NATURAL RESOURCES DEFENSE COUNCIL

August 17, 2017

Ms. Kelly Hammerle
National Program Manager
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, VA 20166

*Submitted online at http:www.regulations.gov*

Re: NRDC Comments on the Request for Information and Comments on the Preparation of the 2019-2024 Outer Continental Shelf Oil and Gas Leasing Program.

Dear Ms. Hammerle:

On behalf of the Natural Resources Defense Council ("NRDC") and its more than 2.5 million members and online activists, we submit this letter to the Bureau of Ocean Energy Management, Regulation, and Enforcement ("BOEM") regarding the Request for Information for the Preparation of the 2019-2024 Outer Continental Shelf Oil and Gas Leasing Program ("Program"). For more than three decades, NRDC has monitored and engaged in policy processes related to leasing, exploring and producing oil and gas from our nation's oceans.

We object to the Administration's initiation of a whole new process to develop a Five-Year Program so soon after the current Outer Continental Shelf Offshore Oil and Gas Leasing Program (2017-2022) was put in place (January 2017). An extensive, multi-year public process preceded the adoption of the current program, during which over 1.4 million comments were submitted opposing new drilling. The program finalized at the end of this lengthy public process contains no lease sales in the following areas: the Atlantic, Pacific, Arctic, Bristol Bay or Eastern Gulf.

New offshore drilling and leasing threatens billion dollar coastal economies, would open fragile and priceless coastal ecosystems to damage from pollution and spills, and would accelerate global climate disruption. Moreover, U.S. energy needs can be better met in other ways.

America's oceans are ecological and economic treasures that generate billions of dollars to our economy each year. Our ocean economy contributes more than $350 billion each year to our Nation's Gross National Product.[1] Approximately $114 billion of this, or about a third, is generated from tourism, recreation and living resources (such as fishing and aquaculture). Three quarters of the overall ocean employment, or more than 2 million jobs, is attributed to these three sectors. The coastal economy is even bigger, generating more than $17 trillion annually to the GDP, with a significant amount of this economic strength coming from tourism, recreation, and fishing which rely on healthy, functioning ocean ecosystems.[2]

[1] National Ocean Economics Program, *Market Data, Ocean Economy*, 2014, http://www.oceaneconomics.org/ (accessed August 15, 2017).
[2] National Ocean Economics Program, *Market Data, Coastal Economy Data, 2014*, http://www.oceaneconomics.org/Market/coastal/coastalEcon.asp (accessed August 15, 2017).

Our valuable ocean resources are simply too vital to our economy to unnecessarily put them at risk of catastrophic oil spills. The disaster in the Gulf affirmed that there is no way to take the risk out of what is an inherently dangerous industrial operation at sea. To protect our resources and the communities and economic activity reliant upon healthy oceans and coasts, NRDC submits the following comments, detailed below:

1. The Following Areas Should Be Excluded from New Leasing in the Five-Year Program:
   a. The Atlantic Region
   b. The Pacific Region
   c. The North Aleutian Basin/Bristol Bay
   d. The Arctic Region
   e. Cook Inlet
   f. Gulf of Mexico

2. New Offshore Oil and Gas Leasing in These Areas is Not Necessary Because U.S. Energy Needs can be Better Met in Other Ways.
   a. Energy and Fuel Efficiency Offer Far Greater Gains Than New Drilling.
   b. Offshore Renewable Energy Should be Given Strong Preference Over Offshore Oil and Gas Development.
   c. Climate Change Impacts Should Be Considered.

3. Key Safety Recommendations and Improvements Have Not Yet Been Fully Implemented since the BP Deepwater Horizon spill and Those that have been are now being Reviewed and are in danger of being Revised

4. Impacts of Seismic Surveys and Other Sources of Disruptive Industry Noise.

**1. Areas to Exclude from the Five-Year Program**

Our oceans are ecological and economic treasures that are put in jeopardy by inherently dangerous oil and gas exploration and drilling. Given the very fragile nature of marine ecosystems and the industries that rely upon them, and the degradation and impacts some areas have already experienced, combined with the availability of alternatives, the following areas should be excluded from the Program.

**a. The Atlantic Region Should Be Excluded.**

The Atlantic region holds important biological value that would be jeopardized by offshore oil and gas activities. Further, the health of the Atlantic economy is inextricably linked to healthy coasts and oceans. Because of the unique and fragile ecosystems in the Atlantic, as well and the ocean-based economies that rely upon them, this region should be excluded from the Program. In fact, the previous administration conducted an exhaustive analysis of potential drilling in the Atlantic and determined that based on a myriad of reasons including economic impacts, this area was not suitable for inclusion in the current Five-Year Program.

Including the Atlantic Region in a plan to expand drilling will bring the risk of oil spills to beaches from South Florida to Maine. Economies that rely on tourism, recreation and fishing will be irrevocably harmed by oil spills and routine pollution. In 2014, the U.S. Atlantic Ocean economy contributed more than $92 billion to the country's gross domestic product (GDP).[3] More than 60 percent of that value is from tourism, recreation, and the fishing and seafood industries. All of these money-makers depend on clean water, clean beaches and abundant fish and

[3] National Ocean Economics Program. Ocean Economy, 2014. Available at: http://www.oceaneconomics.org/Market/ocean/oceanEcon.asp

wildlife. Together, they employ more than 1 million people, supporting 80 percent of all Atlantic Ocean jobs.[4] For example, in 2014, the South Atlantic seafood industry supported more than 90,000 jobs; fisherman landed more than 105 million pounds of fish and earned more than $184 million for their catch.[5]

Not only will economies be at risk, but rich ecosystems and wildlife will also be in harm's way. Oil spills can quickly travel vast distances. For example, contamination from the massive 1989 *Exxon Valdez* oil spill reached shorelines nearly 600 miles away; if the spill had occurred on the East Coast, it would have extended from Massachusetts to North Carolina.[6]

Oil spills exact a serious toll on coastal communities and our natural environment. The BP oil spill in 2010 contaminated more than 1,300 miles of coastline, at least 3,200 square miles of the deep ocean floor,[7] and 57,000 square miles of surface water.[8] Some 22,000 tons of oil washed up on the shores of the Gulf Coast.[9] To date, impacts include:

- The Gulf of Mexico commercial fishing industry was estimated to have lost $247 million as a result of post spill fisheries closures. [10] One study projects that the overall impact of lost or degraded commercial, recreational, and mariculture fisheries could be $8.7 billion by 2020, with a potential loss of 22,000 jobs over the same timeframe.[11]
- Almost a million coastal and offshore seabirds have died as a result of the oil spill.[12]
- Nearly 1,400 dolphins died as a result of illnesses linked to exposure to petroleum products.[13]
- According to several studies, as many as 300,000 sea turtles were killed or lost by the Deepwater Horizon oil disaster, including 160,000 young turtles contaminated by oil. [14,15,16]

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[4] *Id*.

