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March 12, 2015

VIA E-MAIL AND U.S. MAIL, RETURN RECEIPT REQUESTED

Mr. Curtis Joyner
South Carolina Department of Health and Environmental Control
Office of Ocean and Coastal Resource Management
1362 McMillan Ave, Suite 400
Charleston, South Carolina 29405
joynercm@dhec.sc.gov

**Re: Proposed Consistency Certification for Spectrum Geo Inc. Atlantic 2D
Geophysical Survey; Notice No. CZC-15-0061; BOEM Application E14-006**

Dear Mr. Joyner:

The Southern Environmental Law Center (“SELC”) submits these comments on behalf of the South Carolina Coastal Conservation League, Natural Resources Defense Council, South Carolina Wildlife Federation, Conservation Voters of South Carolina, Waccamaw Riverkeeper, Charleston Waterkeeper, the Charleston Chapter of The Surfrider Foundation, and the Southern Alliance for Clean Energy on the proposal by Spectrum Geo Inc. (“Spectrum”) to collect two-dimensional (“2D”) geophysical seismic data offshore of South Carolina. Our organizations are profoundly concerned about Spectrum’s intention to conduct high-intensity seismic surveys off of South Carolina’s coast because of the significant environmental harms presented by seismic exploration, as well as the potentially catastrophic impacts of offshore oil drilling. During federal consistency review, South Carolina has an important opportunity to protect its coastal resources from seismic exploration, as well as the potential dangers of offshore oil development.

As described more fully below, we do not believe Spectrum’s proposal is consistent with South Carolina’s federally-approved coastal management program (“CMP”) for the following reasons:

- Spectrum’s proposal would result in undue harm to marine mammals, including the critically-endangered North Atlantic right whale;
- Spectrum’s proposal fails to adequately protect sea turtles and would result in undue harm to these threatened and endangered species;
- Spectrum’s proposal would result in significant adverse impacts to South Carolina’s fisheries and fish habitat; and
- The long-range, cumulative impacts of Spectrum’s proposal, as well as the other pending seismic survey proposals and potential future oil and gas drilling, threaten the sustainability of South Carolina’s coastal ecosystem and economy, and will provide little, if any, economic benefit.

- Spectrum has failed to provide any information whatsoever about the project’s long-range, cumulative effects.

In light of the enforceable policies of South Carolina’s CMP, the special resources it is designed to protect, and the threats to those resources from this proposed activity, we believe that Spectrum’s proposal is inconsistent with South Carolina’s CMP and OCRM should therefore object to Spectrum’s consistency certification. At a minimum, OCRM should find that Spectrum has not provided sufficient information to demonstrate that its proposal *is* consistent with the CMP.

I. Legal and Factual Background

The federal Coastal Zone Management Act of 1972 (“CZMA”) was passed by Congress to “promote comprehensive and coordinated planning for coastal zone development and preservation between states and the federal government.”¹ The CZMA articulates a number of policy objectives, including “to preserve, protect . . . and restore or enhance the resources of the Nation’s coastal zone; [and] to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and aesthetic values as well as to needs for economic development.”² Coastal states have “substantial and significant interests in the protection, management, and development” of resources in the exclusive economic zone that are best served by state involvement in plans that impact coastal resources and the development of state coastal management plans.³ Under the CZMA, each coastal state may adopt a coastal zone management plan that provides for “the protection of natural resources, including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife and their habitat, within the coastal zone” and “management of coastal development to improve, safeguard, and restore the quality of coastal waters, and to protect natural resources and existing uses of those waters,” among other objectives.⁴

In accordance with the CZMA, in 1977, South Carolina enacted the Coastal Tidelands and Wetlands Act (known as the “South Carolina Coastal Zone Management Act”).⁵ The Act recognized that “[t]he coastal zone is rich in a variety of natural, commercial, recreational and industrial resources of immediate and potential value to the present and future well-being of the State,” as well as that “[t]he coastal zone and the fish, shellfish, other living marine resources and wildlife therein, may be ecologically fragile and consequently extremely vulnerable to destruction by man’s alterations.”⁶ The Act required the South Carolina Department of Health

¹ *Conservation Law Found. v. Watt*, 560 F. Supp. 561, 574 (D. Mass. 1983), *aff’d sub nom. Com. of Mass. v. Watt*, 716 F.2d 946 (1st Cir. 1983).

² 16 U.S.C. § 1452(1)-(2).

³ *Id.* at § 1451.

⁴ *Id.* at § 1452(2)(a)-(b).

⁵ S.C. Code Ann. §§ 48-39-10 *et seq.*

⁶ *Id.* at § 48-39-20.

and Environmental Control (“DHEC”) to develop a comprehensive coastal management program to implement the objectives and policies of both the federal CZMA and South Carolina’s CZMA.⁷ DHEC was further instructed to “[d]evelop a system whereby the department shall have the authority to review all state and federal permit applications in the coastal zone, and to certify that these do not contravene the [CMP].”⁸ One primary goal of the CMP is the “[d]evelopment of a management program that will achieve a rational balance between economic development and environmental conservation of natural resources in the coastal zone of South Carolina.”⁹

