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COMMENTS SUBMITTED BY THE GULF RESTORATION NETWORK TO THE BUREAU OF OCEAN ENERGY MANAGEMENT (BOEM) IN RESPONSE TO ITS NOTICE OF PREPARATION OF A PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (PEIS) ON MULTIPLE GEOLOGICAL AND GEOPHYSICAL (G & G) ACTIVITIES IN THE OCS OF THE GULF OF MEXICO

JUNE 19, 2013

The Gulf Restoration Network (GRN) is a network of local, regional, and national environmental, social justice, and public interest groups and individuals dedicated to empowering people to protect and restore the ecological and biological integrity of the Gulf of Mexico. Network members hail from each of the Gulf states of Alabama, Florida, Louisiana, Mississippi, and Texas, and beyond. The GRN is deeply concerned about the potential environmental impacts of seismic exploration on the resources of the Gulf of Mexico.

As stated in the federal register notice, this PEIS is being prepared cooperatively with NMFS to serve as the required environmental analysis for a proposed rulemaking under the MMPA governing authorization for unintentional takes during G&G activities. We strongly support the programmatic rulemaking that BOEM and NOAA intend to include in their Proposed Action, but insist that the agency adopt mitigation and monitoring measures at this stage of analysis for the following reasons:

- The Gulf of Mexico is the most heavily prospected body of water on the planet. Reflecting this, the industry routinely conducts dozens of seismic exploration surveys each year, many of them involving high-intensity airgun arrays and running for weeks or months. Recent analysis conducted by NOAA shows that chronic noise levels from airguns alone are approaching 120 decibels throughout much of the northern Gulf.
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- Airguns have been shown to displace commercial species of fish horizontally and vertically in the water column on a vast scale – over thousands of square kilometers. The result has been to dramatically depress catch rates of species such as cod, haddock, and rockfish across areas as large as the state of Rhode Island, leading fishermen in Norway and other parts of the world to seek industry compensation for their losses. Like marine mammals, Gulf fisheries are still compromised by the Deepwater Horizon spill and can ill afford the sustained insult that the industry's activities represent.

- This activity has a huge environmental footprint. Airgun noise is loud enough to mask whale calls over literally thousands of miles, destroying their capacity to communicate and breed. It can drive whales to abandon their habitat and cease foraging, again over large areas of ocean. BOEM's own funded research, published in 2009, found that Gulf sperm whales subjected to even moderate amounts of airgun energy appeared to lose

about 20% of their foraging ability – a result that could well explain why the population hasn't recovered from whaling. Other research has demonstrated a range of other impacts from the industry's surveys, including silencing of calls, hearing loss, and even injury and death.

- The industry's current activities are hitting marine mammal populations already compromised by the Deepwater Horizon disaster. These populations include the coastal bottlenose dolphin population, which has undergone a severe die-off since the spill; the Gulf's population of Brydes' whales, of which fewer than 50 animals remain; and its unrecovered population of sperm whales, whose nursery in Mississippi Canyon was ground zero for the spill.

- Given all of this activity, programmatic rulemaking is absolutely essential, and we fully support the programmatic rulemaking that the Proposed Action would include. But it is just as essential that BOEM develop and adopt mitigation at this programmatic stage of review, in order to manage this problem at a scale appropriate to the biology, the industry, and the mitigation and monitoring solutions available. The most promising management measures – including habitat exclusions, alternative seismic technologies, and full-scale monitoring – cannot easily be assessed or implemented on an activity-by-activity basis; they must be considered at the programmatic stage.

- To safeguard marine mammal populations, BOEM must find ways to reduce the cumulative, chronic exposure of vulnerable species. It must adopt area closures for high-value habitat, such as in the DeSoto and Mississippi Canyons; set caps on activities; eliminate duplicative surveys; and require the use of greener seismic technologies, such as marine vibroseis, in certain areas. These mechanisms are essential both to protecting Gulf populations of marine mammals and to satisfying federal law.

With regard to the actual scope of analysis covered in the noticed PEIS, the Agencies must fully analyze

- All potentially available alternative technologies that would allow exploration for oil and gas reserves at different sound levels than those used by seismic technologies currently employed by the industry

- The impacts of all aspects of the process of seismic exploration on all protected marine mammal species, including the following marine mammals that have been found in the geographic area covered by the EIS, including but not limited to

    - Atlantic Spotted Dolphin - *Stenella frontalis*
    - Blainville's Beaked Whale - *Mesoplodon densirostris*
    - Blue Whale - *Balaenoptera musculus*
    - Bottlenose Dolphin - *Tursiops truncatus*
    - Bryde's Whale - *Balaenoptera edeni*

- Clymene Dolphin - *Stenella clymene*
- Cuvier's Beaked Whale - *Ziphius cavirostris*
- Dwarf Sperm Whale - *Kogia simus*
- False Killer Whale - *Pseudorca crassidens*
- Fin Whale - *Balaenoptera physalus*
- Fraser's Dolphin - *Lagenodelphis hosei*
- Gervais' Beaked Whale - *Mesoplodon europaeus*
- Humpback Whale - *Megaptera novaeangliae*
- Killer Whale - *Orcinus orca*
- Melon-headed Whale - *Peponocephala electra*
- Minke Whale - *Balaenoptera acutorostrata*
- Northern Right Whale - *Eubalaena glacialis*
- Pantropical Spotted Dolphin - *Stenella attenuata*
- Pygmy Killer Whale - *Feresa attenuata*
- Pygmy Sperm Whale - *Kogia breviceps*
- Risso's Dolphin - *Grampus griseus*
- Rough-toothed Dolphin - *Steno bredanensis*
- Sei Whale - *Balaenoptera borealis*
- Short-finned Pilot Whale - *Globicephala macrorhynchus*
- Sowerby's Beaked Whale - *Mesoplodon bidens*
- Sperm Whale - *Physeter macrocephalus*
- Spinner Dolphin (Long-snouted) - *Stenella longirostris*
- Striped Dolphin - *Stenella coeruleoalba*
- West Indian Manatee - *Trichechus manatus*

Far too often agency analysis of impacts is limited to discussion of the science surrounding bottlenose dolphins. However, the agency must consider potential differences in hearing sensitivity and thus the difference in the potential for impact among the different species that inhabit the OCS of the Gulf of Mexico.

- The additive affect of continuing seismic exploration on species within the foot print of and thus impacted by the BP oil disaster of 2010.

- The indirect, secondary and cumulative impacts on the marine environment of all activities of the oil and gas industry in the geographic area covered by the EIS. Cumulative impact analysis must include a review of the overall impacts of seismic in addition to an estimated potential removal structures per year (which were predicted in previous NEPA reviews to be as high as 100 per year), other activities associated with oil and gas exploration and development that produce noise, military activities (such as precision airstrike activities and vessel sonar testing) and non-BOEM regulated activities (i.e. marine transportation, fishing, etc). [1]

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[1] The Fifth Circuit has set out the kind of information that this "broader analysis" must include:

> Given the CEQ regulations, it seems to us that a meaningful cumulative-effects study must identify: (1) the area in which effects of the proposed project will be felt; (2) the impacts

- The effectiveness of current mitigation measures in reducing the threat to protected species, and additional reductions in impact that could be achieved by use of alternative technologies or additional mitigation measures beyond those currently employed.

Respectfully submitted:

Cynthia Sarthou
Executive Director

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that are expected in that area from the proposed project; (3) other actions -- past, proposed, and reasonably foreseeable -- that have had or are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact that can be expected if the individual impacts are allowed to accumulate.

Fritiofson, 772 F.2d at 1245 (emphasis added). N.R.D.C. v. Hodel, 865 F.2d 288, 298-300 (D.C. Cir. 1988) (holding that references to impacts within each region of offshore oil drilling do not constitute an inter-regional cumulative impact analysis).

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Docket: BOEM-2013-0034
Outer Continental Shelf Geological and Geophysical Exploration Activities in the Gulf of Mexico

Comment On: BOEM-2013-0034-0001
Outer Continental Shelf Geological and Geophysical Exploration Activities in the Gulf of Mexico

Document: BOEM-2013-0034-DRAFT-0006
Comment from L Leavitt, Gulf Coast Environmental and Health Coalition

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General Comment

We strongly oppose the harmful seismic oil & gas exploration program that is proposed for the Mid-Atlantic and South Atlantic outer continental shelf (OCS) planning areas. The seismic activity is not only injurious to marine wildlife, but it is also the first step toward harmful offshore drilling and spilling off our coasts. We will never be able to drill our way to low gas prices or energy independence, so there is no justification for subjecting marine animals to the extremely damaging effects of airgun noise. The intense blasts of airgun arrays are some of the loudest underwater sounds humans make, short of explosives. This is exceedingly disruptive for all marine animals that rely on hearing to feed, mate, travel, communicate and many other behaviors necessary for survival. Airgun noise is loud enough to mask whale calls over literally thousands of miles, destroying their capacity to communicate and breed. It can drive endangered whales to abandon their habitat and cease foraging, again over vast areas of ocean. Closer interactions with airguns can cause hearing loss, injury and death. The south Atlantic is the only calving area for one of the most endangered whales in the world, the North Atlantic right whale, and these airguns pose serious threats to their future. Airguns also displace commercial species of fish as far as thousands of square kilometers away from where they are used. This has reduced catch rates of species such as cod, haddock, + rockfish across areas as large as the state of Rhode Island, leading fishermen in Norway and other parts of the world to seek industry compensation for their losses. This poses a huge threat to commercial/recreational fishing off mid- and southeast Atlantic that (not including N.J.) generate $11.8 billion annually + support 222,000 jobs. We urge you to choose Alt.“C” (the “no-action” alternative) which will keep dangerous oil and gas exploration off our coasts, and instead focus on developing renewable energy.

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Outer Continental Shelf Geological and Geophysical Exploration Activities in the Gulf of Mexico

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Document: BOEM-2013-0034-DRAFT-0016
Comment from Kimberly McCuiston, Alabama Coast United

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General Comment

The Gulf of Mexico's wildlife and mammals, and human beings have not recovered from the worst man made environmental disaster in history in 2010. The Fossil Fuel Extraction Profiteers want to press on. We have a dead zone the size of New Jersey. We also know this type of exploratory testing can lead to more Mammal deaths due to the impact on their hearing, sonar, ability to feed, and reproduce. You are not dealing anymore with stupidity, or ignorance from the South. This is not what the President, or the residence of the Gulf Coast want more of. No more testing in our Gulf. There will come a time when we claim self defense. We know that our oil production is not for us, but for profits for export to China and other Counties. How dare you sacrifice our sea life, and Gulf for that. We are not your Energy Sacrifice Zone

Kimberly McCuiston
Alabama Coast United

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Outer Continental Shelf Geological and Geophysical Exploration Activities in the Gulf of Mexico

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Comment from Jim Tozzi, Center for Regulatory Effectiveness

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General Comment

For additional information on seismic regulation see the CRE Interactive Public Docket at http://www.thecre.com/forum13/

Attachments

GOM.Scoping

Comments by the Center for Regulatory Effectiveness ("CRE") on ''Geological and Geophysical Exploration Activities on Federal and State Waters of the Gulf of Mexico'' ("G&G Scoping"), http://www.gpo.gov/fdsys/pkg/FR-2013-05-10/pdf/2013-11226.pdf . Comments filed electronically on July 9, 2013, at *gomggeis@boem.gov*., and at *http://www.regulations.gov*, ID: BOEM-2013-0034-0001.

I. Executive Summary

Current and historical oil and gas geological and geophysical exploration ("G&G") in the Gulf of Mexico ("GOM") has not harmed marine mammals or other species. There is no basis for regulating G&G more stringently. In light of the current and historical record, the Services should consider regulating GOM G&G less stringently.

Any more stringent regulation of GOM G&G would require a new Information Collection Request ("ICR") under the Paperwork Reduction Act ("PRA"); a new Notice to Lessees ("NTL"); a new Protected Species Stipulation; and OMB Approval.

Any new Environmental Impact Statement ("EIS") for GOM G&G will have to comply with Information Quality Act Guidelines ("IQA Guidelines"), as explained by the National Academy of Sciences ("NAS") in its recent report *Assessing Risks to Endangered and Threatened Species from Pesticides* ("NAS Report"), pages 6, 31, 34, available online at http://www.thecre.com/forum1/?p=6116 .

Marine Vibroseis ("MarVib") is a promising new technology. While MarVib will likely never replace seismic airguns, NMFS should more fully recognize the advantages of MarVib in any proceeding involving regulation of offshore oil and gas G & G. The public should have notice of and an opportunity to comment on this proceeding. The record for this proceeding should be transparent, and the proceeding should comply with IQA Guidelines. NMFS should always assess the practicability of any changes in acoustic criteria or in any other G&G regulatory requirements

Sperm whales should not be listed in the GOM as a Distinct Population Segment ("DPS") under the endangered species Act ("ESA") for the reasons stated in CRE's previous comments to NMFS, which are available online at http://thecre.com/pdf/sperwhcomments.pdf , and which are incorporated herein by reference. If NMFS continues to explore a possible DPS listing for GOM sperm whales, then NMFS should also explore a possible ESA delisting for such a DPS. The current record does not demonstrate that GOM sperm whales are endangered under the ESA.

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II. NO NEED AND NO BASIS FOR MORE STRINGENT G&G REGULATION IN THE GOM

Seismic has been the Government's primary concern when regulating GOM G&G. For years, BOEM and the National Marine Fisheries Service ("NMFS") have used a 500 meter exclusion zone to regulate oil and gas seismic in the GOM. BOEM has repeatedly and correctly pointed out that current regulation under the NTL is adequate. More stringent regulation is unnecessary. For example, BOEM recently stated:

> "NTL 2012-JOINT-G02, 'Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program,' minimizes the potential of harm from seismic operations to marine mammals. These mitigations include onboard observers, airgun shut-downs for whales in the exclusion zone, ramp-up procedures, and the use of a minimum sound source. Therefore, no significant cumulative impacts to marine mammals would be expected as a result of the proposed exploration activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other ongoing activities in the area. Within the CPA, which is directly adjacent to the EPA, there is a long-standing and well-developed OCS Program (more than 50 years); there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations."[1]

BOEM has correctly emphasized the adequacy of the current regulatory scheme for GOM seismic. This regulatory scheme relies on the NTL and on the Protected Species Stipulation in leases, which requires compliance with the NTL:

> "The lessee and its operators, personnel, and subcontractors, while undertaking activities authorized under this lease, must implement and comply with the specific mitigation measures outlined in…NTL No. 2012-JOINT-G02 (Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program)…."[2]

The Protective Species Stipulation, which requires compliance with the NTL's 500 meter exclusion zone, "provide[s] protection by ensuring the animals remain a safe distance from the operations or the activity ceases":

> "Effectiveness of the Lease Stipulation
> The Protected Species Stipulation has been used on leases since 2001, and the resource agencies with the primary responsibility for the protection of the species [e.g., NMFS and FWS] helped to create it. The stipulation minimizes certain activities and stops others

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[1] Bureau of Ocean Energy Management's Draft Environmental Impact Statement ("DEIS"), for the Gulf of Mexico, Outer Continental Shelf ("OCS"), Eastern Planning Area ("EPA") Lease Sales 225 and 226, page 2-22. The DEIS is available online at http://boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/nepaprocess.aspx .

[2] *E.g.*, Lease Stipulations, Consolidated Central Gulf of Mexico Planning Area, Oil and Gas Lease Sale 216/222, Final Notice of Sale, Stipulation No. 8 – Protected Species.

> when those actions have the potential to impact marine mammals or sea turtles. These avoidance criteria provide protection by ensuring the animals remain a safe distance from the operations or the activity ceases."[3]

The Government has repeatedly and consistently emphasized that the current and historical regulatory scheme, which relies on a 500 meter exclusion zone, adequately protects marine mammals and other species during GOM seismic. For example, BOEM recently stated in anther GOM environmental impact statement that

> "… NTL 2012-JOINT-G02, 'Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program,' minimizes the potential of harm from seismic operations to marine mammals. These mitigations include onboard observers, airgun shut-downs for whales in the exclusion zone, ramp-up procedures, and the use of a minimum sound source. Therefore, no significant cumulative impacts to marine mammals would be expected as a result of the proposed exploration activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other ongoing activities in the area. Within the [GOM] WPA, there is a long-standing and well-developed OCS Program (more than 50 years); there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations. Therefore, in light of the above analysis for a WPA proposed action and its impacts, the incremental effect of a WPA proposed action on marine mammal populations is not expected to be significant when compared with non-OCS energy-related activities."
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> "Although there will always be some level of incomplete information on the effects from routine activities under a [GOM] CPA proposed action on marine mammals, there is credible scientific information, applied using acceptable scientific methodologies, to support the conclusion that any realized impacts would be sublethal in nature and not in themselves rise to the level of reasonably foreseeable significant adverse (population-level) effects. Also, routine activities will be ongoing in the CPA proposed action area as a result of active leases and related activities. As of May 2012, there are 4,377 active leases in the CPA. Within the CPA, there is a long-standing and well-developed OCS Program (more than 50 years); there are no data to suggest that routine activities from the preexisting OCS Program are significantly impacting marine mammal populations."[4]

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[3] DEIS, Page 2-35.

[4] Gulf of Mexico OCS Oil and Gas Lease Sales: 2012-2017; Western Planning Area Lease Sales 229, 233, 238, 246, and 248; Central Planning Area Lease Sales 227, 231, 235, 241, and 247; Final Environmental Impact Statement; Volume I , page 4-215; Volume II , page 4-710; available online at http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/nepaprocess.aspx . BOEM reiterated these conclusions in its Gulf of Mexico OCS Oil and Gas Lease Sales: 2013-2014, Western Planning Area Lease Sale 233, Central Planning Area Lease Sale 231 ; Final Supplemental Environmental Impact Statement; BOEM Gulf of Mexico OCS Region, pages 4-30 and 4-130, available online at http://www.boem.gov/uploadedFiles/BOEM/BOEM_Newsroom/Library/Publications/2013/BOEM%202013-0118.pdf .

The National Academy of Sciences' National Research Council agrees with the Department of Interior that "there are no documented or known population-level effects due to sound," and has concluded with regard to the entire OCS that "[T]here have been no known instances of injury, mortality, or population level effects on marine mammals from seismic exposure…."[5]

NMFS also agrees that "to date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to airgun pulses, even in the case of large airgun arrays."[6]

In sum,

- the record does not include any evidence of harm from GOM G&G;

- the record does not discuss what if any benefits would result from more stringent regulation of GOM G&G; and

- the record does not discuss the costs and other burdens to the industry from more stringent regulation of GOM G&G.

