
APPENDIX J:
RESPONSE TO PUBLIC COMMENTS ON THE
OCTOBER 2010 DRAFT PROGRAMMATIC EIS/OEIS

COMMENT RESPONSE MATRIX
Public Draft Programmatic EIS/OEIS for NSF-Funded and USGS-Conducted Marine Seismic Research
(Comment Period: October 8 – November 22, 2010)

JEAN PUBLIC, WHITEHOUSE STATION, NJ (OCTOBER 8, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>i object to and oppose this action for seismic surveys. i do not believe in drilling in arctic areas. i do not believe there is adequate ways to stop spills and do not believe america should be polluting this area like bp was allowed to pollute the gulf of mexico courtesy of nsf.</p> <p>ea should not be permitted. any project like this should be done via eis. this is a way to sneak past nepa regulations used by sneaky agencies that attempt to use a cheap, poorly constructed ea. ea's need to be banned since they are incomplete and lazy and cheap ways to evaluate the effect on the environment. the american public wants an eis. nsf is trying to sneak something through without adequate evaluation.</p> <p>if nsf did 7years and 31 ea's they sure were busy sneaking through inadequate investigation. there is much damage done by seismic surveys. america is sick of pollution. this agency is attempting to sneak another one through. i do not approve of this proposal. it is lazy, it is cheap. it allows pollution and harm and damage to the environment to happen.</p>	<p><i>Thank you for your comments. Please note that the proposed action would involve marine seismic research funded by NSF and conducted by the USGS and not drilling or exploring for oil and gas. In addition, the Draft Programmatic EIS/OEIS does not include activities within Arctic waters (refer to Section 1.7 of the Final PEIS). The Department of the Interior's Bureau of Ocean Energy Management, Regulation and Enforcement, not NSF or USGS, is the agency responsible for permitting offshore oil and gas activities in U.S. waters, such as BP's exploratory well in the Gulf of Mexico. The proposed action described in this PEIS is for marine seismic research to understand geologic features on the seafloor, not to explore for oil and gas resources in the oceans (refer to Section 1.3 of the Final PEIS).</i></p> <p><i>The environmental compliance document prepared under the National Environmental Policy Act (NEPA) for proposed marine seismic research funded by NSF and conducted by USGS is a Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) and not an Environmental Assessment (EA) (Refer to Chapter 1, introductory paragraph 1, of the Final PEIS).</i></p> <p><i>As stated above, the environmental compliance document prepared under NEPA for proposed marine seismic research funded by NSF and conducted by USGS is a Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) and not an Environmental Assessment (EA) (Refer to Chapter 1, introductory paragraph 1, of the Final PEIS). The previous EAs were prepared in accordance with the NEPA and the Council on Environmental Quality's regulations for implementing NEPA. Those documents completely and adequately described the proposed action, a range of alternatives, and the direct, indirect, and cumulative impacts on the human environment (refer to Section 1.4 of the Final PEIS).</i></p>

CENTER FOR REGULATORY EFFECTIVENESS (CRE), WASHINGTON, DC (NOVEMBER 16, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>The proprietary acoustic models used in the draft PEIS/OEIS lack practical utility and do not meet Information Quality Act ("IQA") Guidelines. They are accurate, if at all, only when modeling an SEL metric, and all U.S. agencies including NMFS regulate seismic on an rms SPL metric. They do not regulate seismic on SEL. Moreover, the draft PEIS/OEIS' proposed applications of these models have not been validated in accordance with EPA's Council for Regulatory Environmental Modeling Guidelines. The CREM guidance reflects Information Quality Act standards. The models also violate IQA Guidelines because NMFS has not produced "especially rigorous robustness checks" for the proprietary models.</p>	<p><i>The acoustic modeling and associated results are provided in both rms SPL and SEL, and the PEIS does provide impact analyses based on the rms SPL metric. Therefore, the models and information provided in the draft PEIS/OEIS are useful and appropriate for assessing impacts and implementing regulatory requirements as related to marine mammals. NSF and USGS closely consulted with NMFS, the regulatory agency charged with technical expertise on underwater acoustic impacts to marine mammals, on the appropriate model. After meeting with its acoustics expert, NMFS viewed the NSF/USGS modeling approach as appropriate. NMFS, NSF and USGS believe that the models can be accurate on a SEL metric. The models used in the PEIS were reviewed by NMFS' acoustics expert. This individual made recommendations and comments on the acoustic information and components of the document. These comments were reviewed by NSF and USGS and incorporated into the PEIS as appropriate. Modeling portions of the draft PEIS were reviewed by an expert identified by NSF and USGS. The expert, Dr. John Diebold of Columbia University's Lamont-Doherty Earth Observatory, provided advice and guidance on these portions of the document. Reviews of the modeling portions of the document were conducted by the lead and cooperating agencies and noted acoustic experts throughout the development of the document. Moreover, no further peer review was deemed necessary to support the NEPA analysis.</i></p>
<p>The draft PEIS/OEIS acoustic models are intended to help NSF meet current seismic regulatory requirements. They are useless for this purpose because they cannot accurately model compliance with current federal regulatory requirements, which are based on an rms SPL sound metric. Consequently, these models and the draft PEIS/OEIS advocating them violate the practical utility requirement of NSF's Information Quality Act guidelines. These guidelines define "practical utility" as involving "the usefulness of the information to its intended users." The draft PEIS/OEIS models lack practical utility because they are useless for their intended regulatory purpose.</p>	<p><i>The Draft PEIS presents acoustic impact analyses based on both rms SPL and SEL metrics (refer to Section 2.3.2 of the Final PEIS). While both metrics are used to describe potential impacts to marine mammals from acoustic sources, as is current NMFS policy, only the rms SPL metric is used to estimate potential levels of take and to describe mitigation measures. The discussion of the recommendations of the Noise Criteria Group (Southall et al. 2007) is provided in Section 2.3.2.3 of the Final PEIS. It essentially reiterates what was stated in the referenced USGS IHA application. NMFS has not yet proposed changes to the acoustic criteria but potential changes are possible in the future. NOAA is currently developing acoustic guidelines for assessing the effects of anthropogenic sound on marine mammal species under its jurisdiction. The guidelines will provide past acoustic criteria, as well as updated procedures for assessing acoustic effects based on recent advances in science. NOAA is working toward numerical criteria where appropriate and possible, while general analytical paradigms will be used in other cases (i.e., for instances where context- or environmental-specific factors reduce or eliminate the relevance of broadly applicable numerical criteria). The guidelines will also include an approach for updating acoustic criteria and policy guidance. The process to finalize the guidelines includes the following steps: (1) NOAA internal review; (2) external peer review; (3) public comment; and (4) finalize and release of guidelines. NOAA is currently still conducting step 1 of this process.</i></p>
<p>These models, and an SEL metric, are not necessary to protect sea life. In 2010, NMFS issued USGS a MMPA authorization that does not use these models or an SEL metric. NMFS explained that "NMFS believes that the planned monitoring program will be sufficient to visually detect, with reasonable certainty, most marine mammals within or entering identified EZs [exclusion zones]. This monitoring, along with the required mitigation measures, will help ensure the authorized taking effects the least practicable adverse impact on the affected species or stocks and-will-have-a-negligible impact-on the affected species or stocks. Until proven technological -advances are made, nighttime mitigation measures during operations include combinations of the use of PSVOs and night vision devices (NVDs)."</p>	<p><i>The Draft PEIS presents acoustic impact analyses based on both rms SPL and SEL metrics (refer to Section 2.3.2 of the Final PEIS). While both metrics are used to describe potential impacts to marine mammals from acoustic sources, as is current NMFS policy, only the rms SPL metric is used to estimate potential levels of take and to describe mitigation measures. The discussion of the recommendations of the Noise Criteria Group (Southall et al. 2007) is provided in Section 2.3.2.3 of the Final PEIS. It essentially reiterates what was stated in the referenced USGS IHA application. NMFS has not yet proposed changes to the acoustic criteria but potential changes are possible in the future. NOAA is currently developing acoustic guidelines for assessing the effects of anthropogenic sound on marine mammal species under its jurisdiction. The guidelines will provide past acoustic criteria, as well as updated procedures for assessing acoustic effects based on recent advances in science. NOAA is working toward numerical criteria where appropriate and possible, while general analytical paradigms will be used in other cases (i.e., for instances where context- or environmental-specific factors reduce or eliminate the relevance of broadly applicable numerical criteria). The guidelines will also include an approach for updating acoustic criteria and policy guidance. The process to finalize the guidelines includes the following steps: (1) NOAA internal review; (2) external peer review; (3) public comment; and (4) finalize and release of guidelines. NOAA is currently still conducting step 1 of this process.</i></p>
<p>If NMFS wishes to change its regulation of offshore seismic to an SEL metric, then NMFS should propose this change in the context of its ongoing acoustic criteria proceeding. The USGS has explained: "NMFS is proposing to replace current Level A and B harassment criteria with guidelines based on exposure characteristics that are specific to particular groups of mammal species and to particular sound types (NMFS 2005). Recently, a committee of specialists on noise impact issues has proposed new science-based impact criteria (Southall et al. 2007). Thus, for projects subject to U.S. jurisdiction, changes in procedures may be required in the near future."</p>	<p><i>The Draft PEIS presents acoustic impact analyses based on both rms SPL and SEL metrics (refer to Section 2.3.2 of the Final PEIS). While both metrics are used to describe potential impacts to marine mammals from acoustic sources, as is current NMFS policy, only the rms SPL metric is used to estimate potential levels of take and to describe mitigation measures. The discussion of the recommendations of the Noise Criteria Group (Southall et al. 2007) is provided in Section 2.3.2.3 of the Final PEIS. It essentially reiterates what was stated in the referenced USGS IHA application. NMFS has not yet proposed changes to the acoustic criteria but potential changes are possible in the future. NOAA is currently developing acoustic guidelines for assessing the effects of anthropogenic sound on marine mammal species under its jurisdiction. The guidelines will provide past acoustic criteria, as well as updated procedures for assessing acoustic effects based on recent advances in science. NOAA is working toward numerical criteria where appropriate and possible, while general analytical paradigms will be used in other cases (i.e., for instances where context- or environmental-specific factors reduce or eliminate the relevance of broadly applicable numerical criteria). The guidelines will also include an approach for updating acoustic criteria and policy guidance. The process to finalize the guidelines includes the following steps: (1) NOAA internal review; (2) external peer review; (3) public comment; and (4) finalize and release of guidelines. NOAA is currently still conducting step 1 of this process.</i></p>
<p>The referenced NMFS proceeding "(NMFS 2005)" is the proper process for proposing</p>	<p><i>The Draft PEIS presents acoustic impact analyses based on both rms SPL and SEL metrics (refer to Section 2.3.2 of the Final PEIS). While both metrics are used to describe potential impacts to marine mammals from acoustic sources, as is current NMFS policy, only the rms SPL metric is used to estimate potential levels of take and to describe mitigation measures. The discussion of the recommendations of the Noise Criteria Group (Southall et al. 2007) is provided in Section 2.3.2.3 of the Final PEIS. It essentially reiterates what was stated in the referenced USGS IHA application. NMFS has not yet proposed changes to the acoustic criteria but potential changes are possible in the future. NOAA is currently developing acoustic guidelines for assessing the effects of anthropogenic sound on marine mammal species under its jurisdiction. The guidelines will provide past acoustic criteria, as well as updated procedures for assessing acoustic effects based on recent advances in science. NOAA is working toward numerical criteria where appropriate and possible, while general analytical paradigms will be used in other cases (i.e., for instances where context- or environmental-specific factors reduce or eliminate the relevance of broadly applicable numerical criteria). The guidelines will also include an approach for updating acoustic criteria and policy guidance. The process to finalize the guidelines includes the following steps: (1) NOAA internal review; (2) external peer review; (3) public comment; and (4) finalize and release of guidelines. NOAA is currently still conducting step 1 of this process.</i></p>