In determining whether to certify an activity as being consistent with the CMP, DHEC’s Office of Ocean and Coastal Resource Management (“OCRM”) must consider “[t]he extent and significance of impact on the following aspects of quality or quantity of these valuable coastal resources,” including the “destruction of endangered wildlife or vegetation or of significant marine species” and the “degradation of existing water quality standards.”¹⁰ Specifically, for activities occurring in the coastal zone, OCRM should not certify an activity as being consistent with the CMP if it will have a significant negative impact on wildlife and fisheries resources, either on the stocks themselves or their habitat, unless overriding socio-economic considerations are involved.¹¹ Further, “[w]ildlife and fisheries stocks and populations should be maintained in a healthy and viable condition and these resources should be enhanced to the maximum extent possible” and “[c]ritical wildlife and fisheries habitat should be protected and enhanced to the extent possible.”¹² OCRM must also consider “[t]he possible long-range, cumulative effects of the project, when reviewed in the context of other possible development and the general character of the area.”¹³

It is important to recognize that the CMP does not specifically consider Outer Continental Shelf (“OCS”) oil and gas exploration and development activities such as seismic surveys because there was little historical interest in oil and gas development off the coast of South Carolina.¹⁴ Spectrum’s proposal and the other impending seismic survey applications are unprecedented in both their scale and their significance of impacts. OCRM must therefore exercise extreme caution as it undertakes this consistency review, and should look to existing state law regulating oil and gas exploration and drilling within state waters for guidance. For example, when it enacted the laws governing these activities within South Carolina’s jurisdictional limits, the General Assembly “[f]ound and declare[d] that the highest and best use of the seacoast of the State is as a source of public and private recreation,” and

that the preservation of this use is a matter of the highest urgency and priority, and that such use can only be served effectively by maintaining the coastal waters,

⁷ *Id.* at § 48-39-80.

⁸ *Id.*

⁹ CMP (July 1979) at III-1.

¹⁰ CMP at III-14.

¹¹ Policies and Procedures of the CMP (July 1995) at III-41.

¹² *Id.*

¹³ CMP at III-14.

¹⁴ *See* CMP at IV-32 (“the likelihood of South Carolina experiencing any significant Outer Continental Shelf (OCS) related activity onshore in the immediate future seems slight”).

estuaries, tidal flats, beaches, and public lands adjoining the seacoast in as close to a pristine condition as possible, taking into account multiple use accommodations necessary to provide the broadest possible promotion of public and private interests.¹⁵

Further, the transfer of pollutants, such as would occur with oil and gas drilling and transportation, is a “hazardous undertaking” and

[s]pills, discharges, and escapes of pollutants occurring as a result of procedures involved in the transfer, storage, and transportation of such products pose threats of great danger and damage to the environment of the State, to owners and users of shore front property, to public and private recreation, to citizens of the State and other interests deriving livelihood from marine-related activities, and to the beauty of the coast.¹⁶

Finally, “[s]uch state interests outweigh any economic burdens imposed upon those engaged in transferring pollutants and related activities,” because “the preservation of the public uses referred to herein is of grave public interest and concern to the State in promoting its general welfare, preventing diseases, promoting health, and providing for the public safety.”¹⁷

Clearly, the coastal zone of South Carolina is an ecologically rich area that supports resources of vital importance to all citizens of the state. These resources include federally protected sea turtles, such as federally threatened loggerheads; marine mammals, including dolphins and federally endangered North Atlantic right whales; and productive commercial and recreational fisheries. As OCRM and the National Oceanic and Atmospheric Administration (“NOAA”) have recently pointed out, these natural resources are not only ecologically irreplaceable; they are also of vital economic importance. According to OCRM, marine fisheries provide over a billion dollars in economic value to the state, coastal tourism is responsible for approximately half of a \$17 billion tourism industry in South Carolina, and the impact of outdoor recreation-related coastal tourism is approximately \$7.046 billion.¹⁸ Each year, more than a million residents and 15 million visitors enjoy boating, fishing, and recreating along South Carolina’s coast.¹⁹ Beaches are the primary reason that non-residents choose South Carolina as a vacation destination – in 1999, South Carolina’s 187 miles of beaches attracted more than 28 million visitors – and South Carolina’s coastal resorts account for more than 60 percent of total state tourism revenues.²⁰ In further support of the ecological and economic value of natural resources off the coast of South Carolina, NOAA explained that in 2011, the National Marine Fisheries Service (“NMFS”) determined that recreational fishing created over 3,300 jobs; \$115

¹⁵ S.C. Code Ann. § 48-43-520.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ Letter from Rheta DiNovo (OCRM) to Paul Scholz (NOAA) (Aug. 25, 2014).

¹⁹ NOAA, *available at* <http://coast.noaa.gov/magazine/2011/03/article3.html?redirect=301ocm> (accessed Feb. 11, 2015).

²⁰ Free, Kathryn, *South Carolina Responds to Beach Erosion: Is Beach Nourishment The Last Line of Defense Against an Armored Coastline?* (Spring 2005), *available at* <http://www.law.sc.edu/environmental/papers/200511/elsc/free.pdf> (accessed Feb. 11, 2015).

million in income; \$307 million in sales; and \$185 million in value-added to the state's gross domestic product.²¹

Coastal communities are deeply concerned about the threat posed to these valuable ecological and economic resources, and several have already passed resolutions opposing offshore drilling and the use of seismic airguns to explore for oil and gas off the coast of South Carolina. To date, the communities of Isle of Palms, Folly Beach, Edisto Island, Beaufort, and Port Royal have passed such resolutions. Several additional communities are currently reviewing and considering passing such resolutions. Further, the Mayor of Charleston wrote a letter in 2014 to the President of the U.S. and Secretary of the Department of the Interior urging them to prevent any seismic testing from being conducted off the coast of South Carolina because of the “serious negative impacts to our marine resources that form the foundation of economic vitality for communities all along the Atlantic coast.”²²