In light of the current and historical record, BOEM and NMFS should consider whether less stringent regulation of GOM G&G is appropriate.

CRE has prepared a Memorandum entitled "The State of Seismic Regulation in the Gulf of Mexico," which discusses in detail the Government's long-standing and successful reliance on the NTL and the 500 meter exclusion zone. This memorandum is incorporated by reference into these CRE comments on the G&G Scoping. [7]

III. MORE STRINGENT G&G REGULATION IN THE GOM WOULD REQUIRE A NEW NTL, A NEW PROTECTED SPECIES STIPULATION, NEW ICR REVIEW, AND OMB APPROVAL

BOEM would have to revise the current NTL and Protected Species Stipulation before BOEM could regulate GOM G&G more stringently.

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[5] See, *e.g.*, Outer Continental Shelf Oil & Gas Leasing Program, 2007-2012 Programmatic Environmental Impact Statement, page V-64 (MMS April 2007), available online at http://www.boem.gov/Oil-and-Gas-Energy-Program/Leasing/Five-Year-Program/2007-2012-Draft-Environmental-Impact-Statement.aspx .

[6] 75 FR 49759, 49795 (Aug. 13, 2010), available online at http://edocket.access.gpo.gov/2010/2010-19962.htm .

[7] This Memorandum is available online at http://www.thecre.com/forum13/wp-content/uploads/2013/03/State_of_Marine_Sound_Regulation1.pdf , and it is incorporated herein by reference.

In addition, BOEM would need a new ICR that has been reviewed and approved by OMB under the PRA. OMB-approved ICRs are necessary for the agencies' regulation of offshore seismic because that regulation depends in large part on the monitoring and compliance reports sent by operators to federal agencies.

Before it split into BOEM and BSEE, BOEMRE responded to CRE's comments on BOEMRE's seismic regulation ICR 1010–0151. BOEMRE's response stated that BOEMRE would need and request a new ICR if it ever intends to regulate offshore seismic activities in a manner more burdensome than required at the time it responded to CRE's comments. BOEMRE's response defines the burden and scope of seismic information collection authorized by ICR 1010–0151, which was approved by OMB after and based on BOEMRE's response to CRE.

BSEE subsequently asked OMB to approve a new seismic regulation ICR which, according to BSEE "does not change the burden hours or make any other modifications to what was previously approved [under ICR 1010–0151], other than to remove the collections under the purview of BOEM" in order to accommodate the split of regulations from the Bureau of Ocean Energy Management, Regulation and Enforcement ("BOEMRE") to BOEM and BSEE."[8] BSEE's ICR Supporting Statement to OMB for this new seismic ICR reads in part as follows:

> "Another commenter [CRE] requested that we [BSEE] should state that we are not submitting any ICRs for seismic regulations that are more stringent than current regulations, including NTL 2007-G02. We believe that this comment is not germane to current BSEE regulatory requirements because when BOEMRE split into the new bureaus of BOEM and BSEE, the regulatory requirements pertaining to seismic requirements are now under BOEM purview. Nonetheless, we agree with BOEM's response that the public will be given the opportunity to comment on modifications made to any information collections as a result of changes to NTL 2007-G02 and 30 CFR 250, subpart B regulations. BOEM's actual reply was:
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> *Response: For the renewal of this ICR, we are not requesting anything more stringent than in current NTL 2007-G02 and 30 CFR 250, subpart B regulations, which are covered under OMB Control Number 1010-0151. We have no plans, at this time, to change the content of or the resultant burdens imposed by NTL 2007-G02. Therefore, BOEMRE should move forward with the required information collection to ensure compliance with OMB deadlines. If the lawsuit settlement or resulting decree requires changes to the NTL and/or DOI regulations, information collection coordination and OMB approval will occur before any NTL is reissued or regulations are promulgated.*[9]

OMB's approval of this BSEE ICR states:

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[8] 77 FR 58858 (Sept. 24, 2012), available online at http://www.gpo.gov/fdsys/pkg/FR-2012-09-24/html/2012-23386.htm .

[9] Click on Supporting Statement A at http://www.reginfo.gov/public/do/PRAViewDocument?ref_nbr=201202-1014-004 , and read BSEE's response to Question 8 in the Supporting Statement.

> "Terms of Clearance: The public will be given the opportunity to comment on substantive modifications made to any information collections as a result of changes to NTL 2007-G02 and 30 CFR 250, subpart B regulations."[10]

Consequently, any "substantive modifications" to the current NTL would have to be preceded by public notice and comment as well as OMB review and approval, and may not be approved by OMB.

NMFS has indicated that it intends to significantly change the acoustic criteria that it has historically used for oil and gas seismic. [11] Such a significant change would require a new ICR to implement the changed information collection requirements. BOEM has already acknowledged the need for a new ICR for any change in acoustic criteria. There is no difference between NMFS and BOEM in this respect.

IV. BOEM and NMFS Should Follow the NAS Report on Data Quality

In April 30, 2013, the National Academy of Sciences released its report *Assessing Risks to Endangered and Threatened Species from Pesticides* ("NAS Report").[12] The NAS prepared this report at the request of NMFS, the Environmental Protection Agency, the Fish and Wildlife Service, and the Department of Agriculture.

This NAS report reviews and discusses the "the best scientific and commercial data available" standard under the ESA.[13] In reviewing and discussing this standard, the NAS Report at page 31 explains that "all federal agencies are expected to comply with the Office of Management and Budget (OMB) guidelines on objectivity, utility, and integrity of disseminated information":

> "OMB (67 Fed. Reg. 8452 [2002]) describes those attributes as follows: 'Objectivity' focuses on the extent to which information is presented in an accurate, clear, complete and unbiased manner; and, as a matter of substance, the extent to which the information is accurate, reliable and unbiased. 'Utility' refers to the usefulness of the information to the intended users. 'Integrity' refers to security, such as the protection of information from unauthorized access or revision, to ensure the information is not compromised through corruption or falsification.
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> The Services and EPA (EPA 2002; FWS 2007) have separately published information quality guidelines (IQGs) that follow closely the government-wide OMB guidelines. Similar basic principles for achieving a scientifically credible assessment are prescribed

[10] Available online at http://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201202-1014-004 . There are no substantive differences between NTL 2007-G02 and its successor NTL.
[11] Page 4-13, at http://www.nmfs.noaa.gov/pr/permits/eis/arctic_sdeis_vol2.pdf .
[12] *Assessing Risks to Endangered and Threatened Species from Pesticides* ("NAS Report"), pages 6, 31, 34. A prepublication copy of the complete NAS Report is available on CRE's website at http://thecre.com/pdf/NAS--Assessing_Risks.pdf .
[13] *E.g.*, NAS Report, pages 6, 31, 34.

> in the IQGs from the agencies; the agencies are committed to ensuring the quality of evaluations and the transparency of information from external sources used in their disseminated assessments and actions (EPA 2003; NMFS 2005). They also recognize that a high level of transparency and scrutiny is needed for influential information that is expected to have a substantial effect on policies and decisions (EPA 2002; NMFS 2004; FWS 2007) [citing the Agencies' DQA Guidelines]."

The NAS report at page 34 provides the following additional guidance on data quality:

> "● Given that stakeholders are aware of and can provide valuable and relevant data, the committee encourages provision for their involvement at the early stage and throughout the ERA [ecological risk assessment] process. Stakeholder data are expected to meet the same data relevance and quality standards as all other data.
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> ● To ensure that the best data available are used, information should first be screened for relevance and then subjected to quality review.
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> ● The agencies should, at a minimum, subject all information to a review based on OMB criteria of 'objectivity, utility and integrity.' Information sources that fail any of the criteria can be used at the discretion of the risk assessor, provided that their limitations are clearly described.
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> ● Comparisons of all information sources with the relevance and quality attributes should be documented in the risk assessment and described in the overall characterization of uncertainties."

BOEM's Federal Register notice for the G&G Scoping states that it is for a programmatic environmental impact statement ("PEIS") which

> "will be prepared cooperatively with NMFS to serve as the requisite environmental analysis under NEPA for the National Marine Fisheries Service's (NMFS) Marine Mammal Protection Act (MMPA) rulemaking governing authorization for unintentional marine mammal takes during G&G activities in GOM waters. It will also provide information for future decisions regarding Outer Continental Shelf Lands Act (OCSLA) permit and MMPA authorization actions, in addition to informing consultations under the Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), and other statutes."[14]

Consequently, the NAS report's discussion of information quality is directly applicable to NMFS' work on the G&G scoping and on additional development of a PEIS for GOM G&G. BOEM and the Department of the Interior also follow OMB's IQA Guidelines.[15] So the NAS Report's discussion of data quality during the ecological risk assessment process should also

[14] 78 FR 27427 (May 10, 2013), at http://www.gpo.gov/fdsys/pkg/FR-2013-05-10/pdf/2013-11226.pdf .

apply to BOEM. BOEM should also follow the NAS' guidance on data quality during BOEM's work on the G&G scoping and on additional development of a PEIS for GOM G&G.

V. NMFS Should Carefully, Expressly and Transparently Consider The Effect of Any New Acoustic Criteria or other Regulation on Marine Vibroseis ("MarVib")

NMFS and BOEM have announced their intent to assess MarVib for use in the Gulf of Mexico and elswhere. MarVib is a promising new technology that may supplement but will never replace seismic airguns. A recent environmental assessment of MarVib explains:

> "For purposes of this assessment, marine seismic surveys with future-generation MarVib systems are assumed to differ from airgun-based surveys in several major ways. • The sound signal transmitted at or near each grid location ("shotpoint") is expected to be longer in duration (seconds vs. 10s of milliseconds for an airgun pulse) but will have a substantially lower source pressure level. • Total acoustic energy transmitted at each location may be similar to that with airguns, or perhaps somewhat reduced if the necessary geophysical data can be recovered from a lower-energy signal through enhanced signal processing possible with MarVib. (Most of the conclusions in this assessment make the precautionary assumption that total transmitted acoustic energy per location will be similar to that with airguns. If a lower source energy level can be used, this would further reduce the environmental effects.) • The rise time of the MarVib signals will be slower than that of airgun pulses, and MarVib signals will be "non-pulse" whereas airgun signals are impulsive, at least near the source. • As noted above, a major design goal for MarVib, as compared to airguns, is a faster decrease (roll-off) in source spectrum levels at frequencies above ~100 Hz or, if possible, above a somewhat lower inflection point. This would substantially reduce the biological effects, particularly on species that are most sensitive to higher frequency sounds and not very sensitive to low- frequency (LF) sounds, e.g., the odontocete cetaceans."[16]

This MarVib Assessment further explains that

> "The sound signals expected to be emitted by next-generation MarVib systems will differ in important ways from airgun signals. Differences include being non-pulse rather than impulsive in character, having reduced peak pressure but increased signal duration and probably increased duty cycle, and having well controlled spectral properties.
> *Non-Pulse Signals:* This is expected to be an important mitigating factor inherent to MarVib sources. As a result, marine mammals should tolerate exposure to higher cumulative energy levels from MarVib than from airguns before auditory impairment would be expected. The

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[15] http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Quality.aspx .

[16] Environmental Assessment of Marine Vibroseis, LGL Ltd. and Marine Acoustics Inc, (April 2011) ("MarVib Asessment"), page viii, at http://www.soundandmarinelife.org/Site/Products/EA%20of%20MarVibr-LGL&MAI-20Apr'11(final).pdf .

> same is probably true for at least some other types of marine animals. Southall et al. estimated that the cumulative energy exposure would need to be ~17 dB higher with non-pulse than with impulse sound before PTS (auditory injury) would occur." [17]

The MarVib Assessment modeled potential PTS and TTS from MarVib in the Gulf of Mexico, and concluded:

> "The specific distances out to which TTS or PTS might extend would depend on the circumstances. However, for the MarVib scenarios in the northern Gulf of Mexico examined in this assessment (§ 6.2.6.3),PTS would be limited to very close distances, if it occurs at all, and the number of individual animals that might incur PTS would be very small or zero. In the modelled scenarios, PTS is expected in <1 individual of each of the three representative species that were considered (sperm whale, bottlenose dolphin, Bryde's whale). In an actual seismic survey in which • some animals avoid the approaching seismic source and • real-time mitigation measures are implemented, even fewer cases of hearing impairment would be expected. It has not been demonstrated that, in realistic field conditions, a MarVib source (or airguns) would cause TTS or PTS in any type of marine animal. For cetaceans and perhaps pinnipeds, it can be inferred from available data that TTS and (less likely) PTS might occur in the occasional animal that is very close to a MarVib source during at least one transmission. For sea turtles, fish, and invertebrates, it is unknown whether these auditory effects could occur in animals close to a MarVib source. If hearing impairment is possible, it would be limited to close distances. In the case of benthic-dwelling animals, this would mean that these theoretical auditory effects would only be possible in shallow water or if the source were towed close to the bottom."[18]

Consequently, there is no rational basis for using revised acoustic criteria, or for imposing any other requirement, that would impede use of MarVib. In order to ensure that this does not happen, NMFS should expressly address MarVib in any proceeding to consider new acoustic criteria. The public should have notice of and an opportunity to comment on this proceeding. The record for this proceeding should be transparent, and the proceeding should comply with IQA Guidelines. [19]

Of course, these same requirements should apply to any and all proceedings to consider new acoustic criteria.

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[17] *Id*., page xii.

[18] *Id.*, page X.

[19] The NOAA/ NMFS IQA Guidelines are available online at https://grunt.sefsc.noaa.gov/iqa/ and at http://www.cio.noaa.gov/services_programs/info_quality.html_. BOEM and Interior IQA Guidelines_ are available online at http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Quality.aspx and at http://www.doi.gov/ocio/information_management/iq.cfm .

VI. Do Not List GOM Sperm Whales as a DPS; Consider GOM Sperm Whales for ESA Delisting

Sperm whales live in the GOM and are listed as endangered under the ESA. Consequently, sperm whales will have to be considered in any PEIS for GOM G&G.

NMFS recently published its ninety-day finding on a petition to list GOM sperm whales as a DPS under the GOM:

> "We, NMFS, announce a 90-day finding on a petition from WildEarth Guardians to list the sperm whale (Physter macrocephalus) as an endangered or threatened distinct population segment (DPS) in the Gulf of Mexico. We find that the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted. As a result, we hereby initiate a status review of sperm whales in the Gulf of Mexico to determine whether the petitioned action is warranted."[20]

CRE previously filed comments with NMFS on its ninety-day finding. CRE's comments opposed the listing, and are incorporated herein by reference.[21]

Congress intended "that the authority to list DPSs be used...sparingly."[22] As explained in detail in CRE's incorporated comments, GOM sperm whales should not be listed as a DPS under the ESA for the following reasons:

First, there is no evidence that sperm whale populations are decreasing.

Second, whaling caused sperm whale reduction, and whaling has been banned for years in the GOM and globally. The International Union for Conservation of Nature's ("IUCN") Red List of Threatened Species explains with regard to the sperm whale:

> "The cause of the population reduction in this species (commercial whaling) is reversible, understood, and is not currently in operation. …A peer-reviewed publication (Whitehead 2002) provides a model-based estimate of global trend that can be used to evaluate the population…. The results suggest little chance that the population would meet the criteria for Endangered or for Least Concern."[23]

Third, the International Whaling Commission ("IWC") does not recognize a DPS for GOM sperm whales.[24]

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[20] 78 FR 19176 (2013), at http://www.gpo.gov/fdsys/pkg/FR-2013-03-29/html/2013-07355.htm
[21] CRE's sperm whale comments are at http://thecre.com/pdf/sperwhcomments.pdf .
[22] DPS Listing Petition, page 3, at http://www.nmfs.noaa.gov/pr/pdfs/petitions/spermwhale_gom_dps.pdf .
[23] http://www.iucnredlist.org/details/41755/0 .
[24] NMFS' ESA Section 7 Consultation Biological Opinion on the U.S. Navy Atlantic Fleet's conduct of active sonar training along the Atlantic Coast of the United States and in the Gulf of

Fourth, the current data are too flawed and incomplete to support a DPS for GOM sperm whales. NMFS' Sperm Whale Plan includes the investigations necessary to determine whether a GOM DPS for sperm whales is warranted. Those investigations are not complete.[25] Consequently, a DPS Listing for GOM sperm whales based on the current record would be premature and would not meet Information Quality Guidelines.

Fifth, there is no evidence of anthropogenic injury to any GOM sperm whale.

If NMFS continues to explore a possible DPS listing for GOM sperm whales, then NMFS should also explore a possible ESA delisting for such a DPS. The current record does not demonstrate that GOM sperm whales are endangered under the ESA. Like the rest of the GOM, they seem to be thriving. The additional data developed through NMFS' planned studies of GOM sperm whales should inform a decision as to whether an ESA delisting is appropriate.

We think you for the opportunity to submit these comments, and we look forward to BOEM and NMFS' response.

THE CENTER FOR REGULATORY EFFECTIVENESS

Mexico from January 2012 to January 2014, Page 93, http://www.nmfs.noaa.gov/pr/pdfs/consultations/biop_navy_afast_loa2012.pdf .

[25] FINAL RECOVERY PLAN FOR THE SPERM WHALE (NMFS, December 2010)("Sperm Whale Plan"), pages IV-7, I-4, V-4 to V-5, at http://www.nmfs.noaa.gov/pr/pdfs/recovery/final_sperm_whale_recovery_plan_21dec.pdf .

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General Comment

See attached file(s)

Attachments

Scoping Comments for the Gulf of Mexico G&G Programmatic EIS_OCEANA_2013

July 8, 2013

Submitted Via Electronic Mail

Mr. Gary D. Goeke
Chief, Regional Assessment Section, Office of Environment (GM 623E)
Bureau of Ocean Energy Management, Gulf of Mexico OCS Region
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New Orleans, Louisiana 70123-239

RE: Scoping Comments for the Gulf of Mexico G&G Programmatic EIS

Dear Mr. Goeke,

On behalf of our organization and our members, we write to submit comments on a proposed Programmatic Environmental Impact Statement (PEIS) for geological and geophysical (G&G) activities in the Outer Continental Shelf (OCS) waters of the Gulf of Mexico.