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these dramatic changes. These changes would affect several different agencies (e.g., USGS and the bureau of Ocean Energy Management), and many stakeholders (e.g., scientific researchers, the Navy, oil and gas exploration, shipping, indigenous communities and NGOs). NMFS should be express, direct and transparent if it intends to make these changes.	
In addition, NMFS should comply with all applicable laws, including its Information Quality Act guidelines, if NMFS wants to change its regulation of sound in the oceans.	<i>NMFS will comply with all applicable laws, including the Information Quality Act for producing its updated acoustic guidelines. These will not be issued as regulations.</i>
This acoustic modeling scheme has no practical utility because it cannot be used to demonstrate compliance with NMFS' and other agencies' regulation of seismic effects on marine mammals. This regulatory uselessness results from the models' inability to accurately predict rms SPL sound levels, which are the current federal regulatory metric.	<i>The models in the PEIS are used to estimate marine mammal take estimates at the Level A & B harassment isopleths regulated by NMFS and are presented in SEL and rms SPL metrics. NMFS, NSF and USGS believe that the models can be accurate on a SEL metric. The impact analyses discussed in the PEIS are based on the best available science. The PEIS presents take estimates in both SEL and SPL metrics, allowing for estimates to be predicted based on NMFS' current use of an rms SPL metric for implementing mitigation measures.</i>
There are other Information Quality Act problems with these models. They are proprietary, and NSF's IQA guidelines state that when "estimates and projections included in NSF information products are not directly reproducible by the public because the underlying data sets used to produce them are either confidential or proprietary ... NSF will apply rigorous robustness checks and document what checks were undertaken." NMFS' IQA guidelines impose a similar requirement of especially rigorous robustness checks. Where are NMFS' and NSF's documentation of their "rigorous robustness checks" on the proprietary models used in the draft PEIS/OEIS? We have found none in the record.	<i>The PEIS was reviewed by NMFS' acoustics expert. This individual made recommendations and comments on the acoustic information and components of the document. These comments were reviewed by NSF and USGS and incorporated into the PEIS as appropriate. Modeling portions of the draft PEIS were reviewed by an expert identified by NSF and USGS. The expert, Dr. John Diebold of Columbia University's Lamont-Doherty Earth Observatory, provided advice and guidance on these portions of the document. Reviews of the modeling portions of the document were conducted by the lead and cooperating agencies and noted acoustic experts throughout the development of the document. The comments provided by these individuals are part of the complete Administrative Record for this PEIS.</i>
NMFS previously had the AIM model peer reviewed. The resulting AIM Peer review report states in part as follows: "The three terms of reference required that the Panel evaluate whether AIM correctly implements the models and data upon which it is based; whether animal movements are adequately simulated; and whether AIM meets the Council for Regulatory Monitoring (CREM) guidelines for model development and evaluation. The Panel agreed that AIM appears to be correctly implemented. However, all panelists had recommendations for further testing to be undertaken. They also agreed that animal movement appears to be appropriately modelled within AIM given the inadequacies of -the available data. With regard to whether AIM satisfies the CREM guidelines there was some diversity of opinion. This is understandable given that the CREM guidelines are not <i>directly</i>	<i>The PEIS was reviewed by NMFS' acoustics expert. This individual made recommendations and comments on the acoustic information and components of the document. These comments were reviewed by NSF and USGS and incorporated into the PEIS as appropriate. Modeling portions of the draft PEIS were reviewed by an expert identified by NSF and USGS. The expert, Dr. John Diebold of Columbia University's Lamont-Doherty Earth Observatory, provided advice and guidance on these portions of the document. Reviews of the modeling portions of the document were conducted by the lead and cooperating agencies and noted acoustic experts throughout the development of the document.</i>