Pursuant to its proposal, Spectrum plans to use “seismic airgun arrays” to conduct its survey.²³ The 2D seismic survey would be conducted 24 hours per day, seven days per week during the second quarter of 2015. Two survey vessels towing airguns, starting on opposite sides of the survey area, would collect data simultaneously by releasing intense impulses of compressed air into the water about once every 10-12 seconds. Spectrum estimates that two additional chase or support vessels would also be used for the proposed survey.²⁴ A large seismic airgun array can produce effective peak pressures of sound higher than those of virtually any other man-made source save explosives;²⁵ and although airguns are vertically oriented within the water column, horizontal propagation is so significant as to make them, even under present use, one of the leading contributors to low-frequency ambient noise thousands of miles from any given survey.²⁶ Indeed, the enormous scale of this acoustic footprint has now been confirmed by studies of seismic in numerous regions around the globe. Spectrum's proposal states that it will not conduct seismic testing within state waters, which extend three miles beyond the coastline into the Atlantic Ocean, however, the impacts of seismic testing will undoubtedly be felt in state waters.²⁷

²¹ Letter from Jeffrey Payne, Ph.D. (NOAA) to Rheta DiNovo (OCRM) (Nov. 18, 2014) at 7.

²² Letter from Mayor Riley (Charleston) to President Obama and Secretary Jewell (Apr. 16, 2014), attached as Exhibit A.

²³ Spectrum Proposed Coastal Zone Consistency Determination (hereafter, “Spectrum Proposal”) at 3.

²⁴ *Id.* at 1.

²⁵ National Research Council, *Ocean Noise and Marine Mammals* (2003).

²⁶ 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).

²⁷ BOEM recently announced a five-year draft proposed leasing program for the Mid-Atlantic OCS for the development of oil and gas reserves that includes a 50 mile buffer zone along the Mid and South Atlantic coasts where no leasing will be allowed. *See 2017-2022 OCS Oil and Gas Leasing Program*, BUREAU OF OCEAN AND ENERGY MGMT, <http://www.boem.gov/Five-Year-Program-2017-2022/> (accessed Feb. 25, 2015). Seismic testing will occur within the 50 mile buffer zone established in the Draft Proposed Program, within which no oil and gas development may take place.

It is undisputed that sound is a fundamental element of the marine environment. Fish, whales, and other wildlife depend on it for breeding, feeding, navigating, and avoiding predators. Spectrum's proposed survey would dramatically degrade the acoustic environment along South Carolina's coast. The noise impacts of seismic surveys pose such a serious threat to the marine ecosystem that on March 5, 2015, a group of seventy-five scientists from around the world sent a letter to President Obama voicing their concern that conducting these activities in the Atlantic "represents a significant threat to marine life throughout the region."²⁸ In their letter, the scientists describe likely impacts to marine mammals, sea turtles, and fish, and conclude that

Our expert assessment is that the Department's premise [that seismic activities would only have a negligible impact on marine species and populations] is not supported by the best available science. On the contrary, the magnitude of the proposed seismic activity is likely to have significant, long-lasting, and widespread impacts on the reproduction and survival of fish and marine mammal populations in the region, including the critically endangered North Atlantic right whale, of which only 500 remain.²⁹

These concerns from the scientific community further highlight the need to have a thorough understanding of the risks posed by seismic activities before they are allowed to proceed and potentially cause harm to the coastal ecosystem and economy.

Further, before any consistency determination is made, a public hearing on this proposal should be held. As discussed above, seismic surveys are controversial, impact numerous stakeholders, and are highly technical in nature; members of the public must have a sufficient opportunity to fully understand and weigh in on this proposal's potential impacts to ecologically and economically significant resources. For these reasons, we respectfully request that OCRM exercise its discretion under the CMP to hold a public hearing on Spectrum's proposal.

Through the consistency process, a state has the authority to ensure protection of its resources. Any federal activity proposed within or outside of a state's 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."³⁰ In light of the enforceable policies of the CMP, the special resources it is designed to protect, and the threats to those resources from this proposed activity, we believe that Spectrum's proposal is inconsistent with South Carolina's coastal zone management program, and OCRM should exercise its authority to protect our state's resources.

²⁸ Letter from Seventy-Five Scientists to President Obama (Mar. 5, 2015), attached as Exhibit B.

²⁹ *Id.*

³⁰ 16 U.S.C. § 1456(c)(1)(A).

II. Spectrum's Proposal would result in Undue Harm to Marine Mammals and would be Inconsistent with the CMP.

It is well-established that the high-intensity pulses produced by airguns can cause a range of impacts on marine mammals, including broad habitat displacement, disruption of vital behaviors essential to foraging and breeding, loss of biological diversity, and, in some circumstances, injuries and mortalities.³¹ Consistent with their acoustic footprint, most of these impacts are felt on an extraordinarily wide geographic scale – especially on endangered baleen whales, such as right 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.³² Similar responses, all occurring over enormous areas of ocean, have been seen in these and other baleen whale species in a variety of regions and across behavioral states, affecting foraging, breeding, and migration.³³

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.³⁴ 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.³⁵ According to recent modeling from Cornell and NOAA, the highly endangered North

³¹ 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).

³² 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).

