

**National Science Foundation
Geosciences Directorate
Division of Ocean Sciences
Arlington, Virginia**

**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 Santa Barbara Channel, November 2008

ODP #0751807

Principal Investigator: Craig Nicholson

Institution: UCSB

Project Title: Collaborative Research: A Test for Extending the High-Resolution Climate Record Back to 1.2 Ma - Investigating the Mid-Pleistocene Climate Transition in Santa Barbara Basin

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) *Melville*, operated by University of California's Scripps Institution of Oceanography (SIO), in the Santa Barbara Channel during November 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 *Melville* in the Santa Barbara Channel, November 2008" (Report #TA4643-1) (Attachment 1). 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 EA by reference as if fully set forth herein.

Project Objectives and Context

The proposed seismic survey would test the feasibility of extending the remarkable high-resolution paleoclimate record from Santa Barbara Basin from ~700,000 years ago back to ~1.2 million years ago. This would be accomplished by conducting detailed 3D modeling of the structure and outcrop stratigraphy of the northern shelf to locate optimal core sites, and by conducting high-resolution seismic reflection site surveys, piston coring, and core analyses of both the northern shelf and mid-channel area. A similar seismic and coring expedition in 2005 verified the presence of this remarkable paleoclimate record back to ~700,000 years ago in the mid-channel region. An integrated seismic data acquisition and coring cruise would be conducted to (1) acquire piston core samples of older marine sediments that are now exposed at the seafloor to test the suitability of these older deep basin sediments to provide a high-quality paleoclimate record, and (2) conduct high-resolution multi-channel seismic (MCS) surveys of the coring sites to place the results from the core analyses in a wider basin context, and to identify

subsequent optimal and safe coring strategies suitable for recovering a continuous paleoclimate record from the shallow marine sediments in Santa Barbara Basin in the future as part of the Integrated Ocean Drilling Program (IODP). The acquisition of both seismic and coring data would also help tremendously in terms of providing critical sub-seafloor geologic and geophysical information needed to conduct additional coastal environmental and hazard studies in the Santa Barbara Channel area where a large and growing coastal population is currently at risk. In addition, the data would contribute to a better understanding of the processes of global climate change. USGS would provide scientific personnel and equipment in support of this cruise.

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 Santa Barbara Channel, in the territorial waters of the United States, partly in California state waters. The survey would involve one source vessel, the R/V *Melville*. Seismic sources to be deployed by the R/V *Melville* would vary with water depth. At two shallow-water sites that cross into California state waters, a 1.5 kiloJoule (kJ) electromechanical boomer or a 2 kJ electric sparker system would be used, depending on water depth and seafloor conditions, and depending on which source provides the highest resolution and best sub-seafloor signal penetration. In general, the boomer source likely would be preferred. At three deeper-water sites outside state waters, a small (25 to 45 cubic inch) GI airgun would be used. The receiving system for the returning acoustic signals would consist of a 72 channel, 450 meter long towed hydrophone streamer. As the boomer, sparker, or GI airgun are towed along the survey lines, the hydrophone streamer would receive the returning acoustic signals and transfer the data to the on-board processing system.

One alternative to the proposed action would be to conduct the survey at an alternative time. The proposed time for this cruise, however, is the most suitable time logistically for the R/V *Melville*, the participating scientists, necessary equipment, as well as the additional research studies planned on the vessel for 2008 and beyond. Marine mammals are expected to be found throughout the proposed study area and throughout the time period during which the project may occur.

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, and no environmental impacts of other types. The seismic data collected from the proposed seismic survey 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 would be critical in furthering the understanding of our paleoclimatic record, climate change, and coastal environmental and hazard studies. 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. The “No Action” alternative could also, in some circumstances,

result in significant delay of other geophysical studies that are planned by SIO for 2008 and beyond, depending on the timing of the decision, and would result in a cancellation of an important aspect of the IODP.

Summary of environmental consequences

The potential effects of sounds from airguns are described in detail in Attachment 1 (pages 42-71 and Appendices A-D) 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.

The proposed activity would include a monitoring and 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 7-12; and 56), mitigation measures that would be adopted would include (1) vessel speed or course alteration, provided that doing so would not compromise operational safety requirements, (2) GI airgun or boomer shut down within calculated exclusion zones, (3) minimizing approach to slopes and submarine canyons, if possible, because of sensitivity of beaked whales, and (4) shut down at any range in the unlikely event that a North Pacific right whale or a concentration of sea otters is sighted. The fact that the GI airgun, as a result of its design, directs the majority of the energy downward, and less energy laterally, is also an inherent mitigation measure. Two other standard mitigation measures—airgun array power down and airgun array ramp up—are not possible because only one, low-volume GI airgun would be used for the surveys. There would be a minimum of one dedicated observer maintaining a visual watch during all daytime airgun operations (and when possible at other times) and shut downs when mammals or turtles are detected in or about to enter designated exclusion zones.

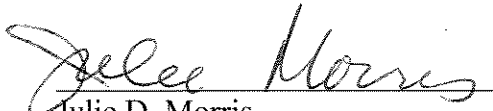
With the planned monitoring and mitigation measures, unavoidable impacts to each species of marine mammal and turtle that could be encountered are expected to be limited to short-term, localized changes in behavior (such as temporary masking of natural sounds) and distribution near the seismic vessel. 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.

A number of marine mammal species are year-round residents in the SCB, so altering the timing of the proposed project likely would result in no net benefits for those species. Other marine mammal species (e.g., the gray whale and northern elephant seal) are migratory, and are absent from the SBC at the time of the proposed survey. Therefore, postponing the proposed project to a later time in the year could result in higher numbers of migratory species in the SBC during the proposed survey (see Attachment 1, page 71).

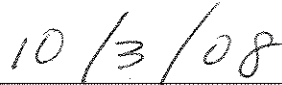
The “No Action” alternative would not have any environmental consequences; although it would preclude important scientific research from going forward (see Attachment 1, page 71).

Conclusions

NSF has reviewed and concurs with the conclusions of the LGL environmental assessment report (Attachment 1) 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 R/V *Melville* in the Santa Barbara Channel in November 2008.



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Date