We are concerned about BOEM's intention to permit high-intensity seismic surveys in the Gulf of Mexico, because of the potentially catastrophic consequences of expanding OCS drilling and the environmental risks posed by airgun exploration itself. Sound is a fundamental element of the marine environment. Increasingly, the available science demonstrates that airgun blasts harm a diversity of marine mammals and significantly impact fish and fisheries, with unknown but potentially substantial effects on coastal communities. The sound from airguns can travel hundreds to thousands of miles underwater, and it is detected across entire ocean basins.[1] Humpback and fin whales stopped vocalizing in a 100,000 square mile area[2] during airgun activity, and blasts have been shown to cause baleen whales to abandon habitats over a similar spatial area.[3] Surveys taking place in the Gulf of Mexico will impact endangered species throughout the region, disrupting populations of sperm whales and other species which are still struggling from the Deepwater Horizon oil spill.

Seismic surveys could expand deepwater and ultra deepwater drilling into new areas in the Gulf of Mexico. This would be an impermissible continuation of the same risky practice that led to the Deepwater Horizon oil spill, which killed eleven rig workers, spilled over 200 million gallons of oil, fouled thousands of miles of coastline, endangered public health, and killed thousands of birds, dolphins, and fish. Unfortunately, accidents and spills are still common on offshore drilling rigs in the Gulf of Mexico. There were nearly 1,500 major violations of environmental or

[1] Nieukirk, S.L., Stafford, K.M., Mellinger, D.K., Dziak, R.P., and Fox, C.G., (2004). Low-frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean, *Journal of the Acoustical Society of America* 115: 1832-1843.
[2] Clark, C.W., and Gagnon, G.C., (2006) Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales (IWC Sci. Comm. Doc. IWC/SC/58/E9).
[3] MacLeod, K., Simmonds, M.P., and Murray, E., (2006).Abundance of fin (*Balaenoptera physalus*) and sei whales (*B. Borealis*) amid oil exploration and development off northwest Scotland, *Journal of Cetacean Research and Management* 8: 247-254.

safety regulations in 2011 and 2012.[4] We do not believe the new safety regulations or fines are robust enough to prevent the next major drilling disaster. To quote the former director of BOEMRE, Michael Bromwich, the fines are "patently inadequate at deterring violations."[5]

In short, the proposed action is an activity with significant potential impacts on the marine environment. Accordingly, we believe that the following actions, discussed in detail below, must be taken in order to protect marine resources and the communities that are still suffering from the Deepwater Horizon disaster, and to avoid repeating the same mistakes that led to the largest accidental oil spill in history.

General Recommendations:

1) Suspend the present National Environmental Policy Act (NEPA) review process indefinitely, and at the very least until the Natural Resources Damage Assessment (NRDA) makes crucial scientific information accessible to BOEM and the public about how the Deepwater Horizon oil spill is impacting marine mammals and other marine life.
2) Should the EIS go forward, update marine mammal stock assessments in the Gulf of Mexico and fill information gaps about how their populations were impacted by the Deepwater Horizon spill.

Recommendations for Alternatives Analysis and Mitigation:

3) Adopt a bar on oil and gas exploration activity from the region, but allow G&G activity for renewable energy development on a case-by-case basis.
4) Should the G&G permitting process go forward, exclude from seismic survey activities all areas in the Eastern Gulf of Mexico Planning Area that lack a scheduled lease sale under the Obama Administration's OCS Oil and Gas Leasing Program 2012-2017 and/or that lie within a Congressional Moratorium for drilling which prevents lease sales until 2022.
5) If Alternative 4 is not included, separate the Western, Central, and Eastern Gulf of Mexico planning areas into different EIS processes.
6) Identify habitat for species of concern and develop exclusion zones based on biological and oceanographic features.
7) Establish caps on airgun exploration in addition to requiring common surveyors in areas of interest and for all 2-D surveys.
8) Require the least harmful technologies for survey efforts, with a concrete pathway to phase out airguns in three to five years.
9) Mandate the use of passive acoustic monitoring (PAM) to detect sounds made by marine mammals prior to and during all seismic surveys to supplement visual observations, especially at night and during periods of poor visibility.

[4] Natural Resources Committee, Office of Rep. Ed Markey, Massachusetts. 10 May 2013. Dangerous Drillers: Offshore Safety Lapses Continue Three Years after BP Spill.
[5] Statement of Michael R. Bromwich Director of Bureau of Ocean Energy Management United States Department of the Interior Before the House Committee on Natural Resources on Offshore Energy; The Interior's Plans for Offshore Energy, Revenue and Safety Reorganization. 15 July 2011. http://www.doi.gov/ocl/hearings/112/OffshoreEnergyAgenciesBromwich_071511.cfm

10) To reduce risk of injury and hearing loss, consider adopting all of the "best practices" for safety zone distances, maintenance, and monitoring set forth in Weir and Dolman (2007) and Parsons et al. (2009).

Recommendations for Impact Assessment:

11) Use the new acoustic guidelines for impacts to marine mammals, currently being developed by the National Oceanic and Atmospheric Administration (NOAA) and slated for release later this year.
12) Properly model for temporary and permanent threshold shift in marine mammals, taking into account recent information which indicates a higher risk of disturbances at great distances.
13) Rigorously assess impacts of seismic activity on the resident sperm whale population in the Gulf of Mexico, the status of which is currently under review by the National Marine Fisheries Service for potential listing as a Distinct Population Segment (DPS), and reflect the current development of this rulemaking in the draft EIS.
14) Analyze direct and indirect effects attributable to proposed G&G operations for expanded offshore drilling and its impact on greenhouse gas emissions and climate change.
15) Evaluate non-acoustic cumulative impacts from other threats on marine life in the Gulf of Mexico, including the continuing effects of the Deepwater Horizon oil spill, climate change, and ocean acidification.
16) Ensure full compliance with other laws, including the Marine Mammal Protection Act, the Endangered Species Act, the Coastal Zone Management Act, the Magnuson-Stevens Act, and Executive Order 13158.

I. IMPACTS OF AIRGUN SURVEYS AND OTHER G&G ACTIVITIES

The ocean is an acoustic world. Marine mammals and many fish species depend on sound in order to find mates, forage, avoid predators, navigate, and communicate. The introduction of high levels of anthropogenic sound into the ocean serves to degrade this aspect of the environment that is essential to many species' survival.

For offshore exploration, the oil and gas industry relies heavily on arrays of airguns, which are towed behind ships as they release intense impulses of compressed air into the water about once every 10-12 seconds.[6] The resulting noise constitutes the loudest man-made sound in the ocean, next to dynamite. [7] At over 250 decibels, the blasts from airgun arrays are 100,000 times more intense than a jet engine, and their continuous use every ten seconds, sometimes for days to weeks at a time, causes massive acoustic footprints. Although the airguns are vertically oriented within the water column, horizontal propagation is so significant as to make them, even under present use, one of the leading contributors to low-frequency ambient noise thousands of miles from any given survey. [8]

[6] Airguns are not used in surveys for renewable energy projects.

[7] National Research Council, *Ocean Noise and Marine Mammals* (2003).

[8] Nieukirk, S.L., Stafford, K.M., Mellinger, D.K., Dziak, R.P., and Fox, C.G., Low-frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean, *Journal of the Acoustical Society of America* 115: 1832-1843 (2004).

Impacts on marine life can range from temporary and permanent hearing loss, to abandonment of habitat, to disruption of vital behaviors like mating and feeding. [9] Consistent with their acoustic footprint, these impacts are felt on a wide geographic scale. The intermittency of airgun pulses hardly mitigates this effect, since their acoustic energy spreads over time and can sound virtually continuous at distances from the array.[10] Airguns are known to affect a broad range of marine mammal species, including those that frequent the Gulf of Mexico. For example, sperm whale foraging declines significantly during exposure to even moderate levels of airgun noise, with potentially serious long-term consequences.[11] Broader work on other sources of undersea noise, including noise with predominantly low-frequency components, indicates that beaked whale species are likely sensitive to airguns as well.[12] Additionally, seismic surveys have been implicated in the long-term loss of marine mammal biodiversity off the coast of Brazil.[13]

Airgun surveys also have important consequences for the health of fisheries. For example, airguns have been shown to dramatically depress catch rates of various commercial species (by 40-80%) over thousands of square kilometers around a single array,[14] leading fishermen in some parts of the world to seek industry compensation for their losses. Other impacts on commercially harvested fish include habitat abandonment – one hypothesized explanation for the fallen catch rates – reduced reproductive performance, and hearing loss.[15] Even brief playbacks of

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[9] *See, e.g.*, Hildebrand, J.A., Impacts of anthropogenic sound, *in* Reynolds, J.E. III, Perrin, W.F., Reeves, R.R., Montgomery, S., and Ragen, T.J. (eds), *Marine Mammal Research: Conservation beyond Crisis* (2006); Weilgart, L., The impacts of anthropogenic ocean noise on cetaceans and implications for management. *Canadian Journal of Zoology* 85: 1091-1116 (2007).

[10] Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., van Parijs, S., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems as a function of anthropogenic sound sources (2009) (IWC Sci. Comm. Doc. SC/61/E10); Weilgart, L. (ed.), Report of the workshop on alternative technologies to seismic airgun surveys for oil and gas exploration and their potential for reducing impacts on marine mammals, 31 Aug. – 1 Sept., 2009, Monterey, Calif. (2010) (available at www.okeanos-stiftung.org/okeanos/download.php?id=19).

[11] Miller, P.J.O., Johnson, M.P., Madsen, P.T., Biassoni, N., Quero, M., and Tyack, P.L., Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales in the Gulf of Mexico, *Deep-Sea Research I* 56: 1168-1181 (2009).

[12] Tyack, P.L., Zimmer, W.M.X., Moretti, D., Southall, B.L., Claridge, D.E., Durban, J.W., Clark, C.W., D'Amico, A., DiMarzio, N., Jarvis, S., McCarthy, E., Morrissey, R., Ward, J., and Boyd, I.L. (2011), Beaked whales respond to simulated and actual Navy sonar, PLoS ONE 6(3): e17009. Doi:10.1371/journal.pone.0017009; Soto, N.A., Johnson, M., Madsen, P.T., Tyack, P.L., Bocconcelli, A., and Borsani, J.F. (2006), Does intense ship noise disrupt foraging in deep-diving Cuvier's beaked whales (Ziphius cavirostris)? Mar. Mamm. Sci. 22: 690-699.

[13] Parente, C.L., Pauline de Araújo, J., and Elisabeth de Araújo, M., Diversity of cetaceans as tool in monitoring environmental impacts of seismic surveys, *Biota Neotropica* 7(1) (2007).

[14] Engås, A., Løkkeborg, S., Ona, E., and Soldal, A.V., Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*), *Canadian Journal of Fisheries and Aquatic Sciences* 53: 2238-2249 (1996); *see also* Skalski, J.R., Pearson, W.H., and Malme, C.I., Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish (*Sebastes ssp.*), *Canadian Journal of Fisheries and Aquatic Sciences* 49: 1357-1365 (1992).

[15] McCauley, R.D., Fewtrell, J., Duncan, A.J., Jenner, C., Jenner, M.-N., Penrose, J.D., Prince, R.I.T., Adhitya, A., Murdoch, J. and McCabe, K., Marine seismic surveys: analysis and propagation of air-gun signals, and effects of air-gun exposure on humpback whales, sea turtles, fishes, and squid (2000) (report by Curtin U. of Technology); McCauley, R., Fewtrell, J., and Popper, A.N., High intensity anthropogenic sound damages fish ears, *Journal of the Acoustical Society of America* 113: 638-642 (2003); Scholik, A.R., and Yan, H.Y., Effects of boat engine noise on

predominantly low-frequency noise from speedboats have been shown to significantly impair the ability of some fish species to forage.[16] Low-frequency sound also disrupts chorusing in black drum fish, a behavior essential to breeding in this commercial species.[17] Airgun noise can also kill or decrease the viability of fish eggs and larvae.[18]

The amount of disruptive activity under consideration in this programmatic EIS is enormous. The industry will conduct more surveys if areas are opened for leasing, and will send ships back again and again to certain areas of interest to see how geologic features change over time. In addition to airguns, high-resolution site surveys make use of a variety of high-frequency acoustic sources, including side-scan and multi-beam echosounders. The repeated insult from airgun surveys and high-frequency mapping equipment, over months and seasons would pose a threat to populations of protected marine mammals and other species.

II. COMPLIANCE WITH NEPA

NEPA establishes a national policy to "encourage productive and enjoyable harmony between man and his environment" and "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. § 4321. In order to achieve its broad goals, NEPA mandates that "to the fullest extent possible" the "policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [NEPA]." 42 U.S.C. § 4332. As the Supreme Court explained,

> NEPA's instruction that all federal agencies comply with the impact statement requirement – and with all the requirements of § 102 – "to the fullest extent possible" [cit. omit.] is neither accidental nor hyperbolic. Rather the phrase is a deliberate command that the duty NEPA imposes upon the agencies to consider environmental factors not be shunted aside in the bureaucratic shuffle.

Flint Ridge Dev. Co. v. Scenic Rivers Ass'n, 426 U.S. 776, 787 (1976). Central to NEPA is its requirement that, before any federal action that "may significantly degrade some human environmental factor" can be undertaken, agencies must prepare an environmental impact statement. *Steamboaters v. F.E.R.C.*, 759 F.2d 1382, 1392 (9th Cir. 1985) (emphasis in original).

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the auditory sensitivity of the fathead minnow, *Pimephales promelas*, *Environmental Biology of Fishes* 63: 203-209 (2002).

[16] Purser, J., and Radford, A.N., Acoustic noise induces attention shifts and reduces foraging performance in three-spined sticklebacks (Gasterosteus aculeatus), PLoS One, 28 Feb. 2011, DOI: 10.1371/journal.pone.0017478 (2011).

[17] Clark, C.W., pers. comm. with M. Jasny, NRDC (Apr. 2010).

[18] Booman, C., Dalen, J., Leivestad, H., Levsen, A., van der Meeren, T., and Toklum, K., Effecter av luftkanonskyting på egg, larver og yngel (Effects from airgun shooting on eggs, larvae, and fry), *Fisken og Havet* 3:1-83 (1996) (Norwegian with English summary); Dalen, J., and Knutsen, G.M., Scaring effects on fish and harmful effects on eggs, larvae and fry by offshore seismic explorations, *in* Merklinger, H.M., *Progress in Underwater Acoustics* 93-102 (1987); Banner, A., and Hyatt, M., Effects of noise on eggs and larvae of two estuarine fishes, *Transactions of the American Fisheries Society* 1:134-36 (1973); L.P. Kostyuchenko, Effect of elastic waves generated in marine seismic prospecting on fish eggs on the Black Sea, *Hydrobiology Journal* 9:45-48 (1973).

The fundamental purpose of an EIS is to force the decision-maker to take a "hard look" at a particular action – at the agency's need for it, at the environmental consequences it will have, and at more environmentally benign alternatives that may substitute for it – before the decision to proceed is made. 40 C.F.R. §§ 1500.1(b), 1502.1; *Baltimore Gas & Electric v. NRDC*, 462 U.S. 87, 97 (1983). This "hard look" requires agencies to obtain high quality information and perform accurate scientific analysis. 40 C.F.R. § 1500.1(b). The law is clear that the EIS must be an objective, rigorous, and neutral document, not a work of advocacy to justify an outcome.

To comply with NEPA, an EIS must include a "full and fair discussion" of direct and indirect environmental impacts, consider the cumulative effects of reasonably foreseeable activities in combination with the proposed action, analyze all reasonable alternatives that would avoid or minimize the action's adverse impacts, address measures to mitigate those adverse effects, and assess possible conflicts with other federal, regional, state, and local authorities. 40 C.F.R. §§ 1502.1, 1502.14(f), 1502.16(c), 1508.7. We offer the following comments to ensure BOEM's compliance with these important mandates.

A. Prohibition on Non-Renewable Energy Resource Exploration

The Deepwater Horizon oil spill in the Gulf of Mexico continues to have far-reaching implications for how BOEM should approach the environmental review of offshore oil and gas activities. BOEM should indefinitely suspend its plans to allow seismic exploration activity in the Gulf of Mexico region and the expansion of offshore oil and gas activities. It must seriously consider the no-action alternative with respect to offshore oil and gas seismic exploration permits in its EIS, and the benefits that this would have for the marine environment.

On April 20, 2010 the Deepwater Horizon oil rig exploded and caught fire, leaving 11 workers dead and spilling approximately 4.9 million barrels of oil, which eventually reached the shores of the Gulf Coast, closing fisheries, beaches and wildlife refuges. Hundreds of marine species continue to be directly harmed by the polycyclic aromatic hydrocarbons (PAHs) which remains in the environment including several threatened and endangered species of sea turtles, whales, and seabirds. PAHs and chemical dispersants are likely to remain in coastal and marine environments for decades and continue to accumulate in the food chain. To expose these already jeopardized ecosystems to the added stress of seismic surveys would cause irreparable harm and contravenes BOEM's statutory duty, at the exploration and permit approval stage, to reject applications that would cause "serious harm" or "undue harm" to the marine environment. *See, e.g.*, 43 U.S.C. § 1340(a); 30 C.F.R. § 550.202.

In light of the Deepwater Horizon spill, BOEM should suspend preparation of the present EIS or, at the very least, seriously consider prohibiting all G&G operations for oil and gas activities in the Gulf of Mexico in favor of renewable resource development. The Deepwater Hoirzon spill is a unique event which requires a reassessment of potential impacts to rebalance offshore development and environmental protection as called for under the Outer Continental Shelf Lands Act (OCSLA). Meaningful analysis, however, is nearly impossible due to the lack of basic information about the continuing effects of the oil spill on the region. The Natural Resources Damage Assessment (NRDA) has not yet made crucial scientific information accessible to BOEM and the public about how the Deepwater Horizon oil spill is impacting marine mammals

and other marine life. Until this vital information is made available, the draft EIS would contain significant gaps as to how the ecological baseline of the Gulf of Mexico has changed following the spill.

There is an ongoing and unprecedented Unusual Mortality Event (UME) for marine mammals in the Northern Gulf of Mexico. Since the initial Deepwater Horizon spill response began 905 cetaceans have been stranded.[19] This included many premature and still-born bottlenose dolphins. This number is likely a fraction of the total number of marine mammals that may have died, and historical carcass detection rates in this region are as low 1-2 percent of the total that die in the ocean.[20] Furthermore, marine mammal stock assessments in the Gulf of Mexico are outdated, and the most recently updated assessment is from 2004.[21] One-third of all stock assessments for marine mammals in the Gulf of Mexico lack human-caused mortality estimates and Potential Biological Removal (PBR). Over half of the most recent stock assessment reports were conducted before 2009, and the Deepwater Horizon oil spill. BOEM must fill these gaps in information about marine mammal stocks and how their populations were impacted by the Deepwater Horizon spill.