[5] National Marine Fisheries Service. 2016. Fisheries Economics of the United States, 2014. U.S. Dept of Commerce, NOAA Tech. Memo. NMFS-F/SPO-163, www.st.nmfs.noaa.gov/Assets/ economics/publications/FEUS/FEUS-2014/Report-and-chapters/FEUS-2014-FINAL-v5.pdf (accessed February 2017). Jobs includes seafood industry jobs (without imports) plus jobs created through recreational fishing expenditures.

[6] Exxon Valdez Oil Spill Trustee Council. 1994. Exxon Valdez Oil Spill Restoration Plan. p. 1.

[7] Deepwater Horizon Natural Resource Damage Assessment Trustees. (2016). Deepwater Horizon oil spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement. Pp. 4-70; 4-72. Available at http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan.

[8] MacDonald, I.R., et al., Natural and unnatural oil slicks in the Gulf of Mexico, Journal of Geophysical Research: Oceans, Vol. 120(12), pp.8364-8380, 2015.

[9] Boufadel, M.C., et al., "Simulation of the Landfall of the Deepwater Horizon Oil on the Shorelines of the Gulf of Mexico," Environmental Science & Technology, Vol. 48(16), pp.9496–9505, 2014.

[10] McCrea-Strub, A., et al., Potential impact of the Deepwater Horizon oil spill on commercial fisheries in the Gulf of Mexico, Fisheries, Vol. 36(7), pp. 332–336, 2011.

[11] Sumaila, U.R., et al., Impact of the Deepwater Horizon well blowout on the economics of U.S. Gulf fisheries. Canadian Journal of Fisheries and Aquatic Sciences, Vol. 69(3), 2012, pp. 499–510. www.nrcresearchpress.com/doi/full/10.1139/f2011-171#.VKL_D14DxA.

[12] Haney, J.C., Geiger, H.J., and Short, J.W.," Bird mortality from the Deepwater Horizon oil spill. I. Exposure probability in the offshore Gulf of Mexico." Marine Ecology Progress Series, Vol. 513, 2014, pp. 225-237; Haney, J.C., Geiger, H.J., and Short, J.W., "Bird mortality form the Deepwater Horizon oil spill. II. Carcass sampling and exposure probability in the coastal Gulf of Mexico," Marine Ecology Progress Series, Vol 513, 2014, pp. 239–252.

[13] Venn-Watson, S. et al., "Adrenal Gland and Lung Lesions in Gulf of Mexico Common Bottlenose Dolphins (Tursiops truncates) Found Dead following the Deepwater Horizon Oil Spill," PLoS ONE 10(5), 2015, p. e0126538.

[14] Deepwater Horizon Natural Resource Damage Assessment Trustees, *supra* n. 7 at 4-561.

[15] Deepwater Horizon Natural Resource Damage Assessment Trustees, *supra* n. 7 at 4-565.

[16] Deepwater Horizon Natural Resource Damage Assessment Trustees, *supra* n. 7 at 4-518; 4-569.

- Of the seven known coral sites within 15 miles of the wellhead, four were observed to have sustained injury attributable to *Deepwater Horizon* oil. The site closest to the wellhead sustained injury to 75% of its coral colonies, and the second closest coral site sustained injury to 50% of its colonies.[17]

Despite the 2010 BP oil disaster, adequate safety reforms have never been implemented, and even the progress that has been made is in question with the "America First Offshore Energy Strategy" executive order which directs reconsideration and revision of the Well Control Rule designed to help prevent another BP-type disaster.

NRDC is also deeply concerned about the Administration's movement to allow seismic testing for oil and gas exploration off the Atlantic coast. As discussed in detail below, acoustic impacts from these activities pose serious risk to the Atlantic Region's fragile ecosystem. For example, a single seismic survey in the mid-Atlantic has been shown to cause endangered fin and humpback whales to stop vocalizing – a behavior essential to breeding and foraging – and abandon habitat over an area at least 100,000 $nm^2$ in size.[18] According to the Department of Interior's own sensitivity analysis, the Mid-Atlantic region is characterized as "most sensitive" for relative environmental sensitivity, "moderate" for relative effects of climate change on environmental sensitivity, and the first of seven in the existing primary productivity rankings.

From an ecological perspective, the Atlantic Ocean is an interconnected network of unique geographic features and rare, threatened, and endangered marine species. In this fluid system, impacts from oil and gas spills are not localized, and sound pollution from seismic exploration spreads to blanket the entire seaboard with noise. To underscore the importance of this interconnected system along the Atlantic coast, it's worth noting several of the unique and important areas that are part of this system.

One array of features was deemed so valuable that the Obama Administration permanently removed them from offshore oil and gas development on December 20, 2016. This acreage is permanently off limits to inclusion in any leasing program, withdrawn from all mineral disposition under OCSLA 12(a). It would be illegal to include this acreage in a revision to the existing or new Five-Year Program. This acreage includes 31 submarine canyons in the Atlantic Ocean (stretching from offshore of the Chesapeake Bay to the Canadian border).[19] The White House called these canyons "majestic geologic features carved by glacial runoff or by rivers that once flowed overland and were submerged by rising seas after the last ice age, have incredible ecological importance. The massive underwater canyons are home to many species and have been the subject of scientific exploration and discovery since the 1970s."[20] These areas contain an incredible abundance of marine life, vivid cold-water corals that are hundreds or thousands of years old; multitudes of whale species, including the highly endangered North Atlantic right whale (with only 500 individuals remaining);[21] a range of shellfish and fish, like the powerful bluefin tuna; seabirds that rely on the nutrient-rich waters; sea turtles; and new species not known to live anywhere else on

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[17] Deepwater Horizon Natural Resource Damage Assessment Trustees, *supra* n. 7 at 4-253; White, H.K., et al., Impact of the Deepwater Horizon oil spill on a deep-water coral community in the Gulf of Mexico, Proceedings of the National Academy of Sciences, Vol. 109(50), 2012, pp. 20303–20308. Fisher, CR, et al., Footprint of Deepwater Horizon blowout impact to deep-water coral communities. Proceedings of the National Academy of Sciences, Vol 111(32), 2014, pp. 11744–11749.

[18] C.W. Clark and G.C. Gagnon, Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E9); C.W. Clark, pers. comm. with M. Jasny, NRDC (Apr. 2010).

[19] Statement by the President on Actions in the Arctic and Atlantic Oceans. National Archives and Records Administration. Accessed August 17, 2017. https://obamawhitehouse.archives.gov/the-press-office/2016/12/20/statement-president-actions-arctic-and-atlantic-oceans

[20] Fact Sheet: Unique Atlantic Canyons Protected from Oil and Gas Activity. Department of the Interior. Accessed August 17, 2017. https://www.doi.gov/sites/doi.gov/files/uploads/atlantic_canyons_fact_sheet_for_release.pdf

[21] NOAA Fisheries. May 2016. North Atlantic Right Whale (*Eubalaena glacialis*) Western Atlantic Stock Assessment 2015. Available at: http://www.fisheries.noaa.gov/pr/sars/pdf/stocks/atlantic/2015/f2015_rightwhale.pdf.

