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Division of Ocean Sciences
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ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT PURSUANT TO THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA), 42 U.S.C. 4321, *et seq.*

Marine Seismic Survey in the Gulf of Alaska (GOA), September 2008

EAR #0408584
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Project Title: COLLABORATIVE RESEARCH: ST. Elias Erosion/tectonics Project (STEEP)

This constitutes an environmental assessment (EA) by the National Science Foundation (NSF) for a marine seismic survey proposed to be conducted on board the research vessel (R/V) *Marcus G. Langseth,* operated by Columbia University's Lamont-Doherty Earth Observatory (LDEO), in the GOA during September 2008. This EA is based, in part, on an environmental assessment report prepared by LGL Limited, environmental research associates (LGL) on behalf of NSF, entitled, "Environmental Assessment of a Marine Geophysical Survey by the R/V *Marcus G. Langseth* in the Gulf of Alaska, September 2008" (Report #TA4412-1) (Attachment 1). The conclusions from the LGL report were used to inform the management of the Division of Ocean Sciences (OCE) of potential environmental impacts of the 2008 cruise. After the LGL report was fully and independently reviewed by OCE management, OCE management concurred with the report's findings. Accordingly, the LGL report is incorporated into this EA by reference and fully adopted as if fully set forth herein.

Project Objectives and Context

The proposed seismic survey will examine crustal structure, fault patterns, and tectonic-climate geohistory of the area. The program will investigate the interplay of climate and tectonics onshore and offshore in an area that includes the world's largest strikeslip earthquakes (Magnitude 8.0 Denali Event), largest earthquake caused uplift (14.4 m in 1962), largest area of seismic uplift (during the 1962 event), highest tsunami (over 200 m in Latoya Bay in 1958), largest temperate glaciers (the Malaspina and Bering Glaciers), and some of the highest sedimentation rates (over 1 m per year in some places). Nowhere else on the planet are tectonics and climate interacting to create this combination of mountain building, glacial erosion, strike-slip (California style), and subduction (Japan style) earthquakes.

While affecting only a small local population, natural seismic activity in the Gulf of Alaska (GOA) could influence the whole of the North Pacific basin which includes many large population centers. Alaska is being directly affected by modern climate change, and new evidence suggests that, in fact, as climate changes, tectonics respond and vice versa. This interplay could be fundamental to the way the Earth works as a system, and by examining this

interplay since the onset of glaciers, the intention of the STEEP program is to examine the feedbacks that drive the system.

The STEEP program is 5 years in length and includes scientists from over 10 universities. The study represents the most comprehensive study of tectonic and climate interactions ever undertaken in a single project. The offshore seismic component is a keystone for the experiment. The data obtained from the seismic survey will be used to determine the history of tectonic-climate interplay, as well as the nature of the Yakutat plate that is causing all of the deformation in southern Alaska, built the Saint Elias Mountains, and started the aggressive glaciation that continues today.

Summary of Proposed Action and Alternatives

The proposed action is a seismic survey, providing essential data in support of the above described research that would be conducted in the GOA, in the territorial waters and Exclusive Economic Zone (EEZ) of the United States. The R/V *Marcus G. Langseth* would deploy as an energy source an array of up to 36 airguns, with a total discharge volume of 6600 in^3. The receiving system for the returning acoustic signals would consist of a towed hydrophone streamer and/or Ocean Bottom Seismometers (OBSs).

One alternative to the proposed action would be to conduct the survey at an alternative time. The proposed time for the STEEP cruise, however, is the most suitable time logistically for the R/V *Marcus G. Langseth* and the participating scientists as well as the additional research studies planned on the vessel for 2008 and beyond. Within the weather window that will allow vessel operations, alternative times offer minimal advantages or disadvantages in this location.