³³ See, e.g., Blackwell, S.B., Nations, C.S., McDonald, T.L., Greene, Jr., C.R., Thode, A.M., Guerra, M., and Macrander, M., *Effects of airgun sounds on bowhead whale calling rates in the Alaskan Beaufort Sea*, MARINE MAMMAL SCIENCE 29(4): E342-E365 (2013); Castellote, M., Clark, C.W., and Lammers, M.O., *Acoustic and behavioural changes by fin whales (*Balaenoptera physalus*) in response to shipping and airgun noise*, BIOLOGICAL CONSERVATION 147: 115-122 (2012); Cerchio, S., Strindberg, S., Collins, T., Bennett, C., and Rosenbaum, H., *Seismic surveys negatively affect humpback whale singing activity off Northern Angola*, PLOS ONE 9(3): e86464.doi:10.1371/journal.pone.0086464 (2014).

³⁴ 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).

³⁵ *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,

Atlantic right whale is particularly vulnerable to masking effects from airguns and other sources given the acoustic and behavioral characteristics of its calls.³⁶ 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 Programmatic Environmental Impact Statement (“PEIS”) issued by the Bureau of Ocean and Energy Management (“BOEM”).³⁷ Repeated insult from airgun surveys, over months, 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 off South Carolina.

As indicated above, these impacts are especially concerning for the critically-endangered right whale. The proposed survey area will overlap with the world’s only known calving habitat for right whales. Notably, an area off the coast of Georgia and Florida has long been designated as federally protected critical habitat for the species, and NMFS’ recent proposal to expand right whale critical habitat encompasses areas off the entire coast of South Carolina.³⁸ This proposal, as well as numerous other protections for right whales in waters offshore South Carolina demonstrates the need for additional mitigation measures to protect right whales and their critical habitat.^{39, 40}

31 Aug. – 1 Sept., 2009, Monterey, Calif. (2010), available at <http://www.oceanos-foundation.org/assets/Uploads/Airgun.pdf> (accessed Mar. 9, 2015).

³⁶ 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).

³⁷ Bureau of Ocean and Energy Management, Atlantic OCS Proposed Geological & Geophysical Activities, Mid-Atlantic and South Atlantic Planning Areas, Final Programmatic Environmental Impact Statement (“PEIS”) at xix (April 2014), available at [http://www.boem.gov/Atlantic-G-G-PEIS/#Final PEIS](http://www.boem.gov/Atlantic-G-G-PEIS/#Final%20PEIS) (accessed Mar. 9, 2015)

³⁸ See 80 Fed. Reg. 9314, 9327 (Feb. 20, 2015).

³⁹ While we are encouraged that Spectrum is proposing to use mitigation measures such as passive acoustic monitoring and protected species observers, these measures alone will not fully protect marine mammals. For example, Spectrum is proposing to conduct its seismic activities 24 hours a day, but visual observation will be impossible at night and during other periods of poor visibility. Further, the effectiveness of passive acoustic monitoring may be limited by the interference of other sounds in high-traffic areas. And finally, right whale mothers and calves engage in much less vocalization than other right whales, decreasing the effectiveness of passive acoustic monitoring for detecting mother and calf pairs.

⁴⁰ Further, in developing its proposed area closures (which have been adopted by Spectrum in this proposal), BOEM relied on historical sighting data of right whales from NMFS and a rigid assumption that approximately 83% of right whales occur within 20 nautical miles of the coast. However, a recent study confirmed that the majority of recorded calls during the peak season of right whale activity (mid-January 2013 through late March 2013) occurred further offshore at marine autonomous recording unit (“MARU”) sites 3 (38 nautical miles from shore) and 5 (63 nautical miles from shore) than at MARU sites closer to shore. In other words, the vast majority of right whale detections occurred outside the bounds of the proposed time-area closures. Thus,

Airguns are also known to affect a broad range of other marine mammal species beyond the endangered great whales. For example, sperm whale foraging appears to decline significantly on exposure to even moderate levels of airgun noise, with potentially serious long-term consequences;⁴¹ and harbor porpoises have been seen to engage in strong avoidance responses fifty miles from an array.⁴² Seismic surveys have been implicated in the long-term loss of marine mammal biodiversity off the coast of Brazil.⁴³ 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.⁴⁴

In sum, it is clear that seismic surveying will have significant adverse impacts on whales and other marine mammals, rendering Spectrum's proposal inconsistent with the CMP.

III. Spectrum's Proposal Fails to Adequately Protect Sea Turtles and Would Result in Undue Harm, which is Inconsistent with the CMP.

Spectrum's proposed survey area overlaps with numerous populations of sea turtles, 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;⁴⁵ limiting anthropogenic disturbances to these nesting locations is paramount for the global conservation of this species. As BOEM observed in the PEIS, "...breeding adults, nesting adult females, and hatchlings could be exposed to airgun seismic survey-related sound exposures at levels of 180 dB re 1 μ Pa or greater. Potential impacts could include auditory injuries or behavioral avoidance that interferes with nesting activities."⁴⁶ The recovery plan for the Northwest Atlantic population of loggerhead sea turtles also notes that several aspects of oil and

the spatial protection afforded to right whales by the proposed time-area closures remains inadequate, as it does not reflect the actual habitat use of right whales.

⁴¹ 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).

⁴² 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).

⁴³ 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).

⁴⁴ 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.

⁴⁵ 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 (accessed Mar. 9, 2015).

