Good evening, My name is Dr. Aaron Richardet. I am an executive board member of the Caper Fear chapter of Surfrider. I am here representing myself, my family and the over 1200 engaged local Surfrider members. Cape Fear Surfrider is part of an activist organization of over 250,000 members.

Seismic testing for natural oil and gas comes at a great price to the local marine life that live in our coastal waters. The auditory assault from seismic surveys has been found to damage or kill fish eggs and larvae and to impair the hearing and health of fish and marine mammals, making them vulnerable to predators and leaving them unable to locate prey or mates or communicate with each other. These disturbances can disrupt and displace important migratory patterns, pushing marine life away from suitable habitats like nurseries and foraging, mating, spawning, and migratory corridors. In addition, seismic surveys have been implicated in whale beaching and stranding incidents.

The threats to marine mammals, sea turtles, fish populations, archeological resources, reduction of recreational fishing areas, and endangerment to our beaches out weigh any short term benefits gained by the G&G activities. The North Carolina coast supports a $2.6 billion tourism and travel industry with 40,000 jobs, and a $116 million commercial and recreational fisheries industry with 27,000 jobs. In North Carolina we rely on clean and healthy off shore and near shore environments. It is our business and our way of life.

As a surfer there is a magical moment that happens on the oceans surf zones when you look over in the surf line up and you find yourself catching waves with dolphins, the worlds greatest surfers. They are out there just like us for pure enjoyment of the oceans waves. Once you have this moment happen and you feel

this connection you are changed forever, and you know you must protect your fellow surfers.

Our ocean is one of the greatest treasures that our children hold us responsible for protecting for future generations, and we along with millions of other Americans are willing to do what it takes to protect this gift. The Cape Fear Sufrider Foundation urges the Bureau of Ocean Energy Management to adopt "Alternative C"—No action for oil and gas production, status quo for renewable energy and marine mineral G&G activity. It's the best policy for our environment and our economy.

by petitioners Natural gas is as natural as the coal and oil

Delaware Chapter of the Sierra Club
100 West 10th Street, Suite 106
Wilmington, DE 19801

April 26, 2012

Mr. Gary D. Goeke
Chief, Regional Assessment Section
Office of Environment (MS 5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123–2394

Comments on Draft Programmatic Environmental Impact Statement (PEIS)
Atlantic Geological and Geophysical (G&G) Activities
Public Hearing: Wilmington, Delaware

Dear Mr. Goeke,

The Delaware Chapter of the Sierra Club opposes high intensity seismic testing of the Atlantic Continental shelf for oil and gas exploration. This action would place the nation as a whole, the State of Delaware, and the ocean's aquatic biodiversity at risk; a risk that we assert is too dangerous for us to take.

We are at a crossroads in our nation's energy policy, with tremendous opportunities to develop renewable energy resources that can provide energy to our nation without the devastating pollution and climate impacts of fossil fuels (Komor, 2004; Nye, 2001; Scheer, 2007; Tertzakian and Hollihan, 2009). Pursuit of the development of offshore oil and gas exploration diverts us from the needed task at hand.

Climate change poses serious risks to the State of Delaware. With miles of coastline and large-expanses of low-lying areas, Delaware is particularly vulnerable to the impacts of climate change (Frumhoff et al., 2007; Karl, Melillo and Peterson, 2009; Titus et al., 2009). The nation's continued commitment to developing fossil-based energy resources places the State of Delaware at a disproportionate risk of sea level rise.

The lesson of the Deepwater Horizon's oil spill in the Gulf of Mexico two years ago should inspire caution about the development of offshore oil and gas (Ladd, 2012; Mascarelli, 2012; Skogdalen and Vinnem, 2012; Sumaila et al., 2012). Delaware's coastal and aquatic resources provide tremendous value to our state (DNREC, 2004; Kauffman et al., 2011), which would be harmed in the case of an oil spill. Deepwater Horizon has proven the risks of such activities.

High intensity seismic testing itself places wildlife at risk. The Draft PEIS claims that these risks are moderate, minor or negligible, though we disagree. Acoustic pollution has been demonstrated to cause significant impacts on aquatic life. Declarations of the safety of the proposed high-intensity seismic testing, such as those asserted in the Draft PEIS, have not been proven in peer-reviewed scientific literature (Parsons et al., 2009; Popper et al., 2005; Slabbekoorn et al., 2010; Weilgart, 2007).

A tremendous proportion of aquatic life depends upon the continental shelves for foraging, habitat and reproduction. Seismic testing places not only endangered whales and sea turtles directly at risk with noise pollution, but it also threatens the multitude of species for which life within the aquatic environment depends.

We ask that the Bureau of Ocean and Energy Management protect the State of Delaware and the marine environment upon which we depend by prohibiting seismic testing and offshore oil and gas development in the Atlantic coastal region.

Thank you,

Amy Roe.

Amy Roe, Ph.D.
Energy and Environmental Policy
Sierra Club
Delaware Chapter
Conservation Chair

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International Fund for Animal Welfare

IFAW
www.ifaw.org

May 21, 2012

Mr. Gary D. Goeke, Chief
Regional Assessment Section
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Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
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Re: Bureau of Ocean Energy Management (BOEM) Geological and Geophysical Exploration on the Atlantic Outer Continental Shelf (OCS) Notice of Availability of a Draft Programmatic Environmental Impact Statement (PEIS)

Dear Mr. Gary Goeke,

On behalf of the International Fund for Animal Welfare (IFAW) and its 2 million supporters I request that the agency reject Alternatives A and B which would allow for geological and geophysical (G&G) survey activities in Federal waters Mid- and South Atlantic Outer Continental Shelf and in State waters. IFAW's U.S. whale program and marine mammal research and rescue team activities are centered on conservation and welfare considerations of North Atlantic Right Whales and other key species. With this focus we have worked hard to help support ocean research and regulations including acoustic buoy hydrophone monitoring, entanglement and stranding research and response, the ship strike rule, ship reporting requirements, and the Atlantic Large Whale Take Reduction Plan. While these actions have been crucial to the recovery of right whales and other cetaceans, the North Atlantic right whale has yet to show significant recovery and therefore a more pre-cautionary approach is warranted.

I. Status of North Atlantic Right Whales

The North Atlantic right whale, despite its small population size, is one of the better studied species of great whales. However, our understanding of the biology and population demographics is a result of concerted efforts to protect this species that has been dangling on the brink of extinction. NOAA Fisheries' 2010 stock assessment, based on 2009 data, estimated a minimum of 361 individuals in the population.[1] Whereas the Right Whale Consortium report card, using 2010 data, made a minimum estimate of only 268 with a best estimate of 490 individuals.[2] The stock assessment numbers have shown a gradual increasing trend starting with fewer than 300 individuals in the early 1990s to over 400 today, but despite this upward trend recovery has been very slow.[3] Since 2001, calving has been relatively stable around 20 to 30 new calves each year,[4] however, this winter has been exceptionally poor with only 6 new calves sighted for the season.[5]

Critical habitat has been established under the Endangered Species Act off the coast of New England and the coasts of Florida and Georgia. The critical habitat off the southeast coast of the United States, which would be affected by the proposed actions, is of particular concern due to its importance as the single known calving range for North Atlantic right whales.

II. Impacts of Proposed Actions on the North Atlantic Right Whale and other Endangered Marine Mammals

IFAW believes that at "present the full animal welfare, biological and conservation implications of ocean noise pollution are unknown. What evidence we do have indicates that, at very least, noise has serious welfare implications for marine mammals and at worst the potential to disrupt entire ecosystems… It is essential that precautionary measures are introduced without delay to reduce man-made ocean noise and to mitigate its effects."[6]

Marine mammals have very sensitive hearing and complex methods of communication used for navigation, communication, group cohesion and finding food. In the underwater environment where light quickly deteriorates, hearing is the primary sensory device. Noise pollution from anthropogenic activities interferes with normal communication and behaviors, and can permanently damage hearing or even kill these animals. The blue whale's acoustic range has been reduced by nine-tenths as a result of increased ambient noise in the ocean, humpbacks are known to alter their song, a key component to mating, in response to noise, and in the Sakhalin Island gray whales have been seen to alter their foraging behavior during seismic surveys with resultant evidence of under-nourishment. For baleen whales, of which there are 5 species in this region of the Arctic, the impact is of particular concern because the frequency band used for communication has significant overlap with the noise frequencies produced by shipping and

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[1] NOAA Fisheries. 2010. North Atlantic Right Whale (*Eubalaena glacialis*) Western Atlantic Stock. 2010 Marine Mammal Stock Assessment Report. www.nmfs.noaa.gov/pr/pdfs/sars/ao2010whnr-w.pdf
[2] 2011. North Atlantic Right Whale Consortium 2011 Annual Report Card.
[3] Ibid.
[4] NOAA Fisheries. 2010. North Atlantic Right Whale (*Eubalaena glacialis*) Western Atlantic Stock. 2010 Marine Mammal Stock Assessment Report. www.nmfs.noaa.gov/pr/pdfs/sars/ao2010whnr-w.pdf
[5] Comments of Clay George, Georgia Department of Natural Resources.
[6] IFAW. 2008. *Ocean Noise: Turn it down – A report on ocean noise pollution.*

airguns. Even at low levels ocean noise can increase stress levels in marine animals, negatively impacting their immune systems and reproductive success.[7]

Airguns used for seismic surveys are the biggest concern topping out with peak noise levels of 259dB. Marine animals have been recorded fleeing survey areas, not surprising considering the level of noise and the repeated nature of airgun blasts in these surveys. Displacement from habitat is a major concern that could impact feeding, breeding and calving success of large portions of sensitive marine mammal populations. In the areas of oil and gas development off Sakhalin Island whales were recorded leaving their feeding areas during surveys only to return days after the surveys stopped, a clear indicator of habitat displacement. However, the greater threat is that with prolonged seismic surveys this displacement might become permanent.[8]

Despite ongoing efforts of the Atlantic Large Whale Take Reduction Team to reduce entanglements, and government and NGO efforts to regulate shipping to minimize ship collisions, the annual take of North Atlantic right whales remains above Potential Biological Removal (PBR). PBR as reported in the 2010 Stock Assessment Report (SAR) is 0.7 and the minimum rate of human-caused serious injury and mortality from 2004 through 2008 averaged 2.8 per year (0.8 per year from fishery interactions and 2.0 per year from vessel strikes).[9] As not all carcasses are detected or retrieved for necropsy, the SARs acknowledge that this represents a minimal record of mortality and serious injury to these species. Increasing development of offshore oil and gas along the Mid- and South Atlantic coasts poses a serious threat to the North Atlantic right whale population regardless of mitigation measures and closures. Until greater success is achieved by entanglement and ship strike risk reduction measures further actions that could negatively impact the species must be avoided.

IFAW appreciates the efforts the agency has made to include appropriate mitigation measures within the proposed alternatives, and applauds the inclusion of passive acoustic monitoring in Alternative B, however we cannot support the proposed actions due to the estimated level of incidental take. The draft PEIS models predict Alternatives A and B could result in Level A incidental take of up to 2 right whales per year, and Level B incidental take of up to 476 individuals per year.[10] Due to the precarious status of this species and proximity to crucial calving grounds this level of impact whether causing serious injury or mortality or behavioral harassment comes at too high a cost. This is especially true when considering fishing and shipping activities that are already highly regulated fail to achieve take levels below PBR.

Other endangered marine mammals are also at risk. This past winter, the Virginia Aquarium documented an increased number of young humpbacks in the waters off Virginia, and the Gulf of Maine population is known to migrate through the area of proposed exploration. According to the 2010 SAR for the Gulf of Maine humpback population, PBR is 1.1 whereas the minimum estimate for serious injury and mortality from 2004 to 2008 averaged 4.6 per year (3.0 per year

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[7] IFAW. 2008. *Ocean Noise: Turn it down – A report on ocean noise pollution.*
[8] Ibid.
[9] NOAA Fisheries. 2010. North Atlantic Right Whale (*Eubalaena glacialis*) Western Atlantic Stock. November 2010 Marine Mammal Stock Assessment Report. www.nmfs.noaa.gov/pr/pdfs/sars/ao2010whnr-w.pdf
[10] BOEM. 2012. Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas – Draft Programmatic Environmental Impact Statement. Vol 1: Chapters 1-8.

from fishery interactions and 1.6 per year from vessel strikes).[11] Incidental take is already 4 times greater than PBR and yet the agency finds it acceptable to propose actions that could result in Level A incidental take of up to 12 additional humpbacks each year, and Level B take of up to 1,131 individuals per year.[12]

Additionally, the draft PEIS estimates Level A combined annual incidental take of up 32,367 for bottlenose dolphins, short-beaked common dolphins, Atlantic spotted dolphins, short-finned pilot whales, and striped dolphins.[13]

III. Conclusion

IFAW does not find the level of impact as discussed above acceptable, and therefore cannot support Alternative A or B. Until impacts of anthropogenic ocean noise on marine mammals is better understood, and appropriate mitigation measures or new technologies are developed offshore exploration and development should not move forward. Alternative C, no action, is the only reasonable option that will prevent undo harm to these endangered marine mammals.

Sincerely,

Beth Allgood
Campaigns Manager
International Fund for Animal Welfare
1350 Connecticut Ave NW, Suite 1220
Washington, DC 20036 USA

[11] NOAA Fisheries. 2010. Humpback Whale (*Megaptera novaeangliae*) Gulf of Maine Stock. November 2010 Marine Mammal Stock Assessment Report. http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2010whhb-gme.pdf
[12] BOEM. 2012. Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas – Draft Programmatic Environmental Impact Statement. Vol 1: Chapters 1-8.
[13] Ibid.

4.25.12
Wilmington, NC
Re: Comments on the Draft PEIS for Atlantic G&G Activities

To Mr. Gary D. Goeke,

Thank you for the opportunity to make comments today regarding the Draft PEIS for Atlantic Geological and Geophysical activities on behalf of 22,000 Sierra Club members and supporters here in North Carolina.

We believe, unequivocally, that seismic surveying for oil and gas off the Atlantic Coast will harm marine life and fisheries, and will not solve our energy problems. The people of North Carolina will be much better served if the Administration stops allocating time and resources toward oil and gas exploration, and instead focuses on the development of clean, renewable, and significantly less-invasive offshore wind farms.

While the oil and gas industries may want the public to believe that offshore drilling can be done in an environmentally sensitive manner, we know that is not the case.

The Sierra Club stands opposed to seismic testing in its own right, but also as the first step in a series of processes that, collectively, wreak havoc on the environment and public health at every step: from the seismic testing which this Draft EIS specifically addresses; to potential blowouts during drilling as we saw with the BP Deepwater Horizon disaster; to explosions during the refinery process as we saw last month in Memphis; to massive spills during transportation as we saw with the Exxon Valdez; to the millions of tons of carbon dioxide and thousands of tons of particulate matter that combustion creates every day.

As this Administration well knows, seismic testing has serious impacts on marine species. Compressed air exploding under water every second for days, weeks, even months at a time destroys whales' ability to communicate, disrupting their feeding, migration, and breeding patterns. Here in North Carolina, Right, Sperm, Humpback, Pilot, and Finback whales and Risso's, Bottlenose, short-beaked, and Atlantic spotted Dolphins all migrate through the waters off our coast. By this Department's own estimations, seismic exploration would injure up to 138,500 marine mammals and seriously disrupt their vital, daily activities. There are only about 400 north Atlantic Right Whales left in the world, and, under the current proposal, seismic testing could take place right on the edge of known calving grounds, filling it with disruptive blasts that can travel for hundreds to thousands of miles.

Loggerhead, Green, Leatherback, and even Kemp's Ridley Sea Turtles, also migrate through and build nests along our coast. The impact of seismic testing on sea turtles is not as well documented as on marine mammals, but turtles are certainly able to hear noise and, and their predator avoidance instincts depend on their ability to detect tiny changes in vibrations underwater, which would undoubtedly be overwhelmed by seismic testing blasts. Air gun blasts have also been documented to displace commercial fisheries thousands of square miles from where the tests occurred. Fishermen in parts of the world where seismic testing is occurring have already begun to seek compensation for their losses.

1PM

We recognize the Administration's desire to develop secure and domestic sources of energy, but seismic testing for offshore oil and gas that could ultimately lead to drilling off North Carolina's coast is not the answer. North Carolina has the best offshore wind resources of any state on the East Coast, and a shift in the focus of this Bureau from dirty, harmful, and non-renewable fossil fuels toward clean, abundant, and renewable alternatives is not only prudent but environmentally and economically beneficial. Where offshore seismic testing and drilling for oil and gas would put tourism, fishing jobs, and our delicate marine ecosystem at risk, offshore wind development would create thousands of permanent jobs, reduce pollution, and even benefit ocean life through artificial reef creation.

For the members and supporters of the Sierra Club, the choice is clear. We want offshore wind, not offshore drilling, here in North Carolina, and we call on the Administration to choose Alternative C, the "no action" alternative, keeping harmful seismic testing operations away from our coast, and maintaining the moratorium on East Coast offshore drilling.

Thank you again for the opportunity to submit these comments.

Sincerely,

Carina Barnett-Loro

Carina Barnett-Loro
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U.S. Department of the Interior
Bureau of Ocean Energy Management

BOEM
Bureau of Ocean Energy Management

Public Meetings for the Draft Programmatic Environmental Impact Statement for Proposed Geological and Geophysical Activities in the Mid- and South Atlantic Planning Areas

COMMENT SHEET

Comments: PLEASE PRINT

We need to have this Geological & Geophysical data Activity to commense As SOON as possible to ensure that from over 35 yrs ago, of suspected oil or Natural gas Deposits, are still in the areas that are planned - North, MID, & South Atlantic areas, To update old data using state-of-art technology to find the Natural gas Deposits & further energy exploratory means possible for Development of this country's, The United States of America, use of oil & natural gas resources that will develop thousands of jobs, create better opportunities for millions of people seeking this type of vest & productive careers; Create wider studies in science areas that can have effective scholarship programs for college bound students wanting to be endeavored into this field of study, and to have this country's own Natural gas for the future generations of the United States of America to NOT be dependent on ANY MORE FOREIGN oil - To insure the security of this NATION and retain what our FOUNDING FATHERS of this Nation wanted for ALL AMERICANS.

Name: CARlene CARMEN, SFC (Ret.)
Title: legislative Committee Chairperson
Organization: Carolina Patriots
Address: 3395 Potts TRAIL
City, State, & Zip Code: CONWAY, SC 29526

Comments are not limited to the space on this sheet. Please feel free to add additional sheets if necessary.

April 24, 2012

Public Comments #7

Hello and thank you for the opportunity to comment. My name is Cathy Malina, and I am an associate attorney with the Southern Environmental Law Center in Charlottesville, VA. As my colleague Deborah Murray just stated, SELC opposes seismic activities in the Mid & South Atlantic.

To offer a regional perspective for my colleagues comments, in four coastal states of the South Atlantic — Virginia, North Carolina, South Carolina, and Georgia — more than 36,000 jobs are supported by the seafood industry, and more than 29,000 jobs are supported by the recreational fishing industry. Together these two industries, which depend on healthy fisheries and coastal environments, generate more than 6.5 billion dollars in sales annually. Seismic exploration would jeopardize the regional economy if these resources are harmed.

In addition to adverse effects on fisheries, noise from seismic surveying can also harm sea turtles, and additional vessel traffic presents an increased risk of ship strikes. Species of sea turtles that live and migrate through the Atlantic include a number that are listed as federally endangered, including the Loggerhead & Leatherback sea turtles. These animals respond negatively to noise, and there is concern that →

→ intense noise may drive them and other species to the surface, where they are more vulnerable to the hazards of ship strikes, predation, and fishing. Further, because of their swimming habits, and the amount of time they spend underwater, sea turtles could be exposed to the highest levels of sound.

These harms and the harms outlined by my colleague in her earlier comments, show that the Administration should keep dangerous oil and gas exploration off our coasts and look instead to clean, renewable energy sources such as offshore wind. Thank you again for the opportunity to speak.

24 April 2012

My name is Deborah Murray. I am an attorney with the Southern Environmental Law Center. The Southern Environmental Law Center is a regional organization, and we have worked for over 25 years to protect the coastal resources of Virginia, the Carolinas, Georgia, and Alabama. We oppose the administration's plans to allow seismic exploration for oil and gas ~~on the~~ because of the harm to marine ~~mammal~~ animals, and the environment, and the threat to our fisheries and coastal economies.

¶ The potential risks from seismic surveys are tremendous. As one example, the air guns that industry uses to search for oil and gas release blasts of compressed air into the water every 10 seconds for days, weeks, and even months on end. The noise from these blasts is extremely loud. Imagine living next door to a site where dynamite blasts occur every few seconds.

~~Whales and other~~

The noise from the airguns is loud enough to mask whale calls over thousands of miles, destroying

the whales' ability to communicate and to breed, and potentially forcing them to abandon large expanses of ocean -- as ~~as much as~~ much as 100,000 square miles. These air gun blasts can cause injury, hearing loss, and death to animals in closer proximity.

The endangered North Atlantic Right whale is particularly vulnerable. As the slide showed, the whale calves off the coasts of Georgia and Florida and migrates up and down the Atlantic Coast. This species is virtually, rather it is on the brink of extinction, with a population of only about 300 to 400 individuals left.

Use of seismic air guns also threaten the fish and fisheries of the Atlantic. Air guns have been shown to displace commercial species of fish over thousands of square kilometers, dramatically reducing catch rates.

Commercial and recreational fishing off just the coast of Virginia generates more than $1.7 billion in commercial fishing sales in Virginia and nearly $580 million in recreational fishing

~~sales~~ sales in Virginia annually, and commercial sales support over 24,000 jobs.

We are opposed to the Administration's plans to conduct seismic exploration not only because of the ~~addition~~ environmental impacts but also because it is the first step toward allowing offshore oil and gas development.

~~The answer is not to greenlight seismic exploration or to open~~

The Administration should instead direct its efforts toward increasing fuel efficiency standards for cars, which will reduce the demand for oil, and save consumers money, and to continue to develop renewable, alternative ~~or~~ energy sources.

We are not going to be able to drill our way to lower gas prices. According to the U.S. Energy Information Agency, even if we were to fully develop all of the recoverable offshore oil reserves found anywhere off our coasts in the U.S, that would only lower prices at the pump by three cents, and even that would take ~~only~~ 20 years to do.

We urge the Administration to adopt alternative C. Thank you for the opportunity

CITIZENS
FOR SOUND
CONSERVATION

Improving South Carolina's Environmental and Economic Quality of Life

April 20, 2012

Re: "Comments on the Draft PEIS for Atlantic G&G Activities"

Mr. Gary D. Goeke, Chief, Regional Assessment Section
Office of Environment (MS5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCR Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Dear Mr. Goeke,

I write today on behalf of Citizens for Sound Conservation to voice our strong support for the proposed G&G activities off the Atlantic Outer Continental Shelf (OCS). As an organization dedicated to promoting an appropriate balance between economic growth and responsible usage of our natural resources, we don't take this issue lightly. Our supporters include a wide variety of business interests who have studied this issue and believe that seismic studies and associated G&G activities can be done safely and are a prudent first step towards improving our economy and increasing our energy independence.

According to government sources, there are at least 86 billion barrels of oil and 420 trillion cubic feet of natural gas technically recoverable from our federal offshore areas – of that amount it is estimated 3.3 billion barrels of oil and 31 trillion cubic feet of natural gas is off the Atlantic Coast. Given today's volatile energy prices, economic stagnation and high unemployment rate, our supporters believe access to these domestic energy supplies is essential – provided our coastal environment is protected to the maximum extent possible.

Beyond these estimates, the simple fact is that we really don't know how much energy is off the Atlantic seaboard as these estimates are based mostly on data from over 25 years ago. A lot has changed over that period – particularly technology. As you are aware, original surveys of Alaska's Prudhoe Bay put recoverable oil estimates at 9 billion barrels. New survey and production techniques have helped support the recovery of 16 billion barrels of oil to date. Oil estimates in the Central and Western Gulf of Mexico have increased by 400% while natural gas resource estimates have more than doubled due to new technology.

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CitizensForSoundConservation.org • info@citizensforsoundconservation.org

We need as much information as possible about Atlantic OCS energy reserves so we can make intelligent decisions about our nation's energy future. The seismic surveys proposed are key to those decisions. New seismic survey techniques can give producers a vastly more detailed accounting of OCS resources – and it can be done safely. The knowledge gained is imperative in order to have a comprehensive debate over whether to allow further exploration and drilling that could result in hundreds of thousands of new jobs and dramatic increases in domestically produced energy.

As we all know though, without these new seismic studies there will be no leasing. And without leasing there will be no drilling. And without drilling there will be no development and thus no potential for the additional jobs and revenue that offshore oil and natural gas development can bring.

It's encouraging to see the federal government start to move this process forward and recognize the need for our nation to begin utilizing more domestic energy resources. The studies and activities discussed here today are a necessary first step towards creating a more secure country through a comprehensive and rational energy policy. For these reasons we ask that you move forward with the proposed plan.

Thank you for your time and consideration.

Sincerely,

Denver Merrill
Executive Director

#1

Good afternoon. My name is Eileen Levandoski. I am the Virginia Conservation Program Manager with the Sierra Club and I am a resident of Virginia Beach.

This seismic study is completely unnecessary when it comes to supporting Virginia's offshore wind development. Such geological and geophysical studies are already covered by the programmatic Environmental Assessment that BOEM has already approved for the mid-Atlantic wind energy areas which includes Virginia.

Secretary of Interior Salazar and others contend that seismic testing will not only reveal how much oil and gas may be on the outer continental shelf, but will also benefit research for the offshore wind industry. However, it's "dynamite vs. a hammer" when comparing the level of seismic study necessary for oil and gas vs. that for offshore wind.

The oil and gas industry wants to know what is hundreds and thousands of feet below the sea floor; to get information from that far below the ground, they use extremely loud air guns. But the renewables industry only wants to know what's on the seafloor and just below it, so they use echo-sounders and sub-bottom profilers that are generally many orders of magnitude quieter than air guns.

The difference is on the order of 250+ decibels (for air guns) vs. 200 decibels (for sub-bottom profilers and echosounders). That's a huge gap, since intensity goes up 10 times for every 10 decibels you gain. Not to mention that airguns put out broadband sound, potentially affecting everything in the ocean that can hear, while the sources used by the renewables industry are limited to a small part of the frequency spectrum.

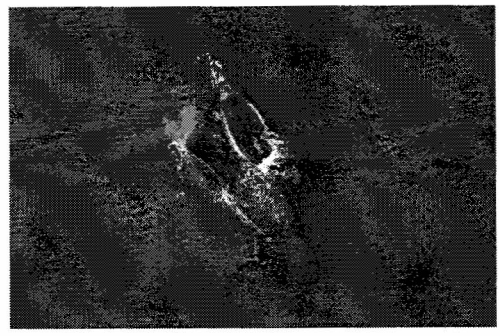
Harming our wildlife and our fishing and tourism industries to explore for oil and gas is also unnecessary since we don't want drilling to go forward in any case. Almost two thousand Virginians participated in Hands Across the Sand to speak out against drilling off our Virginia coast. Our coastal environment is too precious to risk with any drilling-related activity. While the Gulf and its people are today still reeling from the BP gulf oil spill disaster, other spills have since occurred off the coast of Scotland in the North Sea and off the Brazilian coast. The risk continues to be real and formidable. Why even kick off the process with exploration?

Harmful seismic studies aren't needed for offshore wind development, a clean energy source we can all support. The Sierra Club is ready to join BOEM to help power America with clean renewable energy, but we won't accept offshore drilling off Virginia, and we won't accept putting our marine life at risk from seismic surveys.

Tell the Dept. of Interior "NO" to dangerous offshore seismic exploration!

Tues., April 24, 2012, 1pm and 7pm
Hilton Norfolk Airport, 1500 N. Military Hwy., Norfolk, VA

DOI's Bureau of Ocean Energy Management is conducting public hearings regarding its draft seismic exploration plan. This plan calls for seismic surveys intended to reveal locations of oil and gas deposits below the ocean floor. It's a first step towards drilling offshore that we don't want in the first place, and it threatens serious harm to our marine life.



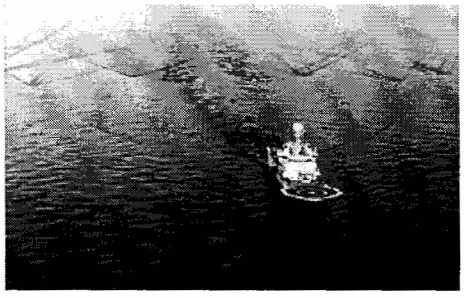
Seismic activity will have an affect on the extremely endangered Right While - only about 400 of which are left in this world.

To search for oil and gas, the industry uses arrays of airguns, which release intense blasts of compressed air into the water every 10 seconds for days, weeks and months on end. They repeatedly comb over vast areas of ocean – areas the size of Rhode Island around a single array.

This activity has a huge environmental footprint. Airgun noise is loud enough to mask whale calls over thousands of miles, destroying their capacity to communicate and breed. It can drive whales to abandon their habitat and cease foraging. Closer to the noise, it can cause hearing loss, injury and death.

According to the administration's estimates, seismic exploration would injure up to 138,500 marine mammals and disrupt marine mammal feeding, calving, breeding, and other vital activities more than 13.5 million times over the course of the proposed eight years of exploration.

Airguns have been shown to displace commercial species 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. Commercial and recreational fishing off the Atlantic from Maryland south generate $11.8 billion annually and support 222,000 jobs. Fishermen in some parts of the world where seismic testing is already occurring are seeking industry compensation for their losses.



Airgun noise is loud enough to mask whale calls over thousands of miles, destroying their capacity to communicate and breed.

Green-lighting seismic also poses threats to the $20 million whale-watching industry in the mid- to SE Atlantic. And if the administration takes the next step by opening the coast to oil and gas drilling, the entire $23 billion coastal tourism and recreational industries are at risk.

Harming our wildlife and our fishing and tourism industries to explore for oil and gas is foolish and unnecessary since we don't want drilling to go forward in any case. Our coastal environment is too precious to risk with any drilling-related activity. While the Gulf and its people are today still reeling from the BP gulf oil spill disaster, other spills have since occurred off the coast of Scotland in the North Sea and off the Brazilian coast. The risk continues to be real and formidable. Why even kick off the process with exploration?

Harmful seismic studies aren't needed for offshore wind development, a clean energy source we can all support. Tell the Interior Department we're ready to help power America, but we won't accept offshore drilling off Virginia, and we won't put our marine life at risk from seismic surveys.

For more info, contact Eileen.Levandoski@SierraClub.org or visit vasierraclub.org.

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SURFRIDER FOUNDATION
CAPE FEAR CHAPTER

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April 27, 2012

Mr. Gary D. Goeke Chief, Regional Assessment Section
Office of Environment (MS 5410), Bureau of Ocean Energy Management, Gulf of Mexico OCS Region,
1201 Elmwood Park Boulevard, New Orleans, Louisiana 70123-2394

RE: Comments on the Draft PEIS for Atlantic G&G Activities

Dear Sir,

The purpose of this letter is to provide official written comment regarding the draft PEIS for Atlantic Geological & Geophysical (G&G) Activities from the Cape Fear Chapter of the Surfrider Foundation. The Cape Fear Surfrider Foundation locally has over 1200 engaged volunteers and is part of an international activist network with over 250,000 members worldwide and 82 chapters throughout the US. Our mission is the protection and enjoyment of oceans waves and beaches through a powerful activist network. The Cape Fear Surfrider Foundation is in support of Alternative C- No action for oil and gas production, status quo for renewable energy and marine mineral G&G activity.

The threats to marine mammals, sea turtles, fish populations, archeological resources, reduction of recreational fishing areas, and endangerment to our beaches out way any short term benefits gained by the G&G activities. The North Carolina coast supports a $2.6 billion tourism and travel industry with 40,000 jobs, and a $116 million commercial and recreational fisheries industry with 27,000 jobs. In North Carolina we rely on clean and healthy off shore and near shore environments. It is our business and our way of life.

The Cape Fear Surfrider Foundation urges the Bureau of Ocean Energy Management to adopt "Alternative C". It's the best policy for our environment and our economy.

Sincerely,

Ethan Crouch
Cape Fear Surfrider Foundation

#4

U.S. Department of the Interior
Bureau of Ocean Energy Management

BOEM
Bureau of Ocean Energy Management

Public Meetings for the Draft Programmatic Environmental Impact Statement for Proposed Geological and Geophysical Activities in the Mid- and South Atlantic Planning Areas

COMMENT SHEET

Comments: **PLEASE PRINT**

The regional climate protection organization I am representing opposes drilling and any steps that lead to expanded drilling, for a few simple reasons. Drilling only prolongs and expands our dependence on fossil fuels, environmentally threatening the Hampton Roads area - both with oil leaks and with the effects of climate change, sea level rise and extreme weather events. If the administration takes the step of opening our coast to drill for any oil or gas discovered through offshore seismic testing, the entire $83 billion coastal tourism and recreational industries would be jeopardized. Energy experts say that there is no credible link between domestic drilling and gas prices, describing it as naive to think that lifting the moratorium would have better than a negligible impact of a cent or two per gallon at the pump. High oil prices today are a global phenomenon. The global balance of supply and demand would not change significantly. Continued dependence on fossil fuels has consequences for the climate. We are loading the dice, and painting higher numbers on them, and we should expect worse hurricanes like Isabel, the most damaging hurricane to hit the area in decades. Storm surge, winds, heavy rains and flooding killed 10 people in Virginia and caused $1.85 billion in damages in state, and spawned a tornado in the waterfront Ocean View district of Norfolk. Oil drilling risks local livelihoods and plays to a way of thinking that keeps us addicted to greenhouse-gas intensive fossil fuels, benefitting Big Oil, not VA. Offshore wind will not harm our climate or coastline or endanger fishing or tourism and should be developed without delay.

Name: Hannah Wiegand

Title:

Organization: Chesapeake Climate Action Network

Address: 1108 East Main St. Suite 603

City, State, & Zip Code: Richmond, VA 23219

Comments are not limited to the space on this sheet. Please feel free to add additional sheets if necessary.

Stop - Please.
No drilling or exploring

PUBLISHED YEARS APART in the magazine, each of these photos of oil-spill victims sparked outrage from NWF members. Tom Myers' photo of an oiled grebe (left) was taken shortly after the 1969 Santa Barbara spill in California. Twenty years later, Randy Brandon made this image of a gloved worker holding a pigeon guillemot during the 1989 disaster in Alaska's Prince William Sound. And 21 years after that, Charlie Riedel photographed a brown pelican at the peak of the 2010 Gulf of Mexico spill.

In our Oceans!!!

CHARLIE RIEDEL (ASSOCIATED PRESS); ABOVE LEFT, TOM MYERS; ABOVE RIGHT, RANDY BRANDON

Joyce Grant,
Founder
Citizens for
Oceanfront
Preservation
17 J
701 Ocean
Avenue.
Asbury Park
NJ
07712

IN ITS EARLY YEARS, the magazine relied on a handful of photographers to supply most of its wildlife images. One of them, Ron Austing, captured this great horned owl on film for a June/July 1963 article "The Birds of Prey." Though photos of birds in flight are common today, Austing's stop-action picture was considered exceptional 50 years ago.

A STRIKING EXAMPLE of how contemporary wildlife photographers make use of today's advanced camera equipment, this Michael Forsberg image of sandhill cranes was published in "New Dawn for a Prairie River." The October/November 2007 article reported on efforts to protect water flows in the Platte River in Nebraska, where as many as 500,000 cranes gather to rest during migration.

RON AUSTING; BELOW, MICHAEL FORSBERG

New Jersey Society for Environmental, Economic Development

308 West State Street
Trenton, NJ 08618
609.394.7726
609.394.2795 Fax
info@njseed.org
www.njseed.org

NJ SEED – Testimony In Support of Offshore Oil and Natural Gas Exploration

U.S. Bureau of Ocean and Energy Management Hearing:

Offshore Oil and Natural Gas Exploration.

April 27, 2012

Good Afternoon. My name is Michael Drulis and I am the Executive Director of the New Jersey Society for Environmental Economic Development (NJ SEED). I wish to thank you for allowing me to testify here today. On behalf of our Board of Trustees and the members of NJ SEED, we support the Government's decision to allow seismic studies on the Atlantic Outer Continental Shelf (OCS).

NJ SEED is a unique coalition of New Jersey's most prominent labor and business leaders. Our diverse membership includes labor advocates, business organizations and trade groups, construction and electrical workers unions, energy providers, environmental consultants, telecommunications firms, banks, residential and commercial development interests, insurance firms, educators, State Troopers and firefighters, food manufacturers and retailers, water utilities, chemical industries, pharmaceutical companies and health care interests. What we all have in common is our belief that economic growth and environmental protection are not mutually exclusive. For more than thirty five years, NJ SEED has supported balanced public policies that bolster our economy and enhance our environment.

I come before you today to echo the sentiments of our members and partner organizations alike who believe America's natural gas and oil resources are a

linchpin aspect in our economy. Looking to the future, an increase in these limited resources is required to strengthen America's domestic energy production and independence.

Current resource estimates of the Atlantic OCS are hindered by a lack of data. Recent undiscovered, technically recoverable resource estimates weigh in at over 3 billion barrels of oil and 31.3 trillion cubic feet of natural gas. Even these estimates stand to be conservative ones, as some areas of the Atlantic OCS are largely unexplored and have not benefited from the use of new seismic and computer modeling technologies.

At the core of NJ SEED's mission is the genuine devotion to environmentally-friendly economic development. Marine seismic exploration is carefully regulated by the federal government and managed by the operator who is committed to the monitoring of marine mammals, the surrounding sound levels, and the marine life's proximity to noted "exclusion zones." NJ SEED commends government's efforts to work closely with all industry to ensure that issues of environmental or ecological harm do not occur. Our coalition firmly believes we can safely develop our energy portfolio while still protecting our environment.

The benefits of such production trickle down far beyond energy security. Currently, the oil and natural gas industry supports $9.2 million jobs and delivers more than $86 million per day in revenue to our government. Studies have shown that developing oil and natural gas reserves in offshore waters and other federally controlled areas could create hundreds of thousands of new jobs and generate hundreds of billions of dollars in new revenue for government programs.

In order to insure sound investment decisions, we need to begin the research now and we fully support the government's decision to conduct a seismic analysis. With

the current data over 20 years old, a new seismic survey would undoubtedly give producers a clearer picture and detailed accounting of potential resources. Not only would future natural gas and oil production lead to a steady and reliable source of energy, it would also help keep overall input costs stable. In a time of rising expenditures and stagnant revenues, their benefit to our economy is one we simply cannot afford to ignore.

I ask that you consider these points presented today and urge you to see the vital role increased production of our oil and natural gas resources plays in strengthening our economy.

Thank you for your time.

Audubon SOUTH CAROLINA

Francis Beidler Forest
Audubon Center & Sanctuary
336 Sanctuary Road
Harleyville, SC 29448
Tel: 843-462-2150
Fax: 843-462-2713
www.sc.audubon.org

May 10, 2012

Mr. Gary D. Goeke
Chief, Regional Assessment Section
Office of Environment (MS5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCR Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Re: Comments on the Draft PEIS for Atlantic G&G Activities

Dear Mr. Goeke,

Thank you for this opportunity to comment on the Atlantic G&G activities PEIS. As a coastal constituent adjacent to the South Atlantic Planning Area, I encourage BOEM to adopt Alternative C—the no action alternative—in its programmatic environmental impact statement. Our concerns about the lack of transparency proposed for this process are outlined below.

South Carolina currently enjoys a vibrant coastal tourism industry and thriving fisheries that contribute significantly to both our quality of life and economy. More than 6,000 people are employed in the fishing industry, and commercial and recreational fishing account for more than $500 million in sales per year. Our state's tourism and recreation industry generates $2.2 billion in revenue per year and employs over 55,000 South Carolinians.

A lack of transparency during this process makes it impossible to weigh the costs and benefits of offshore oil and gas development off our coast. The data to be collected during the proposed G&G activities would be proprietary and available only to BOEM during the pre-leasing process. South Carolina officials and residents would have no meaningful opportunity to analyze the data collected and make an educated decision about the risks and rewards associated with offshore oil and gas development on the Mid and South Atlantic OCS.

This leaves East Coast states in the precarious position of opposing or supporting offshore oil and gas development without the updated information and data necessary to evaluate what impacts any recoverable reserves of oil and gas would have on job creation, economic development, revenue generation, foreign oil dependencies, and energy prices.

Additionally, because the BOEM leasing process allows for the development of both oil and gas, the States and the public would not be able to adequately weigh the risks of offshore oil development versus offshore natural gas development, which is arguably more benign due to the lack of potential for spills.

Because the PEIS and the subsequent leasing process make it impossible for South Carolina officials and the public to engage in an open, meaningful dialogue related to the appropriateness of oil and gas exploration and development on the Mid and South Atlantic OCS, we recommend that BOEM not allow any oil and gas related G&G activities in these areas.

Sincerely,

Norman L. Brunswig
Executive Director

printed on 100% post-consumer recycled paper

Surfrider Foundation
PO Box 6010
San Clemente, CA
92674-6010

May 29, 2012

Mr. Gary D. Goeke
Chief, Regional Assessment Section
Office of Environment (MS5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCR Region 1201
Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Re: Comments on the Draft PEIS for Atlantic G&G Activities

Mr. Goeke,
The Surfrider Foundation is a grassroots environmental organization dedicated to the protection and enjoyment of the world's oceans, waves, and beaches for all people. On behalf of our 250,000 supporters, activists, and members, including our local chapters in New Jersey, Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, and Florida, the Surfrider Foundation submits the following comments on the Draft PEIS for Atlantic Geological & Geophysical Activities.

The Surfrider Foundation supports Alternative C: No Action for Oil and Gas, Status Quo for Renewable Energy and Marine Mineral G&G Activity.

The Surfrider Foundation has significant concerns with the actions proposed by the Bureau of Ocean Energy Management (BOEM) in Alternatives A and B. Geological and geophysical (G&G) activities on the Atlantic Outer Continental Shelf (OCS) would cause significant environmental harm to marine life and the ocean ecosystem. In particular, deep penetration seismic surveys, in which a survey vessel tows an array of airguns that emit acoustic blasts into the seafloor over long durations and over large areas, would result in unacceptable environmental effects. 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, including broad habitat displacement, disruption of vital

behaviors essential to foraging and breeding, loss of biological diversity, and, in some circumstances, injuries and mortalities. According to the Bureau's own estimates in the Draft PEIS, the impacts of Alternative A would include, but not be limited to:

- Bottlenose dolphins: up to 11,748 injuries per year
- Short-beaked common dolphin: up to 6,147 injuries
- Atlantic spotted dolphins: up to 5,848 injuries per year
- Short-finned pilot whales: up to 4,631 injuries per year
- Striped dolphins: up to 3,993 injuries per year
- Disruption to marine mammal feeding, calving, breeding, & other vital activities: 1.6 million times per year
- Sea turtles: potential behavior disruption and breeding & nesting displacement for endangered species including the hawksbill, Kemp's ridley, and leatherback, and the threatened loggerhead sea turtle
- Fish resources: potential behavioral responses, temporary hearing loss, and physiological effects on demersal and pelagic fishes

The Surfrider Foundation believes that such impacts to our nation's marine resources are not an acceptable price to pay for the assessment of potential oil & gas resources on the Atlantic Outer Continental Shelf (OCS). Beyond the direct effects to the ocean ecosystem, such impacts would also threaten the economic and social well being of coastal communities from New Jersey to Florida. Industries such as tourism, recreation, and commercial fishing are fundamentally dependent on a healthy ocean environment and generate significant economic revenue for the Atlantic coast region. According to the National Ocean Economics Program, the Tourism and Recreation sector for the states of Florida, Georgia, South Carolina, North Carolina, Virginia, Maryland, Delaware, and New Jersey generated a combined $22 billion in gross domestic product in 2009. We believe these economic benefits should not be threatened by geological and geophysical activities off the south and mid-Atlantic coasts.

Further, as noted in the Draft PEIS, Alternatives A and B are identical with respect to the G&G activities that could be conducted, and differ only with respect to certain mitigation measures and time-area closures that are included as part of Alternative B. According to BOEM, such measures are intended to help avoid, reduce, or mitigate the impacts of proposed G&G activities; however, BOEM also acknowledges that these provisions will not solve most of the issues. BOEM states in the Draft PEIS that the potential impacts of Alternatives A and B are "broadly similar" and that many of the potential effects of Alternative A would also likely apply for Alternative B. Accordingly, while the Surfrider Foundation views Alternative B as preferable to Alternative A, and recognizes that such mitigation may result in decreased impacts on species such as the Atlantic Right Whale, we are opposed to both Alternatives A and B, and view Alternative C as the only acceptable course of action for the South and Mid-Atlantic Planning Areas.

Finally, in the aftermath of the BP oil spill in the Gulf of Mexico - the worst environmental disaster in US history – the Surfrider Foundation is concerned that the Department of Interior is focused on advancing potential oil and gas development off the Atlantic coast. Given the inherent risks and environmental impacts of offshore drilling, we believe that the Department should not be taking steps to expand offshore drilling to new OCS planning areas where such development has not occurred. Instead, our nation must seek a comprehensive and environmentally sustainable energy plan that prioritizes conservation and support for renewable energy technologies.

The Surfrider Foundation appreciates the opportunity to provide these comments on the Draft PEIS for Atlantic G&G Activities. The Surfrider Foundation is a non-profit grassroots organization dedicated to the protection and enjoyment of our world's oceans, waves and beaches through a powerful activist network. For more information on the Surfrider Foundation, visit www.surfrider.org.

Sincerely,

Pete Stauffer
Ocean Program Manager
Surfrider Foundation

FLORIDA WILDLIFE FEDERATION

Affiliated with National Wildlife Federation

Northeast Office
201 Owens Ave Suite A
St Augustine, Florida 32080

Phone: (904)461-1160
Website: www.fwfonline.org

May 22, 2012

Joseph Christopher, Regional Supervisor
Leasing and Environment (MS 5410)
Minerals Management Service
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, LA 70123-2394

Dear Mr. Christopher:

On behalf of the Florida Wildlife Federation (Federation), please note our concern as to the Bureau of Ocean Energy Management's (BOEM) draft programmatic environmental impact statement (EIS), published March 30, 2012, which evaluates potential environmental effects of multiple Geological and Geophysical (G&G) activities in the Mid and South Atlantic Planning Areas of the Outer Continental Shelf. Of special concern to the Federation is the negative impact, from seismic activity, on the marine fishery and on federally protected species such as the critically endangered North Atlantic right whale, threatened loggerhead turtle and the endangered leatherback turtle. In that regard, the Federation supports the EIS *Alternative C,* which prohibits the expansion of the existing permit for marine minerals and renewable energy so as to include oil and gas exploration.

BOEM's proposal to conduct seismic activity in the Atlantic includes the use of airgun arrays. As noted in the draft EIS, impacts to marine species will be categorized as "Moderate." A "Moderate" impact to federally listed species is unacceptable. Moreover, the nation should continue to support exploratory efforts which augment renewable energy sources. The existing permit does this and needs no amendment.

In sum, the Federation supports *Alternative C* which prohibits oil and gas exploration and leases and supports the status quo which allows for renewable energy and marine minerals. We appreciate the opportunity to comment on this issue and the BOEM's effort to balance environmental protection and renewable energy.

Sincerely,

Sarah Owen Gledhill, AICP
Northeast Florida Planning Advocate

U.S. Department of the Interior
Bureau of Ocean Energy Management

BOEM
Bureau of Ocean Energy Management

Public Meetings for the Draft Programmatic Environmental Impact Statement for Proposed Geological and Geophysical Activities in the Mid- and South Atlantic Planning Areas

COMMENT SHEET

Comments: I have lived in Tidewater 30 years. I currently live in VB. I work in Chesapeake as a Mental Health Case Manager and the first word that comes to mind for me re this is Delusional. They say one definition of insanity is pursuing the same actions thinking one will get different results. I ask with the BP Disaster, how can you think we want drilling for oil and gas here?

I say no to oil & gas drilling. Our ocean here & Chesapeake Bay are already not healthy - why would we take a chance to make it worse? I have read that there are only 400 Right Whales left in the world. I don't think closing parts of the coast for short periods are enough protection for them. Commercial fishing jobs (222,000) are at risk. Our 23 million dollar coastal tourism industry is at risk.

We have been supporting & SUBSIDIZING oil & Gas Corporate Powers for decades. These resources along w/ coal are finite. We are past peak oil. I am outraged at our continued corporate welfare in the area of Energy.

China is the leader in Wind Power. An earlier speaker noted where our ingenuity is re renewable energy - How ironic & ridiculous that we do not mobilize wind and other renewable energy.

It's time to do things a new way & build a new world.

PLEASE PRINT

Name: Susan M Shaw

Title: member

Organization: Occupy Virginia Beach

Address: 309 Plaza Trail Ct.

City, State, & Zip Code: Virginia Beach VA 23452

Comments are not limited to the space on this sheet. Please feel free to add additional sheets if necessary.

NATIONAL WILDLIFE FEDERATION®
Mid-Atlantic Regional Center
706 Giddings Avenue, Suite 2C
Annapolis, Maryland 21401
(443) 759-3400 phone
(443) 927-8050 fax
www.nwf.org/midatlantic

July 2, 2012

Email to: GGEIS@boem.gov

Regional Assessment Section, Office of Environment
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123–2394

Re: Draft Programmatic Environmental Impact Statement for Atlantic Ocean Seismic Exploration

Dear Mr. Goeke,
The National Wildlife Federation's Mid-Atlantic Regional Center represents over 200,000 members in the Mid-Atlantic that treasure our coastal lands and waters for the ecological, recreational, and social benefits they provide. We appreciate the Bureau of Ocean Energy Management's (BOEM) efforts to outline potential impacts oil and gas throughout the region and host public meetings. However, NWF supports current policy to leave the eastern Gulf of Mexico, the Atlantic coast and the Pacific coast from California to Washington off-limits to drilling. We also are extremely concerned about the proposed geological and geophysical activities off the coast of the Mid- and South-Atlantic states. Oil and gas exploration activities greatly threaten our valuable coastal and marine resources. As such, we ask that BOEM considers only Alternative C of the Draft Programmatic Environmental Impact Statement (PEIS) and not allow oil and gas exploration activities along the coast and allow only the activities necessary to support renewable energy development.

Oil and gas exploration, specifically seismic testing that includes continuous air gas blasts across a large area could be devastating to marine life, especially marine mammals and sea turtles. This type of seismic testing is much more extensive than testing for renewable energy development in terms of depth and area covered and noise generated. As noted in the PEIS, with seismic air gun testing incidental takes will occur, including for all but one seven endangered marine mammal species located within the testing area. Though careful avoidance, minimization and mitigation practices will be essential, NWF feels that in comparison to oil and gas exploration, required surveys for renewable energy resources will have a reduced potential for incidental takes and harassment of marine mammals. BOEM recently completed a Final Environmental Assessment for renewable energy lease issuance in the mid-Atlantic and reviewed the potential impacts from renewable energy high-resolution geophysical surveys and

shallow and medium penetration sub-bottom profiling. BOEM reached a Finding of No Significant Impact, subject to a set of impact avoidance, minimization, and mitigation measures. This indicates the difference in impacts between the activities required for renewable energy surveys and oil and gas exploration offshore. This DPEIS is of little value to renewable energy development in these locations. NWF believes a similar process defined Wind Energy Areas in North Carolina and South Carolina, with associated design features, is appropriate.

Oil spills is a major environmental risk that would be catastrophic to the marine and coastal environmental and the species that live there. As the seismic testing is proposed 3 miles offshore, oils spills and other impacts could affect critical areas such as the Chesapeake Bay, Delaware Bay, and Albemarle Sound, which are some of the most productive estuaries in the country. Additionally, exploratory drilling and production produce extensive toxic waste that will affect not only fish and marine life, but humans when consuming contaminated fish[1]. Our coastal environment and the people that live and work there are too valuable to put them at risk from the potential impacts of offshore oil and gas drilling.

Again, we urge the BOEM to consider only Alternative C in the PEIS title, which would prevent harmful impacts to our coastal and marine environment as well as the economic livelihood along much of the coast, while still allowing necessary actions that support renewable energy development.

Sincerely,

Austin Kane
Science and Policy Manager, NWF's Mid-Atlantic Regional Center

[1] MMS. 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS).

Delaware Nature Society

ABBOTT'S MILL NATURE CENTER | ASHLAND NATURE CENTER | BUENA VISTA | COOCH-DAYETT MILLS | COVERDALE FARM PRESERVE | DUPONT ENVIRONMENTAL EDUCATION CENTER

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Executive Director
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TO: Mr. Gary D. Goeke, Chief, Regional Assessment Section Office of Environment, Bureau of Ocean Energy Management

FROM: Brenna Goggin, Environmental Advocate
Lorraine, Fleming, Board Member
Brian Winslow, Executive Director

SUBJECT: Programmatic Environmental Impact Statement for seismic testing for offshore oil and gas exploration (PEIS)

The Delaware Nature Society is a private, non-profit, membership organization with more than 6,500 members statewide that works to foster understanding, appreciation, and enjoyment of the natural world through education, advocacy and preservation. The organization has been studying "energy issues" broadly for many years.

In 1981, Congress protected America's coasts, beaches, and marine ecosystems from the threats of oil and gas development by adopting the Outer Continental Shelf (OCS) Moratorium; however, the moratorium expired in the summer of 2008 amidst rising oil prices. The Delaware Nature Society has supported the idea of renewing this moratorium in the past and therefore we support Alternative C of the Bureau of Ocean Energy Management (BOEM)'s Programmatic Environmental Impact Statement (PEIS). According to BOEM's PEIS,

> "Alternative C is the No Action Alternative required by the regulations implementing NEPA. Under this alternative, no G&G activities associated with oil and gas exploration would occur in the AOI. However, permitting and post lease G&G activities for renewable energy development and marine minerals use would continue to occur on a case-by-case basis.[1]"

The Society appreciates the BOEM's efforts to substantially outline all potential impacts to any proposed action in the Mid-Atlantic region through their PEIS document and their willingness to host a hearing in Delaware, where the Society was represented. Although we believe BOEM has made a good faith effort to educate the public and provide mitigation plans to offset environmental impacts, we do not believe Alternatives A&B would adequately protect the Mid-Atlantic region against offshore exploration and subsequent extraction activities. Although BOEM's PEIS is in regard to exploration efforts, the Nature Society believes any drilling off the coasts of the Mid-Atlantic region will have the following impacts:

[1] Bureau of Ocean Energy Management Draft Programmatic Environmental Impact Statement Proposed Geological and Geophysical Activities in the Mid-Atlantic March 2012 pg. 10

I. Environmental and Wildlife Impacts

A. Oil Spills

The Delaware Nature Society does not believe that offshore drilling will have any impact on gas prices, but it will have a negative impact on our coastal environment and wildlife. According to a report done by the University of Delaware and Delaware Geological Survey in 1982, only five out of 28 exploration wells off the Mid-Atlantic coast held any oil and gas[2]. Spilled oil is a major environmental risk from offshore drilling and is made more dangerous when in the path of strong storms or hurricanes that frequent the Mid-Atlantic region. The Coast Guard estimated that 9 million gallons of oil spilled into the Gulf of Mexico when Hurricanes Katrina and Rita hit the coasts in 2005, causing irreparable harm to already vulnerable coastline[3].

On April 20, 2010, the largest accidental oil spill ever occurred in the Gulf. The largest environmental disaster to ever face our nation caused 200 million gallons of oil to spill into the Gulf of Mexico. Oceana.org reports that

- More than 8,000 birds, 1,000 sea turtles and 600 dolphins and whales have been collected either dead or injured near the site of the spill. (This is a low-end estimate of the number of animals killed or injured by the spill, and the total count is likely many times greater than the number of carcasses found.)
- Ancient deepwater corals that can live more than 2,000 years were killed by oil from the spill.
- In some areas of the Gulf, 50% of the fish caught had lesions.

As this event happened only two years ago, the long-term effects have yet to be determined.

Offshore exploratory drilling and production can create significant quantities of waste that contain toxic and radioactive pollutants, all of which can contaminate fish and marine life consumed by humans[4]. Each well also discharges hundreds of thousands of gallons of "produced water," which contains toxic contaminants, including but not limited to benzene, arsenic, radium, zinc, and petroleum hydrocarbons.

B. Air Quality

In addition to the negative effects offshore drilling has on wildlife, it also causes significant air quality issues. The National Oceanographic and Atmospheric

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[2] University of Delaware & Delaware Geological Survey History of Oil and Gas Exploration in the Mid-Atlantic Region, by Robert Doyle July 1982

[3] U.S Minerals Management Service. News Release. MMS Updates Hurricane Katrina and Rita Damage. 1 May 2006

[4] MMS, 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS)

Administration (NOAA) found that each offshore oil platform generates approximately 214,000 pounds of air pollution each year. If an oil spill were to occur, Volatile Organic Compounds (VOCs) would be released into the atmosphere. For a state that already fails to meet air quality standards, an oil spill could compound the problem

C. Wildlife

The NOAA Fisheries Office of Protected Resources and the U.S Fish and Wildlife Service list the North Atlantic Right Whale as endangered. In the BOEM PEIS, it states "at some point this acoustic smog could affect the abilities of whales to find food and mates.[5]" If the BOEM were to move forward with either Alternative A or B, the seismic testing could be potentially devastating to a species with less than 350 individuals left. Due to the low level population, any 'incidental take' would be unacceptable. All endangered or candidate species--marine mammals, fish, and sea turtles--would be negatively impacted by the many acoustic and other disturbances created by exploration drilling.

Additionally, pipelines, development, and infrastructure that come with drilling scar beaches, disrupt marine life, and undermine coastal tourism and fishing economies. In 2006, 486,000 people spent more than $283 million on hunting, fishing, and wildlife viewing in Delaware. If an accidental oil spill were to occur, it would negatively affect one of Delaware's critical revenue sources.

D. Climate Change

The Delaware Nature Society's climate change policy supports energy conservation, capping and eventually reducing anthropogenic soot and greenhouse gas emissions, including CO2 emissions from the burning of fossil fuels, and legislation encouraging alternative energy initiatives. Delaware is already seeing the affects of climate change through shoreline erosion and saltwater incursion and sea-level rise, which endangers Delaware's marshland, farmland, and coastal communities. Carbon dioxide produced by the burning of fossil fuels is the primary greenhouse gas responsible for climate change and its negative environmental impacts.

II. Bluewater Wind Project and the Atlantic Wind Connection

Despite the setback of the Bluewater Wind project, the Delaware Nature Society believes Delaware will eventually have an offshore wind project. We want to ensure that exploration of offshore drilling would not hinder any project moving forward. Further, those areas that have been identified by the University of Delaware as having the greatest potential for offshore wind development should be reserved for that purpose[6]. On Monday, May 14, 2012 the Department of Interior announced their plans to move forward with the Atlantic Wind Connection, proposed 800-mile transmission line off the Atlantic seaboard. The Society is concerned how BOEM's exploratory drilling will affect this project.

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[5] BOEM G&G Activities and Proposed Action Scenario Section 3.6.11 (Cumulative Noise in the Sea)

[6] Delaware Marine Spatial Planning: Offshore Wind Context University of Delaware Revised April 9, 2012

III. The Delaware Coastal Zone Act

To protect Delaware's vulnerable coastlines, Governor Russell Peterson signed the Coastal Zone Act into law on June 28, 1971, designed to protect the natural environment of the coastal areas and safeguard their use primarily for recreation and tourism and therefore would prohibit off shore drilling along Delaware's coastline.

The Delaware Nature Society believes that drilling in the Mid-Atlantic region would be damaging to the marine ecosystem and potentially devastating to Delaware's coastline.

Thank you for the opportunity to comment.