Another alternative to conducting the proposed activities would be the "No Action" alternative, i.e., do not issue an Incidental Harassment Authorization (IHA) and do not conduct the operations. If the planned research were not conducted, the "No Action" alternative would result in no disturbance to marine mammals attributable to the proposed activities, and no environmental impacts of other types. The seismic data from the proposed seismic survey to examine crustal structure, fault patterns, and tectonic-climate geohistory of the area would not be available for use and the project objectives as described above would not be met. It is anticipated that the data collected from a survey such as that proposed will be critical in furthering the understanding of Earth processes, climate change, and phenomena such as tsunamis and earthquakes (strike-slip and subduction) that can have catastrophic impacts on society. The "No Action" alternative would result in a lost opportunity to obtain important scientific data and knowledge relevant to a number of research fields and to society in general. The institutions, investigators, students, and technicians involved would lose collection of new data, thus halting support of the greater effort to process and interpret these data, and introduce new results into the greater scientific community. Loss of NSF support often represents a significant negative impact to the academic infrastructure.

Summary of environmental consequences

The potential effects of sounds from airguns are described in detail in Attachment 1 (pages 49-83 and Appendices B-E) and might include one or more of the following: tolerance, masking of

natural sounds, behavioral disturbance, and at least in theory, temporary or permanent hearing impairment, or non-auditory physical or physiological effects. With the possible exception of some cases of temporary threshold shift in harbor seals, it is unlikely that the project would result in any cases of temporary or especially permanent hearing impairment, or any significant nonauditory physical or physiological effects.

The proposed activity (seismic survey in the Gulf of Alaska) would include a mitigation program to minimize impacts on marine mammals that may be present during the conduct of the research to a level of insignificance. As detailed in Attachment 1 (pages 7-16; and 63), mitigation measures that would be adopted, include: airgun ramp ups; minimum of one dedicated observer maintaining a visual watch during all daytime airgun operations; two observers 30 minutes before and during day and night ramp ups (and when possible at other times); passive acoustic monitoring (PAM) via towed hydrophones during both day and night activities (when practicable); power downs (or if necessary shut downs) when marine mammals or sea turtles are detected in or about to enter designated exclusion zones; shut downs if North Pacific right whales are sighted at any distance from the source vessel (given their special status); avoidance of close approaches to Steller sea lion rookeries and haulouts; and, avoidance of concentrations of humpback whales, fin whales, and sea otters.

With the planned monitoring and mitigation measures, unavoidable impacts to each species of marine mammal and turtle that could be encountered are expected to be limited to short-term, localized changes in behavior (such as temporary masking of natural sounds) and distribution near the seismic vessel. At most, effects on marine mammals may be interpreted as falling within the U.S. Marine Mammal Protection Act (MMPA) definition of "Level B Harassment" for those species managed by the National Marine Fisheries Service. No long-term or significant effects are expected on individual marine mammals, sea turtles, or the populations to which they belong, or on their habitats.

The proposed project would have little impact on fish resources, and the only effect on Essential Fish Habitat (EFH) would be short term disturbance that could lead to temporary relocation of EFH species or their food. Impacts of seismic sounds on birds are possible, although none are expected to be significant to their populations.

Considering the limited time and locations of the planned seismic survey, no significant impacts are expected on the availability of marine mammals or fish for the subsistence harvest. The potential for negative impacts on subsistence harvesting and commercial fisheries would be minimized by avoiding seismic operations in areas where those activities would be occurring at the time of the survey. Also, villages near the planned project area have been consulted to identify and avoid areas of potential conflict.

As marine mammals are expected to be found throughout the proposed study area and throughout the time period during which the project may occur, no significant benefits would be gained from the alternative to conduct the survey at a different time (see Attachment 1, pages 82-83).

The "no action" alternative would not have any environmental consequences; although it would preclude important scientific research from going forward.

Conclusions

NSF has reviewed and concurs with the conclusions of the LGL environmental assessment report (Attachment 1) that supports the conclusion that implementation of the proposed activity will not have a significant impact on the environment. Consequently, implementation of the proposed activity is not a major federal action having a significant impact on the environment within the meaning of NEPA, and an environmental impact statement will not be prepared. Therefore, on behalf of NSF, I authorize the issuance of a Finding of No Significant Impact for the marine seismic survey proposed to be conducted on board the research vessel *Marcus G. Langseth* in the Gulf of Alaska in September 2008.

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Date