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<p>applicable to AIM since it is not an application model (but a. tool for developing such models).</p> <p>One of the requirements of the CREM guidelines is for the "model" to have undergone "adequate" peer review. The panelists were split on this question. NMFS clearly thought that an independent peer review was required and hence they initiated this review. The Panel have now reviewed AIM (in what appears to be the first independent peer review), but it is not for them to judge whether their review was an "adequate peer review".</p> <p>The Panel did agree that the principles of credible science had been addressed during the development of AIM. They agreed that AIM is a useful and credible tool for developing application models. The need for expertise in the use of AIM was noted (e.g., in the choice of transmission loss model); as was the absence of appropriate uncertainty and sensitivity tests in the current applications of AIM. It follows, that the Panel agree that the use of AIM can lead to models which will meet the CREM guidelines. However, such models, at this stage, would need to be evaluated on a case-by-case basis (i.e., merely using AIM is not sufficient; it must be used appropriately for the specific application)."</p> <p>In other words, the AIM peer review report requires that NSF peer review the proposed specific applications of AIM and the two JASCO models, and the conjunctive use of these models in each application, in order to determine whether they meet the CREM guidelines. We have not found this peer review in the draft PEIS/OEIS record or anywhere else.</p>	
<p>The draft PEIS/OEIS should be revised to delete any use of the JASCO/MONM/AIM models to determine compliance with a regulation based on an rms SPL metric.</p>	<p><i>The acoustic modeling and associated results are provided in both rms SPL and SEL, and the PEIS does provide impact analyses based on the rms SPL metric. NMFS, NSF and USGS believe that the models can be accurate on a SEL metric.</i></p>
<p>If NMFS wants to change from an rms SPL metric to a SEL regulatory metric, then NMFS should continue with its 2005 proceeding or institute another proceeding which transparently announces and addresses the scope of such a major regulatory change, and which solicits the participation of all stakeholders in federal regulation of ocean sound.</p>	<p><i>The Draft PEIS presents acoustic impact analyses based on both rms SPL and SEL metrics. The discussion of the recommendations of the Noise Criteria Group (i.e., Southall et al. [2007]) is provided in Section 2.3.2.3 of the Draft PEIS. It essentially reiterates what was stated in the referenced USGS IHA application. NMFS has not yet proposed changes to the acoustic criteria but potential changes are possible in the future. NOAA is currently developing acoustic guidelines for assessing the effects of anthropogenic sound on marine mammals under its jurisdiction. The guidelines will provide past acoustic criteria, as well as updated procedures for assessing acoustic effects based on recent advances in science. NOAA is working toward numerical criteria where appropriate and possible, while general analytical paradigms will be used in other cases (i.e., for instances where context- or environmental-specific factors reduce or eliminate the relevance of broadly applicable numerical criteria). The guidelines will also</i></p>

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	<i>include an approach for updating acoustic criteria and policy guidance. It is not intended to be a regulatory change but rather national guidelines. The process to finalize the guidelines includes the following steps: (1) NOAA internal review; (2) external peer review; (3) public comment; and (4) finalize and release of guidelines. NOAA is currently still conducting step 1 of this process.</i>
Each application of any and all acoustic models used by the federal government should be externally peer reviewed to determine their compliance with the CREM guidelines.	<i>The CREM guidelines are EPA guidelines and are not legally binding or required for other federal agencies. In addition, within the 2009 CREM guidelines, EPA includes a disclaimer stating: "This document provides guidance to those who develop, evaluate, and apply environmental models. It does not impose legally binding requirements; depending on the circumstances, it may not apply to a particular situation." NSF does not require peer review of models and their application is required for NEPA documentation. Further, the IQA peer review requirements are triggered by dissemination of "influential scientific information" which is defined to include scientific information that will have a "clear and substantial impact on important public policies or private sector decisions." Given the nature of the PEIS and acknowledgment that future cruise-specific surveys will be reviewed and analyzed, the PEIS alone will not impact important public policies and thus does not amount to a dissemination of influential scientific information. This reaffirms the conclusion that external review of the models and their application is not necessary. Although NSF came to this conclusion, the PEIS was reviewed by NMFS' acoustics expert. This individual made recommendations and comments on the acoustic information and components of the document. These comments were reviewed by NSF and USGS and were incorporated into the PEIS as appropriate. Modeling portions of the Draft PEIS were reviewed by an expert identified by NSF and USGS. The expert, Dr. John Diebold of Columbia University's Lamont-Doherty Earth Observatory, provided advice and guidance on these portions of the document. Reviews of the modeling portions of the document were conducted by the participating agencies and noted acoustic experts throughout the development of the document.</i>
There should be an easily accessible record demonstrating that any and all proprietary acoustic models used by NSF and NMFS meet the requirements of NSF's IQA guidelines.	<i>The Office of Management and Budget (OMB) allows each agency the discretion of selecting an appropriate peer review method for disseminating "influential" information. As noted in the response above, NSF believes the PEIS alone will not impact important public policies and thus does not amount to a dissemination of influential scientific information and external peer review is therefore not necessary. Although the models used to determine the effects of anthropogenic noise on marine organism were proprietary, the model validation and results were published in peer-reviewed journals and used in reports and EISs of other agencies. Records of peer-reviewed journals that examined the Marine Acoustics Inc. (MAI) Acoustic Integration Model© (AIM) and the JASCO's Marine Operations Noise Model (MONM) can be found in Appendix B of the PEIS. In addition, an independent assessment of AIM was initiated by NMFS in September 2006 and can be accessed at http://www.marineacoustics.com/AIM.htm.</i>

W. STEVEN HOLBROOK, PROFESSOR OF GEOPHYSICS, UNIVERSITY OF WYOMING ON BEHALF OF THE MARCUS LANGSETH SCIENCE OVERSIGHT COMMITTEE (MLSOC) (NOVEMBER 18, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>Appended below are comments on the draft PEIS for marine seismic work, submitted on behalf of the Marcus Langseth Science Oversight Committee (MLSOC). MLSOC strongly supports adoption of the draft PEIS. W. Steven Holbrook, MLSOC member Professor of Geophysics, University of Wyoming</p> <p>The R/V <i>Marcus G. Langseth</i> is a national facility with unique capabilities to seismically image the solid Earth beneath the oceans. The Marcus Langseth Science Oversight Committee (MLSOC), which oversees the facility on behalf of the Earth science community, endorses the Programmatic Environmental Impact Statement drafted by NSF and USGS. The rationale for this support, which is detailed below, stems from our recognition that marine seismic data provide an indispensable means of imaging many Earth processes that directly impact human societies.</p> <p>Numerous key geological processes occur in the solid Earth beneath the oceans:</p> <ul style="list-style-type: none"> • Many of the world’s most threatening geological hazards, such as devastating earthquakes and tsunami, occur beneath the oceans. Eight-five percent of global earthquake energy is released beneath the seas. • Ocean sediments contain the longest and most continuous record of Earth’s geological and climate history available. • 80% of the world’s population lives at or near the coast, and they influence, and are affected by, marine geological processes. • Most of the world’s petroleum resources are hosted in marine sediments. <p>In order to peer beneath the blue ocean, which covers 70% of the planet’s surface, research vessels equipped with specialized seismic gear (including, but not limited to, the R/V Langseth) are required. Without these capabilities, Earth scientists would be “blind” to many of the processes that govern Earth’s climate, tectonics, environment, and hazards. Moreover, marine seismic imaging undergirds many U.S. and international science initiatives, including: (1) IODP, the Integrated Ocean Drilling Program; (2) GeoPRISMS (the MARGINS successor program); (3) R2K (the RIDGE 2000 initiative); (4) Continental Dynamics; (5) the Ocean Bottom Seismometer Instrument Pool; and (6) IRIS/PASSCAL.</p> <p>Formal adoption of Action Alternative B will streamline planning and permitting important scientific work while retaining stringent guidelines for compliance with all relevant federal environmental statutes.</p>	<p><i>Thank you for your comments. No responsive changes have been made to the PEIS based on your comments.</i></p>