Earth. Permanently protecting these valuable areas from offshore oil and gas development will mean not only protection for rare wildlife, but also habitat that will support commercial and recreational fisheries.[22]

There are a number of other critical areas within the Atlantic that help comprise its rich and diverse habitats. The Atlantic's continental shelf/slope break that the canyons cut into is itself a hotspot of marine biodiversity – a place of steep edges, a mixing zone of currents, and sharp temperature gradients. Highly endangered North Atlantic right whales migrate annually through continental shelf waters between calving grounds off South Georgia and Florida in the winter and feeding areas in the waters off New England in the summer. The migratory corridor Biologically Important Area (BIA) for the North Atlantic right whale is defined by the National Oceanic and Atmospheric Administration (NOAA) from shore to the continental shelf break along the entire U.S. East Coast from feeding areas in the Gulf of Maine to calving areas off Florida.[23]

The Gulf of Maine is a semi-enclosed sea bounded by Georges and Browns Banks, New England shorelines, and Nova Scotia, and is one of Earth's most productive marine systems. As the north's icy Labrador Current meets the warm Gulf Stream at the northern edge of its loop pattern and is impacted by the Bay of Fundy's intense tides, nutrient-rich waters perfect for phytoplankton production flood the Gulf's banks, ledges, and coastal shelf, allowing a wide diversity of marine life to flourish, from forage species like herring and menhaden to large tunas, whales, marine mammals, and birds. Scientists have identified several distinct sub-regions in the Gulf of Maine, and jewels like Georges Bank, Stellwagen Bank, Jordan Basin, and Jeffreys Ledge are important refuges for rare marine animals and key to maintaining productive fish stocks for generations of fishing families.

The Gulf's mountain range of Cashes Ledge rises up from basins hundreds of feet deep to a ledge roughly 40 feet from the surface. The ledge's peak, Ammen Rock, punctures the ocean current, resulting in a nutrient and oxygen-rich water mix, feeding the Atlantic's deepest and largest cold-water kelp forest, a source of food for much of the area's diverse and abundant marine life. Cashes Ledge is a place of restoration for iconic New England fish, such as cod and pollock, and rare species like the Atlantic wolffish. Migrating schools of bluefin tuna, sea turtles, and blue and basking sharks are common here. It is also the site of BIAs for feeding minke, sei, fin, and humpback whales.[24] Feeding and mating BIAs and Critical Habitat designated under the Endangered Species Act (ESA) for North Atlantic right whales are also found in this region.[25] A small and resident population of harbor porpoises also resides in the Gulf.[26]

The Northeast Canyons and Seamounts Marine National Monument, located about 150 miles southeast of Cape Cod, protects a spectacular underwater seascape inhabited by an extraordinary diversity of life[27]. The more than 1,000 species that call the canyons and seamounts home include centuries-old coral, dolphins, whales (including the endangered sperm whale), Atlantic puffins, and other seabirds and sea turtles. The monument's underwater canyons rival the Grand Canyon in size and scale, and the seamounts rise higher than any mountain east of the Rockies. The area, with its unique geological features, has been the site of active scientific exploration and of the discovery of species of coral found nowhere else on earth, as well as of other rare fish and invertebrates.

Another area of critical importance lies about twenty miles offshore from Cape Hatteras and is one of the U.S.'s most diverse and productive marine ecosystems. It is uniquely positioned where the warm Gulf Stream swings

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[22] Fact Sheet: Unique Atlantic Canyons Protected from Oil and Gas Activity, *supra* n. 20.

[23] LaBreque E, et al. (2015). Biologically Important Areas for Cetaceans within U.S. waters – East Coast Region. Aquatic Mammals 41(1), 17-29.

[24] LaBreque E, et al. (2015). *Id.*

[25] "Designated Critical Habitat; North Right Whale; Final Rule." 59 Federal Register 226 (3 June 1994), 28805-28835.

[26] LaBreque E, et al. (2015). *Id.*

[27] "First marine national monument created in Atlantic." First marine national monument created in Atlantic | National Oceanic and Atmospheric Administration. Accessed August 14, 2017. http://www.noaa.gov/news/first-marine-national-monument-created-in-atlantic

close to shore and meets the cool Labrador Current to the north, dynamic ocean fronts provide a sustained source of nutrients, supporting an abundance of marine life, from plankton, invertebrates, and forage fish, to large marine predators such as tuna, swordfish, sharks, seabirds, and marine mammals. Cape Hatteras is considered to have the highest marine mammal biodiversity of any area along the East Coast[28] and endangered species, including fin, humpback, and sperm whales, occur at unusually high densities.[29] Cape Hatteras is considered by NOAA as a BIA as it forms part of the migratory corridor for the endangered North Atlantic right whale.[30] Four of the six species of sea turtle found along the U.S. East Coast nest by the beaches of Cape Hatteras National Seashore: vulnerable leatherbacks, endangered loggerhead and green turtles, and the rarest sea turtle in the world, the critically endangered Kemp's Ridley. These species occur at high densities in the waters immediately offshore from Cape Hatteras[31] and are known to migrate offshore to feeding grounds in the Mid- and South Atlantic Bight.[32,33]

Along the east coast there is a migratory pathway, approximately 22 miles from the shoreline where marine mammals, sea turtles, and fish gather. Loggerhead, Kemp's ridley, and leatherback turtles travel seasonally nearby this strip, 12 miles from shore. This nearshore corridor is also an important foraging area for seabirds and nursery ground for important crab and fish species. Key nursery areas include the mouths of the Chesapeake and Delaware Bays.[34] BIAs for nine small and resident populations of bottlenose dolphins have been identified by NOAA within the Southeast Atlantic's nearshore corridor, ranging from the Northern North Carolina Estuarine System south to the Florida Bay.[35]

The Atlantic network also includes the Charleston Bump, a deepwater, rocky ocean bottom feature 80-100 miles southeast of Charleston, South Carolina. The Bump rises from the Blake Plateau that lies beyond the edge of the continental shelf off of South Carolina and Georgia. The Bump deflects the Gulf Stream offshore away from the eastern coast of the U.S., causing eddies and other current features that are considered "Essential Fish Habitat".[36] The combination of rocky bottom and complex currents is attractive to large pelagic fish such as marlins, sailfish and swordfish. Satellite tagging data show that it is an important feeding and spawning area for swordfish.[37] The area is also home to the only known population of wreckfish and the only known spawning site for wreckfish in the western North Atlantic.[38] The hard bottom areas of the Bump support deepwater corals that grown in mounds and pinnacles and extend several meters above the bottom.[39]

The coasts of Georgia and Northeastern Florida are also key areas for marine wildlife. From mid-December through late-March, pregnant North Atlantic right whales give birth in ESA Critical Habitat calving grounds off Georgia and northeastern Florida. The designated Critical Habitat calving grounds encompass waters from the shore out to 17

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[28] Byrd BL, et al. (2014). Strandings as indicators of marine mammal biodiversity and human interactions off the coast of North Carolina. Fishery Bulletin 112(1), 1-23.