July 2, 2012

Mr. Gary D. Goeke, Chief, Regional Assessment Section
Office of Environment (MS5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCR Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Re: Comments by the Marine Section of the Society for Conservation Biology[1] on the Draft Programmatic Environmental Impact Statement for Atlantic Geological & Geophysical Activities.

On behalf of the Marine Section of the Society for Conservation Biology (SCB), we offer the following comments on the Bureau of Ocean Energy Management (BOEM) draft programmatic environmental impact statement (PEIS) regarding future geological and geophysical activities in support of oil and gas exploration and development, renewable energy, and marine minerals in the Mid- and South Atlantic Planning Areas of the Atlantic Ocean. In particular, we are concerned that the draft PEIS underestimates the risks that seismic activities, especially deep penetration seismic air gun surveys, pose for the critically endangered north Atlantic right whale (*Eubalaena glacialis*). Given the suite of anthropogenic threats that this species already faces from commercial and recreational fisheries, collisions with large vessels, renewable energy development, marine minerals use, LNG import terminals, military training, and dredged material disposal, as well as long-term challenges of climate change, seismic surveys will likely place this species in greater jeopardy of extinction.

High-intensity pulses produced by seismic air gun surveys can cause a range of impacts on marine mammals, fish, and other marine life, including habitat displacement, disruption of vital behaviors essential to foraging and breeding. In some cases, seismic air gun surveys can result in injuries or mortalities to marine species, including marine mammals.[2] SCB supports Alternative C, the alternative that would permit no action with regard to oil and gas exploration, but would not affect the measurement of wind resources and related renewable energy studies. Alternative C represents the appropriately precautionary approach to managing the ongoing development of the Atlantic Ocean's natural resources, while providing sufficient protection for its critically endangered wildlife.

[1] SCB is an international professional organization whose mission is to advance the science and practice of conserving the Earth's biological diversity, support dissemination of conservation science, and increase application of science to management and policy. The Society's membership comprises a wide range of people interested in the conservation and study of biological diversity. Resource managers, educators, government and private conservation workers, and students make up the Society's 5,000 members worldwide in over 140 countries.

[2] *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).

I. Background on the Programmatic EIS and Relevant Statutory Framework.

In 1990, Congress imposed a moratorium on pending oil and gas development activities on the outer continental shelf (OCS) of the Atlantic Ocean. The moratorium was instituted shortly after the 1989 Exxon Valdez oil spill. Despite the passage of the Oil Pollution Act, which including oil spill restoration and prevention measures, many remained concerned that a precautionary approach was needed regarding additional offshore oil development. The Congressional moratorium was reinforced in 1998 when President Clinton issued an Executive Order[3] that prohibited federal agencies from conducting activities relating to oil and gas development on the Atlantic OCS. Both the Congressional and Executive Office moratoria were allowed to expire in 2008. In the appropriations bill for the Department of Interior (DOI), Congress required the DOI "to conduct a Programmatic EIS to evaluate potential significant environmental effects of multiple geological and geophysical activities in the Atlantic OCS."[4] In January of 2011, BOEM began the process under the National Environmental Policy Act (NEPA) to develop a programmatic EIS, and released a draft programmatic EIS (hereafter "PEIS") on March 28, 2012.[5] The PEIS analyzes three alternatives:

- Alternative A, the proposed action, would authorize all G&G activities (oil and gas exploration, renewable energy development, and marine mineral development) in all program areas from short to a distance of 350 nautical miles (nmi) offshore. Alternative A would include 617,775 line kilometers of 2D streamer surveys, 120,000 line km of 3D streamer surveys, and 900 line km of 3D WAZ surveys; or approximately 3,750 days of vessel activity over the 2012-2020 period. The renewable energy program is expected to conduct 4,255 days of high resolution geophysical (HRG) survey vessel activity and as many as 9,969 vessel trips for coring operations between 2012 and 2020.
- Alternative B would authorize the same G&G activities in the same geographical area, but include additional mitigation measures to protect the north Atlantic right whale, including additional time-area closures for North Atlantic right whales and sea turtles, and would establish a 40 kilometer separation distance between simultaneously operating deep-penetration seismic air gun surveys.
- Alternative C is the no-action alternative required by NEPA, which would not authorize any seismic activity in the Atlantic OCS. Existing efforts to develop renewable energy on the OCS would not be impacted.

The PEIS has determined that geological and geophysical (G&G) activities could potentially result in tens of thousands of incidents of Level A harassment each year. The Marine Mammal Protection Act (MMPA) defines Level A harassment as those acts which have "the potential to injure a marine mammal."[6] Under Alternative A, and depending on the modeling method[7] used by

[3] Memorandum on Withdrawal of Certain Areas of the United States Outer Continental Shelf from Leasing Disposition, 34 Weekly Comp. Pres. Doc. 1111 (June 12, 1998)
[4] H. Conf. Report 111-316, Interior Department and Further Continuing Appropriations, Fiscal Year 2010, Public Law 111-88 (Oct. 30, 2009).
[5] *Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas Draft Programmatic Environmental Impact Statement* (hereafter Draft PEIS). The full EIS can be located at: http://www.boem.gov/oil-and-gas-energy-program/GOMR/GandG.aspx
[6] 16 U.S.C. § 1362(18)(A)(i)

the National Marine Fisheries Service (NMFS), there could be up to 11,748 Level A takes of bottlenose dolphin, 6,147 Level A takes of short-beaked common dolphin, 5,848 Level A takes of Atlantic spotted dolphin, 4,631 Level A takes of short-finned pilot whale, and 3,993 Level A takes of striped dolphin each year.[8] Seven federally-endangered whales occurring in the areas proposed for G&G activities would also be subject to Level A take, including up to 310 incidents of Level A take of sperm whales each year, 12 incidents of Level A take of humpback whales each year, and up to 2 incidents of Level A take of the critically endangered north Atlantic right whale each year.[9] Level A take is anticipated temporary or possible permanent hearing loss, which can "partially or completely reduce an individual's ability to effectively communicate; detect important predator, prey, and/or conspecific signals; and/or detect important environmental features associated with spatial orientation."[10]

The modeling also predicts substantial Level B harassment, which is defined by the MMPA as harassment that "has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." Using the NMFS 160-dB criterion, the five species with the highest annual Level B take estimates are "the bottlenose dolphin (up to 1,151,442 individuals/year); short-beaked common dolphin (up to 602,424 individuals/year); Atlantic spotted dolphin (up to 573,121 individuals/year); short-finned pilot whale (up to 453,897 individuals/year); and striped dolphin (up to 391,376 individuals/year)."[11] Sperm whales could experience up to 30,356 incidents of Level B take each year, humpback whales could be exposed to up to 1,131 Level B takes each year, and north Atlantic right whales could be exposed to up to 184 Level B takes each year. Under Alternative A, a time-area closure for North Atlantic right whales would be included, and is predicted to reduce Level A and Level B incidental takes of North Atlantic right whales by about 67 percent from the levels described above.

Under Alternative B, similar levels of take would occur, except that the expanded time-area closure for North Atlantic right whales under Alternative B would reduce the risk of acoustic and vessel strike impacts on this species. According to the PEIS "incidental take was not modeled for Alternative B, it is estimated that the expanded time-area closure would avoid approximately 80 percent of the incidental takes of North Atlantic right whales over the period of this Programmatic EIS."[12] The expanded time-area closure for North Atlantic right whales under Alternative B would slightly reduce the risk of acoustic and vessel strike impacts on some other marine mammals by precluding certain surveys in a portion of the AOI during certain times. Additionally, the time-area closure in Brevard County under Alternative B would reduce the risk of disrupting sea turtle nesting in an area that is estimated to support 25 percent of all loggerhead turtle nesting in the United States.

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[7] NMFS uses the Acoustic Integration Model which sets Level A at noises above 180-dB and the Southall (2007) criterion to assess injuries to marine mammals. Draft PEIS at xii.
[8] Draft PEIS at xiii.
[9] Draft PEIS Supplemental Take Tables at 5.
[10] Draft PEIS at 4-46.
[11] Draft PEIS at 4-54.
[12] Draft PEIS at xxiv.

Section 101 of the MMPA provides a mechanism for allowing the incidental (not intentional) taking of "small numbers" so long as the taking has no more than a "negligible impact" on such species.[13] Incidental take" authorizations require that regulations be promulgated outlining the (i) permissible methods and the specified geographical region of taking; (ii) the means of effecting the least practicable adverse impact on the species or stock and its habitat and on the availability of the species or stock for subsistence uses; and (iii) requirements for monitoring and reporting. The MMPA does allow takes for those marine mammal species protected as threatened or endangered under the Endangered Species Act (ESA) so long as the taking remains small in number and has a negligible impact on a listed species.

Under Section 7 of the Endangered Species Act (ESA), all federal agencies within the executive branch must consult with the NMFS and/or the U.S. Fish and Wildlife Service (FWS) if a proposed agency action could "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat."[14] Under Section 7 the action agency, in this case the BOEM, must prepare a Biological Assessment (BA) to determine whether the proposed action "may affect" a listed threatened or endangered species. If the agency concludes that an action "may affect" a listed species, the NMFS or FWS enters into formal consultations to produce a Biological Opinion (BO) on whether the action will in fact jeopardize the survival or recovery of a listed species, and identifies Reasonable and Prudent Alternatives (RPAs) to avoid a jeopardy finding. Given the duty not to jeopardize any endangered species' survival or recovery, and the Section 7(a)(1) duty to affirmatively assist in the recovery of listed species, BOEM has a duty to limit incidental taking to levels that will not reduce the likelihood of recovery. In the case of the north Atlantic right whale, the conservation status of the species requires avoiding even the least amount of additional harm.

The Biological Assessment (BA) prepared by BOEM, with the input from NMFS, has concluded that proposed seismic activities are likely to adversely affect all of the endangered whales found in the proposed activity area, including the critically endangered North Atlantic right whale.[15] The BA concludes that mitigation measures required by BOEM will "be effective in avoiding Level A harassment of North Atlantic right whales by active acoustic sound sources *to the maximum extent practicable*."[16] However, there is a significant difference between avoiding all adverse effects altogether and avoiding adverse effects to the maximum extent practicable. The former guarantees that harm will not come to any individual right whale, the latter only reduces the risk to individual right whales. Thus, while BOEM may not expect that Level A take, i.e. injury or mortality, will occur, BOEM cannot guarantee that its actions will not jeopardize the North Atlantic right whale. Therefore, SCB disagrees that BOEM has done everything possible to mitigate the impacts of these proposed seismic activities. SCB notes that BOEM has the authority to impose whatever mitigation measures it deems necessary to fully protect the right whale. For example, BOEM could prohibit all seismic activities in the entire South Atlantic planning area when right

[13] 16 U.S.C. § 1371(a)(5)(A)(i).
[14] 16 U.S.C. § 1536(a)(2).
[15] BOEM. 2012. *Atlantic OCS Proposed Geological and Geophysical Activities: Mid-Atlantic and South Atlantic Planning Areas Biological Assessment* at A-141. Available at: http://www.boem.gov/uploadedFiles/BOEM/Oil_and_Gas_Energy_Program/GOMR/Biological_Assessment_finalforwebposting_wcover_5-24-12.pdf
[16] *Id*. at A-145.

whales are on their calving and nursing grounds each winter. Such a prohibition would be much more effective than closing only 4% of the project area at certain times of year.[17] Substantially more significant mitigation measures are required because of the extraordinarily wide geographic scale that the impacts of seismic surveys can be felt at by the large baleen whales.

Baleen whales vocalizations and acoustic sensitivities overlap with the enormous low-frequency energy that seismic air gun surveys cause in the water. For example, a single seismic survey has been shown to cause endangered fin and humpback whales to stop vocalizing, an essential behavioral activity for 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.[18] Similarly, seismic air gun 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.[19] The intermittency of air gun pulses does not mitigate this effect since their acoustic energy spreads over time.[20] The critically endangered North Atlantic right whale is particularly vulnerable to masking effects from seismic air gun surveys given the acoustic and behavioral characteristics of its calls.[21] The exposure levels implicated in all of these studies above are lower than the threshold used to evaluate air gun behavioral impacts in the DPEIS. Repeated insult from seismic air gun surveys would occur on top of already high levels of background noise. For individual right whales, and cumulatively for the species, these activities represent jeopardy for the species continued existence.

II. The Programmatic EIS Contains Procedural Shortcomings That Limit the Ability to Review the Underlying Scientific Conclusions Regarding the Impacts of G&G Activities on Marine Mammals.

The draft PEIS contains a significant procedural shortcoming, namely it fails to consider a sufficient number of meaningful alternatives discussed in the draft EIS. The National Environmental Policy Act has two overarching goals -- to require agencies to take a "hard look" at the consequences of a proposed action, and to provide the public with both information about the proposed action and an opportunity to provide its comments on the action.[22] The way an agency takes a hard look at a proposed action is by analyzing a range of alternatives to the action, which the

[17] PEIS at 2-4.

[18] 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).

[19] 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).

[20] *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).

[21] 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).

[22] *Robertson v. Methow Valley Citizens Council*, 490 US 332, 356 (1989).

Council on Environmental Quality (CEQ) describes as the "heart of the environmental impact statement."[23] SCB is concerned that BOEM imprudently eliminated from further consideration several significant alternatives to the proposed action in the draft EIS, leaving the existing document with no meaningful consideration of practical alternatives (other than no-action) to the proposed action. Instead, the EIS only provides two substantive choices: G&G activities throughout the South and Mid-Atlantic OCS and the same with a little bit more mitigation. As has been upheld in several courts, "the existence of a viable but unexamined alternative renders an environmental impact statement inadequate."[24] As a result, an agency must "look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action and sufficient to permit a reasoned choice."[25]

SCB recognizes that Congress ordered BOEM to conduct a Programmatic EIS to "evaluate potential significant environmental effects of multiple geological and geophysical activities in the Atlantic OCS." However, this general requirement did not eliminate BOEM's discretion as to where within the Atlantic OCS to permit defer G&G seismic surveys. It may be for this reason that BOEM felt justified in not considering an EIS alternative that would have included the North Atlantic OCS region. SCB is concerned that BOEM did not consider other macro-level options for where and when (both seasonally and over subsequent years) G&G activities might take place. For example, BOEM did not consider in its draft EIS an option for only conducting G&G in the mid-Atlantic or only conducting G&G in areas over 20, 50, or 100 miles from shore. BOEM also eliminated from detailed consideration the possibility of requiring non-air gun acoustic surveys in the Atlantic OCS despite the fact that "some air gun alternative technologies are available now or in the next 1-5 years."[26] Even if these technologies are not yet perfected, requiring their use in the Atlantic could provide the needed incentive for industry to improve these technologies to the point that they are comparable to traditional seismic air gun surveys. Overall, given the exceptionally high level of marine mammal take anticipated, the failure of BOEM to consider additional options in the PIES beyond (1) conducting seismic throughout the South and Mid-Atlantic planning areas and (2) no G&G seismic activities anywhere does not appear to represent a sufficiently broad range of alternatives, making the PEIS inadequate.

Therefore, SCB recommends that BOEM reconsider its overall approach in the PEIS, and in regard to G&G seismic activities, include more detailed hypothetical periods of inactivity to allow marine mammal populations to recover from adverse impacts from G&G seismic activities and fully integrate a research and monitoring program to determine how well the various mitigation measures are working. This should involve comprehensive impact studies before, during and after any seismic activities and an adaptive management program to adjust future G&G activities as more is learned about the impact of such activities on marine mammal populations. Given the uncertainties involved regarding the cumulative impact of anthropogenic activities in the marine environment, the PEIS should have discussed in detail any seismic program alternatives that include a more precautionary approach for undertaking these G&G activities.

[23] 40 C.F.R. § 1502.14
[24] *Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir.1985)
[25] *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519 (9th Cir. 1992) (internal quotations omitted).
[26] Draft PEIS at 2-54.

Second, the draft PEIS states that the review of G&G activities "is programmatic in nature and therefore will not result in an application for an ITA under Section 101(a)(5) of the MMPA."[27] With respect to the ESA, the draft PEIS states that a BA will eventually be provided to the NMFS so that the consultation between the two agencies can begin.[28] However, there is no indication as to whether the BO will be completed prior to the completion of the final PEIS. BOEM states that, instead, the draft PEIS "will serve as a reference for environmental documentation regarding future site-specific actions. Such future documentation will tier off this document in a similar fashion to that under NEPA."[29] As a general practice, it is acceptable for an agency to use programmatic documents as a reference for future, site-specific environmental analysis. As will be discussed in greater detail below, there are significant concerns for the cumulative impact that G&G activities will have on north Atlantic right whales in specific and other endangered marine mammals in general. Therefore, tiering site-specific actions to this larger PEIS presents the risk that the best available science will be lacking in both the PEIS and future, related environmental analyses.

SCB recognizes that it is not a violation of NEPA to move forward with an EIS without the benefit of a completed BO under the ESA or an ITA under the MMPA. However, under normal circumstances, NEPA serves as the primary vehicle for all federal agencies to submit recommended changes and mitigation measures to the primary agency reviewing the project to ensure that a project complies with *all* environmental laws. The CEQ's regulations implementing NEPA state that "to the fullest extent possible" agencies shall prepare an EIS "concurrently with and integrated with ... the Endangered Species Act and other environmental review laws."[30] By moving forward with the PEIS without the benefit of the NMFS' input, BOEM undermines the ability of the public to comment on the adequacy of proposed mitigation measures. This lack of meaningful review is especially troubling given that the PEIS acknowledges that "incidental take was not modeled for Alternative B" with respect to the effectiveness of mitigation for the north Atlantic right whale. If BOEM and NMFS are only approximating how effective mitigation might be for right whales, then it is difficult to imagine how the public could adequately comment on the proposed mitigation in the PEIS either. Because of these shortcomings, SCB recommends Alternative C as the only alternative in the PEIS that is sufficiently precautionary to fully protect endangered species in the Atlantic Ocean.

Finally, SCB is concerned that BOEM has not undertaken enough of an effort to address areas where there is a lack of information regarding the impacts of seismic air gun survey activities. NEPA regulations set out an "ordered process" for an agency preparing an EIS in the face of missing information.[31] When there is incomplete information relevant to reasonably foreseeable significant adverse impacts that is essential to a reasoned choice among alternatives, an agency must obtain and include the missing information in the EIS if the overall costs of obtaining it are not exorbitant.[32] The CEQ's regulation furthers NEPA's purpose of ensuring that agencies make "fully informed and well-considered decisions," by ensuring a "widespread discussion and consideration

[27] PEIS at 5-9.
[28] *Id*.
[29] *Id*.
[30] 40 C.F.R. § 1502.25
[31] *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1244 (9th Cir. 1984).
[32] 40 C.F.R. § 1502.22.

of the environmental risks" of a project.[33] The PEIS does not fully address data gaps that may be critical to the survival and recovery of endangered whales in the Atlantic. For example, the BOEM concludes that:

> there is incomplete or unavailable information (40 CFR 1502.22) for all marine mammals with respect to: (1) seasonal abundances; (2) stock or population size; (3) population trends, whether they are increasing, stable, or decreasing; (4) the hearing range for mysticetes; and (5) the basic biology of specific species and their physiology for underwater hearing.[34]

These factors all seem particularly important given the scale of seismic air gun surveys that BOEM is considering permitting in the future. Equally problematic is the basic approach towards categorizing the effects of marine sounds on marine mammals. As was explained in a letter by several scientists that have conducted extensive research on the effects of marine noise:

> The working assumption that impulsive noise never disrupts marine mammal behavior at levels below 160 dB (RMS), and disrupts behavior with 100% probability at higher levels has been repeatedly demonstrated to be incorrect, including in cases involving the sources and areas being considered in the Arctic DEIS. That 160 dB (RMS) threshold level originated from the California HESS panel report in the late 1990s1 and was based on best available data from reactions to seismic surveys measured in the 1980s. Since then considerable evidence has accumulated, and these newer data indicate that behavioral disruptions from pulsed sources can occur well below that 160 dB (RMS) threshold and are influenced by behavioral and contextual co-variates. For example, migrating bowheads are known to avoid seismic air gun surveys in the Arctic at distances beyond 20 kilometers, where received levels are approximately 120-130 dB (RMS).[35]

SCB believes that given these uncertainties, especially as they may apply to the North Atlantic right whale, that seismic activities should not be permitted at this time, given the large gaps in BOEM's knowledge and information about these key scientific issues.

III. Alternative C is the Only Alternative that is Sufficiently Protective of the North Atlantic Right Whale to Ensure Compliance with the Endangered Species Act.

The North Atlantic right whale is one of the world's most critically endangered marine mammals, with an estimated population at approximately 361 individuals. In the context of the

[33] *Vermont Yankee Nuclear Power Corp. v. Natural Resources Def. Council*, 435 U.S. 519, 558 (1978); *LaFlamme v. FERC*, 852 F.2d 389, 398 (9th Cir. 1988) (internal quotation marks omitted).
[34] PEIS at 4-11.
[35] Letter from Christopher Clark, David Mann, Patrick Miller, Doug Nowacek, Brandon Southall, Comments on Arctic Ocean Draft Environmental Impact Statement, February 8, 2012. See also, Richardson, W. J., Miller, G. W., & Greene, Jr., C. R. (1999). *Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea*. Journal of the Acoustical Society of America, 106, 2281.

MMPA, the right whale is classified as strategic because the "average annual human-related mortality and serious injury exceeds [potential biological removal] (Waring et al., 2010)."[36] Continued threats to the North Atlantic right whale population include entanglements in commercial fisheries gear, vessel strikes, underwater noise, habitat degradation, and predators. The 2004 recovery plan for the right whale states: "there has been no apparent sign of recovery in the last 15 years…. the possibility of biological extinction in the next century is very real." Elsewhere, NMFS stated that the "loss of even a single individual may contribute to the extinction of the species."[37] There may have been a slight improvement in the right whale's conservation status since 2004, and in the 2010 BO regarding Atlantic lobster fisheries, NMFS concluded that "the serious injury or mortality of one right whale per year, as a result of fisheries entanglement is not likely to reduce appreciably the likelihood of both survival and recovery of the North Atlantic right whale population."[38]

However, this is not to say that the threats to right whales have abated. As the 2010 lobster BO notes, "documented serious injury and mortality to right whales decreased to an average rate of 2.8 per year. Incidental fishery entanglement records and ship strike records for the period 2004 through 2008 averaged of 0.8 (U.S. waters 0.6) and 2.0 (U.S. waters, 1.6) respectively per year."[39] And while SCB understands the statistical validity of these data, in real life, it is difficult to injure 0.8 of a particular individual right whale without injuring the remaining 0.2 of that individual. SCB understands that BOEM and NMFS must do their best to model the likely amount of Level A take of right whales from seismic activities. However, an environmental impact statement must also consider cumulative impacts of the proposed action compared to the existing baseline. Thus, if entanglements average 0.6 incidents per year in U.S. waters, ship strikes average 1.6 incidents per year, and the PEIS predicts 0.27 to 2.29 incidents of Level A take per year – which amounts to as many as *five* animals per year –, BOEM and NMFS have an obligation to consider how all of these incidents of take interact synergistically on right whale populations.

SCB hopes that BOEM and NMFS will carefully consider the cumulative impacts of pre-existing stressors on north Atlantic right whales as it weighs future seismic activities. For example, when NMFS conducted a population viability analysis (PVA) of the right whale as part of the 2010 lobster BO, NMFS concluded that, "the status quo showed an 8.6% probability of achieving a 2.0% growth rate over the next 35 years. With one less mortality per year, that probability went up to 14.7%, with one less adult female mortality per year, the probability improved to 24.6%." In other words, if existing threats continue at their current levels, the right whale has between a 75%-90% chance of either having a stable population or a population that is increasing at less than the stated recovery goal for the species. Given the conservation status of the right whale, growth of the population is essential for its survival and recovery. But G&G seismic surveys were not part of this calculus. And if seismic surveys are in fact a precursor to commercial oil and gas development along the Atlantic OCS, additional threats could potentially develop which undermine the small

[36] Draft PEIS at 4-25.
[37] *Advance Notice of Proposed Rulemaking (ANPR) for Right Whale Ship Strike Reduction*, 69 Fed. Reg. 30,857, 30,858 (June 1, 2004)
[38] *Endangered Species Act Section 7 Consultation on the Continued Implementation of Management Measures for the American Lobster Fishery [Consultation No. F/NER/2003/00956]* at 119 (hereafter "Lobster BO"), Oct. 29, 2010. Available at: http://www.nero.noaa.gov/prot_res/section7/NMFS-signedBOs/LOBSTER%20BIOP%202010.pdf
[39] Lobster BO at 23.

conservation gains that have been made over the last twenty years with the north Atlantic right whale. Whether or not these seismic activities will further jeopardize the species must not be underestimated in the BO and consultation between BOEM and NMFS. And, as will be discussed in greater detail below, the precariousness of this species in light of these threats must not be underestimated in the agency's analysis of significance for the PEIS.

IV. The Programmatic EIS's Analytical Approach Underestimates the Risks to Endangered Marine Mammals and the Environment Generally.

NEPA requires federal agencies to prepare an EIS for any proposed action "significantly affecting the quality of the human environment."[40] Accordingly, the CEQ has developed regulations that define "significantly" based on the context and intensity of the proposed action.[41] "Context" means the affected environment in which a proposed action would occur, while, "intensity" means the degree to which the proposed action would, among other things, have "highly uncertain effects or unique or unknown risks," "cumulative effects," or "adverse effects on endangered or threatened species or designated critical habitat (pursuant to the Endangered Species Act)."[42] For the PEIS, BOEM analyzed the significance to affected natural resources from G&G seismic activities and categorized the impacts as "negligible," "minor," "moderate," or "major."[43] For impacts to marine mammals, BOEM defined moderate impacts as "injury or mortality, but in low enough numbers such that the continued viability of the local population or stock is not threatened and the annual rates of recruitment or survival of the local population or stock are not seriously affected."[44] Major impacts were defined as "extensive levels of life-threatening or debilitating injury or mortality in sufficiently high numbers that the continued viability of the population is seriously threatened, including serious diminishment of annual rates of recruitment or survival."[45]

For its analysis of the effect of project-related seismic air gun survey noise, BOEM concluded that "most impacts would be limited to short-term disruption of behavioral patterns or displacement of individual marine mammals from discrete areas…including both critical and preferred habitat."[46] BOEM predicted that because impacts "would be somewhat localized and temporary in duration," and "based on the results of this analysis and proposed mitigation measures, *the effects on marine mammals would be moderate*."[47] SCB is very concerned that the conclusion regarding the significance of the impacts of seismic activities does not represent a meaningful, scientific statement because impacts must be evaluated on a species-by-species basis, not in the aggregate.

The impact of thousands of linear miles of seismic surveys over a ten-year period on a species whose global population is 361, as is the case for the north Atlantic right whale, will be far

[40] 42 U.S.C. § 4332(C).
[41] 40 C.F.R. § 1508.27
[42] *Id*.
[43] Draft PEIS at xii.
[44] Draft PEIS at 4-44.
[45] *Id*.
[46] Draft PEIS at 4-55.
[47] *Id*. (emphasis added).

different from a species whose population in the western Atlantic is 4,800 individuals, as is the case for sperm whale. And the impacts to these two species will be different than those for species such as the bottlenose dolphin and common dolphin, whose populations could easily run into the hundreds of thousands in the Atlantic. If seismic activities kill or injure one right whale, that event could diminish the entire species' annual rate of recruitment or survival, making such activity one of "major" significance. In contrast, the death of one common dolphin from seismic activities is probably of negligible significance for the species under NEPA or the MMPA. But, the PEIS fails to consider these species individually when it comes to assessing significance. Given that the PEIS provides predicted Level A and Level B take for all relevant species within the Atlantic planning areas, BOEM should also be able to assess whether or not such take reaches a particular threshold of significance by the definitions it has provided. Stating that the impacts to marine mammals will be moderate masks the gravity of the potential takes of all of the threatened, endangered and depleted marine mammals in the proposed activity area. SCB requests that BOEM provide supplemental information addressing whether anticipated take will result in major or moderate impacts for each ESA-listed or MMPA-depleted species.

CONCLUSION

Because of the lack of meaningful opportunities to comment on the adequacy of mitigation with respect to compliance with the MMPA and the ESA, and the procedural and analytical shortcomings of the current PEIS, SCB recommends that BOEM choose Alternative C, the no-action alternative.

Respectfully,

Chris Parsons, Ph.D.
President, Marine Section, Society for Conservation Biology

Hedley Grantham, Ph.D.
Chair, Policy Committee, Marine Section, Society for Conservation Biology

Andrew Wright, Ph.D.
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From:	SHSLFoundation@aol.com
To:	G&GEIS
Cc:	science@cleanoceanaction.org; thomasarmbruster320@comcast.net; business@cleanoceanaction.org
Subject:	Comments on Draft Atlantic G & G Programmatic EIS
Date:	Tuesday, May 01, 2012 11:50:57 AM

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

Dear Mr. Goeke,

SandyHook SeaLife Foundation opposes the DPEIS released by BOEM and strongly opposes any exploration for oil and/or gas in the Atlantic, but most especially via seismic surveys. These 'surveys' create intense marine noise pollution that extend over vast areas of ocean, in this case along the ocean floor from Florida to Delaware, and would cause severe damage to both marine life and marine ecosystems.

SSF believes that a significant amount of data, presenting the economic value of a drill-free Jersey shore, and the ultimate damage to wildlife caused by seismic surveying, has been presented and we urge you to consider the weight of that data and adopt the "No Action Alternative" on this matter.

Thank you for your time.

For the Ocean,
Thomas Armbruster, MD
President & Founder
SandyHook SeaLife Foundation™ Highlands, NJ 07732
Marine Conservation through Education, Volunteerism & Political Action
Member of Blue Frontier Campaign, The Ocean Project & Shark Alliance
Supporter of The Campaign for Environmental Literacy
Website: http://www.sandyhooksealife.org
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From:	Grant Campbell
To:	G&GEIS
Cc:	Frank Jackalone; bgparadise@comcast.net
Subject:	Comments on seismic airgun surveys
Date:	Wednesday, May 02, 2012 3:29:38 PM

At a time when we are trying desperately to wean the world from the burning of fossil fuels, the fossil fuel industries do not wish to give up their cash cows and are driven ever deeper into exploration for offshore oil and gas deposits using seismic airgun surveys.

Seismic airgun surveys are conducted by trawling arrays of airguns which create an explosion every 10-15 seconds. The noise permeates the seafloor and the signal that reflects back is deciphered to portray the substrates below. The noise also causes destructive disturbances to wildlife and habitat, such as broken corals, disoriented whales and dolphins and possible hearing loss and disorientation, or even death, as well as migratory disruptions, in endangered sea turtles and other sea-life.

These surveys can often be heard thousands of miles from the source and, although not all deleterious effects are known or proven, it is not worth taking the chance of damaging our earth any more than we already have.

The tremendous profits made by the fossil fuel industries would be far better spent in developing alternative energy and helping the rest of the world provide a cleaner, healthier environment for our future generations.

Grant Campbell
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Protecting nature. Preserving life.™

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Via email to GGEIS@boem.gov; hard copy to follow

July 2, 2012

Gary Goeke
Chief, Regional Assessment Section
Office of Environment (MS 5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Re: Draft Programmatic Environmental Impact Statement – Geological and Geophysical Exploration on the Atlantic Outer Continental Shelf (OCS)

Dear Mr. Goeke:

On behalf of my colleagues in the Eastern Division of The Nature Conservancy, I thank you for this opportunity to provide comments on the Bureau of Ocean Energy Management (BOEM) Draft Programmatic Environmental Impact Statement (DPEIS) on Geological and Geophysical Exploration on the Atlantic Outer Continental Shelf (OCS). Our comments on the DPEIS build on those we submitted to Joseph Christopher at the Minerals Management Service on May 17, 2010 in response to the scoping notice for this project.

Background on The Nature Conservancy and our interest in coastal and marine conservation
The Nature Conservancy (the Conservancy) is a non-profit organization with a mission to conserve the lands and waters on which all life depends. We are best known for our science-based, collaborative approach to developing creative solutions to conservation challenges. We work on the ground in all 50 states and more than 30 countries and enjoy the support of approximately one million individual members.

The Conservancy has worked at more than one hundred marine sites around the globe employing a variety of strategies for marine conservation including habitat restoration at important nursery and spawning areas; removal of invasive species; protection of key coastal lands; private conservation of submerged lands; establishment of protected areas; management of extractive activities; reduction of nutrient and toxic inputs to coastal systems; the development, compilation, and analysis of coastal and marine data to drive better

management decisions; and a variety of related policy measures. We select our appropriate conservation strategies in concert with public and private partners and based on the biological, socioeconomic, and governance circumstances at each site. Additional details regarding the Conservancy's coastal and marine work in the Mid- and South Atlantic are available in our May 17, 2010 comment letter.

Summary of our comments and recommendations

1. BOEM needs to acknowledge the connection between geological and geophysical activities and future extraction/development activities (oil and gas, renewable energy, and marine minerals) and evaluate whether locations within the Area of Interest (AOI) are appropriate or inappropriate for both sets of activities.
2. Based on Executive Order 13547 (Stewardship of the Ocean, Our Coasts, and the Great Lakes) and BOEM's stated interests in reducing conflicts, minimizing regulatory uncertainties, and improving economic and environmental outcomes, BOEM use a data-driven, stakeholder-led process to rationally allocate ocean space and resources to complete this PEIS and handle subsequent leasing and permitting actions.
3. BOEM needs to employ the full hierarchy of mitigation actions in all the alternatives it evaluates to ensure that it avoids, minimizes, and offsets impacts to species and habitats.
4. BOEM should develop additional alternatives that locate different activities within different portions of the AOI and phase in lease and permit requirements based on available technologies and adaptive management.
5. BOEM needs to continue to work hard to close existing data gaps and, wherever possible, make publically available non-proprietary data from geological and geophysical surveys and associated protected species observer programs.
6. BOEM needs to outline a transparent and rigorous adaptive management framework, including the mandated incorporation of new technologies and improved mitigation measures.
7. Lastly, BOEM needs to improve its cumulative impacts analysis so it is clear that moderate to major impacts have not been overlooked.

The remainder of this document addresses these issues in more detail.

Connection between activities considered under this PEIS and future extraction and/or development activities

When the comment period for the scoping notice of this PEIS closed in May 2010, oil was still spilling from the damaged Macondo well nearly a mile below the surface of the Gulf of Mexico following the explosion and subsequent collapse of the Deepwater Horizon drilling platform. The Conservancy devoted considerable attention in our letter to the Deepwater Horizon accident and the future of offshore oil and gas development in new geographies on the OCS. In summary, we recommended that the then-constituted Minerals Management Service postpone action on the PEIS until "an independent investigation of the Deepwater Horizon accident is complete, its recommendations released, and MMS and the Department of Interior

understand the full import of those recommendations on its offshore oil and gas leasing program."

In a report titled, *ASSESSING PROGRESS: Implementing the Recommendations of the National Oil Spill Commission*, former members of the National Commission on the Deepwater Horizon Oil Spill and Offshore Drilling submit that much work remains to be done to significantly reduce the probability of similar accidents in the future. The report also highlights that significant work also remains to ensure that government and industry are well-equipped to respond if such an accident were to occur. However, the Conservancy understands that the Congressional directive for this geological and geophysical work included in the Conference Report for the Fiscal Year 2010 USDOI, Environment and Related Agencies Appropriations Act makes it difficult for BOEM to delay further this PEIS.

It is nevertheless important that BOEM be clear that private industry will undertake geological and geophysical exploration activities primarily to generate data they can either use themselves or sell to other entities interested in mining sand or gravel, constructing wind energy facilities, or, most significantly, developing oil and gas reserves on the OCS. While the activities causing impacts may be different for exploration versus drilling, the issues of primary environmental concern – damage to sensitive marine habitats and species – are largely the same. As such, BOEM needs to consider exploration and drilling as closely interconnected activities whenever possible, most especially with regards to spatially explicit avoidance measures within an overall mitigation framework (discussed in more detail under the *Mitigation* and *Amended Alternatives* sections below). BOEM can avoid some adverse impacts to marine mammals and other fauna by not permitting exploration activities in areas that are unsuitable for future development.

Lastly, we note that while the Conservancy does not oppose the full suite of geological and geophysical activities across the entire AOI, we may oppose the inclusion of oil and gas lease sales along the Atlantic Coast in future five year programs developed by BOEM and the Department of the Interior.

Importance of coastal and marine spatial planning

Offshore energy, fishing, recreational use, sand and gravel extraction, tourism and shipping are all economic engines that support our country, providing hundreds of billions of dollars of economic benefits each year. Healthy oceans and coasts are an integral part of this coastal and marine economy and are essential to everyone's quality of life. Recognizing the indistinguishable link between economic vitality and ecological health, President Obama, via executive order in July 2010, established a National Ocean Policy and adopted the recommendations of The White House Council on Environmental Quality's Interagency Ocean Policy Task Force. Those recommendations included a framework for effective coastal and marine spatial planning (CMSP), a data-driven, multi-sector decision-making process that creates a blueprint for ocean use and conservation. As articulated in President Obama's Executive Order:

> *Coastal and marine spatial planning identifies areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives. In practical terms, coastal and marine spatial planning provides a public policy process for society to better determine how the ocean, our coasts, and Great Lakes are sustainably used and protected- now and for future generations. (Executive Order 13457, 2010)*

The Conservancy strongly supports CMSP as a key tool in the President's vision of a national policy for our ocean, coasts, and Great Lakes and is actively involved in advancing the policy and practice of CMSP. As we have stressed in previous comments to BOEM on proposed programs for oil and gas and various evaluations of wind energy projects, we do not expect BOEM to delay action on this PEIS until the relevant Regional Planning Bodies develop comprehensive regional ocean plans encompassing the Mid- and South Atlantic Planning Areas. We do suggest, however, that BOEM continued to align its planning, review, and leasing activities with the recommendations of the interagency task force, including the twelve national guiding principles for CMSP.

On this PEIS specifically, one key step is to identify areas incompatible with future energy or mineral extraction/development based on existing human uses and/or sensitive and significant habitats and species, and to exclude or limit geological and geophysical exploration in those areas. The Conservancy offers its own recommended exclusion areas in this letter, and we expect other stakeholders, including the Department of Defense, commercial fisherman, recreational interests, and the shipping industry will also highlight areas of concern. While being responsive to all affected stakeholders by itself does not constitute full application of CSMP principles, it is a practical and concrete step in the right direction. As such, this PEIS offers an important opportunity to support the National Ocean Policy by putting CMSP principles into practice. Having a fuller understanding of the overlapping or competing interests within the AOI prior to moving forward on any specific leasing decisions will allow BOEM and private industry to make proactive decisions and avoid costly delays and controversy.

Employing the full suite and proper sequence of mitigation actions

The Council of Environmental Quality defines mitigation to include, in order of preference, avoidance, minimization, and a variety of measures to offset or compensate for unavoidable impacts (40 CFR § 1508.20). This mitigation framework is explained further in report by the Environmental Law Institute and the Conservancy as, "an approach to the foreseeable impacts of projects that requires first making every effort to avoid damages to environmental resources, then minimizing that damage that cannot be avoided, and only then offsetting the damage that cannot be avoided or minimized" (Wilkinson, et al, 2009).

The Conservancy is concerned that DPEIS relies on a much more narrow definition of mitigation. Indeed, the DPEIS fails to utilize the full sequence of mitigation actions, and this deficiency means that impacts to both habitats and species, including protected species, will be greater in number and severity than is necessary. In summary, the deficiencies are as follows:

- *Avoidance* - While the Conservancy appreciates that the DPEIS does include some spatially explicit avoidance measures, these exclusions areas are currently too small and too narrowly defined. Many more areas merit exclusion from at least some portion of the proposed action.
- *Minimization* – By rejecting a full analysis and the incorporation of a number of different technology-based minimization measures, the DPEIS misses an opportunity to reduce impacts to sensitive resources.
- *Offsets* – Lastly, despite the fact the DPEIS highlights a number of unavoidable impacts, including impacts to threatened and endangered species, the document fails to provide any description of appropriate measures to compensate for those impacts.

These issues are discussed in more detail below.

Avoidance Areas

Identifying geographical areas where impacts will be avoided altogether, otherwise known as 'avoidance areas' or 'no take zones', is the first step in the overall mitigation framework (McKenney and Kiesecker, 2010). Avoidance areas should be established where the resource is irreplaceable and where take would either cause irreversible impact to the species or its population or where mitigation of the take would have a low probability of success. Therefore, it is the sensitivity of the resource not the level of activity that should dictate the location of avoidance areas.

The Conservancy appreciates that BOEM identifies the central importance of avoidance in any comprehensive mitigation program. Indeed, in Section 2.1.2.6 of the DPEIS, BOEM states that, "A basic mitigation philosophy for BOEM is to mitigate by avoidance." The Conservancy also appreciates the time-area closure for North Atlantic right whales included in Alternative A and the expanded version of that closure coupled with a time-area closure for nesting sea turtles offshore of Brevard County, Florida in Alternative B. By themselves, however, these avoidance areas are insufficient to protect key habitats and species.

The Conservancy submits that one key reason that BOEM has included relatively few avoidance areas is that the agency has generally limited its analysis to only those impacts specifically related to the geological and geophysical activities covered by this PEIS. While a focus on direct impacts is understandable, it is incomplete. An analysis that considers the extraction and construction activities that may follow from the geological and geophysical activities is more robust and would suggest a number of additional areas appropriate for avoidance. Put another way, areas with documented high ecological value and sensitivity to disturbance are inappropriate for oil and gas development and most renewable energy projects and sand and

gravel mining. Since those development activities should not occur in these areas of high ecological value, there is scant justification for permitting geological and geophysical activities in these same locations, especially those activities like deep penetration seismic surveys that by themselves have been documented as having adverse impacts to living resources.

Based on this more holistic approach to evaluating the totality of potential impacts, our review of the DPEIS, and the Conservancy's own ecological assessments within the AOI[1], we recommend strongly that BOEM establish the following three categories of avoidance areas (see Appendix 1 and Maps 1-3 for more detailed descriptions and graphic representation respectively of these areas):

1. Cetacean Conservation Areas (Map 1) – As is documented in the DPEIS, cetaceans are the group of species most vulnerable to serious, even fatal, impacts from certain geological and geophysical activities, most notably airgun arrays used for deep penetration seismic surveys. Unfortunately, all of the Northwest Atlantic's large whales are federally endangered, and all cetaceans are protected under the Marine Mammal Protection Act (MMPA). Accordingly, the Conservancy recommends that no deep penetration seismic surveys or other surveys that utilize airguns be permitted year-round in the following areas, unless new, dramatically less impactful technologies are used:

- North Atlantic right whale critical habitat and migration routes as established in Alternative B
- High abundance areas for sperm whales, striped dolphin and bottlenose dolphin

2. Significant Benthic Habitats and Other Critical Conservation Areas (Map 2) – As is also documented in the DPEIS, the AOI contains a number of extremely important benthic habitats and other areas that support high levels of biodiversity and are of special value to sea turtles and/or commercial fish species. As none of these areas would be appropriate for oil and gas development and all contain living resources that can be impacted by seismic surveys, the Conservancy recommends that these areas be closed to airgun-based surveys. Additionally, the areas containing important benthic habitats should be closed to most geological and geophysical activities involving seafloor-disturbing activities, most notably Deep Stratigraphic and Shallow Test Drilling. Limited seafloor-disturbing activities, such as sediment sampling, that are aimed at providing additional information on seafloor habitats, geological hazards, etc. may be appropriate if exercised with appropriate protocols and safeguards.

[1]Northwest Atlantic Marine Ecoregional Assessment (Green et al. 2010), Carolinian Marine Ecoregional Assessment (DeBlieu et al. 2005), and Florida Marine Ecoregional Assessment (Geselbracht et al. 2005).

Avoidance Areas based primarily on documented presence of sensitive benthic habitats[2]

- Canyons and Canyon Heads (including Norfolk, Baltimore, and Wilmington Canyon Complexes and Georgetown Hole)
- Gray's Reef and Monitor National Marine Sanctuaries
- Ten Fathom Ledge and Big Rock
- Oculina Bank

Avoidance Areas based primarily on documented importance to sensitive marine species

- Sea turtle nesting aggregation area off Brevard County, Florida
- South Atlantic Deepwater Marine Protected Areas
- The Point

3. Other Areas of Conservation Concern (Map 3) – There are several additional areas with significant benthic habitats and of great importance to a variety of marine species, including numerous commercial fish species and deepwater corals. In recognition of the value of these areas, the South Atlantic Fisheries Management Council has designated these areas as Essential Fish Habitat - Habitat Areas of Particular Concern (HAPCs) and established a variety of protection measures for species and habitats found within. While the value of these species and habitats is no less than those associated with the areas listed under *Significant Benthic Habitats and Other Critical Conservation Areas* above, the large size of these HAPCs and the more scattered nature of the resources located within the boundaries suggests a slightly different approach. Namely, at this stage the Conservancy does not recommend that these areas be permanently closed to airgun-based seismic surveys or all seafloor-disturbing geological or geophysical activities. Instead, the Conservancy recommends that those activities be postponed in these areas until more data collection and analysis can be conducted to determine specific locations within these larger areas where avoidance is appropriate and other areas where geological and geophysical activities can proceed. The areas that the Conservancy highlights within this category are as follows:

- Charleston Bump and Gyre Complex
- Deepwater Coral (Lophelia) HAPCs
- Golden Tilefish HAPC

Lastly, it is important to note that these exclusion areas are based on data that is currently available. As BOEM is aware, there are significant data gaps regarding species and habitats—

[2] It is worth noting that BOEM makes clear in the DPEIS that it will require specific avoidance measures for important benthic habitats before authorizing seafloor-disturbing geological and geophysical activities in future leases. Additionally, many of the habitat types and spatially explicit areas BOEM highlights are identical to those we highlight this letter. BOEM states, however, that it "has not designated specific benthic locations for avoidance in the AOI." While the Conservancy appreciates BOEM's stated interest in protecting sensitive bottom habitats, it is more efficient and more logical to designate specific avoidance areas for benthic habitats in the AOI in the PEIS itself.

especially data on marine mammals and sensitive benthic habitats on the shelf (both addressed below in more detail). Indeed, it is fair to say that we know even less about the life histories, movements, and behaviors of many species that could be impacted by activities covered by the PEIS than the geologic and geophysical attributes of the AOI. When more data on habitats and living resources is available, it is likely that there will be additional areas appropriate for exclusion from many geological and geophysical activities.

Minimization Measures

Overall, the Conservancy supports the minimization measures outlined in the DPEIS, including the additional requirements in Alternative B (separation between simultaneous seismic airgun surveys and required passive acoustic monitoring). However, we submit that BOEM is missing significant opportunities to reduce troubling impacts to marine species, including takings of endangered species, by not requiring the use of a number of non-airgun acoustic technologies. The potential viability and sustainability of these technologies were reviewed at the Okeanos Seismic Airgun Alternatives Workshop held in Monterey, California in 2009. The conclusions of this workshop – directly excerpted from the workshop report (Weilgart 2010) – were as follows:

- Airguns produce "waste sound" that is not used by the industry, yet has the potential to impact marine life;
- This sound (mainly high frequencies and lateral propagation) could be eliminated without sacrificing any data quality for the hydrocarbon industry;
- Reducing peak sound levels is a worthwhile goal even at the expense of requiring a slightly longer signal;
- Technologies are available or emerging that introduce no or substantially less anthropogenic sound into the environment;
- Less sound may be required to gather the same quality of data with the new, more sensitive receivers; and
- Regulatory pressure, [associated] incentives, [and] more funding to develop these technologies will expedite their availability and broaden their applications.

In Section 2.5.6 of the DPEIS, BOEM reviews these same technologies and concludes that many of them would be viable and would produce far fewer acoustic impacts than conventional airguns. Yet BOEM contradicts its own findings by ultimately rejecting *all* of these technologies for further analysis in the PEIS. In Section 2.5.6.8, BOEM states that:

> *The non-airgun alternative would not meet the purpose and need specified in Chapter 1. Alternative acoustic sources are in various stages of development, and none of the systems with the potential to replace airguns as a seismic source are currently commercially available for use on the scale of activity considered in the proposed action scenario described in Chapter 3.*

Such a conclusion seems unwarranted based on the preceding review of technologies and forfeits a tremendous opportunity to drive the timely development of these technologies by

simply requiring them to be employed, if not at the very start then at least by some later date during the 2012-2020 time period covered by this PEIS. As the Okeanos workshop highlights in its report, "regulatory pressure [and the associated financial] incentives… to develop these technologies will expedite their availability and broaden their applications." BOEM's own review of many of the technologies strongly indicates that requiring their use (not of any one specific technology but any that can meet technical standards while substantially reducing acoustical impacts) would produce the sort of market incentives necessary to transform technological advancements into commercial scale applications. Additionally, the expected time frame for that transformation was often referenced as a year or two, so phased in requirements for more environmentally-sensitive technologies certainly seems feasible within the time frame of the PEIS.

Compensatory Mitigation

The DPEIS fails to address compensation for unavoidable and incidental impacts, the third step in the mitigation hierarchy. In the case of these activities, the biggest driver for offsets from unavoidable impacts is take of threatened or endangered species, including marine mammals and sea turtles. While BOEM does state that additional mitigation may be required as a result of ESA or MMPA consultations with the National Marine Fisheries Service, the Conservancy submits that it would be appropriate for BOEM and NMFS, as a cooperating agency, to provide a clear framework for compensatory mitigation activities in the PEIS. That framework should identify the preferred compensation mechanism, refine its existing models to better estimate take of marine mammals and other protected species, and develop a transparent and defensible methodology for determining appropriate offsets.

Suggested amendments to existing alternatives

The Conservancy recognizes that every Alternative included in the PEIS requires rigorous and, at times, expensive analysis. Accordingly, we understand that it is not feasible for BOEM to evaluate every possible combination of approaches. That being said, however, the current suite of options – Alternatives A, B, and C – do not capture an appropriately diverse suite of alternatives, leaving the public largely with a choice between no oil and gas related geological and geophysical tests/surveys (Alternative C) and a comprehensive suite of activities across the entire AOI, aside from limited time-area closures (Alternatives A and B). Additionally, because modeling results for projected impacts are aggregated into a handful of categories (negligible, minor, moderate, and major), Table 2.2 suggests that there are almost no statistical differences in impacts between Alternative A and B. More fine-scaled information suggests more meaningful differences. For example, in the Introduction of the DPEIS, BOEM states that:

> *The expanded time-area closure for North Atlantic right whales under Alternative B would reduce the risk of acoustic and vessel strike impacts on this species. Although incidental take was not modeled for Alternative B, it is estimated that the expanded time-area closure would avoid approximately 80 percent of the incidental takes of North Atlantic right whales over the period of this Programmatic EIS (as compared with no closures). In contrast, the Alternative A*

time-area closure would be expected to avoid about 67 percent of the right whale incidental takes.

Considering the highly endangered status of the North Atlantic right whale, a nearly 20 percent reduction in anticipated take merits serious consideration and more prominent emphasis.

A more diverse suite of Alternatives would recognize that the AOI is very large and quite diverse, the time period covered by this PEIS (2012-2020) is fairly long, and the program areas (oil and gas, renewable energy, and marine minerals) encompassed are highly variable. Thus, BOEM should develop additional alternatives that:

- Acknowledge that the AOI is not a single, monolithic area, but instead contains a great diversity of human uses and ecological resources. Those uses and many of those resources have defined locations that can be mapped (see our proposed avoidance areas on Map 1-3 as an example). Thus, BOEM should evaluate the appropriateness of geological and geophysical activities in different portions of the AOI based at least in part on the location and compatibility of other uses and ecological resources.
- Use the full time period of the PEIS to phase in certain requirements based on the availability of new technologies and/or operational changes based on adaptive management (see Monitoring and Adaptive Management section below);
- Recognize that differing program areas require different sorts of data, distinctions that also can have spatial ramifications.

While the Conservancy strongly urges that every alternative in the PEIS utilize the full mitigation hierarchy as outlined above, including the Conservancy's recommended avoidance areas, we offer these comments to urge BOEM to think more creatively about the various ways it can meet the stated purpose and need of the proposed action while ensuring that impacts to the human and natural environment are mitigated as effectively as possible.

Addressing data gaps and data availability

As the Conservancy highlighted at some length in our May 17, 2010 comment letter, we remain concerned that BOEM does not have the data necessary for a comprehensive and thorough assessment of environmental impacts associated with geological and geophysical activities in the Mid- and South Atlantic Planning Areas. As funding for these efforts is obviously a concern, we encourage BOEM to utilize fully its existing authorities (or work with Congress if those are not sufficient) to secure a small portion of any future lease revenue specifically for data collection and analysis efforts. Continued investments in independent research and monitoring through its Environmental Studies program appear to be an especially important effort for BOEM to be able to greatly minimize data gaps in the future.

Data gaps with marine mammals

In evaluating impacts of seismic activities on living resources, the Conservancy is most concerned about the lack of marine mammal data, especially for the five federally endangered

large whale species found in the Mid- and South Atlantic: the fin, humpback, North Atlantic right, sei, and sperm. The complete lack of data on beaked whales including True's, Gervais', Blainville's and Sowerby's is particularly troubling as these species are known to occur most frequently along and beyond the shelf-slope break where conventional energy development is most likely to be located. Additionally, beaked whales are known to be extremely vulnerable to injury and death from anthropogenic noise. While the population level impacts of seismic-generated noise on marine mammals and other species are not yet fully understood, decades of research clearly indicate that effects can be significant and adverse. We appreciate that BOEM acknowledges these data gaps and incomplete information in several places through the DPEIS and addresses the issue overall in Section 4.1.4.1 *Analysis and Incomplete or Unavailable Information.* However, the fact remains that BOEM does not have sufficient data on the presence and absence of large whale species, stock identification, timing of migrations and overwintering, and characterization of key activities and behaviors (such as feeding and reproduction) needed to fully evaluate and mitigate for seismic and acoustical impacts to these species. At the risk of stating the obvious, we stress that an absence of data does not indicate an absence of impacts. BOEM and other federal agencies such as NOAA, in collaboration with industry and research institutions, will need to continue to expand efforts to collect and analyze data on large and beaked whales and other marine mammals before the harmful impacts of geological and geophysical survey activities to these animals can be adequately mitigated.

Data gaps with benthic habitats

Additional sensitive seafloor habitats almost assuredly exist but have not yet been identified in poorly surveyed nearshore and shelf areas throughout the AOI. Cold water coral habitat especially is likely much more extensive and ecologically important throughout the Mid-Atlantic than the current literature suggests. An inventory of the location and distribution of naturally occurring areas of corals and hard bottoms should be one of BOEM's top priorities to address. These important habitats have been found on the continental shelf 10-20 miles offshore of Ocean City, Maryland and include sea-whip meadows (*Leptogorgia virgulata*, a soft coral) and boulders and sand stone slabs densely colonized by northern star coral (*Astrangia poculata*, a hard coral), anemones, sponges and other invertebrates. In the South Atlantic, it has been estimated that these habitats could constitute up to 30 percent of the continental shelf between Cape Fear and Cape Canaveral (Parker, et al. 1983). These habitats are extremely vulnerable to bottom disturbance and appear to be critically important for black seabass (*Centropristis striata),* tautog (*Tautoga onitas*), and other economically important species. Once more fully inventoried and documented, all such live bottom habitats should be excluded from any bottom disturbing activities.

Prioritizing data collection and analysis efforts

We submit that the MMS-sponsored *Workshop on Environmental Research Needs in Support of Potential Virginia Offshore Oil and Gas Activities* (Diaz et al. 2009) presents very well-informed recommendations regarding surveys, data collection, and monitoring that must take place in the Mid- and South Atlantic OCS. Additionally, we again refer BOEM to the recent report by the Joint Subcommittee on Ocean, Science and Technology entitled "Addressing the Effects of

Human-Generated Sound on Marine Life." This report outlines targeted research priorities for the federal government regarding ocean sound, emphasizes the collection of baseline biological information, urges better understanding of sound sources and their effects (seismic testing being one of the top priorities for research), and recommends the advancement of monitoring programs and mitigation measures for minimizing industrial noise in the ocean (Southall et al. 2009). The Conservancy asks that, to the greatest extent possible, BOEM fully implement the recommendations of this report as part of the development of this PEIS. In addition, we invite BOEM's Regional Assessment Program to access the publicly available spatial data products the Conservancy has assembled for the Atlantic coast at http://www.nature.org/easternusmarine. We welcome the opportunity to meet with BOEM staff to review these data in more detail and explore opportunities for further collaboration on this front.

Data available to the public

The Conservancy also strongly recommends that BOEM ensure data and observations on living marine resources and seafloor habitats collected by industry as part of the geological and geophysical surveys permitted by the PEIS be used to address these data gaps. To do this effectively, BOEM will need to establish a basic framework for such work in this PEIS and develop more detailed guidance for incorporation into specific leases and associated permits for such activity. The key elements of such a framework will be a) comprehensive and consistent protocols for data collection and b) requirements that certain information captured through geological and geophysical activities be made publicly available. The Conservancy certainly recognizes that much of the data collected by geological and geophysical activities is proprietary. Other information, such as the presence of deepwater corals or the nature of seafloor sediments should not be, as that information does not reveal economically recoverable resources but does help indicate degree of ecological compatibility with development activities. Additionally, some information that might be otherwise proprietary could be made public in aggregate or summary form.

Monitoring and adaptive management

As we stated in our May 17, 2010 comment letter, the Conservancy recommends that all alternatives considered in the PEIS stipulate robust monitoring plans to determine actual impacts on marine resources, the effectiveness of mitigation measures, and what steps BOEM needs to take to adaptively manage where and under what conditions geological and geophysical activities occur in the future.

In Section 2.5.4 of the DPEIS, BOEM asserts that one reason it did not evaluate an alternative that would have delayed geological and geophysical activities until more baseline information is available to evaluate impacts or until improved mitigation methods are developed and tested was, "because the proposed action includes an adaptive management approach that would incorporate new technology and improved mitigation measures as they are developed and proven efficacious."

While the Conservancy does not necessarily agree that such a delay is unwarranted, we do submit that adoption of a comprehensive and well-designed adaptive management protocol provides one way to move forward with a project in the absence of all the desired baseline information and to subsequently improve siting and operational requirements as more data becomes available. Thus, we were encouraged to see this commitment by BOEM to adaptive management. Unfortunately, when we reviewed the DPEIS, we saw no section that outlined this adaptive management approach or the required use of new technology or improved mitigation measures. The Conservancy strongly recommends that BOEM correct this oversight in the Final PEIS and provide the public with sufficient information to evaluate the efficacy and rigor of the adaptive management framework.

Cumulative Impacts

The Conservancy was pleased to see that BOEM conducted a cumulative impacts analysis in the DPEIS. BOEM acknowledges that the Atlantic Ocean is increasingly impacted by anthropogenic noise from a variety of sources, and the impacts associated with geological and geophysical activities will add to the problem and thus much be evaluated in that context. Additionally, the Conservancy appreciates that BOEM included a comprehensive list of sound generating activities in the cumulative impacts analysis. This list is consistent with the noise-producing activities identified at the Okeanos workshop in 2009.

It is unclear to the Conservancy, however, what methodology BOEM used to assign an overall vulnerability ranking to any particular species. The DPEIS reports that the Acoustic Integration Model (Section 2.1.3.2) was used to calculate incidental take in the proposed actions scenarios. However, it is unclear whether this model was used when determining impacts in the cumulative activities scenario. Further, it appears that each impact-producing factors (IPF) included in the cumulative impact scenario for a given species or group of species was assessed one at a time. What seems to be lacking in the cumulative impact scenario is a complete assessment of how all of the IPFs together will impact the viability of the species. The participants in the Okeanos workshop developed new approaches to modeling and mapping cumulative impacts of noise on both marine mammal populations and individuals, and they stressed that once vulnerability scores are assigned for each impact, then vulnerability measures should be "weighted and combined into an overall vulnerability score" (Wright, 2009). The analysis in the DPEIS seems to fall short of this step. Thus, the Conservancy submits that it is very difficult to determine whether or not a number of negligible to minor impacts to a species or group of species add up to a moderate to major cumulative impact. The Conservancy recommends that BOEM either clarify the methodology and analysis in the DPEIS or redo the cumulative impacts analysis consistent with the recommendations and protocols outlined in the report from the 2009 Okeanos workshop.