AMERICAN PETROLEUM INSTITUTE (API), INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS (IAGC), NATIONAL OCEAN INDUSTRIES ASSOCIATION (NOIA), AND U.S. OIL AND GAS ASSOCIATION (USOGA) (NOVEMBER 22, 2010)	
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<p><u>Overall Approach and Methodology</u> We commend NSF for undertaking the development of this comprehensive DPEIS. The scientific description of the environment and potential effects to the environment, the overall methodology and acoustic modeling are excellent. The level of scientific detail and analysis for acoustic impacts on marine mammals is exceptional. This DPEIS represents a good synthesis of the best available science presented in an objective and scientifically professional manner. We support the general approach and methodology, such as the use of representative areas and acoustic modeling, utilized in the DPEIS and recommend that other US government agencies consider a similar approach when preparing programmatic environmental impact statements (PEIS) for commercial geophysical surveys. However, we have some concerns which we expand upon in the following points.</p>	<p><i>Thank you for your comment. No responsive changes have been made to the PEIS based on your comment.</i></p>
<p><u>Regulatory and Policy</u> As mentioned previously, we strongly support NSF’s decision to prepare a PEIS for its planned global marine seismic research operations. In the DPEIS (pages ES-3 and 1-4), the stated purpose is to address cumulative effects and to reduce duplication of effort in preparing environmental documentation. As stated, the PEIS should replace the duplicative EAs which have been used previously to analyze the effects of individual marine seismic research surveys. The comprehensive analysis in the PEIS more than adequately evaluates the potential individual and cumulative effects of proposed marine seismic research cruises. We encourage NSF to use this PEIS as the NEPA document for all upcoming marine seismic operations until additional relevant data is available which might prompt a need for a project specific EA or supplemental environmental assessment. Additional EAs should only be necessary if the proposed action or geographic area is significantly different from what is described in the DPEIS or if significant new scientific information becomes available.</p>	<p><i>As future marine seismic cruises are proposed, the appropriate environmental compliance documents will be prepared for all such activities. It is expected that future surveys proposed by NSF or USGS would be covered by or tiered from the current PEIS, depending on the specifics of the proposed research and survey area. Future projects that are not covered by the analysis contained in the PEIS will likely require additional NEPA. However, those NEPA documents will incorporate by reference as much of the analysis from the PEIS as possible in accordance with the CEQ regulations.</i></p>
<p><u>Use of precautionary approach</u> Overall, the Affected Environment and Environmental Consequences, Acoustic Impact Criteria, and Acoustic Modeling sections provide well-written descriptions and reviews of the best available science on these topics. However, we are disappointed that in the DPEIS, NSF seems to advocate using a precautionary approach when estimating the numbers of animals exposed to seismic sources and in recommending mitigation measures. Even though the science described in the sections on the environment and potential effects does not indicate that biologically significant effects to marine animal populations have resulted from geophysical operations, the authors repeatedly state that the most conservative values and assumptions were used as input for the acoustic model</p>	<p><i>The lead and cooperating agencies agree with the commenters that a conservative approach to modeling has been employed in the draft PEIS. Employing conservative values and assumptions at various stages in the modeling allows for consistency in approach, and for an overall conclusion that the modeling results are conservative. This approach while conservative, allows both the action proponent and regulators confidence that actions will unlikely exceed modeled take estimates. Although the modeling approach may be conservative, results are still viewed to represent potential conditions. This would not preclude the action agency from identifying in future NEPA analyses instances where conservative take estimate results are unlikely to be realized. Underestimating takes has potential for negatively impacting the seismic research community as it could result in the premature termination of a survey and future surveys, since a robust schedule is needed to keep vessels operating efficiently.</i></p>

AMERICAN PETROLEUM INSTITUTE (API), INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS (IAGC), NATIONAL OCEAN INDUSTRIES ASSOCIATION (NOIA), AND U.S. OIL AND GAS ASSOCIATION (USOGA) (NOVEMBER 22, 2010)	
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<p>(e.g. page 2-57, Table 2-10; page 2-62, Figure 2-27; page 2-63, section 2.3.3.3) and in estimating the received exposure level (page 3-141, Section 3.6.5.1). By using the most conservative values and assumptions, the end result is an overestimate of the number of animals exposed. We suggest a more balanced approach, incorporating the best available science and risk assessment, be utilized when determining the inputs for the model and calculating received exposure levels.</p> <p>We are opposed to a government agency adopting the “precautionary principle” as regulation. The US statutory framework is supposed to incorporate a risk-based approach that relies upon the use of sound scientific data and the objective assessment of risk to determine the potential effects from human activity. This is in marked contrast to the precautionary approach, utilized in the EU, which does not require demonstrated adverse impact. NEPA does not require or recommend the use of the precautionary approach in preparing environmental documents.</p> <p>We recommend NSF reconsider using this precautionary approach in its environmental assessment.</p>	<p><i>NMFS uses the best available science to make its decisions under the MMPA. NMFS decisions concerning whether or not to issue authorizations for the incidental take of marine mammals under Sections 101(a)(5)(A) and (D) of the MMPA may be made only after the agency sets forth and supports specific determinations, including determinations that the authorization will result in no more than a negligible impact on the affected species or stock, and that mitigation will achieve the least practicable adverse impact on the affected marine mammal species or stock. The authorization must also set forth the permissible methods of taking and requirements for the monitoring and reporting of such taking. The analyses contained in the PEIS will provide useful information for NMFS in evaluating the potential impacts of marine seismic surveys on marine mammals and their habitat and other marine resources. NSF and USGS appropriately rely on NMFS for these determinations, as NMFS is the federal regulatory agency with statutory responsibility for authorizing take under the MMPA and the necessary technical expertise in determining underwater acoustics impacts to marine mammals.</i></p>
<p><u>Noise exposure criteria</u></p> <p>We applaud NSF for considering the Southall et al. (2007) noise exposure criteria and including estimates of exposure using this criterion in the DPEIS. In our view, Southall et al. (2007) is the best available peer-reviewed scientific paper on noise exposure criteria and associated metrics. Southall et al. provides valuable information to assist in risk assessment of the potential for physical harm to individual animals during seismic operations. The criteria proposed by Southall et al. can and should help inform whether there is a risk of physical harm to animals both during regular operation and soft-start of a source array.</p> <p>The current NMFS guidelines for Level A harassment under the MMPA are based on the root-mean-square (rms) sound pressure metric. “However, there is now scientific evidence that suggests that auditory effects of transient sound on marine mammals are better correlated with the amount of received energy than with the level of strongest pulse” (DPEIS, page 2-47). Therefore, we strongly recommend the use the Southall et al. noise exposure criteria, which uses a sound exposure level (SEL) metric or at least development of a criteria based on SEL and not rms.</p> <p>In addition, we support the recommendation that “allowance should be given to the differential frequency responsiveness of various marine mammal groups” (DPEIS page 2-52) by applying frequency-weighting functions when calculating the effective SELs.</p>	<p><i>Given the potential for NMFS to change its acoustic guidelines in the future, the PEIS provides both M-weighted and flat-weighted and rms SPL and SEL metrics in the impact analyses. At present, NMFS still requires the use of the rms SPL metric for estimating acoustic exposures of marine mammals. Should NMFS incorporate a SEL approach for estimating acoustic exposures of marine mammals and use of M-weighting, the PEIS will still be effective. NOAA is currently developing acoustic guidelines for assessing the effects of anthropogenic sound on marine mammal species under its jurisdiction. The guidelines will provide past acoustic criteria, as well as updated procedures for assessing acoustic effects based on recent advances in science. NOAA is working toward numerical criteria where appropriate and possible, while general analytical paradigms will be used in other cases (i.e., for instances where context- or environmental-specific factors reduce or eliminate the relevance of broadly applicable numerical criteria). The guidelines will also include an approach for updating acoustic criteria and policy guidance. The process to finalize the guidelines includes the following steps: (1) NOAA internal review; (2) external peer review; (3) public comment; and (4) finalize and release of guidelines. NOAA is currently still conducting step 1 of this process. Until such time that these guidelines are finalized, NMFS shall continue to use the rms SPL metric for estimating take and establishing mitigation measures.</i></p>