[29] Halpin PN, et al. (2009). OBIS-SEAMAP: The world data center for marine mammal, sea bird and sea turtle distributions. Oceanography 22(2), 104-115.

[30] LaBreque E, et al. (2015). *Id.*

[31] Halpin PN, et al. (2009) *Id.*

[32] McClellan CM, et al. (2011). Conservation in a complex management environment: The by-catch of sea turtles in North Carolina's commercial fisheries. Marine Policy 35, 241-248.

[33] Griffin DB, et al. (2013). Foraging habitats and migration corridors utilized by a recovering subpopulation of adult female loggerhead sea turtles: implications for conservation. Marine Biology 160, 3071-3086.

[34] NOAA (1999). Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks: Environmental Impact Statement, Part 1. Northwestern University. April 1999.

[35] LaBreque E, et al. (2015). *Id.*

[36] Sedberry GR, et al. (2001). The Charleston Bump: An island of essential fish habitat in the Gulf Stream. American Fisheries Society Symposium 25, 3-24.

[37] Sedberry GR, et al. (2000). The role of the Charleston Bump in the life history of Southeastern U.S. marine fishes. Final Report. Prepared by South Carolina Department of Natural Resources. November 2000.

[38] Sedberry GR, et al. (2001). *Id.*

[39] Sedberry GR (2009-07-29). "A Profile of the Charleston Bump". National Oceanic and Atmospheric Administration. Retrieved 2016-11-30.

miles from Altamaha River, Georgia, to Jacksonville, Florida, and the shore out to almost 6 miles from Jacksonville to Sebastian Inlet, Florida.[40] However, survey data suggest that calving North Atlantic right whales routinely use broader habitat than that defined by the Critical Habitat designation; NOAA therefore has defined the calving BIA as encompassing waters of 25 meter water depth between Cape Canaveral, Florida, and Cape Lookout, North Carolina.[41]

In addition to the obvious ecological and economic reasons for excluding the Atlantic Region from any drilling plan, is the overwhelming opposition to drilling from communities along the coast. As of July 2017, 129 East Coast municipalities and nearly 1,200 local, state and federal elected officials have formally opposed offshore drilling and/or seismic airgun blasting.[42] This vocal opposition has not been limited to residential communities. By August 2017, 41,000 businesses and 500,000 commercial fishing families have opposed east coast offshore drilling as part of the Business Alliance for Protecting the Atlantic Coast.[43] More than 1.4 million public comments opposing offshore drilling were submitted to the Obama administration in opposition to offshore drilling. In addition, there has been a strong bipartisan push from lawmakers against opening this coast to drilling, given the risk it poses to local economics and communities.

Due to much of this input from communities, citizens and business, in 2016 BOEM concluded the Atlantic should not be included in the 2017-2022 Five Year Program based on risks to the current economies:

> An important consideration in removing the Mid- and South Atlantic Program Area from the Proposed Program is concern regarding competing uses of the Program Area and the potential harm that oil and gas development could pose to those existing uses. The range, number and nature of conflicts in the Atlantic are unique to the region and require additional work to deconflict prior to including a lease sale in the Program. As expressed by many stakeholders, ocean-dependent tourism, commercial and recreational fishing, and commercial shipping and transportation are established and important economic uses in and along the coast of the Mid- and South Atlantic Program Area that could be potentially impacted by oil and gas activity. Under current conditions, the economic value of commercial fishing along the coast of the Mid-Atlantic Planning Area could be more than $1.5 billion in total value added gross domestic product (GDP), with the industry being especially important in Virginia. In the Mid- and South Atlantic Planning Areas, ocean-dependent tourism is also a significant economic use, accounting for more than $6.5 billion and $4.4 billion in value added, respectively, to adjacent coastal areas (BOEM 2014). Numerous stakeholders, including many citizens living along the Atlantic coast and their public officials, expressed concern that oil and gas activities and their potential impacts could jeopardize existing economic activities and the health of important contributors to coastal economies.[44]

Finally, BOEM also took into consideration the Department of Defense input, when excluding the Atlantic from the Five-Year Program. The incompatibility of offshore drilling with Department of Defense activities further solidified the many reasons to exclude the Atlantic:

> In addition to potential conflicts with commercial fishing and ocean-dependent tourism, oil and gas activity in the Mid- and South Atlantic Program Area raises concerns with regard to DOD activities in these areas. The USDOI respects DOD's mission of protecting the United States and has been working closely with DOD to better understand the military's needs in these areas. In response to the DPP, DOD prepared its 2015 Assessment (see Section 6.6 Other Uses of the OCS),

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[40] *Id.*

[41] LaBreque E, et al. (2015). *Id.*

[42] http://usa.oceana.org/climate-and-energy/grassroots-opposition-offshore-drilling-and-exploration-atlantic-ocean-and (accessed August 14, 2017)

[43] http://protectingtheatlanticcoast.org/business-opposition-grows-stronger-in-opposition-to-offshore-oil-exploration-and-drilling/ (accessed August 14, 2017)

[44] https://www.boem.gov/2017-2022-Proposed-Program-Decision/

> which communicates concerns and important considerations within the Mid- and South Atlantic Program Area. DOD's assessment identifies much of the area offshore Virginia, as well as significant portions of the Program Area offshore North Carolina, as areas that should not be made available for oil and gas development, as such development would be incompatible with DOD's activities. Additionally, DOD recommends that significant acreage of the Mid- and South Atlantic Program Area not be made available for placement of oil and gas structures due to conflicts with DOD activities. These areas of DOD concern significantly overlap the known geological plays and available resources. DOD's significant competing use of the ocean highlights the incompatibility between the many and longstanding competing uses in the Atlantic and oil and gas activities in those areas. Therefore, prior to proposing a lease sale covering this region, significant additional analysis is needed to determine how oil and gas leasing activities may fit within the already established, complex multiple use landscape along the Atlantic OCS.[45]

Based on the unique and important ecology of the Atlantic, the major economies based on fishing, tourism and recreation, the overwhelming local opposition and finally the DOD conflicts, the Atlantic simply does not belong in any plan to explore or develop offshore oil and gas resources.

**b. The Pacific Region Should be Excluded.**

The Pacific region should be excluded from the 2019-2024 Five Year Program. To include the three West Coast states in the 2019-2024 Five-Year Program would drastically threaten each state's robust ocean and coastal economies, all three of which are wholly dependent on vital marine ecosystems. From a resource perspective, the social and economic value California, Oregon, and Washington's marine renewable resources exceed those that new or expanded offshore oil and gas production would provide.