⁴⁶ PEIS at 2-24.

gas activities, including seismic surveying, threaten these populations.⁴⁷ And recent analysis of sea turtle hearing confirms that loggerheads and other sea turtles have their greatest acoustic sensitivity below 400 Hz, which is where much of the energy produced by airguns is concentrated.⁴⁸

It is important to note that in Appendix I to the PEIS, BOEM acknowledges that there is insufficient data and information about the impacts of sound on sea turtles to fully understand the potential risks of seismic surveying, and that more research is necessary in order to develop appropriate noise exposure criteria to reduce the risk of injury or death. The lack of information about potential adverse impacts demonstrates the need to proceed with caution and implement mitigation measures that will be sufficiently protective in order to avoid harm to sea turtles.

We are deeply concerned, therefore, that Spectrum's proposal only contemplates time-area closures for Brevard County, Florida, ignoring the fact that beaches along the South Carolina coast, among others, provide important habitat for nesting sea turtles. South Carolina turtle nests in 2014 included 2,071 loggerheads, 8 greens, and 2 leatherbacks.⁴⁹ Charleston County in particular is considered a high density area for nesting sea turtles, and large swaths of the South Carolina coast – including beaches in Georgetown, Charleston, Colleton, and Beaufort counties – have been designated as critical habitat for loggerheads.⁵⁰

Long-term datasets show nesting declines for loggerheads in North Carolina, South Carolina, Georgia, and southeast Florida,⁵¹ 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 seismic surveying 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, all near-coastal waters from Florida through North Carolina, from May 1 through October 31, should be excluded from seismic airgun activity to protect both nesting females and hatchlings. It is unclear why Spectrum will implement time-area closures “to avoid disturbing the large numbers of loggerhead turtles (and hatchlings) that are likely to be present in nearshore waters of Brevard County during turtle nesting and hatchling season,”⁵² but will not also afford similar protection to sea turtles in other areas, including the large number nesting along the South Carolina coast.

⁴⁷ Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle at I-52 (“Petroleum seismographic cannons produce intense noise at both high and low frequencies and have the potential to harm sea turtles.”).

⁴⁸ 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).

⁴⁹ SCDNR Sea Turtle Conservation Program, available at <http://www.seaturtle.org/nestdb/index.shtml?view=2&year=2014> (accessed Feb. 10, 2015).

⁵⁰ See 79 Fed. Reg. 39756, 39787-91 (July 10, 2014).

⁵¹ NMFS, Loggerhead Sea Turtle (*Caretta caretta*), available at <http://www.nmfs.noaa.gov/pr/species/turtles/loggerhead.htm> (accessed Mar. 9, 2015).

⁵² Spectrum Proposal at 9.

Additionally, important *Sargassum* habitat should also receive consideration for time-area closures. Large areas of designated critical marine habitat for loggerheads overlap with Spectrum's proposed survey area.⁵³ Mitigation measures should be developed and implemented to ensure that effects to sea turtles in these areas are also minimized.

OCRM itself raised these concerns in its request to review Spectrum's proposal for consistency with the CMP, stating that "our primary concern relates to the lack of a time-area closure for nesting sea turtles similar to that of the Northern Atlantic Right Whale (NARW) with respect to imminent acoustic sound sources."⁵⁴ The agency went on to say that "[i]t seems problematic from a resource management perspective that these sites do not warrant a similar mitigation measure afforded to Brevard County, FL."⁵⁵ In making its consistency determination, OCRM must follow-through on these concerns.

In sum, seismic surveying will have significant impacts on sea turtles, rendering Spectrum's proposal inconsistent with the CMP. At the very least, time-area closures should be expanded to include important nesting habitat, as well as *Sargassum* habitat, in order to ensure that endangered and threatened sea turtle populations are adequately protected from the harmful impacts of seismic surveying.

IV. Spectrum's Proposal would result in Negative Impacts to Commercial and Recreational Fisheries and is Inconsistent with the CMP.

Seismic surveying off South Carolina would place the fish and fisheries off the coast at significant risk, thus jeopardizing a substantial component of South Carolina's economy. According to OCRM, marine fisheries provide over a billion dollars in economic value to the state.⁵⁶ And recreational fishing contributes significantly to coastal tourism – NOAA explained that in 2011, NMFS determined that recreational fishing created over 3,300 jobs; \$115 million in income; \$307 million in sales; and \$185 million in value-added to the state's gross domestic product.⁵⁷

The South Atlantic OCS contains many areas that have been designated Essential Fish Habitat ("EFH") and/or Habitat Areas of Particular Concern ("HAPC") under the Magnuson-Stevens Fishery Conservation and Management Act.⁵⁸ The South Atlantic Fishery Management Council ("SAFMC") has designated EFHs for shrimp, red drum, snapper grouper, spiny lobster, rock shrimp, coastal migratory pelagic, golden crab, spiny lobster, dolphin wahoo, royal red

⁵³ See NMFS, Critical Habitat for the Northwest Atlantic Ocean Loggerhead Sea Turtle DPS, 79 Fed. Reg. 39856, 39892, 39912 (July 10, 2014).

⁵⁴ Letter from Rheta DiNovo (OCRM) to Paul Scholz (NOAA) (Aug. 25, 2014).

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ Letter from Jeffrey Payne, Ph.D. (NOAA) to Rheta DiNovo (OCRM) (Nov. 18, 2014) at 7.