AMERICAN PETROLEUM INSTITUTE (API), INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS (IAGC), NATIONAL OCEAN INDUSTRIES ASSOCIATION (NOIA), AND U.S. OIL AND GAS ASSOCIATION (USOGA) (NOVEMBER 22, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p><u>Mitigation zones</u> Overall, we agree with the methodology outlined in the DPEIS: identification of representative analysis areas and detailed acoustic modeling for a subset of those areas to define mitigation zones (MZ) and evaluate potential acoustic impacts. However, NSF states that in addition to the acoustic modeling conducted for the 5 representative areas in the DPEIS, "...cruise-specific MZs would need to be modeled to determine the effective MZs for marine mammals and turtles" (pages ES-8 and 2-72). Though it might be possible to perform detailed acoustic modeling and determine a specific MZ for every marine seismic research survey, we caution other government agencies about requiring this for commercial geophysical surveys. The amount of resources (time, personnel, financial) required to model the MZ for every proposed Industry geophysical survey would be prohibitive. An alternative approach would be to define 'generic' MZs, perhaps for shallow and deep water, for marine seismic surveys based on the acoustic modeling performed for the representative areas. Defining a generic MZ based on the representative areas modeled would eliminate the need for redundant modeling for every seismic survey and would still protect marine mammals from physical or auditory harm.</p>	<p><i>NSF funds approximately 4-8 seismic surveys per year and USGS conducts approximately 8-12 per year. These surveys are conducted worldwide with little repetition in the same survey area from year-to-year as they are driven by scientific goals and objectives. This is different from the oil and gas industry, which conducts several different types of surveys in the same geographic area. At present, NSF and USGS perform modeling to identify the mitigation zone for each survey and therefore viewed it feasible to continue operating in this manner. Based on information gleaned from recent publications and workshops on the topic of monitoring and mitigation for acoustic sources, incorporating geographically specific data into the mitigation zone modeling enhances the accuracy of determining acoustic propagation and associated regulated mitigation zone. Therefore, NSF and USGS have attempted to incorporate this approach into the monitoring and mitigation program. Based on past surveys and certain conditions, a fixed mitigation zone was identified for the low-energy surveys. In the future should it be determined that a fixed mitigation zone can be employed successfully rather than modeled for high-energy surveys, NSF and USGS can re-evaluate the PEIS. The monitoring and mitigation program outlined in the PEIS was designed for NSF and USGS purposes and may not be feasible or appropriate for other entities.</i></p>
<p><u>Passive Acoustic Monitoring</u> We support NSF's use of passive acoustics as a monitoring tool. However, we question if NSF's proposal to use passive acoustic monitoring (PAM) during "both daytime and nighttime seismic operations as well as when the sources are not active" is feasible and practicable. The PAM operators will need periods of rest and time to repair equipment; it would require several operators to run PAM continuously. Also, there is limited bunk space on seismic vessels and it would be difficult if not impossible to accommodate the number of people that continuous 24/7 PAM operations would require. In addition, the global pool of experienced PAM operators is limited.</p> <p>Though there are limitations to current PAM technology (as described in the DPEIS), there are also limitations to visual observations. PAM offers another tool, in addition to visual observers, to use for monitoring. We support the use of PAM as a monitoring tool during certain conditions, such as to allow soft-starts during low-visibility conditions. PAM is useful under certain conditions and for certain species which have somewhat regular vocalization patterns, such as sperm whales. However, at this time, PAM systems are not able to reliably and accurately determine the location of the vocalizing animal automatically. An experienced operator is needed to optimize detection capability and interpret the data displayed in the user interface to estimate range to a vocalizing animal. A significant amount of research is underway to improve the localization capabilities of PAM systems.</p>	<p><i>NSF-USGS agrees with the comments regarding the current state and efficacy of PAM. PAM is viewed as a useful tool in assisting marine mammal observers and will be used as appropriate and as recommended by NMFS as part of the MMPA compliance process. In determining what mitigation and monitoring should be included in an MMPA authorization, NMFS must assess the benefit to the species of implementing the measure, practicability for applicant implementation, and effectiveness of the measure. Whether or not PAM should be used or required in a MMPA authorization will be assessed on a cruise-by-cruise basis and on an applicant-by-applicant basis. NMFS works with each individual applicant to determine the most appropriate mitigation and monitoring requirements. NSF and USGS will continue to monitor the advances made with PAM technology and incorporate any advanced systems when viewed beneficial and feasible, or conversely, should it be proven to not be beneficial in monitoring or mitigating for marine mammals.</i></p> <p><i>At present PAM is used on the primary seismic vessel, the R/V Langseth. The technical support for 24/7 PAM operations is currently being met aboard the R/V Langseth and therefore was viewed feasible to continue operating in this manner. Columbia University's Lamont-Doherty Earth Observatory (LDEO), ship operator of the R/V Langseth, subcontracts for PAM and PAM support; LDEO has successfully obtained satisfactory PAM support for past surveys. The PAM program outlined in the PEIS however was designed for NSF and USGS activities and may not be feasible or</i></p>

AMERICAN PETROLEUM INSTITUTE (API), INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS (IAGC), NATIONAL OCEAN INDUSTRIES ASSOCIATION (NOIA), AND U.S. OIL AND GAS ASSOCIATION (USOGA) (NOVEMBER 22, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>We recommend that basic training criteria, such as that specified by many countries for PSVOs, be developed and required for PAM operators. In addition, minimum requirements for PAM equipment should also be considered.</p> <p>A period of confidence in the current PAM capabilities, understanding of limitations, and experienced operator capacity-building is needed before government agencies consider requiring PAM as a mandatory monitoring tool during seismic operations.</p>	<p><i>appropriate for other entities and their associated activities.</i></p> <p><i>Regarding the comment to require basic training criteria for PAM operators, NMFS is currently in the process of developing national standards for PSVOs, which include information about requirements for PAM operators.</i></p> <p><i>No responsive changes have been made to the PEIS based on your comments regarding PAM.</i></p>
<p><u>Ramp-up procedures</u> We agree with NSF’s use of a ramp-up procedure as an operational mitigation measure but recommend an alternative description of the procedure. In the DPEIS (pages ES-12 and 2-69), the recommended ramp-up procedure is described as follows, “Airguns would be added in a sequence such that the source level of the array would increase in steps not exceeding 6 dB per 5-min period. A 36-airgun array would take approximately 30 min to achieve full operation via ramp-up.”</p> <p>The procedure described above is prescriptive and may not be possible to achieve for all seismic source array configurations. Therefore, we recommend that the following guidance for ramp-up, as described in the 2007 MMS Notice to Lessees and Operators (NTL), be used in the DPEIS instead: “Initiate ramp-up procedures by firing a single airgun. The preferred airgun to begin with should be the smallest airgun, in terms of energy output (dB) and volume (in³). Continue ramp-up by gradually activating additional airguns over a period of at least 20 minutes, but no longer than 40 minutes, until the desired operating level of the airgun array is obtained.”</p>	<p><i>The PEIS describes the airgun sources and configurations used by NSF or USGS and therefore prescribe a ramp-up procedure logical for those sources. The text has been revised to account for the ramp-up of low-energy sources (e.g., 2 GI guns) (see Section 2.4.1.1 of the Final PEIS). The ramp-up procedure outlined in the PEIS was designed for NSF and USGS energy sources and activities and is based on the requirements specified by NMFS in previous IHAs for these agency activities. These procedures may not be feasible or appropriate for other entities and their associated activities. In determining what mitigation and monitoring should be included in an MMPA authorization, NMFS must assess the benefit to the species of implementing the measure, practicability for applicant implementation, and effectiveness of the measure. NMFS works with each individual applicant to determine the most appropriate mitigation and monitoring requirements and procedures for implementing them. Refer to Sections 1.4 and 1.8.3 of the Final PEIS for a more detailed discussion of the MMPA and associated IHA requirements.</i></p>
<p><u>Protected Species Visual Observers</u> We support the use of Protected Species Visual Observers (PSVOs) to visually monitor the MZ. However, it is not the role of PSVOs to determine if an observed marine animal’s change in behavior is biologically significant or to estimate the numbers of marine mammals potentially ‘taken’ by harassment as defined by MMPA (page 2-66). The primary responsibility of the PSVOs onboard the seismic vessel is to visually monitor the MZ and record their observations. Also, while we recognize that additional data on the distribution and abundance of marine life is needed, this type of data collection is not the primary responsibility of PSVOs and it should not detract from their primarily responsibility of visually monitoring the MZ. We recommend NSF clarify the roles and responsibilities of PSVOs in the DPEIS.</p>	<p><i>The roles and responsibilities of PSVOs as well as the data collection and documentation requirements are defined by NMFS and are based on the required procedures identified in previous marine seismic research survey IHAs funded by NSF or conducted by USGS. Section 2.4.1.1, PSVO Data and Documentation, of the Final EIS/OEIS has been revised to provide clarification on the roles and responsibilities of the PSVOs.</i></p>