Setting aside the imperative of curbing $CO_2$ emissions by reducing, rather than increasing, domestic fossil fuel production, developing Pacific OCS oil reserves would be a poor investment because California, Oregon, and Washington's oil and gas resources are minute in the context of U.S. energy demand. The West Coast states have minimal oil and gas resources and little, if any, coastal infrastructure to support offshore oil and gas development in Washington, Oregon, Northern California and Central California. Of the 89.87 billions of barrels (Bbo) of Risked Undiscovered Technically Recoverable Oil and Gas Resources (UTRR) on the United States' OCS, the Pacific is estimated to contain 10.20 Bbo—just 11.3 percent of the total.[46] There is little oil in each of the four Pacific planning areas.

Contextualizing the Pacific's potential oil resources in terms of daily U.S. oil consumption illustrates how short term and meager a contribution Pacific OCS development would have in meeting U.S. energy needs. If developed, Washington and Oregon's offshore oil would be commercially exhausted in ten days.[47] Fully developing California's OCS oil would meet U.S. energy needs for 329 days. In other words, the Pacific OCS only contains enough economically recoverable oil to meet U.S. energy demand for less than one year.[48] The Pacific's OCS gas reserves

[45] https://www.boem.gov/2017-2022-Proposed-Program-Decision/

[46] Fact Sheet: Assessment of Undiscovered Oil and Gas Resources of the Nation's Outer Continental Shelf, 2016, Bureau of Ocean Energy Management.

[47] U.S. Energy Information Administration, https://www.eia.gov/naturalgas/crudeoilreserves/pdf/usreserves.pdf; Fact Sheet: Assessment of Undiscovered Oil and Gas Resources of the Nation's Outer Continental Shelf, 2016, Bureau of Ocean Energy Management. This scenario was developed assuming the price of oil is $60 per barrel and natural gas is $3.20 per cubic feet—both generous estimates for economically recoverable resources. There is an estimated a total of 6.45 billion barrels of oil and 8.29 million cubic feet of natural gas on the Pacific OCS. This amounts to about 11% of the total U.S. OCS gas and 8% of the total natural gas. In 2016, the United States consumed a total of 7.19 billion barrels of petroleum products, an average of about 19.63 million barrels per day. At this rate, the estimates predict how long these resources would last.

[48] *Id.*

would make an even less significant contribution to U.S. domestic gas production. Of the four OCS planning areas in the Pacific, Washington/Oregon, Northern California, Central California, and Southern California, Washington/Oregon is estimated to contain a fraction of the Pacific estimate, 0.40 Bbo, with Northern, Central, and Southern California containing slightly larger, but still modest, oil resources.[49]

Jeopardizing the health of the Pacific region's irreplaceable marine resources and thriving fishing, tourism, and recreation economies in favor of short-lived oil and gas production would be illogical. To trade off long term growth in favor of short terms gains that would ultimately degrade Washington, Oregon, and California's robust economies plainly contradicts the courses these states have charted.

**Economic and Social Benefits of the Pacific Region's Ocean Economies**

The Pacific Coast marine habitats are among the most productive and diverse in the world. Major upwelling centers nourish the coastal waters, fueling them with nutrients from the deep. A vast range of habitats, including kelp forests, eel grass, estuarine nurseries, wetlands, rocky reefs and pinnacles, intricate hydrocorals, diverse sponges, sandy beaches, steep canyons, and the margins of offshore islands support a remarkable variety of ocean life, including hundreds of species of fish and dozens of species of birds and marine mammals.[50] The coast and ocean areas of the West Coast host many iconic places that are also biodiversity hot spots. For example, California's Farallon Islands support a growing population of the almost extirpated northern fur seals, threatened Steller sea lions, numerous other marine mammals, and the largest seabird colony in the continental United States, with thirteen different species breeding on the islands.[51] Every year, more than 20,000 gray whales travel a migratory route between the Arctic and Baja. [52] Washington, Oregon, and California's public commitment to preserving and protecting its coastal and marine resources is long standing and well-documented. The value of the West Coast states' marine areas extends beyond those captured by laws and economic valuation.

Given their stunning natural beauty and abundant biodiversity, it is no surprise that ocean tourism and recreation contribute a significant amount to the western coastal states' economy. To preserve the West Coast's world class marine ecosystems, the federal government has responded to tribes, local communities, and local and state elected officials by protecting some of the West Coast's invaluable marine treasures. California is home to the United States' largest and most comprehensive network of National Marine Sanctuaries, and Washington's Olympic Coast National Marine Sanctuary attracts 3 million visitors annually. Favoring marine protection over mineral and/or fossil fuel extraction has been enormously beneficial to the West Coast states' marine ecosystems and the fishermen and businesses that depend on them.

Washington, Oregon, and California's ocean economy GDP was valued at $56.3 billion in 2014.[53] Importantly, coastal tourism and recreation contribute $24.1 billion to that number—nearly 42.8 percent of the Pacific states' ocean GDP.[54] The West Coast fishing industries contribute over $2 billion in ocean GDP, and most importantly,

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[49] Mean estimates UTRR in Bbo: Northern California, 2.08; Central California, 2.40; Southern California, 5.32. Fact Sheet: Assessment of Undiscovered Oil and Gas Resources of the Nation's Outer Continental Shelf, 2016, Bureau of Ocean Energy Management

[50] Oceana, Protecting the Oregon Coast: Identifying and Protecting Important Ecological Areas (2011), http://oceana.org/en/news-media/publications/reports/protecting-the-oregon-coast-identifying-and-protecting-important-ecological-areas (accessed August 8, 2014).

[51] *Farallon National Wildlife Refuge*, http://www.fws.gov/refuges/profiles/index.cfm?id=81641 (accessed February 08, 2012).

[52] Oceana, *supra* n. 50.

[53] National Ocean Economics Program, Market Data, Ocean Economics (Washington, Oregon, and California Ocean GDP). Available at http://www.oceaneconomics.org/Market/ocean/oceanEcon.asp

[54] National Ocean Economics Program, Market Data, Ocean Economics (Washington, Oregon, and California/Tourism and Recreation).

provided a total of 15,296 fishing jobs in 2014.[55] The tourism and recreation sector of each West Coast state provided a total 498,274 jobs in 2014.[56] For all three West Coast states, the tourism and recreation sectors are growth industries for both ocean GDP and jobs. Since 2005, jobs in the tourism and recreation sector have climbed 18.5 percent.[57]

Of the three states included in the Pacific planning region, California is the only one with current commercial oil and gas production in its offshore waters. Given that California is potentially more vulnerable to oil and gas development than Oregon or Washington because of its greater resources and existing oil and gas infrastructure, much of the discussion here focuses on California.

California's ocean waters and unique marine ecosystems help drive its $41.8 billion ocean economy.[58] The state's devastating 1969, 1997, and 2015 oil spills illustrate the unacceptable risks expanded oil and gas production would pose to California's marine ecosystems and the many industries they support.