In conclusion, let me again thank you for the opportunity to provide comments to BOEM on this important issue. If you have any questions about these comments, please contact David Phemister, our Director of Federal Government Relations in Virginia, at 434-951-0584 or dphemister@tnc.org.

Sincerely

John Cook
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Attachments: Maps 1-3

Cc w/ attachments

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Appendix 1
Descriptions of Areas Recommended for Avoidance

Cetacean Conservation Areas (Map 1)

North Atlantic right whale critical habitat and migration routes – The North Atlantic right whale is one of the most endangered mammals on the planet, and by far the most endangered large whale. The calving grounds of the federally endangered North Atlantic right whale are located in the shallow nearshore waters between the Altamaha River in Georgia and Sebastian Inlet, south of Cape Canaveral on the Florida coast. The National Marine Fisheries Service designated these 500,000 hectares as Critical Habitat for the North Atlantic right whale. Additionally, the North Atlantic right whale migrates through the nearshore waters of the Mid- and South Atlantic to spend summers in the Gulf of Maine and Bay of Fundy. NMFS has established a Special Management Area with associated vessel speed limits throughout portions of that nearshore migration corridor. The Conservancy supports the expanded closure zone outlined in Alternative B (a continuous 37-km (20-nmi) wide zone extending from Delaware Bay to the southern limit of the AOI) to prevent impacts on right whales along their entire migration route and calving and nursery grounds.

High abundance areas for sperm whales, striped dolphin and bottlenose dolphin – Striped and bottlenose dolphins are protected under the Marine Mammal Protection Act (MMPA) and the bottlenose dolphin is MMPA-listed as depleted throughout its western North Atlantic range. The sperm whale is MMPA listed as depleted and listed under the Endangered Species act as endangered throughout its range. All three species are sensitive to noise impacts, and the NOAA Fisheries Office of Protected Species indicates "disturbance by anthropogenic noise, notably in areas of oil and gas activities or where shipping activity is high" is a key threat to sperm whales. In its Northwest Atlantic Marine Ecoregional Assessment, TNC analyzed toothed whale data obtained from the U.S. Navy to reveal high abundance areas for these three species, defined as ten minute squares with an abundance two or more standard deviations higher than average for the survey area. Please note that, while underway, similar analysis of important areas for marine mammals, especially toothed whales, in the South Atlantic is not yet available. Therefore, the absence of priority areas for cetaceans in the South Atlantic (aside from the aforementioned right whale) reflects much more an absence of information than actual lack of important habitats for whales and other marine mammals.

Significant Benthic Habitats and Other Critical Conservation Areas (Map 2)

Avoidance Areas based primarily on documented presence of sensitive benthic habitats

Canyons and Canyon Heads (including Norfolk, Baltimore, and Wilmington Canyon Complexes and Georgetown Hole) – The DPEIS cites 30-year old information to indicate that canyon fish fauna is dominated by cutthroat eels and grenadiers, without mentioning other species except for golden tilefish. However, submarine canyons and canyon head ecosystems provide critically important benthic and pelagic habitats for a diverse array of ecologically and commercially important fish species, as well as sea birds, marine mammals, and sharks. Such benthic species

include various flounders, hakes and skates, American lobster, and red crab. Pelagic species such as tunas, sharks, marlin, and marine mammals such as sperm whales, beaked whales, and bottlenose dolphins are well known to aggregate in canyon areas and the shelf slope break in general.

The Conservancy's Northwest Atlantic Marine Ecoregional Assessment included an analysis of 40 years of NMFS benthic trawl survey data for areas north of Cape Hatteras and confirmed that canyon head complexes are areas of persistence for several species of conservation concern with concentrated fish community diversity (Green et al. 2010). The physical features that make submarine canyons so valuable as wildlife habitat are highly vulnerable to destruction or serious degradation from bottom disturbances associated with platform and pipeline emplacements, anchors, sedimentation, and contaminants associated with oil and gas development activities or other intense construction or extractive uses. For these reasons, submarine canyons and their margins need to be fully protected from all phases of oil and gas energy development and other extractive activities, including seismic surveys or seafloor disturbing geological and geophysical activities.

The importance of canyon areas is gaining increasing recognition. The Conservancy appreciates that Norfolk Canyon was considered to be a *de facto* marine sanctuary and highlighted as an Area of Special Concern in the FEIS on the Proposed Outer Continental Leasing Program: 2007-2012 (MMS 2007). The Mid-Atlantic Fisheries Management Council (MAFMC) has designated a Gear Restricted Area for golden tilefish within Norfolk Canyon and has also recently submitted Norfolk Canyon for inclusion in NOAA's National System of Marine Protected Areas. Additionally, the New England Fisheries Management Council (NEFMC) and the MAFMC are considering other formal protections for several other canyons and inter-canyon areas within the AOI, including an option to enhance protection for all areas deeper than 300 meters. Lastly, the South Atlantic Fisheries Management Council has identified Georgetown Hole as a Habitat Area of Particular Concern and it is one of the areas being discussed as a future Marine Protected Area.

The Monitor and Gray's Reef National Marine Sanctuaries – There are two designated National Marine Sanctuaries located within the AOI: The Monitor and Gray's Reef. The Monitor is an archeologically based sanctuary designed to protect the wreck of the famed Civil War ironclad USS *Monitor*, best known for its battle with the Confederate ironclad *Virginia* in Hampton Roads, Va., on March 9, 1862. Since its sinking, the *Monitor* has become a productive artificial reef and is home to numerous fish species, including black seabass, oyster toadfish and great barracuda. Gray's Reef National Marine Sanctuary contains some of the most outstanding examples of hard live bottom in the Mid- and South Atlantic OCS. Composed of a series of rocky ridges, the sanctuary covers just 57 square kilometers but more than 66 species of reef fish have been identified in its varied habitats. The physical features that render both sanctuaries valuable as wildlife habitat are highly vulnerable to destruction or serious degradation from bottom disturbances associated with platform and pipeline emplacements,

anchors, sedimentation, and contaminants associated with oil and gas activities or other intense construction or extractive uses.

Ten Fathom Ledge and Big Rock – These two areas located off the coast of North Carolina have unique geologic and physical oceanographic characteristics and have been designated by the SAFMC as Essential Fish Habitat – Habitat Areas of particular concern for the snapper grouper complex, coastal migratory pelagics, dolphin wahoo, and deepwater corals.

Ten Fathom Ledge encompasses numerous patch reefs of coral-algal-sponge growth on rock outcroppings over 352 square kilometers of ocean floor, beginning along the southern edge of Cape Lookout Shoals. Nearby, Big Rock encompasses 93 square kilometers of deep drowned reef around the 50-100 meter isobath approximately 58 kilometers south of Cape Lookout. Unique bottom topography at both sites produces oases of productive bottom relief with diverse epifaunal and algal communities surrounded by less productive sand bottom. Approximately 150 species of reef-associated species have been documented from Ten Fathom Ledge and Big Rock. The physical features that render these sites valuable as wildlife habitat would be highly vulnerable to destruction or serious degradation from bottom disturbances associated with platform and pipeline emplacements, anchors, sedimentation, and contaminants associated with oil and gas activities or other intense construction or extractive uses.

Oculina Bank – As stated by the South Atlantic Fisheries Management Council, "The shelf-edge Oculina coral reef, located off the central east coast of Florida, is unique among coral reefs and exists nowhere else on earth. The area takes its name after the slow-growing ivory-tree coral, *Oculina varicosa*, which forms massive thickets supporting dense and diverse communities of finfish and invertebrates over a 90-mile strip of reefs. In 1984, the South Atlantic Fishery Management Council established the 92-square-mile Oculina Bank Habitat Area of Particular Concern (HAPC) in order to protect the fragile coral. The Oculina HAPC was designed to protect the area from damage caused by bottom-tending fishing gear including bottom trawls, bottom longlines, dredges, and fish traps. Subsequent management measures provided further protection to the Oculina HAPC by prohibiting anchoring, trawling for rock shrimp and by requiring the use of vessel monitoring systems (VMS) on rock shrimp vessels. Expanded in 2000, the HAPC now encompasses 300-square-miles."

Avoidance Areas based primarily on documented importance to sensitive marine species
Sea Turtles Nesting Aggregation off Brevard County – All sea turtles that occur in U.S. waters are listed as either endangered or threatened under the ESA. As noted in the PEIS, the beaches of the South Atlantic provide critical nesting grounds for four species of sea turtles: loggerhead, hawksbill, leatherback, and Kemp's ridley. Overall, the variety and number of sea turtle species nesting on beaches increases from north to south within the AOI. For this reason, the Conservancy supports the inclusion of the sea turtle nesting aggregation off of Brevard County. Monitoring the effectiveness of this exclusion area for the protection of sea turtles should be

considered within an adaptive manage framework to evaluate whether other nesting beaches should be added in the future.

South Atlantic Deepwater Marine Protected Areas – In 2009, the South Atlantic Fisheries Management Council established eight deepwater Marine Protected Areas (MPAs) to protect a suite of snapper and grouper species, including the snowy grouper, speckled hind, and blue tilefish. Many of the fish species in this management complex are slow to mature and have low reproductive rates, characteristics that make recovery from overfishing and habitat loss particularly challenging. Six of these are within AOI: Snowy Grouper, Northern South Carolina, Edisto, Charleston Deep Artificial Reef, Georgia, and North Florida MPAs. Site characteristics vary, but include hard bottom habitats, spawning and nursery areas, shelf edge habitat, upwelling areas, and mud-bottom habitat. Designated as Type 2 MPAs, these areas are permanently closed to deepwater snapper and grouper fishing, but fishing for pelagic species is permitted. These areas would be vulnerable to destruction of priority habitats and direct impacts to demersal fish communities from oil and gas activities or other intensive uses.

The Point (a.k.a. Hatteras Corner) – Located offshore from Cape Hatteras, the confluence of the Gulf Stream with as many as three other water masses creates a dynamic and highly productive environment known as The Point. Adults of many highly migratory species congregate in this area, and the diversity of larval fishes found here is astounding. These high concentrations of adult and larval species make this area significantly more sensitive to contaminants from discharges of produced water, wastes and drilling materials.

<u>Other Areas of Conservation Concern (Map 3)</u>

Charleston Bump and Gyre Complex – The topographic irregularity southeast of Charleston known as the Charleston Bump is an area of productive seafloor habitats that rise abruptly from 700 to 300 meters within the short distance of about 20 kilometers. The cyclonic Charleston Gyre is a permanent oceanographic feature of the South Atlantic Bight caused by the reflection of rapidly moving Gulf Stream waters by the Charleston Bump. The gyre produces a large area of upwelling of nutrients from depths of 450 meters to less than 50 meters. This is the single biggest source of source of nutrients near the shelf break within the entire South Atlantic Bight and contributes significantly to primary and secondary production in the ecoregion. The gyre is considered an essential nursery habitat for pelagic fish species and plays a role in retention of fish eggs and larvae and their transport to nearshore environments. The complex structure of the seafloor in this area makes it vulnerable to bottom disturbance, and its role as an upwelling site and primary nursery area is not compatible with intensive industrial uses such as those associated with the proposed geological and geophysical activities.

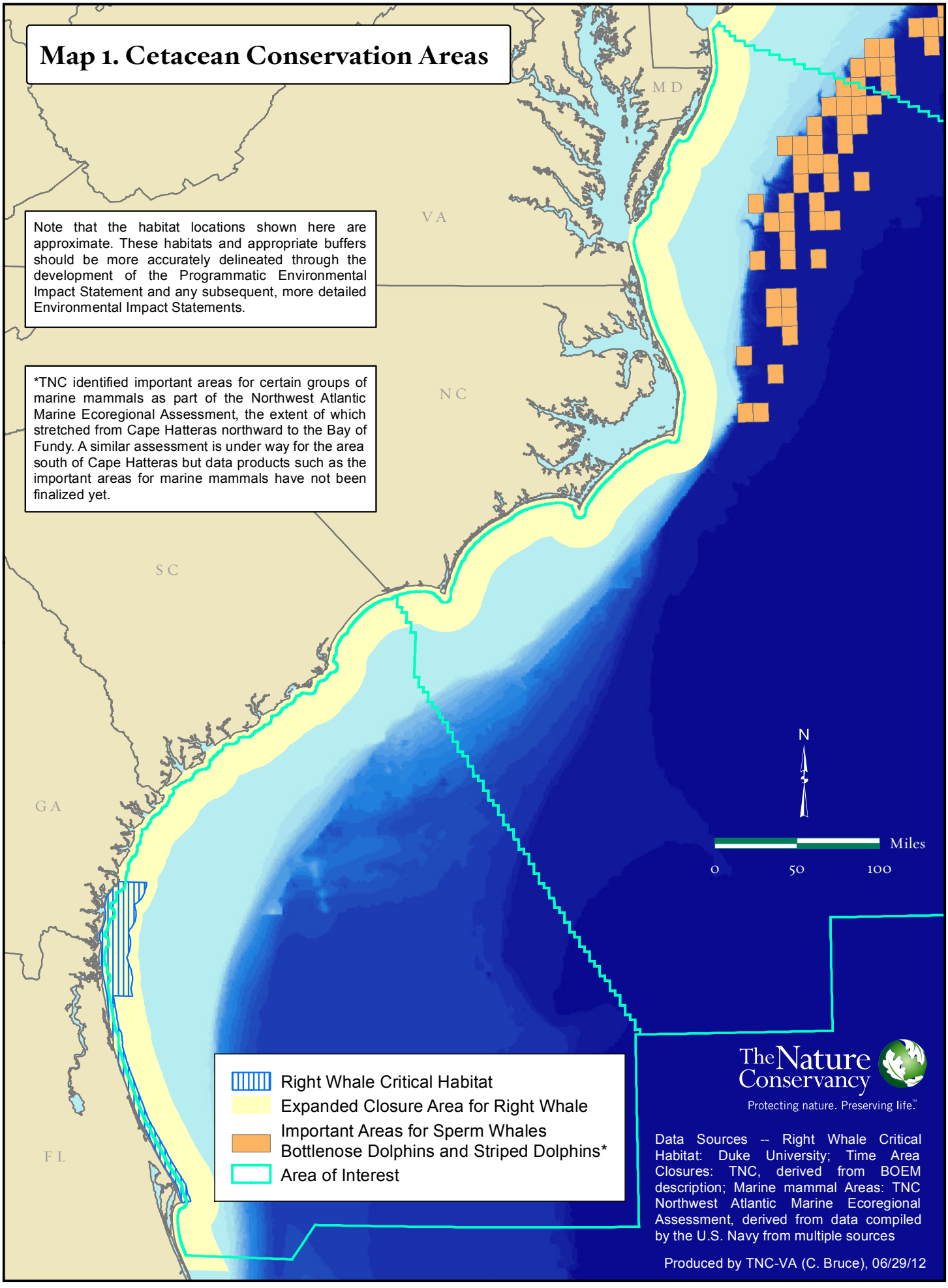
Deepwater Coral (Lophelia) HAPC – Cold water coral species are found throughout the South Atlantic. Two species, *Oculina* and *Lophelia pertusa*, form larger reef habitats that can grow to several meters in height over hundreds of years. Lophelia corals occur at greater depths, 490-870 meters, off the coasts of South Carolina, Georgia and Florida on the Blake Plateau and in the Straits of Florida (Reed, 2004). Both habitats support a wide array of fish and invertebrate

species. Recognizing the sensitivity of these coral eco-systems, the South Atlantic Fisheries Management Council has designated five areas encompassing more than 23,000 square miles as Coral Habitat Areas of Particular Concern. Four of these are located within the AOI: Cape Lookout Lophelia Banks, Cape Fear Lophelia Banks, Blake Ridge Diapir, and Stetson Reef/Savannah and East Florida Lithoherms. Designation as an HAPC restricts uses in the area, including trawling, dredging, bottom long line fishing, trapping and anchoring activities.

While less abundant overall and more scattered (and thus not depicted on Map 2), the canyons, shelf-slope break, and other more isolated locations throughout the Mid-Atlantic OCS shelter a number of sensitive marine species including diverse hard and soft cold-water corals. Individual colonies of some coldwater coral species are known to live for thousands of years, typically only growing a few millimeters a year. These ancient coldwater coral communities are extremely sensitive to any type of bottom disturbance, including energy development. All corals are also highly vulnerable to destruction or serious degradation from sedimentation during drilling activities, contaminants from discharges of produced water, wastes and drilling materials, and the explosive removal of retired structures. When coldwater corals are damaged, they may take centuries to recover, or they may be lost forever.

Golden Tilefish HAPC – Submarine canyon walls and inter-canyon areas along the shelf-slope break are critical habitat for golden tilefish (*Lopholatilus chamaeleonticeps*). Tilefish construct extensive burrows in the clay outcroppings and their burrowing activities create unique habitats that provide refuge for several other species. Their burrow networks, called “pueblo habitat” are fragile and easily damaged by physical disturbance. Therefore, the South Atlantic Fisheries Management Council has designated a long, fairly linear golden tilefish HAPC along the shelf slop break from Florida to North Carolina. The Mid-Atlantic Fisheries Management Council (MAFMC) has designated Norfolk Canyon as a Gear Restricted Area (GRA) to protect this critical habitat from bottom trawling fishing gear, though tilefish habitat is by no means restricted to this canyon.

Map 1. Cetacean Conservation Areas



Note that the habitat locations shown here are approximate. These habitats and appropriate buffers should be more accurately delineated through the development of the Programmatic Environmental Impact Statement and any subsequent, more detailed Environmental Impact Statements.

*TNC identified important areas for certain groups of marine mammals as part of the Northwest Atlantic Marine Ecoregional Assessment, the extent of which stretched from Cape Hatteras northward to the Bay of Fundy. A similar assessment is under way for the area south of Cape Hatteras but data products such as the important areas for marine mammals have not been finalized yet.

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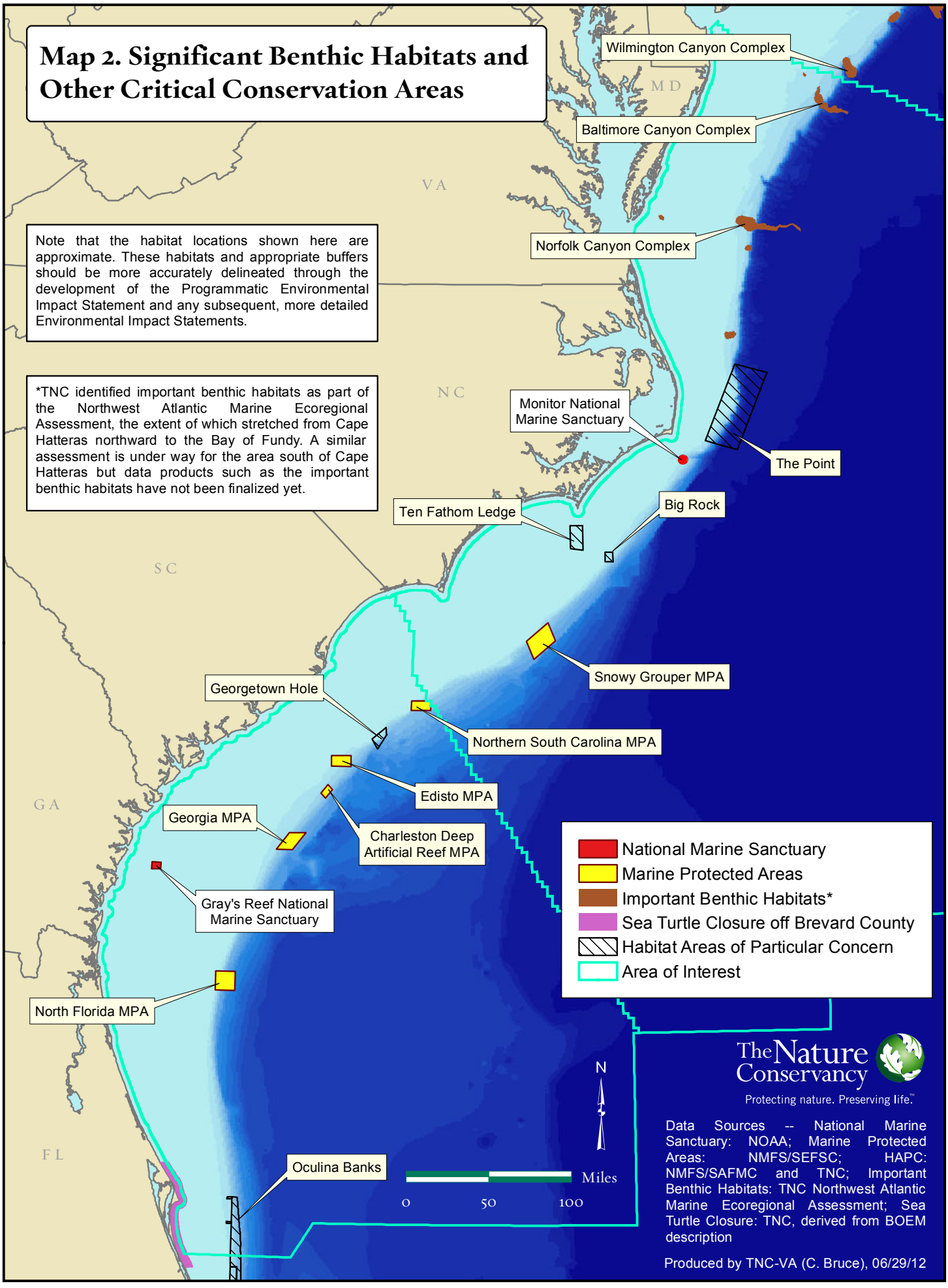
Data Sources -- Right Whale Critical Habitat: Duke University; Time Area Closures: TNC, derived from BOEM description; Marine mammal Areas: TNC Northwest Atlantic Marine Ecoregional Assessment, derived from data compiled by the U.S. Navy from multiple sources

Produced by TNC-VA (C. Bruce), 06/29/12

Map 2. Significant Benthic Habitats and Other Critical Conservation Areas



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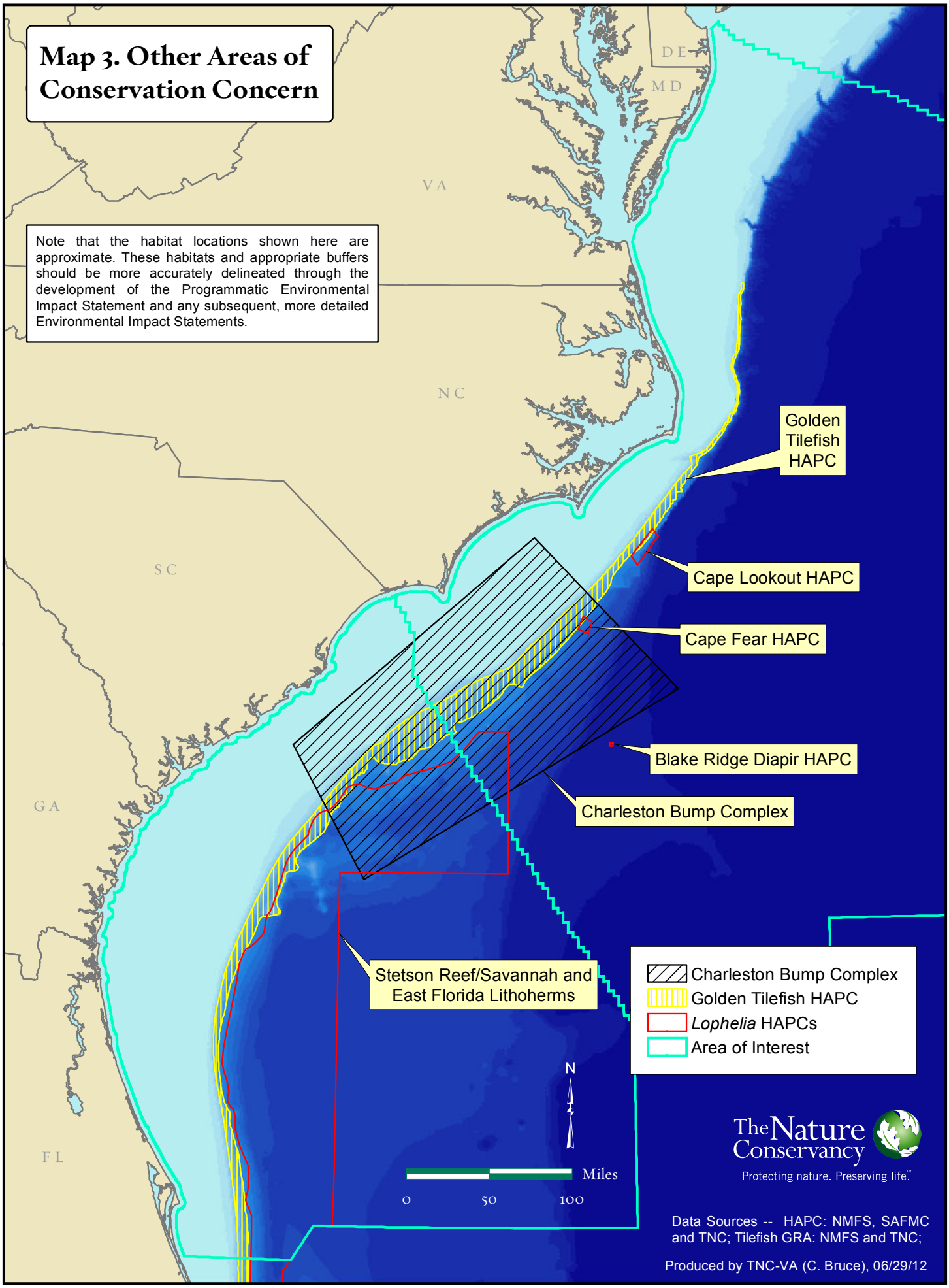
Data Sources -- National Marine Sanctuary: NOAA; Marine Protected Areas: NMFS/SEFSC; HAPC: NMFS/SAFMC and TNC; Important Benthic Habitats: TNC Northwest Atlantic Marine Ecoregional Assessment; Sea Turtle Closure: TNC, derived from BOEM description

Produced by TNC-VA (C. Bruce), 06/29/12


Map 3. Other Areas of Conservation Concern
Note that the habitat locations shown here are approximate. These habitats and appropriate buffers should be more accurately delineated through the development of the Programmatic Environmental Impact Statement and any subsequent, more detailed Environmental Impact Statements.
DE
MD
VA
NC
SC
GA
FL
Golden Tilefish HAPC
Cape Lookout HAPC
Cape Fear HAPC
Blake Ridge Diapir HAPC
Charleston Bump Complex
Stetson Reef/Savannah and East Florida Lithoherms
Charleston Bump Complex
Golden Tilefish HAPC
Lophelia HAPCs
Area of Interest
N
Miles
0
50
100
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Data Sources -- HAPC: NMFS, SAFMC and TNC; Tilefish GRA: NMFS and TNC;
Produced by TNC-VA (C. Bruce), 06/29/12

COASTAL
CONSERVATION
LEAGUE

April 5th, 2012

Mr. Gary D. Goeke, Chief, Regional Assessment Section
Office of Environment (MS5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCR Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Re: Comments on the Draft PEIS for Atlantic G&G Activities

Dear Mr. Goeke,

Thank you for this opportunity to comment on the Atlantic G&G activities PEIS. The Coastal Conservation League (CCL) is a non-profit environmental advocacy organization representing over 5,000 members in the state of South Carolina. We submit these comments related to our grave concerns regarding the potential impacts oil and gas exploration and development could have on South Carolina's natural environment, tourism industry, and quality of life.

CCL recognizes that the scope of the current PEIS is focused on geological and geophysical activities associated with the siting of renewable projects, marine mineral extraction, and oil and gas exploration, but as evidenced from the previous public hearing process and the current permit applications thus far submitted to BOEM, these geophysical activities are primarily, if not exclusively, focused on oil and gas exploration and are intended to advance the potential for oil and gas development on the Mid and South Atlantic OCS.

It would, therefore, seem appropriate to also consider during this scoping process whether ultimately allowing oil and gas development in these areas would present an unacceptable risk to the environment, tourism industry, and quality of life for Mid and South Atlantic states. If oil and gas development is found to be an inappropriate activity in these areas, then there can be no justification for allowing exploration activities that would inevitably have a variety of negative impacts on various marine species and their respective habitat.

Based on the history of offshore oil and gas development in this country, including the recent BP Deepwater Horizon catastrophe in the Gulf of Mexico and the substantial spills during Hurricanes Rita and Katrina from both offshore and onshore oil and gas infrastructure, and the inability of BOEM to implement regulations that prevent spills, leaks, and other accidents of consequence, CCL recommends that exploration activities

not be allowed on the Mid and South Atlantic OCS, as these activities are simply a means of allowing for future development of oil and gas reserves in these areas. Additionally, these exploration activities will inevitably be disruptive and detrimental to the health of numerous marine species and potentially have population level impacts on the endangered North Atlantic right whale.

As noted by BOEM, the drilling of exploratory wells is considered to be a G&G activity that is covered by this PEIS. The risk of a blowout or oil leak can actually be greater during the exploration stage because less information is available about subsurface conditions (i.e. pressures, geology, and fluid properties). Therefore, if exploration activities are allowed to move forward they should be limited to seismic studies and the drilling of exploratory wells should be prohibited.

Another primary concern of CCL relates to the use of data gathered from exploratory activities. Because the data would be proprietary and only available to BOEM during the pre-leasing process, the States and the public would not have a meaningful opportunity to weigh the costs and benefits associated with offshore oil and gas development on the Mid and South Atlantic OCS.

This leaves the States and the public in the precarious position of opposing or supporting offshore oil and gas development without the updated information and data necessary to evaluate what impacts any recoverable reserves of oil and gas would have on job creation, economic development, revenue generation, foreign oil dependencies, and energy prices.

Additionally, because the BOEM leasing process allows for the development of both oil and gas, the States and the public would not be able to adequately weigh the risks of offshore oil development versus offshore natural gas development, which is arguably more benign due to the lack of potential for spills.

Therefore, as proposed, the PEIS makes it impossible for the States and the public to engage in an open, meaningful dialogue related to the appropriateness of oil and gas exploration and development on the Mid and South Atlantic OCS.

CCL recommends the following actions be considered as alternatives to the current BOEM proposal:

1. A comprehensive, public planning process for the Atlantic OCS should be undertaken as an alternative to the current proposed actions. Because of the increasing pressures on our finite marine resources, it is only appropriate that

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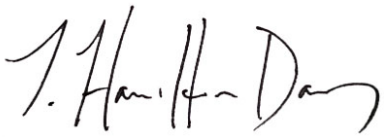
BOEM move forward with a planning process that is capable of evaluating all current and future uses of the Atlantic OCS. Establishing a data set capable of guiding public discussion as plans are created for future activities and uses of the Atlantic OCS should be prioritized by BOEM in place of the current proposal to enable oil and gas development without sufficient opportunity for public evaluation of the data gathered during the course of potentially damaging exploratory activities.

2. Prior to allowing exploration activities for oil and gas on the Mid and South Atlantic OCS, BOEM should determine whether oil and gas development is appropriate for these areas in light of the relative sensitivity of these coastal ecosystems, the potential for negative impacts to state tourism and fishing industries, and the inevitable negative impacts on quality of life related to onshore infrastructure necessary to support the industrial activities associated with oil and gas development.
3. If it is decided that exploratory activities will be allowed on the Mid and South Atlantic OCS, then all data should be made available to the States and public as leasing plans are developed by BOEM for offshore oil and gas development. Making the data public would allow for a meaningful dialogue related to the costs and benefits associated with development of estimated oil and gas reserves.

Sincerely,



Hamilton Davis
Energy & Climate Director
SC Coastal Conservation League

OCEANA – CENTER FOR BIOLOGICAL DIVERSITY – CLEAN OCEAN ACTION – EARTHJUSTICE – NATURAL RESOURCES DEFENSE COUNCIL – DEFENDERS OF WILDLIFE – SURFRIDER FOUNDATION – SOUTHERN ENVIRONMENTAL LAW CENTER – SIERRA CLUB

April 27th, 2012

Via electronic mail sent to GGEIS@boem.gov
Mr. Gary D. Goeke
Chief, Regional Assessment Section
Office of Environment
Bureau of Ocean Energy Management, Gulf of Mexico OCS Region,
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123–2394.

RE: Request for a 30-day extension on the comment period for the Draft PEIS for Atlantic G&G Activities [FR Doc. 2012–7693].

Dear Mr. Goeke,

On behalf of Oceana, Natural Resources Defense Council, Center for Biological Diversity, Clean Ocean Action, Earthjustice, Defenders of Wildlife, Surfrider Foundation, Southern Environmental Law Center, and Sierra Club we are requesting a 30-day extension to the public comment period for the Bureau of Ocean Energy Management's (BOEM) Draft Programmatic Environmental Impact Statement (PEIS) to evaluate potential environmental effects of multiple Geological and Geophysical (G&G) activities in the Mid and South Atlantic Planning Areas of the Outer Continental Shelf (OCS).

Due to the length and complexity of the Draft PEIS documents as well as the relevance and importance of new information from the National Oceanic and Atmospheric Administration (NOAA) regarding noise and its potential impacts on marine mammals that is due for release shortly before the comment deadline,[1] we are requesting a 30-day extension to generate our comments. Volumes I & II of the Draft PEIS as well as the appendices, including figures and tables, represent a total of 1,247 pages that require careful review. The spatial extent of these proposed activities in the Mid and South Atlantic waters, as well as the diversity of habitats, wildlife and social impacts that could occur from the proposed activities all contribute to the scope and complexity of the Draft PEIS and the importance of thorough analysis by the public.

On January 19th, 2010, in a letter to the President's Council on Environmental Quality, NOAA Administrator Dr. Jane Lubchenco committed to improving the tools used by NOAA to evaluate the impacts of human-induced noise on cetaceans.[2] As a result, two data and product-driven working groups were convened: the Underwater Sound-field Mapping Working Group and the Cetacean Density and Distribution Mapping Group. The working groups will be sharing the results of their two years of work including

mapping tools and information on cetacean species distribution and management implications on May 23rd and 24th in Washington, DC, at a symposium called "Mapping Cetaceans and Sound: Modern Tools for Ocean Management." The materials and tools shared at this event are necessary for adequate public comment on both the impacts and alternatives analysis in the Draft PEIS. A 30-day extension is necessary to allow the results of the working groups to be appropriately applied to public comments.

Of course we welcome discussing this matter with you or your staff at any time. For further discussion, please contact Matthew Huelsenbeck at Oceana at 202.467.1924 or mhuelsenbeck@oceana.org.

Thank you for your consideration of our request and we look forward to hearing from you.

Sincerely,

Jacqueline Savitz
Acting Vice President, North America
Oceana

Miyoko Sakashita
Senior Attorney, Oceans Director
Center for Biological Diversity

Cindy Zipf
Executive Director
Clean Ocean Action

Stephen E. Roady
Attorney & Oceans Program Director
Earthjustice

Michael Jasny
Senior Policy Analyst
Natural Resources Defense Council

Sierra Weaver
Senior Staff Attorney
Defenders of Wildlife

Pete Stauffer
Ocean Program Manager
Surfrider Foundation

Deborah M. Murray
Senior Attorney
Southern Environmental Law Center

Athan Manuel
Director, Lands Protection Program
Sierra Club

[1] Lubchenco, J., Undersecretary of Commerce for Oceans and Atmosphere, Letter to Nancy Sutley, Chair of the Center for Environmental Quality. 19 January 2010. United States Department of Commerce, Available online at: http://www.st.nmfs.noaa.gov/cetsound/documents/Lubchenco_Sutley%20letter.pdf

[2] Draft Agenda for Mapping Cetaceans and Sound – Modern Tools for Ocean Management Symposium. 23rd and 24th May, 2012. Four Points Sheraton, 1201 K St. NW. Washington, D.C. Available online at: http://www.st.nmfs.noaa.gov/cetsound/pdf/DraftCetSoundSymposiumAgenda.pdf

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www.SierraClub.org/NJ

Gary D. Goeke
Chief Regional Assessment Section, Office of Environment
Bureau of Ocean energy Management
Gulf Mexico OCS Region
1201 Elmwood Park Blvd.
New Orleans, Louisiana 70123-2394

May 29, 2012

Re: Draft PEIS for Atlantic G&G Activities

Dear Mr. Goeke,

The New Jersey Sierra Club is opposed to the draft plain for oil and gas exploration in the Atlantic Ocean. This proposed plan for seismic testing in the Mid-Atlantic Ocean to evaluate oil, gas, and other resources is nothing more than a gateway for drilling off our coast. Our main concern is that there would not be a proposed seismic testing plan if there was a plan to drill. It has been two years after the BP disaster and we are not any safer. Drilling off the coast of New Jersey is a huge risk to our coast, fishing and tourism industry, and our economy.

Seismic testing alone posses many issues showing to disrupt marine life and animals especially those that are sensitive to seismic testing including whales and dolphins. The use of air guns can have devastating impacts on marine life impacting their social communication which they use to find food, mate, and identity predators. This does not only affect marine animals, but humans, businesses and our economy as well. Seismic testing has also been seen to cause commercial fishing catch rates to decrease dramatically. This could threaten our $1.4 billion in recreation fishing sales, $5.8 billion in commercial fishing sales, and impact 46,000 fishing industry jobs in our state if fish stocks and catches are affected. In addition divers and swimmers are at risk of serious trauma if they are underwater during a nearby air gun blast. Overall seismic testing will negatively impact our coast, our economy, and put marine animals at risk.

Seismic exploration will inevitably lead to offshore drilling off, which will put our coast and economy at even more risk. This will put New Jersey at risk for a potential oil spill off of our coast. Since they have not strengthened the regulations for off shore drilling the likelihood of a disaster off our coast is very real. If there is drilling of the mid Atlantic they would bring the oil to New Jersey Refineries through pipelines putting us at risk for a potential disaster. Drilling off the coast of Virginia less than 100 miles from New Jersey's coasts will pose a threat to New Jersey because Shell Oil Company has said it plans to run a pipeline through our state's waters.

Revenues linked to coastal areas make up the largest sector of our state's economy with offshore drilling putting this at risk. New Jersey's tourism and recreation industry, which generates more

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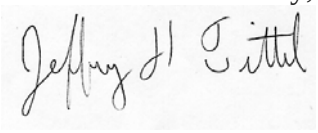
than $38 billion and 312,000 jobs, would be at risk if drilling were to begin off of the Atlantic Ocean. Visits to New Jersey's beaches support nearly 500,000 jobs and $16.6 billion in wages.

Not only does this put our coast at risk, but it undermines renewable energy and growing our green energy economy. We have to explore new technologies for wind and wave power and remove obstacles that stand in the way of clean energy.

Sincerely,



Jeff Tittel
Director of New Jersey Sierra Club

Center for Regulatory Effectiveness

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Washington, D.C. 20009
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Secretary1@mbsdc.com www.TheCRE.com

May 30, 2012

SUBMITTED ELECTRONICALLY AT GGEIS@boem.gov

Mr. Gary D. Goeke
Regional Assessment Section
Office of Environment (MS5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123–2394

Re: **Center for Regulatory Effectiveness Comments on Bureau of Ocean Energy Management Draft Programmatic Environmental Impact Statement ("DPEIS") For Geological and Geophysical Exploration on the Atlantic Outer Continental Shelf;**
Comments due on May 30, 2012[1]

Dear Mr. Goeke:

The Center for Regulatory Effectiveness ("CRE") is pleased to submit the following comments on the Bureau of Ocean Energy Management's ("BOEM") Draft Programmatic Environmental Impact Statement ("DPEIS") for Geological and Geophysical ("G&G") Exploration on the Atlantic Outer Continental Shelf ("OCS").

I. EXECUTIVE SUMMARY

Seismic and other oil and gas G&G has caused no harm under current, longstanding regulation by BOEM.

Nevertheless, the DPEIS proposes a new Draft Protocol for regulating seismic airgun surveys. The CRE asks BOEM to confirm or deny that the DPEIS' Draft Protocol is only proposed for the Atlantic, and is not intended for any other water body.

[1] Available online at http://www.boem.gov/oil-and-gas-energy-program/GOMR/GandG.aspx

The DPEIS' new Draft Protocol is significantly more stringent than BOEM's currently effective NTL 2012 G0-2.[2] BOEM's responses to CRE's comments on BOEM's seismic Information Collection Requests ("ICRs") mean that current regulation under NTL 2012 G0-2 is sufficient, and that there can be no significant change in this NTL without new ICRs and new OMB review under the Paperwork Reduction Act ("PRA"). BOEM's current ICRs do not authorize the DPEIS' new Draft Protocol.

The current BOEM ICRs would not have been submitted and approved if current regulation were inadequate, unless there's been a significant change in knowledge since the ICRs were submitted. There has been no significant change in knowledge except that it's even more obvious now that seismic compliant with NTL 2012 G0-2 is harmless.

NMFS' external Peer Review Report for the Acoustic Integration Model ("AIM") recommends that there be additional peer review each time AIM is applied. The additional peer review should be performed in accordance with OMB's Peer Review Bulletin. The additional peer review should be performed in order to determine each AIM application's compliance with Council for Regulatory Environmental Modeling ("CREM") Guidelines.

There is no public record showing that AIM has been peer reviewed for its proposed application in the Atlantic PEIS. BOEM should identify in the public record each and every AIM peer review that they believe has occurred. BOEM should allow public comment on those and all other peer reviews relevant to the DPEIS.

All AIM peer reviewers should be advised of the Information Quality Act ("IQA") requirements applicable to BOEM.

NMFS' Peer Review Report for AIM states that the AIM input data on behavioral effects are inadequate. BOEM also repeatedly states that adequate input data do not exist for most of the marine mammals that AIM models.

Consequently, before BOEM uses AIM to estimate Takes BOEM should conduct external peer review of AIM in order to determine, among other issues, whether the behavioral effects data input into the model are adequate to estimate Takes.

Passive Acoustic Monitoring ("PAM") should be required in the Atlantic, and PAMGUARD should be encouraged. PAM is already being required in most NMFS regulation of seismic, and it is "strongly encouraged" by BOEM's NTL 2012 G0-2, so this is not a significant change in current regulation.

Finally, the DPEIS, and all BOEM information disseminations, must meet IQA requirements. These IQA requirements apply to any outside or third-party information that BOEM uses or relies on.

[2] Available online at http://www.bsee.gov/Regulations-and-Guidance/Notices-to-Lessees/2012/2012-JOINT-G02-pdf.aspx

II. SEISMIC AND OTHER OIL AND GAS G&G CAUSE NO HARM UNDER CURRENT, LONGSTANDING REGULATION

With regard to oil and gas G&G in the Arctic, NMFS recently stated:

> "There is no specific evidence that exposure to pulses of airgun sound can cause PTS [physical injury] in any marine mammal, even with large arrays of airguns."
>
> ***
>
> "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."
>
> ***
>
> "NMFS does not expect any marine mammals will incur serious injury or mortality in the Arctic Ocean or strand as a result of the proposed seismic survey."
>
> ***
>
> "Thus, the proposed activity is not expected to have any habitat-related effects on prey species that could cause significant or long-term consequences for individual marine mammals or their populations."
>
> ***
>
> "Data on short-term reactions by cetaceans to impulsive noises are not necessarily indicative of long-term or biologically significant effects. It is not known whether impulsive sounds affect reproductive rate or distribution and habitat use in subsequent days or years. However, gray whales have continued to migrate annually along the west coast of North America despite intermittent seismic exploration (and much ship traffic) in that area for decades (Appendix A in Malme *et al.* 1984; Richardson *et al.* 1995), and there has been a substantial increase in the population over recent decades (Allen and Angliss 2010). The western Pacific gray whale population did not seem affected by a seismic survey in its feeding ground during a prior year (Johnson *et al.* 2007). Similarly, bowhead whales have continued to travel to the eastern Beaufort Sea each summer despite seismic exploration in their summer and autumn range for many years (Richardson *et al.* 1987), and their numbers have increased notably (Allen and Angliss 2010). Bowheads also have been observed over periods of days or weeks in areas ensonified repeatedly by seismic pulses (Richardson *et al.* 1987; Harris *et al.* 2007)."[3]

[3] NMFS' Federal Register notice available online at http://www.gpo.gov/fdsys/pkg/FR-2012-05-01/pdf/2012-10386.pdf

A recent NMFS Biological Opinion concluded that marine mammals are flourishing and increasing in the Arctic during increasing oil and gas seismic activities there:

> "Data indicate that bowhead whales are robust, increasing in abundance, and have been approaching (or have reached) the lower limit of their historic population size at the same time that oil and gas exploration activities have been occurring in the Beaufort Sea and, to a lesser extent, the Chukchi Sea."
>
> ***
>
> "To our knowledge, no whales or other marine mammals have been killed or injured by these past seismic operations, and the BCB population of bowhead whales continues to increase at an annual rate estimated more than 3 percent."[4]

BOEM, when it was still MMS, concluded with regard to the entire Outer Continental Shelf that:

> "[T]here have been no known instances of injury, mortality, or population level effects on marine mammals from seismic exposure…"[5]

In reaching this conclusion, BOEM relied on a report by the National Academy of Sciences' National Research Council, which stated:

> "With the exception of the beaked whale strandings, connections between anthropogenic sound in the oceans and marine mammal deaths have not been documented. In the presence of clear evidence of lethal interactions between humans and marine mammals in association with fishing and vessel collisions (Clapham et al., 1999; Laist et al., 2001), the absence of such documentation has raised the question of the relative importance of sound in the spectrum of anthropogenic effects on marine mammal populations. Anthropogenic ocean noise is thought not to be a factor in any of the recent major declines in marine mammal populations, such as Steller sea lions (*Eumetopias jubatus*; NRC, 2003a), harbor seals (*Phoca vitulina*; Pitcher, 1990), fur seals (York, 1987), and Aleutian Island sea otters (*Enhydra lutris*; Doroff et al., 2003). No scientific studies have conclusively demonstrated a link between exposure to sound and adverse effects on a marine mammal population."[6]

BOEM itself recently issued a Final Supplemental Environmental Impact Statement for a Gulf of Mexico OCS Oil and Gas Lease Sale. This final SEIS for the GOM concluded that, despite more

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[4] Pages 64-65, ENDANGERED SPECIES ACT: SECTION 7 CONSULTATION BIOLOGICAL OPINION, Incidental harassment authorization to allow for incidental takes of marine mammals during shallow hazards survey in the Chukchi Sea, Alaska, 2011 (NMFS 2011), available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/statoil_biop2011.pdf

[5] See, *e.g.*, Outer Continental Shelf Oil & Gas Leasing Program,2007-2012 Final Environmental Impact Statement, page V-64 (MMS April 2007), available online at http://www.boemre.gov/5-year/2007-2012DEIS/VolumeII/5and6-ConsultationPreparers.pdf

[6] Marine Mammal Populations and Ocean Noise: Determining when Noise causes Biologically Significant Effects, Oceans science board (2005), page 15, available online at http://www.nap.edu/openbook.php?isbn=0309094496 .

than 50 years of oil and gas G&G, "there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations":

> "Overall, within the CPA [GOM Central Planning Area], there is a long-standing and well-developed OCS [oil and gas] Program (more than 50 years); there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations."[7]

In sum, past regulation of OCS oil and gas G&G has adequately protected the environment. With the possible exception of reasonable temporal and zoning restrictions in order to protect the endangered right whale, there is no reason to believe a different approach is required in the Atlantic. [8]

III. NEW ICR AND OMB REVIEW ARE NECESSARY BEFORE BOEM COULD IMPLEMENT ITS DRAFT PROTOCOL FOR ATLANTIC SEISMIC

CRE has previously filed two comments that are relevant to the PEIS and seismic.[9] BOEM's responses to these two comments agree with CRE on an important point: BOEM will have to prepare a new Information Collection Request ("ICR") for public comment and for Office of Management and Budget ("OMB") review before BOEM could regulate seismic in a manner that is significantly different from current regulation under NTL No. 2007-G02.

First, on September 30, 2011, BOEM published Federal Register notice that BOEM was submitting an ICR to OMB for review. This notice also responds to comments that CRE submitted on BOEM's draft ICR. This ICR is for regulations that apply to offshore seismic.[10]

Second, on October 21, 2011, BOEM published Federal Register notice that BOEM was submitting another ICR to OMB for review. This notice responds to comments that CRE submitted on BOEM's draft ICR. This ICR is also for regulations that apply to offshore seismic.[11]

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[7] Page 4-231 of document available online at http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/nepaprocess.aspx. Click on "Gulf of Mexico OCS Oil and Gas Lease Sale: 2012; Central Planning Area Lease Sale 216/222; Final Supplemental Environmental Impact Statement; Volume I: Chapters 1-4; Volume II: Chapters 5-8, Appendices, and Keyword Index."

[8] CRE takes no position in these comments on the DPEIS' specific proposed temporal and zoning restrictions for the North Atlantic Right Whale.

[9] CRE's comments on the September 30th ICR are available in www.regulations.gov, Docket ID # BOEM-2011-0011-0003, http://www.regulations.gov/#!documentDetail;D=BOEM-2011-0011-0003. CRE's comments on the October 21st ICR are available in www.regulations.gov, Docket ID # BOEM-2011-0036-0003, http://www.regulations.gov/#!documentDetail;D=BOEM-2011-0036-0003.

[10] BOEM's September 30, 2011 Federal Register notice of the ICR's submission to OMB is available online at http://www.gpo.gov/fdsys/pkg/FR-2011-09-30/html/2011-25262.htm. The OMB file for this ICR is available online at http://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201108-1010-003.

[11] BOEM's October 21, 2011 Federal Register notice of the ICR's submission to OMB is available online at http://www.gpo.gov/fdsys/pkg/FR-2011-10-21/html/2011-27331.htm .
The OMB file for this ICR is available online at

BOEM's September 30th Federal Register notice explains:

> "We received two comments in response to the Federal Register notice. The first comment, from the Marine Mammal Commission, supported our request to OMB. The second comment, from the Center for Regulatory Effectiveness, requested that we should state that we are not submitting any ICRs for seismic regulations that are more stringent than current regulations, including NTL 2007-G02. 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."[12]

Similarly, BOEM's October 21st Federal Register Notice explains:

> "We received two comments in response to the Federal Register notice. The first commenter, the Marine Mammal Commission stated that it was in support of our submission to OMB. The second commenter, Center for Regulatory Effectiveness, requested two actions. One, that we should state that we are not submitting any ICR for seismic regulations that is more stringent than current regulations, including NTL 2007-G02. Response: For the renewal of this ICR, we are not requesting anything more stringent than in current 30 CFR 551 regulations; NTL 2007-G02 is covered under OMB Control Number 1010-0151. Second, that we wait to submit the ICR to OMB. There is current on-going litigation pertaining to seismic regulations (BOEM vs environmental plaintiff(s)). Response: This particular ICR renewal pertains mostly to revising the form currently in use due to new developments in technology; we are not requesting any new requirements. If the lawsuit settlement or decree requires changes to the form and/or DOI regulations, information collection coordination and OMB approval will occur before the form is reissued or regulations are promulgated.[13]

The referenced NTL No. 2007-G02 is entitled "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program." Since the above-quoted Federal

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http://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201106-1010-004

[12] Page 60681 of BOEM's September 30, 2011 Federal Register notice of the ICR's submission to OMB, available online at http://www.gpo.gov/fdsys/pkg/FR-2011-09-30/html/2011-25262.htm.

[13] http://www.gpo.gov/fdsys/pkg/FR-2011-10-21/html/2011-27331.htm, page 65523.
In the above-quoted Federal Register notices, BOEM responds to CRE comments which explain in greater detail that environmental group plaintiffs are suing BOEM in New Orleans federal court over regulation of seismic in the GOM. CRE's ICR comments state concerns regarding the regulatory impact of any settlement, and the need for public comment on and OMB review of any such impact.

register notices, BOEM has replaced this 2007 NTL with a 2012 NTL: *Notice to Lessees and Operators of Federal Oil, Gas, and Sulphur Leases in the OCS, Gulf of Mexico Region, Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program.*[14] This 2012 NTL is substantially the same as the 2007 NTL. The 2012 NTL states that it:

> "supersedes and replaces NTL No. 2007-G02. It does not introduce any new types of mitigation measures; however, it clarifies how you should implement seismic survey mitigation measures, including ramp-up procedures, the use of a minimum sound source, airgun testing and protected species observation and reporting. The measures contained herein apply to all onlease/ancillary activity surveys you conduct under 30 CFR 550 and all off-lease surveys you conduct under 30 CFR 551."[15]

By contrast, on page C-39, Vol. II, of the DPEIS there is a "Draft Seismic Airgun Protocol." BOEM acknowledges that this Draft Protocol differs significantly from NTL 2012-G02, which we discuss above in these comments.

We assume that the DPEIS' new Draft Protocol is only proposed for the Atlantic, and that it is not intended for any other area. We ask BOEM to confirm or deny our assumption in BOEM's response to CRE's comments.

For the reasons stated above, BOEM's current ICRs do not authorize the DPEIs' new Draft Protocol. This new Draft Protocol could not be applied in the Atlantic or anywhere else without a new ICR and OMB review.

Unless there is something about the Atlantic that requires and justifies a different seismic protocol, the DPEIS Draft protocol should not be applied anywhere.[16] CRE's ICR comments referenced above explain that, for at least two reasons, BOEM should not send OMB any revised ICRs for seismic regulation that is more stringent than currently imposed by NTL-G02. First, BOEM has repeatedly and correctly stated that current regulation of seismic adequately protects the environment. In other words, current regulation of seismic is all that's necessary for the proper performance of BOEM's functions. Therefore, under the Paperwork Reduction Act BOEM should not submit, and OMB should not approve, ICRs for more stringent seismic regulation. Such ICRs would violate the PRA because they would be unnecessary for proper performance of BOEM's functions.

Second, any ICRs for more stringent seismic regulation would also violate the accuracy requirement of BOEM's Information Quality Act Guidelines. The PRA requires that BOEM certify that ICRs are necessary for the proper performance of BOEM's functions. That

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[14] This document is available online at http://www.bsee.gov/Regulations-and-Guidance/Notices-to-Lessees/2012/2012-JOINT-G02-pdf.aspx.

[15] *Id.*

[16] We acknowledge the possibility that protecting the endangered North Atlantic Right Whale might justify some reasonable time and place restrictions for G&G in the Atlantic. However, the DPEIS' new Draft Protocol does not contain any such provisions.

certification would be inaccurate in the case of ICRs for more stringent seismic regulation. Current regulation of seismic, and ICRs based on current regulation, are all that is necessary for proper performance of BOEM's functions.

CRE's comments on these two ICRS are incorporated by reference into these comments by CRE on the DEIS.[17]

IV. BOEM SHOULD NOT USE THE AIM MODEL UNTIL IT HAS BEEN PEER REVIEWED FOR APPLICATION IN THE ATLANTIC

A) The Application Of The AIM Model in the DPEIS Should Be Peer Reviewed In Order To Determine Whether It Is CREM Compliant. Peer Review Should Be Conducted In Accordance With OMB's Peer Review Bulletin, and the Peer Reviewers Should Be Informed Of BOEM's IQA Requirements.

The DPEIS, Vol. 1, page 2-12, states that

> **"**Incidental take of marine mammals was estimated for the proposed action scenario using the Acoustic Integration Model© (AIM), which is a 4D, individual-based, Monte Carlo statistical model designed to predict the exposure of receivers to any stimulus propagating through space and time (Appendix E)."

The DPEIS, Vol. 2, page E-3, further states that

> "MAI's Acoustic Integration Model©, or AIM, is a software package developed to predict the acoustic exposure of marine animals from an underwater sound source. The unique and principal component of AIM is a 3D movement engine, which programs the geographic and vertical movements of sound sources and simulated marine animals. In 2006, the Center for Independent Experts (CIE) conducted a review and assessment of AIM. The CIE panel concluded that AIM is a credible tool for developing application models (Independent System for Peer Review, 2006)."

The DPEIS neglects to mention that the 2006 AIM Peer Review by CIE also stated that

> "The three terms of reference required that the Panel evaluate whether AIM correctly implements the models and data upon which it is based; whether animal movements are adequately simulated; and whether AIM meets the Council for Regulatory Monitoring [sic] (CREM) guidelines for model development and evaluation."
>
> ***

[17]CRE's comments on the September 30th ICR are available in www.regulations.gov, Docket ID # BOEM-2011-0011-0003, http://www.regulations.gov/#!documentDetail;D=BOEM-2011-0011-0003. CRE's comments on the October 21st ICR are available in www.regulations.gov, Docket ID # BOEM-2011-0036-0003, http://www.regulations.gov/#!documentDetail;D=BOEM-2011-0036-0003.

> "The Panel agreed that AIM appears to be correctly implemented. However, all panelists had recommendations for further testing to be undertaken. They also agreed that animal movement appears to be appropriately modeled within AIM given the inadequacies of the available data.
>
> With regard to whether AIM satisfies the CREM guidelines there was some diversity of opinion. This is understandable given that the CREM guidelines are not *directly* applicable to AIM since it is not an application model (but a tool for developing such models)."
>
> ***
>
> "It follows, that the Panel agree that the use of AIM can lead to models which will meet the CREM guidelines. However, such models, at this stage, would need to be evaluated on a case-by-case basis (i.e., merely using AIM is not sufficient; it must be used appropriately for the specific application)."[18]

There is no public record showing that AIM has been peer reviewed for its application in the Atlantic DPEIS. If BOEM believes that peer review of the DPEIS application of AIM has occurred, then BOEM should identify those peer reviews in the public record, and BOEM should allow public comment on those peer reviews.

Peer review should be performed in accordance with OMB's Peer Review Bulletin, and in order to determine each AIM application's compliance with CREM Guidelines.[19]

The AIM peer reviewers should be advised of the Information Quality Act requirements applicable to BOEM. As OMB explained to EPA in a peer review proceeding:

> "Since the development of Agency Information Quality (IQ) guidelines required by statute, many agencies have been using [peer review] charge language that tracks with the standards of their own IQ guidelines. For example, such language often focuses on whether or not the information in question is accurate, clear, complete, transparently and objectively described, and scientifically justified. We believe it may be useful for EPA to follow a similar approach and incorporate some of the language from your IQ guidelines into the formulation of the [peer review] charge questions."[20]

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[18] AIM Peer Review, page 1, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/lfa_aim_review.pdf.

[19] OMB's Peer Review Bulletin is available online at http://www.whitehouse.gov/sites/default/files/omb/assets/omb/memoranda/fy2005/m05-03.pdf . The CREM Models Guidance is available online at http://www.epa.gov/crem/cremlib.html#guidance .

[20] OMB document available online at http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cts=1331655089425&ved=0CCUQFjAA&url=http%3A%2F%2Foaspub.epa.gov%2Feims%2Feimscomm.getfile%3Fp_download_id%3D495502&ei=P3FfT-jzLsPh0QGw18SuBw&usg=AFQjCNGd_cMw9iCZalNgLZzgBTspzJwzcg&sig2=Q_vr76vteXyCY3lWiOb98 .

2) The AIM Model should be externally peer reviewed to determine whether the behavioral effects data input into the model are adequate to estimate Takes.