AMERICAN PETROLEUM INSTITUTE (API), INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS (IAGC), NATIONAL OCEAN INDUSTRIES ASSOCIATION (NOIA), AND U.S. OIL AND GAS ASSOCIATION (USOGA) (NOVEMBER 22, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p><u>Seismic Sources</u> We applaud NSF for including language in the DPEIS which describes why the values for source levels provided in Table 2-3 are not actually realized in the water column, "Because the actual source would be a distributed sound source (typically 2, 4, 18, or 36 airguns) rather than a single point source, the highest sound levels listed in Table 2-3 apply only to downward propagating signals. Because of the directional nature of the sound from large airgun arrays, the effective source level for sound propagating in near-horizontal directions would be substantially lower than that for downward propagation" (page 2-23 Table 2-3; page 2-29).</p> <p>The source levels in Table 2-3 are the back-calculated, modeled sound pressure values and are not actually realized at any point in the water column. Numbers of this sort are regularly quoted but they require explanation in order for the reader to have a clear understanding of the numbers. In virtually all cases they are derived from modeling and are an over-estimate of the true source sound level (sound output from a seismic source array at 1 meter distance from the array). This is an extremely significant point and we suggest NSF add the following text or similar and a graphic to further expand upon this important point: "It is difficult to measure the actual sound pressure level close to a full source array that is being activated, due to the physical environment surrounding an active seismic array. Therefore assumptions are made that enable the response of a given source array to be modeled.</p> <p>The 'far field' assumption suggests that at some distance away from a source array, which is much greater than the dimensions of the source array, the peak energy pulses from the various individual source elements ('near field' signature) arrive at the same time and add together constructively to form the 'far field' response of the source. This response is corrected or back-projected to one meter from the source array to produce the 'far field' signature of the source at one meter, which is a standard modeled measure of a source array output. It is well known that the peak energy pulses from individual source elements no longer align at locations close to the seismic source array (in the 'near field') as a seismic source array is a 'distributed', rather than a 'point' source. Therefore, the emitted sound pressure level close to the source array is lower than that calculated using the 'far field' calculation."</p>	<p><i>Suggested text has been added to the end of Section 2.2.3 of the Final PEIS. Additional discussion of source levels and far/near field signatures can be found in Appendix B, Acoustic Modeling Report, Sections 4.1, 5.1, and 8.3.</i></p>
<p><u>Effectiveness of previous mitigation measures</u> Scientific evaluation of the effectiveness of mitigation measures is needed. We are pleased to read that NSF is developing a paper describing the effectiveness and limitations of the mitigation measures used during its previous marine seismic research cruises. We look forward to the publication of the final report. According to the</p>	<p><i>Thank you for your comments. LGL is still preparing the data for future publication regarding the effectiveness of current mitigation and monitoring procedures, however since no specific journal or date for publication has yet been identified by LGL, the reference in the document has been changed to "LGL unpublished data." No further responsive changes have been made to the PEIS based on your comment.</i></p>

AMERICAN PETROLEUM INSTITUTE (API), INTERNATIONAL ASSOCIATION OF GEOPHYSICAL CONTRACTORS (IAGC), NATIONAL OCEAN INDUSTRIES ASSOCIATION (NOIA), AND U.S. OIL AND GAS ASSOCIATION (USOGA) (NOVEMBER 22, 2010)	
<i>Comment</i>	<i>NSF Response</i>
summary of the preliminary results from the Holst et al. paper, "...monitoring and mitigation measures have been effective in reducing the potential exposure of marine mammals and sea turtles to high-level seismic sounds and, presumably, of biologically significant effects (Holst et al. in prep.). Various monitoring and mitigation methods and measures can be combined to complement one another" (page 2-71). This is a significant finding. The information in this section of the DPEIS should be highlighted as it demonstrates that current mitigation and monitoring measures during marine seismic research surveys have been effective and therefore, additional precautionary mitigation measures are not necessary.	

M. LYLE, PROFESSOR, DEPARTMENT OF OCEANOGRAPHY, TEXAS A&M UNIVERSITY, COLLEGE STATION, TX	
<i>Comment</i>	<i>NSF Response</i>
<p>I am a Principal Investigator responsible for seismic reflection data acquisition funded by the National Science Foundation (3 expeditions since 2000). I strongly support this programmatic EIS, because individual environmental impact statements for each cruise have proven costly and are for the most part redundant efforts. In addition, they make it difficult to schedule seismic reflection operations and add to uncertainty about what parts of a scientific program can be carried out. Finally, rules for conducting the seismic reflection surveys have changed with each survey in what seems to be an arbitrary fashion.</p> <p>In terms of mitigation alternatives, I strongly recommend that Alternative B--generic mitigation measures for low-energy acoustic sources-- be chosen as the best mitigation option. Alternative B provides for customizing mitigation measures when environmental factors require it to minimize affecting marine mammals, yet minimizes red tape when standard operations are envisioned.</p>	<p><i>Thank you for your comments. No responsive changes have been made to the PEIS based on your comments.</i></p>

STATE OF HAWAII, OFFICE OF HAWAIIAN AFFAIRS, HONOLULU, HI (NOVEMBER 17, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>The Office of Hawaiian Affairs (OHA) is in receipt of your October 1, 2010 request for comments on the above-referenced project. OHA understands that the project entails a series of marine seismic surveys funded by the National Science Foundation (NSF) or conducted by the U.S. Geological Survey (USGS). As lead agency, NSF prepared the subject draft Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement (hereinafter Draft PEIS) to cover the research activities of academic and U.S. government scientists who will perform scientific research to better understand the structure and stratigraphy of the crust and overlying sediment of the ocean floor. The Draft PEIS does not examine the impacts of a specific research activity; rather, it analyzes the impacts of future marine seismic research on thirteen exemplary analysis areas. The surveys will primarily involve the use of high-energy sources of sound, in addition to mapping, dredging, drilling, and coring research.</p> <p>Based on the documentation provided, OHA does not have comments on the Draft PEIS. In the event a seismic survey is planned around Hawai 'i, the impacts associated with said survey would likely be most similar to those of the Marianas Qualitative Analysis Area, as both are volcanic archipelagos within the Pacific Trade Wind Longhurst Biome. Should a seismic survey be planned around Hawai'i, OHA requests that we be directly notified prior to its commencement.</p>	<p><i>Thank you for your comments. Per OHA request, the action agencies will contact OHA should a seismic survey be planned around Hawai 'i prior to its commencement. No responsive changes have been made to the PEIS based on your comment.</i></p>

MARINE MAMMAL COMMISSION, BETHESDA, MD (NOVEMBER 24, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>Programmatic Approach and Site-Specific Analyses Federal agencies are required to comply with the National Environmental Policy Act before they make final decisions about proposed federal actions that could impact the human environment. The National Science Foundation has identified proposed marine seismic research that it will fund or that the U.S. Geological Survey will conduct as federal actions requiring such environmental review. In the past, the Foundation has prepared environmental assessments to analyze the environmental impact of individual cruises or surveys and posted the assessments on the Foundation’s website for public review and comment. The Marine Mammal Commission concurs with the Foundation and the Survey that a programmatic analysis such as the one under consideration here may help streamline environmental reviews needed for marine seismic research.</p> <p>However, a programmatic approach also has its limitations. The Foundation and the Survey state that they cannot anticipate fully the actual types of research activities that they will fund or conduct during the next several years and therefore have limited their programmatic analyses to “exemplary areas” based on past activities. Although a focus on such areas may be useful for the purpose of completing a programmatic analysis, such a focus does not provide assurance that all area-specific considerations are adequately described in the analysis. In addition, other factors such as season, protected resources at risk, environmental conditions, and the precise nature of future studies may not be adequately described using a programmatic approach based on exemplary areas. The Foundation’s <i>Federal Register</i> notice acknowledges such limitations and states that subsequent project- and cruise-specific analyses will be needed to evaluate specific research projects. <u>The Marine Mammal Commission</u> concurs with this assessment and <u>recommends</u> that the National Science Foundation and the U.S. Geological Survey be prepared to conduct supplemental environmental analyses under the National Environmental Policy Act once the details pertaining to specific proposed seismic studies become available. The Marine Mammal Commission requests that the National Science Foundation and the U.S. Geological Survey provide the Commission with copies of these supplemental environmental analyses as they are made available for public review and comment.</p>	<p><i>We appreciate that the MMC is in agreement with the approach identified in paragraph 1, pg 1-5 of the Draft PEIS, that in accordance with NEPA and other regulatory requirements (e.g., ESA, MMPA), NSF and USGS will conduct supplemental environmental analyses as appropriate and as specific details for proposed cruises are identified. NSF and the USGS will make copies of these supplemental or tiered environmental documents available to the public for review and comment. No responsive changes have been made to the PEIS based on your comment.</i></p>
<p>Action Alternatives Past environmental assessments have generally discussed only two alternatives; the No Action Alternative (i.e., research is not conducted) and the Preferred Alternative (a single statement of proposed mitigation measures for a specific research program). This narrow range of alternatives is contrary to guidance provided by the Council on Environmental Quality in regulations implementing the National Environmental Policy Act. This guidance states that environmental documents “should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the</p>	<p><i>In order to respond as effectively as possible to this comment, NSF, USGS, and NMFS contacted MMC to obtain further clarification regarding this comment.</i></p> <p><i>We appreciate the MMC’s comments with regard to the action alternatives presented in the Draft PEIS. The Draft PEIS provides a description of the various types of vessels and technology that would be utilized during proposed marine seismic surveys conducted by USGS or funded by NSF (Chapter 2), their utility for various purposes and in various locations, and their characteristics (Sections 2.1 and 2.2). Section 2.6 also provides a description of alternative technologies that were considered for</i></p>