⁵⁸ 16 U.S.C. §§ 1801 *et seq.*

shrimp, cobia, and dolphin,⁵⁹ and HAPC for shrimp, *Sargassum*, red drum, snapper grouper complex, spiny lobster, coastal migratory pelagic, coral, and dolphin wahoo.⁶⁰

Additionally, the SAFMC has established eight deepwater Marine Protected Areas (MPAs) in the South Atlantic region, off the coast of the Carolinas and Georgia, to protect a portion of the long-lived, “deepwater” snapper grouper species such as snowy grouper, speckled hind, and blueline tilefish.⁶¹ Among the MPAs is the Edisto MPA, designed to protect the fish species that depend on the Charleston Bump.⁶² Unique features on South Carolina’s OCS, including natural hard bottoms, as well as 37 artificial reefs and five major shipwrecks, similarly support and sustain many resident and migratory fisheries species.⁶³

Despite Spectrum’s assertion that the proposed activities would have minimal impacts on fisheries, the reality is that seismic surveys would have significant negative consequences for both commercial and recreational fishing industries. 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,⁶⁴ 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.⁶⁵ Even brief playbacks of predominantly low-

⁵⁹ SAFMC’s EFH Designations, *available at* <http://safmc.net/EFH/EFH%20Table.pdf> (accessed Mar. 9, 2015).

⁶⁰ SAFMC, Essential Fish Habitat-Habitat Areas of Particular Concern and Coral Habitat Areas of Particular Concern, *available at* <http://safmc.net/EFH/EFH-HAPC%20Table.pdf> (accessed Mar. 9, 2015).

⁶¹ See SAFMC, Marine Protected Areas, *available at* <http://safmc.net/managed-areas/marine-protected-areas> (accessed Mar. 9, 2015). A Marine Protected Area, as defined in Presidential Executive Order 13158 (2000), is any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein. *Id.*

⁶² *Id.*

⁶³ See Sea Grant, Marine Fisheries: Fisheries/Living Marine Resource Program, *available at* <http://www.scseagrant.org/Content/?cid=43> (accessed Mar. 9, 2015).

⁶⁴ 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).

⁶⁵ 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

frequency noise from speedboats have been shown to significantly impair the ability of some fish species to forage.⁶⁶ Recent data suggest that loud, low-frequency sound also disrupts chorusing in black drum fish, a behavior essential to breeding in this commercial species.⁶⁷ Several studies indicate that airgun noise can kill or decrease the viability of fish eggs and larvae.⁶⁸ BOEM acknowledged in the PEIS that airguns may result in changes to “behavioral responses, masking of biologically important sounds, temporary hearing loss, and physiological effects.”⁶⁹

In addition to the need to minimize impacts to the important habitat areas described above, we particularly stress the extremely sensitive nature of the Charleston Bump and gyre complex, a unique habitat located southeast of Charleston on the Blake Plateau, which deflects the Gulf Stream offshore in the South Atlantic Bight, resulting in ocean upwelling that brings nutrients to the surface waters. The Charleston Bump and the gyre surrounding it provide a highly productive, nutrient-rich area, supporting and concentrating a food chain from zooplankton to small fish to commercially and recreationally important reef and pelagic fish that prey on them. In addition, this area provides essential nursery habitat for numerous offshore fish species. The slow-growing and long-lived corals that characterize the Charleston Bump are fragile in nature and highly vulnerable to disturbance. Because of the significant ecological importance of this deepwater coral ecosystem, Governor Sanford expressly requested that President Bush designate the Charleston Bump and its coral reefs a Marine National Monument.⁷⁰ Protection of this area is clearly incompatible with the proposed seismic activities.

We also emphasize the fragility and importance of submarine canyons and canyon heads, as 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

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

⁶⁶ 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).

⁶⁷ Clark, C.W., pers. comm. with M. Jasny, NRDC (Apr. 2010).

⁶⁸ Booman, C., Dalen, J., Leivestad, H., Levsen, A., van der Meeren, T., and Toklum, K., Effeter 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).

⁶⁹ PEIS at xvii.

⁷⁰ See Petersen, Bo, Will a deep-ocean marvel be preserved?, *The Post and Courier* (June 7, 2008), available at <http://www.postandcourier.com/article/20080607/PC1602/306079937> (accessed Mar. 9, 2015).

for bottom-dwelling species.⁷¹ 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.⁷² The canyons represent high-value habitat for many other species, and 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.⁷³ More than 200 species of invertebrates have been identified in the Atlantic submarine canyons and seamounts, including species of black corals, boreal red corals, sponges, and feather-like sea pens.⁷⁴ 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.

In sum, Spectrum's proposed seismic activities are in direct conflict with the enforceable policies of the CMP. South Carolina's coastal economy depends on the health of recreational and commercial fisheries, and seismic activities pose an unacceptable threat to the sustainability of these fisheries. OCRM should therefore find Spectrum's proposal to be inconsistent with the CMP.

V. Spectrum Failed to Provide Any Analysis of Long-Range, Cumulative Impacts.

BOEM has received nine applications to conduct seismic survey activities on the Atlantic OCS, seven of which DHEC has requested to review for consistency with the CMP because of their reasonably foreseeable direct impacts to coastal areas of South Carolina. In reviewing projects for consistency with the CMP, OCRM must consider "[t]he possible long-range, cumulative effects of the project, when reviewed in the context of other possible development and the general character of the area."⁷⁵ Spectrum's consistency certification contains no information whatsoever about the project's long-range, cumulative effects, and does not even

⁷¹ 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).