The Aim Peer review report also stated:

> "It was generally agreed by the Panel that the animal movement methods used in AIM were appropriate given the level of available data. The qualifier is important here. The Panel did not perceive a problem with AIM's animal movement methods. They do acknowledge a problem with the absence of the type of data needed to realistically simulate animal movement within AIM.
>
> Relevant extracts:
> • At this point in time, I believe the reliability of AIM to assess the exposure hazard of marine mammals to anthropogenic sound is more limited by the realism of the animate engine module of AIM than the sound propagation modules … animal behavior is far more complicated than behavior of physical systems (Getz 2006).
>
> • … requires that aggregative social, feeding, or predator avoidance behavior of individuals be taken into account. In the absence of data that allows aversion parameters to be set that would simulate such behavior, plausible scenarios need to be investigated under "what if …?" scenarios that assumed that individuals aggregate for various reasons (Getz 2006)."[21]

The inadequacy of AIM's knowledge base is further demonstrated by the discussion of AIM in BOEM's 2011 Application to NMFS for GOM Take rules under the Marine Mammal Protection Act. For example:

> "2.6.6 Animal Behavior Parameters
> The specific animal behavioral parameters that were used in this analysis are provided below. Where the "Surfacing/Dive Angle" column is empty, there were no meaningful data available and, as such, 75º was used as a default value…"[22]

There were "no meaningful data available," and "75º" was used as AIM's default value, for the vast majority of marine mammals modeled: *i.e.*, beaked whales; dwarf and pygmy sperm whales; blackfish: false killer whale, pygmy killer whale, melon-headed whale, and pilot whale; killer whales: Risso's dolphin; bottlenose dolphin; stenella: spinner, atlantic/pantropical spotted, and striped dolphins; fraser's dolphin; and rough toothed dolphin.

The 2011 application candidly acknowledges many other inadequacies in the data that AIM uses to model behavioral effects on specific marine mammals in the GoM. For example:

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[21] AIM Peer Review, page 7, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/lfa_aim_review.pdf

[22] 2011 Application, Appendix A at page 61, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/boemre_application2011.pdf

"Bryde's Whale
There is a paucity of data for this species. Since they are similar in size, data for both Sei and Bryde's whales have been pooled to derive parameters. Note that Sei whales are rare in the Gulf of Mexico, but their similarities to Bryde's whales was used to determine some of their movement parameters.

"Surface Time
No direct data available, fin whale values used.
Dive Depth
No direct data available, fin whale values used." [23]

***

"Beaked Whales
Data on the behavior of beaked whales are sparse. Therefore, all beaked whale species have been pooled into a single animal." [24]

***

"Dwarf and Pygmy Sperm Whales (Kogia spp.)
Data on dwarf and pygmy sperm whales are rare, and these species are very similar, so data for these two species have been combined.[25]

***

"Blackfish: False iller Whale, Pygmy Killer Whale, Melon-headed
Whale, Pilot Whale
Studies describing the movements and diving patterns of these animals are rare and sparse. Therefore, they have been combined into a single "blackfish" category. As more data become available, these species will be split into separate animats" [26]

***

"Killer Whale
There is a remarkable paucity of quantitative data available for killer whales, considering their coastal habitat and popular appeal. Nevertheless, most data from "blackfish" were used to model *Orcinus orca*, with the exception of dive depth. The different feeding ecology of these species makes very deep dives apparently unnecessary. When additional data allow, separate animats for "resident" and "transient" killer whales will be developed."[27]

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"Risso's Dolphin
Dive Time

[23] *Id.* at page 61.
[24] *Id.* at page 64.
[25] *Id*. at page 65.
[26] *Id.* at page 66.
[27] *Id*. at page 68.

> No data on dive times could be found. The values for blackfish, which have a similar ecological niche, were used."[28]
>
> ***
>
> "Rough toothed dolphin
> **Dive Depth**
> No dive depth data are available; depths are based upon other species."[29]

Nothing in the DPEIS suggests that these fatal problems with the AIM input data have been solved.

V. PAM SHOULD BE REQUIRED AND PAMGUARD ENCOURAGED

The DPEIS at Vol.1, pages ix-x, asks whether Passive Acoustic Monitoring ("PAM") should be encouraged or required in the Atlantic. For the following reasons, we recommend that PAM be required and use of PAMGUARD should be encouraged.

A) NMFS Already Routinely Includes PAM As a Monitoring or Mitigation Requirement in Ihas, Loas or Rules That NMFS Issues Under the MMPA.

A published article by NMFS' staff discusses NMFS' currently required uses of PAM.[30] In just the year 2011, NMFS included PAM requirements in, *e.g.*:

> ● An L-DEO seismic survey in the Western Gulf of Alaska, available online at http://www.nsf.gov/geo/oce/envcomp/shillington-2011-final-ea-23-may.pdf, and issued permit at http://www.nmfs.noaa.gov/pr/pdfs/permits/ldeo_wgoa_issued_iha.pdf;
>
> ● An industry seismic survey in Cook Inlet, Alaska, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/apache_ak_iha_application2011.pdf;
>
> ● University of Alaska Geophysics Institute seismic survey in the Arctic Ocean, using PAM , available at http://www.nmfs.noaa.gov/pr/pdfs/permits/uagi_iha_issued.pdf;
>
> ● An industry seismic IHA for the Chukchi, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/statoil_iha_issued2011.pdf; and
>
> ● An USGS seismic survey in Central Gulf of Alaska, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/usgs_goa_iha2011.pdf.

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[28] *Id.* at page 70.
[29] *Id* at page 74.
[30] "The use of acoustic monitoring in the National Marine Fisheries Service marine mammal incidental take authorizations," Shane Guan, Office of Protected Resources, NOAA/NMFS, presented at 160th Meeting of the Acoustical Society of America (Nov. 15 – 19, 2010), Session 1pAB: Animal Bioacoustics, available online at http://scitation.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=PMARCW000011000001010002000001&idtype=cvips&doi=10.1121/1.3606451&prog=normal

The Navy and NMFS are also requiring that PAM be used with Navy sonar. With NMFS' concurrence, the Navy stated that "Passive acoustic monitoring for low frequency sounds generated by marine mammals will be conducted when SURTASS [sonar] is deployed."[31]

Recent Brazilian studies have recommended the increased use of PAM to help protect sea life from marine sound:

> "The possibility of detecting marine mammals by hydrophone arrays linked to special software (Passive Acoustic Monitoring – PAM) has shown promise as a monitoring tool for some species of marine mammal with frequent vocalization (e.g. Swartz et al., 2002; Mellinger, 2004). PAM has been suggested as an alternative or additional technique to improve the effectiveness of monitoring marine mammals (Lewis et al., 1998). This acoustic technique has been used to complement visual surveys during periods ofdarkness and may have advantages over the visual technique in areas with strong wind and poor visibility (Swartz et al., 2003). Considering all of these factors, it is recommended to start experiments with PAM in Brazilian waters as an auxiliary tool to document the presence of marine mammals during seismic surveys."[32]

B) BOEM's NTL Comes Close To Requiring PAM

BOEM's *Notice to Lessees and Operators of Federal Oil, Gas, and Sulphur Leases in the OCS, Gulf of Mexico Region, Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program* ("NTL*")* has a section which strongly encourages the use of PAM:

> "**Experimental Passive Acoustic Monitoring**
> Whales, especially sperm whales, are very vocal marine mammals, and periods of silence are usually short and most often occur when these animals are at the surface and may be detected using visual observers. However, sperm whales are at the greatest risk of potential injury from seismic airguns when they are submerged and under the airgun array. Passive acoustic monitoring appears to be very effective at detecting submerged and diving sperm whales, and some other marine mammal species, when they are not detectable by visual observation. BOEM and BSEE strongly encourage operators to participate in an experimental program by including passive acoustic monitoring as part of the protected species observer program. Inclusion of passive acoustic monitoring does relieve an operator of any of the mitigations (including visual observations) in this NTL **with the following exception:** Monitoring for whales with a passive acoustic array by an observer proficient in its use will allow ramp-up and the subsequent start of a seismic survey during times of reduced visibility (darkness, fog, rain,

[31] http://www.surtass-lfa-eis.com/Measures/index.htm.

[32] Effectiveness of Monitoring Marine Mammals during Marine Seismic Surveys off Northeast Brazil, Parente and de Araújo, Journal of Integrated Coastal Zone Management 11(4):409-419 (2011), available online at http://www.aprh.pt/rgci/pdf/rgci-251_Parente.pdf.

> etc.) when such ramp-up otherwise would not be permitted using only visual observers. If you use passive acoustic monitoring, include an assessment of the usefulness, effectiveness, and problems encountered with the use of that method of marine mammal detection in the reports described in this NTL. A description of the passive acoustic system, the software used, and the monitoring plan should also be reported to BSEE at the beginning of its use." [33]

C) BOEM Should Require PAM in the Atlantic Because PAM Is A Valuable Supplement to Visual Monitoring

NMFS rejects as impracticable arguments that seismic should shut down during times of poor visibility. NMFS instead requires PAM during these times in order "to further enhance the detection of marine mammals."[34] For the same reason, BOEM should require PAM use in the Atlantic during times of poor visibility, especially since NMFS is already requiring its use under the MMPA.

D) BOEM Should Encourage Use of PAMGUARD

NMFS recently proposed to issue a seismic IHA to L-DEO which includes PAMGUARD use. NMFS explains here that

> "*Passive Acoustic Monitoring*
> Passive acoustic monitoring will complement the visual monitoring program, when practicable. Visual monitoring typically is not effective during periods of poor visibility or at night, and even with good visibility, is unable to detect marine mammals when they are below the surface or beyond visual range. Acoustical monitoring can be used in conjunction with visual observations to improve detection, identification, and localization of cetaceans. The acoustic monitoring will serve to alert visual observers (if on duty) when vocalizing cetaceans are detected. It is only useful when marine mammals call, but it can be effective either by day or by night, and does not depend on good visibility. The acoustic observer will monitor the system in real time so that he/she can advise the visual observers if they acoustic detect cetaceans. When the acoustic observer determines the bearing (primary and mirror-image) to calling cetacean(s), he/she alert the visual observer to help him/her sight the calling animal(s)….
>
> The acoustic signals received by the hydrophones are amplified, digitized, and then processed by the Pamguard software." [35]

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[33] This document is available online at http://www.bsee.gov/Regulations-and-Guidance/Notices-to-Lessees/2012/2012-JOINT-G02-pdf.aspx

[34] NMFS' Federal Register of IHA issued to Shell for seismic in Cook Inlet, Alaska, 77 FR 27724 (May 11, 2012), available online at http://www.gpo.gov/fdsys/pkg/FR-2012-05-11/pdf/2012-11296.pdf .

[35] Page 25984 of Federal Register notice available online at http://www.gpo.gov/fdsys/pkg/FR-2012-05-02/pdf/2012-10627.pdf

Academic groups (University of St. Andrews, Oregon State University, Herriot Watt University, and Scripps Institute of Oceanography), environmental groups (EcoLogic), and select oil and gas companies (through the International Association of Oil and Gas Producers) have spent considerable time, effort and money developing the freely available version of PAM called PAMGUARD. The PAMGUARD web site discusses PAMGUARD in considerable detail, and provides free, public access to PAMGUARD.[36]

This site explains why PAMGUARD should be used as a supplement to visual monitoring, and it is worth quoting at some length:

> "The default method for detecting marine mammals at sea is to look for them. Visual observations play a vital role, but marine mammals are difficult to spot on the sea surface, especially when weather and light conditions are poor. In addition…visual techniques are next to impossible at night but often operators wish to continue noise producing activities round the clock….[A]coustic cues can often be detected more reliably at greater ranges and are less affected by weather and sighting conditions and animals can be detected acoustically equally well day and night. Passive Acoustic Monitoring isn't a panacea but for many species it can significantly increase the probability that they are detected and increase the effectiveness of mitigation."
>
> ***
>
> "WHY DID WE NEED PAMGUARD?
>
> Good acoustic monitoring software existed before PAMGUARD but there were a number of reasons that justified developing something new.
>
> In the first place, it was realised that there was a real value in having a single software that marine mammal observers (MMOs) could become familiar with and use on a variety of different vessels. Ideally that software should be freely available, interface to a wide range of hardware configurations and work on many different computer platforms. (Pamguard achieved cross platform compatibility by being written in Java.)
>
> None of the existing programs were open source. This meant that the functioning and performance of the algorithms within them was often not clear and it wasn't possible for a group of users to contribute to and to support it. There was also a long term risk that the software might be withdrawn from use or become outdated.
>
> In most cases there was no commitment to supporting and updating the software and as it wasn't open source it would be difficult for other programmers to

[36] The industry-sponsored PAMGUARD website is available online at http://www.pamguard.org/home.shtml

> provide such support. Some of the software, though excellent, was not designed for real time monitoring by a single operator in field conditions."[37]

PAMGUARD has now undergone beta testing.[38]

BOEM should encourage the use of PAMGUARD by discussing it favorably in the final PEIS for the Atlantic, and in other EISs and other appropriate documents published by BOEM.

VI. BOEM'S IQA REQUIREMENTS APPLY TO THIRD-PARTY OR OUTSIDE INFORMATION IF BOEM USES OR RELIES ON THE INFORMATION

The DOI/BOEM IQA requirements are available online,[39] and they won't be discussed in detail here, except to emphasize their applicability to outside or third-party data that BOEM uses or relies on.

The DOI/BOEM IQA guidelines state they apply to third party information

> "where the Department distributes information submitted by a third party in a manner that suggests that the Department endorses or adopts the information, or indicates in its distribution that it is using or proposing to use the information to formulate or support a regulation, guidance, or other Departmental decision or Position."
>
> ***
>
> **"V. Third Party Information Under the Information Quality Guidelines**.
>
> If the Department relies upon technical, scientific, or economic information submitted or developed by a third party, that information is subject to the appropriate standards of objectivity and utility. The standards of these Information Quality Guidelines apply not only to information that the Department generates, but also to information which can be verified that other parties provide to the Department, if the Department disseminates or relies upon this information. In instances where the information is relied upon but is not verifiable, the source must be made transparent to the public, and such original information will not be subject to these Information Quality Guidelines.
>
> Departmental personnel who conduct scientific activities shall be held accountable for the integrity of the information they collect and analyze, and the conclusions they present." [40]

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[37] PAMGUARD site available online at http://www.pamguard.org/31_PamguardBackground.html.
[38] Ocean Science Consulting, "Advisors to the New Zealand Government," blog entry dated March 15, 2012, available online at http://www.osc.co.uk/blog/index.php/2012/03/ongoing-beta-testing-of-pamguard/ .
[39] See http://www.boemre.gov/qualityinfo/PDF/MMSQualityInfoGuidelines-Final.pdf for the MMS/BOEM IQA Guidelines, and http://www.doi.gov/archive/ocio/guidelines/515Guides.pdf for the DOI IQA Guidelines.

OMB explains that "if an agency, as an institution, disseminates information prepared by an outside party in a manner that reasonably suggests that the agency agrees with the information this appearance of having the information represent agency views makes agency dissemination of the information subject to these [DQA] guidelines." [41]

Several months later, in reviewing agency-specific DQA guidelines, OMB further explained how the DQA guidelines covered outside or "third party" information relied upon by an agency in a rulemaking. OMB used the draft Department of Transportation ("DOT") DQA guidelines as an example:

> "DOT incorporated these principles from the OMB guidelines by stating that an agency disseminates information if it relies on information in support of a rulemaking. 'If the Department is to rely on technical, scientific, or economic information submitted by, for example, a commenter to a proposed rule, that information would need to meet appropriate standards of objectivity and utility' (DOT, 3). 'The standards of these guidelines apply not only to information that DOT generates, but also to information that other parties provide to DOT, if the other parties seek to have the Department rely upon or disseminate this information or the Department decides to do so.'(DOT, 8). . . . Other agencies, particularly those likely to be involved with using and/or disseminating 'influential' information, must include similar provisions in their guidelines."[42]

In correspondence with CRE, NMFS acknowledges that both the OMB Government-wide and NMFS' own DQA guidelines apply to outside or third-party information if NMFS uses or relies on that information.[43]

VII. BOEM SHOULD ISSUE AN ICR FOR PUBLIC INPUT ON NON-FEDERAL DATA THAT SHOULD BE USED FOR G&G ACTIVITIES IN THE ATLANTIC

BOEM should seek public input on which non-Federal data and information to use for the G&G Activities in the Atlantic. Accordingly, BOEM should obtain an ICR for the public input on non-Federal data to be incorporated, and provide the public with a public comment period on the ICR.

This is the precise procedure followed by the Department of Health and Human Service (HHS) when HHS sought "Public Input to Nominate Non-Federal Health and Health Care Data Sets and Application for Listing on Healthdata.gov." HHS set an important precedent for incorporating

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[40] Pages 6 ,7 at http://www.doi.gov/archive/ocio/guidelines/515Guides.pdf.
[41] Page 8454 of OMB Federal Register notice available online at http://www.whitehouse.gov/sites/default/files/omb/assets/omb/fedreg/reproducible2.pdf .
[42] *Memorandum for the President's Management Council*, June 10, 2002, on "Agency Draft Information Quality Guidelines," from John D. Graham, Administrator of OMB's Office of Information and Regulatory Affairs, at 6-7 of Attachment, available online at http://www.whitehouse.gov/sites/default/files/omb/assets/omb/inforeg/iqg_comments.pdf .
[43] See, *e.g.*, NMFS' letter to CRE available online at http://thecre.com/pdf/NOAA-IWC_Letter.pdf.

non-Federal data into federal databases, specifically data.gov. BOEM should closely follow the process established by HHS by obtaining an ICR.

BOEM should establish "rules of governance" for allowing non-federal parties that contribute to G&G activities in the Atlantic to have a link to the BOEM website. This would permit greater stakeholder involvement and public participation in the Atlantic OCS G&G activities. The rules governing the family of CRE's Interactive Public Dockets should be considered when establishing such rules:

1. *No Barrier to Entry:* Any person or organization can post on a CRE IPD as long as the posts do not contain profanity and do not include personal attacks on federal employees.

2. *Interactive:* All posts on CRE IPD's have the capability for a reader to either post comments on an existing post or initiate a new post.

3. *Accept Criticism:* The host of the IPD must allow dissenting opinions to be expressed on the IPD.

4. *Hassle Free:* CRE IPD's require no registration, no personal information including email address and will accept anonymous posts and with large attachments.

VIII. BOEM SHOULD PROCEED WITH THE PROPOSED G&G ACTIVITIES PURSUANT O THE PROPOSED ACTION, ALTERNATIVE A.

The proposed action, Alternative A, would authorize G&G activities in support of all BOEM program areas – oil and gas exploration and development, renewable energy, and marine minerals – throughout the entire Area of Interest in Atlantic. Importantly, the proposed action should not be controversial because the scope of the PEIS does not evaluate specific proposals for oil and leasing, it merely provides an environmental analysis of G&G activities to gain a better understanding of the ocean bottom and subsurface for the possibility of future renewable energy development, extraction of marine minerals, and oil and gas development. The proposed action "would provide information about the location and extent of oil and gas reserves, bottom conditions for oil and gas or renewable energy installations, and marine minerals off the Atlantic coast of the U.S."[44] The proposed action would provide BOEM with the appropriate knowledge and data to maximize ocean resources in the Atlantic, while also harmonizing competing ocean uses.

The proposed action, Alternative A, is the appropriate manner in which BOEM should conduct G&G activities in the Atlantic. BOEM concludes that "Alternatives A and B would both fulfill the statutory mission and responsibilities of this Agency for permitting G&G activities in the program areas managed by BOEM. Alternatives A and B both provide protective measures for important biological resources in the AOI that in some cases are protected species." And as BOEM concedes, "potential impacts of Alternatives A and B are broadly similar," and "most impacts under all three alternatives would be **negligible** or **minor**, and no **major** impacts were

[44] BOEM, *Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas Draft Programmatic Environmental Impact Statement*, page 1-8.

identified."[45] Nevertheless, Alternative A would provide BOEM with the most accurate and comprehensive understanding of the resources available in the Atlantic, while also minimizing impact to marine mammals. Thus, BOEM should proceed with Alternative A, but should do so by incorporating the recommendations in this comment above into the proposed action.

The proposed action will "use the information obtained by the G&G surveys to make informed business decisions regarding oil and gas reserves, engineering decisions regarding the construction of renewable energy projects, and informed estimates regarding the composition and volume of marine mineral resources."[46]

IX. BOEM SHOULD MAKE THE PUBLIC COMMENTS AVAILABLE TO THE PUBLIC

Public access to public comments on a public proceeding is basic prerequisite of open government.

For decades federal agencies have made public comments available to the public, first through docket rooms and then, as the internet developed, through online systems developed by each agency.Agency-specific solutions to providing public access to public comments were superseded by Regulations.gov. President Obama has emphasized the importance of the public comment portal and has enhanced its operation.

Despite the Administration's emphasis on the use of Regulations.gov to promote public participation and collaboration in agency proceedings, the Bureau of Land Management has repeatedly refused to release public comments on the 2012 Oil Shale and Tar Sands PEIS. Instead, BLM has chosen to bypass the open process in favor of their own comment processing system, a system which excludes the public from reading public comments. Moreover, BLM's internal comment processing system has the capabilities to post the comments online, which the previous administration had done in the 2008 Oil Shale and Tar Sands PEIS.[47] Despite these capabilities, BLM has chosen secrecy over transparency in the PEIS process.

BLM's lack of transparency is troubling, especially in light of the current Administration's Open Government Initiative. CRE urges BOEM to embrace a more transparent process in conducting the Atlantic PEIS by making the public comments available to the public immediately after the comment period closes.

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[45] BOEM, *Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas Draft Programmatic Environmental Impact Statement*, page 2-55 (emphasis in the original).

[46] BOEM, *Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas Draft Programmatic Environmental Impact Statement*, page 1-8.

[47] 2008 PEIS Comments available at http://ostseis.anl.gov/involve/draftcomments/dsp_commentlist.cfm?PageNum=1&browse#rec

X. CONCLUSION AND RECOMMENDED ACTIONS

BOEM should confirm or deny that the DPEIS' new Draft Protocol for seismic airguns is only proposed for the Atlantic, and is not intended for any other water body.

BOEM's current ICRs do not authorize the DPEIS' new Draft Protocol for seismic airguns. BOEM will have to apply for a new ICR and justify this new Draft Protocol before it could be used anywhere. Given the success of the current regulation and ICRs, BOEM will have difficulty supporting the new more stringent Draft Protocols.

BOEM should not use the AIM Model to estimate Takes in the Atlantic until AIM has passed peer review in accordance with OMB's Peer Review Bulletin. The additional peer review should be performed in order to determine in part whether AIM's application in the Atlantic complies with CREM Guidelines. The additional peer review should also be performed in order to determine whether the behavioral effects data input into the model are adequate to estimate Takes.

The public should have an opportunity to participate in this peer review. BOEM should identify in the public record each and every AIM peer review that they believe has occurred. BOEM should allow public comment on those and all other peer reviews relevant to the DPEIS. All AIM peer reviewers should be advised of the IQA requirements applicable to BOEM. Passive Acoustic Monitoring ("PAM") should be required in the Atlantic, and PAMGUARD should be encouraged.

Further, BOEM should obtain an ICR for the public input on non-Federal data and information that should be incorporated into the proposed action, and provide the public with a public comment period on the ICR. In addition, any non-Federal information that BOEM uses or relies on must meet IQA requirements.

Finally, BOEM should pursue Alternative A in the PEIS, but should do so by incorporating all of the above recommendations.

The CRE appreciates the opportunity to submit these comments, and looks forward to the agency's response. If you need further information regarding any issue discussed in this comment letter, please do not hesitate to contact me at secretary1@mbsdc.com or (202) 265-2383.

Respectfully Submitted,

Jim Tozzi
Member, Board of Advisors

From:	Captain Joel S. Fogel
To:	Synnøve Marie Kvam Strømsvåg
Cc:	Glenn Klotz; basrbara conifer-purgen; cindy zipf; emily hackett-clean ocean action; G&GEIS; georgina shanley; matt steinem2; Captain Alfred Scott Mc Laren, USN (Ret.), Ph.D.; neill borowski; Doug Bergen
Subject:	Mr. President....please stop those air guns now.....
Date:	Thursday, May 03, 2012 9:36:35 AM

Dear President Obama,

I strongly oppose the harmful seismic oil and 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, 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. This poses a huge threat to commercial and recreational fishing off the mid- and southeast Atlantic that (not including New Jersey) generate $11.8 billion annually and support 222,000 jobs.

Seismic exploration is the first of many dangerous and polluting steps in offshore oil and gas development. For all the threats that offshore drilling imposes on our oceans and coastal economies, there is very little reward. According to the U.S. Energy Information Agency, fully developing all of our recoverable offshore oil reserves everywhere would only lower pump prices by 3 cents – and would take twenty years to do so.

I urge you to choose Alternative “C” (the “no-action” alternative) which will keep dangerous oil and gas exploration off our coasts, and instead focus on developing renewable energy.

Dear Mr. President,

Imagine if you lived beneath the sea and your neighbors blasted a boom box and dynamite next to your home at unpredictable hours at a decibel of sound reaching 230 and your ear drums could only handle 120 decibels.

What kind of neighbor would you be and would you call the Police for some relief ?

We Sir, we are the Police of the Sea and we are responding to responding to our neighbors, the Silent Sentinels of the Sea...the Marine Mammals.

Please respect their rights as creatures of the Planet.

Mr. President, please don't shoot those air guns underwater....

VTY,

Capt. Joel S. Fogel
Chairman, Environmental Affairs
The Explorers Club, Philadelphia Chapter
www.explorers.org

President, WATERWATCH International
www.waterwatchinternational.org

Subject: Turning up the volume in dolphin habitats
From: wavemaker@oceana.org
To: fidco@hotmail.com
Date: Thu, 3 May 2012 13:52:55 +0000

Dear Captain,

Imagine having dynamite go off in your neighborhood every ten seconds for days, weeks, or months on end. This is what the ocean sounds like to dolphins and whales when humans conduct seismic testing for oil. The loud noises drown everything out, **including the animals' own voices**, and could injure or even kill animals too close to the airgun blasts. Some dolphins and whales may even beach themselves to escape the noise.

Protect dolphins and whales from underwater blasts

Sign today to stop dangerous seismic testing in the Atlantic»

Keep the oceans peaceful. Sign today and tell the US government not to drown out dolphins' voices»

Seismic testing is performed by shooting compressed air into the water. It's one of the loudest underwater noises humans can make, and the sound travels thousands of miles.

The Department of the Interior is currently proposing seismic testing for the Middle and South Atlantic. Tens of thousands of whales and dolphins will be at risk, and habitats exposed to the sound include the **only known calving ground for endangered right whales.** There are only about 400 right whales left in the wild—disrupting the lives of mothers and babies could push them closer to extinction.

Turning up the volume could be deadly for whales. Sign today to protect Atlantic animals from noisy seismic testing»

The fact is, dolphins and whales just can't live their lives while surrounded by such loud noise. Whales use their voices to find mates. Dolphin mothers communicate with their babies with clicks and whistles. These sounds will be silenced by the airguns. If they can't talk to one another, these social animals are lost—and if they get too close to the airguns, **they may not survive at all.**

Dolphins and whales need YOU to speak up. Tell the government to keep airguns OUT of the Atlantic»

Let's make sure the government can hear us, so the dolphins won't have to.

For the oceans,
Emily Fisher
Oceana

Text JOIN to 50555 to sign up for Oceana text alerts. Standard message and data rates may apply.
Click here to update your information.
This message was sent to fidco@hotmail.com. If you no longer wish to be an Oceana supporter, you can unsubscribe by simply clicking here.

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A PROJECT OF THE NATIONAL COALITION FOR MARINE CONSERVATION (NCMC)

June 29, 2012

Mr. Gary D. Goeke, Chief, Regional Assessment Section
Office of Environment (MS 5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123–2394

RE: Comments on Draft PEIS for Atlantic G&G Activities

Dear Mr. Goeke,

The National Coalition for Marine Conservation (NCMC), founded by fishermen in 1973, is dedicated to keeping the oceans wild to preserve fishing opportunities for the future. Our Wild Oceans project stresses the importance of preserving critical habitats and protecting predator-prey interactions essential to the survival of ocean wildlife. NCMC opposes the use of harmful airgun surveys to explore potential sites for ecologically-damaging oil and gas extraction. We therefore support the no action alternative (Alternative C) in the Programmatic Environmental Impact Statement (PEIS) for Atlantic OCS Proposed Geological and Geophysical (G & G) Activities, which would continue to prohibit oil and gas related G & G projects.

As described in the PEIS, the area that would be subjected to G & G activities would extend over 330,000 square miles from the mouth of the Delaware Bay south to Cape Canaveral Florida and out to 360 nautical miles from shore, encompassing critical fish habitat and fishing grounds within the Mid-Atlantic Bight and South Atlantic Bight. The PEIS (tables 4-19 through 4-25) identifies 84 fish species for which Essential Fish Habitat has been designated within areas where seismic surveys would be permitted, including habitat for overfished/recovering species such as bluefin tuna, blue and white marlin, sandbar and dusky sharks, and red snapper. The effected area, however, is potentially much larger. Noise from airgun seismic surveys is known to travel more than 3,000 miles from the source.[1]

The seismic surveys are projected to span the years 2012 through 2020. Airgun surveys take place day and night, continuing for days, weeks, or months, firing sounds in the frequency range of 10 to 200 Hz with sound pressure levels ranging from 225 to 260 dB re 1 µPa. As the PEIS (p. 4-119) points out, "airgun sounds are also pulsed and have a rapid rise time, greatly increasing the potential for

[1] Nieukirk S. et al 2004. Low frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean. *Journal of Acoustical Soc. of America*. 115:4:1832-1843.

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physiological impacts. At close range (~10-20 m [33-66 ft]), airgun noise can damage auditory and non-auditory anatomy in fishes of all life stages (e.g., eggs and larvae)."

Given the incessant nature, intensity and extensive duration of the noise produced by airgun surveys, the PEIS takes an inappropriately narrow and short-sighted approach when evaluating the effects on ocean wildlife. Acknowledging that the most likely responses would be behavioral in nature, the PEIS overlooks potential long-term and cumulative impacts through the flawed assumption that behavioral impacts will be transient in nature – animals will either move away from the sounds or acclimate to them, no harm done. However, as noted in BOEM's own literature synthesis, "(c)hanges in behavior could have a population level effect such as keeping fish from migratory routes (e.g., salmon or American shad). Issues not only involve detection but also questions of habituation and how fish, in general, respond to a fright stimulus."[2] Alteration of behavior could disrupt feeding and reproduction or impair access to spawning grounds and other essential habitats, with long-term repercussions.

Predator-prey interactions are an important consideration when evaluating the impacts of behavioral responses. Because of specialized hearing anatomy, clupeids (i.e., herrings), which include imperiled American shad, alewife and blueback herring, are especially vulnerable to noise produced by the airgun surveys and are likely to exhibit avoidance responses.[3] Herrings are critical to the Atlantic's forage base, serving as primary prey to a myriad of ocean life including seabirds, marine mammals and commercially and recreationally-important fish. Studies have also documented strong avoidance responses to airgun noise in squids,[4] another major component of the Atlantic food web. Impacts to forage fish and their predators – ecological and economic - could be serious if they are deterred from their migrations or driven from spawning habitats, foraging grounds or from traditional fishing grounds.

With scant data available for boney fish and virtually no information available for invertebrates and elasmobranchs, the conclusion of "minor impact" to fishery resources from airgun surveys is unsupportable and inappropriate. Within the Atlantic OCS, fishery resources generate over $1.5 billion annually in commercial landings value alone,[5] not taking into account the billions generated by recreational fishing industry and the incalculable value the public places on our wildlife resources. The NCMC has been engaged in the conservation and management of Atlantic fishery resources for decades. We have worked directly with scientists, fishery managers and fishermen to incorporate ecosystem considerations into policies and practices to ensure sustainable fisheries for the greatest benefit to the nation. The long-term ecosystem risks from an intensive oil and gas exploration and extraction program in the Atlantic OCS far outweigh the promise of short-term non-renewable energy supplies. We strongly oppose the authorization of airgun surveys and urge you not to proceed with either of the action alternatives.

Sincerely,

Pam Lyons Gromen
Executive Director

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[2] Normandeau Associates, Inc. 2012. Effects of Noise on Fish, Fisheries, and Invertebrates in the U.S. Atlantic and Arctic from Energy Industry Sound-Generating Activities. A Literature Synthesis for the U.S. Dept. of the Interior, Bureau of Ocean Energy Management. Contract # M11PC00031. 153 pp.

[3] U.S. Department of the Interior, Bureau of Ocean Energy Management, New Orleans Gulf of Mexico OCS Region. Atlantic OCS Proposed Geological and Geophysical Activities Mid-Atlantic and South Atlantic Planning Areas: Biological Assessment. May 2012.

[4] McCauley, R.D. et al., 2000. Marine Seismic Surveys: Analysis And Propagation of Air-Gun Signals; And Effects of Air-Gun Exposure on Humpback Whales, Sea Turtles, Fishes and Squid. Report for Australian Petroleum Production Exploration Association Available from Centre for Marine Science and Technology Curtin University of Technology Western Australia 6102 198 pp.

[5] See note 2, Appendix Table B-3.

MARINE MAMMAL COMMISSION

2 July 2012

Mr. Gary D. Goecke
Chief, Regional Assessment Section
Office of the Environment
Gulf of Mexico Outer Continental Shelf Region
Bureau of Ocean Energy Management
1201 Elmwood Park Boulevard, MS-5410
New Orleans, LA 70123-2394

Dear Mr. Goecke:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed (1) the Bureau of Ocean Energy Management's Draft Programmatic Environmental Impact Statement on Geological and Geophysical Exploration of the Atlantic Outer Continental Shelf and (2) the associated 30 March 2012 notice (77 Fed. Reg. 19321) seeking comments. The Commission provides the following recommendations and rationale.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the Bureau of Ocean Energy Management—

- select alternative B as its preferred alternative;
- amend alternative B to 1) expand the geographic boundary of the time-area restriction on airgun seismic surveys to all coastal waters out to 55 km from shore and 2) require passive acoustic monitoring to detect nearby vocalizing marine mammals for all active acoustic surveys that have the potential to take marine mammals by harassment, including high resolution geophysical surveys;
- add an analysis of the direct and indirect economic costs of implementing each alternative, describe the criteria the Bureau will use to select a preferred alternative, and add an additional comment period so that the public is able to review and judge that material and comment on it;
- increase its efforts to maximize the utility of seismic data while minimizing the number and impacts of new seismic studies, using suggested strategies described below;
- include in its final environmental impact statement an alternative that, as part of the permitting process, would promote the further development, testing, and use of alternative, less harmful technologies to collect the required geophysical information;
- work with other agencies with related responsibilities, the oil and gas industry, scientists, conservation organizations, and other stakeholders to develop standards for baseline data collection and ensure the availability of adequate baseline information before moving forward with the proposed geological and geophysical surveys;
- provide confidence limits and sources of potential bias associated with the density and take estimates that were calculated for each species;

- use the 120-dB re 1 μPa threshold to recalculate the Level B harassment zone and associate takes for the use of shallow-penetration sub-bottom profilers and other non-impulsive sound sources;
- include in its calculation of estimated takes an assessment of all potential sound sources associated with geological and geophysical surveys, including exploratory drilling and vessel sounds;
- require, as a term and condition for issuing a geological and geophysical permit, that applicants obtain authorization under section 101(a)(5)(A) or (D) of the Marine Mammal Protection Act to take small numbers of marine mammals incidental to those activities; such approval should also stipulate minimum requirements for mitigation, monitoring, and reporting, as outlined in Appendix C of the draft document;
- use the mitigation measures proposed for seismic airgun surveys (i.e., the seismic airgun survey protocol) as minimal mitigation measures for all high-resolution geophysical surveys and other sounds that have the potential to take marine mammals by Level A or Level B harassment;
- develop comprehensive, standardized monitoring protocols for assessing the effects of geological and geophysical surveys and associated activities on marine mammals;
- prepare annual summaries of marine mammal observer reports, including an analysis of the frequency and outcome of all marine mammal-vessel interactions;
- require that all operators report immediately to the National Marine Fisheries Service and the local marine mammal stranding network all injured and dead marine mammals in the vicinity of the proposed surveys, and suspend those activities if a marine mammal is seriously injured or killed and the injury or death could have been caused by those activities (e.g., a fresh dead carcass is found); and
- revise its cumulative effects analysis to provide a more rigorous and comprehensive assessment of the full impacts of sound and other human-caused and natural activities that affect marine resources in the proposed action area.

Analysis of alternatives

The draft programmatic environmental impact statement evaluates the potential environmental impacts of geological and geophysical surveys in state and federal waters of the South and Mid-Atlantic planning areas of the outer continental shelf and adjacent high seas out to 350 nmi (648 km). The surveys would support oil and gas, renewable energy, and marine minerals exploration and development from 2012 to 2020.

The statement evaluates two action alternatives. Both include mitigation and monitoring measures to avoid, reduce, or minimize impacts on protected species, including marine mammals. They include—

1) time-area restrictions on airgun surveys within the Mid-Atlantic and Southeast Seasonal Management Areas designated under 50 CFR 224.105 when vessel speeds are restricted
2) (1 November to 1 April for the mid-Atlantic and 15 November to 15 April for the southeast);
3) ramp-up, start-up, and shut-down procedures for seismic airgun surveys and at least two protected species observers on duty at all times to monitor the exclusion zone, the radius of which would be determined on a survey-specific basis but in any case would not be less than 500 m;
4) no initiation of ramp-up at night or in poor visibility conditions if the minimum source level drops below 160 dB re 1 μPa-m (rms); maintaining a minimum source level of 160 dB re 1 μPa-m (rms) to avoid visual clearance of the exclusion zone prior to ramp-up would only be authorized under certain situations (e.g., turning, airgun maintenance);
5) start-up and shut-down procedures for acoustic sources used in high resolution geophysical surveys operating at a frequency less than 200 kHz and the use of at least one protected species observer on duty at all times to monitor a minimum 200-m exclusion zone (larger exclusion zones may be established where necessary);
6) the optional use of passive acoustic monitoring to detect vocalizing marine mammals;
7) training of observers in statutory and regulatory requirements, protected species identification, data collection, and reporting of marine mammals in the exclusion zone;
8) guidance to vessel operators on vessel strike avoidance, marine debris awareness, and prevention of discharges into the marine environment;
9) reporting and protection of suspected historic and prehistoric archaeological resources;
10) avoidance of sensitive benthic communities;
11) minimizing impacts on National Marine Sanctuary resources and users; and
12) coordination of all permitted activities with activities of the military and the National Aeronautics and Space Administration.

Alternative B

Alternative B would provide more protection for marine mammals. In addition to the above, alternative B would (1) expand the time-area restrictions for airgun surveys to include all coastal waters from Cape Canaveral to Delaware Bay out to 20 nmi offshore, (2) add a sea turtle time-area restriction for airgun surveys in waters offshore Brevard County, Florida, during the nesting season, (3) require seismic operators to use passive acoustic monitoring for all seismic airgun surveys, and (4) maintain a minimum of 40-km between vessels that are conducting simultaneous deep penetration seismic surveys.

The continuous time-area restrictions along the east coast would protect breeding and migrating right whales as well as other cetaceans in near-coastal waters (e.g., bottlenose dolphins, common dolphins, white-sided dolphins, spotted dolphins, harbor porpoise, and humpback whales). However, the Commission believes that the proposed corridor is too narrow and should be expanded from 37 km (20 nmi) to 55 km (30 nmi) offshore. Prior to issuing its 2008 regulations to reduce whale-vessel collisions (73 Fed. Reg. 60173), the National Marine Fisheries Service had proposed a protective corridor out to 55.6 km (71 Fed. Reg. 36299). The width of the area was reduced based on potential economic impacts on shipping, even though it reduced protection for

right whales. Since then, Schick et al. (2009) have confirmed that migrating right whales occur at least 55 km and as far as 200 km offshore in the mid-Atlantic. Hence, in the Commission's view, the area that would be restricted under alternative B likely would not provide adequate protection for migrating whales.

The 40-km spacing requirement for vessels conducting simultaneous deep penetration airgun surveys is intended to prevent the merger of two ensonified areas to create a single, much larger obstacle to migration. The use of passive acoustic monitoring would provide additional assurance that marine mammals in the area would be detected and shut-down procedures implemented as appropriate. It also would provide a more accurate estimate of the number of animals exposed to airgun noise. This technology already is required for certain seismic surveys in the Gulf of Mexico and the Arctic, and recent advances have improved its use for detecting, classifying, and localizing marine mammals using open-source software (e.g., PAMGUARD). The Commission has commented often on the limited effectiveness of visual observations and believes that passive acoustic monitoring should be used during all surveys with active sound sources that may take marine mammals, including high resolution geophysical surveys.

Because it provides greater protection for marine mammals, including the highly endangered North Atlantic right whale, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management select alternative B as its preferred alternative. The Commission further recommends that the Bureau amend alternative B to 1) expand the geographic boundary of the time-area restriction on airgun seismic surveys to all coastal waters out to 55 km from shore and 2) require passive acoustic monitoring to detect nearby vocalizing marine mammals for all active acoustic surveys that have the potential to take marine mammals by harassment, including high resolution geophysical surveys.

The Bureau has stated that the additional mitigation measures proposed under alternative B would add direct and indirect economic costs to the industry, and that the Bureau wishes to review the totality of the record generated by the programmatic environmental impact statement in the public review period to assist in identifying its preferred alternative. However, the information the Bureau is reviewing is not clear because it did not describe the direct and indirect economic costs associated with each alternative. The omission of economic information is inconsistent with the Bureau's regulations implementing the National Environmental Policy Act, which state that the preferred alternative is the alternative the Bureau believes would "best accomplish the purpose and need of the proposed action while fulfilling its statutory mission and responsibilities, giving consideration to *economic*, environmental, technical, and other factors" (emphasis added) (43 CFR § 46.420). The Marine Mammal Commission therefore recommends that the Bureau of Ocean Energy Management add an analysis of the direct and indirect economic costs of implementing each alternative, describe the criteria the Bureau will use to select a preferred alternative, and add an additional comment period so that the public is able to review and judge that material and comment on it.

Reducing the potential for redundant seismic surveys

At least 38 marine mammal species occur in the North Atlantic during all or part of the year (Waring et al. 2011). The area of interest for the proposed surveys includes a wide range of marine mammal habitats. The surveys would involve the use of seismic airguns that emit high energy, low frequency acoustic pulses that travel long distances and may disrupt important marine mammal behaviors (i.e., feeding, resting, migrating, breeding, calving) and—at close range—can cause physical or physiological injury (Gordon et al. 2004). The noise also can mask biologically important sounds, such as communication calls between conspecifics (Richardson et al. 1995). Baleen whales (right, humpback, fin, blue, and minke whales) are the most likely to be affected by the proposed activities because of their sensitivity to low frequency sounds, whereas other cetaceans could be adversely affected if close enough to the sound source.

The Bureau has received nine applications for geological and geophysical activities in the Atlantic. Eight of those have proposed two-dimensional seismic surveys in some or all of the area of interest to identify potential oil and gas reserves. The projected two-dimensional seismic activity in the south and mid-Atlantic for 2012 to 2020 exceeds the total level of seismic survey activity documented for the entire Atlantic from 1968 to 2005 (Minerals Management Service 2007). If seismic activities proceed as projected, the potential for multiple surveys of the same areas by different applicants is considerable (Figure E-19, page E-59)—especially during 2013 and 2014, the two years of highest projected seismic survey activity.

Conducting multiple seismic surveys of the same area will increase risks to marine mammals and marine ecosystems unnecessarily with no meaningful gain in information. Permitting unnecessarily duplicative surveys is contrary to the charge of balancing orderly resource development with protection of the human, marine, and coastal environments, as directed by the Outer Continental Shelf Lands Act of 1953 (43 U.S.C. 1331 et seq.), as amended. The Bureau stated that they considered coordinating and consolidating seismic surveys to eliminate duplication of survey effort but rejected this approach because the vessel spacing requirements of alternative B would limit concurrent surveys. The Commission agrees that alternative B would prohibit concurrent overlapping or immediately adjacent surveys, but it would not prevent two or more operators from conducting multiple, unnecessarily redundant seismic surveys of the same area at a different time of year or in subsequent years.

As the permitting authority for companies that conduct geological or geophysical exploration of the Outer Continental Shelf, the Bureau is responsible under the National Environmental Policy Act to identify and evaluate alternatives that avoid unnecessary adverse impacts on the environment. The Bureau also must ensure that permitted activities are compliant with the provisions of other federal laws, including the requirement under the Marine Mammal Protection Act that any permitted taking of marine mammals have a negligible and least practicable impact on the affected marine mammal species or stocks.

The Bureau's analysis of existing seismic survey data provides a comprehensive assessment of undiscovered technically recoverable oil and gas resources in the Atlantic (Post et al. 2012).

Rather than re-survey large areas of the Atlantic for which two-dimensional seismic surveys already exist, or conduct multiple overlapping surveys of the same areas, the Bureau should require the oil and gas industry to make the most use of existing, publicly available seismic data. The Bureau also should provide broader access to seismic data that has been collected but that may not yet be in the public domain. This could help to focus and restrict the scope of future surveys to areas that show the most promise for oil and gas development, especially considering that oil and gas resources in the south and mid-Atlantic are expected to be relatively small (Bureau of Ocean Energy Management 2011, Post et al. 2012). The Bureau also should encourage companies that are engaged in or interested in acquiring seismic data in the same areas to collaborate on data collection to limit the number of surveys that are required.

The Commission has emphasized the need to minimize redundant seismic surveys in the Gulf of Mexico and the Arctic. The Bureau has considered methods to achieve that objective under the current regulatory framework, but the Commission believes more could be done. To that end, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management increase its efforts to maximize the utility of seismic data while minimizing the number and impacts of new seismic studies. Steps that could be taken include—

- analyzing fully all existing, publicly available seismic data;
- encouraging industry to release seismic data that is not yet in the public domain;
- collaborating on seismic surveys in areas of common interest;
- limiting the geographic scope, frequency, sound output, and/or duration of surveys that occur in any given year, especially in preferred marine mammal habitat areas;
- having the Bureau conduct seismic surveys and making them available to the industry for a fee;
- auctioning the right to conduct seismic surveys in certain planning areas or blocks; and
- providing tax or other incentives to companies that use alternative, less harmful technologies for the collection of seismic data.

Clearly, the Bureau will need to engage the industry in identifying the best ways to move forward, but the Bureau will have to provide the leadership and retain decision-making authority to ensure the necessary progress.

Alternatives to airguns

As noted previously, sound from seismic airguns poses a number of risks to marine mammals. In its draft environmental impact statement the Bureau discussed several alternative (i.e., non-airgun) technologies including the use of marine vibrators (vibroseis), low-frequency acoustic sources, deep-towed acoustics/geophysics systems, low-frequency passive acoustic systems, and controlled source electromagnetic systems. Some may have the potential to replace airguns, but all are still in various stages of development and not yet commercially available for use on the scale considered in the proposed action. For that reason, the Bureau rejected an alternative that would have prohibited the use of seismic airguns.

Rather than immediately prohibiting airguns, the Bureau should seek an orderly transition by industry from airguns to alternative technologies. In addition to time, such a transition undoubtedly will require permitting incentives and additional research investments. But unless the Bureau steps forward and facilitates a transition to new, less harmful technologies, the development and use of those technologies will be stalled.

Marine vibroseis is a particularly promising and potentially less harmful alternative to airguns for collecting subsurface geophysical data (Weilgart 2010). The draft environmental impact statement indicates that it could be commercially viable within two to four years with additional investment in design and testing. This is well within the nine-year timeframe considered for the proposed action. Controlled source electromagnetic technology also provides an alternative to seismic airguns for characterizing oil and gas resources identified using traditional airgun surveys. That technology already has been used in Norway to direct three-dimensional surveys toward the most prospective oil and gas areas prior to drilling (pers. comm. D. Ridyard, EMGS).

Given the need for and potential of alternative technologies to replace or minimize the use of airguns, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management include in its final environmental impact statement an alternative that, as part of the permitting process, would promote the further development, testing, and use of alternative, less harmful technologies to collect the required geophysical information.

Baseline information

A thorough evaluation of the potential impacts of geophysical surveys and related vessel activities on marine mammals and their habitats depends on the availability of good baseline information. That information is essential to inform efforts to identify and avoid potential harmful interactions with sensitive populations (e.g., those listed as threatened or endangered under the Endangered Species Act or depleted under the Marine Mammal Protection Act) and to minimize impacts on particularly sensitive areas (e.g., marine protected areas, national monuments, essential fish habitats, designated critical habitats, and biological hotspots or areas of particular biological richness). It also should be collected at temporal and spatial scales necessary to characterize the variability inherent in the affected ecosystem. For potentially affected marine mammals, the necessary information includes their stock structure, population status, abundance and trends, distribution and seasonal movements, habitat use patterns, and trophic relationships. For example, additional baseline data regarding migrating North Atlantic right whales could be collected using tagging or aerial surveys to assess their movement patterns (e.g., their distance from shore at different times of the year).

The Bureau has acknowledged that baseline information is lacking for many marine mammals in the area of interest. However, the Bureau has concluded that the cost of acquiring such information would be exorbitant and such information could not be collected in time to evaluate the impacts of the proposed action. The Commission agrees that the collection of comprehensive baseline information requires a long-term and consistent commitment of effort and resources, and

that federal funding for such studies has been limited. Nevertheless, such information is needed to inform decision-makers regarding whether, where, and under what conditions to conduct activities that could have acute or long-term adverse effects on marine mammals and other marine species. In addition, the Commission does not consider the cost of collecting such information to be exorbitant, particularly when viewed in the context of the billions of dollars involved in oil and gas development. In any given year, the total funding for marine mammal research and conservation is on the order of 200 million dollars or less. At the same time, the annual profits of some individual oil companies are in the tens of billions of dollars. Furthermore, the failure to invest in the necessary studies undermines our professed intent to manage our marine resources on the basis of sound science.

The Commission has long argued that the industry and regulatory agencies have a responsibility to ensure that the research needed to manage resource use is conducted in a timely and comprehensive manner. The Bureau's Environmental Studies Program, in collaboration with other federal agencies, has committed to providing multi-year funding to the National Marine Fisheries Service for the Atlantic Marine Assessment Program for Protected Species. That program is supporting a broad-scale, multi-year data collection of abundance and seasonal distribution data for marine mammals and other wildlife in the area of interest for geological and geophysical surveys. The Commission commends that joint effort as it will improve the quality of baseline information needed for assessments of marine mammal stocks. For that reason, it should continue to be a high priority for the Bureau. However, as noted by the Bureau, the resources provided still fall short of what is needed. The Commission believes that the Bureau and the industry need to find additional means of supporting essential research. The industry, in particular, should provide multi-year financial support for stock assessment surveys and stock structure research in areas where seismic surveys are proposed because the risks to marine mammals stem from their activities. The industry should consider efforts to address and manage these risks responsibly as a cost of doing business.

The development of a rigorous program to collect baseline information in the Atlantic, especially in advance of any future leasing activities, is well within existing scientific capacity and would require only a very small fraction of the total cost of developing energy resources in this region. A long-term and consistent investment in baseline data collection would ensure that the decisions regarding proposed survey activities are guided by the best available scientific information. For those reasons, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management work with other agencies with related responsibilities, the oil and gas industry, scientists, conservation organizations, and other stakeholders to develop standards for baseline data collection and to ensure the availability of adequate baseline information before moving forward with the proposed geological and geophysical surveys.

Estimating takes

The data used to estimate takes of marine mammals in the area of interest is based on incomplete or outdated stock assessment surveys. The Bureau used density estimates derived from limited shipboard surveys conducted between 1994 and 2006 by the National Marine Fisheries Service. The density estimates were then extrapolated to other areas for which density estimates

were not available, including areas beyond the exclusive economic zone. As a result, the reliability of the density estimates is uncertain, as are the resulting take estimates. In addition, the uncertainty has not been quantified and hence is not available and apparent to decision-makers. To better convey the uncertainty or reliability of the density and take estimates used in the draft environmental impact statement, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management provide confidence limits and sources of potential bias associated with the density and take estimates that were calculated for each species.

The Bureau used 160 dB re 1 μPa (rms) as the behavioral disturbance criteria for the calculation of Level B incidental takes from all sound sources, pulse and non-pulse. Although 160 dB re 1 μPa (rms) is appropriate for pulse signals, such as airguns, it is not appropriate for non-impulsive sound sources, such as chirp (shallow penetration) sub-bottom profilers. The National Marine Fisheries Service recently clarified that for non-impulsive sound sources, whether continuous or intermittent, Level B harassment is presumed to begin at received levels of 120 dB re 1 μPa (76 Fed. Reg. 43639). Consistent with that guidance, the Level B harassment zone should be calculated based on that threshold rather than 160 dB re 1 μPa. To address this concern, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management use the 120-dB re 1 μPa threshold to recalculate the Level B harassment zone and associate takes for the use of shallow-penetration sub-bottom profilers and other non-impulsive sound sources.

The Bureau also noted that certain activities (e.g., drilling of deep stratigraphic or shallow test wells, geotechnical bottom sampling for renewable energy site characterization) would generate continuous sounds associated with the drilling rig or the support vessel's dynamic positioning thrusters. However, the Bureau did not include those sound sources in its modeling or calculation of take estimates. To address this shortcoming, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management include in its calculation of estimated takes an assessment of all potential sound sources associated with geological and geophysical surveys, including exploratory drilling and vessel sounds.

Mitigation, monitoring, and reporting measures

Seismic airgun and high resolution geophysical surveys both use active sound sources that have the potential to take marine mammals by Level A or Level B harassment, as defined under the Marine Mammal Protection Act. Operators conducting those surveys are required to seek authorization under section 101(a)(5)(A) or (D) of the Marine Mammal Protection Act to take small numbers of marine mammals incidental to those activities. In the case of cetaceans and pinnipeds, authorization is to be sought from the National Marine Fisheries Service and, in the case of manatees, from the Fish and Wildlife Service. The Bureau has not been consistent in its guidance to applicants regarding compliance with the Marine Mammal Protection Act, and this has led to confusion and litigation. To avoid confusion for applicants seeking permits to conduct geological and geophysical surveys in the south and mid-Atlantic, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management require, as a term and condition for issuing a geological and geophysical permit, that applicants obtain authorization under section 101(a)(5)(A) or (D) of the Marine Mammal Protection Act to take small numbers of marine

mammals incidental to those activities; such approval should also stipulate minimum requirements for mitigation, monitoring, and reporting, as outlined in Appendix C of the draft document.

The Bureau has proposed that the exclusion zone for each survey would be determined on a survey-specific basis, but in any case would not be less than 500 m for airgun seismic surveys and 200 m for high-resolution geophysical surveys. The Commission has previously commented on the need to obtain in-situ sound propagation measurements to calculate survey-specific exclusion zones, and commends the Bureau for including that provision in its proposed mitigation measures for both airgun surveys and high-resolution geophysical surveys.

As seismic airgun and high-resolution geophysical surveys both use active sound sources that have the potential to take marine mammals by Level A or Level B harassment, it is unclear why the Bureau has proposed different mitigation measures for the two types of surveys. The survey protocols proposed for high resolution geophysical surveys are inconsistent with those proposed by Cape Wind Associates for geophysical surveys, which included the use of ramp-up procedures, multiple observers, and a minimum 500-m exclusion zone. The Commission believes that the mitigation measures proposed for airgun surveys, including the use of passive acoustic monitoring as identified under alternative B and expanded to include also monitoring of high-resolution geophysical surveys, are minimal requirements for all surveys involving active sound sources. Therefore, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management use the mitigation measures proposed for seismic airgun surveys (i.e., the seismic airgun survey protocol) as minimal mitigation measures for all high-resolution geophysical surveys and other sounds that have the potential to take marine mammals by Level A or Level B harassment.

Rigorous monitoring is needed to assess the effectiveness of mitigation measures and to determine the effects of survey activities on marine mammals at different times and in different locations. Such effects often are assessed by measuring changes from baseline conditions. The monitoring program should follow hypothesis-driven, standardized protocols for data collection to facilitate consistency in data collection and analysis, whether by industry, government, or contracted researchers. Monitoring protocols should be rigorous enough to detect effects caused by specific survey activities or other key anthropogenic or natural events that may be occurring at the same time in the project area. Figure 1 represents a conceptual framework that could be used to guide the development of monitoring protocols (adapted from MMC 2011). For that purpose, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management develop comprehensive, standardized monitoring protocols for assessing the effects of geological and geophysical surveys and associated activities on marine mammals.

The Bureau's recently published summary of seismic survey mitigation measures and marine mammal observer reports indicated that the presence of marine mammals and the resulting ramp-up and shut-down procedures do not cause frequent delays during surveys (Barkaszi et al. 2012). The summary also indicated that shut-down procedures in response to sightings of small cetaceans also would not cause significant delays. The Commission has commented on several occasions that

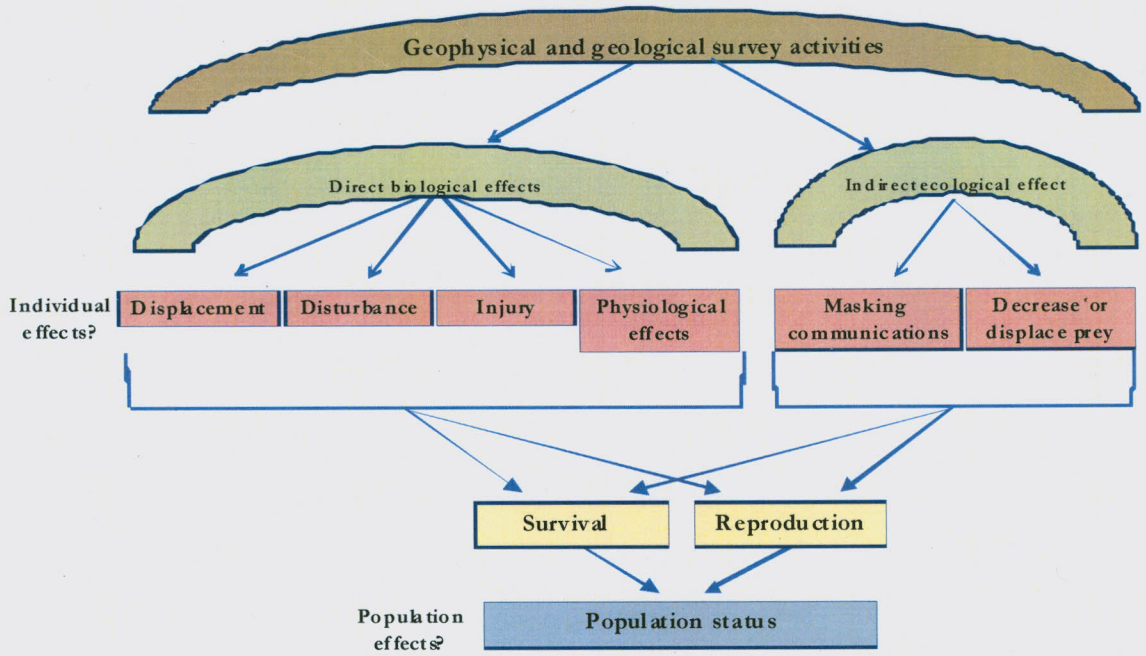

Figure 1. Conceptual framework for assessing the effects of geophysical and geological survey and associated activities on marine mammals.

shut-down procedures should be used to protect all marine mammals, not just whales, and the analysis in the summary report suggests that implementing this recommendation would not create significant economic concerns. Indeed, the Bureau proposes to require that ramp-up and shut-down procedures be used to protect all marine mammals. The one situation where this may not be feasible is when dolphins approach a vessel or towed equipment to bow-ride or draft off the equipment. The frequency of such interactions and the best ways to manage them are not clear. To provide that information, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management prepare annual summaries of marine mammal observer reports, including an analysis of the frequency and outcome of all marine mammal-vessel interactions.