The 1969 Santa Barbara oil blow-out spilled more than 8.4 million gallons of oil into the ocean, covering more than 800 square miles and contaminating miles of beaches. The oil spill killed thousands of birds and other wildlife, and wreaked havoc on the local tourism and fishing industries.[59] In 1997, another offshore oil spill off Vandenberg Air Force Base caused substantial environmental harm. In 2015, Santa Barbara again experienced the impacts of an oil spill on the marine environment when the Plains All American Pipeline spilled more than 140,000 gallons of heavy crude oil, much of which reached the ocean. This spill had devastating impacts to the marine environment as well as the Southern California coastline, reaching as far as the Channel Islands and Los Angeles County. The spill killed hundreds of seabirds, dolphins, and sea lions, closed State Parks and popular public beaches, shut down more than a hundred square miles of fishing grounds, and devastated the local tourism industry.[60]

Galvanized by the seminal 1969 Santa Barbara oil spill, California has led the United States in marine protection. California has the United States' largest network of National Marine Sanctuaries: Greater Farallones National Marine Sanctuary, Cordell Bank National Marine Sanctuary, Monterey Bay National Marine Sanctuary, and Channel Islands National Marine Sanctuary. The state's commitment to marine protection also extends to state waters—in 1999, California passed the Marine Life Protection Act, which created 124 Marine Protected Areas in state waters comprising approximately 16 percent of California's coastal waters.

Economic data and trends associated with marine protection illustrate the benefits of investments in a non-extractive use of the United States' OCS resources. The tourism and recreation portion of California's ocean economy plays an outsize role in employment and contribution to the State's GDP—it comprises the largest portion of the ocean economy and contributes more jobs than all of the other sectors. In 2014, California's tourism and recreation sector generated $19.5 billion in GDP, nearly 50 percent of the ocean sector's contribution to

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[55] National Ocean Economics Program, Market Data, Ocean Economics (Washington, Oregon, and California/Living Resources/All).

[56] *Id.*

[57] *Id.*

[58] National Ocean Economics Program, Market Data, Ocean Economics (California GDP). Available at http://www.oceaneconomics.org/Market/ocean/oceanEcon.asp. $41.8 billion is the average of the California ocean GDP for all sectors from 2005 to 2014.

[59] *State of California v. Norton, supra*, at 1176-1177. NOAA Incident News Santa Barbara Well Blowout, available at https://incidentnews.noaa.gov/incident/6206.

[60] *People of the State of California v. Plains All American Pipeline Company, L.P.*, Santa Barbara County Superior Court Case No. 1495051, Indictment, May 16, 2016; California Department of Fish and Wildlife Office of Oil Spill Prevention and Response, *Refugio Oil Spill Response Evaluation Report,* May 2016; Refugio Oil Spill Incident Updates; Refugio Response Joint Information Center, Fact Sheet regarding beach closures: http://www.refugioresponse.com/go/doc/7258/2541530/index.html.

California's GDP.[61] Most significantly, the tourism and recreation sector of the ocean economy has grown 35 percent since 2005, underscoring that this non-extractive path is a powerful economic engine for the state.[62]

In contrast, the "oil and gas exploration and production" (O&G) sector of the ocean GDP has declined 10 percent during the same period of time—falling from $5.13 billion in 2005 to $4.66 billion in 2014.[63] Employment data for the tourism and recreation sector contrast starkly with those of the O&G sector and affirm the social value of the tourism and recreation economies. In 2014, the tourism and recreation sector provided 400,056 jobs, an increase of 19.5 percent since 2005.[64] In contrast, in 2014, the O&G sector provided 8,775 jobs. Contrary to the argument that increased oil and gas production will bring jobs to California, relying on the state's thriving tourism and recreation and renewable energy industries will provide economic and social benefits that far surpass those the offshore O&G industry can offer. This observation also applies to the United States generally—the tourism and recreation sector is the largest employment sector of the U.S. ocean economy, providing more than 2.2 million jobs in 2014, which constitutes 19.4 percent growth in employment in this sector since 2005, whereas oil and gas employment provided only 164,420 jobs in 2014.[65]

In choosing to expand California's marine protections such as the National Marine Sanctuaries and state Marine Protected Areas, federal and state agencies and the people of California have affirmed that these marine areas confer greater value to the United States and Californians in their protected state than if used for extractive purposes.

**Pacific Region Consistency with State Goals and Policies**

Section 18 of the Outer Continental Shelf Lands Act (OCSLA) enumerates "principles" the Secretary of the Interior must consider in determining the size, timing, and location of leasing. Applying these principles to the four Pacific planning areas strongly indicates that the Pacific region should be excluded in the 2019-2024 Five-Year Program. While the Secretary's independent analysis of the Pacific region should lead to this conclusion, the historic context of leasing decisions with respect to the Pacific is noteworthy.

The Pacific has been excluded from the Five-Year Program since the conclusion of the 1987-1992 Five-Year Program, a decision multiple administrations, both Republican and Democrat, have made. Consistent with BOEM's decisions over the past 25 years, in 2014, BOEM concluded the Pacific should not be included in the 2017-2022 Five Year Program. BOEM based that decision on the agency's analysis of the region with respect to section 18 of OCSLA:

> The four planning areas off the Pacific coast were not included for potential leasing in the 2017-2022 Program. This determination was consistent with the requirements of section 18 of the Act, which gives priority leasing consideration to areas where the combination of previous experience; local, state, and national laws and policies; and expressions of industry interest indicate that potential leasing and development activities could be expected to proceed in an orderly manner. The exclusion of the Pacific coast in the 2012-2017 Program is consistent with the long-standing interests of the west coast states, as framed in an agreement that the governors of California, Washington, and Oregon signed in 2006.[66]

[61] National Ocean Economics Program, Market Data, Ocean Economics (California, All counties, Tourism & Recreation Employment and Minerals/Oil & Gas Exploration and Production).
[62] *Id*.
[63] National Ocean Economics Program, Market Data, Ocean Economics (California, All counties, Minerals/Oil & Gas Exploration and Production/Employment/GDP)
[64] National Ocean Economics Program, Market Data, Ocean Economics (California, All counties, Tourism and Recreation/Employment).
[65] *Id*.
[66] Department of the Interior, Bureau of Ocean Energy Management, Request for Information and Comments on the Preparation of the 2017-2022 Outer Continental Shelf (OCS) Oil and Gas Leasing Program, Federal Register/Vol. 79, No. 115/Monday, June 16, 2014.

In the West Coast Governors' Agreement on Ocean Health of 2006, the Governors agreed to reinforce "our opposition to oil and gas leasing, exploration, and development off our coasts."