⁷² *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://www.coris.noaa.gov/activities/deepcoral_rpt/DeepCoralRpt2007.pdf (accessed Mar. 9, 2015).

⁷³ 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).

⁷⁴ Oceana, There's No Place Like Home: Deep Seafloor Ecosystems of New England and the Mid-Atlantic (2007) at 9, available at http://oceana.org/sites/default/files/reports/NewEnglandTrawlReport_low1.pdf (accessed Mar. 9, 2015); Lumsden et al., The state of deep-coral ecosystems, at 200, 203; NRDC, Priority Ocean Areas.

⁷⁵ CMP at III-14.

acknowledge the six other seismic survey applications that DHEC has determined will have reasonably foreseeable impacts to the South Carolina coast. This is a major flaw in Spectrum's proposal that should render it inconsistent with the CMP.

If OCRM decides to ignore this serious deficiency and proceed with the consistency determination, Spectrum's failure to provide this information does not relieve OCRM of its obligations under the CMP to consider long-range, cumulative impacts. OCRM must gather the necessary information and undertake its own analysis of the long-range, cumulative impacts of airgun blasting. In its analysis, OCRM must consider the fact that each of the seven of applications submitted to BOEM will include surveying off the coast of South Carolina, and that many, if not all, of these individual survey efforts will be going on at the same time in the same place. Spectrum itself will have multiple survey vessels operating simultaneously, in addition to the numerous vessels being operated by other companies. Because the information obtained in the surveys is deemed proprietary and will not be shared among the companies or with the state or the public, the same areas will likely be blasted over and over again by airguns, greatly amplifying the adverse impacts to marine life. Further, since the information will not be shared with the state regulatory agencies charged with balancing the economic interests of the state with impacts to natural resources, it is unclear how any determination can be made about whether the serious environmental risks posed by these activities will be offset by any potential economic benefit to the citizens of the state.

Finally, OCRM must consider the fact that seismic surveys are the first step towards oil and gas drilling off the coast of South Carolina. The impacts of seismic surveys alone are significant, but the impacts of full-scale oil development will be even more devastating to the marine and coastal environments. These future impacts of the activities that will be facilitated by seismic surveys must be considered as part of OCRM's cumulative impacts analysis.

VI. Conclusion

For all of these reasons, we are deeply concerned about the reasonably foreseeable impacts of Spectrum's proposal – which threaten the ecological and economic integrity of South Carolina's coastal region – and believe it is inconsistent with South Carolina's coastal management program. At a minimum, OCRM should find that Spectrum has not provided sufficient information to demonstrate that its proposal *is* consistent with the CMP. We appreciate the opportunity to submit these comments. Please do not hesitate to contact us if you wish to discuss these comments in greater detail.

[signature page follows]

Sincerely,



Christopher K. DeScherer



Heather A. Murray

cc: Pace Wilber, National Marine Fisheries Service
Jaclyn Daly, National Marine Fisheries Service
Mark Leao, U.S. Fish and Wildlife Service
Kelly Laycock, U.S. Environmental Protection Agency
Bob Perry, South Carolina Department of Natural Resources
Susan Davis, South Carolina Department of Natural Resources
Hamilton Davis, Coastal Conservation League
Michael Jasny, Natural Resources Defense Council
Steve Gilbert, South Carolina Wildlife Federation
Ann Timberlake, Conservation Voters of South Carolina
Paula Reidhaar, Waccamaw Riverkeeper
Andrew Wunderley, Charleston Waterkeeper
Kate Dittloff, Charleston Chapter of The Surfrider Foundation
Chris Carnevale, Southern Alliance for Clean Energy

Exhibit A



City of Charleston

Joseph P. Riley, Jr.
Mayor

April 16, 2014

The President of the United States
The White House
1600 Pennsylvania Avenue NW
Washington, DC 20500

Dear Mr. President and Secretary Jewell:

I am writing to urge you to halt proposed seismic airgun testing for oil and gas in the Atlantic Ocean. Proposed seismic testing would span from Delaware to Florida, but the impacts would be felt in communities throughout the entire East Coast – potentially harming sea life, ecosystems, fisheries and coastal economies.

The use of airguns to conduct these seismic tests threatens fish populations and profitable fisheries. In fact, airgun noise has been shown to decrease catch rates of certain fisheries. Commercial and recreational fishing off the mid and south Atlantic generate billions annually and supports hundreds of thousands of jobs. The Department of the Interior's assessment ignores the economic impacts the proposed seismic testing will have on fisheries and the fishermen who rely on the oceans for their livelihoods.

Additionally, the type of seismic airgun testing used to search for oil and gas is incredibly harmful and could injure or possibly kill thousands of marine mammals and fish, including the critically endangered North Atlantic right whale. Seismic airguns fire intense blasts of compressed air – almost as loud as explosives – every 10-12 seconds, 24 hours a day, for days to weeks on end. These loud airgun blasts can be heard for many hundreds of miles in the ocean and can drive whales to abandon their habitats, go silent, and cease foraging over vast areas. At shorter distances, airguns cause permanent hearing loss, injury, and even death for whales, dolphins and fish.

Proposed seismic airgun testing will result in serious negative impacts to our marine resources that form the foundation of economic vitality for communities all along the Atlantic coast. We urge your administration to stop this process and focus on ensuring the vitality of vulnerable coastal economies along the Atlantic Coast. We cannot continue to put our ocean environment, beaches, and marine resources and coastal communities at risk.