Incidental harassment authorizations issued under sections 101(a)(5)(A) and 101(a)(5)(D) generally require reporting of all injured or dead marine mammals. The Bureau's proposed activities have the potential to harass marine mammals. Therefore, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management require that all operators report immediately to the National Marine Fisheries Service and the local marine mammal stranding network all injured and dead marine mammals in the vicinity of the proposed surveys, and suspend those activities if a marine mammal is seriously injured or killed and the injury or death could have been caused by those activities (e.g., a fresh dead carcass is found).

Cumulative effects

The Bureau's analysis of cumulative effects evaluated the incremental increase of certain aspects of the proposed action when added to other impacts of a similar nature (for example, the incremental increase in sound from the proposed active acoustic surveys when added to other sources of underwater noise). However, the analysis falls short in evaluating the combined effect of all impacts resulting from the proposed action when compared to all existing and reasonably foreseeable future actions. The Commission recognizes the difficulty in monitoring and evaluating the individual effects of specific activities on marine mammals, let alone the combined effects of multiple activities in a constantly changing environment. This is especially true considering that effects resulting from the proposed action likely will involve behavioral changes in the affected marine mammals and/or indirect effects on prey species, the long-term biological significance of which are harder to assess than the significance of acute effects such as injuries or mortalities.

Nevertheless, numerous guidelines are available for developing a conceptual framework to analyze the cumulative effects of sound and other stressors on marine mammals and the marine environment (Council on Environmental Quality 1997, National Research Council 2005, Moore et al. 2012). A comprehensive analytical framework is necessary to determine if, when, and where marine resources, including marine mammals, are being exposed to cumulative effects that reduce their status or hinder their potential to grow and recover. Therefore, the Marine Mammal Commission recommends that the Bureau of Ocean Energy Management revise its cumulative effects analysis to provide a more rigorous and comprehensive assessment of the full impacts of sound and other human-caused and natural activities that affect marine resources in the proposed action area.

Please contact me if you have questions about the Commission's recommendations or comments.

Sincerely,

Timothy J. Ragen

Timothy J. Ragen, Ph.D.
Executive Director

cc: Michael Payne, National Marine Fisheries Service

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May 25, 2012

Mr. Gary D. Goeke,
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Re: Comments on "Atlantic OCS, Proposed Geological and Geophysical Activities, Mid-Atlantic and South Atlantic Planning Areas, Draft Programmatic Environmental Impact Statement"

Dear Mr. Goeke,

We are writing this letter as marine science professionals from the Virginia Aquarium & Marine Science Center Foundation (VAQF), Research & Conservation Division. To be clear, the following comments are the opinion of the signers of this letter and do not reflect the organizational opinion of VAQF.

Our organization coordinates sea turtle and marine mammal stranding response for the state of Virginia. From 2001 to 2010, VAQF responded to a total of 950 marine mammal and over 1500 sea turtle strandings. As part of our stranding response efforts, we have collected over 20 years of data related to marine species presence, health, and anthropogenic risk in Virginia. In addition to stranding response, we have participated in VAQF research projects focused on protected species in Chesapeake Bay and coastal mid-Atlantic waters, including: sea turtle and marine mammal boat-based and aerial surveys; marine mammal photo-identification and biopsy sampling; sea turtle and pinniped satellite telemetry tagging; sea turtle and pinniped health assessment; fishery by-catch and gear modifications research; and large vessel traffic characterization studies.

The intent of this letter is to provide comments related to the Bureau of Ocean Energy Management (BOEM) publication of the *"Atlantic OCS, Proposed Geological and Geophysical Activities, Mid-Atlantic and South Atlantic Planning Areas, Draft Programmatic*

Environmental Impact Statement" (referred to as the DPEIS hereafter). Given the risk to protected species, the lack of sufficient protected species density data, and the fact that the proposed action is not essential for Wind Energy Area (WEA) development, we support *Alternative C – No Action for Oil and Gas, Status Quo for Renewable Energy and Marine Mineral G&G Activity*. Please accept the following three comments that will explain why we chose a no action alternative.

COMMENT 1:

The DPEIS accurately indicates that there is a very wide range of possible behavioral responses to sound exposure, given that the sound is audible to the particular animal. However, your point that the following list is increasing in severity, but decreasing in likelihood, is questionable when the sound exposure is of the scale involved with seismic exploration:

- none observable – animals can become less sensitive over repeated exposures;
- looking or increased alertness;
- minor behavioral responses such as vocal modifications associated with masking;
- cessation of feeding or social interactions;
- temporary avoidance behavior (emerging as one of the more common responses);
- modification of group structure or activity state;
- habitat abandonment; and/or
- injury and/or death via direct response or possibly exacerbated by physiological factors.

Southall et al. (2007) found that sounds of 120-150dB can trigger behavioral changes that are not necessarily minor, and occur far from noise sources. Baleen whales response to multiple pulsed sounds (e.g. airguns) showed avoidance, brief cessation of reproductive behavior, aggressive behavior (e.x. tail/flipper slapping, jaw clapping, abrupt directed movement), and brief and extended changes in vocalization. These types of reactions for sounds between 120-150 dB were documented in approximately 60% of baleen whale studies observed in this study.

Foraging disruption is the behavioral impact most likely to affect long-term health of individuals or populations. Jochens et al. (2008) found that whales may remain at the surface when exposed to sound levels of 160 dB, and may not dive to feed until the sound exposure stopped. The study also found that no tagged whale made a deep dive closer than 4km from the array. The authors found that a 20% decrease in overall foraging activity is likely to occur near airguns.

Additionally, no observable response from a particular individual or group of animals does not necessarily mean the sound is having no effect. Tyack (2008) points out that in addition to acute behavioral responses there is significant risk to populations of marine mammals from less visible effects of chronic exposure.

There is risk that this level of seismic surveys will have an impact on marine mammals. The degree of this effect is currently unquantifiable and not fully understood. Since we believe that there is no immediate need for these surveys to take place, it would be irresponsible for BOEM to approve the proposed Action.

COMMENT 2:

According to the 1976 Marine Mammal Protection Act (MMPA), "takes" of marine mammals are prohibited unless an "incidental take" Letter of Authorization (LOA) is provide by National Marine Fisheries Service (NMFS). LOAs are only authorized if actions have a less than negligible impact on marine mammal species not listed as under the Endangered Species Act (ESA). Species density estimates and acoustic modeling were used to report the number of takes per grid block throughout the survey area for all marine mammal species (Section 4.2.2.2). Based on these take estimates, the PEIS reports that the proposed Actions, "would result in negligible or minor impacts to marine mammals" (Sections 4.2.2.2 and 4.2.2.3). According to Section 1.6.7 of the DPEIS, the take data reported will be used to "serve as a reference for environmental documentation regarding future site-specific Actions."

Overall, we recognize the efforts the BOEM has made to compile species density data and model the effect of acoustics on protected species. However, we assert that the baseline density data used may be a gross underestimate of actual density due to the lack of sufficient marine mammal sighting data, on a regional and seasonal scale, throughout the proposed G&G survey area. One of the assumptions of the complex acoustic modeling effort used in this study was "animal density estimates would use the best available data, specified by location and season, for the modeling effort." Additionally, the report states that "the AIM (acoustic integration modeling) was used to estimate the impacts per survey block for each species, based on the typical planned geometry for each type of survey in each modeled area where the surveys would be conducted, using the appropriate thresholds for that species." Therefore; the potential physiological and behavioral impacts to marine mammals in this study are being based on a model that relies on accurate animal density estimates.

The density estimates were developed as the NAVY Operating Area Density Estimates (NODE) in 2007 (U.S. Dept. of the Navy. 2007). These density estimates were based on the NMFS Southeast Fisheries Science Center (SEFSC) shipboard surveys conducted between 1994 and 2006. Virginia falls under the jurisdiction of NOAA Northeast Fisheries Science Center. While SEFSC surveys do occasionally cover Virginia waters, these efforts are generally limited, conducted on a very broad scale, and usually species specific (most surveys have focused on bottlenose dolphins, *Tursiops truncatus*).

The DPEIS identifies Zone 20 extending across the continental shelf from Cape Lookout to the Delaware Bay, including Virginia waters. Many of the species have zero or near zero reported average densities (4.2.2.2), but have regular presence in Virginia stranding and sighting records (Table 1). Humpback whales (*Megaptera novaeangliae*) and bottlenose dolphins are of particular interest, because both our sighting reports and our stranding data are inconsistent with these densities (Figure 1). The DPEIS reports a zero density of humpback whales and a 0.00002 density of fin whales (*Balaenoptera physalus*) in Zone 20; however, using photo-identification techniques, VAQF has documented a minimum of 57 humpback whales and 5 fin whales in near-shore Virginia ocean waters from December

2011 through February 2012. In addition, the DPEIS reports a density of 0.1816 bottlenose dolphins in Zone 20. During 2011, a total of 14,576 km of aerial survey transits resulted in 346 bottlenose dolphin group sightings within Zone 20. The groups ranged in size from 1 to 65 animals and totaled 2,010 individuals (Figure 1). As these examples show, lack of formal survey data from the mid-Atlantic region resulted in a model with large areas of zero and near zero density, despite extensive anecdotal stranding and sighting records.

The lack of robust (*e.g*. consistent and fine scale), yearlong, comprehensive data causes several problems when researchers calculate abundance estimates. First, the lack of yearlong survey data limits researcher's ability to calculate abundance over a population's entire habitat. Second, visual line-transect data are subject to perception and availability-bias, and should not be used to calculate abundance without appropriate methodology to allow for bias correction. However, the NODE density model cited in the DPEIS assumes an availability bias, or g(0), of 1 which underestimates the species density by assuming that there are no animals under the surface of the water (U.S. Dept. of the Navy. 2007b). Finally, survey design of multiple efforts must be conducted from similar platforms using comparable methodology to allow for data compatibility. Existing regional sighting datasets cannot be pieced together to calculate wide-scale population and abundance estimates. The sighting data used in the analysis suffers from these biases and the presence or absence of species in the DPEIS should not be predicted using uncorrected sighting data.

Furthermore, marine mammals and turtles, as well as avian species, are migratory animals that have seasonally specific habitats. These habitats have vast ecological ranges, crossing multiple political boundaries, and animals may change behavioral patterns in response to anthropogenic activities. Robust distribution and abundance estimates for migratory marine species must be available on temporal and spatial scales that incorporate all ecological niches for these species. Currently, these data are not available for appropriate EIS or environmental NEPA analyses. There are critical gaps in density data available for marine species population assessments of cetaceans, including critically endangered right whales and other ESA whale species, as well as for endangered sea turtles, shore birds and waterfowl in the mid-Atlantic region. The last comprehensive, year-long marine mammal

and sea turtle surveys of the Atlantic coast were the Cetacean and Turtle Assessment Program (CeTAP) and the Southeast Sea Turtle Survey (SETS), conducted in the late 1970's and early 1980's. Current inter-agency survey efforts by NMFS, OEMRS and FWS in a project called "Atlantic Marine Assessment Program for Protected Species" (AMAPPS) are collecting these important data, but it is unlikely that there will be sufficient funding to conduct fine scale mid-Atlantic surveys required for seasonal density estimates in the seismic survey areas in the near future. Additional survey efforts using comparable platforms and survey methodology must be added to the broad-scale efforts by AMAPPS for NMFS to be able to properly develop abundance and distribution assessments of protected marine species.

The density estimates used in the DPEIS report are in no way an accurate representation of animal density in Virginia waters and therefore it is not sensible to use the results of this model for our area. It would be careless to base a study on noise that has the potential to cause direct behavioral and physiological impacts to marine mammals, including impacts that could lead to death, on a biological model using such limited data. It is important that BOEM work with other federal agencies and NMFS to fill these data gaps and re-create the acoustic model used to predict take numbers, prior to issuing an environmental impact finding for the seismic surveys.

COMMENT 3:

On February 3, 2012, BOEM issued Notice of the Availability (NOA) of an Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) for the Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf (OCS) Offshore New Jersey, Delaware, Maryland, and Virginia (Docket No. BOEM–2011–0088). As a result, BOEM is authorized under NEPA to move forward with geophysical, geotechnical, archaeological, and biological surveys needed to develop identified Wind Energy Areas (WEAs). The seismic surveys proposed in the G&G DPEIS are not necessary for development of the WEAs given that BOEM is already authorized to move forward with the less invasive side-scan surveys that meet the needs of benthic studies for wind tower construction.

BOEM, the State of Virginia, and regional municipalities have all been supportive of WEA development and we believe BOEM should focus its energy and resources on leasing and developing these areas instead of O&G exploration in the mid-Atlantic.

Sincerely,

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Table 1: Shows species that have relatively high stranding numbers in Virginia compared to their reported densities. The stranding numbers were calculated from the Virginia Aquarium & Marine Science Center's marine mammal stranding database. The density estimates were reported from the DPEIS.

Species	Density Reported in DPEIS Zone 20	Stranded in VA (2005-2011)
Atlantic white-sided dolphin	0.0005	7
Bottlenose dolphin	0.1816	456
Common dolphin	0.1808	46
Harbor porpoise	0.0005	65
Harbor seal	0.0001	24
Hooded seal	0.0001	7
Humpback whale	0.0000	9

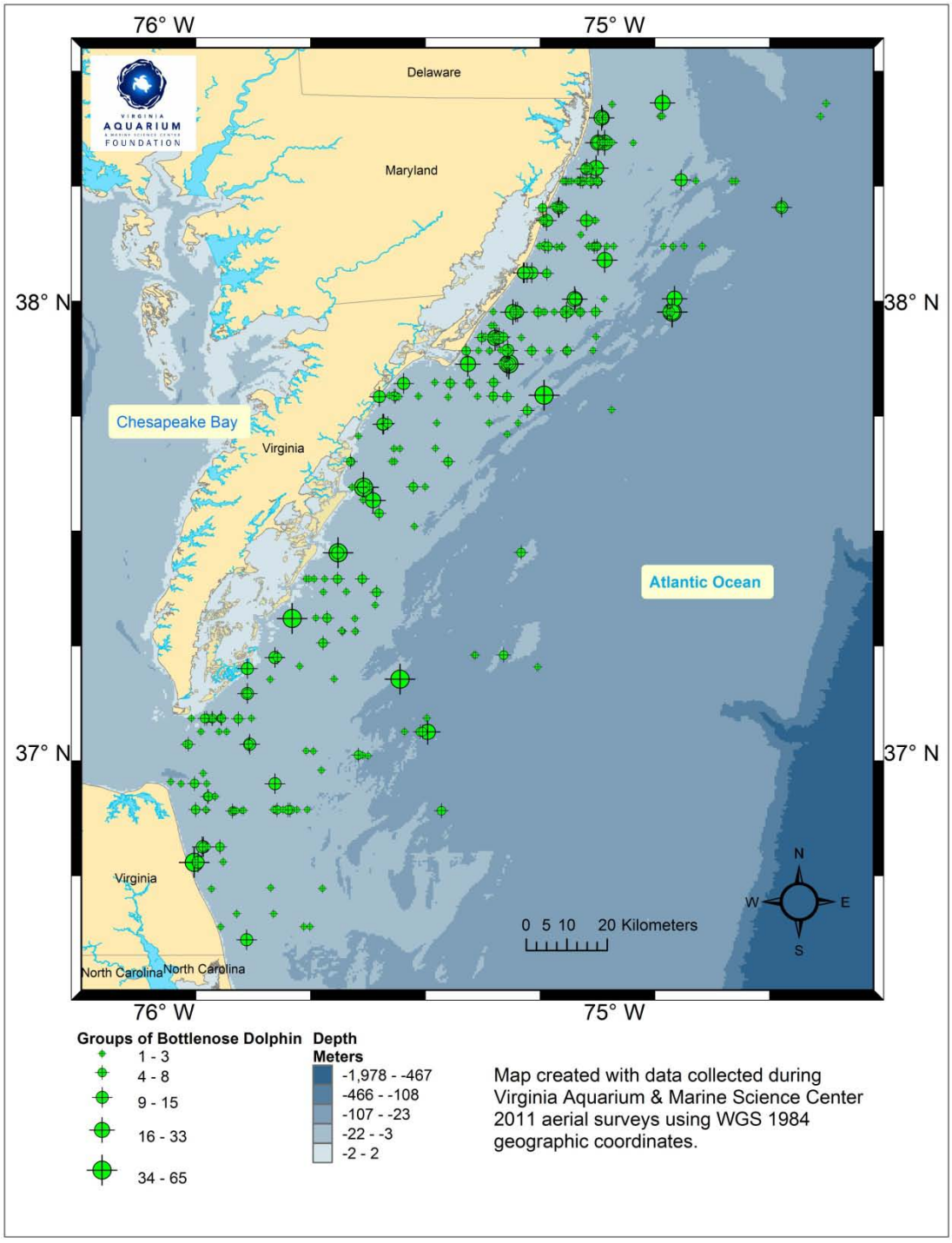

Figure 1: Locations of bottlenose dolphin sightings from 2011 VAQF aerial surveys in Zone 20 (area described in DPEIS). The green circles indicate a group sighting, with the icon sized in proportion to the group size. A GIS layer was not available for zones, so sightings within the zone were selected based on the zone description in the DPEIS.

Center for Biological Diversity • Center for Water Advocacy • Clean Ocean Action • Coastal Conservation League • Earthjustice • Natural Resources Defense Council • Ocean Conservation Research • Oceana • Southern Environmental Law Center • Surfrider Foundation • The Humane Society of the United States • Whale and Dolphin Conservation Society

By Electronic Mail

July 2, 2012

Mr. Gary D. Goeke
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Office of Environment (MS 5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394
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Re: **Comments on the Draft PEIS for Atlantic G&G Activities**

Dear Mr. Goeke:

On behalf of our organizations and our millions of members, we write to submit comments on the Draft Programmatic Environmental Impact Statement ("DPEIS") for geological and geophysical ("G&G") activities off the mid-Atlantic and southeast coasts. 77 Fed. Reg. 19321 (Mar. 30, 2012). For the reasons discussed in detail below, we believe that the DPEIS not only fails to meet the environmental review standards prescribed by the National Environmental Policy Act ("NEPA"), but fails to an extent that cannot be remedied through the issuance of a final EIS. Accordingly, if BOEM intends to allow oil and gas exploration in the Atlantic, we believe that the document must be thoroughly revised and reissued as a draft for further public review and comment.

We are profoundly concerned about BOEM's intention to permit high-intensity seismic surveys in the Atlantic region, not only because of the potentially catastrophic impacts of OCS drilling, but because of the significant environmental harm represented by airgun exploration itself.

It is undisputed that sound is a fundamental element of the marine environment. Whales, fish, and other wildlife depend on it for breeding, feeding, navigating, and avoiding predators – in short, for their survival and reproduction – and it is no exaggeration to say that BOEM's proposed action would dramatically degrade the acoustic environment along most of the east

coast. To prospect for oil and gas, the industry typically tows arrays of high-volume airguns behind ships, firing intense impulses of compressed air – often as loud as explosives – about every 12 seconds, 24 hours per day, for days, weeks, or months on end. Increasingly, the available science demonstrates that these blasts disrupt baleen whale behavior and impair their communication on a vast scale; that they harm a diverse range of other marine mammals; and that they can significantly impact fish and fisheries, with unknown but potentially substantial effects on coastal communities. Given the scales involved, surveys taking place off the coast of Virginia could well affect endangered species off southern New England down through the Carolinas, impacting the endangered right whale's entire migratory range. And the degree of activity contemplated under this EIS is enormous, with BOEM having already received permit applications to run hundreds of thousands of miles of survey lines during the pre-leasing phase alone.

Even according to BOEM's estimates – which significantly understate the harm – oil and gas activity would injure up to 138,500 marine mammals and disrupt marine mammal feeding, calving, breeding, and other vital activities more than 13.5 million times over the next eight years alone.

NEPA dictates that, before opening the floodgates to this action, BOEM must employ rigorous standards of environmental review, including a fair and objective description of potential impacts, a comprehensive analysis of all reasonable alternatives, and a thorough delineation of measures to mitigate harm. Unfortunately, the DPEIS falls far short of these standards. Instead, it provides an analysis that on almost every crucial point is disconnected from the relevant science, in a way that consistently tends to understate impacts and, consequently, to rationalize BOEM's proposed action. To cite just a few examples:

- BOEM relies on a 13-year-old, cookie-cutter threshold for harm that was recently castigated by some of the world's leading experts in this field as "overly simplified, scientifically outdated, and artificially rigid" – leading to a serious misconception of the scale of the impact area and a massive underestimate of marine mammal take.

- It fails to assess the far-reaching cumulative impacts of airgun blasting on marine mammal communication, despite the availability of Cornell and NOAA models, simply stating without any discernible support (and contrary to the literature) that masking effects on marine mammals would be "minor."

- It fails to incorporate new studies, accepted by the Navy and other state and federal agencies and incorporated into their recent impact statements, demonstrating that marine mammals are more susceptible to hearing loss than previously believed.

- In lieu of a serious analysis of cumulative impacts, it strings together a few unsupported and indeed baseless statements, ignoring not only its own marine mammal take numbers but also failing to consider such patently foreseeable impacts as the Navy's substantial takes of the same populations over the same period (just analyzed in the Navy's Draft EIS for the Atlantic Fleet).

- Despite acknowledging that airguns can cause wide-scale displacement of fish species – disrupting spawning and reproduction, altering migration routes, and impairing feeding, and dramatically reducing catch rates – it assumes without support that effects on both fish and fisheries would be localized and "minor."

Nor is BOEM's analysis of alternatives any more credible. **The fundamental problem is that the agency simply does not take the problem of cumulative, sublethal impacts seriously; and misprising the scale and potential significance of the impacts, it fails to consider alternatives and mitigation adequate to address it.** It does not even attempt to identify biologically important areas within the enormous activity area, aside from critical habitat for the right whale and loggerhead sea turtles. It does not attempt to reduce the extraordinary amount of activity by restricting exploration from areas that are unlikely to be leased, beginning with important Navy training areas, or to reduce the environmental footprint of the activity that does occur. It fails even to devise a long-term monitoring plan, which is a staple of Navy mitigation and essential to any meaningful adaptive management program. Instead, other than an insufficiently small time-area closure for the critically endangered right whale, BOEM's preferred alternative relies on mitigation that the Courts have rightly described in other contexts as "woefully inadequate and ineffectual." These faults are all the more serious given BOEM's decision to avoid programmatic review under the Marine Mammal Protection Act.

Our organizations strongly support Alternative C, which would bar oil and gas exploration activity from the region, but allow G&G activity for renewable energy development and minerals exploration on a case-by-case basis, preserving the status quo. It makes no sense on either economic or ecological grounds to open the greater portion of the east coast to oil and gas development. If, however, BOEM proceeds with this poorly conceived policy, it must correct the fundamental errors in the present DPEIS. Merely revising the draft into a final EIS is not sufficient, because its pervasive flaws and omissions have effectively deprived federal and state agencies, the scientific community, and the general public of their statutory right to an objective description of the activity and a meaningful opportunity to comment.

These comments (1) provide background on NEPA and the science of ocean noise; (2) assess BOEM's scant alternatives analysis and recommend additional alternatives and mitigation measures for consideration; (3) critique the document's analysis of impacts on marine species; and (4) discuss what BOEM must do to satisfy its obligations under other statutes. Our recommendations for BOEM's alternatives analysis, mitigation, and monitoring are summarized as follows.[1]

(1) BOEM should assess alternatives that place meaningful caps or limits on offshore activities, to reduce disruptions of marine mammal behavior.

[1] Except as indicated, these recommendations are intended to apply to seismic airgun activities, rather than to G&G activities more generally.

(2) BOEM should eliminate duplication of survey effort by prescribing or incentivizing the use of common surveyors, particularly for the extensive 2-D surveys expected within the first five years of activity.

(3) BOEM should develop alternatives for the development and implementation of "greener" exploration technology, of which several possibilities are described below.

(4) BOEM should exclude from G&G exploration areas that are unlikely to be leased in the near future, whether for biological, political, or economic reasons, such as waters within 50 miles of the Virginia shore or waters important to the Navy's national security mission.

(5) BOEM should consider establishing buffer zones around all of its time-area closures, to prevent ensonification of important habitat at disruptive levels.

(6) BOEM should develop time-area closures for marine mammals based on a systematic analysis of their density, distribution, and habitat use within the area of interest. To begin with, it should expand the time-area closure for North Atlantic right whales to fully capture the calving grounds and migration corridor, and put the Cape Hatteras Special Research Area off limits on a year-round basis.

(7) BOEM should extend the seasonal Brevard County time-area closure for sea turtles to near-coastal areas through North Carolina, and should consult with NMFS to ensure inclusion of all loggerhead critical habitat in any closure provision.

(8) BOEM should consider alternatives that exclude key fish habitat and fisheries, including submarine canyons in the mid-Atlantic, and Habitat Areas of Particular Concern designated by the Mid-Atlantic and South Atlantic Fishery Management Councils.

(9) BOEM should exclude airgun surveys within a 145 dB isopleth around established dive sites.

(10) 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, and, to this end, should consider establishing an expert panel within the agency to review survey designs with the aim of reducing their wildlife impacts.

(11) BOEM should require operators to validate *in situ* the assumptions about propagation distances used to establish safety zones and calculate take, as is required in the Arctic.

(12) BOEM should therefore require that all vessels associated with G&G activities, including support vessels and vessels used in HRG surveys, adhere to a 10 knot speed limit when operating or transiting at all times.

(13) BOEM should require that vessels avoid important habitat, such as right whale calving grounds, when transiting to G&G activities.

(14) BOEM should require that all vessels used in oil and gas G&G activities undergo measurement for their underwater noise output per American National Standards Institute/ Acoustical Society of America standards (S12.64); that all such vessels undergo regular maintenance to minimize propeller cavitation; and that all new industry vessels be

required to employ the best ship-quieting designs and technologies available for their class of ship.

(15) BOEM should consider prescribing larger, more conservative separation distances, since marine mammals can experience displacement and other impacts well beyond the 160 dB isopleth, on which the current proposed separation distance is based.

(16) BOEM should require that operators working close to shore design their tracklines to minimize the potential for embayments and strandings.

(17) BOEM should reconsider the size of the safety zones it would prescribe as part of its nominal protocol for seismic airgun surveys, taking into account new data on the threshold shift in marine mammals; and should consider establishing larger shutdown zones for certain target species, such as right whales.

(18) BOEM should improve its real-time monitoring requirements, by reducing the length of time a marine mammal observer can continuously work; requiring that observers used on airgun surveys have meaningful field experience; mandating, or at least presumptively requiring, the use of passive acoustic monitoring; prescribing aerial surveillance on a case-by-case basis; and, for HRG surveys, requiring two trained observers in order to maintain coverage on both sides of the survey vessel.

(19) BOEM should commit to consider limiting activities in low-visibility conditions on a case-by-case basis, and describe the conditions under which it might be required.

(20) BOEM should immediately develop a long-term monitoring program, to establish environmental baselines, to determine long-term impacts on populations of target species, and to test whether the biological assumptions underlying the DPEIS are correct.

(21) BOEM should incorporate an adaptive management plan into its alternatives, and should also set forth a protocol for emergency review or suspension of activities, if serious unanticipated impacts are found to occur.

I. BACKGROUND: ENVIRONMENTAL IMPACTS AND NEPA COMPLIANCE

A. Impacts of Airgun Surveys and Other G&G Activities

For offshore exploration, the oil and gas industry typically relies 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.[2] A large seismic airgun array can produce effective peak pressures of sound higher than those of virtually any other man-made source save explosives;[3] 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

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

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

ambient noise thousands of miles from any given survey.[4] Indeed, the enormous scale of this acoustic footprint has now been confirmed by studies of seismic in numerous regions around the globe, including the Arctic, the northeast Atlantic, Greenland, and Australia (see *infra* at § IV.B.1).

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, including broad habitat displacement, disruption of vital behaviors essential to foraging and breeding, loss of biological diversity, and, in some circumstances, injuries and mortalities.[5] Consistent with their acoustic footprint, most of these impacts 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.[6]

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.[7] 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.[8] 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.[9] As discussed further below, the exposure levels implicated in all of these studies are lower – indeed orders of magnitude lower on a decibel scale – than the threshold used to evaluate airgun behavioral impacts in the DPEIS.

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[4] 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).

[5] *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).

[6] 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).

[7] 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).

[8] *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).

[9] 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).

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 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 long-term consequences;[10] and harbor porpoises have been seen to engage in strong avoidance responses fifty miles from an array.[11] Seismic surveys have been implicated in the long-term loss of marine mammal biodiversity off the coast of Brazil.[12] Broader work on other sources of undersea noise, including noise with predominantly low-frequency components, indicates that beaked whale species would be highly sensitive to seismic noise as well.[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 predominantly low-frequency noise from speedboats have been shown to significantly impair the ability of some fish species to forage.[16] Recent data suggest that loud, low-frequency sound also

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[10] 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).

[11] 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).

[12] 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).

[13] 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.

[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 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).

disrupts chorusing in black drum fish, a behavior essential to breeding in this commercial species.[17] Several studies indicate that airgun noise can kill or decrease the viability of fish eggs and larvae.[18]

The amount of disruptive activity under consideration in this PEIS is enormous. Since MMS issued its Notice of Intent in 2010, it has received roughly 10 applications for G&G activity in the Atlantic region. 75 Fed. Reg. 16830, 16832. Most of these applications involve extensive airgun surveys in the Mid-Atlantic and South Atlantic planning regions: for example, Spectrum Geo has proposed shooting 112,500 line miles of surveys from Massachusetts down to Florida, Western Geco another 54,900 miles between New Jersey and Georgia, and CGG Veritas more than 42,000 miles running northwards from Florida.[19] As you know, industry will conduct more surveys as areas are opened for leasing, and will send ships back again and again to certain areas of interest to see how geologic features there change over time.

In all, the PEIS estimates more than 617,000 kilometers of 2D surveys, 2500 blocks of 3D/ 4D surveys (each block being about 9 square miles), and 900 blocks of wide-azimuth surveys in the Mid-Atlantic and South Atlantic Planning Areas through 2020, plus hundreds of thousands of additional kilometers of high-resolution surveys, vertical seismic profiling, and electromagnetic exploration, plus disturbance from vessel noise, node and cable installation, and other activities. PEIS at Table 3-3. The 2D surveys alone equate to about 8.8 years of continuous airgun activity, running 24 hours per day, 365 days per year, assuming vessel speeds of 4.5 knots. The 3D surveys, which according to BOEM's assumptions would not even begin until 2016, amount to 4 to 10.8 years of continuous activity assuming (per recent 3D surveys in the Arctic) 7 to 19 miles of trackline for every square mile of lease block. There is no indication that these estimates represent a worst-case scenario for G&G activity in the region, nor does the PEIS provide any projections for G&G activity beyond the 2013-2020 study period. In any case, BOEM is contemplating an enormous amount of activity with a vast environmental footprint.

B. 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

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[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).

[19] MMS, Atlantic Geological and Geophysical (G&G) Activities Programmatic Environmental Impact Statement (PEIS), *available at* www.gomr.mms.gov/hompg/offshore/atlocs/gandg.html (accessed May 12, 2010).

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 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 MMS' compliance with these important mandates.

III. ALTERNATIVES AND MITIGATION

According to NEPA's implementing regulations, the alternatives analysis is "the heart of the environmental impact statement" and is intended to "provid[e] a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14. The alternatives analysis should "serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made." *Id.* § 1502.2(g). Additionally, agencies are required to disclose and analyze measures to mitigate the impacts of proposed actions. *Id.* §§

1502.14(f), 1502.16(h). This analysis must be "reasonably complete" in order to properly evaluate the severity of the adverse effects of an agency's proposed action prior to the agency making a final decision. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352 (1989). Unfortunately, the PDEIS' alternatives and mitigation analyses are incomplete and do not satisfy the regulatory standards.

A. Failure to Develop Reasonable Alternatives

The purpose of an EIS is to "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action. 40 C.F.R. § 1502.14(a). That discussion of alternatives "is the heart of the [EIS]" (*id.* at § 1502.14), and it "guarantee[s] that agency decision-makers have before them and take into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance." *Alaska Wilderness Recreation & Tourism Ass'n v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995) (quoting *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228 (9th Cir. 1988)); *see also Angoon v. Hodel*, 803 F.2d 1016, 1020 (9th Cir. 1986) ("[T]he touchstone for our inquiry is whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation.") (quoting *California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982)). These standards have not been met.

1. Failure to develop alternatives based on different permissible levels of activity

BOEM should place meaningful caps or limits 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."[20] Airguns in particular can cause low-frequency background noise to rise significantly over very large areas of ocean (see *infra* at § IV.B.1), and the best available evidence indicates that such noise can interfere with foraging in some species at moderate levels of exposure,[21] and substantially interfere with the communication abilities of marine mammals, particularly baleen whales, at very considerable distances.[22] These effects cannot be eliminated through the use of area closures alone, especially given the long distances at which masking can occur. Yet the DPEIS declines even to consider an alternative limiting the amount of activity that can be conducted in the Atlantic, or part of the Atlantic, over a given period.

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[20] Memorandum from Dr. Jane Lubchenco, Undersecretary of Commerce for Oceans and Atmosphere, to Nancy Sutley, Chair, Council on Environmental Quality at 2 (Jan. 19, 2010).

[21] *E.g.*, 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).

[22] *E.g.*, 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., 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).

The DPEIS does not provide any reason for BOEM's lack of consideration of activity limits. In their recent DPEIS for Arctic geophysical exploration, however, the agencies based their tentative rejection of this alternative not on the grounds that it exceeded their legal authority, but that it did not meet the purpose and need of the proposed action.[23]

In fact, determining the legally acceptable limits of activity is essential to NMFS' issuance of take authorizations in the Atlantic – which, presumably, would be that agency's purpose and need.[24] Pursuant to NMFS' own general regulations, an incidental harassment authorization must be revoked if the authorized takings "individually or in combination with other authorizations" are having more than a negligible impact on the population or an unmitigable adverse impact on subsistence.[25] Unfortunately, the DPEIS makes no attempt to assess whether the scope of activities it contemplates satisfies the negligible impact standard. Similarly, considering limits on activities is essential to BOEM's permitting and other requirements under OCSLA.

In the Arctic, instead of developing a suitable alternative for the EIS, the agencies proposed, in effect, to consider overall limits on activities when evaluating individual applications under OCSLA and the MMPA.[26] It would, however, be much more difficult for NMFS or BOEM to undertake that kind of analysis in an individual IHA application or OCSLA exploration plan because the agencies often lack sufficient information to take an overarching view of the activities occurring that year. Determining limits at the outset would also presumably reduce uncertainty for industry. In short, excluding any consideration of activity limits from the alternatives analysis in this EIS frustrates the purpose of programmatic review, contrary to NEPA.[27]

2. Failure to develop alternative based on eliminating duplicative survey effort

It seems obvious that BOEM should eliminate duplication of survey effort and should not permit multiple surveys, or parts of surveys, in the same locations for the same or similar purposes. NMFS' expert Open Water Panel has twice called for the elimination of unnecessary, duplicative surveys, whether through required data sharing or some other means.[28] In the Atlantic, data

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[23] National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement at 2-45 (Dec. 2011).

[24] *Id.* at 1-3 to 1-4.

[25] 50 C.F.R. § 216.107(f)(2). Additionally, NMFS must ensure that the activity does not take more than "small numbers" of marine mammal species and stocks – another standard that the agency improperly fails to evaluate in the DPEIS.

[26] National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement at 2-45 (Dec. 2011).

[27] *See also* 40 C.F.R. § 1500.2(e) (stating that agencies should identify and assess alternatives that would "avoid or minimize adverse effects of [proposed] actions upon the quality of the human environment").

[28] 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

sharing through the use of common surveyors seems particularly appropriate given the large number of wide-ranging 2-D surveys for which applications have already been received.

The DPEIS does not analyze this alternative "because its main benefit (a limit on concurrent surveys) is already addressed by Alternative B." DPEIS at 2-49. Putting aside the fact that Alternative B may not be adopted, BOEM has obviously mischaracterized the effects and benefits of a consolidation measure. Consolidating surveys would reduce concurrence by the standards of BOEM's Alternative B only if the surveys in question happened to come within 40 km of one another *while operating* – a scenario that seems likely to represent a relatively small number of instances. On the contrary, the plain benefit of consolidation is to reduce the cumulative, not necessarily simultaneous, impacts of seismic activity on marine species. As NMFS' expert Open Water Panel observed: "Although the risks to marine mammals and marine ecosystems are still somewhat poorly described, unnecessarily duplicative surveys must increase those risks."[29] BOEM's stated rationale for not considering this alternative does not make sense.

Additionally, BOEM avers that consolidating and coordinating surveys "does not clearly fall under the mandates of this Agency," or its sister agencies the Department of Energy and U.S. Geological Survey. DPEIS at 2-49. This argument seems similar to one advanced in the Arctic DPEIS, wherein the agencies suggested that BOEM could not adopt a data sharing measure, on the grounds that it cannot "require companies to share proprietary data, combine seismic programs, change lease terms, or prevent companies from acquiring data in the same geographic area."[30] Yet this analysis overlooks BOEM's statutory duty under OCSLA to approve only those permits whose exploration activities are not "unduly harmful" to marine life. 43 U.S.C. § 1340(a); *see also* 30 C.F.R. § 550.202. While OCSLA does not define the standard, it is difficult to imagine an activity more expressive of "undue harm" than a duplicative survey, which obtains data that the government and industry already possess and therefore is not necessary to the "expeditious and orderly development, subject to environmental safeguards" of the outer continental shelf. 30 U.S.C. § 1332(3). It is thus within BOEM's authority to decline individual permit applications that it finds are unnecessarily duplicative, in whole or part, of existing or proposed surveys or data.

Additionally, nothing in OCSLA bars BOEM from incentivizing the use of common surveyors or data sharing, as already occurs in the Gulf of Mexico, to reduce the total survey effort. Certainly the Gulf of Mexico business model has led to the "expeditious and orderly development" of that region. 30 U.S.C. § 1332(3). The DPEIS fails to consider this latter alternative, even though it could substantially reduce the quantity of 2-D survey effort expected in the region over the next several years. BOEM must consider an alternative that eliminates duplicative effort.

3. Failure to develop a viable technology-based alternative

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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).

[29] Burns et al., Expert panel review at 10 (2010).

[30] National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement at 2-46 (Dec. 2011).

The DPEIS, despite acknowledging the potential for alternative technology to reduce potential impacts on marine wildlife, has failed to develop and consider any alternatives for the development and implementation of that technology. DPEIS at 2-54.

New technology represents a promising means of reducing the environmental footprint of seismic exploration. Industry experts and biologists participating in a September 2009 workshop on airgun alternatives 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, given the natural resistance of industry, governments should accelerate development and use of these technologies through both research and development funding and regulatory engagement.[31] Among the technologies discussed in the 2009 workshop report are engineering modifications to airguns, which can cut emissions at frequencies not needed for exploration; controlled sources, such as marine vibroseis, which can dramatically lower the peak sound currently generated by airguns by spreading it over time; various non-acoustic sources, such as electromagnetic and passive seismic devices, which in certain contexts can eliminate the need for sound entirely; and fiber-optic receivers, which can reduce the need for intense sound at the source by improving acquisition at the receiver.[32] An industry-sponsored report by Noise Control Engineering made similar findings about the availability of greener alternatives to seismic airguns, as well as alternatives to a variety of other noise sources used in oil and gas exploration.[33]

The draft EIS instead relies on out-of-date information in characterizing the availability of certain technologies. For example, marine vibroseis – which has the potential to reduce peak sound levels by 30 decibels or more and virtually eliminate output above 100 Hz – is on the verge of commercial availability, with useable arrays produced by Geo-Kinetics and PGS now being tested for their environmental impacts on fish, and other models in development through the Canadian government and a Joint Industry Program.[34] Yet the DPEIS uses a 2010 personal communication with PGS for the proposition that a commercial electric vibroseis array is not "available for data collection at this time" (DPEIS at 2-50) – an outdated observation that does

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[31] 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.

[32] *Id.*

[33] 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.

[34] Tenghamn, R., An electrical marine vibrator with a flextensional shell, *Exploration Geophysics* 37:286-291 (2006); LGL and Marine Acoustics, Environmental assessment of marine vibroseis (2011) (Joint Industry Programme contract 22 07-12).

not reflect current fact. Nor does the DPEIS consider the specific airgun modifications discussed in Weilgart (2010). *See* DPEIS at 2-53.

Critically, the DPEIS fails to include any actionable alternatives to require, incentivize, or test the use of new technologies in the Atlantic, or indeed in any other region. Such alternatives include: (1) mandating the use of marine vibroseis or other technologies in pilot areas, with an obligation to accrue data on environmental impacts; (2) creating an 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 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; (4) providing incentives for use of these technologies as was done for passive acoustic monitoring systems in NTL 2007-G02; and (5) exacting funds from applicants to support accelerated mitigation research in this area. The final EIS must consider these alternatives.

B. Failure to Consider Additional Time-Place Restrictions

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.[35] It was for this express reason that NOAA, in 2011, established a working group on Cetacean Density and Distribution Mapping, to define marine mammal hotspots for management purposes.[36] Unfortunately, the PDEIS, while identifying two possible time-area closures for North Atlantic right whales and one possible closure for sea turtles, does not consider any other areas for any other species. Nor, as discussed below, are its proposed right whale closures adequate to protect right whales.

As a general matter, the PDEIS does not give any consideration to year-round area closures, for reasons that are unclear. It makes no sense to open up areas for geophysical exploration – adding to the cumulative noise burden, impairing the communication space of the right whale and other species – that are unlikely to be leased, whether for biological, political, or economic reasons. For example, the lease sale area off Virginia that Interior included in its 2012-2017 leasing program (but aborted after the BP spill) stood more than 50 miles offshore, in order to reduce

[35] *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 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).

[36] Memorandum from Dr. Jane Lubchenco, Undersecretary of Commerce for Oceans and Atmosphere, to Nancy Sutley, Chair, Council on Environmental Quality at 2 (Jan. 19, 2010).

conflict with military, fishing, and other uses. 73 Fed. Reg. 67201, 67205 (Nov. 13, 2008).[37] If lease sales are unlikely within 50 miles of the Virginia shore, seismic exploration can be excluded from these areas while meeting the stated purpose and need. BOEM should identify areas within the mid- and southeast Atlantic that are unlikely to be opened to lease sales within the 2017-2022 period due to conflict of use, political opposition, and other factors, and consider an alternative (or alternatives) that restricts oil and gas exploration in these areas.

Recently, in their DEIS for oil and gas exploration in the Arctic, BOEM and NMFS argued that they lack authority under the MMPA and OCSLA to prescribe year-round closures.[38] Instead, they suggest that the proper time for consideration of permanent closures is during the offshore leasing program and lease sale processes.[39] Yet BOEM's relegation of this alternative to the leasing process is not consistent with its obligation, at the exploration and permit approval stage, to reject applications that would cause "serious harm" or "undue harm." *E.g.*, 43 U.S.C. § 1340(a); 30 C.F.R. § 550.202. It is reasonable for BOEM to define areas where exploration activities would exceed these legal thresholds regardless of time of year, just as it defines areas for seasonal avoidance pursuant to other OCSLA and MMPA standards. Moreover, the lease sale stage is not a proper vehicle for considering permanent exclusions for strictly off-lease activities, such as the off-lease seismic surveys that would account for all of the oil and gas exploration activity during the first five years of the study period. The DPEIS must consider establishing year-round exclusion areas as well as seasonally-based closures.

Finally, as a general matter, the PDEIS does not consider establishing buffer zones around areas of biological importance, aside from a "setback distance" to prevent seafloor disturbance within the Monitor and Gray's Reef National Marine Sanctuaries and such other buffer zones as may be warranted to protect benthic communities. DPEIS at C-18.[40] Buffer zones are a standard feature of biosphere 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.[41] 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 the reduction in the severity, intensity, or number of exposures, particularly (but not exclusively) for vulnerable species. *See*,

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[37] BOEMRE, Virginia Lease Sale 220 Information (2010), *available at* www.gomr.boemre.gov/homepg/lsesale/220/matl220.html (accessed June 2012) (confirming lease sale area is at least 50 miles offshore).

[38] National Marine Fisheries Service, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement at 2-44 (Dec. 2011).

[39] *Id.*

[40] The DPEIS does incorrectly mischaracterize its proposed seasonal exclusion for right whales, as set forth in Alternative B, as a "continuous buffer… from active acoustic sources" (DPEIS at 4-213) but this exclusion area represents part of the right whale's migratory corridor and calving grounds, not a buffer zone.

[41] *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).

e.g., 74 Fed. Reg. 3886 (Jan. 21, 2009). On this basis, BOEM should consider and adopt meaningful buffer zones around its exclusion areas.

More specifically:

1. Time-place restrictions for marine mammals

The DPEIS study area includes important marine mammal habitat that was not considered for time-place restrictions. For example:

(a) North Atlantic right whale habitat

The cetacean species of greatest concern in the region is the North Atlantic right whale, a species that has a minimum population of only about 361 whales and is considered the most imperiled large whale on the planet. In order to protect this species and comply with its obligations under the Endangered Species Act, BOEM must seasonally exclude all North Atlantic right whale habitat areas from seismic and other proposed activities. These areas include both the designated critical habitat identified in the PDEIS' Alternative A as well as areas that have not yet been designated as critical habitat but are known to be important migratory habitat.

Notably, NMFS is considering whether to expand right whale critical habitat in response to a Sept. 16, 2009 petition filed by the Center for Biological Diversity, Humane Society of the United States, Whale and Dolphin Conservation Society, Defenders of Wildlife, and Ocean Conservancy. That petition identified additional areas that are critical for breeding, raising calves, migrating, and feeding, and which should be included as designated critical habitat for the species. In relevant part, the petitioners requested that NMFS:

…

(2) expand right whale critical habitat in the waters off the Southeast United States to include coastal waters from the shore out to 35 nautical miles off the coast of South Carolina, and waters off the coast of Georgia and Florida from approximately 32.0° N latitude, 80.35° W southward to approximately 28° N latitude, 80.35° W longitude…; and

(3) designate as right whale critical habitat coastal waters all waters along the migratory corridor of the mid-Atlantic from the shore out to 30 nautical miles, between the northern border of South Carolina (approximately 33.85° N latitude and 78.53° W longitude) northward to the southeastern corner of Cape Cod, Massachusetts (approximately 41.55° N latitude, 70.0° W longitude), southeastward to the southern

corner of the current Great South Channel Critical Habitat (41.0° N latitude and 69.1° W longitude).[42]

It is worth noting that a 30 nm coastal exclusion (along the lines defined above) does not include a buffer zone as the DPEIS suggests (DPEIS at 4-213), but reflects the extent of the right whale migratory corridor itself.[43] Regardless of their status as critical habitat, these areas should be avoided, and added to the DPEIS' alternatives analysis as an extension to the 20 nm coastal time-area closure of Alternative B.

Additionally, contrary to the present Alternatives A and B (*see* DPEIS at 2-4), a seasonal exclusion for right whales should also apply to HRG surveys, including for renewables. During the migration, any substantial deflection of mothers and calves around a low- to mid-frequency sound source such a sub-bottom profiler – a result that is particularly likely for activities occurring landward of the animals –[44] could put the animals at greater risk of killer whale predation or exposure to rougher seas. In the calving grounds as well as the migration corridor, any behavioral response similar to that observed in Nowacek et al. (2004) – in which right whales, responding to an acoustic alarm, positioned themselves directly below the water surface – would put them at substantially greater risk of vessel collision. Right whales were demonstrated to respond significantly to alarm signals, which occupied the same frequencies as the sub-bottom profilers intended for HRG surveys, at received levels of 133-148 dB re 1 µPa (RMS).[45] If anything, these levels could underestimate the response threshold for many of the whales, given the heightened reactions to other sound sources that have been observed in baleen whale mothers and calves.[46] Received levels of 130 dB

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[42] Center for Biological Diversity, The Humane Society of the United States, Whale and Dolphin Conservation Society, Defenders of Wildlife, and Ocean Conservancy, Petition to Revise Critical Habitat Designation for the North Atlantic Right Whale at 1-2 (2009).

[43] Knowlton, A.R., Ring, J.B., and Russell, B., Right whale sightings and survey effort in the mid-Atlantic region: Migratory corridor, time frame, and proximity to port entrances (2002) (report submitted to NMFS ship-strike working group); Kraus, S., New England Aquarium, pers. comm. with Michael Jasny, NRDC (Apr. 2012). *See also* Fujiwara, M., and Caswell, H., Demography of the endangered North Atlantic right whale, *Nature* 414: 537-541 (2001); Kraus, S.D., Prescott, J.H, Knowlton, A.R., and Stone, G.S., Migration and calving of right whales (*Eubalaena glacialis*) in the western North Atlantic, *Reports of the International Whaling Commission* 10: 139-144 (1986); Ward-Geiger, L.I., Silber, G.K., Baumstark, R.D., and Pulfer, T.L., Characterization of ship traffic in right whale critical habitat, *Coastal Management* 33: 263-278 (2005).

[44] Buck, J.R., and Tyack, P.L., Reponses of gray whales to low frequency sounds, *Journal of the Acoustical Society of America* 107: 2774 (2000).

[45] Nowacek, D.P., Johnson, M.P., and Tyack, P.L., Right whales ignore ships but respond to alarm stimuli, *Proc. Royal Soc. London, Pt. B: Biol. Sci.* 271: 227-231 (2004).

[46] *E.g.*, 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 from Curtin University of Technology). It is also worth noting that, under some conditions, migrating bowheads avoid airgun pulses out to the 120 dB isopleths and gray whales avoid industrial noise and low-frequency sounds out to 120 dB or 140 dB. Buck and Tyack, Responses of gray whales, *supra*; Malme, C.I., Miles, P.R., Clark, C.W., Tyack, P., and Bird, J.E., Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior: Phase II: January 1984 migration (1984) (NTIS PB86-218377); Richardson, W.J., Miller, G.W.,

and above could easily occur more than 10 kilometers from the chirpers, boomers, and pile drivers at issue here. Real-time visual monitoring is very difficult for right whales, 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.[47]

As NRDC observed in our comments on BOEM's recent EA on mid-Atlantic Wind Energy Areas, we would support allowing some small amount of sub-bottom profiling activity to occur during the winter exclusion period provided (1) that the operators have conscientiously planned to complete their HRG surveys outside the seasonal exclusion months, (2) that their inability to complete the surveys is due to unforeseen circumstances, and (3) that permitting some small amount of HRG activity to occur during the winter months would allow them to avoid extending their survey effort into the following calendar year. That said, given the conservation status of this species, we recommend extension of the right whale time-area closure to HRG activity.

(b) Cape Hatteras Special Research Area

The area of interest also includes habitat known to be important for multiple cetacean species. For example, the continental shelf break off Cape Hatteras features a major oceanic front created by the Gulf Stream, which veers off into the Atlantic and merges with Labrador Current, creating conditions for warm-core rings and high abundance of marine mammals and fish.[48] Among the many species that are drawn to this area in high abundance are long- and short-finned pilot whales and Risso's dolphin, whose interactions with the pelagic longline fishery have exceeded the insignificance threshold for potential biological removal and triggered the formation

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and Greene, C.R., Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea, *Journal of the Acoustical Society of America* 106: 2281 (1999).

[47] *E.g.*, Barlow, J., and Gisiner, R., Mitigation and monitoring of beaked whales during acoustic events, *Journal of Cetacean Research and Management* 7: 239-249 (2006); 72 Fed. Reg. 46846, 46875 (Aug. 21, 2007) (SURTASS LFA rulemaking); Dolman, S., Aguilar de 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) (report from European Cetacean Society); 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).

[48] Churchill, J., Levine, E., Connors, D., and Cornillon, P., Mixing of shelf, slope and Gulf Stream water over the continental slope of the Middle Atlantic Bight, *Deep Sea Research Part I: Oceanographic Research Papers*, 40: 1063-1085 (1993); Hare, J., Churchill, J., Cowen, R., Berger, T., Cornillon, P., Dragos, P., Glenn, S.M., Govoni, J.J., and Lee, T.N., Routes and rates of larval fish transport from the southeast to the northeast United States continental shelf, *Limnology and Oceanography* 47: 1774-1789 (2002); Garrison, L., Swartz, S., Martinez, A., Burks, C., and Stamates, J., A marine mammal assessment survey of the southeast US continental shelf: February-April 2002 (2003) (NOAA Technical Memorandum NMFS-SEFSC-492); Waring, G., Josephson, E., Fairfield-Walsh, C., and Maze-Foley, K., U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2008 (2009) (NOAA Tech Memo NMFS NE 210); 74 Fed. Reg. 23349, 23349-23358 (May 19, 2009).

of a take reduction team under the MMPA.[49] The Cape Hatteras Special Research Area, designated by NMFS as a tool to manage the marine mammal-fishery interactions, captures most of the crucial habitat, having some of the highest densities of cetaceans in the entire region and being one of the most important sites for charter, commercial, and recreational pelagic fisheries.[50] BOEM must consider excluding – and, indeed, under any meaningful management plan, must exclude – this area.

(c) Other areas identifiable through habitat mapping

Remarkably, BOEM has not attempted any systematic analysis of marine mammal habitat for purposes of establishing time-area closures within the area of interest. This stands in obvious counter-distinction to the Navy's 2008 programmatic EIS for sonar activities in the region, which formulated several alternatives based on predictive modeling of marine mammal habitat. There is no reason why a similar analysis should not be done here. Indeed, given the importance of time-area closures in mitigating acoustic impacts, such an analysis (and the gathering of any needed data in support of that analysis) is essential to a reasoned choice among alternatives. 40 C.F.R. § 1502.22.

(1) Predictive mapping.— Over the past few years, researchers have developed at least two predictive models to characterize densities of marine mammals in the area of interest: the NODE model produced by the Naval Facilities Engineering Command Atlantic, and the Duke Marine Lab model produced under contract with the Strategic Environmental Research and Development Program, both to fulfill the Navy's responsibilities for offshore activities under NEPA and other statutes.[51] Indeed, the Navy employed the NODE model in developing three habitat-based alternatives, in its own programmatic EIS, for sonar training off the U.S. east coast from 2009 to 2014.[52] Further, NOAA has convened a Cetacean Density and Distribution Mapping Group with the purpose of evaluating, compiling, supplementing, and enhancing available density information for marine mammals within the U.S. EEZ.[53] Its product, which includes habitat-based density maps and other data for nearly all of BOEM's area of interest, broken down by species and month, was

[49] 74 Fed. Reg. 23349, 23350.

[50] 74 Fed. Reg. 23349; NMFS, Environmental Assessment, Regulatory Impact Review, and Final Regulatory Flexibility Analysis for the Final Pelagic Longline Take Reduction Plan (Jan. 2009) (produced by NMFS Southeast Regional Office).

[51] U.S. Navy, Final Atlantic Fleet Active Sonar Training Environmental Impact Statement/ Overseas Environmental Impact Statement (2008); Read, A., and Halpin, P., Final report: Predictive spatial analysis of marine mammal habitats (2010) (SI-1390, report prepared for SERDP); Duke Marine Lab, Marine Animal Model Mapper, *available at* http://seamap.env.duke.edu/serdp/serdp_map.php (accessed June 2012).

[52] Navy, Final Atlantic Fleet Active Sonar Training EIS.

[53] Memorandum from Dr. Jane Lubchenco, Undersecretary of Commerce for Oceans and Atmosphere, to Nancy Sutley, Chair, Council on Environmental Quality (Jan. 19, 2010).

shared in late May at an expert workshop that was partly funded by BOEM, and is slated for public release in early July.[54]

BOEM must use these sources, which represent best available science and, indeed, have partly been used in prior Navy NEPA analyses and rulemakings, to identify important marine mammal habitat and develop reasonable alternatives to the proposed action. *See* 40 C.F.R. § 1502.22. Species of particular importance, aside from the North Atlantic right whale, include the five other large whale species listed under the Endangered Species Act, *i.e.*, blue, fin, sei, humpback, and sperm whales; and beaked whales and harbor porpoises, whose vulnerability to anthropogenic noise is well recognized.

(2) Persistent oceanographic features.— Marine mammal densities are correlated over medium to large scales with persistent ocean features, such as ocean currents, productivity, and surface temperature, as well as with concentrations in other marine species, such as other apex predators and fish.[55] The occurrence of these features is often predictable enough to define core areas of biological importance on a year-round or seasonal basis.[56] In the area of interest, the most important of these features is the Gulf Stream; warm-core rings that develop off the Gulf Stream are likely to provide particularly important habitat for beaked whales, which are considered especially sensitive and vulnerable to anthropogenic sound. Analysis of these features should figure in predictive mapping, but can be used to supplement maps that do not take dynamic features into account.

2. Time-place restrictions for sea turtles

The single time-area closure included in Alternative B, a seasonal avoidance of coastal waters off Brevard County, Florida, is not sufficient to protect endangered and threatened species of sea turtles from harm due to proposed G&G activities off the mid- and south Atlantic.

BOEM's area of interest overlaps with populations of sea turtles, including green, leatherback, loggerhead, hawksbill, and Kemp's Ridley, and contains thousands of nesting locations of particular importance to loggerhead sea turtles. Indeed, the U.S. and Oman represent the majority of nesting sites for loggerhead sea turtles worldwide;[57] limiting anthropogenic disturbances to these nesting locations is paramount for the global conservation of this species. The DPEIS observes that "…breeding adults, nesting adult females, and hatchlings could be

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[54] NOAA, Cetecean and Sound Mapping, *available at* www.st.nmfs.noaa.gov/cetsound (accessed June 2012).

[55] Hyrenbach, K.D., Forney, K.A., and Dayton, P.K. (2000), Marine protected areas and ocean basin management, *Aquatic Conservation: Marine and Freshwater Ecosystems* 10:437-458.

[56] *Id.* ("Design Recommendations for Pelagic MPAs" include the use of persistent oceanographic features like sea temperature to define core areas for protection).

[57] FWS and NMFS, Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*) Second Revision (2008) (*available at* www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_loggerhead_atlantic.pdf).

exposed to airgun seismic survey-related sound exposures at levels of 180 dB re 1 μPa or greater. Potential impacts could include auditory injuries or behavioral avoidance that interferes with nesting activities." DPEIS at 2-17. The recovery plan for the Northwest Atlantic population of loggerhead sea turtles also notes that several aspects of oil and gas activities, including seismic surveying, threaten these populations.[58] And recent analysis of sea turtle hearing confirms that loggerheads and other sea turtles have their greatest acoustic sensitivity below 400 Hz, which much of the energy produced by airguns is concentrated.[59] Given these findings, as well as the global significance of the region for loggerheads, all important habitats for endangered and threatened sea turtles in the area of interest should be avoided.

Although Brevard County, Florida represents vital loggerhead nesting habitat and must be protected, many additional sea turtle nesting sites are found each year within the mid- and south Atlantic planning areas, in Georgia, South Carolina, North Carolina, and other parts of Florida, as displayed in Figures 4-14 and 4-16 of the DPEIS. Volusia County, Florida, for instance, has had an average of 1,865 loggerhead sea turtles nests reported between 2007-2011.[60] In 2010 on Georgia beaches 1,761 loggerhead nests were found.[61] South Carolina sea turtle nests in 2011 included 4,018 loggerheads, 3 greens and 4 leatherbacks.[62] North Carolina sea turtle nests in 2011 included 948 loggerheads, 16 greens and 1 Kemp's Ridley.[63] Long-term datasets show nesting declines for loggerheads in North Carolina, South Carolina, Georgia, and southeast Florida, [64] and it is critical to their recovery to protect females heading to and from their nesting beaches as well as hatchlings that enter the neritic zone. Nesting females and hatchlings could be disturbed or injured by the proposed G&G activities in any of these locations through an increase in vessel traffic, accidental oil discharges, and noise propagation from the use of airguns. For these reasons, BOEM should exclude from seismic airgun activity all near-coastal waters from Florida through North Carolina, from May 1 through October 31, to protect both nesting females and hatchlings.