California has continued to underscore its opposition to expanded offshore oil and gas development since the West Coast Governors' Agreement. In December 2016, Governor Jerry Brown requested then President Barack Obama to permanently withdraw California from new oil and gas leasing.[67] The State Lands Commission passed a resolution the same month in support of the federal government's prohibition on new oil and gas leasing in federal waters.[68] In May 2017, the California State Senate adopted Senate Resolution 35 with overwhelming, and bi-partisan, support, which resolves that the Senate, "strongly and unequivocally supports the current federal prohibition on new oil or gas drilling in federal waters offshore California, opposes attempts to modify the prohibition, and will consider any appropriate actions to maintain the prohibition."[69] At local, state, and federal levels, California's policies state explicitly that OCS development for oil and gas is inconsistent with its laws, goals, and policies.

In California, which has the sixth largest economy in the world, and highest GDP of all fifty states, both republican and democratic constituencies have asserted resolutely that offshore oil and gas development is inconsistent with the state's commitment to protecting its $41.2 billion ocean economy and weaning the United States from fossil fuel dependence into a truly energy independent future. The majority – 69 percent – of Californians actively oppose new oil and gas drilling off the California coast.[70] That majority includes Californians from across the political spectrum, underscoring the truly bi-partisan nature of this issue. Public opposition would be a costly and time-intensive hurdle that would make potential oil and gas development in California an unappealing prospect for developers.[71]

Further, expanded offshore fossil fuel development at the expense of preserving California's marine environment would plainly contradict the State's commitment to addressing climate change. Through groundbreaking legislation, the California Legislature has set California on a path toward a renewable energy economy. On the West Coast, California leads the nation in setting targets for renewable energy and emissions reductions. On September 8, 2016, Governor Jerry Brown signed into law SB 32 and AB 197, two bills that require the state to reduce its emissions to 40 percent below 1990 levels by 2030. The Clean Energy and Pollution Reduction Act (SB 350) mandates that 50 percent of California's power generation come from renewable energy sources by 2030—expanded oil and gas development would impede and contradict California's renewable energy and emissions reduction requirements.

Given the imperative of upholding the highest level of protection for protected marine waters off the coast of California, including the State of California's Marine Protected Area network, any OCS activities that would occur proximate to or within National Marine Sanctuaries or California MPAs would need to be fully consistent with all state and federal laws that govern protected resources. These should include, but would not be limited to, the California Marine Life Protection Act, the California Coastal Act, the California Environmental Quality Act, the

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[67] Protect California Offshore Waters from Oil and Gas Leasing:
https://www.gov.ca.gov/docs/POTUS_Letter_12.13.16.pdf

[68] Resolution by The California State Lands Commission Supporting
The Federal Government's Prohibition of New Oil and Gas Leasing
in The Outer Continental Shelf Offshore California, http://www.slc.ca.gov/About/News_Room/2016/docs/12-06-16_Resolution.pdf.

[69] SR 35: Relative to New Outer Continental Shelf oil and gas leasing in federal waters offshore California.
http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SR35

[70] Californians & the Environment, Public Policy Institute of California, Statewide Survey, July 2017. Mark Baldassare Dean Bonner David Kordus Lunna Lopes.

[71] *Id.*

National Marine Sanctuaries Act, the Endangered Species Act, the Migratory Bird Treaty Act, and all other relevant laws.

In light of the necessity of transitioning away from fossil fuels, the West Coast's thriving coastal and ocean economies, and the region's commitment to aggressively transitioning to low-carbon energy systems, the Pacific Coast is unsuitable for inclusion in the Five-Year Program.

**c. Bristol Bay and the Entire North Aleutian Basin Should Be Excluded.**

BOEM should exclude the North Aleutian Basin Planning Area from the 2019-2024 Program. The area is currently withdrawn from oil and gas leasing by presidential order for a time period without specific expiration, and BOEM should recognize the extraordinary values of Bristol Bay and its surrounding waters that led to the presidential withdrawal, and should exclude the entire planning area from further leasing consideration.

The Kvichak and Nushagak rivers which feed Bristol Bay are home to some of the world's largest wild salmon runs. Sockeye salmon runs in Bristol Bay average 37.5 million fish annually[72], and already by mid-July this year had exceeded that number.[73] This area is home to 25 federally recognized tribal governments, and the native communities have relied on subsistence fishing and hunting from these waters for thousands of years. Bristol Bay is a vital fishing resource and is considered a world-class destination for sport anglers because of its abundance of large game fish including sockeye, Chinook and coho salmon and rainbow trout.[74]

A critical part of the local and statewide economy, the Bristol Bay wild salmon ecosystem generates between $318 and $572 million in direct economic expenditures annually—including commercial and sports fishing, hunting, tourism, and subsistence.[75] When indirect economic activity is accounted for, just the sockeye fishery there alone accounts for $1.5 billion in output or sales value across the United States.[76] The area should be excluded from this leasing program as well as all future ones.

**d. All Arctic Planning Areas Must Be Excluded.**

All Arctic Planning Areas were appropriately excluded from the 2017-2022 leasing program, and 95% of their acreage is permanently off limits to inclusion in any leasing program, withdrawn from all mineral disposition under OCSLA section 12(a). As discussed below, no worse places to drill for oil and gas exist in the United States. Biologically rich, fragile, vitally important, remote, harsh, battered by climate disruption, poorly understood, and impossible to open safely to drilling, they should be entirely excluded from the upcoming program.

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[72] Alaska Dispatch News, *EPA to protect Bristol Bay salmon fishery in move that could lead to Pebble mind veto* (Feb. 28, 2014). http://www.adn.com/article/20140228/epa-protect-bristol-bay-salmon-fishery-move-could-lead-pebble-mine-veto (accessed August 8, 2014).

[73] Alaska Dept. of Fish and Game, *Bristol Bay Daily Run Summary (July 17, 2014)* (showing 40 million total run, with 28 million fish caught to that date this year). http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.harvestsummary (accessed July 29, 2014).

[74] U.S. Environmental Protection Agency, *An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alsaka, Appendix A: Fishery Resources of the Bristol Bay Region* 1 (November 2013), http://cfpub.epa.gov/ncea/bristolbay/recordisplay.cfm?deid=253500 (accessed July 29, 2014).

[75] Duffield, J.W. et al., *Bristol Bay Wild Salmon Ecosystem Economics,* 2008 Update, www.fs.fed.us/rm/pubs/rmrs_p049/rmrs_p049_035_044.pdf (accessed August 8, 2014).

[76] G. Knapp et al. The Economic Importance of the Bristol Bay Salmon Industry. Institute of Social and Economic Research. Anchorage Ak (2013). http://fishermenforbristolbay.org/wp-content/uploads/2013/02/CFBB-ISER-FINAL-REPORT-5-10-2013.pdf (accessed July 29, 2014).