MARINE MAMMAL COMMISSION, BETHESDA, MD (NOVEMBER 24, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>decisionmaker and the public.”</p> <p>The draft programmatic environmental impact statement identifies two action alternatives. Alternative A would require cruise-specific mitigation measures for all energy sources, whereas Alternative B (the preferred alternative) would require cruise-specific mitigation measures except for low-energy acoustic sources, which would require only generic mitigation measures. The Commission does not consider these proposed alternatives to be sufficient to define sharply the issues and provide a clear basis for choice among alternatives. Indeed, both of these alternatives would be carried out in identical fashion for all but low-energy sources. Undoubtedly, the programmatic analysis will be limited because the specifics of future seismic studies are not known. However, in developing the analysis, the Foundation and the Survey should be able to provide a full description of the various types of technology that are involved, their utility for various purposes and in various locations, their characteristics (in addition the amount of energy involved), and the types and severities of the risks involved. By including such information in the analysis the agencies will inform the public and decision-makers regarding the various technologies and research approaches that are available and the tradeoffs in terms of information gained versus risks presented. In addition, the agencies should be able to provide a full description of the kinds of mitigation measures that might be used, and their utility and shortcomings under different circumstances. Also, the Commission understands that the Foundation helps researchers design their proposed actions in ways that minimize effects on marine mammal populations. The Commission gratefully acknowledges such efforts, and believes that the guidance given to researchers should be described in the programmatic analysis and may provide a basis for additional alternatives to be considered.</p> <p>The alternatives in the programmatic analysis will determine whether and to what extent it provides an adequate foundation from which to tier future project-specific analyses. To that end, <u>the Marine Mammal Commission recommends</u> that the National Science Foundation and the U.S. Geological Survey redefine the alternatives considered in the programmatic analysis to encompass the broad technological, monitoring, and mitigation issues that pertain to all marine seismic research and provide a clear basis for choosing among options by decision-makers and the public. Doing so should then allow the agencies to focus their attention on specific matters when particular studies are analyzed.</p>	<p><i>conducting marine seismic surveys but were dismissed from further consideration as they currently do not meet the scientific objectives of the proposed surveys.</i></p> <p><i>A full description of the kinds of mitigation measures, based on past and ongoing marine seismic surveys, is provided in Section 2.4.1.1.</i></p> <p><i>A description of pre-cruise planning procedures is presented in Section 2.4.1.1. The action agencies respond to specific research requests and, therefore, it is often not appropriate to add additional action alternatives. Nevertheless, the agencies will attempt to better characterize pre-cruise planning efforts which shape surveys in future site-specific NEPA documentation.</i></p> <p><i>Given that the technologies for potential future surveys and monitoring and mitigation are in fact well defined in the PEIS (See Section 2.6), the action agencies feel that the alternatives presented in the PEIS are appropriate. The action agencies feel that the approach to alternatives proposed by MMC do not effectively take into consideration the comprehensive descriptions in the PEIS of technologies, the pre-cruise planning mitigation, and other monitoring and mitigation activities, which make the MMC’s proposed approach for alternatives less applicable. The PEIS, by design, is broad and comprehensive in approach. It has identified and discussed all known effective mitigation measures, including various technologies even though they have not been presented as separate action alternatives. This approach is appropriate to the decision being made and the scope and level of analysis necessary to inform that decision. Though the range of action alternatives is limited to the two fully evaluated, the PEIS in no way forecloses or limits the development and evaluation of a broader range of alternatives structured around different mitigation approaches in tiered project-level NEPA documents prepared for specific cruises. The PEIS presents data and analyses to foster development of such alternatives. Therefore the action agencies feel that alternatives presented in the Draft PEIS and carried forward to the Final PEIS establish a range of reasonable alternatives effective at informing both the public and agency decision makers within NSF and USGS on the environmental issues, impacts and trade-offs associated with the programmatic decision at hand.. NSF, therefore, has not included additional action alternatives in the PEIS in response to this comment.</i></p>
<p>Site- and Species-Specific Mitigation and Monitoring Measures</p> <p>The National Marine Fisheries Service has indicated that cruise-specific analyses of impacts will be required for the issuance of incidental take authorizations under the Marine Mammal Protection Act and/or incidental take statements under the Endangered Species Act. These authorizations likely will have cruise-specific mitigation and monitoring requirements based on potential impacts on the marine mammal species</p>	<p><i>As MMC encourages, NSF and USGS will continue to incorporate appropriate, survey-specific mitigation and monitoring based on survey-specific factors such as species present in the survey area, oceanographic features, and any unique survey activities. NSF and USGS will also work in conjunction with NMFS to develop survey-specific monitoring and mitigation measures and will comply with subsequent authorizations and recommendations made through the MMPA and ESA processes. No responsive</i></p>

MARINE MAMMAL COMMISSION, BETHESDA, MD (NOVEMBER 24, 2010)	
<i>Comment</i>	<i>NSF Response</i>
<p>expected to be in the study area. <u>The Marine Mammal Commission</u> agrees with the need for such specificity and <u>recommends</u> that the National Science Foundation and the U.S. Geological Survey require for each proposed project specific mitigation and monitoring requirements tailored to such things as the species present in the research area, their natural history and status (e.g., endangered, threatened), pertinent oceanographic and bathymetric features, and the proposed operations.</p>	<p><i>changes have been made to the PEIS based on your comment.</i></p>
<p>Guidance for Applicants The draft programmatic environmental impact statement indicates that the design of any specific survey requires consideration of the trade-off among the range and resolution of different sound sources, the timing of the survey and seasonal sea conditions, research vessel transit times, and the availability of properly outfitted vessels. Whether and to what extent researchers consider potential impacts on marine mammals and other protected species is not clear. If staff from the Foundation and/or Survey spend considerable time and effort helping researchers redesign their studies to minimize impacts on marine mammals, then it may be useful for the agencies to provide guidelines for research that scientists could incorporate into their original research design and planning efforts. For that reason, <u>the Marine Mammal Commission recommends</u> that the National Science Foundation and the U.S. Geological Survey develop guidelines for cruise research design and planning that would minimize the potential impacts of seismic research on marine mammals and other protected species. The Commission would be pleased to assist in developing such guidelines.</p>	<p><i>Pre-cruise planning for applicants is an important and vital part of the marine seismic survey process (see Section 2.4.1.1.) NSF currently has a guidance document for scientists interested in marine seismic research and is available on the NSF website at: http://www.nsf.gov/geo/oce/pubs/Seismic_Reflection_Permitting_Procedures.pdf. Although the focus of this document is on seismic surveys conducted in foreign waters, many of its underlining principles, such as those related to pre-cruise planning, are relevant to all seismic surveys, and therefore the document serves more for the science community than the document's noted titled purpose. This information has been added to Section 2.4.1.1 of the Final PEIS. NSF accepts the MMC's offer to provide assistance with improving existing pre-cruise planning procedures and will consider suggestions to incorporate into seismic survey guidelines. In addition to written guidance, outreach and education regarding optimizing survey design, considering potential environmental consequences, and best practices is conducted through presentations at scientific meetings, conferences, and workshops; University-National Oceanographic Laboratory System (UNOLS) meetings and oversight committees; and, pre-cruise planning meetings held by the vessel operators.</i></p>
<p>Collection of Information by Protected Species Observers The Foundation and the Survey propose to deploy protected species observers aboard seismic survey vessels, whether the research is funded by the Foundation or conducted by the Survey. The agencies would consult with the Office of Protected Resources at the National Marine Fisheries Service regarding the observers' qualifications. The National Marine Fisheries Service has developed standards for the selection and training of fisheries observers, and it has made preliminary recommendations to improve protected species observer programs generally, including recommendations for program management, data reporting, training and eligibility, standards of conduct and conflict of interest, and safety. Those recommendations have not yet been implemented in the training of observers for seismic studies and the qualifications and training of observers on seismic vessels varies considerably. The lack of uniform standards undermines the quality (e.g., accuracy, reliability) of information available to assess the impact of seismic activities on marine mammals. To address this concern, <u>the Marine Mammal Commission recommends</u> that the National Science Foundation and the U.S. Geological Survey work with their observers, observer service providers, the National Marine Fisheries Service, the Fish and stakeholders to establish and implement standards for</p>	<p><i>As MMC has noted, NSF and USGS currently use PSVOs on seismic surveys and are typically required as part of the associated governing IHA issued by the NMFS. While it is outside the agency mission and staff expertise of NSF and USGS to develop a PSVO Standards and Training Program, the action agencies are willing to comply with the PSVO requirements established by NMFS and/or USFWS, the regulating agencies for these activities. NMFS is currently in the process of developing national standards for PSVOs, including PSVOs on research seismic vessels. Once these national standards are finalized, NSF and USGS will ensure that the PSVOs placed on their marine seismic research surveys will meet the required standards. Per requirements established in the survey IHAs, data collected by PSVOs are compiled and analyzed and submitted to NMFS in a report within 90 days of survey completion. Reports currently, and will continue to, estimate potential effects on marine mammals and provide information regarding the effectiveness of monitoring and mitigation measures. Data collected by PSVOs are viewed by the action agencies as public information and any further analysis of them is allowable, and encouraged, at user's expense. A discussion of PSVOs is provided in Section 2.4.1.1 of the Final PEIS.</i></p>