Important foraging and migrating habitat should also receive consideration for time-area closure. Loggerheads that were tracked after nesting at Archie Carr National Wildlife Refuge, in Brevard County, headed north and followed three main foraging and migratory patterns between Virginia

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[58] *Id.*

[59] Piniak, W.E.D., Mann, D.A., Eckert, S.A., and Harms, C.A., Amphibious hearing in sea turtles, *in* Popper, A.N., and Hawkins, A., eds., *The Effects of Noise on Aquatic Life* at 83-88 (2012).

[60] FWC/FWRI Statewide Nesting Beach Survey Program Database as of 8 Feb. 2012, Loggerhead Nesting Data 2007-2011, *available at* http://myfwc.com/media/2078432/LoggerheadNestingData.pdf.

[61] Georgia Department of Natural Resources. Sea Turtle Conservation and Research, *available at* http://www.georgiawildlife.com/node/1804 (accessed May 2012).

[62] South Carolina Department of Natural Resources, SC Marine Turtle Conservation Program, *available at* http://www.dnr.sc.gov/seaturtle/ (accessed May 2012).

[63] North Carolina Wildlife Commission, Sea Turtle Nest Monitoring System: North Carolina loggerhead, *available at* http://www.seaturtle.org/nestdb/index.shtml?view=1&year=2011.

[64] NMFS, Loggerhead Sea Turtle (*Caretta caretta*), *available at* http://www.nmfs.noaa.gov/pr/species/turtles/loggerhead.htm (accessed May 2012).

and North Carolina.[65] These foraging and migratory areas for loggerheads conflict with the mid- and south Atlantic planning areas, and the impacts to loggerheads could occur outside of nesting beaches.

Finally, BOEM must create time-area closures to avoid future conflicts with loggerhead critical habitat. NOAA has established Distinct Population Segments ("DPSs") for loggerheads, including in the Northwest Atlantic, and has until September 2012 to designate critical habitat for them. 76 Fed. Reg. 58868 (Sept. 22, 2011). The Final PEIS should reflect the current development of this rulemaking. BOEM should consult with NOAA on the designation and incorporate time-area closures within the Final PEIS to avoid conflicts with these areas.

In sum, BOEM should extend its proposed Brevard County exclusion to coastal areas from Florida up through North Carolina during the sea turtle nesting season, from May 1 through October 31; should identify and exclude important foraging and migrating habitat outside the nesting areas; and should establish time-area closures for all loggerhead critical habitat, which NMFS is required to designate, under the Endangered Species Act, by September 2012.

3. Time-place restrictions for fish and fisheries

The DPEIS does not consider any alternative that would exclude important fish habitat areas from G&G and other detrimental activities. While the document describes a number of areas in the mid-Atlantic and southeast Atlantic that provide especially important fish habitat and fishery resources, it simply dismisses effects on these areas.

Similarly, the Draft PEIS does not give serious consideration to space and use conflicts with commercial and recreational fisheries. The document considers such conflicts only in the context of permanent structures that physically block access to fishing sites, which it asserts will be rare. However, lethal and sublethal impacts to targeted fish species, including changes in their behavior or movements, as well as habitat degradation stemming from the proposed action would also adversely impact – and therefore conflicts with – commercial and recreational fishing uses.

The Final PEIS must consider alternatives that exclude key fish habitat and fisheries from the proposed action. These areas include:

(a) Charleston Bump and gyre complex.— Charleston Bump and the gyre surrounding it as a result of rapidly moving Gulf Stream waters provide a highly productive, nutrient-rich area that contributes significantly to primary and secondary production in the region. In addition, this area provides essential nursery habitat for numerous offshore fish species. The importance and sensitive nature of this seafloor and gyre habitat make it incompatible with the proposed seismic activities.

[65] Evans, D., Cariani, S., Ehrhart, L.M., Identifying migratory pathways and foraging habitat use by loggerhead turtles (*Caretta caretta*) nesting on Florida's east coast, *Sea Turtle Conservancy and UCF* (2011).

(b) The Point (also known as Hatteras Corner).— This area is formed at the confluence of the Gulf of Mexico with other water bodies, creating a highly productive open-water habitat. Adults of many highly migratory species such as tuna and swordfish congregate in this area. In addition, a wide diversity of larval fishes is found here.

(c) Ten Fathom Ledge and Big Rock.— These areas feature complex and valuable bottom habitat that is known to be used by some 150 reef-associated species. Ten Fathom Ledge encompasses numerous patch reefs consisting of coral, algae, and sponges on rock outcroppings covering 352 km^2 of ocean floor. Big Rock encompasses 93 km^2 of deep reef. Both areas are highly vulnerable to damage from bottom disturbances, sedimentation, and contamination associated with the proposed activities.

(d) Submarine canyons and canyon heads.— These structurally complex ecosystems provide critically important benthic and pelagic habitats for numerous fish species, sharks, sea birds, and marine mammals. The canyons plummet down several miles and their solid undersea walls provide a hard substrate foundation for bottom-dwelling species.[66] Among these is the golden tilefish, which create unique habitat for co-evolved species by burrowing extensively into the canyon walls, giving them the appearance of miniature, underwater versions of the pueblo villages of the American Southwest.[67] And the canyons represent high-value habitat for many other species, include monkfish, hakes, skates, American lobster, and red crab, as well as such lesser-known species as cod-like grenadiers and bioluminescent lanternfish.[68] Endangered sperm whales, beaked whales, dolphins, and other marine mammals come to the canyons and seamounts to feed on the schools of squid and fish that congregate there.[69] More than 200 species of invertebrates have been identified in the

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[66] Natural Resources Defense Council. Priority Ocean Areas for Protection in the Mid-Atlantic: Findings of NRDC's Marine Habitat Workshop at 25, 27 (Jan. 2001).

[67] *Id.*; Lumsden, S.E., T.F. Hourigan, A.W. Bruckner, & G. Dorr, eds., The state of deep coral ecosystems of the United States at 211 (2007) (NOAA Technical Memorandum CRCP-3, *available at* http://coris.noaa.gov/activities/deepcoral_rpt/pdfs/DeepCoralRpt2007.pdf).

[68] NRDC, Priority Ocean Areas; NMFS, Resource Survey Report: Bottom Trawl Survey. March 7 – April 28, 2007 (2009) (available at http://www.nefsc.noaa.gov/esb/rsr/sbts/sbts_2007/large_file.pdf); NMFS & NEFMC. Protecting Sensitive Deep-Sea Canyon Habitats through Fisheries Management: A Case Study in the Northeastern United States (2009) (available at http://www.nefmc.org/habitat/managing_fisheries_poster.pdf); Marine Conservation Biology Institute, Places in the Sea: Hudson Canyon (2009) (available at http://www.mcbi.org/shining_sea/place_atlantic_hudson.htm); NOAA Ocean Explorer. Mission Plan: Mountains in the Sea" (2009) (available at http://oceanexplorer.noaa.gov/explorations/03mountains/background/plan/plan.html); Lumsden et al., The state of deep coral ecosystems at 211; NOAA, Explorations: Deep East: Logs: Summary of the Expedition (2009) (*available at,* http://oceanexplorer.noaa.gov/explorations/deepeast01/logs/oct1/oct1.html).

[69] Waring, G.T., Hamazaki, T., Sheehan, D., Wood, G., and Baker, S., Characterization of beaked whale (*Ziphiidae*) and sperm whale (*Physeter macrocephalus*) summer habitat in shelf-edge and deeper waters off the northeast U.S." *Marine Mammal Science* 17: 703-717 (2001); Waring, G.T., Josephson, E., Maze-Foley, K., and Rosel, P.E., eds., U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2011 (2011).

Atlantic submarine canyons and seamounts, including species of black corals, boreal red corals, sponges, and feather-like sea pens.[70]

Submarine canyon and canyon head habitats are highly vulnerable to damage associated with bottom disturbances, sedimentation, and contamination from the proposed activities; and fish and other canyon species are particularly vulnerable to acoustic impacts from seismic surveys, which may be exacerbated by reverberation from the canyon walls. For these reasons, the Atlantic canyons, including such highly productive areas such as Norfolk Canyon and Georgetown Hole, should be excluded from all such activities, as should all Gear Restricted Areas for golden tilefish.

(e) Areas designated as Habitat Areas of Particular Concern ("HAPCs") by the Mid-Atlantic or South Atlantic Fishery Management Councils.— BOEM should consider excluding the following designated areas:

- HAPCs for coral, coral reefs, and live/hard bottom habitats
  - North Carolina: 10-Fathom Ledge, Big Rock, The Point
  - South Carolina: Charleston Bump, Hurl Rock
  - Georgia: Gray's Reef National Marine Sanctuary
  - Florida: Tube worm (*Lophelia*) reefs off FL's central east coast, *Oculina* Bank off coast from Fort Pierce to Cape Canaveral, nearshore (0-12 ft.) hard bottom off coast from Cape Canaveral to Broward County
- HAPCs for penaeid, rock, and royal red shrimps
- HAPCs for reef fish/snapper-grouper management unit, and areas that meet the criteria for Essential Fish Habitat-HAPCs for these species
  - medium- to high-profile offshore hard bottoms where spawning normally occurs
  - localities of known or likely periodic spawning aggregations
  - nearshore hard bottom areas
  - The Point, Ten Fathom Ledge, and Big Rock
  - Charleston Bump
  - mangrove habitat
  - seagrass habitat
  - oyster/shell habitat
  - all coastal inlets
  - all State-designated nursery habitats of particular importance to snappers-groupers (e.g., primary and secondary nursery areas designated in North Carolina)
  - pelagic and benthic *Sargassum*
  - Hoyt Hills for wreckfish
  - the *Oculina* Bank HAPC
  - all hermatypic coral habitats and reefs

[70] Oceana. There's No Place Like Home at 9; Lumsden et al., The state of deep-coral ecosystems, at 200, 203; NRDC, Priority Ocean Areas.

- manganese outcroppings on the Blake Plateau
- Council-designated Artificial Reef Special Management Zones

- HAPCs for coastal pelagic species
  - Sandy shoals of Cape Lookout, Cape Fear, and mid-Cape Hatteras; The Point, Ten-Fathom Ledge, Big Rock (North Carolina)
  - Charleston Bump, Hurl Rocks (South Carolina)
  - Nearshore hardbottom (Florida)

(f) South Atlantic Deepwater MPAs.— These areas, established in 2009 by the South Atlantic Fishery Management Council, support various snapper and grouper species, including snowy grouper, speckled hind, and blue tilefish. Many of the deep-dwelling species the area supports are slow-growing and already struggling to recover from overfishing and habitat damage.

(g) Gray's Reef National Marine Sanctuary.

(h) Areas known to be inhabited by and/or proposed as critical habitat for Atlantic sturgeon.

In addition, BOEM must analyze an alternative that would require any entity carrying out the proposed activities to identify aggregations of forage species and prohibit operations within the vicinity of such aggregations that might disturb them. Similarly, BOEM must analyze an alternative that would prohibit the proposed activities from being carried out in the vicinity of spawning aggregations of grouper and snapper species, as well as concentrations of *Sargassum*, which provides vital nursery habitat to numerous species in Atlantic shelf waters and the Gulf Stream.

C. Failure to Adequately Consider Reasonable Mitigation and Monitoring Measures

The DPEIS does not adequately consider, or fails to consider at all, a number of other reasonable measures that would reduce environmental risk from the proposed activities. These measures include:

(1) Exclusion of airgun surveys around established dive sites.— It is well established that intense undersea noise can jeopardize the health and safety of human divers. For this reason, the Navy has established a significant acoustic stand-off zone around established dive sites, for training and operations of its SURTASS LFA system as well as for other acoustic sources.[71] The Navy's 145 dB stand-off for SURTASS

[71] Navy, Final Overseas Environmental Impact Statement and Environmental Impact Statement for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar (2001) (notes that standard was endorsed by Navy's Bureau of Medicine and Surgery and the Naval Sea Systems Command); Navy, Final Supplemental Environmental Impact Statement for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar (2007).

LFA is based on research showing severe discomfort in a portion of experienced civilian divers, on exposure to low-frequency noise at that level.[72] Given the lack of any analogous studies on airgun noise, BOEM should adopt the Navy's 145 dB threshold as the best available standard for high-intensity, low-frequency airguns. The stand-off zone should apply to Monitor and Gray's Reef National Marine Sanctuaries as well as to other established dive sites.

(2) 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.[73] None of these measures is considered in the DPEIS. We would note that, in the past, 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.[74] Additionally, BOEM should consider establishing an expert panel, within the agency, to review survey designs with the aim of reducing their wildlife impacts. These requirements are consistent with both the MMPA's "least practicable impact" requirement for authorizing marine mammal take and OCSLA's "undue harm" requirement for permitting of offshore exploration.

(3) Sound source validation.— Relatedly, BOEM should require operators to validate the assumptions about propagation distances used to establish safety zones and calculate take (*i.e.*, at minimum, the 160 dB and 180 dB isopleths). 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 noise propagation.[75] It should be clarified that safety zone distances would initially be established in site-specific EAs and applications for MMPA authorization, to ensure opportunity for agency review and analysis.

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[72] Navy, Final Overseas Environmental Impact Statement and Environmental Impact Statement for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar: Technical Report 3 (1999).

[73] 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); 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).

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

[75] *See*, *e.g.*, Burns et al., Expert Panel Review (2010), *supra*; Brower et al., Expert Panel Review (2011), *supra*.

(4) Expansion of the speed-reduction requirement for vessels engaged in G&G activities.— As it stands, BOEM would require G&G ships to maintain a 10 knot speed restriction only when "mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel," or where the conditions specified in the existing right whale ship-strike rule (50 C.F.R. § 224.105) apply. DPEIS at 2-7. This requirement should be expanded.

Ship strikes represent one of the leading threats to the critically endangered North Atlantic right whale. More than half (n=10 of 14) of all North Atlantic right whales that died from significant trauma between 1970 and 2002, and were recovered for pathological examination, had vessel collision as a contributing cause of death (in cases where presumed cause of death could be determined);[76] and these data are likely to grossly underestimate the actual number of animals struck, as animals struck but not recovered, or not thoroughly examined, cannot be accounted for.[77] Each fatal strike could constitute jeopardy under the Endangered Species Act. As NMFS has repeatedly stated, "the loss of even a single individual [North Atlantic right whale] may contribute to the extinction of the species" and "preventing the mortality of one adult female a year" may alter this outcome.[78]

For these reasons, significant steps have been taken over the last several years to reduce the threat of right whale collisions by (1) shifting and narrowing Traffic Separation Schemes ("TSS"), (2) designating "areas to be avoided" ("ATBA"), and (3) establishing seasonal speed reductions for vessels in known right whale habitat. With respect to speed reductions, the best available science indicates that limiting ship speed to 10 knots reduces both the collision risk for right whales and the risk of mortality should a collision occur.[79] NMFS has therefore set a 10 knot limit on ships greater than 65 feet in length transiting certain waters along the eastern seaboard, including areas off the Mid-Atlantic.[80] The agencies have separately extended this requirement to all construction vessels associated with the Cape Wind project, as well as to both construction *and* support ships associated with the Neptune liquid natural

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[76] Moore, M. J., Knowlton, A.R., Kraus, S.D., McLellan, W.A., and Bonde, R.K., Morphometry, gross morphology and available histopathology in North Atlantic right whale (*Eubalena glacialis*) mortalities (1970-2002), *Journal of Cetacean Research and Management* 6:199-214 (2004).

[77] Reeves, R.R., Read, A., Lowry, L., Katona, S.K., and Boness, D.J., *Report of the North Atlantic right whale program review*, 13–17 March 2006, Woods Hole, Massachusetts (2007) (prepared for the Marine Mammal Commission).

[78] *See* 69 Fed. Reg. 30,857, 30,858 (June 1, 2004); *see also* 73 Fed. Reg. 60,173, 60,173 (Oct. 10, 2008); 72 Fed. Reg. 34,632, 34,632 (June 25, 2007); 66 Fed. Reg. 50,390, 50,392 (Oct. 3, 2001).

[79] Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S., and Podesta, M., Collisions between ships and whales, *Marine Mammal Science* 17: 35-75 (2001); Pace, R.M., and Silber, G.K., Simple analyses of ship and large whale collisions: Does speed kill? Biennial Conference on the Biology of Marine Mammals, December 2005, San Diego, CA. (2005) (abstract); Vanderlaan, A.S.M., and Taggart, C.T., Vessel collisions with whales: The probability of lethal injury based on vessel speed, Marine Mammal Science 23: 144-156 (2007); NMFS, 2010 Large Whale Ship Strikes Relative to Vessel Speed (2010) (*available at* http://www.nmfs.noaa.gov/pr/pdfs/shipstrike/ss_speed.pdf).

[80] 73 Fed. Reg. 60173, 60173-60191 (Oct. 10, 2008).

gas ("LNG") facility regardless of vessel length. Notably, both the Cape Wind and Neptune LNG speed limits apply to waters beyond those covered by NMFS' ship-strike rule.[81] A speed reduction measure in this case would, of course, also reduce the risk of fatal ship strikes on other endangered baleen whales, such as fin and humpback whales, which also occur within the WEAs and shoreward.

BOEM should therefore require that all vessels associated with G&G activities, including support vessels, adhere to a 10 knot speed limit when operating or transiting: i.e., at all times. This measure is easily practicable for most vessels involved in G&G activities: seismic boats proceed at a nominal 4.5 knots when operating and at generally slow speeds (below 13-14 knots) when transiting. But specific language on this point is needed, as in the case of the Neptune LNG facility, to ensure that all vessels (and not just those vessels over 65 feet in length) and all affected waters (beyond the areas immediately surrounding the major Mid-Atlantic ports) are covered by the speed limit, and that the requirement persists beyond the original 5-year term of the existing right whale ship-strike rule. Because this measure would likewise reduce the risk of vessel collisions with other species, including other endangered baleen whales, and because it would significantly reduce cavitation noise,[82] it should apply throughout the year and not only during periods of right whale occurrence.

Finally, as per requirements for the Neptune LNG facility,[83] the EA should specify that designated crew members must receive National Oceanic and Atmospheric Administration ("NOAA") certified training regarding marine mammal and sea turtle presence and collision avoidance procedures, prior to the commencement of construction and support activities.

(5) 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.[84] Indeed, the agencies admit in their DPEIS for Arctic exploration that routing ships around important habitat would benefit species in that region, including bowheads,

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[81] Cape Wind Associates, Construction and Operations Plan: Cape Wind Energy Project, Nantucket Sound, Massachusetts (Feb. 2011); NMFS, Biological Opinion: Issuance of license to Neptune LNG to MARAD to construct, own, and operate an LNG deepwater port, at 15-16 (2007) (license number F/NEr/2006/04000).

[82] Renilson, M., Reducing underwater noise pollution from large commercial vessels (2009) *available at* www.ifaw.org/oceannoise/reports; Southall, B.L., and Scholik-Schlomer, A. eds. Final Report of the National Oceanic and Atmospheric Administration (NOAA) International Symposium: Potential Application of Vessel-Quieting Technology on Large Commercial Vessels, 1-2 May 2007, at Silver Springs, Maryland (2008) (*available at* http://www.nmfs.noaa.gov/pr/pdfs/acoustics/vessel_symposium_report.pdf).

[83] NMFS, Biological Opinion at 15. By contrast, the mitigation set forth in Appendix C of the Draft EA merely requires that vessel and aircraft operators receive a "briefing." *See* Draft EA at 226.

[84] *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).

belugas, gray whales, and walruses.[85] Accordingly, the draft EIS should require avoidance of such areas, including right whale calving grounds, as a standard mitigation measure.

(6) Reduction of noise from vessels used in oil and gas G&G activities.— To further reduce undersea noise, BOEM should require that all vessels used in oil and gas G&G activities undergo measurement for their underwater noise output per American National Standards Institute/ Acoustical Society of America standards (S12.64); that all such vessels undergo regular maintenance to minimize propeller cavitation, which is the primary contributor to underwater ship noise; and that all new industry vessels be required to employ the best ship-quieting designs and technologies available for their class of ship.[86]

(7) Separation distances— As part of Alternative B, BOEM would require operators to maintain a 40 km separation distance between concurrent airgun surveys. DPEIS at C-21. While we agree with BOEM about the benefits of reducing simultaneous exposure of the same area, we believe the proposed separation distance is too small to accomplish the objective. Forty kilometers represents a doubling of the 160 dB isopleth around a large array, plus an additional 10 km buffer needed for marine species to freely transit through the area or otherwise escape disruptive levels of exposure. But marine mammals experience take at much lower levels of exposure, as discussed below at § IV.B. To take just one example, migrating bowhead whales experience displacement well beyond the 160 dB isopleths, out to 25-30 km; the proposed 40 km separation would do little to mitigate the displacement and allow transit of the animal.[87] BOEM should consider larger, more conservative separation distances including, but not limited to, 90 km, which is the distance considered in the Arctic DPEIS.

(8) Designing tracklines to minimize the potential for strandings.— Biologists have expressed concern, based on correlations of airgun surveys with some marine mammal stranding events as well as the traditional use of sound in cetacean drive fisheries, that seismic operations (and other intense noise sources) could cause marine mammals to strand, particularly if used near shore.[88] To reduce analogous risk in

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

[86] Renilson, Reducing underwater noise pollution from large commercial vessels; Southall and Scholik-Schlomer, eds., Final Report of the National Oceanic and Atmospheric Administration (NOAA) International Symposium: Potential Application of Vessel-Quieting Technology on Large Commercial Vessels.

[87] Richardson, W.J., Miller, G.W., and Greene Jr., C.R., Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea, *Journal of the Acoustical Society of America* 106: 2281 (1999).

[88] Brownell, R.L., Jr., Nowacek, D.P., and Ralls, K., Hunting cetaceans with sound: a worldwide review, *J. Cetacean Res. Manage.* 10: 81-88 (2008); Hildebrand, J., Impacts of anthropogenic sound, *in* Ragen, T.J., Reynolds III, J.E., Perrin, W.F., Reeves, R.R., and Montgomery, S. (eds.), *Marine Mammal Research: Conservation beyond*

other contexts, Australia and the NATO Undersea Research Program have required planners of mid-frequency sonar exercises to design their tracklines to minimize the potential for embayments and strandings, such as by avoiding tracks that could herd animals into bays and estuaries or keeping transmissions in bays to a minimum.[89] The potential location of deep-penetration airgun surveys close to shore recommend the use of the same measure in this case.

(9) Adequate safety zone distances.— BOEM should reconsider the size of the safety zones it would prescribe as part of its nominal protocol for seismic airgun surveys.

The DPEIS proposes establishing a safety zone of 180 dB re 1 µPa (with a 500 m minimum) around individual seismic arrays, correctly observing that this standard is generally consistent with NMFS' requirements for other acoustic sources. DPEIS at 2-5. It is not clear, however, whether BOEM took recent research into account when calculating nominal safety zone distances in the document. For example, Gedamke et al. (2011), whose lead author is the present director of NMFS' Bioacoustics Program, has put traditional means of estimating safety zones into doubt. That paper demonstrates through modeling that, when uncertainties about impact thresholds and intraspecific variation are accounted for, a significant number of whales could suffer temporary threshold shift (*i.e.*, hearing loss) beyond 1 km from a relatively small seismic array (source energy level of 220 dB re 1 $\mu Pa^2(s)$) – a distance that seems likely to exceed BOEM's estimates (PDEIS at C-10).[90] Moreover, a recent dose-response experiment indicates that harbor porpoises are substantially more susceptible to temporary threshold shift than the two species, bottlenose dolphins and belugas, that had previously been tested.[91] And a number of recent studies suggest that the relationship between temporary and permanent threshold shift may not be as predictable as previously believed.[92] Further discussion appears at section IV.B.3 below ("Failure to set proper thresholds for hearing loss"). BOEM must take account of these studies, as, for example, by extending the safety zone by a precautionary distance, as the Navy and NMFS have done to compensate for uncertainties in the

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Crisis 101-123 (2006); 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).

[89] Royal Australian Navy, Maritime Activities Environmental Management Plan: Procedure S1 (2006); NATO Undersea Research Centre, NATO Undersea Research Centre Human Diver and Marine Mammal Risk Mitigation Rules and Procedures, at 10 (2006) (NURC Special Pub. NURC-SP-2006-008).

[90] 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).

[91] 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).

[92] 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).

case of SURTASS LFA. 67 Fed. Reg. 46712 (July 16, 2002); 72 Fed. Reg. 46846 (Aug. 21, 2007).

Additionally, BOEM should consider establishing a cumulative exposure metric for temporary threshold shift in addition to the present RMS metric, as suggested by Southall et al. (2007).[93]

Finally, BOEM should consider establishing larger shutdown zones for certain target species. Although time/area closures are a more effective means of reducing cumulative exposures of wildlife to disruptive and harmful sound, these expanded safety zones have value in minimizing disruptions, and potentially in reducing the risk of hearing loss and injury, outside the seasonal closure areas.[94] Visual sighting of any individual right whale should trigger shut-down; for other species, shut-down should occur if aggregations are observed within the 160 dB isopleth around the sound source.

(10) 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 high sea states and fog.[95] Supplemental methods that have been used on certain other projects include ship-based passive acoustic monitors, hydrophone buoys and other platforms for acoustic monitoring, aerial surveys, shore-based monitoring, and the use of additional small vessels. Unfortunately, the real-time monitoring effort proposed in the DPEIS is inadequate.

While BOEM seems to require two observers for airgun surveys – the minimum number necessary to maintain 360 degree coverage around the seismic vessel – it otherwise sets forth requirements that are inconsistent with survey conventions and with prior studies of observer effectiveness. *First*, BOEM's "draft protocol" would allow visual observers to work at four-hour stretches, with two-hour breaks in between, and for a maximum of 12 hours per day. DPEIS at C-41. That four-hour work cycle doubles the amount of time conventionally allowed for marine mammal observation aboard NMFS survey vessels, and is even less appropriate for conditions where, as here, an animal's health is at stake. *Second*, BOEM's training requirements for marine mammal observers amount to little more than a desktop course – basically the "poor example" of a 45-minute "DVD" lesson criticized by Parsons et al. (2009) – and do not mandate any prior field experience. DPEIS at C-41 to C-42. Yet, as UK

[93] Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran. J.J., Gentry, R.L., Greene, C.R., Jr., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A., and Tyack, P.L., Marine mammal noise exposure criteria: Initial scientific recommendations, *Aquatic Mammals* 33:411-521 (2007).

[94] *See* MMS, Final Programmatic Environmental Assessment, Arctic Outer Continental Shelf Seismic Surveys – 2006, OCS EIS/EA MMS 2006-038 at 110-111 (June 2006) (noting sensitivity of baleen whale cow-calf pairs).

[95] *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, 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).

data have demonstrated, use of observers with no meaningful experience in marine mammal observation, such as ships' crew, results in extremely low levels (approaching zero percent) of detection and compliance.[96] BOEM should require field experience in marine mammal observation of any

Furthermore, while it includes mandatory passive acoustic monitoring ("PAM") under Alternative B (DPEIS at C-21), the DPEIS discusses the measure in a later section as though it has already been "considered but not selected" (DPEIS at C-25 to C-26). The rationale for this seeming rejection is that the method is limited – but then, as the PDEIS acknowledges, visual observation is limited as well, "and most likely an integrated approach is necessary" (DPEIS at C-25). Real-time PAM has had some success in detecting toothed whale calls in the Arctic and elsewhere, as NMFS and its expert Open Water Panel have recognized; and towed arrays in the Gulf of Mexico have successfully detected sperm whales and implemented shut-down procedures.[97] Indeed, PAM systems appear to be widely used in the Gulf, in waters deeper than 200 meters; many of the same survey vessels are likely to be employed in east-coast exploration. There is no reason, especially given BOEM's high estimates of hearing loss, why PAM should not be mandated, or at least presumptively required.

Finally, BOEM improperly rules out aerial surveillance as a monitoring measure, apparently due to its limited application and to safety concerns that arise under some conditions. DPEIS at C-27. This, however, is hardly a reason to categorically reject the measure. The offshore industry routinely uses aircraft to carry out its own exploration and production activities; requiring flights to also reduce the environmental impacts of those activities should be viewed in the same light. Furthermore, the industry has run aerial monitoring around surveys in the Arctic since at least the 1980s. For its upcoming Arctic work, Shell is committed to implement an aerial program extending 37 kilometers from shore. 76 Fed. Reg. 69,958, 69,987 (Nov. 9, 2011). We agree that aerial monitoring should not be required of every airgun survey in every location within the two planning areas, but BOEM should consider prescribing it on a case-by-case basis, and should indicate in the Final EIS when they might be required.[98]

For HRG surveys, BOEM must require a sufficient number of competent, trained visual observers. Requiring only one trained observer, as proposed in Appendix C

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[96] 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, *supra*. It is worth noting that the "inexperienced" marine mammal observers involved in the UK study usually still received some basic training. Stone, The effects of seismic surveys, *supra*.

[97] *Id.*; 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 cetaceans, *Proceedings of the Institute of Acoustics* 30(5) (2008).

[98] We fully support efforts by NMFS, BOEM, the Office of Naval Research and others to develop unmanned planes for offshore aerial monitoring (*see* PDEIS at C-27), but unfortunately that is no substitute at the present time for manned aircraft.

(DPEIS at C-16), is simply not adequate to maintain a steady visual watch for more than two hours or to effectively monitor in all directions around the sound source.[99] At least two observers should be required to have any chance of effectively spotting marine mammals on both sides of the survey vessel.

(11) Limiting activities in low-visibility conditions.— The DPEIS does not consider limiting activities in low-visibility conditions, which, as the agencies acknowledged in their Arctic DPEIS for exploration activities, can reduce the risk of ship-strikes and near-field noise exposures.[100] Anticipating BOEM's objection, however, it may be said that the agencies' categorical rejection of this measure in the Arctic context is flawed. *First*, they suggest (correctly) that the restriction could extend the duration of a survey and thus the potential for cumulative disturbance of wildlife; but this concern would not apply in circumstances, such as in the right whale migratory corridor, where the prime mitigation concern is migratory species. *Second*, while they suggest that the requirement would be expensive to implement, they do not consider the need to reduce ship-strike risk in heavily-used migratory corridors in order to justify authorization of an activity under the IHA process.[101] At the very least, BOEM should commit to consider this measure on a case-by-case basis and to describe the conditions under which it might be required.

(12) Adequate long-term monitoring.— Numerous sources have called for thorough biological surveying before, during, and after seismic surveys in biologically important areas.[102] And yet – remarkably for an activity that even BOEM estimates would take millions of marine mammals each year – the DPEIS does not set forth a long-term monitoring plan nor give any indication that one will be developed. By comparison, the U.S. Navy, when it embarked on regulatory compliance for Atlantic Fleet sonar training, began devising a long-term plan and entered into partnerships with Duke Marine Lab and others to begin vessel surveys, habitat modeling, and

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[99] *See* 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).

[100] NMFS, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement at 4-160 to 4-153 (Dec. 2011).

[101] IHAs cannot issue to activities with the potential to cause serious injury or mortality. 16 U.S.C. § 1371(a)(5)(D).

[102] *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, *supra*; 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 and Dolman, 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).

research in support of that effort.[103] Incredibly, the sum total of relevant BOEM research in the Atlantic since 2006 – other than for offshore alternative energy – consists of (1) a study of marine productivity across BOEM's oil and gas planning areas – a national study in which the Atlantic was included, and (2) a study of sperm whale dive patterns. DPEIS at G-3.

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 DPEIS are correct. There is no sign that BOEM has even begun to think about such a thing. Yet it is imperative that the agencies elaborate a monitoring plan now, during the NEPA process, since BOEM apparently refuses to apply to NMFS for a programmatic, 5-year rulemaking. We urge BOEM to begin consulting *immediately* with NMFS regional fisheries science centers as well as with non-government experts on the components of an effective plan.

We note that any meaningful long-term monitoring program should include passive acoustics. As has been the case in other regions, acoustic data can have enormous value in helping to define marine mammal distribution and abundance, detect impacts from noise-generating activities, and assess cumulative levels of noise exposure for purposes of adaptive management.[104] For example, PAM has served as a critical means of impact assessment for wind farm construction in Europe.[105] It provides an important supplemental source of information for some species, such as researchers have seen in Southern California, where passive acoustics have altered conclusions about baleen whale seasonality that were established on the basis of visual surveys alone. Real-time acoustic monitoring can also improve safety zone monitoring, particularly for cryptic, vocalizing species and for nighttime operations. Finally, PAM is also cost-effective, typically costing far less than visual surveys.[106]

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[103] U.S. Navy, Final Atlantic Fleet Active Sonar Training Environmental Impact Statement/ Overseas Environmental Impact Statement (2008).

[104] 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)

[105] Evans, P.G.H. (Ed.), Proceedings of the ECS/ASCOBANS Workshop: Offshore wind farms and marine mammals: impacts and methodologies for assessing impacts, at 50-59, 64-65 (2007) (ECS Special Publication Series No. 49, available at www.wdcs.org/submissions_bin/wind_farm_workshop.pdf); *see also* Carstensen, J., Henriksen, O. D., and Teilmann, J., Impacts of offshore wind farm construction on harbour porpoises: acoustic monitoring of echolocation activity using porpoise detectors (T-PODs), *Mar. Ecol. Prog. Ser.* 321: 295-308 (2006).

[106] *See* Scientific Advisory Group for Navy Marine Species Monitoring, Workshop report and recommendations (2011) (available at www.cascadiaresearch.org/Navy_MMM_Scientific_Advisory_group_report_May_2011.pdf) (report by experts convened by U.S. Navy, per NMFS regulation, to evaluate Navy's range monitoring program for marine mammals).

(13) Adaptive management.— In justifying its decision not to delay seismic exploration, BOEM claims to have taken an "adaptive management approach that would incorporate new technology and improved mitigation measures as they are developed and proven efficacious." DPEIS at 2-48. Yet nowhere in the DPEIS does the agency set forth the terms of an adaptive management program. Such a program, if it is not mere window-dressing, must include (1) a means of monitoring impacts on target species (see "Adequate long-term monitoring," above), (2) a means of encouraging and developing mitigation measures (see, e.g., "Failure to develop a viable technology-based alternative," above), and (3) a means of modifying the proposed action as new information and mitigation measures emerge. The DPEIS provides none of these elements. One can only draw, again, an invidious comparison with the Navy, whose activities throughout the U.S. EEZ include a long-term monitoring program and are subject to annual adaptive management review, on consultation with NMFS. *See*, *e.g.*, 74 Fed. Reg. 4844, 4854-4858, 4884-4885 (Jan. 27, 2009).[107] Nor does BOEM set forth a protocol for emergency review or suspension of activities, if serious unanticipated impacts, such as a mass stranding or a vessel collision with a right whale, are found to occur – a standard element of Navy sonar mitigation. *See*, *e.g.*, 50 C.F.R. 216.244(xxx).[108] Here as elsewhere, the agency must expand its analysis of alternatives and mitigation measures.

IV. IMPACTS ANALYSIS

A. Failure to Obtain Essential Information

It is undisputed that there are significant gaps in basic information about the mid- and south Atlantic regions, their wildlife, and the potential effects of noise and disturbance from oil and gas exploration.

NEPA regulations set out an "ordered process" for an agency preparing an EIS in the face of missing information. *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1244 (9th Cir. 1984). When there is incomplete information relevant to reasonably foreseeable significant adverse impacts that is essential to a reasoned choice among alternatives, an agency must obtain and include the missing information in the EIS if the overall costs of obtaining it are not exorbitant. 40 C.F.R. § 1502.22. If the costs are exorbitant or the means to obtain the information are unknown, agencies must provide in the EIS a number of responses including, a "summary of existing credible scientific evidence" and an evaluation of impacts "based upon theoretical approaches or research methods generally accepted in the scientific community." *Id*. at § 1502.22(b).

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[107] The agencies use MMPA as their vehicle in the Navy context, but of course a different adaptive management scheme could be established through the NEPA process.

[108] *See also*, *e.g.*, NMFS, Stranding response plan for major Navy training exercises in the AFAST Study Area (2009) (available at www.nmfs.noaa.gov/pr/permits/afast_stranding_protocol_final.pdf).

The regulation furthers NEPA's purpose of ensuring that agencies make "fully informed and well-considered decision[s]," its mandate of "widespread discussion and consideration of the environmental risks and remedies associated with [a] pending project", and its "require[ment] that this evaluation take place *before* a project is approved." *Vt. Yankee Nuclear Power Corp. v. Natural Resources Def. Council,* 435 U.S. 519, 558 (1978) ("fully informed and well-considered decision[s]"; *LaFlamme v. FERC*, 852 F.2d 389, 398 (9th Cir. 1988) (internal quotation marks omitted).

The DPEIS cites to the applicable Council of Environmental Quality ("CEQ") regulation and maintains that it identifies those areas where information is unavailable to support a thorough evaluation of the environmental consequences of the alternatives. *See* DPEIS at 4-6. In fact, however, the document evades the analysis that § 1502.22 requires. In the first place, it fails to identify certain obvious gaps in information – such as important habitat areas for marine mammals – essential to a reasoned choice among alternatives. Beyond this, its modus operandi is to acknowledge major information gaps on virtually every topic under analysis, then insist – without any specific findings about their significance for the agencies' decisionmaking – that BOEM agency has an adequate basis for proceeding. *See*, *e.g.*, PDEIS at 4-46 (masking in marine mammals), 4-47 to 4-49 (stress and behavioral impacts in marine mammals), 4-79 (behavioral impacts on sea turtles). This approach simply does not satisfy NEPA.

The DPEIS, and the DPEIS that NMFS and BOEM recently prepared for the Arctic, reveal in many instances that relevant studies are already underway, indicating that obtaining essential information is not cost prohibitive. For example, a study undertaken by BP, the North Slope Borough, and the University of California "will help better understand masking and the effects of masking on marine mammals[.]"[109] NOAA has convened working groups on Underwater Sound Field Mapping and Cetacean Density and Distribution Mapping throughout the U.S. territorial sea and exclusive economic zone, including virtually the entirety of the present study area, for purposes of improving cumulative impact analysis and mitigation measures.[110] BOEM has an Environmental Studies Program that includes several relevant studies (though few specific to the Atlantic) and, more importantly, should serve as a vehicle for targeted research. *See* DPEIS at Appendix G. As the Ninth Circuit recently found, agencies have an obligation pursuant to NEPA "to ensure that data exists *before approval*" so that decisionmakers can "understand the adverse environmental effect *ab initio*." *Northern Plains Resource Council v. Surface Transport. Bd*, --- F.3d ----, 2011 WL 6826409, *14 (9th Cir. Dec. 29, 2011) (emphasis in original). BOEM has not done so here.

B. Failure to Set Proper Thresholds for Marine Mammal Take

As a comment letter from Duke Marine Lab has noted, the DPEIS has vastly underestimated marine mammal take from the proposed activity. The reasons for this are manifold, but lie principally in the agency's mistaken adoption of a 160 dB threshold for Level B take and its

[109] NMFS, Effects of Oil and Gas Activities in the Arctic Ocean: Draft Environmental Impact Statement at 4-88 (Dec. 2011).

[110] *Id*. at ES-34.

failure to calculate impacts from masking. Nor has BOEM performed a sensitivity analysis to determine how significantly its take and impact estimates would differ if some of its core assumptions – such as its 160 dB threshold – are wrong.

1. Illegal threshold for behavioral take

The DPEIS uses 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. This approach simply does not reflect the best available science, and the choice of threshold is not sufficiently conservative in several important respects. 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."[111] *See* 40 C.F.R. § 1502.22. BOEM must use a more conservative threshold for the following reasons:

(a) The method represents a major step backward from recent programmatic authorizations. For Navy sonar activity, NMFS has used a combination of specific bright-line thresholds (for harbor porpoises) and linear risk functions that endeavor to take account of risk and individual variability and to reflect the potential for take at relatively low levels.[112] In the wake of these past authorizations for acoustic impacts on marine mammals, the agencies' reversion to a single, non-conservative, bright-line threshold for all species is simply not tenable.

(b) The 160 dB threshold is non-conservative, since the scientific literature establishes that behavioral disruption can occur at substantially lower received levels for some species.

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.[113] (Similarly, a low-frequency, high-amplitude fish mapping device was recently found to silence humpback whales at distance of 200 km, where received levels ranged from 88 to 110 dB.)[114] Sperm whale foraging success, as measured by buzz rate, appears to decline significantly on exposure to airgun received levels above 130 dB (RMS), with potentially serious

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

[112] *E.g.*, 74 Fed. Reg. 4844, 4844-4885 (Jan. 27, 2009).

[113] 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).

[114] 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).

long-term consequences.[115] Harbor porpoises are known to be acutely sensitive to a range of anthropogenic sources, including airguns. They have been observed to engage in avoidance responses fifty miles from a seismic airgun array – a result that is consistent with both captive and wild animal studies showing them abandoning habitat in response to pulsed sounds at very low received levels, well below 120 decibels (re 1 µPa (RMS)).[116] Bowhead whales migrating through the Beaufort Sea have shown almost complete avoidance at airgun received levels at 120-130 dB (RMS) and below;[117] for this reason BOEM has stated in past Arctic lease sale EISs that most bowheads "would be expected to avoid an active source vessel at received levels as low as 116 to 135 dB re 1 µPa when migrating.[118]. Beluga whales are highly sensitive to a range of low-frequency and low-frequency dominant anthropogenic sounds, including seismic airgun noise, which has been shown to displace belugas from near-coastal foraging areas out beyond the 130 dB (RMS) isopleth.[119]

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[115] 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).

[116] *E.g.*, 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); Kastelein, R.A., Verboom, W.C., Jennings, N., and de Haan, D., Behavioral avoidance threshold level of a harbor porpoise (Phocoena phocoena) for a continuous 50 kHz pure tone, *Journal of the Acoustical Society of America* 123: 1858-1861 (2008); Kastelein, R.A., Verboom, W.C., Muijsers, M., Jennings, N.V., and van der Heul, S., The influence of acoustic emissions for underwater data transmission on the behavior of harbour porpoises (Phocoena phocoena) in a floating pen, *Mar. Enviro. Res.* 59: 287-307 (2005); Olesiuk, P.F., Nichol, L.M., Sowden, M.J., and Ford, J.K.B., Effect of the sound generated by an acoustic harassment device on the relative abundance and distribution of harbor porpoises (Phocoena phocoena) in Retreat Passage, British Columbia, *Mar. Mamm. Sci.* 18: 843-862 (2002).

[117] Miller, G.W., Elliot, R.E., Koski, W.R., Moulton, V.D., and Richardson W.J., Whales, *in* Richardson, W.J. (ed.), Marine Mammal and Acoustical Monitoring of Western Geophysical's Open-Water Seismic Program in the Alaskan Beaufort Sea, 1998 (1999); Richardson, W.J., Miller, G.W., and Greene Jr., C.R., Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea, *Journal of the Acoustical Society of America* 106:2281 (1999).

[118] *See*, *e.g.*, Beaufort Sea and Chukchi Sea Planning Areas Oil and Gas Lease Sales 209, 212, 217, and 221: Draft Environmental Impact Statement (2008) (OCS EIS/EA MMS 2008-0055); 71 Fed. Reg. 66,912, 66,913 (2006). although bowheads appear less aversive while feeding, the Arctic EIS rightly acknowledges that they may be "so highly motivated to remain in a productive feeding area" that they experience adverse effects and increased chronic stress. NMFS, Effects of Oil and Gas Activities in the Arctic Ocean, Draft Environmental Impact Statement at 4-99 (Dec. 2011).

[119] Miller, G.W., Moulton, V.D., Davis, R.A., Holst, M., Millman, P., MacGillivray, A., and Hannay. D., Monitoring seismic effects on marine mammals—southeastern Beaufort Sea, 2001-2002, *in* Armsworthy, S.L., et al. (eds.), Offshore oil and gas environmental effects monitoring/Approaches and technologies, at 511-542 (2005). *See also* Findley, K.J., Miller, G.W., Davis, R.A., and Greene, C.R., Jr., Reactions of belugas, Delphinapterus leucas, and narwhals, Monodon monoceros, to ice-breaking ships in the Canadian high Arctic, *Can. J. Fish. Aquat. Sci.* 224: 97-117 (1990); Cosens, S.E., and Dueck, L.P., Ice breaker noise in Lancaster Sound, NWT, Canada: implications for marine mammal behavior, *Mar. Mamm. Sci.* 9: 285-300 (1993); Fraker, M.A., The 1976 white whale monitoring program, MacKenzie estuary, report for Imperial Oil, Ltd., Calgary (1977); Fraker, M.A., The 1977 white whale monitoring program, MacKenzie estuary, report for Imperial Oil, Ltd., Calgary (1977); Fraker, M.A., The 1978 white whale monitoring program, MacKenzie estuary, report for Imperial Oil, Ltd., Calgary (1978); Stewart, B.S., Evans, W.E., and Awbrey, F.T., Effects of man-made water-borne noise on the behaviour of beluga whales, *Delphinapterus leucas*, in Bristol Bay, Alaska, Hubbs Sea World (1982) (report 82-145 to NOAA); Stewart, B.S., Awbrey, F.T., and Evans, W.E., Belukha whale (*Delphinapterus leucas*) responses to industrial noise in Nushagak

Beaked whales, though never tested experimentally for their response to airgun noise, have shown themselves 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.[120] And these are merely examples, consistent with the broader literature. *See*, *e.g.*, DPEIS at 4-49.

Little if any of these data were available in 1999, when the High Energy Seismic Survey panel issued the report on which the 160 dB threshold is purportedly based;[121] since that time, the literature on ocean noise has expanded enormously due to massive increases in research funding from the U.S. Navy, the oil and gas industry, and other sources. The evidentiary record for a lower threshold in this case substantially exceeds the one for mid-frequency sonar in *Ocean Mammal Institute v. Gates*, 546 F. Supp.2d 960, 973-75 (D.Hawaii 2008), in which a Hawaiian District Court judge invalidated a NMFS threshold that ignored documented impacts at lower received levels as arbitrary and capricious.

(c) The use of a multi-pulse standard for behavior harassment is non-conservative, since it does not take into account the spreading of seismic pulses over time beyond a certain distance from the array.[122] NMFS' own Open Water Panel for the Arctic – which has included some of the country's leading marine bioacousticians – has twice characterized the seismic airgun array as a mixed impulsive/continuous noise source and has stated that NMFS should evaluate its impacts on that basis.[123] That analysis is supported by the masking effects model referenced above, in which several NMFS scientists have participated; by a number of papers showing that seismic exploration in the Arctic, the east Atlantic, off Greenland, and off Australia has raised ambient noise levels at significant distances from the array;[124] and, we expect, by the

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Bay, Alaska: 1983 (1983); Edds, P.L., and MacFarlane, J.A.F., Occurrence and general behavior of balaenopterid cetaceans summering in the St. Lawrence estuary, *Canada, Can. J. Zoo*. 65: 1363-1376 (1987).

[120] 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).

[121] High Energy Seismic Survey Team, High energy seismic survey review process and interim operational guidelines for marine surveys offshore Southern California (1999).

[122] *See* Expert Panel Review 2011.

[123] *Id.*; *see also* Expert Panel Review 2010.

[124] 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.,

modeling efforts of NOAA's Sound Mapping working group, whose public release is supposed to occur in early July. BOEM cannot ignore this science.

(d) The threshold's basis in the root mean square ("RMS") of sound pressure, rather than in peak pressure, is non-conservative. Studies have criticized the use of RMS for seismic because of the degree to which pulsed sounds must be "stretched," resulting in significant potential underestimates of marine mammal take (see below).[125]

NMFS must revise the thresholds and methodology used to estimate take from airgun use. Specifically, we urge the following:

(a) NMFS should employ a combination of specific thresholds for which sufficient species-specific data are available and generalized thresholds for all other species.[126] These thresholds should be expressed as linear risk functions where appropriate. If a single risk function is used for most species, the 50% take parameter for all the baleen whales and odontocetes occurring in the area should not exceed 140 dB (RMS), per the February 2012 recommendation from Dr. Clark and his colleagues. At least for sensitive species such as harbor porpoises and beaked whales, BOEM should use a threshold well below that number, reflecting the high levels of disturbance seen in these species at 120 dB (RMS) and below. Recent analysis by the California State Lands Commission provides another alternative, differentiating among low-frequency, mid-frequency, and high-frequency cetaceans in a manner that is generally consistent with Southall et al (2007).[127]

(b) Data on species for which specific thresholds are developed should be included in deriving generalized thresholds for species for which less data are available.

(c) In deriving its take thresholds, NMFS should treat airgun arrays as a mixed acoustic type, behaving as a multi-pulse source closer to the array and, in effect, as a continuous noise source further from the array, per the findings of the 2011 Open Water Panel cited above.

(d) Behavioral take thresholds for the impulsive component of airgun noise should be based on peak pressure rather than on RMS, or dual criteria based on both peak

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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).

[125] Madsen, P.T., Marine mammals and noise: Problems with root-mean-squared sound pressure level for transients, *Journal of the Acoustical Society of America* 117:3952-57 (2005).

[126] By "thresholds," we mean either bright-line thresholds or linear risk functions.

[127] California State Lands Commission, Draft Environmental Impact Report at Chap. 4.4 and App. H, *supra*; *see also* Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran. J.J., Gentry, R.L., Greene, C.R., Jr., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A., and Tyack, P.L., Marine mammal noise exposure criteria: Initial scientific recommendations, *Aquatic Mammals* 33:411-521 (2007).

pressure and RMS should be used. Alternatively, BOEM should use the most biologically conservative method of calculating RMS, following Madsen (2005). (See section IV.C. below for additional detail.)

2. Failure to analyze masking effects or set thresholds for masking

The DPEIS fails to consider masking effects, either from continuous noise sources such as ships or from mixed impulsive/continuous noise sources such as airguns. Some biologists have analogized the increasing levels of noise from human activities to a rising tide of "smog" that is already shrinking the sensory range of marine animals by orders of magnitude from pre-industrial levels. DPEIS at 3-43 (citing Clark et al. 2007).[128] Masking of natural sounds begins when received levels rise above ambient noise at relevant frequencies.[129] Accordingly, BOEM must evaluate the loss of communication space – and consider the extent of acoustic propagation – at far lower received levels than the DPEIS currently employs.

Researchers at NOAA and Cornell have created a model that quantifies impacts on the communication space of marine mammals. That published model has already been applied to shipping noise off Massachusetts and off British Columbia, and the same researchers involved in the Massachusetts study have applied it to airgun surveys as well.[130] Additionally, researchers at BP, working with colleagues at the University of California and the North Slope Borough, are applying the model to an analysis of masking effects from seismic operations in the Beaufort Sea.[131] Remarkably, the DPEIS – instead of applying the Cornell/NOAA model – simply states without any discernible support that masking effects on marine mammals would be "minor,"

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[128] *See also* 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); Clark, C., and Southall, B., Turn down the volume in the ocean, *CNN.com*, Jan. 20, 2012, *available at* www.cnn.com/2012/01/19/opinion/clark-southall-marine/index.html; McDonald, M.A., Hildebrand, J.A., and Wiggins, S.M., Increases in deep ocean ambient noise in the Northeast Pacific west of San Nicolas Island, California, *Journal of the Acoustical Society of America* 120: 711-718 (2006).

[129] 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); 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). *See also* Castellote, M., Clark, C.W., and Lammers, M.O., Potential negative effects in the reproduction and survival on fin whales (*Balaenoptera physalus*) by shipping and airgun noise (2010) (IWC Scientific Committee Doc. No. SC/62/E3).

[130] 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); 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); Williams, R., Ashe, E., Clark, C.W., Hammond, P.S., Lusseau, D., and Ponirakis, D., Inextricably linked: boats, noise, Chinook salmon and killer whale recovery in the northeast Pacific, presentation given at the Society for Marine Mammalogy Biennial Conference, Tampa, Florida, Nov. 29, 2011 (2011).

[131] Fleishman, E., and Streever, B., Assessment of cumulative effects of anthropogenic underwater sound: project summary and status, at 2 (2012).

meaning neither extensive nor severe. DPEIS at 4-44. Furthermore, it asserts that its mitigation protocol would "reduce the potential for masking" by excluding some marine mammals from the narrow safety zone that BOEM would establish around the seismic array (DPEIS at 4-47) – a statement that evinces a fundamental misunderstanding of how airgun noise propagates.

Assessing masking effects is essential to a reasoned consideration of impacts and alternatives, and BOEM's failure even to apply a relevant, published model that NOAA's scientists helped develop and that is being used by NOAA, Cornell, BP, the North Slope Borough, the University of California, and St. Andrews University in other regions plainly violates NEPA.

3. Failure to set proper thresholds for hearing loss

The DPEIS appears to estimate cases of temporary threshold shift, or hearing loss, in two ways: by using the original NMFS threshold of 180 dB (SPL), and by applying the hybridized standards set forth in Southall et al. (2007) for different marine mammal functional hearing groups.[132] Unfortunately, BOEM's particular use of Southall et al. (2007) neglects the modifications that have since been made to these standards, by Dr. Southall and the U.S. Navy, in light of new scientific information.

First, BOEM must modify its standard for high-frequency cetaceans to account for new threshold shift data on harbor porpoises. The new data show that harbor porpoises experience threshold shift on exposure to airgun signals at substantially lower levels than the two mid-frequency cetaceans (bottlenose dolphins and beluga whales) on which the Southall et al. acoustic criteria were based.[133] Given similarities between the harbor porpoise ear and that of other high-frequency cetaceans, both the U.S. Navy – in its recent DEISs for the Atlantic Fleet and the Southern California and Hawaii Range Complexes, and in a related technical report prepared by SPAWAR – and Dr. Southall and colleagues from St. Andrew's University, in their Environmental Impact Report for a seismic survey off the central California coast, have significantly reduced the temporary and permanent threshold shift criteria for all high-frequency cetaceans.[134] BOEM must do the same.

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[132] Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran. J.J., Gentry, R.L., Greene, C.R., Jr., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A., and Tyack, P.L., Marine mammal noise exposure criteria: Initial scientific recommendations, *Aquatic Mammals* 33:411-521 (2007).

[133] 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).

[134] Finneran, J.J., and Jenkins, A.K., Criteria and thresholds for U.S. Navy acoustic and explosive effects analysis (Apr. 2012) (available at the aftteis.com website); Navy, Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for Atlantic Fleet Training and Testing (2012); Navy, Hawaii-Southern California Training and Testing Activities Draft Environmental Impact Statement/ Overseas Environmental Impact Statement (2012); California State Lands Commission, Draft Environmental Impact Report (EIR) for the Central Coastal California Seismic Imaging Project at Chap. 4.4 and App. H (2012) (CSLC EIR No. 758) (includes report from Dr. Southall and colleagues at St. Andrews University).

Second, and similarly, BOEM must modify its Southall et al. standard for low-frequency cetaceans: the baleen whales. New data from SPAWAR indicates that mid-frequency cetaceans have greater sensitivity to sounds within their best hearing range than was supposed at the time Southall et al. was published.[135] It is both conservative and consistent with the methodology of that earlier paper to assume that low-frequency cetaceans, which have never been studied for threshold shift, also have greater sensitivity to sounds within their own best hearing range.[136] For this reason and others, Dr. Southall and his St. Andrew's colleagues reduced the threshold shift criteria for baleen whales exposed to airgun noise, in the report they recently produced for the California State Lands Commission.[137] Again, BOEM should do the same.

Hearing loss remains a very significant risk where, as here, the agency has not required aerial or passive acoustic monitoring as standard mitigation, appears unwilling to restrict operations in low-visibility conditions, has set safety zone bounds that are inadequate to protect high-frequency cetaceans, and has not firmly established seasonal exclusion areas for biologically important habitat. BOEM should take a conservative approach and apply the more precautionary standard, once the necessary modifications to Southall et al. (2007) have been made.

4. Failure to set proper thresholds for mid-frequency sources

BOEM has also failed to set appropriate take thresholds for sub-bottom profilers and other active acoustic sources.

As NMFS's Open Water Panel has indicated, some sub-bottom profilers used in Arctic oil and gas surveys have source levels and frequency ranges approaching that of certain active military sonar systems, with shorter intervals between pings.[138] Indeed, the chirp systems analyzed in the DPEIS (DPEIS at D-28) have threshold source levels close to that of the Navy's SQS-56 mid-frequency, hull-mounted sonar.[139] Additionally, these levels vastly exceed those analyzed for similar chirp systems used in HRG surveys for renewables, according to BOEM's recent programmatic EA for mid-Atlantic offshore wind.[140] BOEM's use of a 160 dB threshold under these circumstances is inappropriate. While we do not recommend the application of the Navy's generalized risk functions for mid-frequency sonar, enough data are available for some taxa to indicate species-specific thresholds. For purposes of authorizing mid-frequency sonar training, NMFS assumes that harbor porpoises are taken at received levels above 120 dB (RMS); and the Navy has adopted a 140 dB (RMS) threshold for beaked whales based on the findings of Tyack

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[135] Finneran and Jenkins, Criteria and thresholds, *supra*.

[136] *See* discussion in California State Lands Commission, Draft Environmental Impact Report at H-46, *supra*.

[137] *Id*. at 4.4-49 to 4-50 and H-46; *see also* PDEIS at 4-51 (noting need to reassess TTS in light of SPAWAR data).

[138] *See* Expert Panel Review 2011.

[139] *See*, *e.g.*, 74 Fed. Reg. 4,844 (Jan. 27, 2009); U.S. Navy, Final Atlantic Fleet Active Sonar Training Environmental Impact Statement/ Overseas Environmental Impact Statement (2008).

[140] *Cf.* BOEM, Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New Jersey, Delaware, Maryland, and Virginia: Final Environmental Assessment at 28 (2012) (OCS EIS/EA BOEM 2012-003). The chirpers analyzed for wind farm HRG surveys have a source level of 201 dB.

et al. (2011).[141] At minimum, BOEM should adopt these specific thresholds for the mid-frequency acoustic sources considered in the DPEIS.

Furthermore, while the DPEIS does not provide ping intervals for sub-bottom profilers, the EA suggests that these sources may sound several times each second. It would be absurd to treat them as non-continuous sources.

C. Failure to Set Adequate Source Levels for Propagation Analysis

The DPEIS posits 230 dB (RMS) as a representative source level for purposes of modeling takes from large airgun arrays and 210 dB (RMS) for modeling takes from small arrays. DPEIS at 3-26. We see two significant issues with these assumptions.

