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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 Geophysical Survey by the R/V *Marcus G. Langseth* in the central Gulf of Alaska June 2011

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Project Title: U.S. Extended Continental Shelf Project (ECS). Establishing the full extent of the continental shelf of the United States.

This constitutes an environmental assessment prepared by the U.S. Geological Survey (USGS) and the National Science Foundation (NSF) for a marine seismic survey proposed to be conducted in June 2011 on board the research vessel (R/V) *Marcus G. Langseth* in the western Gulf of Alaska (GOA). This analysis 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 central Gulf of Alaska, June 2011" (Report #P1198-1) (Attachment 1). NSF posted the draft environmental assessment on the NSF website for public comment from April 26, 2011 to May 26, 2011, but received no direct public comments during (or after) the open comment period.

The NSF and USGS assisted NMFS in responding to questions submitted by the Marine Mammal Commission (MMC) in response to the NMFS Federal Register notice related to the proposed issuance of an IHA for the survey, but no changes were made to the Environmental Assessment. The conclusions from the LGL report were used to inform the Division of Ocean Sciences (OCE) management of potential environmental impacts of the cruise. OCE has reviewed and concurs with the report's findings. Accordingly, the LGL report is incorporated into this environmental analysis by reference as if fully set forth herein.

This environmental assessment also serves to support National Marine Fisheries Service (NMFS) NEPA compliance associated with its proposed issuance of an Incidental Harassment Authorization (IHA).

Project Objectives and Context

The primary purpose of the proposed survey is to collect seismic reflection and refraction profiles to be used to delineate the U.S. Extended Continental Shelf in the Gulf of Alaska. The ECS is that region beyond 200 nautical miles (n.mi.) where a nation can show that it satisfies the conditions of Article 76 of the United Nations Convention on the Law of the Sea. One of the conditions in Article 76 is a function of sediment thickness. The seismic profiles are designed to identify the stratigraphic "basement" and to map the thickness of the overlying sediments. Acoustic velocities (required to convert measured travel times to true depth) will be measured directly using sonobuoys and ocean-bottom seismometers (OBSs), as well as by analysis of hydrophone streamer data. The USGS is designated as the lead science agency for ECS activities, and USGS personnel participate as chief scientists on associated field activities, and is therefore the lead agency on this EA. As owners of the R/V *Langseth*, NSF will participate as a cooperating agency with USGS on this final EA.

Summary of Proposed Action and Alternatives

The procedures to be used for the survey will be similar to those used during previous seismic surveys and would involve conventional seismic methodology. The proposed survey will take place in June 2011 within the central Gulf of Alaska (See Attachment 1, Figure 1). The seismic survey will consist of approximately 2700 kilometers (km) of transect lines (including turns) (3200 km including contingency) in water depths ranging from 2000 meters to greater than 6000 meters, with all surveying occurring in depths deeper than 1000 meters. During the survey, a 36-airgun array will be deployed from the R/V *Langseth* as an energy source; it will be operated with four identical linear arrays consisting of 10 airguns each, with a maximum discharge volume of 6600 cubic inches (in^3). Nine airguns in each string will be fired simultaneously, whereas the tenth will be kept in reserve as a spare, to be turned on in case of failure of another airgun. A towed hydrophone streamer, sonobuoys and 15 Ocean Bottom Seismometers (OBSs) will be used to measure acoustic velocities. In addition to the airgun array, a Multibeam Echo-sounder (MBES), a Sub-Bottom Profiler (SBP) and an Acoustic Doppler Current Profiler (ADCP) will be operated continuously throughout the cruise. Seismic operations will be carried out for approximately 13 days. Some minor deviation from proposed cruise dates may be required, depending on logistics, weather conditions, and the need to repeat some lines if data quality is substandard.

One alternative to the proposed action would be to issue an IHA at an alternative time and conduct the survey at that alternative time. Constraints for vessel operations and availability of equipment (including the vessel) and personnel would need to be considered for alternative cruise times. Limitations on scheduling the vessel include the additional research studies planned on the vessel for 2011 and beyond. Other research activities planned within the region also would need to be considered.

Another alternative to conducting the proposed activities would be the "No Action" alternative, i.e. do not issue an 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, but the project objectives as described above to obtain data to determine the U.S. ECS as defined under Article 76 of the United Nations Convention on the Law of the Sea would not be met. The "No Action" alternative would also result in a lost

opportunity to obtain geologic data and any U.S. economic gain resulting from potential U.S. ECS claims.

Summary of environmental consequences

The potential effects of sounds from airguns on marine species, including mammals and turtles of particular concern, are described in detail in Attachment 1 (pages 44-71 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. It is unlikely that the project will result in any cases of temporary or especially permanent hearing impairment, or any significant nonauditory physical or physiological effects. Some behavioral disturbance is expected, if animals are in the general area during seismic operations, but this would be localized, short-term, and involve limited numbers of animals.

The proposed activity will include a mitigation program to further minimize potential 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 8-15; and 65) monitoring and mitigation measures will include: ramp ups; typically two, however a minimum of one dedicated observer maintaining a visual watch during all daytime airgun operations; two observers for 30 minutes before and during ramp ups during the day and at night; no start ups during poor visibility or at night unless at least one airgun has been operating; passive acoustic monitoring (PAM) via towed hydrophones during both day and night to complement visual monitoring (unless the system and back-up systems are damaged during operations); and, power downs (or if necessary shut downs) when marine mammals or sea turtles are detected in or about to enter designated exclusion zones. The fact that the airguns, as a result of their design, direct the majority of the energy downward, and less energy laterally, would also be an inherent mitigation factor.

With the planned monitoring and mitigation measures, unavoidable impacts to each species of marine mammal and turtle that could be encountered will be expected to be limited to short-term, localized changes in behavior 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 will be expected on individual marine mammals, sea turtles, or the populations to which they belong or on their habitats.

A survey at an alternative time would result in few net benefits. As described in Attachment 1, marine mammals and sea turtles are expected to be found throughout the proposed region of study. Some marine mammal species (killer whales, harbor seals, Steller sea lions) are year round residents in the GOA, so altering the timing of the proposed project likely would result in no net benefits for those species. Other species (e.g., the humpback whale) are migratory, spending the summer months in the project area, and mostly vacating the region in late fall. Conversely, gray whales spend the summer in the Bering Sea, but migrate through the project area from October through January and again in spring. However, some occur in the GOA year-round. Most pinnipeds are at rookeries in spring when the proposed survey is planned, strongly reducing the probability of encountering any at sea. The subsistence harvest of harbor seals, Steller sea lions, and sea otters occurs throughout the GOA in coastal waters, far from the

proposed survey area, so altering the survey timing would have no effect. The study area is also located thousands of kilometers from areas where sea turtles nest, and only two species, the leatherback and green turtles, could be encountered in the study area, and then only foraging individuals would occur.

The "No Action" alternative would remove the potential for disturbance to marine mammals or sea turtles attributable to the proposed activities as described. It would, however preclude important scientific research in support of U.S. ECS activities from going forward and the collection of geologic data which would be available for the U.S. academic community.

Conclusions

The USGS and NSF have reviewed and concur with the conclusions of the LGL report (Attachment 1) that implementation of the proposed activity will not have a significant impact on the environment. Consequently, implementation of the proposed activity does not have a significant impact on the environment within the meaning of the National Environmental Policy Act (NEPA). An Environmental Impact Statement will not be prepared. 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 central Gulf of Alaska in June 2011.

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2 Jun 2011
Date