The ill effects of the oil spill will continue to felt throughout the Gulf of Mexico for years to decades to come. Rather than burden the region further with unnecessary and dangerous expansion of G&G activity for offshore oil and gas drilling, BOEM should instead allow for site assessment and permitting activities for renewable energy in the Gulf of Mexico. The types of sub-bottom profiling used for offshore wind are far less harmful than airguns used for oil and gas surveys, as they must search meters, not miles, underneath the ocean. Surveys for offshore wind site assessments are constrained into small wind energy areas that have been de-conflicted with other offshore activities and environmental concerns over many years. Offshore wind farms also carry no risk of a serious oil spill.

The use of airgun surveys for offshore oil and gas drilling impacts large areas of ocean and will cause thousands of injuries and millions of disturbances to protected marine mammals, including endangered species such as sperm whales, which have populations that may still be struggling from the Deepwater Horizon oil spill.[22] Gaps in information undermine BOEM's ability to adequately assess the impacts of the proposed action on marine mammal stocks in the Gulf of Mexico. Proceeding with the present NEPA process under these circumstances is premature. Not only might the scope of activity change significantly, but much of the analysis and the alternatives under consideration could also shift, rendering much of the initial effort irrelevant or inappropriate. We therefore urge BOEM to suspend this NEPA process for G&G activity for oil and gas exploration, at least until the NRDA fills in the vital information gaps and a post-spill marine mammal stock assessment is performed.

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[19] NOAA Fisheries. 2010-2013 Unusual Mortality Event in Northern Gulf of Mexico. http://www.nmfs.noaa.gov/pr/health/mmume/cetacean_gulfofmexico2010.htm

[20] Williams, R., Gero, S., Bejder, L., Calambokidis, J., Kraus, S., Lusseau, D., Read, A., and J. Robbins. 2011. Underestimating the damage: interpreting cetacean carcass recoveries in the context of the Deepwater Horizon/BP incident. *Conservation Letters*, DOI:10.1111/j.1755-263x2011.00168x.

[21] NOAA Fisheries. 2013. Marine Mammal Stock Assessments. http://www.nmfs.noaa.gov/pr/sars/

[22] Ackleh, A. et al. 2012. Assessing the Deepwater Horizon oil spill impact on marine mammal populations through acoustics: Endangered sperm whales. *J. Acoust. Soc. Am.* 131(3), pp. 2306-2314.

B. Alternative Analysis and Mitigation

An EIS must "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. This requirement has been described in regulation as "the heart of the environmental impact statement." *Id.* § 1502.14. The agency must therefore "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." *Id.* § 1502.14(a). Consideration of alternatives is required by—and must conform to the independent terms of—both sections 102(2)(C) and 102(2)(E) of NEPA. In addition, an agency must discuss measures designed to mitigate its action's impact on the environment. *See* 42 C.F.R. § 1502.14(f).

The following alternatives and mitigation measures are critical to reconciling the broad impacts of offshore exploration with the basic requirements of NEPA.

1) *Exclusion areas and caps on survey activities*: Maintaining a small exclusion zone around an airgun array is inadequate to redress the large-scale harms that the scientific literature has now identified.[23] To the contrary, there is general consensus that spatio-temporal avoidance of high-value habitat represents the best available means—other than the source-based measures described below—to reduce the impacts of various types of ocean noise on marine biota.[24] We believe that BOEM must bear the following points in mind in developing alternatives and mitigation measures based on spatio-temporal conservation.

    a. *Deferral of surveys in Eastern Gulf of Mexico*: BOEM should not open up areas for geophysical exploration—thereby adding to the cumulative noise burden, impairing the communication space of the sperm whale and other species—that are unlikely to be leased, whether for biological, political, or economic reasons. At minimum, we urge that BOEM defer exploration in all areas except those likely to be offered in lease sales during the 2012-2017 planning period. Under this alternative, airgun activity would be prohibited in areas excluded from lease sales in the Eastern Gulf of Mexico Planning Area, and those that lie within a Congressional Moratorium for drilling until 2022. This would allow Florida residents and policymakers providing input into the EIS process to support an alternative that protects their shores from expanding seismic surveys and new

[23] Parsons, E.C.M., Dolman, S.J., Jasny, M., Rose, N.A., Simmonds, M.P., and Wright, A.J., A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice? *Marine Pollution Bulletin* 58: 643-651 (2009).

[24] *See, e.g.*, Agardy, T., Aguilar Soto, N., Cañadas, A., Engel, M., Frantzis, A., Hatch, L., Hoyt, E., Kaschner, K., LaBrecque, E., Martin, V., Notarbartolo di Sciara, G., Pavan, G., Servidio, A., Smith, B., Wang, J., Weilgart, L., Wintle, B., and Wright, A., A global scientific workshop on spatio-temporal management of noise. Report of workshop held in Puerto Calero, Lanzarote, June 4-6, 2007 (2007); ECS Working Group: Dolman, S., Aguilar Soto, N., Notabartolo di Sciara, G., Andre, M., Evans, P., Frisch, H., Gannier, A., Gordon, J., Jasny, M., Johnson, M., Papanicolopulu, I., Panigada, S., Tyack, P., and Wright, A., Technical report on effective mitigation for active sonar and beaked whales (2009) (working group convened by European Cetacean Society); OSPAR Commission, Assessment of the environmental impact of underwater noise (2009) (report issued as part of OSPAR Biodiversity Series, London, UK).

offshore drilling.

The efficacy of available mitigation measures should improve significantly with time, assuming that investments are made in geographic and source-based measures. The biological inventory on which habitat exclusions are based should see advancements based on new survey data, as well as the continued refinement of models. Furthermore, technologies that can significantly reduce the environmental footprint of airguns can be made available, at least under some conditions, within three to five years. By deferring surveys to the maximum extent possible, BOEM would increase the that are likely to benefit from the investments made in mitigation, all while decreasing its environmental impact and contributing to the restoration of the Gulf ecosystem.

b. *Site-specific impacts analysis*: Oil and gas companies already own millions of acres of undeveloped leases in the Western and Central Gulf of Mexico planning areas. Permitting years of airgun use in the Eastern Gulf would unnecessarily expand the risk of harm to marine resources. Therefore, if the EIS fails to consider the alternative that excludes areas not available for lease, BOEM should separate the Western, Central, and Eastern Gulf of Mexico Planning areas into different EIS processes. Such site-specific analysis would allow BOEM to independently analyze the particular sensitivities of each region in the wake of the Gulf spill and would provide for the development of meaningful alternatives and mitigation measures.

c. *Time-place restrictions based on considerations of biological and oceanographic factors*: As a general rule, protected areas should not depend on real-time sighting of target species, such as was attempted in the past along the bowhead whale migration corridor in the Beaufort Sea. Real-time visual (and passive acoustic) monitoring is difficult for all marine mammal and sea turtle species, especially during high sea states, nighttime operations, and other low-visibility conditions, and is further complicated by the size of the impact zone that the monitoring effort would have to cover. [25] As numbers of experts have observed, protected areas should ordinarily be identified during the planning stage based on biological and oceanographic factors, rather than on the confirmed presence of marine animals in real time.[26] Such time and place restrictions, designed to protect high-value habitat, are one of the most effective means to reduce the potential impacts of noise and disturbance, including noise from oil and gas exploration.[27]

[25] *See, e.g.*, Barlow, J., and Gisiner, R., Mitigation and monitoring of beaked whales during acoustic events, *Journl of Cetacean Research and Management* 7: 239-249 (2006); ECS Working Group, Technical report; Parsons et al., A critique of the UK's JNCC seismic survey guidelines; 72 Fed. Reg. 46846, 46875 (Aug. 21, 2007).
[26] *See* Agardy et al., A global scientific workshop on spatio-temporal management of noise; ECS Working Group, Technical report.
[27] *See, e.g.*, Agardy, T., Aguilar Soto, N., Cañadas, A., Engel, M., Frantzis, A., Hatch, L., Hoyt, E., Kaschner, K., LaBrecque, E., Martin, V., Notarbartolo di Sciara, G., Pavan, G., Servidio, A., Smith, B., Wang, J., Weilgart, L., Wintle, B., and Wright, A, A global scientific workshop on spatio-temporal management of noise, Report of workshop held in Puerto Calero, Lanzarote, June 4-6, 2007 (2007); Dolman, S., Aguilar Soto, N., Notabartolo di

BOEM should strongly consider establishing seasonal shut-downs of seismic activity in coastal waters during the bottlenose calving season and sea turtle nesting periods. Furthermore, permanent exclusion zones should be established to protect unique oceanographic features that are of great biological importance. Airgun blasting should be prohibited near the De Soto Canyon, an important area for sperm whales and also critical to Bryde's whales, the Gulf's only resident population of large baleen whales. BOEM should also permanently exclude Pulley Ridge, an important coral habitat, the Dry Tortugas, and the Florida Keys National Marine Sanctuary from seismic survey activity. These are only a few of the high-value habitats that are crucially important to many threatened and endangered Gulf species. In order to ensure a reasoned choice among alternatives, BOEM must perform a systematic analysis of critical habitat for marine mammals, turtles, and fish for the purposes of establishing time-area closures within the area of interest.

d. *Establish buffer zones around areas of concern*: Buffer zones should be established around areas protected from airgun noise to reduce the severity of impacts on target species. Buffer zones are a standard feature of marine reserves; have been recommended by numerous experts for use in mitigation of undersea noise around reserves, exclusion areas, and National Marine Sanctuaries; and are regularly prescribed by NMFS around exclusion areas for Navy sonar training.[28] NMFS has established a list of objectives for habitat avoidance and other mitigation measures, including reduction in the total number of marine mammal takes and reduction in the severity, intensity, or number of exposures, particularly (but not exclusively) for vulnerable species. *See*, *e.g.*, 74 Fed. Reg. 3886 (Jan. 21, 2009). On this basis, BOEM should consider and adopt meaningful buffer zones around its exclusion areas.

e. *Caps on activities*: Even with defined protected areas and buffer zones, it will be necessary to cap the extent of airgun surveys taking place within the Gulf region over a given season. Such caps are necessary to reduce certain long-range impacts of airgun use that cannot be addressed through protected areas, such as the substantial rise in low-frequency background noise across vast

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Sciara, G., Andre, M., Evans, P., Frisch, H., Gannier, A., Gordon, J., Jasny, M., Johnson, M., Papanicolopulu, I., Panigada, S., Tyack, P., and Wright, A., Technical report on effective mitigation for active sonar and beaked whales (2009) (working group convened by European Cetacean Society); OSPAR Commission, Assessment of the environmental impact of underwater noise (2009) (report issued as part of OSPAR Biodiversity Series, London, UK); Convention on Biological Diversity, Scientific synthesis on the impacts of underwater noise on marine and coastal biodiversity and habitats (2012) (UNEP/CBD/SBSTTA/16/INF/12).

[28] *See, e.g.*, Agardy et al., A global scientific workshop on spatio-temporal management of noise; Hatch, L.T., and Fristup, K.M., No barrier at the boundaries: Implementing regional frameworks for noise management in protected natural areas, *Marine Ecology Progress Series* 395: 223-244 (2009); Hoyt, E., Marine Protected Areas for Whales, Dolphins, and Porpoises: A World Handbook for Cetacean Habitat Conservation and Planning,2nd Edition (2011); 72 Fed. Reg. 46846, 46846-46893 (Apr. 21, 2007).

expanses of the ocean.[29] Caps should reflect a conservative analysis of the cumulative sublethal effects of airgun surveys on whale communication ranges and other biologically important factors.

Additionally, BOEM should include an alternative which establishes caps on survey activity with a requirement for common surveyors in areas of interest and for all two dimensional surveys. Unnecessarily duplicative surveys greatly increase the potential for lasting harm to marine life. Ensuring that airgun surveys are consolidated and coordinated, and that the data are shared wherever possible, will substantially reduce the amount of disturbance to the marine environment and rein in the widespread redundancy in surveying, a serious concern.

2) *Technological alternatives to airguns*: New technology represents a promising means of reducing the environmental footprint of seismic surveys. Industry experts and biologists participating in a September 2009 workshop on airgun alternatives reached the following conclusions: airguns produce a great deal of "waste" sound and generate peak levels substantially higher than needed for offshore exploration; a number of quieter technologies are either currently available for commercial use, or can be made available within the next five years; and, given the natural resistance of industry, governments should accelerate development and use of these technologies through both research and development funding and regulatory engagement.[30] An industry-sponsored report by Noise Control Engineering made similar findings about the availability of greener alternatives to seismic airguns, in addition to describing alternatives to a variety of other noise sources used in oil and gas exploration.[31]

BOEM should include an alternative that requires the least harmful technologies for survey efforts, with a concrete pathway to phase out airguns in three to five years. Marine vibroseis, briefly mentioned above, is an alternative technology that has been in development for decades and that is being commercially tested in 2013. While it is not a panacea, marine vibroseis will reduce peak sounds by 30 decibels and eliminate high frequency sounds above 100 hertz, which will likely reduce the number of predicted injuries and disturbances for cetaceans. BOEM should use this multi-year EIS process to establish a regulatory pathway that moves the Gulf of Mexico, and all U.S. waters, away from harmful airguns towards safer alternative

[29] Clark, C.W., pers. comm. with M. Jasny, NRDC (Apr. 2010); Clark and Gagnon, Considering the temporal and spatial scales of noise exposures; Nieukirk et al., Low-frequency whale and seismic airgun sounds.

[30] Weilgart, L. ed., Report of the workshop on alternative technologies to seismic airgun surveys for oil and gas exploration and their potential for reducing impacts on marine mammals, 31 Aug. – 1 Sept., 2009, Monterey, Calif. (2010), *available at* www.okeanos-stiftung.org/okeanos/download.php?id=19.

[31] Spence, J., Fischer, R., Bahtiarian, M., Boroditsky, L., Jones, N., and Dempsey, R., Review of existing and future potential treatments for reducing underwater sound from oil and gas industry activities (2007) (NCE Report 07-001) (prepared by Noise Control Engineering for Joint Industry Programme on E&P Sound and Marine Life). Despite the promise indicated in the 2007 and 2010 reports, neither NMFS nor BOEM has attempted to develop noise-reduction technology for seismic or any other noise source, aside from BOEM's failed investigation of mobile bubble curtains.

technologies for seismic surveying.[32]

3) *Adoption of reasonable mitigation and monitoring measures*: The mitigation measures commonly employed by BOEM during seismic surveys are inadequate to avoid repeated disturbances to marine life at great distances. The most common mitigation measures BOEM requires—such as ramp-up procedures, small time-area closures and on-board observers—can only limit impacts within very short ranges. These mitigation measures have been referred to by a judge as "woefully inadequate." *Natural Resources Defense Council, Inc. v. Winter*, 645 F.Supp.2d 841, 854 (C.D. 2007). A draft EIS must include a discussion of the following reasonable mitigation and monitoring measures in order to reduce the environmental risk from the proposed activities over a larger scale:

   a. *Survey design standards and review*: BOEM should require that airgun survey vessels use the lowest practicable source levels, minimize horizontal propagation of the sound signal, and minimize the density of track lines consistent with the purposes of the survey.[33] The California Coastal Commission has required the U.S. Geological Survey to reduce the size of its array for seismic hazards work, and to use alternative seismic technologies (such as a minisparker), to reduce acoustic intensities during earthquake hazard surveys to their lowest practicable level.[34] Additionally, BOEM should consider establishing an expert panel within the agency, tasked with reviewing survey designs with the aim of reducing their impacts on wildlife.[35]

   b. *Sound source validation*: BOEM should require operators to validate the assumptions about propagation distances used to establish safety zones and calculate take, especially in light of the new acoustic guidelines for marine mammal takes that are currently being developed by NOAA. Sound source validation has been required of Arctic operators for several years as part of their IHA compliance requirements, and has proven useful for establishing more accurate, *in situ* measurements of safety zones and for acquiring information on

[32] Weilgart, L. (ed.) (2010) Report of the workshop on alternative technologies to seismic airgun surveys for oil and gas exploration and their potential for reducing impacts on marine mammals, 31 Aug. – 1 Sept., 2009, Monterey, Calif. www.okeanos-stiftung.org/okeanos/download.php?id=19

[33] Parsons et al., A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice? *Marine Pollution Bulletin* 58: 643-651 (2009); Burns, J., Clark, C., Ferguson, M., Moore, S., Ragen, T., Southall, B., and Suydam, R., Expert panel review of monitoring and mitigation protocols in applications for incidental harassment authorizations related to oil and gas exploration, including seismic surveys, in the Chukchi and Beaufort Seas (2010) (NMFS Expert Panel Review 2010); Brower, H., Clark, C.W., Ferguson, M., Gedamke, J., Southall, B., and Suydam, R., Expert panel review of monitoring protocols in applications for incidental harassment authorizations related to oil and gas exploration in the Chukchi and Beaufort Seas, 2011: Statoil and ION Geophysical (2011) (NMFS Expert Panel Review 2011).

[34] *See, e.g.*, California Coastal Commission, Staff Recommendation on Consistency Determination No. CD-16-00 (2000) (review of USGS survey off southern California).

[35] These requirements are consistent with both the MMPA's "least practicable impact" requirement for authorizing marine mammal takes and OCSLA's "undue harm" requirement for permitting of offshore exploration.

noise propagation.[36]

c. *Vessel avoidance of important habitat*: It is well established that vessel routing can significantly reduce both cumulative noise exposure and the risk of ship-strikes.[37] Indeed, the agencies admit in their DPEIS for Arctic exploration that routing ships around important habitat would benefit species in that region, including bowheads, belugas, gray whales, and walruses.[38] Accordingly, the EIS should require avoidance of such areas as a standard mitigation measure.

d. *Separation distances*: Adequate separation distances between concurrent seismic arrays can benefit marine species by reducing simultaneous exposure over the same area. To reduce marine mammal take, BOEM should consider large, conservative separation distances including, but not limited to, 90 km, which is the distance considered in the Arctic DPEIS.

e. *Adequate safety zone distances*: BOEM should meaningfully consider all of the "best practices" for safety zone distances, maintenance, and monitoring set forth in Weir and Dolman (2007) and Parsons et al. (2009)[39] and conservatively calculate its safety zone distances in light of Lucke et al. (2009) and other recent studies on hearing loss and noise propagation.[40] Additionally, BOEM should consider establishing larger shutdown zones for sensitive species.

f. *Adequate real-time monitoring*: It is well established that real-time visual shipboard monitoring is difficult for all marine mammal and sea turtle species, especially at night and during low visibility.[41] One of the most practicable

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[36] *See, e.g.*, Burns, J., Clark, C., Ferguson, M., Moore, S., Ragen, T., Southall, B., and Suydam, R., Expert panel review of monitoring and mitigation protocols in applications for incidental harassment authorizations related to oil and gas exploration, including seismic surveys, in the Chukchi and Beaufort Seas (2010) (NMFS Expert Panel Review 2010); Brower, H., Clark, C.W., Ferguson, M., Gedamke, J., Southall, B., and Suydam, R., Expert panel review of monitoring protocols in applications for incidental harassment authorizations related to oil and gas exploration in the Chukchi and Beaufort Seas, 2011: Statoil and ION Geophysical (2011) (NMFS Expert Panel Review 2011).