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protected species observers to improve the quality and usefulness of information collected during marine seismic surveys. In addition, <u>the Commission recommends</u> that the Foundation and Survey establish requirements for analysis of data collected by the observers to ensure that those data are used both to estimate potential effects on marine mammals and to inform the continuing development of mitigation and monitoring measures.	<i>Future NSF survey PSVO reports will be available on the NSF website at: http://www.nsf.gov/geo/oce/envcomp/index.jsp. Future USGS survey PSVO reports will be available on a yet to be determined USGS website. The 90-day reports submitted to NMFS are also made available on the NMFS Office of Protected Resources website at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications.</i>
<p>Visual Mitigation and Monitoring Measures</p> <p>The Foundation’s analysis of impact on marine mammals is based, in part, on the presumed efficacy of the proposed visual mitigation and monitoring measures. The effectiveness of visual monitoring is limited and varies considerably depending on conditions, as has been determined from extensive data and experience in the field of marine mammal assessment. For example, visual monitoring typically is not effective at night or during periods of bad weather and, even with good visibility, observers are unable to detect marine mammals when they are below the surface or beyond visual range. Determining the efficacy of mitigation and monitoring measures may require not only collecting opportunistic data but also designing and conducting studies to test specific hypotheses regarding the utility of visual observations and to evaluate responses of the various species encountered. Because the efficacy of visual observation can vary markedly depending on circumstances, <u>the Marine Mammal Commission recommends</u> that the National Science Foundation and the U.S. Geological Survey provide additional justification for their preliminary determination that the mitigation and monitoring measures that depend on visual observations would be sufficient to detect, with a high level of confidence, all marine mammals within or entering identified mitigation zones. At a minimum, such justification should describe (1) detection probability as a function of distance from the vessel and (2) changes in detection probability under various sea state and weather conditions. If such information is not available, the Foundation and the Survey should undertake the studies needed to verify that the proposed mitigation and monitoring measures are likely to detect all or nearly all marine mammals in or near mitigation zones and, if necessary, to develop alternative means of detecting marine mammals in or near those zones. The Commission would be pleased to continue discussions with the Foundation and the Survey regarding the design of such experiments to promote a better understanding of the utility and shortcomings of visual observations for monitoring and mitigation purposes.</p>	<p><i>The Agencies believe that the described visual monitoring program, which is consistent with current practices, will be sufficient to visually detect, with reasonable certainty, most marine mammals within or entering identified mitigation zones (MZ). At present, NMFS views the combination of visual and passive acoustic monitoring as the most effective mitigation techniques available for detecting marine mammals within or entering the exclusion zone. The action agencies are receptive to incorporating proven technologies and techniques to enhance the monitoring and mitigation program. In this vein, NSF, in collaboration with other federal agencies have offered a funding opportunity through the National Oceanographic Partnership Program to improve the technologies and existing capabilities to detect, classify and locate marine mammals in survey areas during seismic operations. Results from this funding opportunity may push the boundaries of current technologies and methodologies for monitoring exclusion zones. Until proven technological advances or enhancements are made for visual observation services during surveys. In cooperation with NMFS, LDEO, ship operator for the primary seismic vessel R/V Langseth, will conduct efficacy experiments of night vision devices during a future R/V Langseth cruise. In addition, in response to a recommendation from NMFS, LDEO is evaluating the use of handheld thermal imaging cameras to supplement nighttime mitigation practices. These devices were successfully utilized by another federal agency while conducting nighttime seismic operations. Section 2.4.1.1 of the Final PEIS has been revised to address the concerns regarding the effectiveness of current marine mammal monitoring methods.</i></p>
<p>Analysis of Cumulative Impacts</p> <p>The Council on Environmental Quality’s regulations implementing the National Environmental Policy Act require that an analysis of cumulative impacts include not only the impacts of the proposed action, but also the “incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40</p>	<p><i>The cumulative impacts analysis in the Draft PEIS examined potential impacts at a programmatic level. Consistent with MMC recommendations, NSF and USGS will be prepared to conduct additional cumulative impact analyses for future specific seismic studies in the context of all other factors in the pertinent human environment within a proposed study area as appropriate. Section 4.1 of the Final PEIS has been revised to address your comments.</i></p>

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<p>CFR § 1508.7). Therefore, the Foundation and the Survey must not limit their analysis of cumulative effects only to the expected impact of research funded by the Foundation or conducted by the Survey.</p> <p>Contrary to the Council’s regulations, that appears to be exactly what the Foundation and Survey have done in the draft impact statement. The statement lists other activities, such as oil and gas exploration and production, recreation, tourism and commercial vessel traffic, military exercises and operations, fishing operations, hunting and/or incidental mortality, and pollution, but provides few details regarding the impact of these activities on marine mammals. It also does not mention other potentially important natural and human-related impacts, such as disease, natural toxins, predation, weather and climatic influences, or ingestion of debris. More importantly, the impact statement provides little analysis or discussion of how the proposed action, together with the total effects of all of these factors, might affect marine mammals. Instead, the draft impact statement mentions only the impacts of proposed marine seismic research funded by the Foundation or conducted by the Survey when it concludes there would not be any significant cumulative impacts to marine resources.</p> <p>Furthermore, the Foundation justifies this conclusion simply by stating that pre-cruise planning and coordination with other ongoing and planned activities, as well as mitigation and monitoring during proposed seismic operations, would minimize cumulative impacts to an insignificant level. The Commission does not agree that such a blanket statement can be made without a reasoned analysis to support it. First, it is not possible to do a cumulative effects analysis that encompasses all future seismic projects. Such an analysis must take into account not only the effects of a specific project, but also the effects of all other human impacts in the area and at the time of the proposed study. Because the Foundation and the Survey have recognized already that they cannot predict exactly where and when they will fund or conduct such studies, the Commission does not see how the agencies can describe in advance the other factors that must be considered in a cumulative effects analysis. Second, the added effects of a specific project cannot be dismissed based simply on an expectation or promise of future remedies. To do so would be contrary to the whole purpose of an environmental impact statement. To address this shortcoming, <u>the Marine Mammal Commission recommends</u> that the National Science Foundation and the U.S. Geological Survey provide, to the extent possible, a comprehensive analysis of the cumulative impacts expected from seismic surveys themselves, but then be prepared to conduct additional cumulative impact analyses for future specific seismic studies in the context of all the other factors in the pertinent human environment; that is, the human environment where seismic studies have been proposed.</p>	