First, as with behavioral risk thresholds, using the root mean square ("RMS") rather than peak pressure to estimate source levels for airguns is non-conservative and may not be biologically appropriate. The issue is not trivial: as Madsen 2005 observes, the RMS approach can result in underestimates of take of intense, impulsive sounds, depending on which method is used to calculate RMS and whether propagation takes place in a highly reverberant environment.[142] We recommend that BOEM use peak-pressure, or dual criteria of peak-pressure and RMS, to determine behavioral take for the impulsive component of the airgun source. Alternatively – and at the very least – BOEM should use the most biologically conservative method of determining RMS. According to Madsen's analysis, that method is likely to be the one followed by Madsen

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[141] *Id.*; 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). *See also* Miller, P.J., Kvadsheim, P., Lam., F.-P.A., Tyack, P.L., Kuningas, S., Wensveen, P.J., Antunes, R.N., Alves, A.C., Kleivane, L., Ainslie, M.A., and Thomas, L., Developing dose-response relationships for the onset of avoidance of sonar by free-ranging killer whales (*Orcinus orca*), presentation given at the Society for Marine Mammalogy Biennial Conference, Tampa, Florida, Dec. 2, 2011 (killer whales); Miller, P., Antunes, R., Alves, A.C., Wensveen, P., Kvadsheim, P., Kleivane, L., Nordlund, N., Lam, F.-P., van IJsselmuide, S., Visser, F., and Tyack, P., The 3S experiments: studying the behavioural effects of navy sonar on killer whales (*Orcinus orca*), sperm whales (*Physeter macrocephalus*), and long-finned pilot whales (*Globicephala melas*) in Norwegian waters, Scottish Oceans Institute Tech. Rep. SOI-2011-001, *available at* soi.st-andrews.ac.uk (killer whales). *See also*, *e.g.*, Fernández, A., Edwards, J.F., Rodríguez, F., Espinosa de los Monteros, A., Herráez, P., Castro, P., Jaber, J.R., Martín, V., and Arbelo, M., 'Gas and Fat Embolic Syndrome' Involving a Mass Stranding of Beaked Whales (Family Ziphiidae) Exposed to Anthropogenic Sonar Signals, *Veterinary Pathology* 42:446 (2005); Jepson, P.D., Arbelo, M., Deaville, R., Patterson, I.A.P., Castro, P., Baker, J.R., Degollada, E., Ross, H.M., Herráez, P., Pocknell, A.M., Rodríguez, F., Howie, F.E., Espinosa, A., Reid, R.J., Jaber, J.R., Martín, V., Cunningham, A.A., and Fernández, A., Gas-Bubble Lesions in Stranded Cetaceans, 425 *Nature* 575-576 (2003); Evans, P.G.H., and Miller, L.A., eds., Proceedings of the Workshop on Active Sonar and Cetaceans (2004) (European Cetacean Society publication); Southall, B.L., Braun, R., Gulland, F.M.D., Heard, A.D., Baird, R.W., Wilkin, S.M., and Rowles, T.K., Hawaiian Melon-Headed Whale (*Peponacephala electra*) Mass Stranding Event of July 3-4, 2004 (2006) (NOAA Tech. Memo. NMFS-OPR-31).

[142] Madsen, P.T., Marine mammals and noise: Problems with root-mean-squared sound pressure level for transients, *Journal of the Acoustical Society of America* 117:3952-57 (2005).

et al. (2002) and Møhl et al. (2003), which involves applying -3 dB end points relative to the wave form envelope.[143]

Second, it is not self-evident that using a single representative or average source level for large or small arrays is a reasonable and sufficiently conservative approach to BOEM's take analysis. As the DPEIS recognizes, the effective source levels of industry arrays may run considerably higher or lower than the one used in its modeling, up to or beyond 255 dB (zero-to-peak) for a large array (DPEIS at D-12). Given that impact areas grow exponentially with increases in source levels, the undercount that would result from excluding surveys with higher source levels could significantly exceed the overcount that would result from excluding surveys with lower source levels. For this reason, BOEM should conduct a sensitivity analysis to ensure that any representative source level, or levels, chosen for modeling do not negatively bias the analysis towards an undercount of take. If there is negative bias, the agency should modify the source level, or levels, and either rerun the model or use a conservative corrective factor to estimate take.

D. Failure to Adequately Assess Impacts on the North Atlantic Right Whale

In its consideration of potential environmental impacts, the DPEIS rightly pays special attention to the highly endangered North Atlantic right whale (*Eubalaena glacialis*), which is considered to be one of the most endangered species of large whales in the world. Indeed, as the National Marine Fisheries Service ("NMFS") has repeatedly stated, "the loss of even a single individual [North Atlantic right whale] may contribute to the extinction of the species" and "preventing the mortality of one adult female a year" may alter this outcome. 69 Fed. Reg. 30,857, 30,858 (June 1, 2004); *see also* 73 Fed. Reg. 60,173, 60,173 (Oct. 10, 2008); 72 Fed. Reg. 34,632, 34,632 (June 25, 2007); 66 Fed. Reg. 50,390, 50,392 (Oct. 3, 2001).

The affected planning areas contain both the majority of the right whale's migratory corridor and the species' only known calving ground. NMFS has characterized the latter as "a location vital to the population" and "a very high-risk area for pregnant females, new mothers, and calves."[144] Waters from the Altamaha River in Georgia (north of Brunswick) to San Sebastian Inlet in Florida (south of Melbourne) are federally-designated as critical habitat, specifically to protect it. *See* 59 Fed. Reg. 28,793, 28,803 (June 3, 1994). In addition, these and other waters in the southeast have been designated as special management areas to protect right whales from significant threats, such as ship-strikes and gillnet fishing. *See*, *e.g.*, 73 Fed. Reg. 60,173; 72 Fed. Reg. 34,632. In September 2009, several major conservation organizations petitioned NMFS to expand right whale critical habitat, to include the migratory corridor within 30 nautical miles of shore (from the southern border of Massachusetts to the border between North and

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[143] *Id.* *See also* Madsen, P.T., Møhl, B., Nielsen, B.K., and Wahlberg, M., "Male sperm whale behavior during exposures to distant seismic survey pulses," *Aquatic Mammals* 28:231–240 (2002); Møhl, B., Wahlberg, M., Madsen, P.T., Heerfordt, A., and Lund, A., "The monopulsed nature of sperm whale clicks," *Journal of the Acoustical Society of America* 114:1143–1154 (2003).

[144] NMFS, Final Environmental Impact Statement to Implement Vessel Operational Measures to Reduce Ship Strikes to North Atlantic Right Whales at 4-4 (Aug. 2008).

South Carolina) as well as additional calving areas adjacent to existing critical habitat, based on substantial new information about their biological importance.[145]

As discussed above, a single seismic source can significantly reduce right whale communication range on a population scale. Recent modeling from Cornell and NOAA shows the right whale to be particularly vulnerable to masking effects from airguns and other low-frequency noise given the acoustic and behavioral characteristics of its calls.[146] Seismic surveys in the Mid-Atlantic and South Atlantic planning areas would add cumulatively to the high levels of noise that right whales already experience from commercial shipping in their foraging grounds and along their migratory route, from LNG tanker traffic through their northeast critical habitat, and from Navy antisubmarine warfare training, which is expected to increase near their calving grounds with the construction of a new instrumented training range off Jacksonville, Florida. The advent of airgun noise on top of these other acoustic intrusions could significantly affect right whale vital rates over large scales. For example, modeling of right whale foraging in the Great South Channel, an area subject to high levels of ship traffic, has found that decrements in the whales' sensory range had a larger impact on food intake than even patch-density distribution, and are likely to compromise fitness in this endangered species.[147]

In addition to the threat of noise impacts to right whales, G&G surveying also poses the risk of increasing ship strikes, the leading cause of death for right whales. More than half (10 out of 14) of the post-mortem findings for right whales that died from significant trauma in the northwest Atlantic between 1970 and 2002 indicated that vessel collisions were a contributing cause of death (in the cases where presumed cause of death could be determined);[148] and these data are likely to grossly underestimate the actual number of animals struck, as animals struck but not recovered, or not thoroughly examined, cannot be accounted for.[149] Further, some types of anthropogenic noise have been shown to induce near-surfacing behavior in right whales, increasing the risk of ship-strike at relatively moderate levels of exposure, as noted in the next section below. It is possible that mid-frequency sub-bottom profilers and broadband airguns could produce the same effects, and both should be treated conservatively.

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[145] Center for Biological Diversity, Defenders of Wildlife, Humane Society of the United States, Ocean Conservancy, and Whale and Dolphin Conservation Society, Petition to Revise the Critical Habitat Designation for the North Atlantic Right Whale (*Eubalaena Glacialis*) under the Endangered Species Act (Sept. 16, 2009) (submitted to Commerce and NOAA Fisheries).

[146] 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.

[147] Mayo, C.S., Page, M., Osterberg, D., and Pershing, A., On the path to starvation: The effects of anthropogenic noise on right whale foraging success, North Atlantic Right Whale Consortium: Abstracts of the Annual Meeting (2008).

[148] Moore, M. J., Knowlton, A.R., Kraus, S.D., McLellan, W.A., and Bonde, R.K., Morphometry, gross morphology and available histopathology in North Atlantic right whale (*Eubalena glacialis*) mortalities (1970-2002), *Journal of Cetacean Research and Management* 6:199-214 (2004).

[149] Reeves, R.R., Read, A., Lowry, L., Katona, S.K., and Boness, D.J., Report of the North Atlantic right whale program review, 13–17 March 2006, Woods Hole, Massachusetts (2007) (prepared for the Marine Mammal Commission).

While the DPEIS proposes two time-areas closures to reduce impacts on right whales, these measures are inadequate to address the impacts described here, for reasons discussed earlier in these comments Nor does the DPEIS provide any quantitative or even detailed qualitative analysis of masking effects or other cumulative, sub-lethal impacts on right whales. BOEM has again violated NEPA.

E. Failure to Consider Potential for Death and Serious Injury of Marine Mammals

While the DPEIS acknowledges the potential for injury, and indeed allows that some marine mammals will undergo permanent threshold shift as a result of the activity, it improperly dismisses the risk of mortality and serious injury from acoustic impacts.

First, the DPEIS fails entirely to consider the adverse synergistic effect that at least some types of anthropogenic noise can have on ship-strike risk. Mid-frequency sounds with frequencies in the range of some sub-bottom profilers have been shown to cause North Atlantic right whales to break off their foraging dives and lie just below the surface, increasing the risk of vessel strike.[150]

Second, as noted above (and contrary to representations in the DPEIS), a number of recent studies indicate that anthropogenic sound can induce permanent threshold shift at lower levels than anticipated.[151] Hearing loss remains a significant risk where, as here, the agency has not required aerial or passive acoustic monitoring as standard mitigation, appears unwilling to restrict operations in low-visibility conditions, and has not established seasonal exclusion areas for biologically important habitat other than designated critical habitat for right whales.

Third, the DPEIS wrongly discounts the potential for marine mammal strandings, even though at least one stranding event, the September 2002 stranding of beaked whales in the Gulf of California, is tightly correlated with geophysical survey activity; and even though high-intensity sounds in general have long been used by drive fisheries to force marine mammals ashore.[152]

Fourth, and finally, as noted above, the DPEIS makes no attempt to assess the long-term effects of chronic noise and noise-related stress on life expectancy, survival, and recruitment although proxies are available from the literature on terrestrial mammals and other sources. The need for precautionary analysis in this regard is manifest, given BOEM's failure to commit to any

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[150] Nowacek, D.P., Johnson, M.P., and Tyack, P.L., North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli, *Proceedings of the Royal Society of London, Part B: Biological Sciences* 271:227 (2004).

[151] 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); 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).

[152] 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); 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).

substantial long-term monitoring program in the DPEIS – and the probability that even with an effective monitoring program, catastrophic declines in some Atlantic populations would remain likely to go unobserved.[153]

The DPEIS must be revised conservatively to account for potential mortality of marine mammals in the short- and long-term.

F. Failure to Adequately Assess Cumulative Impacts of the Activity

Here as elsewhere, the DPEIS analysis is anemic. The document makes no attempt to analyze the cumulative and synergistic effects of masking, energetic costs, stress, hearing loss, or any of the other impact mechanisms identified over the last several years,[154] whether for its own action alternatives or for the combined set of activities it identifies in its "cumulative impact scenario." Instead, for each of six sources of impacts, it strings a few unsupported and indeed baseless assumptions together – *e.g.*, that mitigation measures largely dependent on visual detection will eliminate "most" Level A takes, that "no significant noise impacts" would occur, that there is "no evidence of ambient noise levels approaching a threshold" where marine mammals might be significantly affected – and concludes that cumulative impacts would be "negligible" to "minor." *E.g.*, DPEIS at 4-62 to 4-65. This bare-bones approach disregards available information and analytical methodologies that are clearly relevant to an analysis of reasonably foreseeable impacts. 40 C.F.R. § 1502.22.

(1) Qualitative or detailed qualitative assessment.— Over the last several years, the scientific community has identified a number of pathways by which anthropogenic noise can affect vital rates and populations of animals. These conceptual models include the 2005 National Research Council study, which produced a model for the Population Consequences of Acoustic Disturbance; an ongoing Office of Naval Research program whose first phase has advanced the NRC model; and the 2009 Okeanos workshop on cumulative impacts.[155] The DPEIS employs none of these methods, and even in its qualitative analysis does not attempt to analyze any pathway of impact.

(2) Models of masking effects.— As noted above, bioacousticians at NOAA and Cornell have developed a quantitative model to assess loss of communication

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

[154] National Research Council, Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects (2005); Wright, A.J. ed., Report on the workshop on assessing the cumulative impacts of underwater noise with other anthropogenic stressors on marine mammals: from ideas to action, proceedings of workshop held by Okeanos Foundation, Monterey, California, August 26-29, 2009 (2009).

[155] *Id.*.

space over time from both commercial shipping and seismic exploration.[156] Incredibly, the DPEIS does not model for masking effects.

(3) Energetics.— Researchers have studied the impacts of various types of noise on the foraging success of killer whales and sperm whales. Both species were shown to experience significant decrements in foraging, of 18-19% and greater, within areas of obvious biological importance.[157] The DPEIS fails to consider the impacts of noise on foraging and energetics; indeed, despite its own recognition that animals who remain on their feeding grounds may suffer adverse impacts over time, it repeatedly characterizes "observed" impacts as minor and short-term. *E.g.,* DPEIS at 4-55. Based on the published evidence, for example, the DPEIS should conservatively assume that animals that are not evidently displaced from their feeding grounds nonetheless experience a significant decrement in foraging, of at least 20%, at received levels of 140 dB and greater.

(4) Chronic noise.— NOAA's Underwater Sound-Field Working Group has generated cumulative noise maps on ambient noise from ships around the world and on seismic surveys in the Gulf of Mexico, and noise maps covering individual seismic surveys, military training exercises, and piledriving activity.[158] The draft EIS has not incorporated any of this quantitative information into its cumulative impact analysis.

(5) Stress.— Following from studies on terrestrial mammals, stress from ocean noise—alone or in combination with other stressors—may weaken a cetacean's immune system, interfere with brain development, increase the risk of myocardial infarctions, depress reproductive rates, cause malformations and other defects in young, all at moderate levels of exposure.[159] Because physiological stress response is highly

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[156] 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); 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).

[157] Lusseau, D., Bain, D.E., Williams, R., and Smith, J.C., Vessel traffic disrupts the foraging behavior of southern resident killer whales *Orcinus orca*, *Endangered Species Research* 6: 211-221 (2009); Williams, R., Lusseau, D. and Hammond, P.S., Estimating relative energetic costs of human disturbance to killer whales (Orcinus orca), *Biological Conservation* 133: 301-311 (2006); 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). *See also* Mayo, C.S., Page, M., Osterberg, D., and Pershing, A., On the path to starvation: the effects of anthropogenic noise on right whale foraging success, North Atlantic Right Whale Consortium: Abstracts of the Annual Meeting (2008) (finding that decrements in North Atlantic right whale sensory range due to shipping noise have a larger impact on food intake than patch-density distribution and are likely to compromise fitness).

[158] NOAA, Cetecean and Sound Mapping, *available at* www.st.nmfs.noaa.gov/cetsound (previewed at May NOAA symposium).

[159] *See, e.g.,* Chang, E.F., and Merzenich, M.M., Environmental Noise Retards Auditory Cortical Development, 300 *Science* 498 (2003) (rats); Willich, S.N., Wegscheider, K., Stallmann, M., and Keil, T., Noise Burden and the Risk of Myocardial Infarction, *European Heart Journal* (2005) (Nov. 24, 2005) (humans); Harrington, F.H., and Veitch,

conserved across species, it is reasonable to assume that marine mammals would be subject to the same effects, particularly if, as here, they are exposed repeatedly to noise from oil and gas exploration and other stressors.[160] Indeed, a recent New England Aquarium study of North Atlantic right whales, the closest relative of the bowhead whale, indicates that shipping noise alone can induce chronic stress in marine mammals.[161] The DPEIS, while acknowledging the potential for chronic stress to significantly affect marine mammal health, and while expecting that anthropogenic noise would induce physiological stress responses in marine mammals, does not incorporate chronic stress into its cumulative impact analysis, such as by using other species as proxies for lower life expectancies.

(6) Impacts from other sources.— While it lists numerous other reasonably foreseeable activities that stand to impact the same animal populations (DPEIS at 3-36 to 3-43), the DPEIS makes no attempt to incorporate their effects into its cumulative analysis. Perhaps most prominently, though it notes that naval activities will take increasing numbers of marine mammals in the region, BOEM nowhere accounts for the many millions of takes, including thousands of mortalities and serious injuries and hundreds of thousands of cases of threshold shift, that the Navy presently estimates will occur between January 2014 and January 2019 as a result of its Atlantic training and testing activities.[162] The lack of analysis is not supportable under NEPA.

The data already show that industrial noise can disrupt biologically significant behavior and shrink whale communication range on a region-wide scale. As Dr. Chris Clark (Cornell) postulated in a report of the International Whaling Commission's Scientific Committee, such repeated and persistent acoustic insults over the large areas affected by airgun surveys alone should be considered enough to cause population-level impacts in at least some species of marine mammals.[163] That analysis has since been underscored by additional quantitative analysis.[164]

A.M., Calving Success of Woodland Caribou Exposed to Low-Level Jet Fighter Overflights, *Arctic* 45:213 (1992) (caribou).

[160] A special issue of the International Journal of Comparative Psychology (20:2-3) is devoted to the problem of noise-related stress response in marine mammals. For an overview published as part of that volume, *see, e.g.,* A.J. Wright, N. Aguilar Soto, A.L. Baldwin, M. Bateson, C.M. Beale, C. Clark, T. Deak, E.F. Edwards, A. Fernández, A. Godinho, L. Hatch, A. Kakuschke, D. Lusseau, D. Martineau, L.M. Romero, L. Weilgart, B. Wintle, G. Notarbartolo di Sciara, and V. Martin, Do marine mammals experience stress related to anthropogenic noise? (2007).

[161] Rolland, R.M., Parks, S.E., Hunt, K.E., Castellote, M., Corkeron, P.J., Nowacek, D.P., Wasser, S.K., and Kraus, S.D., Evidence that ship noise increases stress in right whales, *Proceedings of the Royal Society B: Biological Sciences* doi:10.1098/rspb.2011.2429 (2012).

[162] Navy, Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for Atlantic Fleet Training and Testing (2012).

[163] 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).

[164] 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); Clark, C., and Rice, A., Seismic airgun surveys and marine vertebrates (2012) (presentation given June 12, 2012 to the Mid-Atlantic Fishery Management Council); NOAA, Cetecean and Sound Mapping, *available at*

The DPEIS' summary conclusions to the contrary are made without support, and without even attempting to address data gaps through methods accepted within the scientific community.[165]

G. Failure to Adequately Define Impact Levels

For each resource, the DPEIS provides specific impact criteria, which are then used to determine whether the overall effect on the resource qualifies as "negligible," "minor," "moderate," or "major." DPEIS at 4-44, 4-50. Unfortunately, as the ultimate measure of potential effects, these descriptors, as stated and as applied, are problematic in the extreme. They do not incorporate all of the factors relevant to NEPA "significance" analysis; and insofar as they reflect standards embodied in other statutes, such as the Marine Mammal Protection Act and Endangered Species /Act, they are fundamentally misapplied.

(1) As BOEM states at the outset, the DPEIS is intended to provide the information necessary for agency compliance with the Marine Mammal Protection Act, Endangered Species Act, and other statutes, as well as the Outer Continental Shelf Lands Act and NEPA. DPEIS at vii. This approach comports with applicable caselaw. Courts have observed that, when an action is taken pursuant to a specific statute, not only do "the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in an EIS," but "the statutory objectives underlying the agency's action work significantly to define its analytic obligations." *Oregon Natural Desert Ass'n v. BLM*, 625 F3d 1092, 1109 (9th Cir. 2010). Indeed, agencies are required by NEPA to explain how alternatives in an EIS will meet requirements of "other environmental laws and policies." 40 C.F.R. § 1502.2(d). But that does not remove the obligation to evaluate significance according to the factors articulated in CEQ's regulations: e.g., "(3) "Unique characteristics of the geographic area," including "ecologically critical areas"; (4) the degree to which impacts "are likely to be highly controversial"; and (5) the degree to which potential impacts "are highly uncertain or involve unique or unknown risks. 40 C.F.R. § 1508.27. Although a defined threshold is particularly needed when an agency prepares an EA, it has consequences here given the programmatic nature of the analysis. BOEM and NMFS may later incorporate portions of the EIS by reference, and under such circumstances, it will be critical to understand the import of the analysis within the context of an established threshold. For that, incorporating the NEPA significance factors is essential.

(2) As noted above, NEPA regulations require agencies to explain how alternatives meet the requirements of other applicable statutes. 40 C.F.R. § 1502.2(d). And yet BOEM, while referencing elements of the MMPA's "negligible impact" standard, does not appear to apply the relevant OCSLA standard, "undue harm," anywhere in the DPEIS. *See* 43

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www.st.nmfs.noaa.gov/cetsound (previewed at May NOAA symposium, showing vast increase in equivalent noise level (L_{EQ}) of ambient noise from seismic in Gulf of Mexico, averaged over one year).

[165] 40 C.F.R. § 1502.22. *See also* Bejder, L., Samuels, A., Whitehead, H., Finn, H., and Allen, S., Impact assessment research: use and misuse of habituation, sensitization and tolerance in describing wildlife responses to anthropogenic stimuli, *Marine Ecology Progress Series* 395:177-185 (2009).

U.S.C. § 1340(a). The omission is puzzling given the DPEIS' ostensible aim of supporting permitting decisions made under OCSLA. DPEIS at vii. BOEM should consider "undue harm" into its analysis.

(3) The DPEIS, having incorporated the MMPA's "negligible impact" standard into its significance criteria, fails completely to apply it. In practice, the document does not provide, for example, the necessary information for determining whether any of the proposed alternatives will have a greater than negligible impact on any marine mammal stock. 16 U.S.C. § 1371(a)(5)(D)(i)(I). Instead, the DEIS offers qualitative conclusions, made without any apparent support or indeed any apparent attempt at assessing the cumulative impacts of the activity. For example, Level B takes are considered to result in only "moderate" impacts, even though the surveys "would affect a large number of individuals," since "it is presumed that exposure to elevated sound would be somewhat localized and temporary in duration." DPEIS at 4-55. Not only does this analysis make assumptions about behavioral response and take thresholds that are inconsistent with the available literature, it makes no attempt to translate short-term behavioral impacts into long-term impacts on populations – a failure that violates NEPA. 40 C.F.R. § 1508.7. The 2006 programmatic environmental assessment for seismic surveying in the Arctic incorporated the MMPA "negligible impact" standard by using "potential biological removal" to determine the number of harassed whales that could affect the population's rates of survival and recruitment.[166] The recent Draft Environmental Impact Report, by the California State Lands Commission, for seismic surveys off the Diablo Canyon nuclear reactor site develops another methodology for evaluating a project's cumulative Level A and Level B impacts against the MMPA standard.[167] BOEM must improve its analysis.

H. Failure to Analyze Impacts on Fish and Other Species of Concern

The activities considered in the DPEIS have potential to detrimentally affect multiple fish species, harm vital fish habitat, and conflict with multiple fisheries.

As an initial matter, the DPEIS's consideration of impacts does not give adequate weight to the effects of repeated seismic testing and other activities on the behavior of fish and invertebrates. For instance, the DPEIS dismisses temporary hearing loss in fish as a minor effect without considering whether the hearing loss may be permanent or whether even a temporary loss of hearing renders the fish vulnerable to predation, unable to locate food, or unable to locate a mate.[168] In addition, sublethal disturbance that causes fish to avoid key feeding or spawning

[166] MMS, Final Programmatic Environmental Assessment, Arctic Outer Continental Shelf Seismic Surveys – 2006, OCS EIS/EA MMS 2006-038 at 36-37 (June 2006) (2006 PEA), *available at* http://www.alaska.boemre.gov/ref/EIS%20EA/Final_PEA/Final_PEA.pdf.

[167] California State Lands Commission, Draft Environmental Impact Report (EIR) for the Central Coastal California Seismic Imaging Project at Chap. 4.4 and App. H (2012) (CSLC EIR No. 758).

[168] *See* 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) (industry-sponsored study undertaken

areas could have a detrimental effect on the population of the species itself. For example, the DPEIS acknowledges that the activities it describes could disrupt feeding by Atlantic sturgeon, which is listed under the Endangered Species Act because its numbers are critically low. DPEIS at 4-131, 4-138. Yet it gives virtually no consideration to what effect disrupted feeding and effects benthic habitat will have when added to the species' ongoing struggle to survive in severely degraded, limited habitat. The DPEIS does not even consider the impacts such as masking, and silencing of fish vocalizations, may have on fish breeding success. For example, masking of black drum fish and toadfish choruses, which overlap with the low-frequency output of seismic airguns, could significantly impair breeding in those species.[169]

In the case of coastal pelagic species, also known as forage species, the action's adverse effects could ripple through the food chain. The DPEIS acknowledges that forage species are often very sensitive to sound and tend to avoid the sort of noise generated by G&G activities. DPEIS at 4-131. These species, such as herring, alewife, and others, comprise an important part of the diets of many predatory fish, including tuna and swordfish. Changes in aggregation behavior or movements of forage species could reduce the available food for predatory species, reducing their fitness and numbers and potentially causing them to shift their own movement patterns in response. Any such effects on predatory fish species would likely adversely affect the commercial and recreational fisheries that depend on them. Nor does the PDEIS assess the impact of G&G activities on invertebrates, such as cephalopods like squid and octopus, even though a number of studies have demonstrated that seismic and other low-frequency sound sources can disrupt, injure, and kill these taxa.[170]

Indeed, airgun surveys are known to significantly affect the distribution of some fish species, which can impact commercial and recreational fisheries and could also displace or reduce the foraging success of marine mammals that rely on them for prey. Indeed, as one study has noted, fishermen in various parts of the world have complained for years about declines in their catch rates during oil and gas airgun surveys, and in some areas have sought industry compensation for their losses.[171] Airguns have been shown experimentally to dramatically depress catch rates of some commercial fish species, by 40 to 80% depending on catch method, over thousands of

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by researchers at the Curtin University of Technology, Australia); 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); *see also* 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).

[169] Clark, C., and Rice, A., Seismic airgun surveys and marine vertebrates (2012) (presentation given June 12, 2012 to the Mid-Atlantic Fishery Management Council).

[170] André, M., Solé, M., Lenoir, M., Durfort, M., Quero, C., Mas, A., Lombarte, A., van der Schaar, M., López-Bejar, M., Morell, M., Zaugg, S., and Houégnigan, L., Low-frequency sounds induce acoustic trauma in cephalopods, *Frontiers in Ecology and the Environment* 2011: doi:10.1890/100124 (2011); Guerra, A., and Gonzales, A.F., Severe injuries in the giant squid *Architeuthis dux* stranded after seismic explosions (2006) (paper presented at International Workshop on the Impacts of Seismic Survey Activities on Whales and Other Marine Biota, convened by German Federal Environment Agency, Sept. 6-7, 2006, Dessau, Germany); McCauley *et al.*, Marine seismic surveys: analysis and propagation of air-gun signals, and effects of air-gun exposure.

[171] McCauley *et al.*, Marine seismic surveys: analysis and propagation of air-gun signals, and effects of air-gun exposure.

square kilometers around a single array.[172] Large-scale displacement is likely to be responsible for the fallen catch rates: studies have shown both horizontal (spatial range) and vertical (depth) displacement in a number of other commercial species on a similar spatial scale.[173] Impacts on fisheries were found to last for some time beyond the survey period, not fully recovering within 5 days of post-survey monitoring.[174] Airguns also have been shown to substantially reduce catch rates of rockfish, at least to the distances (less than 5 km) observed in the experiment.[175] Yet the DPEIS – which acknowledging that displacement can increase the risk of predation, disrupt fish spawning and reproduction, alter migration routes, and impact feeding – appears to assume without support that effects on both fish and fisheries would be localized and "minor." PDEIS at 4-120.

In short, the DPEIS fails to recognize the scale of seismic survey impacts on commercial fish species, does not assess impacts of decreased prey availability on marine mammals, ignores the potential for acoustic impacts on Essential Fish Habitat – and, finally, fails to consider measures to mitigate these impacts, such as excluding surveys from spawning areas and other areas of biological importance to Arctic fish species. BOEM must improve its scant analysis.[176]

I. Failure to Adequately Consider Issues Related to Climate Change

The analysis related to the effects of climate change is faulty in a two key respects: (1) it fails to analyze the direct and indirect effects of the proposed action on climate change and ocean acidification, and (2) it fails to explain how the proposed action will impact the marine environment against the backdrop of ocean warming and acidification. Yet NEPA requires analysis of the direct and indirect effects of greenhouse gas ("GHG") emissions and their consequences for climate change. Indeed, proposed guidance by CEQ concludes that the NEPA

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[172] 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* Løkkeborg, S., Ona, E., Vold, A., Pena, H., Salthaug, A., Totland, B., Øvredal, J.T., Dalen, J. and Handegard, N.O., Effects of seismic surveys on fish distribution and catch rates of gillnets and longlines in Vesterålen in summer 2009 (2010) (Institute of Marine Research Report for Norwegian Petroleum Directorate).

[173] Slotte, A., Hansen, K., Dalen, J., and Ona, E., Acoustic mapping of pelagic fish distribution and abundance in relation to a seismic shooting area off the Norwegian west coast, *Fisheries Research* 67:143-150 (2004).

[174] Engås *et al.*, Effects of seismic shooting.

[175] 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).

[176] Additionally, BOEM must consider the impacts of seismic surveys and other activities on invertebrates. *See*, *e.g.*, 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); André, M., Solé, M., Lenoir, M., Durfort, M., Quero, C., Mas, A., Lombarte, A., van der Schaar, M., López-Bejar, M., Morell, M., Zaugg, S., and Houégnigan, L., Low-frequency sounds induce acoustic trauma in cephalopods, *Frontiers in Ecology and the Environment* doi:10.1890/100124 (2011); Guerra, A., and Gonzales, A.F., Severe injuries in the giant squid *Architeuthis dux* stranded after seismic explorations, *in* German Federal Environment Agency, International Workshop on the Impacts of Seismic Survey Activities on Whales and Other Marine Biota at 32-38 (2006);

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."[177]

First, 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. While the DPEIS acknowledges that survey vessels and aircraft involved in G&G activities would emit greenhouse gas pollution, it never quantifies or evaluates the impact of those emissions. *See* DPEIS at 4-4. Additionally, the DPEIS cannot ignore the greenhouse gases that will be released in to the atmosphere as a result of the oil and gas produced as a result of the exploration activities authorized here. NEPA requires that agencies consider a proposed action's future indirect effects, which are those "caused by an action and are later in time or farther removed in distance, but are still reasonably foreseeable." 40 C.F.R. § 1508.8(b). The stated need for the action is to determine the extent and location of oil and gas reserves to facilitate oil and gas development. DPEIS at 1-8. Accordingly, BOEM must calculate not only the greenhouse gas emissions from the vessels and activities used for the G&G operations, but the impacts of the greenhouse gases emitted from the produced oil and gas reserves.

Second, the DPEIS fails to explain how its G&G activities will impact marine species and ecosystems that are already compromised by rapid climate change and ocean acidification. The DPEIS' cursory description of climate change and ocean acidification, which concludes without analysis that the environmental effects are likely to be small, incremental, and difficult to discern from effects of other natural and anthropogenic factors (DPEIS at 3-43), falls short of the hard look required by NEPA. Moreover, simply stating, in the cumulative impacts section, that climate change is a broad cumulative impact is inadequate and does nothing to examine the relevance of the proposed action to that cumulative effect. *See*, *e.g.*, DPEIS at 4-21, 4-62, 4-85, 4-102, 4-122, 4-135, 4-150, 4-158, 4-164, 4-170, 4-183, 4-199, 4-212. For example, the analysis fails to evaluate the project in light of the increasing frequency and strength of hurricanes in the Atlantic, increasing sea level rise along the Atlantic seaboard, and stress to marine species from ocean warming and acidification that will be compounded by risks from oil and gas exploration and development.

1. Climate change impacts requiring analysis

Climate change is already resulting in warming temperatures, rising sea levels, and increases in the frequency of extreme weather events, particularly heat waves and extreme precipitation events.[178] The average temperature in the United States rose more than 2°F over the past 50 years; by the end of this century, it is expected to increase by 4 to 6.5°F under a lower emissions

[177] 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).

[178] U.S. Global Change Research Program, Global Climate Change Impacts in the United States: A State of Knowledge Report from the U.S. Global Change Research Program (2009) (Cambridge University Press).

scenario and by 7 to 11°F under a higher emissions scenario.[179] The decade from 2000 to 2010 was the warmest on record,[180] and 2005 and 2010 tied for the hottest years on record.[181]

Global average sea level rose by roughly eight inches over the past century, and sea level rise is accelerating in pace.[182] Indeed, sea level is rising faster along the U.S. east coast now than at any other time during at least the past 2,000 years.[183] About 3.7 million Americans live within a few feet of high tide and risk being hit by more frequent coastal flooding in coming decades because of the sea level rise.[184] The most vulnerable state is Florida, followed by Louisiana, California, New York and New Jersey. Modeling indicates that the Atlantic is in danger of in danger of seeing historical extremes of sea level surges frequently surpassed in the coming few decades.[185] Studies that have attempted to improve upon the IPCC estimates have found that a mean global sea-level rise of at least 1 to 2 meters is highly likely within this century.[186] Others that have reconstructed sea-level rise based on the geological record, including oxygen isotope and coral records, have found that larger rates of sea-level rise of 2.4 to 4 meters per century are possible.[187]

As briefly mentioned in the DPEIS, sea turtles that nest on the Atlantic coast will be affected by rising and surging sea levels. The added pressure and displacement from their nesting and migration from the G&G program will further impact these threatened and endangered sea species. Additionally, critical habitat designation for the North Atlantic DPS of loggerhead sea turtles is imminent, and accordingly BOEM should evaluate the extent to which the proposed action will affect areas of potential marine and beach critical habitat. Other coastal wildlife species are also impacted by sea level rise, and these effects must also be evaluated.

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[179] *Id.*

[180] National Aeronautic Space Association, *NASA Research Finds Last Decade was Warmest on Record, 2009 One of the Warmest Years* (Jan. 21, 2010), www.nasa.gov/home/hqnews/2010/jan/HQ_10-017_Warmest_temps.html

[181] National Oceanic and Atmospheric Administration, *NOAA: 2010 Tied for Warmest Year on Record,* www.noaanews.noaa.gov/stories2011/20110112_globalstats.html

[182] U.S. Global Change Research Program, Global Climate Change Impacts, *supra*.

[183] Kemp, A.C., Horton, B.P., Donnelly, J.P., Mann, M.E., Vermeer, M., and Rahmstorf, S., Climate related sea-level variations over the past two millennia, *Proceedings of the National Academy of Sciences of the United States of America* 108: 11017-22 (2011).

[184] Strauss, B.H., Ziemlinski, R., Weiss, J.L., and Overpeck, J.T., Tidally adjusted estimates of topographic vulnerability to sea level rise and flooding for the contiguous United States, *Environmental Research Letters* 7(1): 014033. doi:10.1088/1748-9326/7/1/014033 (2012).

[185] Tebaldi, C., Strauss, B.H., and Zervas, C.E., Modeling sea level rise impacts on storm surges along US coasts, *Environmental Research Letters* 7(1): doi:10.1088/1748-9326/7/1/014032 (2012).

[186] Rahmstorf, S., A semi-empirical approach to projecting future sea-level rise, *Science* 315: 368-370 (2007); Pfeffer, W.T., Harper, J.T., and O'Neel, S., Kinematic constraints on glacier contributions to 21st-century sea-level rise, *Science* 321: 1340-1343 (2008); Vermeer, M., and Rahmstorf, S., Global sea level linked to global temperature, *PNAS* 2009: doi:10.1073/pnas.0907765106 (2009); Grinsted, A., Moore, J.C., and Jevrejeva, S., Reconstructing sea level from paleo and projected temperatures 200 to 2100 AD, *Clim. Dyn.* 2010: doi:10.1007/s00382-008-0507-2 (2010); Jevrejeva, S., Moore, J.C., and Grinsted, A., How will sea level respond to changes in natural and anthropogenic forcings by 2100? *Geophysical Research Letters* 37: doi:10.1029/2010GL042947 (2010).

[187] Milne, G.A., Gehreis, W.R., Hughes, C.W., Tamisiea, M.E., Identifying the causes of sea-level change, *Nature Geoscience* 2009: doi:10.1038/ngeo544 (2009).

Extreme weather events, most notably heat waves and precipitation extremes, are striking with increased frequency,[188] with deadly consequences for people and wildlife. In 2011 alone, a record 14 weather and climate disasters occurred in the United States, including droughts, heat waves, and floods, that cost at least $1 billion (U.S.) each in damages and loss of human lives.[189] Tropical cyclones in the Atlantic have already gotten stronger due to warmer waters, and on average storms in recent years have ramped up in severity more quickly than in the past.[190] Over the last 30 years the Atlantic coast has seen a significant increase in hurricane wave heights.[191] Models predict a doubling of severe category 4 and 5 hurricanes in the Atlantic within the century,[192] and the risks of oil and gas exploration and development increase during severe storms.

Recent studies on the impacts of climate change on biodiversity have demonstrated that current levels of greenhouse gases are already having significant impacts on species and ecosystems in all regions of the world, including changes in wildlife distribution, physiology, demographic rates, genetics, and ecosystem services, as well as climate-related population declines and extinctions.[193] Because greenhouse gas emissions to date commit the Earth to substantial climatic changes in the coming decades, and because climate change is occurring at an unprecedented pace with multiple synergistic impacts, climate change is predicted to result in catastrophic species losses during this century. The IPCC concluded that 20% to 30% of plant and animal species will face an increased risk of extinction if global average temperature rise

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[188] Coumou, D., and Rahmstorf, S., A decade of weather extremes, *Nature Climate Change* doi:10.1038/nclimate1452 (2012); IPCC, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (2012).

[189] National Oceanic and Atmospheric Administration, *Extreme Weather 2011,* http://www.noaa.gov/extreme2011/.

[190] Elsner, J.B., Kossin, J.P., and Jagger, T.H., The increasing intensity of the strongest tropical cyclones, *Nature* 455: 92-5 (2008); Kishtawal, C.M., Jaiswal, N., Singh, R., and Niyogi, D., Tropical cyclone intensification trends during satellite era (prepub.); Saunders, M.A., and Lea, A.S., Large contribution of sea surface warming to recent increase in Atlantic hurricane activity, *Nature* 451: 557-60 (2008).

[191] Komar, P.D., and Allan, J.C., Increasing hurricane-generated wave heights along the U.S. east coast and their climate controls," *Journal of Coastal Research* 242: 479-488 (2008).

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exceeds 1.5°C to 2.5°C relative to 1980-1999 levels, with an increased risk of extinction for up to 70% of species worldwide if global average temperature exceeds 3.5°C relative to 1980-1999 levels.[194] Thomas et al. (2004) projected that 15%-37% of species will be committed to extinction by 2050 under a mid-level emissions scenario—a trajectory which the world has been exceeding.[195] Maclean and Wilson (2011) concluded that the harmful effects of climate change on species exceed predictions and that one in ten species could face extinction by the year 2100 if current rates of climate change continue unabated.[196] The updated IPCC Reasons for Concern reflect that current warming is already at a point where significant risks to species and ecosystems are occurring, and that these risks will become "severe" at a ~1°C rise above preindustrial levels.[197] A comprehensive literature review by Warren et al. (2011) found that significant species range losses and extinctions are predicted to occur at a global mean temperature rise below 2°C in several biodiversity hotspots and globally for coral reef ecosystems. At a 2°C temperature rise, projected impacts increase in magnitude, numbers, and geographic scope. Beyond a 2°C temperature rise, the level of impacts and the transformation of the Earth's ecosystems will become steadily more severe, with the potential collapse of some entire ecosystems, and extinction risk accelerating and becoming widespread.[198]

Contrary to the statements in the DPEIS, the impacts of climate change are happening within the next decade and are already occurring. For the North Atlantic, ocean warming has already been reported as contributing to ecosystem shifts.[199] Changes are seen from phytoplankton to zooplankton to fish and are modifying the dominance of species and the structure, diversity and function of marine ecosystems.[200] These changes in biodiversity, combined with other impacts from fishing, oil and gas exploration and development, and ocean acidification, can contribute to the decline or extinction of species and must be analyzed in the DPEIS.

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[194] IPCC, *Climate Change 2007: Synthesis Report-- An Assessment of the Intergovernmental Panel on Climate Change* (2007).

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2. Ocean acidification impacts requiring analysis

The oceans are becoming more acidic faster than they have in the past 300 million years, a period that includes four mass extinctions.[201] Friedrich et al. (2012) concluded that anthropogenic ocean acidification already exceeds the natural variability on regional scales and is detectable in many of the world's oceans, including Atlantic regions.[202] Observed trends over the last couple of decades off Bermuda indicate that aragonite saturation has declined -0.04 per decade—exceeding the last glacial termination by orders of magnitude.[203]

BOEM must examine the impacts of its proposed project on the marine environment in light of changes that are already occurring due to ocean acidification. Especially relevant to the proposed project is that the oceans are becoming noisier due to ocean acidification.[204] A 0.3 pH decrease causes of loss of ~40% sound absorption.[205] At levels of acidification predicted before the end of the century sound will travel 70% further in the ocean. The DPEIS must discuss the cumulative impacts of combined ocean acidification and the addition of noise to the marine environment from the proposed project.

Most marine animals respond negatively to ocean acidification, undermining calcification, growth, reproduction, metabolism, and survival.[206] Indeed, ocean acidification has already impacted Atlantic wildlife. For example, areas of the Chesapeake Bay have already been lost to oyster harvesting –[207] analogous to oyster die-offs in the Pacific Northwest that have now definitively been linked to ocean acidification.[208] Oyster populations in the bay are already at historically low levels, and an examination of 23 years of water quality data concluded that significant trends in acidity will have impacts on juvenile oyster growth and survival.[209]

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[201] Honisch, B., Ridgwell, A., Schmidt, D.N., Thomas, E., Gibbs, S.J., Sluijs, A., Zeebe, R., The Geological Record of Ocean Acidification, *Science* 335: 1058-1063 (2012).

[202] Friedrich, T., Timmermann, A., Abe-Ouchi, A., Bates, N.R., Chikamoto, M.O., Church, M.J., Dore, J.E., Detecting regional anthropogenic trends in ocean acidification against natural variability, *Nature Climate Change* 2 (2): 1-5 (2012).

[203] *Id.*

[204] Hester, K.C., Peltzer, E.T., Kirkwood, W.J., and Brewer, P.G., Unanticipated consequences of ocean acidification: A noisier ocean at lower pH, *Geophysical Research Letters* 35: L19601 (2008).

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[206] Kroeker, K.J., Kordas, R.L., Crim, R.N., and Singh, G.G., Meta-analysis reveals negative yet variable effects of ocean acidification on marine organisms, *Ecology Letters* 13: 1419-1434 (2010).

[207] Fincham, M.W., Who Killed *Crassostrea virginica*? The Fall and Rise of Chesapeake Bay Oysters (2012) (documentary film made for Maryland Sea Grant at the University of Maryland Center for Environmental Science, summary and excerpt available at www.mdsg.umd.edu/store/videos/oyster).

[208] Barton, A., Hales, B., Waldbusser, G.G., Langdon, C., and Feely, R.A., The Pacific oyster, *Crassostrea gigas*, shows negative correlation to naturally elevated carbon dioxide levels: Implications for near-term ocean acidification effects, *Limnol. Oceanogr.* 57: 698-710 (2012).

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Already, calcification of juvenile oysters is compromised by acidification. Waldbusser et al. (2011) conducted a study of eastern oyster under 4 levels of pH that encompass a range typical of the mesohaline waters of the Chesapeake Bay (7.2–7.9 on the NBS scale). They found that in as little as 2 weeks under various pH levels, shells began to dissolve even in waters that were not corrosive (7.9 pH). The treatments were not atypical for estuarine waters in the Chesapeake Bay and demonstrate that shell dissolution increases with declining pH, especially for fresh shells.[210]

Studies of Northwest Atlantic bivalves demonstrate that changes in ocean acidification and temperature can have significant negative consequences for these coastal animals, especially at larval stages. Eastern oyster and bay scallop are particularly sensitive to ocean acidification, while ocean acidification and temperature rise together impair the survival, growth, development, and lipid synthesis of hard clams and bay scallops.[211]

Not only do calcifying organisms suffer from an increasingly acidic ocean environment, but fish and fisheries are threatened as well. New science confirms the negative consequences of ocean acidification on Atlantic herring, Atlantic cod, and *Menidia beryllina*, a common Atlantic estuarine fish. In Atlantic cod, exposure to CO2 resulted in severe to lethal tissue damage in many internal organs, with the degree of damage increasing with CO2 concentration.[212] Larval survival and length of *M. beryllina* unambiguously decreased with increased carbon dioxide treatments.[213] Eggs exposed to high levels also had a higher rate of malformations, with larvae developing curved bodies. Increased carbon dioxide in the water also negatively affected Atlantic herring larvae.[214] Slower-growing larvae are more vulnerable to predation and decreased feeding success.[215] Since larval survival is critical to recruitment, ocean acidification has the potential to act as an additional source of natural mortality, affecting populations of already exploited fish stocks.[216]

Even now, ocean acidification is putting vulnerable marine animals at the threshold of their tolerance levels. Declines of plankton, shellfish, and fish will reverberate up the marine food web with impacts on entire ecosystems. The DPEIS must quantify and discuss the contribution of the proposed action to further acidification, and it must also evaluate the cumulative impacts of the G&G program on the marine environment, in combination with acidification.

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[210] Waldbusser, G.G., Steenson, R.A., and Green, M.A., Oyster shell dissolution rates in estuarine waters: Effects of pH and shell legacy, *Journal of Shellfish Research* 30: 659-669 (2011).

[211] Talmage, S.C., and Gobler, C.J., Effects of elevated temperature and carbon dioxide on the growth and survival of larvae and juveniles of three species of Northwest Atlantic bivalves, *PLoS ONE* 6(10): e26941.doi:10.1371/journal.pone.0026941 (2011).

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[214] Franke, A., and Clemmesen, C., Effect of ocean acidification on early life stages of Atlantic herring (*Clupea harengus L.*), *Biogeosciences* 8: 3697-3707 (2011).

[215] *Id.*; Baumann et al., Reduced early life growth and survival in a fish, *supra*.

[216] Frommel et al., Severe tissue damage in Atlantic cod larvae, *supra*.

V. COMPLIANCE WITH OTHER STATUTES

A number of other statutes and conventions are implicated by BOEM's permitting of G&G activities in the Atlantic. Among those that must be disclosed and addressed during the NEPA process are the following:

A. Marine Mammal Protection Act ("MMPA")

The MMPA prohibits citizens, including federal agencies, or those operating within the jurisdiction of the United States from "taking" marine mammals without first securing either an "incidental take" permit or an "incidental harassment" authorization. 16 U.S.C. § 1371(a); 50 C.F.R. §216.107. For most activities, "take" is broadly defined to include both the "potential to injure a marine mammal or marine mammal stock in the wild" ("Level A" harassment) and the potential to "disturb" them "by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering" ("Level B" harassment). 16 U.S.C. § 1362(18); 50 C.F.R. § 216.3.

In 1994, Congress amended the MMPA to add provisions that allow for the incidental harassment of marine mammals through incidental harassment authorizations ("IHAs"), but only for activities that result the "taking by harassment" of marine mammals. 16 U.S.C. § 1371(a)(5)(D)(i). For those activities that could result in "taking" other than harassment, interested parties must continue to use the pre-existing procedures for authorization through specific regulations, often referred to as "five-year regulations." 16 U.S.C. § 1371(a)(5)(A). Accordingly, NMFS' implementing regulations state that an IHA in the Arctic cannot be used for "activities that have the *potential* to result in serious injury or mortality." 50 C.F.R. § 216.107 (emphasis added). In the preamble to the proposed regulations, NMFS explained that if there is a potential for serious injury or death, it must either be "negated" through mitigation requirements or the applicant must instead seek approval through five-year regulations. 60 Fed. Reg. 28,379, 28,380-81 (May 31, 1995).

The caution exhibited by NMFS in promulgating the 1996 regulations is consistent with the MMPA's general approach to marine mammal protection. Legislative history confirms that at the time of the MMPA's original passage Congress intended to build in a "conservative bias" that would avoid adverse or irreversible effects "until more is known." H.R. Rep. 92-707, at 5 (1971) *reprinted in* 1972 U.S.C.C.A.N. 4144, 4148. The committee report that accompanied the House version of the 1994 amendments emphasizes that the IHA provisions were not intended to "weaken any of the existing standards which protect marine mammals and their habitats from incidental takes[.]" H.R. Rep. 103-439, at 37 (1994). Thus, the 1994 amendments preserved the existing five-year regulation process for those activities that risked the possibility of lethal or seriously injurious marine mammal take.

The risk of mortality and serious injury, discussed at section IV.E above, has implications for MMPA compliance. Here, in assessing their MMPA obligations, BOEM presupposes that industry will apply for IHAs rather than 5-year take authorizations and that BOEM will not apply

to NMFS for programmatic rulemaking. DPEIS at 1-13, 5-9. But the potential for mortality and serious injury bars industry from using the incidental harassment process to obtain take authorizations under the MMPA. BOEM should therefore consider applying to NMFS for a programmatic take authorization, and revise its impact and alternatives analyses in the EIS on the assumption that rulemaking is required.

Additionally, we are concerned about BOEM's general statement that an IHA "may not be necessary" for certain HRG surveys if operators can demonstrate that they can effectively monitor out to the 160 dB isopleth, which BOEM construes as the threshold for Level B take. DPEIS at C-15. As noted above, we believe that BOEM has applied the incorrect threshold given (1) the potential for take from mid-frequency sources at received levels well below 160 dB (RMS); (2) the demonstrated sensitivity of some species, such as harbor porpoises and beaked whales, requiring far lower take thresholds; and (3) the virtually continuous acoustic output of some sub-bottom profilers, which suggests that a standard designed for transient sounds should not be used. It is not possible for operators to effectively monitor out to the impact distances implied by these conditions; indeed, it is highly unlikely that operators could monitor – with the 100% efficacy that would be necessary – the smaller distances that BOEM appears to contemplate here, especially if surveys occur at night and other times of low visibility.[217]

B. Endangered Species Act ("ESA")

The ESA requires that agencies give first priority to the protection of threatened and endangered species. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 174 (1978) (Supreme Court found "beyond doubt" that "Congress intended endangered species to be afforded the highest of priorities."). Section 2(c) of the ESA establishes that it is "…the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." 16 U.S.C. § 1531(c)(1).

The ESA defines "conservation" to mean "…the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary." 16 U.S.C. § 1532(3). Section 7(a)(2) of the ESA requires federal agencies to "insure that any action authorized, funded, or carried out by such agency… is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the adverse modification of habitat of such species… determined… to be critical…." 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). To accomplish this goal, agencies must consult with the National Marine Fisheries Service or U.S. Fish and Wildlife Service, depending upon the species, whenever their actions "may affect" a listed species. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). Should they find that any listed species is likely to be adversely affected, the consulting agency must issue a biological opinion determining whether the action is likely to jeopardize the continued existence of the species or destroy or adversely modify critical habitat. If so, the opinion must specify reasonable and prudent alternatives that will avoid the likelihood of jeopardy or adverse modification and allow the action to proceed. 16 U.S.C. § 1536(b).

[217] The limitations of real-time visual monitoring are well known, as observed at sections III.B.1 and III.C.10 above.

For its part, BOEM, as the action agency, has an ongoing, substantive duty to ensure that any activity it authorizes, funds, or carries out does not jeopardize a listed species or destroy or adversely modify its critical habitat. An action agency's reliance on an inadequate, incomplete, or flawed biological opinion cannot satisfy its duty to avoid the likelihood of jeopardy to listed species. *See, e.g., Florida Key Deer v. Paulson*, 522 F.3d 1133, 1145 (11th Cir. 2008); *Pyramid Lake Tribe of Indians v. U.S. Navy*, 898 F.2d 1410, 1415 (9th Cir. 1990); *Stop H-3 Ass'n. v. Dole*, 740 F.2d 1442, 1460 (9th Cir. 1984) (action agency must independently ensure that its actions are not likely to cause jeopardy).

The central purpose of the ESA is to recover species to the point where ESA protections are no longer necessary. 16 U.S.C. §§1531(b), 1532(3). The ESA's emphasis on recovery of species means that BOEM may not authorize or carry out actions that will significantly reduce the likelihood of either the survival *or the recovery* of a listed species. *See, e.g. National Wildlife Federation v. National Marine Fisheries Serv.*, 524 F.3d 917, 932 (9th Cir. 2008).

The DPEIS indicates that BOEM has begun the consultation process, and that a Biological Opinion, if issued, will be included as an appendix to the final document. To be sure, the consultation should include every listed marine mammal, sea turtle, fish, and seabird species in the region, but the agencies should spend particular attention on the North Atlantic right whale. Without substantial additional mitigation, NMFS cannot legally issue a no-jeopardy opinion for this species. As noted above, the right whale is so critically endangered that the loss of a single adult female could threaten its survival; it is particularly vulnerable to masking effects at far distances from low-frequency sound sources, to stress effects from anthropogenic noise, and to ship strikes especially in combination with certain types of sound; and sublethal effects that impair the individual whales' ability to feed, communicate, or travel, or otherwise disrupt normal behavior could compromise their overall fitness and reproductive success, diminishing the species' chances at survival and recovery over the long term. Significantly, the members of the population most vulnerable to the effects of the proposed action are mothers and calves – the individuals most vital to maintaining and rebuilding the population.[218]

In order to comply with the ESA, BOEM must select an alternative that sufficiently protects the right whale, its designated critical habitat, and all known migratory corridors, feeding areas, calving and nursery grounds. The seasonal exclusion proposed in Alternative A would not avoid jeopardy, nor would the additional exclusion (though superior) proposed in Alternative B.[219]

C. Coastal Zone Management Act ("CZMA")

[218] *E.g.*, 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).

[219] *See* Comment letter from Dr. Scott Kraus, Vice-President for Research, New England Aquarium, to BOEM (Aug. 10, 2011) (concerning BOEM's Draft Mid-Atlantic Wind Energy Area EA, and noting the risk that acoustic sources will displace mothers and mother/calf pairs into "rougher and more predator-occupied waters, potentially reducing calf survival").

The CZMA requires that "[e]ach Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." 16 U.S.C. § 1456(c)(1)(A). *See also California v. Norton*, 311 F.3d 1162 (9th Cir. 2002) (applying consistency requirement to activities well outside state waters). Under the law, BOEM must provide a consistency determination to the relevant State agency responsible for the State's CZM program at least 90 days before final approval of the federal activity. 16 U.S.C. § 1456(c)(1)(C); 15 C.F.R. § 930.36(b)(1). The State must provide its concurrence with or objection to the consistency determination within 60 days of receiving the determination and supporting information; otherwise, the federal agency may presume that the State concurs with its consistency determination. 15 C.F.R. § 930.41(a). If the State determines that the federal agency has not provided sufficient information to support the consistency determination, as required by 15 C.F.R. § 930.39(a), it must notify the federal agency of the deficiency and the 60-day clock will not commence until the State receives the necessary information. *Id.*

If the State objects to the consistency determination, the federal agency must work with the State to attempt to resolve their differences before the 90-day notice period expires. After that time expires, the federal may only proceed with the activity over the State's objection if the agency determines that federal law requirements prevent the activity from achieving full consistency with enforceable state management program policies or the agency concludes, despite the State's objection, that the activity is fully consistent with such enforceable policies. *Id.* § 930.43(d). In the alternative, a State may issue a conditional concurrence that states the conditions that must be satisfied in order to ensure consistency with specific enforceable polies of the State's CZM program. The agency must modify the proposed plan or application to include the State's conditions or notify the State that it refuses to do so, in which case the State's conditional concurrence will be treated as an objection. *Id.* § 930.4(a)-(b). More specifically:

(1) Importantly, the consistency requirement applies to multiple phases of OCS activities. When BOEM develops a plan to direct the agency's future OCS actions, such as the plan of activities considered in the DPEIS, the agency must provide a consistency determination and seek each State's concurrence that the activities covered by the plan are consistent to the maximum extent practicable with the enforceable policies of the State's coastal zone management program. 15 C.F.R. § 930 Subpart C. This phase of planning and consistency review helps set the stage for future permitting and licensing decisions regarding OCS activities being carried out pursuant to the plan, but does not take the place of subsequent consistency determinations. Activities carried out by private entities that require a permit or license, such as a G & G permit, and all federal license or permit activities described in an OCS plan, must be determined to be fully consistent with the affected State's enforceable coastal zone management policies. 15 C.F.R. § 930 Subparts D, E. The DPEIS acknowledges the multi-stage nature of consistency review under the CZMA, but does not indicate that BOEM will undergo review at the present stage. *See* 5-8 to 5-9. BOEM must.

(2) The CZMA and its regulations broadly define the "may affect" trigger for consistency review. An activity that occurs outside the coastal zone still crosses the threshold if it affects resources within the coastal zone, or if it affects resources (such as whales and fish) that regularly come within the coastal zone but are outside the zone at the time of impact. This definition has significant implications for the high-intensity noise produced by airgun exploration, since a survey occurring tens or even hundreds of miles offshore can still affect coastal resources due to its enormous propagation footprint and its impact on wide-ranging species. *See NRDC v. Winter*, No. 8:07-cv-00335-FMC-FMOx, 2007 WL 2481037 (C.D. Cal. Aug. 7, 2007), *aff'd in rel. part*, 508 F.3d 885 (9th Cir. 2007), *rev'd in part on other grounds sub nom. Winter v. NRDC*, 129 S.Ct. 365 (2008). Perhaps most pressingly, BOEM must include New Jersey – which is omitted from the DPEIS' distribution list (DPEIS at 5-6) – among the affected coastal states. Further, BOEM must acknowledge the full scope of activity that would affect coastal resources under the Act, for purposes of satisfying this important provision at both the planning and permitting stages.

(3) Finally, it is crucial that BOEM provide a thorough analysis of the proposed action's effects on the myriad coastal resources that State programs are designed to protect. Without such a thorough analysis, it is impossible for the states to assess the validity of any consistency determination BOEM issues – particularly in light of the short period of time the states have to object to a consistency determination. In addition, the states need full information to inform their own citizens and give those citizens a meaningful opportunity to comment on the proposed action, as required by 15 C.F.R. § 930.2. As written, however, the DPEIS glosses over many important impacts to coastal resources and, aside from the seasonal restrictions targeted at North Atlantic right whales and loggerhead sea turtles, fails to present reasonable alternatives necessary to protect those resources, including other marine mammals and fisheries. In its final PEIS, BOEM must present these missing alternatives and information, and give State CZM programs sufficient time to assess the information and the proposed actions' consistency with their enforceable policies.

D. Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fisheries Conservation and Management Act, 16 U.S.C. § 1801 et seq., 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. 16 U.S.C. § 1855 (b)(2). In turn, the Act defines essential fish habitat as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. § 1802 (10). As discussed above, BOEM's Atlantic study area contains such habitat, and geological and geophysical operations have the significant potential to adversely affect at least the waters, and possibly the substrate, on which fish in these areas depend. Accordingly, and as the DPEIS anticipates, BOEM must consult with the Secretary of Commerce through NMFS and the Mid-Atlantic and South Atlantic Fisheries Management Councils. DPEIS at 5-9.