[37] *See, e.g.*, Hatch, L., Clark, C., Merrick, R., Van Parijs, S., Ponirakis, D., Schwehr, K., Thompson, M., and Wiley, D., Characterizing the relative contributions of large vessels to total ocean noise fields: a case study using the Gerry E. Studds Stellwagen Bank National Marine Sanctuary, *Environmental Management* 42:735-752 (2008).

[38] NMFS, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement at 4-160 to 4-161 (Dec. 2011).

[39] *Id.*

[40] *See, e.g.*, Lucke, K., Siebert, U., Lepper, P.A., and Blanchet, M.-A., Temporary shift in masked hearing thresholds in a harbor porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli, *Journal of the Acoustical Society of America* 125: 4060-4070 (2009); Madsen, P.T., Johnson, M., Miller, P.J.O., Aguilar Soto, N., Lynch, J., Tyack, P., Quantitative measures of air gun pulses recorded on sperm whales (*Physeter macrocephalus*) using acoustic tags during controlled exposure experiments, *Journal of the Acoustical Society of America* 120, 2366–2379 (2006); *see also infra* at sec. C(2).

[41] *See, e.g.*, Barlow, J., and Gisiner, R., Mitigation and monitoring of beaked whales during acoustic events, *J. Cetacean Res. Manage.* 7: 239-249 (2006); Parsons et al., A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice? *Marine Pollution Bulletin* 58: 643-651 (2009).

methods of supplementing visual detection is ship-based passive acoustic monitoring (PAM), which is a mature technology that is already being applied during offshore activities to avoid marine life impacts. Newer models cover a broader range of species and are more reliable, automatic, and accessible for users. One field test showed that PAM scored 127 marine mammal detections compared to visual observations that counted 18 marine mammals during the same time period over the same area.[42] Eighty-six percent of the observations were heard and never seen. This shows both the ineffectiveness of visual observations, and the necessity of requiring PAM technology, especially for surveys conducted at night or in poor visibility, when visual observers are particularly ineffective.

BOEM should include an alternative that requires PAM to detect sounds made by marine mammals prior to and during all seismic surveys—especially those conducted during periods of little or no visibility—to supplement visual observations.

g. *Adequate long-term monitoring*: Numerous sources have called for thorough biological surveying before, during, and after seismic surveys in biologically important areas.[43] The purpose of any monitoring program is to establish biological baselines, to determine long-term impacts on populations of target species, and to test whether the biological assumptions underlying the EIS are correct. It is imperative that the agencies elaborate a monitoring plan early in the NEPA process. Any meaningful long-term monitoring program should include passive acoustics. Acoustic data can detect impacts from noise-generating activities for marine mammals, and assess cumulative levels of noise exposure for purposes of adaptive management.[44]

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[42] Joint Industry Program on E & P Sound and Marine Life. Presentation by Doug Gillespie, SMRU. Passive Acoustic Monitoring (PAM): PAMGuard's current status and future uses. Herndon, VA May 30th – June 1st 2012.

[43] *See, e.g.*, IWC Scientific Committee, Report of the Scientific Committee of the International Whaling Commission: Annex K: Report of the Standing Working Group on Environmental Concerns (2004); IWC Scientific Committee, Report of the Scientific Committee of the International Whaling Commission: Annex K: Report of the Standing Working Group on Environmental Concerns (2006); Parsons et al., A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice? *Marine Pollution Bulletin* 58: 643-651 (2009); Weilgart, L. (ed.), Report of the workshop on alternative technologies to seismic airgun surveys for oil and gas exploration and their potential for reducing impacts on marine mammals, 31 Aug. – 1 Sept., 2009, Monterey, Calif. (2010) (available at www.okeanos-stiftung.org/okeanos/download.php?id=19); Weir, C.R., and Dolman, S.J., Comparative review of the regional marine mammal mitigation guidelines implemented during industrial seismic surveys, and guidance towards a worldwide standard, *Journal of International Wildlife Law and Policy* 10: 1-27 (2007).

[44] Hatch, L., Clark, C., Merrick, R., Van Parijs, S., Ponirakis, D., Schwehr, K., Thompson, M., and Wiley, D., Characterizing the relative contributions of large vessels to total ocean noise fields: A case study using the Garry E. Studds Stellwagen Bank National Marine Sanctuary, *Environmental Management* 42:735-752 (2008).; Clark et al., Acoustic masking in marine ecosystems as a function of anthropogenic sound sources; Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., Van Parijs, S.M., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems: Intuitions, analysis, and implication, *Marine Ecology Progress Series* 395: 201-222 (2009). (e.g., Hatch et al. 2008; Clark et al. 2009)

C. Impact and Cumulative Impact Assessment

Fundamental to satisfying NEPA's requirement of fair and objective review, agencies must ensure the "professional integrity, including scientific integrity," of the discussions and analyses that appear in environmental impact statements. 40 C.F.R. § 1502.24. To this end, they must make every attempt to obtain and disclose data necessary to their analysis. The simple assertion that "no information exists" will not suffice; unless the costs of obtaining the information are exorbitant, NEPA requires that it be obtained. See 40 C.F.R. § 1502.22(a). Agencies are further required to identify their methodologies, indicate when necessary information is incomplete or unavailable, acknowledge scientific disagreement and data gaps, and evaluate indeterminate adverse impacts based upon approaches or methods "generally accepted in the scientific community." 40 C.F.R. §§ 1502.22(b)(2), (b)(4), 1502.24. Such requirements become acutely important in cases where, as here, so much about a proposed project's impacts depend on newly emerging science.

There are significant gaps in basic information about the Gulf region, its wildlife, and the potential effects of noise and disturbance from oil and gas exploration. This information is especially important in light of how marine resources were impacted by the Deepwater Horizon disaster. As such, we ask that BOEM take note of the following key points in conducting its impact assessment.

a. *Large-scale effects of sublethal take*: The conventional use of a single sound pressure level (160 dB re 1 µPa (RMS)) as a threshold for behavioral, sublethal take in all marine mammal species from seismic airguns simply does not reflect the best available science. Indeed, five of the world's leading biologists and bioacousticians working in this field recently characterized the present threshold, in a comment letter to BOEM and NMFS, as "overly simplified, scientifically outdated, and artificially rigid."[45] The use of such a criticized standard is inconsistent with NEPA's mandate that BOEM "insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." *See* 40 C.F.R. § 1502.24.

   Recent scientific literature establishes that behavioral disruption can occur at substantially lower received levels for some species known to occur in the Gulf of Mexico than previously thought. For example, a single seismic survey has been shown to cause endangered fin and humpback whales to stop vocalizing—a behavior essential to breeding and foraging—over an area at least 100,000 square nautical miles in size, and can cause baleen whales to abandon habitat over the same scale.[46] Similarly, a low-frequency, high-amplitude fish mapping

[45] Clark, C., Mann, D., Miller, P., Nowacek, D., and Southall, B., Comments on Arctic Ocean Draft Environmental Impact Statement at 2 (Feb. 28, 2012).

[46] Clark, C.W., and Gagnon, G.C., Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E9); Clark, C.W., pers. comm. with M. Jasny, NRDC (Apr. 2010); *see also* MacLeod, K., Simmonds, M.P., and Murray, E., Abundance of fin (*Balaenoptera physalus*) and sei whales (*B. Borealis*) amid oil exploration and development off northwest Scotland, *Journal of Cetacean Research and Management* 8: 247-254 (2006).

device was recently found to silence humpback whales at distance of 200 km, where received levels ranged from 88 to 110 dB.[47] Beaked whales have been demonstrated to be sensitive to various types of anthropogenic sound, going silent, abandoning their foraging, and avoiding sounds at levels of 140 dB and potentially well below.[48]

New acoustic guidelines for impacts to marine mammals, being developed by NOAA, may lower the decibel threshold for Level B takes and this will help more accurately estimate the magnitude of disturbances that airguns cause. BOEM should not attempt to estimate marine mammal takes within the draft EIS until these new guidelines are completed and released.

b. *Potential for hearing loss and other debilitating injury*: In its recent preliminary revised 5-year plan for 2007-2012, BOEM retained a statement characterizing "all acoustic impacts" from all sources of industry noise as "sublethal and non-debilitating."[49] This statement does not reflect the prevailing science on undersea noise impacts and should not preempt BOEM's analysis of the potential for debilitating injury or mortality. Indeed, the noise generated by airgun surveys (along with some other sources of industry noise) is sufficiently intense to cause lethality or debilitating injury in certain circumstances. For example, some airgun surveys have been correlated in space and time with mass stranding events,[50] and an analysis of acoustic dive fisheries indicates that a wide range of noise types, including low-frequency sources, have the potential to cause small cetaceans to strand.[51]

c. *Impacts on sperm whales*: Sperm whales are listed under the Endangered Species Act and are further protected by the Marine Mammal Protection Act. Populations in the Gulf of Mexico may still be struggling from the Deepwater Horizon oil spill.[52] Sperm whale foraging success declines significantly during exposure to airgun received levels above 130 dB (RMS), with potentially

[47] Risch, D., Corkeron, P.J., Ellison, W.T., and van Parijs, S.M., Changes in humpback whale song occurrence in response to an acoustic source 200 km away, PLoS ONE 7(1): e29741. doi:10.1371/journal.pone.0029741 (2012).

[48] Soto, N.A., Johnson, M., Madsen, P.T., Tyack, P.L., Bocconcelli, A., and Borsani, J.F., Does intense ship noise disrupt foraging in deep-diving Cuvier's beaked whales (*Ziphius cavirostris*)? *Mar. Mamm. Sci.* 22: 690-699 (2006); Tyack, P.L., Zimmer, W.M.X., Moretti, D., Southall, B.L., Claridge, D.E., Durban, J.W., Clark, C.W., D'Amico, A., DiMarzio, N., Jarvis, S., McCarthy, E., Morrissey, R., Ward, J., and Boyd, I.L., Beaked whales respond to simulated and actual Navy sonar, *PLoS ONE* 6(3):e17009.doi:10.13371/journal.pone.0017009 (2011) (beaked whales); California State Lands Commission, Draft Environmental Impact Report (EIR) for the Central Coastal California Seismic Imaging Project at H-47 (2012) (CSLC EIR No. 758).

[49] MMS, Preliminary Revised Program Outer Continental Shelf Oil and Gas Leasing Program 2007-2012, at 81 (Mar. 2010).

[50] Hildebrand, J., Impacts of anthropogenic sound; IWC Scientific Committee, Report of the Scientific Committee of the International Whaling Commission: Annex K: Report of the Standing Working Group on Environmental Concerns (2009).

[51] Brownell, R.L., Jr., Nowacek, D.P., and Ralls, K., Hunting cetaceans with sound: a worldwide review, *Journal of Cetacean Research and Management* 10: 81-88 (2008).

[52] Ackleh, A. et al. 2012. Assessing the Deepwater Horizon oil spill impact on marine mammal populations through acoustics: Endangered sperm whales. *J. Acoust. Soc. Am.* 131(3), pp. 2306-2314.

serious long-term consequences.[53] The National Marine Fisheries Service (NMFS) is currently reviewing a petition to list the sperm whales in the Gulf of Mexico as a Distinct Population Segment (DPS) under the ESA. 78 Fed. Reg. 19176 (March 29, 2013). BOEM must note the development of this rulemaking in a draft EIS.

It is important to note that real-time PAM has successfully detected sperm whales and implemented shut-down procedures in the Gulf of Mexico.[54] In order to continue to protect this endangered species, BOEM should mandate the use of PAM systems before and during seismic surveys in the Gulf.

d. *Long-term and cumulative impacts*: BOEM must incorporate the reasonably foreseeable impacts of other activities into its environmental analysis, including non-acoustic impacts from ship-strikes, bycatch and entanglements, the Deepwater Horizon oil spill, and other sources on the same species and populations affected by offshore exploration activities. In particular, it is worth noting that NEPA requires analysis of the direct and indirect effects of greenhouse gas (GHG) emissions and their consequences for climate change. Proposed guidance by CEQ concludes that the NEPA process "should incorporate consideration of both the impact of an agency action on the environment through the mechanism of GHG emissions and the impact of changing climate on that agency action."[55] Here, BOEM must fully analyze the direct and indirect effects on climate change from the greenhouse gas emissions attributable to its G&G operations from vessels and other sources and consider how its G&G activities will impact marine species and ecosystems that are already compromised by rapid climate change and ocean acidification.

D. *Compliance with Other Applicable Laws*: A number of other statutes and conventions are implicated by the proposed activities. Among those that must be disclosed and addressed during the NEPA process are the following:

a. The *Marine Mammal Protection Act* ("MMPA"), 16 U.S.C. § 1361 *et seq.*, which requires BOEM to obtain a permit or other authorization from NMFS or the U.S. Fish and Wildlife Service prior to any "take" of marine mammals. Under the Act, a permit can issue only if the regulator finds that the federal action will, *inter alia*, result only in the taking of only "small numbers" of

[53] Miller, P.J.O., Johnson, M.P., Madsen, P.T., Biassoni, N., Quero, M., and Tyack, P.L., Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales in the Gulf of Mexico, *Deep-Sea Research I* 56: 1168-1181 (2009).

[54] Stone, C.J., The effects of seismic surveys on marine mammals in UK waters: 1998-2000 (2003) (Joint Nature Conservation Committee Report 323); *see also* Parsons et al., A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice? *Marine Pollution Bulletin* 58: 643-651 (2009); Gillespie,D., Gordon, J., Mchugh, R., Mclaren, D., Mellinger, D.K., Redmond, P., Thode, A., Trinder, P., and Deng, X.Y., PAMGUARD: semiautomated, open source softward for real-time acoustic detection and localization of ceteaceans, *Proceedings of the Institute of Acoustics* 30(5) (2008).

[55] Nancy Sutley, Chair, Council on Environmental Quality, Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions (Feb. 18, 2010).

marine mammals of a species or stock and have no more than a "negligible impact" on any marine mammal species or stock. 16 U.S.C. §§ 1371(a)(5)(A)(i)-(i)(I). Moreover, in issuing a permit, NMFS must prescribe "methods" and "means of effecting the least practicable impact" on protected species as well as "requirements pertaining to the monitoring and reporting of such taking." *Id.* § 1371(a)(5)(A)(i)(II). These substantive standards are likely to influence BOEM's analysis of alternatives and mitigation and should therefore be explicitly considered in the programmatic EIS.

b. The *Endangered Species Act* ("ESA"), 16 U.S.C. § 1531 *et seq.*, which requires BOEM to enter into formal consultation with NMFS or the U.S. Fish and Wildlife Service, and receive a legally valid Incidental Take Permit, prior to its "take" of any endangered or threatened marine mammals or other species, including fish, sea turtles, and birds, or its "adverse modification" of critical habitat. *See, e.g., id.* § 1536(a)(2); *Romero-Barcelo v. Brown*, 643 F.2d 835 (1st Cir. 1981), *rev'd on other grounds*, *Weinberger v. Romero-Carcelo*, 456 U.S. 304, 313 (1982). BOEM must consult with NMFS over sperm whales, green sea turtles, Kemp's ridley sea turtles, hawksbill sea turtles, leatherback sea turtles, green sea turtles and loggerhead sea turtles, all of which regularly occur within the proposed planning area, and in adjacent waters.

c. The *Coastal Zone Management Act* ("CZMA"), 16 U.S.C. § 1451 *et seq.*, which requires that BOEM make a Consistency Determination ("CD") relative to each affected state's federally approved coastal zone management plan. The management authorities of affected states perform their own review of the action and, if they disagree with BOEM's CD, indicate how the proposal is inconsistent with the coastal zone plan, set forth alternative measures to bring the proposal into consistency, or describe the need for additional information that would allow for a determination. This mandate applies to activities that affect the natural resources of the state coastal zone regardless of whether the activities themselves are located "within or outside the coastal zone." *Id.* § 1456(c)(1)(A).

d. The *Magnuson-Stevens Fisheries Conservation and Management Act* ("MSA"), 16 U.S.C. § 1801 *et seq.*, which requires federal agencies to "consult with the Secretary [of Commerce] with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken" that "may adversely affect any essential fish habitat" identified under that Act. *Id.* § 1855 (b)(2). In turn, the MSA defines essential fish habitat as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." *Id.* § 1802 (10). BOEM's Gulf planning areas contain such habitat, requiring a thorough consultation under the MSA.

a. *Executive Order 13158*, which sets forth protections for marine protected areas ("MPAs") nationwide. The Executive Order defines MPAs broadly to include "any area of the marine environment that has been reserved by Federal, State,

territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." E.O. 13158 (May 26, 2000). It then requires that "[e]ach Federal agency whose actions affect the natural or cultural resources that are protected by an MPA shall identify such actions," and that, "[t]o the extent permitted by law and to the maximum extent practicable, each Federal agency, in taking such actions, shall avoid harm to the natural and cultural resources that are protected by an MPA." *Id.* BOEM must therefore consider and, to the maximum extent practicable, avoid harm to the resources of all federally- and state-designated marine protected areas potentially affected by the proposed activities.

III. Conclusion

In summary, we believe BOEM and NOAA should not move forward with permitting five to ten more years of harmful seismic airgun surveys for oil and gas, or expand risky offshore drilling practices to new areas in the Gulf of Mexico, which are still recovering from the Deepwater Horizon oil spill. There are alternatives to offshore drilling, such as offshore wind, which create more jobs and help solve the problem of climate change. We support the permitting and development of offshore renewable energy in U.S. waters in order to transition away from dirty fossil fuels.

