine.Cody@noaa.gov, and Howard.Goldstein@noaa.gov and the Northwest Regional Stranding Coordinator at 206-526-6550 (Brent.Norberg@noaa.gov). The report must include the following information:

(i) Time, date, and location (latitude/longitude) of the incident; the name and type of vessel involved; the 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 marine mammal and sea turtle observations in the 24 hours preceding the incident; species identification or description of the animal(s) involved; the fate of the animal(s); and photographs or video footage of the animal (if equipment is available).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with the Lamont-Doherty Earth Observatory to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. L-DEO may not resume their activities until notified by NMFS via letter, email, or telephone.

(d) In the event that the Lamont-Doherty Earth Observatory discovers an injured or dead marine mammal, and the lead PSO 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 2(e) below), the Lamont-Doherty Earth 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, Jeannine.Cody@noaa.gov, and Howard.Goldstein@noaa.gov, and the NMFS Northwest Regional Office (206-526-6550) and/or by email to the Northwest Regional Stranding Coordinator (Brent.Norberg@noaa.gov). The report must include the same information identified in Condition 2(c)(i) above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with the Lamont-Doherty Earth Observatory to determine whether modifications in the activities are appropriate.

(e) In the event that the Lamont-Doherty Earth Observatory discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in Condition 2(d) (e.g., previously wounded

animal, carcass with moderate to advanced decomposition, or scavenger damage), the Lamont-Doherty Earth Observatory shall 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, Jeannine.Cody@noaa.gov, and Howard.Goldstein@noaa.gov, and the NMFS Northwest Regional Office (206-526-6550) and/or by email to the Northwest Regional Stranding Coordinator (Brent.Norberg@noaa.gov) within 24 hours of the discovery. The Lamont-Doherty Earth Observatory shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

3. The Lamont-Doherty Earth Observatory is required to comply with the Terms and Conditions of the ITS corresponding to NMFS's Biological Opinion issued to both the National Science Foundation and NMFS's Office of Protected Resources.