Most sincerely yours,

Joseph P. Riley, Jr.
Mayor, City of Charleston

JPR,jr/mp



P.O. Box 652, Charleston, South Carolina 29402
843-577-6970 Fax 843-720-3827

Exhibit B

March 5, 2015

President Barack Obama
The White House
1600 Pennsylvania Avenue
Washington, D.C. 20500

Dear Mr. President:

On behalf of 75 marine scientists, we are writing to convey the attached letter of concern over the introduction of seismic oil and gas surveys off the U.S. east coast. The letter is signed by colleagues representing such institutions as Cornell, Duke, the New England Aquarium, Stanford, the University of North Carolina, and Woods Hole Oceanographic Institution, and includes leading experts in marine biology and bioacoustics.

Last July, the Interior Department issued a “framework” for opening its mid- and southeast Atlantic regions to high-energy seismic airgun surveys. As the letter states, however, we believe that the Department has substantially underestimated the impact of this disruptive activity on marine life and has prescribed mitigation that is inadequate to address its significant cumulative effects.

Fundamentally, the ocean is a world of sound. Whales, fish, and other marine species have evolved to use sound as their primary sense, for foraging, breeding and other activities essential to their survival. The high-volume airgun arrays used by the seismic industry are known to disrupt these vital behaviors in a wide range of marine species on extraordinarily large spatial scales.

It is our expert assessment that the activity proposed by the Interior Department “is likely to have significant, long-lasting, and widespread impacts on the reproduction and survival of fish and marine mammal populations in the region.” On behalf of ourselves and our colleagues, we therefore respectfully urge you to reconsider the Interior Department’s analysis. To proceed otherwise, as the letter states, “is simply not sustainable.”

Very truly yours,

Christopher Clark, Ph.D.
Senior Scientist
Bioacoustics Research Program
Cornell University

Scott Kraus, Ph.D.
Vice President of Research
John H. Prescott Marine Laboratory
New England Aquarium

President Barack Obama

March 5, 2015

Page 2

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Repass-Rodgers Chair of Marine

Conservation Technology

Nicholas School of the Environment

and Pratt School of Engineering

Duke University

Andrew J. Read, Ph.D.

Stephen Toth Professor of Marine Biology

Division of Marine Science and

Conservation

Nicholas School of the Environment

Duke University

Aaron Rice, Ph.D.

Science Director

Bioacoustics Research Program

Cornell University

Dear Mr. President:

We, the undersigned, are marine scientists united in our concern over the introduction of seismic oil and gas exploration along the U.S. mid-Atlantic and south Atlantic coasts. This activity represents a significant threat to marine life throughout the region.

To identify subsea deposits, operators use arrays of high-volume airguns, which fire approximately every 10-12 seconds, often for weeks or months at a time, with sound almost as powerful as that produced by underwater chemical explosives. Already nine survey applications covering the entirety of the region several times over have been submitted within the past six months, including multiple duplicative efforts in the same areas. In all, the activities contemplated by the Interior Department would result in more than 20 million seismic shots.

Airgun surveys have an enormous environmental footprint. For blue and other endangered great whales, for example, such surveys have been shown to disrupt activities essential to foraging and reproduction over vast ocean areas. Additionally, surveys could increase the risk of calves being separated from their mothers, the effects of which can be lethal, and, over time, cause chronic behavioral and physiological stress, suppressing reproduction and increasing mortality and morbidity. The Interior Department itself has estimated that seismic exploration would disrupt vital marine mammal behavior more than 13 million times over the initial six-to-seven years, and there are good reasons to consider this number a significant underestimate.

The impacts of airguns extend beyond marine mammals to all marine life. Many other marine animals respond to sound, and their ability to hear other animals and acoustic cues in their environment are critical to survival. Seismic surveys have been shown to displace commercial species of fish, with the effect in some fisheries of dramatically depressing catch rates. Airguns can also cause mortality in fish eggs and larvae, induce hearing loss and physiological stress, interfere with adult breeding calls, and degrade anti-predator response: raising concerns about potentially massive impacts on fish populations. In some species of invertebrates, such as scallops, airgun shots and other low-frequency noises have been shown to interfere with larval or embryonic development. And threatened and endangered sea turtles, although almost completely unstudied for their vulnerability to noise impacts, have their most sensitive hearing in the same low frequencies in which most airgun energy is concentrated.

The Interior Department's decision to authorize seismic surveys along the Atlantic coast is based on the premise that these activities would have only a negligible impact on marine species and populations. Our expert assessment is that the Department's premise is not supported by the best available science. On the contrary, the magnitude of the proposed seismic activity is likely to have significant, long-lasting, and widespread impacts on the reproduction and survival of fish and marine mammal populations in the region, including the critically endangered North Atlantic right whale, of which only 500 remain.

Opening the U.S. east coast to seismic airgun exploration poses an unacceptable risk of serious harm to marine life at the species and population levels, the full extent of which will not be understood until long after the harm occurs. Mitigating such impacts requires a much better understanding of cumulative effects, which have not properly been assessed, as well as strict, highly precautionary limits on the amounts of annual and concurrent survey activities, which have not been prescribed. To proceed otherwise is simply not sustainable. Accordingly, we respectfully urge you, Mr. President, to reject the Interior Department's analysis and its decision to introduce seismic oil and gas surveys in the Atlantic.

Sincerely,

Christopher Clark, Ph.D.
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