If this EIS process moves forward, BOEM would have to fill in significant gaps about marine mammal stock assessments, and show how marine mammal populations and the ecological baseline of the Gulf of Mexico has changed after the Deepwater Horizon oil spill. To provide a full and fair draft EIS, BOEM must include the aforementioned alternatives and mitigation measures to avoid undue levels of acoustic harm to marine life. We appreciate the opportunity to provide input and thank you for your time. We will continue to be engaged in this process moving forward.

Sincerely,

Matthew Huelsenbeck
Marine Scientist
OCEANA

GOMGGEIS, BOEM <gomggeis@boem.gov>

EIS on G&G activities in the Gulf of Mexico

1 message

Jasny, Michael <mjasny@nrdc.org> Tue, Jul 9, 2013 at 9:43 PM
To: "gomggeis@boem.gov" <gomggeis@boem.gov>

Dear Mr. Goeke:

Please find attached our scoping comments on BOEM's EIS on geological and geophysical activities in the Gulf of Mexico. Please don't hesitate to contact me with any questions.

Best,

Michael Jasny

Michael Jasny

Senior Policy Analyst

Director, Marine Mammal Protection Project

Through Aug. 3, available at 310-876-8525

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NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

Via Electronic Mail

July 9, 2013

Mr. Gary D. Goeke
Chief, Regional Assessment Section
Office of Environment (MS 5410)
Bureau of Ocean Energy Management
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Dear Mr. Goeke:

On behalf of the Natural Resources Defense Council ("NRDC"), Center for Biological Diversity, Earthjustice, Gulf Restoration Network, and the Sierra Club, and our millions of members nationwide, I am writing to submit comments on BOEM's notice of intent to prepare a programmatic environmental impact statement ("EIS") covering geological and geophysical exploration activities in the Gulf of Mexico. 78 Fed. Reg. 27427, 27427-30 (May 10, 2013); 78 Fed. Reg. 33859 (June 5, 2013).

As you know, we are profoundly concerned about the impact of industry's high-intensity seismic exploration activity on the Gulf's marine mammals. Increasingly, the available science indicates that seismic airguns disrupt baleen whale behavior and impair their communication on a vast scale; that they harm a diverse range of other marine mammals in multiple ways; and that they significantly impact fish and fisheries, with unknown but potentially substantial effects on both coastal communities and marine mammal populations. The amount of seismic activity under consideration in this rulemaking is enormous, comprising dozens of surveys each year in what is the most intensively prospected body of water in the world. To make matters worse, all of these surveys are taking place in a context of chronic industrial noise: noise from the industry's support vessels, from its construction of offshore facilities, from its routine operations, and from its platform decommissioning. Moreover, many of the marine mammal populations that seismic operators are affecting—Bryde's whales, sperm whales, and bottlenose dolphins, among others—may already be seriously compromised by the *Deepwater Horizon* spill.

Given the sheer extent of activity in the Gulf, the substantial scientific concern about both seismic surveys and cumulative acoustic stressors, and the acute vulnerability of Gulf populations, particularly in the wake of the *Deepwater* spill, it is vitally important that

NMFS approach this EIS, and its associated rulemaking under the Marine Mammal Protection Act ("MMPA"), carefully and conservatively.

The application that BOEM submitted two years ago for programmatic rulemaking, while benefiting from a more rigorous modeling effort than was attempted in the past, contained a number of major flaws that require redress in any EIS. It adopted a single flat threshold for all species that assumes, insupportably, that take will not occur below 160 dB (RMS); it failed to account for cumulative impacts in any way; and it did not suggest any mitigation beyond the plainly inadequate safety zone monitoring and ramp-up that BOEM currently prescribes in the Gulf. The agencies must drastically improve their impact analysis, and, if a rule is to issue, must prescribe mitigation that reduces takes below the "small numbers" and "negligible impact" threshold, as the MMPA demands.[1] 16 U.S.C. § 1371(a)(5)(A)(i).

Most importantly, *current levels of seismic exploration in the northern Gulf of Mexico are not compatible* with the MMPA, ESA, or OCSLA. The agencies cannot ensure against significant adverse population-level impacts on Gulf marine mammals, or bring themselves into compliance with federal environmental law, without making a focused effort to reduce the environmental footprint of these activities. In its most recent report, the International Whaling Commission's Scientific Committee specifically encouraged the use of "time/area closures and new quieting technologies to address noise pollution" – part of what one NOAA scientist identified as "a shift underway to focus on more ecologically relevant spatial and temporal scales."[2] There are few parts of the world more in need of a paradigm shift in underwater noise management.

Among other elements, we recommend the following:

(1) Consider actionable alternatives to accelerate the development and use of technological alternatives to existing seismic technology, such as by mandating the use of marine vibroseis or other technologies in pilot areas: *e.g.*, in waters shallower than 20 meters, which constitute coastal bottlenose dolphin habitat, and potentially other areas of biological importance.

(2) Establish activity caps, by considering multiple alternatives for reducing cumulative exposures in each planning region to levels that satisfy both the "small numbers" and "lowest practicable level" requirements, and by assigning seasonal or year-round caps that significantly reduce exposures for Bryde's whales, sperm whales, and coastal bottlenose dolphins to address the clear potential for greater than negligible impacts on these species.

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[1] The MMPA also requires NMFS to prescribe mitigation that achieves "the least practicable impact" on marine mammals, but this is a separate mandate. 16 U.S.C. § 1371(a)(5)(A)(i)(II)(aa). The "small numbers" and "negligible impact" standards must be met for the rule to issue at all, and therefore are not limited by considerations of practicability.

[2] IWC, Report of the Scientific Committee of the International Whaling Commission: Annex K, at 14, 15 (2013) (IWC/65A/Rep 1, Annex K).

(3) Establish standards for eliminating duplicative survey effort, and require operators of 3D surveys to acquire, process, and provide data in such as way as to obviate the need for high-resolution site surveys.

(4) Establish standards to ensure that operators reduce the effective source levels of their surveys to the lowest practicable level, and require operators to calibrate their airgun arrays before beginning a survey in order to minimize horizontal propagation of the noise signal.

(5) Adopt area closures and restrictions for high-value habitat, including the Mississippi Canyon, DeSoto Canyon, coastal waters landward of the 20-meter isobath, and sperm whale habitat west of the Tortugas, and consider other areas based on the findings of the NOAA Working Group on Cetacean Mapping and its successor.

I. IMPACTS OF AIRGUN SURVEYS AND OTHER G&G ACTIVITIES

The ocean is an acoustic world. Unlike light, sound travels extremely efficiently in seawater; and marine mammals and many fish depend on sound for finding mates, foraging, avoiding predators, navigating, and communicating – in short, for virtually every vital life function. When loud sounds are introduced into the ocean, it degrades this essential part of the environment. Some biologists have analogized the increasing levels of noise from human activities as a rising tide of "smog" that has industrialized major portions of the marine environment off our coasts. This acoustic smog is already shrinking the sensory range of marine animals by orders of magnitude from pre-industrial levels.[3]

For offshore exploration, the oil and gas industry typically rely on arrays of airguns, which are towed behind ships and release intense impulses of compressed air into the water about once every 10-12 seconds.[4] A large seismic airgun array can produce effective peak pressures of sound higher than those of virtually any other man-made source save explosives;[5] and although airguns are vertically oriented within the water column, horizontal propagation is so significant as to make them, even under present use, one of the leading contributors to low-frequency ambient noise thousands of miles from any given survey.[6] It is well established that the high-intensity pulses produced by airguns can cause a range of impacts on marine mammals, fish, and other marine life,

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[3] Bode, M., Clark, C.W., Cooke, J., Crowder, L.B., Deak, T., Green, J.E., Greig, L., Hildebrand, J., Kappel, C., Kroeker, K.J., Loseto, L.L., Mangel, M., Ramasco, J.J., Reeves, R.R., Suydam, R., Weilgart, L., Statement to President Barack Obama of Participants of the Workshop on Assessing the Cumulative Impacts of Underwater Noise with Other Anthropogenic Stressors on Marine Mammals (2009).

[4] Deep seismic surveys are not used for renewable energy projects.

[5] National Research Council, *Ocean Noise and Marine Mammals* (2003).

[6] Nieukirk, S.L., Stafford, K.M., Mellinger, D.K., Dziak, R.P., and Fox, C.G., Low-frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean, *Journal of the Acoustical Society of America* 115: 1832-1843 (2004).

including broad habitat displacement, disruption of vital behaviors essential to foraging and breeding, loss of biological diversity, and, in some circumstances, injuries and mortalities.[7]

The impacts of airgun surveys are felt on an extraordinarily wide geographic scale – especially on endangered baleen whales, whose vocalizations and acoustic sensitivities overlap with the enormous low-frequency energy that airguns put in the water. For example, a single seismic survey has been shown to cause endangered fin and humpback whales to stop vocalizing – a behavior essential to breeding and foraging – over an area at least 100,000 square nautical miles in size, and can cause baleen whales to abandon habitat over the same scale.[8] Similarly, airgun noise can also mask the calls of vocalizing baleen whales over vast distances, substantially compromising their ability to communicate, feed, find mates, and engage in other vital behavior.[9] The intermittency of airgun pulses hardly mitigates this effect since their acoustic energy spreads over time and can sound virtually continuous at distances from the array.[10] According to recent modeling from Cornell and NOAA, the highly endangered North Atlantic right whale is particularly vulnerable to masking effects from airguns and other sources given the acoustic and behavioral characteristics of its calls.[11] Repeated insult from airgun surveys, over months and seasons, would come on top of already urbanized levels of background noise and, cumulatively and individually, would pose a significant threat to populations of marine mammals.

Airguns are also known to affect a broad range of other marine mammal species beyond the endangered great whales. For example, sperm whale foraging appears to decline significantly on exposure to even moderate levels of airgun noise, with potentially serious

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[7] *See*, *e.g.*, Hildebrand, J.A., Impacts of anthropogenic sound, *in* Reynolds, J.E. III, Perrin, W.F., Reeves, R.R., Montgomery, S., and Ragen, T.J. (eds), *Marine Mammal Research: Conservation beyond Crisis* (2006); Weilgart, L., The impacts of anthropogenic ocean noise on cetaceans and implications for management. *Canadian Journal of Zoology* 85: 1091-1116 (2007).

[8] Clark, C.W., and Gagnon, G.C., Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E9); Clark, C.W., pers. comm. with M. Jasny, NRDC (Apr. 2010); *see also* MacLeod, K., Simmonds, M.P., and Murray, E., Abundance of fin (*Balaenoptera physalus*) and sei whales (*B. Borealis*) amid oil exploration and development off northwest Scotland, *Journal of Cetacean Research and Management* 8: 247-254 (2006).

[9] Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., van Parijs, S., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems as a function of anthropogenic sound sources (2009) (IWC Sci. Comm. Doc. SC/61/E10).

[10] *Id.*; Weilgart, L. (ed.), Report of the workshop on alternative technologies to seismic airgun surveys for oil and gas exploration and their potential for reducing impacts on marine mammals, 31 Aug. – 1 Sept., 2009, Monterey, Calif. (2010) (available at www.okeanos-stiftung.org/okeanos/download.php?id=19).

[11] Clark et al., Acoustic masking in marine ecosystems as a function of anthropogenic sound sources; Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., Van Parijs, S.M., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems: Intuitions, analysis, and implication, *Marine Ecology Progress Series* 395: 201-222 (2009).

long-term consequences;[12] and harbor porpoises have been seen to engage in strong avoidance responses fifty miles from an array.[13] Seismic surveys have been implicated in the long-term loss of marine mammal biodiversity off the coast of Brazil.[14]

Airgun surveys are also known to significant affect the distribution of some prey species, which could in turn displace marine mammals or have significant impacts on their foraging. For example, airguns have been shown to dramatically depress catch rates of some commercial fish species, by 40 to 80% depending on catch method, over thousands of square kilometers around a single array,[15] leading fishermen in some parts of the world to seek industry compensation for their losses. Other impacts on commercially harvested fish include habitat abandonment – one hypothesized explanation for the fallen catch rates – reduced reproductive performance, and hearing loss;[16] and recent data suggest that loud, low-frequency sound also disrupts chorusing in black drum fish, a behavior essential to breeding in this commercial species.[17]

II. COMPLIANCE WITH NEPA

Enacted by Congress in 1969, NEPA establishes a national policy to "encourage productive and enjoyable harmony between man and his environment" and "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. § 4321. In order to achieve its broad goals, NEPA mandates that "to the fullest extent possible" the "policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [NEPA]." 42 U.S.C. § 4332. As the Supreme Court explained,

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[12] Miller, P.J.O., Johnson, M.P., Madsen, P.T., Biassoni, N., Quero, M., and Tyack, P.L., Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales in the Gulf of Mexico, *Deep-Sea Research I* 56: 1168-1181 (2009).

[13] Bain, D.E., and Williams, R., Long-range effects of airgun noise on marine mammals: responses as a function of received sound level and distance (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E35).

[14] Parente, C.L., Pauline de Araújo, J., and Elisabeth de Araújo, M., Diversity of cetaceans as tool in monitoring environmental impacts of seismic surveys, *Biota Neotropica* 7(1) (2007).

[15] Engås, A., Løkkeborg, S., Ona, E., and Soldal, A.V., Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*), *Canadian Journal of Fisheries and Aquatic Sciences* 53: 2238-2249 (1996); *see also* Skalski, J.R., Pearson, W.H., and Malme, C.I., Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish (*Sebastes ssp.*), *Canadian Journal of Fisheries and Aquatic Sciences* 49: 1357-1365 (1992).

[16] McCauley, R.D., Fewtrell, J., Duncan, A.J., Jenner, C., Jenner, M.-N., Penrose, J.D., Prince, R.I.T., Adhitya, A., Murdoch, J. and McCabe, K., Marine seismic surveys: analysis and propagation of air-gun signals, and effects of air-gun exposure on humpback whales, sea turtles, fishes, and squid (2000) (report by Curtin U. of Technology); McCauley, R., Fewtrell, J., and Popper, A.N., High intensity anthropogenic sound damages fish ears, *Journal of the Acoustical Society of America* 113: 638-642 (2003); Scholik, A.R., and Yan, H.Y., Effects of boat engine noise on the auditory sensitivity of the fathead minnow, *Pimephales promelas*, *Environmental Biology of Fishes* 63: 203-209 (2002).

[17] Clark, C.W., pers. comm. with M. Jasny, NRDC (Apr. 2010).

> NEPA's instruction that all federal agencies comply with the impact statement requirement – and with all the requirements of § 102 – "to the fullest extent possible" [cit. omit.] is neither accidental nor hyperbolic. Rather the phrase is a deliberate command that the duty NEPA imposes upon the agencies to consider environmental factors not be shunted aside in the bureaucratic shuffle.

Flint Ridge Development Co. v. Scenic Rivers Ass'n, 426 U.S. 776, 787 (1976). Central to NEPA is its requirement that, before any federal action that "may significantly degrade some human environmental factor" can be undertaken, agencies must prepare an environmental impact statement. *Steamboaters v. F.E.R.C.*, 759 F.2d 1382, 1392 (9th Cir. 1985) (emphasis in original).

The fundamental purpose of an EIS is to force the decision-maker to take a "hard look" at a particular action – at the agency's need for it, at the environmental consequences it will have, and at more environmentally benign alternatives that may substitute for it – before the decision to proceed is made. 40 C.F.R. §§ 1500.1(b), 1502.1; *Baltimore Gas & Electric v. NRDC*, 462 U.S. 87, 97 (1983). This "hard look" requires agencies to obtain high quality information and accurate scientific analysis. 40 C.F.R. § 1500.1(b). "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." *Klamath-Siskiyou Wilderness Center v. Bureau of Land Management*, 387 F.3d 989, 994 (9th Cir. 2004) (*quoting Neighbors of Cuddy Mountain v. United States Forest Service*, 137 F.3d 1372, 1380 (9th Cir. 1998)). The law is clear that the EIS must be a pre-decisional, objective, rigorous, and neutral document, not a work of advocacy to justify an outcome that has been foreordained.

To comply with NEPA, an EIS must *inter alia* include a "full and fair discussion" of direct and indirect environmental impacts (40 C.F.R. § 1502.1), consider the cumulative effects of reasonably foreseeable activities in combination with the proposed action (*id.* § 1508.7), analyze all reasonable alternatives that would avoid or minimize the action's adverse impacts (*id.* § 1502.1), address measures to mitigate those adverse effects (*id.* § 1502.14(f)), and assess possible conflicts with other federal, regional, state, and local authorities (*id.* § 1502.16(c)). We offer the following comments to ensure BOEM's compliance with these important mandates.

A. Alternatives Analysis and Mitigation

At bottom, an EIS must "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. This requirement has been described in regulation as "the heart of the environmental impact statement." *Id.* § 1502.14. The agency must therefore "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." *Id.* § 1502.14(a). Consideration of alternatives is required by (and must conform to the independent terms of) both sections

102(2)(C) and 102(2)(E) of NEPA. In addition, an agency must discuss measures designed to mitigate its action's impact on the environment. *See* 42 C.F.R. § 1502.14(f).

We believe that the following alternatives and mitigation measures are critical to reconciling the broad impacts of offshore exploration with the basic requirements of environmental law.

(1) *Alternative Technologies*

As you know, new technology represents a promising means of reducing the environmental footprint of seismic exploration. Industry experts and biologists participating in a September 2009 workshop reached the following conclusions: that airguns produce a great deal of "waste" sound and generate peak levels substantially higher than needed for offshore exploration; that a number of quieter technologies are either available now for commercial use or can be made available within the next five years; and that governments should accelerate development and use of these technologies through both research and development funding and regulatory engagement.[18] A 2007 report by Noise Control Engineering reached similar conclusions.[19]

By far the most promising of these new technologies is marine vibroseis, a vibratory source that could, by spreading the acoustic energy embedded in a short airgun pulse over several seconds, reduce source levels by 30 dB or more; and that could all but eliminate acoustic output above 100 Hz, which is waste energy for geophysical exploration. The EIS should incorporate the latest information on vibroseis (and other technologies) obtained at BOEM's February 2013 quieting technologies workshop, held in Silver Spring, Maryland, which addressed noise from airguns, pile-drivers, and vessels used in offshore energy exploration and production. For example, at BOEM's workshop, the offshore services company Geo-Kinetics stated that it would field-test its device in the Gulf of Mexico and would have an array available for commercial use within one year; the JIP research and development program is now on a timetable for completion of three vibroseis prototypes, per the settlement agreement in *NRDC v. Jewell*; and several other companies have designed and/or are developing other models.