E. National Marine Sanctuaries Act

The National Marine Sanctuaries Act requires agencies whose actions are "likely to injure a sanctuary resource" to consult with the Office of National Marine Sanctuaries ("ONMS"). 16 U.S.C. § 1434(d). As the DPEIS recognizes, the agency does not need to conduct the activity itself, since any federal agency action, including permitting or licensing, can trigger the requirement; nor must the activity occur within the sanctuary, so long as the resource is likely to be injured. DPEIS at 1-17; 16 U.S.C. § 1434(d). ONMS may also request that the agency initiate the consultation process.[220] Under the consultation scheme, BOEM is required to prepare a Sanctuary Resource Statement; if ONMS determines that the statement is complete and that injury is indeed likely, it must prepare recommended alternatives to the proposed action, which may include relocation, rescheduling, or use of alternative technologies or procedures.[221]

To ensure compliance with the consultation provision, BOEM should keep several critical points in mind.

First, ONMS in its regulations defines the term "sanctuary resource" quite broadly, to the extent that it includes "virtually every living and nonliving component of the sanctuary ecosystem";[222] these include any resource "that contributes to the conservation, recreation, ecological, historical, research, educational, or aesthetic value of the Sanctuary." 15 C.F.R. § 922.182. Consistent with this approach, ONMS defines the term "injure" to mean "change adversely, either in the short or long term, a chemical, biological, or physical attribute of, or the viability of." 15 C.F.R. § 922.3. The DPEIS appears to interpret these provisions narrowly. *See* DPEIS at 5-9 to 5-10. Yet there can be no question, under these definitions, that an activity that degrades the acoustic habitat of a National Marine Sanctuary, even temporarily, or impinges on the sanctuary's value for scuba diving or other recreational activities, injures a sanctuary resource. Thus BOEM should not consider itself subject to consultation only if its permitting activities physically injure a marine animal within sanctuary boundaries. The permitting of any seismic survey likely to degrade the acoustic environment of the Monitor or Gray's Reef NMS, or (given the best available science on scuba diver aversion to low-frequency sound) raise noise levels within the sanctuaries above 145 dB (SPL), is subject to consultation under the Act.

Second, we strongly encourage BOEM to tier consultation with the sanctuaries. As it stands, the agency plans to undertake consultation only with respect to the issuance of survey-specific permits. DPEIS at 1-17. But this approach only risks greater conflict down the line, since BOEM will have less latitude to accept some types of recommended alternatives, such as restricting a survey from certain areas, when the action turns to individual surveys; and it fails to benefit from any streamlining that a tiered process would afford.[223] BOEM should undertake

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[220] NOAA Office of National Marine Sanctuaries, Overview of conducting consultation pursuant to section 304(d) of the National Marine Sanctuaries Act (16 U.S.C. 1434(d)) at 4 (2009).

[221] *Id.* at 8.

[222] *Id.* at 5.

[223] For example, if, as a result of consultation, BOEM establishes a time-area closure around the sanctuaries, its need to consult on individual permitting activities could diminish.

consultation now on its proposed programmatic alternatives and renew the process, if necessary, for individual permits.

F. National Ocean Policy

The National Ocean Policy ("NOP") is a "stewardship" plan for our coast and ocean, including BOEM's area of interest. Under NOP, it is the policy of the federal government to "protect, maintain, and restore the health and biological diversity of ocean, coastal, and Great Lakes ecosystems and resources"; "to improve the resiliency of ocean, coastal, and Great Lakes ecosystems, communities, and economies"; "to respect and preserve our Nation's maritime heritage, including our social, cultural, recreational, and historical values"; "to use the best available science and knowledge to inform decisions affecting the ocean, our coasts, and the Great Lakes"; and "to foster a public understanding of the value of the ocean, our coasts, and the Great Lakes to build a foundation for improved stewardship. Exec. Order No. 13547, 75 Fed. Reg. 43023 (July 22, 2010).

Taken together, the intrusion of oil and gas exploration into the communities of the Atlantic Coast will seriously impact the economies of clean ocean uses. Unlike other regions, where oil and gas operations permeate coastal zone activities, the Atlantic Ocean has been oil and gas industry-free for decades, and has built a clean ocean economy that depends on thriving fisheries, whales to drive ecotourism, and safe, swimmable beaches. The proposed action will lead to the direct displacement of commercial and recreational fishermen and will likely impact long-term ecotourism and coastal cultural values. The President's Executive Order, which directs all agencies to "take such action as necessary to implement the policy set forth in section 2 of this order and the stewardship principles and national priority objectives," does not exempt BOEM from any of its provisions. Therefore, BOEM has the responsibility to protect the economies and ecosystems of the Atlantic Ocean under a program of improved understanding, stakeholder engagement, and science-based decisionmaking. This DPEIS does not achieve any of these goals, does not represent good ocean governance, and does not represent the use of good science. Until it does so, BOEM is in violation of the President's declared policies for the protection of our ocean's ecosystems and resources.

VI. CONCLUSION

For the above reasons, we urge BOEM first and foremost to adopt Alternative C as its preferred alternative, and next to seriously consider the recommendations we have made to improve analysis and mitigate the far-reaching impacts of the proposed activity.

We would welcome the opportunity to meet with you, your staff, and other relevant offices at any time to discuss these matters. Given the swift timeline BOEM has set for finalizing the DPEIS and producing a record of decision, we would urge you to contact us at the earliest opportunity. For further discussion, please contact Michael Jasny of NRDC (mjasny@nrdc.org).

Very truly yours,

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Science and technology serving the sea

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June 14, 2012

Re: Comments on the Draft PEIS for Atlantic G&G Activities

Dear Mr. Goeke,

We welcome the opportunity to review and comment on the Draft Environmental Impact Statement on the Atlantic OCS Proposed Geological and Geophysical Activities (hereinafter DEIS). We will attempt to be thorough and informative in our review comments. We will also be focusing the bulk of our comments on the acoustical impacts of the proposed actions because this is our area of expertise.

While the document reflects much work and a comprehensive exploration into the possible impacts of the proposed activities as required by the National Environmental Policy Act (NEPA), we believe that the DEIS leaves much to be desired if it is to be considered a guiding document for environmental stewardship.

This observation is made in particular light of the fact that despite our assumptions about the boundless ability of the ocean to absorb the assaults of human enterprise we are rapidly finding that the ocean is in very poor shape. This is a consequence of reckless resource extraction and relentless dumping and pollution. The fact is that in many of the more extreme cases ocean environmental degradation has been a significant byproduct industrial practices – particularly the practices of the petroleum exploration and extraction industry.

It was due to the extents of environmental degradation due to reckless and unregulated industrial practices that in the early 1980's a moratorium was placed on exploration and extraction on the US Outer Continental Shelf (OCS). It was clear at that time that the coastal resources for commercial and recreational fishing, and the socio-economic value of clean and vibrant coastal environments were far too valuable to put at risk to the dangers of the fossil fuel extraction and production chain.

This moratorium remained in place until 2008 when the original bill requiring annual reinstatement expired. It was the assumption that technologies and techniques had

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improved that would diminish the likelihood of catastrophic events the likes of which ushered in the 1980's moratoriums in the first place.

Unfortunately as we found in April 2010, the technologies are still dangerous and unpredictable. The full extent of the damages in the Deepwater-Horizon-Macondo well disaster is still unknown, and likely to continue to unfold well into the future. It is also clear that while technologies have advanced significantly in the past 27 years since the initial moratorium (and the reason that legacy OCS surveys are no longer suitable), the task has also become more complex as the reach of exploration sinks down into ever-deeper waters, and ever deeper hydrocarbon deposits.

This has left us with a technology bank that while impressive, is definitely not up to the task. I substantiate this statement by referring to the recently out-of-control gas well in the North Atlantic (Total-Elgin gas leak) and the ongoing leaks, spills, and blowouts that have continued to plague the ocean from Timor, to Nigeria, to Brazil, to the Gulf of Mexico just in this last year. And while the "Atlantic Geological and Geophysical Activities DEIS" is not specifically about deepwater extraction operations, it pre-supposes fossil fuel extraction and production.

Unfortunately that despite the ongoing global problems associated with offshore hydrocarbon exploration and extraction that we are not learning that the cost of powering our global economy with fossil fuel is becoming increasingly expensive. These costs are not just "borne at the pump;" rather they are heavily distributed into the environment at the cost of nature's bounty and the compromised quality of our own lives.

It is also clear from how the three alternatives are presented in the DEIS that Alternative A or B are assumed to be not just the preferred alternatives, but the likely ones as well. This is obviated by the many reinforcing assumptions made to "pave the way" for the proposed Geological and Geophysical activities, but also in the quaint convention used of highlighting the word **"negligible"** throughout the document. This highlighted word shows up some 956 times in just 550 pages. (The highlighted word "**minor**" shows up 513 times in the document, "**moderate"** only 131 times.) While this observation is only a casual metric, it does appear to reveal a bias in the drafting of the DEIS.

The words "**negligible," "minor,"** and **"moderate"** indicate value judgments which while they are sometimes backed up through more detailed discussions in Vol. 1 Chapter 4 using citations, these citations do not track consistently and clearly back to the summary impact assessments. We feel that any assessment in the DEIS should be directly backed up with either peer reviewed literature or some other qualified accountability.

We are also concerned about the arbitrary use of impact conventions when evaluating an action for its "Level A" or "Level B" threshold. The current standard is used by National Marine Fisheries Service (NMFS) under the Marine Mammal Protection Act (MMPA). It is a blunt metric and could use some refinement, but it is the standard. Using it in parallel selectively substituting it with the "Southall Criteria[1]" is confusing and inconsistent,

[1] Southall, B.L., A.E. Bowles, W.T. Ellison, J.J. Finneran, R.L. Gentry, C.R. Greene Jr., D. Kastak, D.R. Ketten, J.H. Miller, P.E. Nachtigall, W.J. Richardson, J.A. Thomas, and P.L. Tyack. 2007. Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33(4):411-521.

particularly since the "Southall Criteria" is only an initial scientific recommendation and has not yet gone through an EIS review as would be required under the National Environmental Policy Act (NEPA) to be used as a guiding document for this DEIS.

And while I believe that the "Southall Criteria" will eventually represent a significant improvement to the current impact threshold assessment process. The motivation behind using one or the other is particularly confusing when there is such a disparity between the results. The table below highlights a few examples of these disparities from Section 4.2.2.2.2 page 4.52- 4.53 referring to "Level A" harassment.

Species	Southall 2007 Criteria (Quoted in the DEIS)[2]	NMFS "180 dB" criteria (Not quoted in DEIS)[3]
Risso's Dolphin	8 - 731	444 - 3180
Striped Dolphin	86 - 1020	495 – 2038
Atlantic Spotted Dolphin	154 – 1496	640 - 3180
Bottlenose Dolphin	3 - 39	1314 - 11748

Table 1: Disparity between estimated "Level A" takes between the Southall 2007 (Table 4-9 in the DEIS) and the 180 dB "historic" criteria (table 4-10 in the DEIS).

The reason for choosing one standard over the other is not clear in the arguments, but the numbers in Table 1 suggest that the lower estimation of the "Level A" takes were used in the DEIS, which would seem to infer a "cherry picking" to derive a desired outcome. We suggest that historic NMFS standard be consistently used throughout the DEIS until that time when the Southall Criteria is complete and has gone through public review as required by the National Environmental Policy Act (NEPA).

Another conceit appears occasionally throughout the DEIS that "marine mammals within the AOI are familiar with vessel noises, so the effects of vessel noises are expected to be **negligible** to **minor.**[4]**"**

Firstly, forced habituation is not a mitigation strategy. Additionally, "habituation" is a faulty assumption because there is no evidence that marine mammals (or fish for that matter) habituate to broad-band noise that would potentially mask biologically significant signals. In fact it has recently been determined that chronic shipping noise induces stress in bowhead whales,[5] so the assumption that animals habituate to vessel noise is patently false and should to be removed from both the marine mammal as well as the fisheries sections of the DEIS until proven to be true.

[2] From DEIS Vol. 2,. Table 4-9 "Annual Level A Take Estimates from Seismic Airgun Sources Using Southall et al. (2007) Criteria for Marine Mammal Species during the Project Period (2012-2020)"
[3] From DEIS Vol. 2,. Table 4-10 "Annual Level A Takes Estimates from Seismic Airgun Sources Using 180-dB Criteria for Marine Mammal Species during the Project Period (2012-2020)
[4] This "presumption" or "assumption" appears in Vol. 1 Summary p.xv, Ch. 2 pages 15, 31, and 40, Ch. 4 page 58 and 255.
[5] Rosalind M. Rolland, Susan E. Parks, Kathleen E. Hunt, Manuel Castellote, Peter J. Corkeron, Douglas P. Nowacek, Samuel K. Wasser and Scott D. Kraus (2012) "Evidence that ship noise increases stress in right whales" Proc. R. Soc. B doi:10.1098/rspb.2011.2429

Rolland et. al.(2012)[6] points to another serious shortcoming in the entire DEIS; While there are sections throughout the document addressing "Cumulative" impacts of the activities, these are considered as "incremental" impacts[7] rather than synergistic impacts.

Biological systems are not adding machines; they have operating ranges that can be stable in the center of their range, but as the systems approach the extents of their range they become instable and subject to amplification of synergistic inputs. Subjecting entire ecosystems to a chronic assault such as noise, physical disruption, or chemical pollution will at some point cause an irrecoverable instability that will crash the system.

In this context the DEIS fails to address anything but the immediate or concurrent impacts of an assault, assuming that once the assault has "moved on" or ceased that it no longer has a measurable impact. While our ability to account for synergistic impacts is rudimentary at best, precaution and empirical evidence would dictate that we factor in synergistic impacts even while we don't entirely understand them.

Furthermore, while we may be arguable that "Level B" behavioral adaptations to proposed activities would be disruptive but recoverable, there is absolutely no justification for biological damage indicated in a "Level A" harassment. Even short term "recoverable" assaults such as temporary threshold shift (TTS) are barbaric. NMFS issuing "Incidental Harassment Authorizations" or "Take Permits" for "Level A" harassment is the apex of institutional hubris. If someone were to apply to the Department of Health and Human Services for a permit to yell in someone's ear, or spill diesel fuel in their salad they would be watched cautiously and put on some "security risk list." So why are institutions encouraged to apply for permission to damage animals? It is patently unethical to damage an animal unless you are going to eat it, or it is going to eat you.

While the forgoing opinions do not have a structural procedure within NEPA to address, they substantiate a systematic shortcoming in this process which is continuously echoed throughout the DEIS: What is the overall impact of 956 "**negligible**" impacts on top of 513 "**minor**" impacts, added to 131 "**moderate**" impacts?

Specific oversights and shortcomings in the DEIS

While it is the purpose of the DEIS to model and address the entire foreseen impacts of the proposed actions, given the complexity of the subject environment and the challenges of introducing complicated technologies and procedures into it, understanding the possible range of impacts is speculative at best. There is no way that comprehensive foreknowledge can be formed with the limited data available.

This situation is addressed to some extent in the DEIS with "When an agency is evaluating reasonably foreseeable significant adverse effects on the environment in an EIS and there is incomplete or unavailable information, the agency reports that such information is lacking…the agency is required to report what relevant information is

[6] Ibid.
[7] DEIS 2.4.1

incomplete and why it is unavailable… Complex environmental evaluations are always to some degree a documentation exercise in the face of imperfect information.[8]"

To this I would add that environmental evaluations are also a studied speculation fed by available, but necessarily incomplete data. This speculation "fills in the gaps" − of which there are many in the field of marine biology, with assumptions − of which there are many in this DEIS. The aforementioned assumption about "habituation" is clearly an incorrect assumption.

Another assumption that is also found in the DEIS is the assumption that "ramp-up" or "soft start" of seismic surveys are effective mitigation strategies. In fact Jochens et. al. (2008)[9] indicates that there was no avoidance behavior with ramp up in sperm whales. This could be due to a number of factors; one possibility being that animals familiar with the seismic survey pulses did not find suitable respite in swimming away from the source so they just waited it out. This hypothesis would be supported by the observation in the study that a whale lingered at the surface throughout the exposure, and then sounded immediately after the last pulse.

Another possibility is that the subjects of Jochens et.al controlled exposure experiments had already been so deeply exposed to airgun blasts that their hearing was already significantly compromised and did not find much reason to avoid airguns (particularly since the study exposures were so carefully controlled to not exceed Level B harassment thresholds).

It may be that some highly mobile and migratory animals would avoid airgun surveys, but animals that exhibit strong site-fidelity such as the sperm whales or sedentary fish would likely not depart from their legacy hunting grounds, or in the case of the fish "shelter in place" rather than seek refuge in unknown areas. Engås et al. (1996)[10] and Løkkeborg and Sodal (1993)[11] showed decreased catch rates of fish following seismic surveys, but the fishing technique in the study was long-lining, requiring some action on the part of the fish, so whether the fish left the area or were not feeding due to physiological compromise remains ambiguous.

Thus the assumption that "ramping up" and "soft starts" constitute an effective mitigation should be withdrawn from the DEIS until proven otherwise.

The comment on page xviii in the summary, and in section 2.1.3.5, and 4.2.5.1.4 that "there is no permanent damage in fish ears" is incorrect and based on outdated literature.[12] The citation from Smith et. al. (2006)[13] is work done on a goldfish, a

[8] DEIS section 4.1.4.1
[9] Jochens et.al. 2008 "Sperm Whale Seismic Study in the Gulf of Mexico" Minerals Management Service contract.
[10] Engås, A. S. Løkkeborg, E. Ona, and A.V. Soldal. 1996." Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*)". Can. J. Fish. Aquat. Sci. 53:2238-2249.
[11] Løkkeborg, S. and A.V. Soldal. 1993. The influence of seismic exploration with airguns on cod (Gadus morhua) behaviour and catch rates. ICES mar. Sci. Symp., 196:62-67.
[12] McCauley, R. D., Fewtrell, J. & Popper, A. N. (2003). High intensity anthropogenic sound damages fish ears. Journal of the Acoustical Society of America 113, 638–642.
[13] Smith, M.E., A.B. Coffin, D.L. Miller, and A.N. Popper. 2006. Anatomical and functional recovery of

freshwater air-breathing fish that resides in turbid environments. The goldfish has been categorized as a "hearing specialist" due to adaptations that are specific to their environment which have no analogies in open ocean fish. So the comment about "fish not suffering lasting hearing damage" and the associated assumptions should be removed from the DEIS.

There is also the phrase "No mortality or injury is expected in any case because there has been no observation of direct physical injury or death to fishes from airguns" found in the fisheries impacts sections of the DEIS. This phrase is only partially correct, as there is evidence of physical injury of fishes from airguns in McCauley et. al. 2003[14]. And while there may be no direct evidence of fish mortality from airguns, if fish sensory systems are compromised by seismic surveys it may lead to intermediate or long term impacts that are not evident immediately after a survey. In this case an absence of evidence does not indicate an absence of harm. Engås et. al 1996 does indicate damage to caged fish, but sedentary fish, while not caged would not necessarily attempt to leave their habitat to escape a pervasive noise, particularly since the pressure-gradient wavelengths are too long for localization, and the particle motion vectors in the far field would be ambiguous and not provide benthic and demersal (and often sedentary) species cues or incentives to leave familiar habitats.

The DEIS treats invertebrates very lightly − almost dismissively. In section 2.1.3.1 the comment is made that "…limited available data assessing physiological effects or biochemical responses of marine invertebrates to underwater noise indicate that serious pathological and physiological effects are unlikely." This is clearly not the case according to André et.al (2006)[15] wherein giant squid mortality was directly correlated to seismic airgun surveys. This is clearly a case where the writers of the DEIS were wrong when they assumed that in a paucity of evidence that the impacts would be "**negligible.**"

These findings, along with the prior work of Angel Guerra et.al (2004)[16] should be incorporated into the DEIS section 2.1.3.1 and 4.2.1.2.2, and the assumptions revised to reflect the papers.

Also in section 4.2.1.2.2 is after citing Payne (2007)[17] the comment is made that "this particular species of lobster was not present in the AOI," thus dismissed. While this species of lobster is not present in the AOI, it stands to reason that other arthropods may suffer the same damage under similar exposures – an "assumption" on our part that holds

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the goldfish (*Carassius auratus*) ear following noise exposure. Journal of Experimental Biology 209:4193-4202.

[14] McCauley, R. D., Fewtrell, J. & Popper, A. N. (2003). High intensity anthropogenic sound damages fish ears. Journal of the Acoustical Society of America 113, 638–642

[15] Michel André, Marta Solé, Marc Lenoir, Mercè Durfort, Carme Quero, Alex Mas, Antoni Lombarte, Mike van der Schaar, Manel López-Bejar, Maria Morell, Serge Zaugg, and Ludwig Houégnigan (2011) "Low-frequency sounds induce acoustic trauma in cephalopods" Front Ecol. Environ. 2011; doi:10.1890/100124

[16] A. Guerra, A.F. González and F. Rocha (2004) A review of the records of giant squid in the north-eastern Atlantic and severe injuries in *Architeuthis dux* stranded after acoustic explorations" International Council for the Exploration of the Sea CC:29

[17] Payne, J.F., C.A. Andrews, L.L. Fancey, A.L. Cook, and J.R. Christian. 2007. Pilot study on the effects of seismic air gun noise on lobster (*Homarus americanus*). Canadian Technical Report of Fisheries and Aquatic Sciences 2712. 46 pp.

much more water than the blanket use of goldfish hearing as a proxy for all marine teleost fishes found in the DEIS.

Also found in section 4.2.1.2.2 and consistent with worrying convention in the DEIS to conflate an absence of data with an absence of harm is the comment that "The BOEM has determined that incomplete or unavailable data or information on the physiological effects or biochemical response of marine invertebrates in the AOI that results from acoustic noise is not relevant to reasonably foreseeable significant adverse impacts or essential to a reasoned choice among the alternatives."

This phrase and the assumptions that it substantiates should be pulled from the DEIS as it is only an opinion and not substantiated by the literature.

Some comments on modeling

Sound propagation and noise attenuation in the ocean is a complex topic. Almost any marine setting will exhibit propagation characteristics that defy our ability to model. This may obviate a need for ongoing monitoring during any potentially noisy operation as a matter of course. In lieu of comprehensive regional and temporal sound propagation models to feed with data we must rely on some stock, simple assumptions. Some simple assumptions are used in the DEIS, but given the scope of the proposed actions both in spatial and temporal terms, the simple models used in the DEIS fail to capture the extents of the impacts.

One assumption is that sound will propagate in a hemispherical pattern away from the source until the acoustical energy encounters a boundary. The 'broad brush' attenuation formula for this is: $20\log_{10}(r_1/r_2)$ where r_1 is the reference distance (usually 1 meter) and r_2 is the subject distance for evaluation.

Once the energy hits the seafloor the energy tends to spread in a cylindrical pattern wherein the attenuation formula is $10\log_{10}(r_1/r_2)$. Because the first boundary encountered is the seafloor, the sound levels at a distance within the depth of the ocean directly beneath the source will be more in line with attenuation at 20dB $\log_{10}$ of r. Far field will be more in line with $10\log_{10} r$. But there is some continuum between these attenuation conditions, so depending on the distance between the receiver and the source the attenuation factor may be closer to 17 in the "nearish field" and 13 in the far field.

Additionally, while it is not mentioned anywhere in the DEIS there is a secondary transmission path in the "mixed layer" above the marine thermocline that behaves as a "surface duct." While the propagation in this transmission path is dependent on the wavelength of the source, the angle of incidence, the depth of the mixed layer, and the surface conditions, the attenuation characteristics are more in consistent with the cylindrical model of $10\log_{10} r$. (see Urick 1983)[18]

[18] Urick, R. J. 1983. Principles of Underwater Sound. (3rd Edition). McGraw-Hill Book Company, New York, NY. Chapter 6

Transmission in the surface duct, along with the far-field cylindrical propagation highlights concerns in the "nearish" field pertaining to both required "exclusion zones" and the efficacy of marine mammal observers (MMO). It is already impractical to expect MMOs to effectively spot marine mammals at distances over 1000 meters in calm seas during the day. In these conditions a large airgun array with a source level of 229 dB re:1µPa @ 1m[(FN.19)] would require 10km to attenuate to 180dB re:1µPa exposure level.

$$229\text{dB} - 180\text{dB} = 41\text{dB} \rightarrow 10\log_{10}(1/13000) = -41\text{dB}$$

MMO effectiveness over these ranges is not just impractical, it is improbable. So it is clear that in most situations a large capacity survey cannot avoid subjecting any marine mammal within 10km to Level A harassment exposures from either the surface ducting or the cylindrical propagation of acoustical energy.

If you add the "second hit" from the reflected sound off of the sea bottom, and the direct noise from the hemispherical propagation, the receiver is hit with at least three distinct wave fronts from multi-path sources (all three transmission paths have differing geometrical lengths as well as different transmission speeds due to temperature, pressure, and salinity factors). These three paths need to be integrated into the Sound Exposure Level (SEL) metric in the near-to-intermediate field.

Additionally, due to the various transmission artifacts there may be situations in the far field in which the noise from the surveys are not heard as distinct pulses, but as a continuous noise due to reverberation and multipath effects.[2021,22,23] Because the noise would be continuous it should be mitigated under the 120dB "continuous noise" exposure threshold, particularly since the surveys will likely be occurring around the clock anyway.

These considerations preclude the use of large capacity seismic surveys if Level A harassment conditions are to be avoided.

Regarding the mitigation strategy of separating the survey vessels by more than 40 km: While the model was not clearly articulated it appears that the DEIS used the hemispherical attenuation factor of $20\log_{10} r$ to derive the 40km "mitigation" strategy.

A more accurate model for this setting is to determine what the exposure level would be at the midpoint (20km) between the two survey vessels. We assume that a source level of 235 dB (convergence in the far field is not influenced by the directivity of the array).

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[19] 235 dB (from Appendix D Table-22) – 6dB to accommodate for directionality of the array.

[20] Guerra, M., Thode, A.M., Blackwell, S.B., Macrander, A.M. (2011) "Quantifying seismic survey reverberation off the Alaskan North Slope., J. Acoustical Society of America 130:5 3046-3058

[21] Nieukirk, S.L., Mellinger, D.K., Moore, S.E., Klinck, K., Dziak, R.P., Goslin, J. (2012) "Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009, J. Acoustical Society of America 131:1102- 1112

[22] 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" J. Acoustical Society of America 115: 1832-1843

[23] Roth, E.H., Hildebrand, J.A., Wiggins, S.M., and Ross, D. (2012). "Underwater ambient noise on the Chukchi Sea continental slope" J. Acoustical Society of America 131:104-110

Using the hemispherical propagation model:

$$20\log_{10}(1/20000) = 86\text{dB} \rightarrow 235\text{dB} - 86\text{dB} = 149\text{dB re:}1\mu\text{Pa}$$

Each survey would contribute 149dB to the system, which at the mid-point between them would yield 152dB (adding two equal sound levels increases the overall level by 3dB). But as we know, far field propagation is not hemispherical, rather it is more cylindrical. Using exclusively the cylindrical model:

$$10\log_{10}(1/20000) = 43\text{dB} \rightarrow 235\text{dB} - 43\text{dB} = 192\text{dB re:}1\mu\text{Pa}$$

Each survey would contribute 192dB to the system, which at the mid-point between them would combine to add +3dB yielding 195dB – well above the 180dB exclusion zone. (These levels would also be significantly beyond the visual reach of MMOs.)

Of course the attenuation factor is somewhere between these two models, but this − like the surface ducting transmission path, is not accounted for in the DEIS.

Section comments on Alternatives:

In Section 2.1.3.1 (associated with chapter 4.2.1) evaluating the impacts of Alternative A, the statement is made regarding the lack of pressure gradient sensors in most marine invertebrates. It is known that many invertebrates have particle motion sensing systems. It is also mentioned that there is limited data on the vulnerability of these sensing systems to mechanical damage, and with this lack of data the writers of the DEIS assume therefore that marine invertebrates are "unlikely" to suffer physiological or pathological impacts from noise exposure.

Unfortunately most of the data we do have on the impacts of large vector particle motion on marine invertebrates is limited to intertidal animals and coastal animals such as lobster, shrimp, clams, scallops, and octopus which would have evolved sensory systems adapted to coastal turbulence and crashing waves and thus not necessarily vulnerable to high amplitude, coherent-vector particle motion. But there has been a correlation to squid mortality and damage associated with seismic airgun surveys, so the blanket assumption that damage to marine invertebrates "is expected to be **negligible**" is an assumption that is not supported by the range of evidence [24] (see also ref. 15, 16, and 17 above).

In Section 2.1.3.2 (associated with chapter 4.2.2) regarding the impacts of boomer, chirp, and sub-bottom profilers, and multi-beam depth sounders, the statement is made that "some of [these] are expected to be beyond the functional hearing range of marine mammals or would be detectable only at very close range." With the exception of the multi-beam depth sounders, these other sources would be detectable by odontocetes and should be evaluated for impacts.

[24] R.D. McCauley, J. Fewtrell, A.J. Duncan, C. Jenner, M-N. Jenner, J.D. Penrose, R.I.T. Prince, A. Adhitya, J. Murdoch and K. McCabe (2000) "Marine seismic surveys— a study of environmental implications" The Australian Petroleum Production & Exploration Association Journal p.692-708

Also in Section 2.1.3.2 the Level B impacts of vessel noise is discounted by the fact that Level B impacts from seismic surveys and other active noise sources have been accounted for. While numerically the exposure levels may have been accommodated in the Level B exposure criteria, this is an over-simplification of the response of animals to increasingly complex noises. It is likely that a fully operating seismic survey with system calibration signals, sea-floor profilers, and various other noises added to the sum of the noises of the vessel would have a more pronounced behavioral impact than the simple exposure impact of each of the sounds separately. It would stand to reason that a complex and varying sound field would have greater impacts than the impacts of just sound type at a specific amplitude – even if each one of them was at or below the Level B harassment threshold. Response to sound quality rather than level alone is substantiated in Frankel and Clark (1998).[25] (This argument appears in section 4.2.2.2 p.4-58 under Vessel Noise Evaluation as well.)

A more accurate (but equally simplistic) model would treat each noise source that exceeded the Level B harassment threshold as a separate Level B harassment.

While it is not entirely within the range of our acoustical impacts evaluation, under the same section 2.1.3.2 regarding accidental oil spills that "marine mammals would be expected to avoid areas of heavy fuel sheen" and thus the impacts would be "**negligible** to **minor.**"[26] Avoidance behavior of oil-sheen waters has not been confirmed and would not necessarily be an evolutionary adaptation. The fact is that there are many compelling photographs and accounts of dolphins and whales surfacing trough oil sheens during the BP oil disaster of 2010.[27] Additionally since the BP disaster the number of dead cetaceans washing ashore has increased significantly with evidence of hydrocarbon poisoning in their systems.[28] The "avoidance behavior" assumption should be pulled from the DEIS along with the assumptions that the comment substantiates.

Chapter 4 Description and Analysis comments

Where not previously addressed in these comments, the following comments are in consideration of Chapter 4 statements and evaluations.

In Section 4.2.2.2.2 "Evaluation" (p.4-52) the comment is made referencing Au and Hastings (2008)[29] that mammalian ears "behaves like an integrator with an integrator time constant," which in the paper is determined to be 100ms, and through this mechanism a 10ms pulse integrated over 100ms represents a 10dB decrease in exposure (presumably impacts). While this does mathematically work into the "Sound Exposure

[25] Frankel, A.S. and C. W. Clark. 1998. Results of low-frequency playback of M-sequence noise to humpback whales, *Megaptera novaeangliae*, in Hawaii. Canadian Journal of Zoology 1998:521-535.
[26] DEIS p. 2-16
[27] See the photos by John Wathan http://www.docudharma.com/diary/21948/wathen-bp-slick-covers-dolphins-whales-video-text.
[28] Leigh Coleman "Baby dolphin deaths rise along Gulf Coast" Reuters Feb. 23, 2011
[29] Au, W.L. and M.C. Hastings. 2008. Hearing in marine animals. In: Principles of marine bioacoustics. New York: Springer-Verlag.

level" metric[30] this metric is for physiological impacts only, there is no evidence of decreased stress from repetitive exposures of "short duration shocks" over longer pulses.

In the same section, p.4-53 "Level A Incidental Take Estimates" are referenced to Tables 4-9 and 4-10. These tables variously refer to either the "Southall criteria" or the "180dB criteria." The reason for choosing one over the other standard is not clear here, except that the "Southall Criteria" numbers are all significantly smaller. As mention before, the Southall Criteria should not be used until complete and approved through NEPA review.

In this same paragraph regarding the use of "other equipment, including sub-bottom profilers, side-scan sonars, and depth sounders" concurrently with airguns would have no additional impacts because "airguns represent the highest energy source" this "it is reasonable to assume that there would be no additional take from the electromechanical sources operating concurrently."

As indicated above it is a faulty assumption based on noise level exposure alone - we can assume that like humans, other animals respond negatively to the complexity of any agonistic signal. For example a racing engine may not in-and-of-itself be too alarming, but if it is accompanied by the noise of grinding metal, or a the beeping of an alarm - even if the noises do not measurably add to the overall noise level, they will induce very different impacts on the nervous system.

Additionally, the noises of the other electromechanical systems are operating across different frequency bands which would not necessarily be masked by the low frequency noise of airguns. Concurrent noise sources are not a set of individual exposures, rather they all contribute to an entire soundscape. These "holo-phonic" impacts will be far greater than individual sound sources or even the sum of concurrent sound sources. In this context a survey operation with two or more boats and an array of profilers and multi-beam sonars should be evaluated across the entire noise spectrum, and over the entire time of the operation. In this context many of these surveys would qualify as "continuous noise sources, and thus subject to the 120dB mitigation criteria.

In the "Conclusion" section the airgun evaluation it is stated from Tables 4-10 and 4-11 that "Incidental take calculations presented in for seismic airgun survey-related noise may be "conservative" because the exposure evaluations "do not consider functional hearing sensitivity ranges for the various species and so assume that all of the species are equally sensitive to received sound frequencies and levels."

While it is true that various animals have adapted to their own acoustical niches, we must assume that these animals reside in a complete bio-acoustic habitat with other animals and that the receivers are not just individual subjects in a test environment.

It would actually be more realistic to state that the auditory thresholds of odontocetes have been determined by way of captive animals that have been habituated (trained) to respond to operant conditioning and to cooperate with Audio Evoked Potential auditory

[30] Hastings MC, Popper AN (2005). Effects of Sound on Fish. California Department of Transportation Contract 43A0139, Task Order 1. Available from URL: http://www.dot.ca.gov/hq/env/bio/files/Effects_of_Sound_on_Fish23Aug05.pdf

testing. These individual animals only approximate the hearing responses of wild animals which often respond as a group to sound stimulus and are adapted to be more responsive to environmental sounds.

Additionally the auditory responses of mysticetes have only been approximated by way of anatomical studies of dead animals and modeled from other vertebrate hearing and thus the auditory threshold models do not clearly represent the entire auditory response capabilities of living baleen whales residing in their natural habitat.

In the same section p.4-55 in is insinuated that animals with differing hearing priorities would have the chance to evade a slow-moving seismic operation to "avoid exposure to injurious sound levels." What is not taken into consideration is the likelihood that most animals are in a particular area because they need to be there – for feeding, community coherence, family bonding, and breeding opportunities. Forced relocation due to exposure to agonistic stimulus undoubtedly increases stress, compromising metabolic, social, and immune system functions.

On p.4.56 referring to the "non-airgun HRG surveys" impacts conclusion section, the statement is made that "Level A take estimates that were calculated utilizing only the 180-dB criterion do not consider functional hearing sensitivity ranges for the various species and so assume that all of the species are equally sensitive to received sound frequencies and levels."

This statement appears to be a specious attempt to soft-pedal exposure impacts. The decision to use the "180 dB Criteria" as a mitigation threshold is an accepted, historical standard predicated on a known auditory thresholds found in captive animals. It was chosen as a mitigation threshold after long deliberation. Deconstruction of this standard for the purpose of this this DEIS is inappropriate.

In the same paragraph: "assuming selective avoidance of the sound source by individual animals and operations within an open ocean environment" is implied as a mitigation strategy. This is not a mitigation strategy; rather it is why mitigation strategies are required. This statement should be pulled from the DEIS along with the assumptions it purportedly substantiates.

In the evaluation of noise impacts from "Vessels and Equipment Noise" p.4-57 that "broadband source levels for most small ships (a category that would include seismic survey vessels and support vessels for drilling of COST wells or shallow test wells) are anticipated to be in the range of 170-180 dB re 1 μPa at 1 m and source levels for smaller boats (a category that would include survey vessels for renewable energy and marine minerals sites) are in the range of 150-170 dB re 1 μPa at 1 m (Richardson et al., 1995)." As these operations are continuous and not periodic or pulse noises the mitigation threshold would be 120dB re: 1 μPa, so the exclusion zone in the loudest instance would be:

$$180\text{dB} - 60\text{dB} = 120\text{dB}$$

$20\log_{10}(1/1000) = -60\text{dB}$ or 1000m for spherical propagation, and

$13\log_{10}(1/40000) = -60\text{dB}$ or 40km for far field propagation per our earlier argument.

Also on the same page is the statement:

> "Drilling-related noises from semi-submersible platforms in deeper waters ranges in frequencies from 10 to 4,000 Hz, and therefore audible to all cetacean and pinneped species within the AOI. Drilling sound source levels from semi-submersible platforms are estimated at 154 dB re 1 μPa-m. Source levels for drillships have been reported to be as high as 191 dB re 1 μPa during drilling. It is expected that marine mammals would detect drilling-related noises within a radius of audibility."

This statement needs to be clarified: Semi-submersible platforms are stabilized by way of thrusters, which have not been characterized in the literature, nonetheless with a source level of 191dB and due to the continuous characteristic of the noise will need to be mitigated at the 120dB exclusion zone, not just "within a radius of audibility."

Given: 191dB – 69dB = 120dB

$20\log_{10}$ (1/2850) = -69dB or 2.85km for spherical propagation, and

$13\log_{10}$ (1/200000) = -69dB or 200km for far field propagation per our earlier argument

Of course this is a simple model and does not account for frequency-dependent sound absorption over distance, but is also does not account for surface channel propagation or effects of multipath propagation over distance. The appropriate use of the 120dB mitigation threshold would preclude the use of semi-submersible platforms in the Area of Interest for exploratory drilling, and in the future for extraction and production.

Summary and Conclusion

While BOEM, and their legacy agencies MMS under the Department of the Interior have not been known to be precautionary, the Atlantic Geological and Geophysical DEIS appears to over-extend hospitality to industry by systematically failing to address many impacts that will occur if either Alternative A or Alternative B is approved.

From the foregoing discussion the following corrections and recommendations should be included in the Atlantic Geological and Geophysical DEIS:

1. NMFS –MMPA Level A and level B criteria should be used exclusively throughout the DEIS. The "Southall Criteria" should not be used until it is complete and has gone through NEPA review.
2. The words "**negligible"** and "**minor"** in the DEIS should be always traceable to peer reviewed papers that substantiate the particulars of the specific evaluation.
3. All references to "habituation" should be removed from the DEIS, especially where it is inferred as a mitigation strategy because it is not supported by the literature.
4. All references to "Ramp-up" and "Soft Start" being used as a mitigation strategy should be either pulled from the DEIS, or included with the caveat that there is no evidence that these techniques are effective (until proven otherwise).

5. All references to fish not being subject to permanent hearing damage should be removed from the DEIS along with the consequent assumptions associated with the comment because it is not supported by the literature.
6. References to acoustical impacts on marine invertebrates – particularly squid, should be updated and included in the EIS to reflect current state of understanding.[31,32,33,34,35]
7. Sound propagation models should include provisions for surface duct transmission paths in seismic surveys, and thruster-stabilized platform and drill-ship operations.
8. Sound propagation models of seismic surveys should account for reverberation and multipath effects in the far field. If the far field noise artifacts are not distinguishable as discrete pulses then the noise criteria should fall under the 120dB mitigation threshold for continuous noise.
9. Exposure to the same seismic signal that arrives at the receiver as multiple signals due to time domain differences in direct, reflected, surface, and SOFAR ducting should be considered separately and figured into the overall Sound Exposure Level (SEL) metric.
10. Complex noise exposures should be integrated as a complete sound field over time rather than taken as a set of discrete noise sources. As such most seismic surveys would be considered "continuous noise sources" in the far field and should be subject to the120 dB Continuous Noise mitigation criteria.
11. Expecting MMOs to effectively find marine mammals at night or in exclusion zones greater than 1000 meters is impractical even in calm sea states. Seismic survey operations should be limited to times and conditions in which MMOs can actually locate marine mammals within the prescribed exposure-dependent "exclusion zone".
12. Boomers, chirp, and sub-bottom profilers, should be more closely scrutinized in terms of their respective impacts on odontocetes.
13. Suggesting an animal's "selective avoidance" be used as a mitigation strategy is circular reasoning and fails to address the purpose of the DEIS. Comments to this effect found throughout the DEIS should be pulled from the document.
14. Under any airgun operation the noise propagation models used in the Final EIS should be verified in the field with acoustical monitoring both in the near and far fields until there is confidence that the EIS models represent the actual noise propagation in the field.

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[31] Michel André, Marta Solé, Marc Lenoir, Mercè Durfort, Carme Quero, Alex Mas, Antoni Lombarte, Mike van der Schaar, Manel López-Bejar, Maria Morell, Serge Zaugg, and Ludwig Houégnigan (2011) "Low-frequency sounds induce acoustic trauma in cephalopods" Front Ecol Environ 2011; doi:10.1890/100124

[32] T. Aran Mooney, Roger T. Hanlon, Jakob Christensen-Dalsgaard, Peter T. Madsen, Darlene R. Ketten and Paul E. Nachtigall" Sound detection by the longfin squid (*Loligo pealeii*) studied with auditory evoked potentials: sensitivity to low-frequency particle motion and not pressure J Exp Biol 2010 213:3748-3759.

[33] R.D. McCauley, J. Fewtrell, A.J. Duncan, C. Jenner, M-N. Jenner, J.D. Penrose, R.I.T. Prince, A. Adhitya, J. Murdoch and K. McCabe (2000) "Marine seismic surveys— a study of environmental implications" The Australian Petroleum Production & Exploration Association Journal p.692-708

[34] A. Guerra*, A.F. González and F. Rocha (2004) A review of the records of giant squid in the north-eastern Atlantic and severe injuries in *Architeuthis dux* stranded after acoustic explorations" International Council for the Exploration of the Sea CC:29

[35] Payne, J.F., C.A. Andrews, L.L. Fancey, A.L. Cook, and J.R. Christian. 2007. Pilot study on the effects of seismic air gun noise on lobster (*Homarus americanus*). Canadian Technical Report of Fisheries and Aquatic Sciences 2712. 46 pp.

15. Semi-submersible drilling platforms and thruster stabilized drilling ships need to be evaluated for noise contribution while in operation and due to the continuous noise characteristic of their thrusters, and need to be mitigated at the 120dB re 1 μPa exclusion criteria.

It appears from the forgoing that neither Alternative A nor Alternative B will meet safe exposure criteria established under the Marina Mammal Protection act, and will cause significant habitat and wildlife damage. This should be avoided. Waiving the extents of the damages with "take authorizations" and "harassment permits" is a short-sighted hubristic strategy that does not take into consideration our own species dependence on healthy, productive marine habitats.

It is increasingly clear that the costs of promoting fossil fuel exploration and production is becoming prohibitively high. The good news in this is that consideration of the true costs of hydrocarbon exploration, extraction, production, and consumption will give our economic society greater incentives to conserve the fossil fuel that we can extract without the extreme collateral damage, and to develop energy alternatives that are regenerative and less damaging to our own habitat.

Thank you for this opportunity to review and comment on the proposed actions.

Sincerely,

Michael Stocker
Director

#4

U.S. Department of the Interior
Bureau of Ocean Energy Management

BOEM
Bureau of Ocean Energy Management

Public Meetings for the Draft Programmatic Environmental Impact Statement for Proposed Geological and Geophysical Activities in the Mid- and South Atlantic Planning Areas

COMMENT SHEET

Comments: **PLEASE PRINT**

The regional climate protection organization I am representing opposes drilling and any steps that lead to expanded drilling, for a few simple reasons. Drilling only prolongs and expands our dependence on fossil fuels, environmentally threatening the Hampton Roads area - both with oil leaks and with the effects of climate change, sea level rise and extreme weather events. If the administration takes the step of opening our coast to drill for any oil or gas discovered through offshore seismic testing, the entire $83 billion coastal tourism and recreational industries would be jeopardized. Energy experts say that there is no credible link between domestic drilling and gas prices, describing it as naive to think that lifting the moratorium would have better than a negligible impact of a cent or two per gallon at the pump. High oil prices today are a global phenomenon. The global balance of supply and demand would not change significantly. Continued dependence on fossil fuels has consequences for the climate. We are loading the dice, and painting higher numbers on them, and we should expect worse hurricanes like Isabel, the most damaging hurricane to hit the area in decades. Storm surge, winds, heavy rains and flooding killed 10 people in Virginia and caused $1.85 billion in damages in state, and spawned a tornado in the waterfront Ocean View district of Norfolk. Oil drilling risks local livelihoods and plays to a way of thinking that keeps us addicted to greenhouse-gas intensive fossil fuels, benefitting Big Oil, not VA. Offshore wind will not harm our climate or coastline or endanger fishing or tourism and should be developed without delay.

Name: Hannah Wiegand

Title:

Organization: Chesapeake Climate Action Network

Address: 1108 East Main St. Suite 603

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Comments are not limited to the space on this sheet. Please feel free to add additional sheets if necessary.

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Mr. Gary D. Goeke, Chief
Regional Assessment Section
Office of Environment (MS 5410)
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Gulf of Mexico OCS Region
1201 Elmwood Park Blvd.
New Orleans, LA 70123-2394

24 May 2012

RE: Proposed Geological & Geophysical Activities in the Mid- and South Atlantic OCS Planning Areas Atlantic City, New Jersey hearing, 27 April 2012

Dear Mr. Goeke,

The Sierra Club, the oldest environmental organization in the United States, opposes any and all plans to undertake seismic testing along the Atlantic coastline, which would lead to future oil and gas exploration and extraction. In my capacity as the Conservation Chair of the Sierra Club, Ocean County Group, New Jersey, I submit the following comments on the subject referenced above.

I – Endangered and Threatened Marine Species

Seismic testing would have a detrimental impact on a number of endangered and threatened species as well as any living marine creature, plants and animals. The pressure disturbance of *sound waves* which travels through a medium by means of particle-to-particle interaction, will distorts sonar communications between whale species as well as dolphins. Sound in *saltwater* travels at about 1500m/s, and it had been stated that the Atlantic Coast OCS would require nearly *43 million blasts.*

A – North Atlantic Right Whale – Endangered 1970

The North Atlantic Right Whale *is the most endangered whale on the planet with less than 350 extant.* These marine mammals can reach a length of 13.7-16.7m (45-55 feet), weigh up to 70 tons (63,500kg) and it is estimated that they can reach 50 years or more. Their diet exists of zooplankton including copepods, euphausiids and cyprids. Therefore, Right Whales are considered surface feeders. The physical waves of seismic testing would destroy the whales' food source as well as their communication. The Right Whale migrates from Florida all the way north to Nova Scotia, Canada each year. Scientists who have dedicated most of their professional careers to studying these mammals do not know their location at any given point and time. Those individuals involved in "seismic testing" hardly could know!

B – Northeast Atlantic Ocean Loggerhead Turtles – Endangered 2011

The weight of the adult turtles can reach 113 kg (250lbs), hatchlings on average 20g. The average length is ca. 1 m (3 feet). How long they live is not known, but they can reach sexual maturity at approx. 35 years of age. Their diet consists of whelks and conch, and the female nests from April-September and generally lays 3-5 eggs per season.

C - Atlantic Sturgeon – Endangered 2012

The adults of the species reach a weight up to 361 kg (800 lbs) and a length up to 12 feet. Their life expectancy is between 50 to 75 years. Their diet consists of mollusks, worms, snails, invertebrates, shrimps, small bottom-dwelling fish and insect larvae. The Sturgeon is more or less a bottom feeder.

These are just the three species that are on the Marine ESA list. But seismic testing and possibly later drilling and installing platforms for oil and gas extraction will impact the entire sea life along the path of the Gulf Stream. One has to understand the movement of the water current along the eastern coastline; such as the *Coriolis force,* the surface water, which moves at faster pace than the *Thermohaline circulation,* the "Global Conveyor Belt," which comprises nearly 90 per cent of ocean waters and constitutes the deep water currents (at a depth of 400 m). Not only does any seismic testing interrupt the feeding sources for marine life, it would certainly also destroy **Critical Habitat** they need to survive. Seismic induced waves inflict heavy damage on the marine environment. It would bring loss of spawning areas and water pollution. One has to remember that the fishing industry makes their living on the seas and brings valuable foods to the nation's tables.

II – Weapons of Mass Destruction (WMDs)

Only in the late 1960s was the dumping by the US military of thousands of canisters of chemical weapons into the waters of the East Coast halted. Records show that the military disposed of WMDs for decades, from 1944 to 1970. Off the coast of New Jersey the military dumped containers of mustard gas and nerve gas, off Virginia and South Carolina canisters of arsenic trichloride, white phosphorus, mustard gas and lewisite. When in 1987 hundred of dolphins washed ashore in Virginia and New Jersey beaches with burns similar to mustard gas exposure, a marine mammal specialist believed chemical weapons dumped in the ocean by the US Army killed these animals.

It is a real possibility that any seismic activity will speed up the breakdown of those aged containers and cause leakage. Not only will any dispersal of such toxic chemical cause great harm to marine life, it may also cause major injury, such as severe spastic paralysis and even death if the respiratory muscles become paralyzed in those human workers. To take it one step further: will the American consumer put seafood on their table contaminated with arsenic and other toxic substances?

III – Tourist Trade

Here along the New Jersey shoreline many people earn their livelihood from the tourist trade. It is estimated that tourism in New Jersey brings in $40 BILLION a year. That is income for the hospitality trade as well as the fishing, boating, swimming, sailing industry and wildlife-related recreation. Families come here to enjoy the clean air and the clean water of the shores and beaches. Businesses can ill afford any interruption of their seasonal income. The beaches of New Jersey are their treasure and need to be protected. In addition to loss of tourism in case of a disastrous accident, property values along the eastern seaboard, and particularly to New Jersey, would be astronomical.

IV – The Gulf Stream

Even if there were to be no seismic testing at the New Jersey coast at the present time, this state and its tourism trade and fishing industry would be impacted by any unforeseen future oil spill, if later drilling was approved along the coastline of Virginia and the Carolinas. The Gulf Stream runs along the entire eastern seaboard and the damage to the environment and estuaries would be unbelievable. Based upon traditional currents, a spill off Virginia would reach New Jersey's southern beaches in about forty-eight (48) hours. As of this day and judging by reports, the area of the horrendous Deepwater Horizon disaster in the Gulf of Mexico is still inundated by suffering and dying sea life, and will be for many years to come.

V- Fossil Fuels

With the ever-increasing evidence of sea level rise along the nation's shorelines one wonders why there is still the push for more oil and gas exploration. There needs to be exploration of alternative energy sources. For your office to claim that you are involved in developing ***"Renewable Energy Programs"*** sounds irresponsible. Are you aware that a possible renewable power source is available without damage to marine life and industry? The Gulf Stream transports ca. 1.4 petawatts of heat which is the equivalent of 100 times the world energy demand.

The Sierra Club Ocean County opposes any seismic testing and future oil and gas exploration in the Atlantic Ocean for the reasons mentioned above. I thank you for giving us the opportunity to express our deep concerns.

Sincerely,

Margit Meissner-Jackson

Copy to:
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Washington, DC

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April 20, 2012

Mr. Gary D. Goeke
Chief, Regional Assessment Section
Office of Environment (MS 5410)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard,
New Orleans, Louisiana 70123–2394.

Dear Mr. Goeke:

The Southern Alliance for Clean Energy is a regional organization that promotes responsible energy choices that create climate change solutions and ensure clean, safe and healthy communities throughout the Southeast. We welcome this opportunity to engage in a thoughtful offshore energy discussion and we would like to thank you for your willingness to discuss offshore energy. SACE would like to voice our support for offshore wind energy while urging a moratorium on offshore oil or natural gas development in the Mid-Atlantic and South Atlantic planning areas.

Offshore Wind Energy is a Better Investment than Offshore Oil and Gas

While no offshore wind farms have been built in the U.S., several proposed wind farms are in the advanced stages of the permitting process. Most of the proposed projects are in the North Atlantic Planning area; however, the Mid-Atlantic and South Atlantic planning areas arguably have the best offshore wind resource in the country.[1]

Offshore wind energy isn't a new idea. Currently, nearly 4 gigawatts of offshore wind farms are operational in Europe.[2] A single gigawatt of offshore wind energy can generate as much electricity as is consumed by about 305,000 average-sized homes annually. Europe plans on installing 150 gigawatts of offshore wind energy by 2030, which would provide between 13% and 18% of that continent's electricity demand.[3] Based on these projections, some 293,000 manufacturing, installation, operations and maintenance jobs could be created in the offshore wind industry in Europe by 2030. Aside from Europe, China is the only other place in the world where offshore wind farms are currently operational.[4]

With offshore wind electricity generation, there is no air pollution, no risk of a catastrophic accident, no water consumption and no mining operations.[5] In addition to supplanting dirtier sources of energy, offshore wind farms may provide artificial reef sites. Some European studies suggest offshore wind farms act as habitat for fish and other wildlife, and may actually improve the ecosystem.[6] More research must be completed to determine the total ecosystem impact from offshore wind turbines.

Offshore Oil and Gas Prospecting is Unnecessary and Harmful

The current Draft Programmatic Environmental Impact Statement (DPEIS) issued by BOEM for geologic and geophysical (G&G) activities off the Mid-Atlantic and South Atlantic planning areas extends significantly beyond areas of interest for offshore wind energy deployment. Geological and geophysical surveys beyond the needs for offshore wind development amount to prospecting activities for offshore oil and gas development. The excessive and intrusive nature of G&G activities for oil and gas prospecting will cause undue harm to the marine environment. Additionally, previous oil and natural gas assessments of the Mid-Atlantic and South Atlantic show there are limited economically viable resources in these planning areas. Geophysical and geological activities beyond what is necessary for offshore wind energy deployment are unnecessary and harmful.

The proposed G&G activities in the DPEIS extend from 3 nautical miles to 350 nautical miles – far beyond the internationally recognized 200 nautical mile exclusive economic zone. In order to cover this substantial swath of ocean area, shipping and aerial traffic are likely to significantly increase. Excessive shipping traffic can cause displacement and mortality of marine species, including fish, sea turtles and marine mammals. The North Atlantic Right Whale is particularly at risk from ship strikes[7], and increasing shipping traffic for G&G activities may exacerbate hazards posed to this critically endangered species.

Seismic geological and geographic studies used for oil and natural gas resource assessments can emit extremely loud noises to penetrate deep into the seabed.[8] These sounds bounce back from the seafloor and below to a collection system onboard a ship. Far from being benign, these loud noises have been shown to cause marine mammals distress and even deafness if the wildlife is too close.[9] Many marine mammals and even fish rely on sound to navigate, hunt and mate. Conducting large-scale seismic testing off the Mid-Atlantic and South Atlantic coasts would do harm to the marine environment, and there is no guarantee of finding significant oil or natural gas resources.

Previous estimates on the offshore oil and natural gas resources for the Mid-Atlantic and South Atlantic show the areas do not contain substantial hydrocarbon resources. At $110 per barrel, the Bureau of Ocean Energy Management estimates that the economically extractable resource potential for the Mid-Atlantic and South Atlantic combined is approximately 1.5 billion barrels of oil and about 11 trillion cubic feet of natural gas from between 3 nautical miles to 200 nautical miles from shore.[10] To put the amount of oil potential into context, the U.S. consumes approximately 19 million barrels of oil a day[11], making the 1.5 billion barrels of oil worth about 79 days of U.S. oil demand. Natural gas consumption is expected to average about 70 billion cubic feet per day in 2012[12], which means the estimated natural gas resource offshore represents about 157 days worth of total U.S. demand. This minuscule amount of oil and natural gas cannot justify the large risk to the offshore environment from wide-scale G&G activities.

Furthermore, considering the end goal of G &G activities beyond areas of interest for offshore wind energy deployment is to drill for oil and gas, we would like to point out the intrinsic risk in investing time, energy, and money into the G&G process which may never even result in the production of energy. In the years between now and the potential installation phase of drilling rigs, clean energy technology and deployment are anticipated to advance greatly and supply greater amounts of clean energy for less expensively than they are currently capable. Given this scenario, the incentive for offshore drilling will be dampened, thus negating the value of near-term exploratory efforts. Furthermore as time passes and the public learns more about the long-term aftermath of the Deepwater Horizon disaster, we expect public opposition to offshore drilling to grow, particularly as offshore wind, as a clean, renewable, and popular ocean-based energy resource—and thus a counterpoint to offshore drilling—comes online.

Recommendations

In order to promote offshore wind energy, and minimize the financial and ecological risks associated with geological and geophysical (G&G) activities, the Southern Alliance for Clean Energy makes the following recommendations:

1) Contain G&G activities to the Wind Energy Areas (WEA) designated by the Bureau of Ocean Energy Management (BOEM). Thus far, BOEM has identified areas off Virginia, Maryland, Delaware and is actively working with taskforces in North Carolina and South Carolina to identify WEAs offshore.[13] These areas are likely to be the focal points for first-generation offshore wind farm installations within the planning areas. Focusing on these areas for G&G activities will minimize ship traffic and will be maximally beneficial for offshore wind energy development. BOEM should also work to develop WEA's for Georgia and Florida.

2) Limit G&G activities to collect relevant data for near-term offshore wind energy deployment. Average turbine installation depth and distance from shore for offshore wind farm projects under development in Europe are approximately 25 meters depth and 20 miles offshore; however, commercially available turbines have been installed in Europe in up to 50 meters depth and up to approximately 62 miles offshore. Most turbines installed utilize a pile-driven monopile foundation structure and submarine interconnection cables.[14] Shallow water, near-shore, shallow penetration G&G activities are best suited for offshore wind energy deployment technologies in the near term and BOEM should focus its efforts on these types of activities. Deep-penetration seismic surveys and electromagnetic surveys are likely unnecessary for offshore wind energy development and thus should be foregone.[15]

3) Minimize overlapping of similar G&G activities in the Mid-Atlantic and South Atlantic. Increased shipping traffic and intense acoustic surveying are likely to have impacts on the marine environment.[16] Disallowing duplicative G&G activities is likely to decrease these impacts by reducing ship traffic.

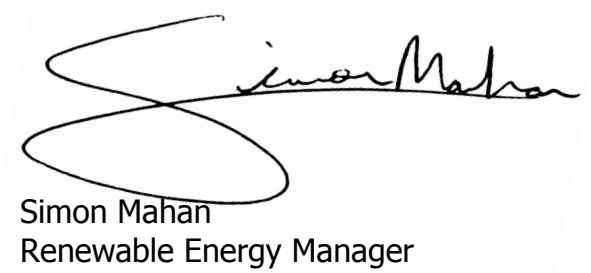
4) Prohibit G&G activities from November to April, which is when the North Atlantic Right Whale are most likely to be within the Mid-Atlantic or South Atlantic planning areas.[17]

5) Do not allow G&G activities specifically designed for offshore oil and natural gas resource assessments or have limited applicability to the offshore wind industry.

Conclusion

Based on the Mid-Atlantic and South Atlantic's offshore wind energy resource, as well as the benefits of developing offshore wind farms, the Southern Alliance for Clean Energy recommends that the Bureau of Ocean Energy Management work to urgently promote and develop offshore renewable energy. Offshore wind energy, without the risks that fossil fuel development poses to the health and vitality of the region, has more benefits than costs, and is preferred over developing the miniscule offshore oil or natural gas resource. With proper siting, studies and incentives, offshore wind energy can generate abundant clean energy and create numerous jobs while protecting the marine environment.

Sincerely,



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