Most importantly, the agency must consider specific management actions to require or incentivize the use of new technologies in the region. Such actions may include: (1) mandating the use of marine vibroseis or other technologies in

[18] Weilgart, L. ed., Report of the workshop on alternative technologies to seismic airgun surveys for oil and gas exploration and their potential for reducing impacts on marine mammals, 31 Aug. – 1 Sept., 2009, Monterey, Calif. (2010) (available at www.okeanos-stiftung.org/okeanos/download.php?id=19).

[19] Spence, J., Fischer, R., Bahtiarian, M., Boroditsky, L., Jones, N., and Dempsey, R., Review of existing and future potential treatments for reducing underwater sound from oil and gas industry activities (2007) (NCE Report 07-001) (prepared by Noise Control Engineering for Joint Industry Programme on E&P Sound and Marine Life).

pilot areas (e.g., waters shallower than 20 meters, which constitute coastal bottlenose dolphin habitat, and potentially other areas of biological importance), with an obligation to accrue data on environmental impacts; (2) creating a specific adaptive process by which marine vibroseis or other technologies can be required as they become available; (3) deferring the permitting of surveys in particular areas (such as relatively shallow-water habitat used by beluga whales) or for particular applications where effective mitigative technologies, such as marine vibroseis, could reasonably be expected to become available within the life of the EIS; and (4) providing incentives for use of these technologies as was done for passive acoustic monitoring systems in BOEM's Notice to Lessees 2007-G02, in the Gulf of Mexico. Similar actions are available for noise-reduction from industry vessels.

We cannot overemphasize the importance of developing and including actionable alternatives for new, noise-quieting technologies in the Gulf of Mexico. It is worth noting the example of Germany, as presented at the February 2013 BOEM workshop, which set ambitious standards for pile-driving noise over the protests of some companies in May 2011 and indicated that they would be incorporated in future offshore leases; within one year, the industry had developed several noise reduction and attenuation technologies that met Germany's standard.[20] New technologies are indispensible for addressing the chronic impacts of oil and gas development in the Gulf of Mexico and for meeting the agencies' statutory responsibilities – and they are emerging at precisely the right time. The management actions described above are reasonable and potentially highly effective, and must be considered in the EIS.

(2) *Activity Caps*

BOEM must place meaningful caps on offshore activities that disrupt marine mammal behavior. As NOAA has found, "[t]here is currently a great deal of concern that a variety of human sources of marine sound (e.g., vessel traffic, seismic activity, sonar, and construction activities) are acting in a cumulative way to degrade the environment in which sound-sensitive animals communicate."[21] We now know from work done in diverse regions, in the North Atlantic, Arctic, and Southern Ocean, that airguns in particular can cause low-frequency

[20] Presentation of Sven Koschinski, Marine Zoology, at BOEM, Workshop on Quieting Technologies for Reducing Noise during Seismic Surveying and Pile Driving, Feb. 25-27, Silver Spring, Md. (2013). *See also* Umwelt Bundes Amt, Empfehlung von Lärmschutzwerten bei der Errichtung von Offshore-Windenergieanlagen (OWEA) (May 2011); Bundesamt für Seeschifffahrt und Hydrographie, Genehmigungsbescheid Innogy Nordsee at 19 (Apr. 4, 2012) (representative lease at § 14); Stefanie Werner, Umwelt Bundes Amt, Determination of noise exposure criteria – the German approach, presentation dated Jan. 24, 2012, available at http://www.bfn.de/fileadmin/MDB/documents/themen/erneuerbareenergien/Tgng_offshore2012/2_3_werner.pdf (2012).

[21] Memorandum from Dr. J. Lubchenco to Ms. N. Sutley.

background noise to rise significantly over very large areas of ocean.[22] The best available evidence indicates that such noise can interfere with foraging in some species at moderate levels of exposure,[23] and substantially interfere with the communication abilities of marine mammals, particularly baleen whales, at very considerable distances.[24] These effects cannot be eliminated through the use of area closures alone, especially given the long distances at which they may occur; and while alternative technologies such as vibroseis and source-based standards can substantially reduce acoustic exposures, it seems unlikely that they can – at least in the near term – reduce exposures below the MMPA "small numbers" and "negligible impact" thresholds.

(a) *Interim analysis.*— In the short term (i.e., for the present programmatic rulemaking), NMFS should (1) consider multiple alternatives and activity caps for reducing cumulative exposures in each planning region to the lowest practicable level; and (2) conservatively assume that any substantial decrement in the communication space of baleen whales (particularly Bryde's whales) or foraging ability of sperm whales (per Miller et al. 2009) or energetics of coastal bottlenose dolphin (*cf.* Noren et al. 2013) will result in greater than negligible impacts on the species or population, and assign seasonal or year-round caps that significantly reduce exposures for those whales. This analysis should integrate the product of the NOAA working group on mapping cumulative sound exposures in the U.S. OCS.

(b) *Complete quantitative analysis.*— NMFS should include, in any proposed rule, an adaptive management provision that allows it to prescribe activity caps based on a quantitative analysis of cumulative exposures from

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[22] Nieukirk, S.L., Stafford, K.M., Mellinger, D.K., Dziak, R.P., and Fox, C.G., Low-frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean, *Journal of the Acoustical Society of America* 115: 1832-1843 (2004); Gedamke, J., Ocean basin scale loss of whale communication space: potential impacts of a distant seismic survey, Biennial Conference on the Biology of Marine Mammals, November-December 2011, Tampa, FL (2011) (abstract); Nieukirk, S.L., Klinck, H., Klinck, K., Mellinger, D.K., and Dziak, R.P., Seismic airgun sounds and whale vocalization recorded in the Fram Strait and Greenland Sea, Biennial Conference on the Biology of Marine Mammals, November-December 2011, Tampa, FL (2011) (abstract); Nieukirk, S.L., Mellinger, D.K., Moore, S.E., Klinck, K., Dziak, R.P., Goslin, J., Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009, *Journal of the Acoustical Society of America* 131:1102- 1112 (2012); Nieukirk, S.L., Stafford, K.M., Mellinger, D.K., Dziak, R.P., and Fox, C.G., Low-frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean, *Journal of the Acoustical Society of America* 115: 1832-1843 (2004); Roth, E.H., Hildebrand, J.A., Wiggins, S.M., and Ross, D., Underwater ambient noise on the Chukchi Sea continental slope, *Journal of the Acoustical Society of America* 131:104-110 (2012).

[23] Miller *et al.*, Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales.

[24] Clark and Gagnon, Considering the temporal and spatial scales of noise exposures; Clark *et al.*, Acoustic masking in marine ecosystems as a function of anthropogenic sound sources; Clark *et al.*, Acoustic masking in marine ecosystems: Intuitions, analysis, and implication; pers. comm., C. Clark (May 2012, July 2012).

multiple anthropogenic noise sources; and should further require BOEMRE, through a monitoring program, to obtain the necessary data and sponsor the analysis of cumulative exposures, *e.g.*, through the use of a passive acoustic network.[25] Activity caps should reflect a conservative analysis of the cumulative sublethal effects of industry activities on whale communication ranges and other biologically important factors.

(3) *Duplicative Survey Effort*

NMFS should require BOEM to eliminate unnecessary duplication of survey effort throughout the Gulf, by rejecting permit applications or requiring modification of permit applications that duplicate, in whole or in part, other surveys occurring in the same locations for the same or similar purposes. This measure is consistent with the findings of the 2010 and 2011 Open Water Panels, which recommended requiring use of a common surveyor to eliminate redundancy in the Arctic.[26] In the Gulf where multi-buyer spec surveys are common, it may be more appropriate for BOEM to review applications for duplication, provided that standards and transparency and reporting requirements are set to ensure independent and rigorous review. We urge BOEM to begin as soon as possible the process, set forth in the *NRDC v. Jewell* settlement agreement, of convening an internal expert panel or panels for evaluation and, hopefully, development of a standard.

Additionally, BOEM should consider requiring operators of 3D surveys to acquire or process data in such a way as to obviate the need for high-resolution site surveys. As the agency notes in its 2011 application for MMPA rulemaking, data processing of 3D seismic data is increasingly capable of yielding useful near-surface information, eliminating "many of the needs previously met" by high-resolution surveys.[27] BOEM should consider a measure ensuring that 3D surveys are conducted, and their data provided, in a manner consistent with this purpose, provided that such a measure does not have countervailing environmental costs; and should consider mandating relevant research on signal processing in their EIS.

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[25] Hatch, L., Clark, C., Merrick, R., Van Parijs, S., Ponirakis, D., Schwehr, K., Thompson, M., and Wiley, D., Characterizing the relative contributions of large vessels to total ocean noise fields: A case study using the Garry E. Studds Stellwagen Bank National Marine Sanctuary, *Environmental Management* 42:735-752 (2008). *See also* Clark and Gagnon, Considering the temporal and spatial scales of noise exposures; Clark *et al.*, Acoustic masking in marine ecosystems as a function of anthropogenic sound sources; Clark *et al.*, Acoustic masking in marine ecosystems: Intuitions, analysis, and implication.

[26] Burns, J., Clark, C., Ferguson, M., Moore, S., Ragen, T., Southall, B., and Suydam, R. (2010). Expert panel review of monitoring and mitigation protocols in applications for incidental take authorizations related to oil and gas exploration, including seismic surveys, in the Chukchi and Beaufort Seas; Brower *et al.*, Expert panel review of monitoring protocols in applications for incidental harassment authorizations.

[27] BOEM, Request to National Oceanic an d Atmospheric Administration (NOAA) for Incidental Take Regulations Governing Seismic Surveys on the Outer Continental Shelf (OCS) of the Gulf of Mexico at 2 (2011).

(4) *Lowest Practicable Source Level*

BOEM should develop standards to (a) ensure that operators reduce the effective source levels of their surveys to the lowest practicable level, and provide an objective, transparent standard and oversight mechanism to ensure compliance; and (b) require operators to calibrate their airgun arrays before beginning a survey in order to minimize horizontal propagation of the noise signal, and report field-checked source levels to the agencies for purposes of transparency and compliance. As with the Arctic, NMFS should prescribe a protocol for taking measurements in the field, both for minimizing horizontal propagation and for verifying source level estimates. As with duplicative surveys, the settlement agreement in *NRDC v. Jewell* sets forth a process for consideration of this important measure.

(5) *Area Closures and Restrictions*

There is general consensus that time and place restrictions designed to protect high-value habitat are one of the most effective means to reduce the potential impacts of noise and disturbance, including noise from oil and gas exploration.[28] In the Gulf of Mexico, areas of biological significance for marine mammals include:

(a) Mississippi Canyon.— It is well established, on the basis of historic whaling records, mark-recapture data, and extensive surveys including by GulfCet II and the Sperm Whale Seismic Study, that this area constitutes important habitat for the Gulf's small, biologically distinct population of sperm whales,[29] most likely due to the input of a nutrient-rich, freshwater

[28] Agardy, T., Aguilar Soto, N., Cañadas, A., Engel, M., Frantzis, A., Hatch, L., Hoyt, E., Kaschner, K., LaBrecque, E., Martin, V., Notarbartolo di Sciara, G., Pavan, G., Servidio, A., Smith, B., Wang, J., Weilgart, L., Wintle, B., and Wright, A, A global scientific workshop on spatio-temporal management of noise, Report of workshop held in Puerto Calero, Lanzarote, June 4-6, 2007 (2007); Dolman, S., Aguilar Soto, N., Notabartolo di Sciara, G., Andre, M., Evans, P., Frisch, H., Gannier, A., Gordon, J., Jasny, M., Johnson, M., Papanicolopulu, I., Panigada, S., Tyack, P., and Wright, A., Technical report on effective mitigation for active sonar and beaked whales (2009) (working group convened by European Cetacean Society); OSPAR Commission, Assessment of the environmental impact of underwater noise (2009) (report issued as part of OSPAR Biodiversity Series, London, UK); Memorandum from Dr. Jane Lubchenco, NOAA Administrator, to Ms. Nancy Sutley, CEQ Chair (Jan. 19, 2010).

[29] *E.g.*, Townsend, C.H., The distribution of certain whales as shown by logbook records of American whaleships, *Zoologica: Scientific Contributions of the New York Zoological Society* 19:3-50 (1935); Biggs, D.C., Leben, R.R., and Ortega-Ortiz, J.G., Ship and satellite studies of mesoscale circulation and sperm whale habitats in the northeast Gulf of Mexico during GulfCet II, *Gulf of Mexico Science* 18:15-22 (2000); Weller, D.W., Wűrsig, B., Lynn, S.K., and Schiro, A.J., Preliminary findings on the occurrence and site fidelity of photo-identified sperm whales (*Physeter macrocephalus*) in the northern Gulf of Mexico, Gulf of Mexico Science 18:35-39 (2000); Baumgartner, M.F., Mullin, K.D., May, L.N., and Leming, T.D., Cetacean habitats in the northern Gulf of Mexico, *Fishery Bulletin, U.S.* 99:219-239 (2001); Jochens, A., Biggs, D., Engelhaupt, D., Gordon, J., Jaquet, N., Johnson, M., Leben, R., Mate, B., Miller, P., Ortega-

plume from the Mississippi Delta.[30] Nearly all sightings of females and mother-calf groups have occurred there, strongly suggesting it functions as a nursery ground.[31]

(b) *DeSoto Canyon.*— The DeSoto Canyon represents important habitat for Bryde's whales, the most commonly occurring baleen whale in the Gulf of Mexico, as well as habitat for sperm whale and other cetaceans. Nearly all known sightings of Bryde's whales have occurred in the canyon.[32] The stock size is estimated at well under 50 animals, leaving it highly vulnerable – particularly if it constitutes a resident population as several studies have suggested.[33] Avoiding the DeSoto Canyon is essential to meeting the MMPA's small numbers standard as well as its negligible impact standard.

(c) *Coastal waters landward of the 20m isobath.*— The coastal ecotype of bottlenose dolphin comprises more than 30 identified stocks across the Northern Gulf, many of which have best population estimates well below 100 individual animals;[34] and manatees are an ESA-listed species whose habitat choices are highly correlated to the absence of predominantly low-frequency sound.[35] These waters provide habitat for both species. The primary calving season for coastal bottlenose dolphins runs from February through May, peaking in March and April, with a secondary calving season occurring in December.[36] As noted elsewhere, coastal bottlenose dolphins are in the midst of a continuing, multi-year die-off. For these *tursiops* stocks as for Bryde's whales, avoiding habitat is essential to meeting MMPA requirements.

Ortiz, J., Thode, A., Tyack, P., Wormuth, J., Wűrsig, B., Sperm whale seismic study in the Gulf of Mexico: Summary report, 2002-2004 (2006) (OCS Study MMS 2006-034).

[30] Davis, R.W., Ortega-Ortiz, J.G., Ribic, C.A., Evans, W.E., Biggs, D.C., Ressler, P.H., Cady, R.B., Leben, R.R., Mullin, K.D., and Wűrsig, B., Cetacean habitat in the northern oceanic Gulf of Mexico, *Deep-Sea Research* 49:121-142 (2002).

[31] *E.g.*, Weller *et al.*, Preliminary findings; Jochens *et al.*, Sperm whale seismic study.

[32] Maze-Foley, K., and Mullin, K.D., Cetaceans of the oceanic northern Gulf of Mexico: Distributions, group sizes, and interspecific associations, *Journal of Cetacean Research and Management* 8(2):203-213 (2006).

[33] Mead, Records of sei and Bryde's whales; Schmidly, Marine mammals of the southeastern United States and the Gulf of Mexico; Jefferson and Schiro, Distribution of cetaceans in the offshore Gulf of Mexico.

[34] Waring *et al.*, U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments.

[35] Miksis-Olds, J.L., and Miller, J.H., Transmission loss in manatee habitats, *Journal of the Acoustical Society of America* 120:2320:2327 (2006); Miksis-Olds, J.L., Donaghay, P.L., Miller, J.H., Tyack, P.T., Nystuen, J.A., Noise level correlates with manatee use of foraging habitats, *Journal of the Acoustical Society of America* 121:3011-3020 (2007).

[36] Pers. comm., Dr. Tom Jefferson, with M. Jasny, NRDC (Jan. 2011).

(d) West of the Florida Keys and Tortugas.— This area, which lies along the continental slope west of the islands, constitutes an area of consistent sperm whale concentration in the Eastern Gulf.[37]

(e) Other areas identified.— NMFS' Cetacean & Sound Mapping program is in the process of both refining predictive habitat models for Gulf species and specifically identifying biologically important areas based on other factors. These latter areas include reproductive areas, where a particular species or population mates, gives birth, or is found with neonates; feeding areas, where a species or population is consistently found to forage; small resident populations; and, migratory corridors.[38] BOEM should use both the predictive maps and biologically important area analysis to identify habitat for protective management in the Gulf.

(6) *Operational Mitigation*

(a) Improving Safety Zones

(1) Application in Gulf of Mexico.— BOEM should expand the application of its existing marine mammal safety zone in the Gulf of Mexico. As it stands under NTL 2012-G02, the safety zone for Gulf seismic surveys applies only to "whales," a category that definitionally excludes delphinids and manatees – a policy that is inconsistent with every past NMFS authorization of seismic surveys and other types of ocean noise. Additionally, the measure applies west of 88º W. longitude only in waters deeper than 200 meters, an arbitrary exclusion that is likewise inconsistent with past MMPA authorizations. The settlement agreement in *NRDC v. Jewell* expands coverage to manatees and to all areas of the Gulf within U.S. jurisdiction, but does not include delphinids and has only the status of interim relief, until compliance with the MMPA and other statutes is achieved. BOEM should prescribe a safety zone that covers all Gulf marine mammal species in all federal waters.

(2) Safety zone distances.— BOEM should conservatively recalculate its safety zone distances in light of recent studies on hearing loss: (1) a controlled exposure experiment demonstrating that harbor porpoises are substantially more susceptible to temporary threshold shift than the two species, bottlenose dolphins and belugas, that have previously been

[37] Mullin, K.D., and Fulling, G.L., Abundance of cetaceans in the oceanic northern Gulf of Mexico, 1996-2001, *Marine Mammal Science* 20:787-807 (2004).

[38] See NOAA Cetacean & Sound Mapping "Biologically Important Areas", *available at* http://cetsound.noaa.gov/important.html (last visited on March 10, 2013).

tested;[39] (2) a modeling effort indicating that, when uncertainties and individual variation are accounted for, a significant number of whales could suffer temporary threshold shift beyond 1 km from a seismic source;[40] and (3) studies suggesting that the relationship between temporary and permanent threshold shift may not be as predictable as previously believed.[41]

(3) *Best practices for maintenance and monitoring.*— More generally, BOEM should consider additional "best practices" for safety zone maintenance and monitoring, as set forth in Weir and Dolman (2007) and Parsons et al. (2009).[42]

(b) Mitigating Effects of Overlapping Surveys

BOEM should require separation of seismic vessels to reduce the potential impacts of overlapping sound fields. As NMFS has noted, "the zone of seismic exclusion or influence could be quite large [if seismic operations overlap in time], depending on the number, and the relative proximity of the surveys."[43] It has been observed that the industry usually maintains an established distance between source vessels in order to avoid contaminating their own data. BOEM should prescribe vessel separation out to a conservative distance, reviewing operating plans on a weekly or biweekly basis to ensure conformity with this requirement.

B. Impact and Cumulative Impact Assessment

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[39] Lucke, K., Siebert, U., Lepper, P.A., and Blanchet, M.-A., Temporary shift in masked hearing thresholds in a harbor porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli, *Journal of the Acoustical Society of America* 125: 4060-4070 (2009).

[40] Gedamke, J., Gales, N., and Frydman, S., Assessing risk of baleen whale hearing loss from seismic surveys: The effect of uncertainty and individual variation, *Journal of the Acoustical Society of America* 129:496-506 (2011).

[41] Kastak, D., Mulsow, J., Ghoul, A., Reichmuth, C., Noise-induced permanent threshold shift in a harbor seal [abstract], *Journal of the Acoustical Society of America* 123: 2986 (2008) (sudden, non-linear induction of permanent threshold shift in harbor seal during TTS experiment); Kujawa, S.G., and Liberman, M.C., Adding insult to injury: Cochlear nerve degeneration after "temporary" noise-induced hearing loss, *Journal of Neuroscience* 29: 14077-14085 (2009) (mechanism linking temporary to permanent threshold shift).

[42] Weir, C.R., and Dolman, S.J., Comparative review of the regional marine mammal mitigation guidelines implemented during industrial seismic surveys, and guidance towards a worldwide standard, *Journal of International Wildlife Law and Policy* 10: 1-27 (2007); Parsons, E.C.M., Dolman, S.J., Jasny, M., Rose, N.A., Simmonds, M.P., and Wright, A.J., A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice? *Marine Pollution Bulletin* 58: 643-651 (2009).

[43] NMFS, Biological Opinion: Oil and gas leasing and exploration activities in the U.S. Beaufort and Chukchi Seas, Alaska; and Authorization of Small Takes under the Marine Mammal Protection Act (2008).

Fundamental to satisfying NEPA's requirement of fair and objective review, agencies must ensure the "professional integrity, including scientific integrity," of the discussions and analyses that appear in environmental impact statements. 40 C.F.R. § 1502.24. To this end, they must make every attempt to obtain and disclose data necessary to their analysis. The simple assertion that "no information exists" will not suffice; unless the costs of obtaining the information are exorbitant, NEPA requires that it be obtained. See 40 C.F.R. § 1502.22(a). Agencies are further required to identify their methodologies, indicate when necessary information is incomplete or unavailable, acknowledge scientific disagreement and data gaps, and evaluate indeterminate adverse impacts based upon approaches or methods "generally accepted in the scientific community." 40 C.F.R. §§ 1502.22(2), (4), 1502.24. Such requirements become acutely important in cases where, as here, so much about a program's impacts depend on newly emerging science.

We ask that MMS take note of the following key points in conducting its impact assessment.

(1) New Acoustic Criteria

As you know, NMFS is in the process of fundamentally revising the manner in which it assesses acoustic impacts on marine mammals, from behavioral response and from hearing loss. A revision of the agency's behavioral response criterion in particular is long overdue, having recently been excoriated by a group of well-regarded bioacousticians as "overly simplified, scientifically outdated, and artificially rigid."[44] Indeed, NMFS recently recognized, in its SDEIS for geophysical and geological activities in the Arctic, that its current methods for analyzing behavioral disturbance from sound "oversimplify the relationship between sound exposure and behavioral harassment, and there are other methods available that can better characterize this relationship, given the available data, while also incorporating consideration of variability in individual responses to sound."[45]

The EIS must reflect these new criteria. It makes no sense to base the document's analysis on a method of measuring harassment by sound that, rightly, is on the cusp of obsolescence. More than this, however, given the importance of the threshold for determining whether "small numbers" and other statutory standards have been met, it is imperative that the DEIS incorporate the new threshold, so that the public has an opportunity to comment.

In reconceiving the geographic scale over which impacts are expected to occur, the new acoustic thresholds, like the new data on masking effects described below,

[44] Clark, C., Mann, D., Miller, P., Nowacek, D., and Southall, B., Comments on Arctic Ocean Draft Environmental Impact Statement (Feb. 28, 2012).

[45] NMFS, Supplemental Draft Environmental Impact Statement for Effects of Oil and Gas Activities in the Arctic at 4-14 (2013).

are likely to substantially change the agency's mitigation analysis. Specifically, they are likely to further justify the use of large time-area closures, to require analysis of wider buffer zones around those closure areas than are currently considered in the Atlantic and Arctic DEISs, and to compel further consideration of noise-reduction alternatives and mitigation, such as use of new technology, enforcement of lowest practicable source levels, and elimination of duplicative surveys.

(2) Masking Effects

The exploration activities covered in the EIS will significantly raise local and ambient noise levels within the Gulf of Mexico, masking biologically important sounds and interfering with marine mammal communication. NMFS' recent SDEIS for the Arctic recognizes the significant potential for airguns, sub-bottom profilers, and other industry sources to mask the communication signals of marine mammals –[46] a major and welcome advance over its previous analyses, which seemed to ignore the airgun's property as a mixed impulsive and continuous noise source.[47] Nonetheless, the document, as well as the DEIS that BOEM produced for G&G activities in the Atlantic, contain only a summary, and indeed substantially underestimated, analysis of the impacts of masking, using, for example, a sound pressure level for masking (120 dB) that is several orders of magnitude higher than the point at which masking potentially begins. As the leading recent papers in the field have indicated, masking is a function of natural ambient noise, and *not* NMFS' present 120-dB continuous-noise threshold for behavioral disturbance.[48] .

To further its analysis, we recommend that BOEM utilize the sound exposure maps representing average levels of ambient noise at relevant frequencies and depths, produced as one product of NOAA's important recent Sound Mapping effort. Maps of ambient noise sources associated with G&G activities, including vessels, should be combined, as should noise maps of other activities, including oil and gas development and production. We continue to recommend that NMFS

[46] *E.g.*, Arctic SDEIS at 4-94, 4-121, 4-265, 4-270.

[47] That is the characterization used in Burns, J., Clark, C., Ferguson, M., Moore, S., Ragen, T., Southall, B., and Suydam, R., Expert panel review of monitoring and mitigation protocols in applications for incidental harassment authorizations related to oil and gas exploration, including seismic surveys, in the Chukchi and Beaufort Seas at 10 (2010) (Expert Panel Review 2010); Brower, H., Clark, C.W., Ferguson, M., Gedamke, J., Southall, B., and Suydam, R., Expert panel review of monitoring protocols in applications for incidental harassment authorizations related to oil and gas exploration in the Chukchi and Beaufort Seas, 2011: Statoil and ION Geophysical at 9 (2011) (Expert Panel Review 2011).

[48] *E.g.*, Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., Van Parijs, S.M., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems: intuitions, analysis, and implication, *Marine Ecology Progress Series* 395: 201-222 (2009); Hatch, L.T., Clark, C.W., van Parijs, S.M., Frankel, A.S., and Ponirakis, D.W., Quantifying loss of acoustic communication space for right whales in and around a U.S. National Marine Sanctuary, *Conservation Bio.* 26: 983-994 (2012).

undertake the quantitative analysis pioneered by NOAA and Cornell, through a model representing loss of communication space that has already been applied to shipping noise in the Stellwagen Bank National Marine Sanctuary and, in unpublished work, to seismic airgun noise as well.[49] Alternatively or in addition, we would propose that BOEM convene an expert group, including the authors of the NOAA and Cornell research, to determine proxies for biological significance from increases in average ambient noise.

Finally, we recommend that BOEM acknowledge the costs and limitations of compensation strategies for masking, for those animals that attempt to compensate at all. It is well recognized in the literature that these strategies – which may involve vocalizing more or shifting the frequency of calls – have two major potential drawbacks: first, they may have energetic costs due to the higher metabolic rates needed to produce additional or modified sound; and second, despite the costs, they may not actually be effective at reducing masking effects, even for communication among conspecifics, making the strategy maladaptive.[50] The potential costs of additional vocalization are suggested by a recent NMFS study of bottlenose dolphins, which to our knowledge offers the first empirical measurement of the metabolic cost of sound production in a cetacean species. According to that study, the dolphins' metabolic rate during two minutes of sound production was 20% greater than during an equivalent period of rest, and as many as seven additional minutes of higher metabolic activity ensued before they returned to resting values.[51] BOEM should acknowledge that compensation strategies for masking may provide no mitigative benefit and, indeed, should the strategy require additional energy yet prove ineffectual, could have negative energetic consequences beyond those of masking itself.

(3) Cumulative Impacts

Given the extent of seismic and other industrial activity in the northern Gulf, as well as the long-term stress placed on the ecosystem by the *Deepwater Horizon* spill, it is plain that the agencies must carefully consider cumulative impacts in preparing the EIS. Unfortunately, BOEM's application does not make any attempt at cumulative effects analysis. Optimally, NMFS would translate sublethal takes into impacts on vital rates of individuals and ultimately on populations of Gulf marine mammals. Such an approach is consistent with the 2005 National Research Council report, "Marine Mammal Populations and Ocean

[49] *See* Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., van Parijs, S., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems as a function of anthropogenic sound sources (2009) (IWC Sci. Comm. Doc. SC/61/E10) (initial analysis of communication space loss in baleen whales from a single seismic source and vessel); see also n. XX[2d footnote in this section] *supra*.

[50] *See*, *e.g.*, Wright, A.J., and Highfill, L. eds., Considerations of the effects of noise on marine mammals and other animals, *International J. of Comp. Psychology* 20: 89-316 (2007).

[51] Noren, D.P., Holt, M.M., Dunkin, R.C., and Williams, T.M., The metabolic cost of communicative sound production in bottlenose dolphins (*Tursiops truncates*), *J. Exp. Biol.* 216: 1624-1629 (2013).

Noise," and the means of accomplishing part of the NRC's analysis are now becoming available.[52]

With respect to airguns, the data already show that industry noise can disrupt the biologically significant behavior and shrink the communication range of baleen whales on a region-wide scale. As Dr. Chris Clark (Cornell) postulated in the report of the International Whaling Commission's Scientific Committee, such repeated and persistent acoustic insults over the large areas affected by airgun surveys should be considered enough to cause population-level impacts in at least some species of marine mammals.[53]

We recognize, however, that a complete quantitative analysis, encompassing each of the steps of the NRC's cumulative impacts model, may not yet be possible and that NMFS may need to rely on a more limited analysis based on the best available science. In conducting that analysis, NMFS should conservatively assume (for example) that any substantial decrements in the communication range of Bryde's whales caused by seismic surveys will result in adverse impacts on the stock. A conservative approach is justified given the available data and modeling on other baleen whale species, the potentially extreme vulnerability of the Bryde's whale stock, and the difficulty of obtaining empirical data on population-level impacts on wild marine animals.[54] The impacts of seismic exploration would occur in an already compromised acoustic environment, which should also be taken into account. NMFS should take a similar approach with respect to sperm whales, and likewise consider that any substantial decrement in foraging on that stock will result in adverse population impacts.

In determining whether the proposed activities will have a greater than negligible impact on Gulf species and stocks, NMFS must consider the impacts of other activities and events into its environmental analysis, including non-acoustic impacts from ship-strikes, bycatch and entanglements, the *Deepwater Horizon* oil spill, and other stressors on the same species and populations affected by offshore exploration activities. Most pressingly, NMFS should consider whether the *Deepwater Horizon* spill establishes new baselines for population abundance and prey availability and for the capacity of certain species to withstand additional stressors. For coastal bottlenose dolphin stocks, which remain in the midst of a three-year-long die-off and which are suffering in large percentages from poor body condition and illness, it must be assumed that the population cannot tolerate any additional stress, including impacts on energetics, beyond *de minimus*.

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[52] National Research Council (NRC), *Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects* (2005).

[53] IWC Scientific Committee, Report of the 2004 Scientific Committee of the International Whaling Commission, Annex K: Report of the Standing Working Group on Environmental Concerns (2004).

[54] *See*, *e.g.*, Taylor, B.L., Martinez, M., Gerrodette, T., and Barlow, J., Lessons from monitoring trends in abundance of marine mammals, *Marine Mammal Science* 23: 157-175 (2007).

Finally, the agencies must consider impacts in the context of other ongoing, reasonably foreseeable activities in the Gulf of Mexico. This includes seismic exploration activities undertaken wholly in state waters, which expressly fall outside the scope of the EIS (78 Fed. Reg. 27427, 27429), as well as seismic exploration conducted under Mexican jurisdiction, which we believe may be considerable.[55] The cumulative analysis must also include explosive removal of oil and gas structures, which were predicted in previous NEPA reviews to run as high as 100 per year; other activities associated with oil and gas exploration and development that produce noise, including vessel and thruster noise; military activities, such as precision airstrike activities and vessel sonar testing which occur in the Gulf, particularly off the coast of Florida; and non-BOEM regulated activities (i.e. marine transportation, fishing, etc).

(4) Population status of Bryde's whales

It is imperative that the agencies determine the population structure of Gulf Bryde's whales before finalizing the EIS.

NMFS' December 2012 stock assessment puts the number of Bryde's whales left in the Gulf at fewer than 50 individuals –[56] a number that would leave it highly vulnerable, particularly if it constitutes a resident population as several studies have suggested.[57] The stock assessment notes that additional genetic, morphological, and/or behavioral data are needed to provide further information on stock delineation from Atlantic Bryde's whales. This information is critical not only because of the extremely small size of the stock, but because of the whales' reliable occurrence in the DeSoto Canyon, an area of interest for oil and gas exploration and production.

It is our understanding that NMFS' Southeast Regional Science Center has analyzed DNA samples of Gulf Bryde's and, to a lesser extent, of Atlantic Bryde's whales, and is producing one or more technical papers on the Gulf stock's genetics. Investigators believe that samples from the Gulf are probably sufficient in number and data quality to make findings about delineation, but that more samples from Atlantic Bryde's whales must be analyzed before conclusions can be drawn. The next step for genetic research therefore requires expanding the available dataset on Atlantic Bryde's whales, by locating samples in archives in

[55] Pers. comm., C. Clark (June 2013).

[56] Waring, G.T., Josephson, E., Maze-Foley, K.M., and Rosel, P.E., eds., U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2012, at 121(2013).

[57] Mead, J.G., Records of sei and Bryde's whales from the Atlantic coast of the United States, the Gulf of Mexico, and the Caribbean, *Reports of the International Whaling Commission Special Issue* 1:113-116 (1977); Schmidly, D.J., Marine mammals of the southeastern United States and the Gulf of Mexico, (1981) (Report No. FWS/OBS-80/41); Jefferson, T.A., and Schiro, A.J., Distribution of cetaceans in the offshore Gulf of Mexico, *Mammal Review* 27:27-50 (1997).

the U.S. and abroad (since the whales are not known to occur in high densities in the northwest Atlantic), and either obtaining those samples or working with other researchers to run the genetics.

Both the MMPA and NEPA require the agencies to obtain these genetic data. Under the MMPA, NMFS must affirmatively find that the covered activities will have no more than a negligible impact of a species or stock. 16 U.S.C. §§ 1371(a)(5)(A)(i), (D)(i)(I). Clearly information on Bryde's whale stock structure is essential to NMFS' analysis, since its ability to make a negligible impact finding depends significantly on whether the whales constitute a small, demographically discrete population of animals. Under NEPA, which NMFS must satisfy in issuing an MMPA authorization, the agency must obtain and disclose any information necessary to its analysis of environmental impacts or alternatives, unless the costs of doing so are exorbitant. 40 C.F.R. § 1502.22(a). Similar responsibilities apply to BOEM pursuant to OCSLA.

We therefore urge the agencies to conduct the comparative genetics, or else determine that the Atlantic population samples available in U.S. and foreign archives are not sufficient for any meaningful analysis. If the issue remains unresolved, BOEM and NMFS must follow the delineation indicated in the most recent stock assessment, and proceed on the assumption that Bryde's whales constitute a distinct stock.[58] Among other things, this will require NMFS, in issuing an authorization, to adopt whatever mitigation is necessary to reduce impacts on the Gulf's small Bryde's stock below the allowable threshold.

(5) Higher-Frequency Sources

The industry employs a variety of acoustic sources, apart from airguns, to characterize the seafloor and subsurface, such as lower and higher-energy sub-bottom profilers known respectively as "chirps" and "boomers," sonars, and multibeam echosounders. Sub-bottom profilers are of concern due to their moderately high energy output at relatively low frequencies; but multibeam echosounders also require careful consideration given their very high amplitude, their use of frequencies not far above the controversial hull-based, mid-frequency sonars employed by navies, and the complex sound fields they generate through their multiple beams.

It is worth noting that the methodology of BOEM's recent Arctic SDEIS discounts the impacts of higher-frequency sources by effectively subsuming them under airguns. Since the document measures acoustic impacts according to the amount of habitat that would be ensonified by industry activities, far-propagating low-frequency sources are its main determinant of significance. But higher-frequency sources like multibeam echosounders pose a serious acute risk to

[58] Waring *et al.*, U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments at 120.

marine mammals, particularly to mid- and high-frequency odontocetes, which have high acoustic sensitivity to the frequencies they produce. If these sources displace marine mammals outside their normal habitat, they could be exposed to environmental conditions that they cannot sustain. BOEM should properly analyze the potential harm resulting from these other sources of noise.

III. CONCLUSION

We appreciate the opportunity to discuss these issues with you and your staff. For further discussion, please do not hesitate to contact Michael Jasny (mjasny@nrdc.org).

Very truly yours,

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