Some of the most productive marine ecosystems on Earth are found in these waters.[77] They are also among the most pristine.[78] The waters of the Beaufort and Chukchi Seas are home to one-fifth of the world's polar bears,[79] as well as ice seals, millions of migratory birds from virtually all continents, bowhead and gray whales, belugas, walrus, and other marine life, much of it already declining or imperiled,[80] including many species already formally listed as threatened or endangered.[81] A panel of international experts designated both seas Ecologically and Biologically Significant Areas,[82] and both are rimmed by a series of Important Bird Areas, identified by BirdLife International as vital to birds and other biodiversity.[83]

Within these seas, a series of specific areas is known to harbor particularly extraordinary biological values. Among these are coastal reaches including the Coastal Plain of the Arctic National Wildlife Refuge and Kasegaluk Lagoon, as well as a series of rich, ecologically vital, and unique marine features like Hannah and Herald Shoals and Barrow Canyon.[84] The irreplaceable values of these special areas merit complete protection from oil and gas development as well as all other industrial threats. Currents, winds, and ice in the Arctic Ocean, however, combine to ensure that oil spilled anywhere in U.S. waters could reach and pollute these sensitive areas.[85] As a result, any drilling for or production of oil and gas throughout the Chukchi and Beaufort would pose unacceptable risks to these areas.

As rich as ecosystems are in the region, they are also highly vulnerable. An Arctic Council assessment notes the "numerical dominance of relatively few key species in Arctic food webs, together with highly variable web interactions (for instance leading to community-wide cycles) and environmentally driven fluctuations with cascading effects through entire ecosystems."[86] These consequences extend to human residents because "biodiversity and the natural environment remain integral to well-being of Arctic peoples, providing not only food

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[77] Arctic Council, *Arctic Biodiversity Assessment: Status and trends in Arctic biodiversity – Synthesis (2013)* http://www.arcticbiodiversity.is/the-report/synthesis (accessed August 16, 2017). In fact, the primary productivity of these waters is potentially much higher than scientists have previously estimated. A National Aeronautic and Space Administration expedition not long ago discovered waters under thin ice in the Chukchi richer in phytoplankton production than any other ocean region known globally. https://www.nasa.gov/home/hqnews/2012/jun/HQ_12-184_NASA_Discovers_Ocean_Plant_Life.html (accessed August 16, 2017); http://www.adn.com/article/under-arctic-ice-scientists-discover-massive-phytoplankton-bloom-foundation-food-chain (accessed August 16, 2017).

[78] B.S. Halpern, et al., *A global map of human impact on marine ecosystems*, 319 Science 948-952 (Feb. 15, 2008).

[79] http://www.sciencedaily.com/releases/2008/01/080104144354.htm (accessed August 16, 2017).

[80] J. Goodyear and B. Beach, *Environmental risks with proposed offshore oil and gas development off Alaska's north slope,* Natural Resources Defense Council Issue Paper (2012), http://www.nrdc.org/land/alaska/files/drilling-off-north-slope-IP.pdf (accessed August 16, 2017).

[81] U.S. Fish and Wildlife Service, *Endangered, Threatened, Proposed, Candidate, and Delisted Species in Alaska,* (May 2014), http://www.fws.gov/alaska/fisheries/endangered/pdf/consultation_guide/4_species_list.pdf (accessed August 16, 2017).

[82] L. Speer and T. L. Laughlin, *IUCN/NRDC Workshop to Identify Areas of Ecological and Biological Significance or Vulnerability in the Arctic Marine Environment: Workshop Report*, International Union for the Conservation of Nature, Natural Resources Defense Council (2011), https://www.iucn.org/sites/dev/files/import/downloads/arctic_workshop_report_2011_2.pdf (accessed August 16, 2017).

[83] Audubon, *Important Bird Areas Program, A Global Currency for Bird Conservation,* http://web4.audubon.org/bird/iba/index.html (accessed August 16, 2017).

[84] Audubon, et al., *A Synthesis of Important Areas in the U.S. Chukchi and Beaufort Seas: Best Available Data to Inform Management Decisions* (2016), http://ak.audubon.org/sites/g/files/amh551/f/synthesis_of_important_areas_us_chukchi_beaufort_seas_28apr2016_0.pdf (accessed Aug. 16, 2017).

[85] NRDC, *The Fate of the Arctic in Offshore Oil Blowouts* (2016), https://www.nrdc.org/sites/default/files/fate-oil-arctic-ocean-blowouts-report.pdf (accessed August 16, 2017).

[86] Arctic Council, *supra* n. 77 at 34.

but the everyday context and basis for social identity, cultural survival and spiritual life."[87] One group estimates that overall the 8,000 people who live in the region depend on ocean sources for as much as 60 percent of their diet.[88]

Adding to the vulnerability of the entire eco-region are the varied and increasing impacts of climate disruption.[89] These include surface water warming, loss of sea ice, and ocean acidification, phenomena implicated in the increased number of animals in the region listed under the Endangered Species Act.[90] The rapidity of change means that where adaptation is possible, for many species it will mean not evolutionary change but northward displacement, a strategy of severely limited utility in the high latitudes entailing, as it necessarily does, the reduction of available surface area for habitat.[91]

For the United States, the Beaufort and Chukchi represent a chance, our last, to pass along to future generations a vast and unique pelagic system largely untouched. Even in 2013, when the federal government was still actively considering an oil and gas leasing program in the Arctic Ocean, an interagency report to the President aptly acknowledged the importance of the federal government ensuring that any offshore development of the U.S. Arctic be accomplished safely.[92] Notwithstanding considerable investment of both public and private resources, however, it remains the case that safe offshore drilling in the Chukchi and Beaufort Seas means no drilling. No amount of oversight and preparation can change the fact that the same conditions making human error there so disastrous also make it entirely predictable. The inordinately well-financed Shell drilling effort in 2012 in both seas illustrated this only too well, with the stress of environmental challenges translating into a sobering string of miscalculations, mistakes, and reversals by company personnel and contractors.[93]

Environmental challenges in the Arctic are manifold and typically far greater than elsewhere in the United States OCS. As the National Commission on the BP and Deepwater Horizon Oil Spill noted: "[t]he Alaskan Arctic is characterized by extreme cold, extended seasons of darkness, hurricane-strength storms, and pervasive fog—all affecting access and working conditions."[94] These conditions make accidents both more likely and much more difficult to deal with effectively.

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[87] *Id.* at 38.

[88] Pew Environment Group, *Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences* (2010) http://www.pewtrusts.org/~/media/legacy/uploadedfiles/peg/publications/report/Oil20Spill20Preventionpdf.pdf (accessed August 16, 2017).

[89] National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *Offshore Drilling in the Arctic: Background and Issues for the Future Consideration of Oil and Gas Activities – Staff Working Paper No. 13* (2011), https://permanent.access.gpo.gov/gpo8622/Offshore%20Drilling%20in%20the%20Arctic_Background%20and%20Issues%20for%20the%20Future%20Consideration%20of%20Oil%20and%20Gas%20Activities_0.pdf (accessed August 16, 2017).

[90] J.P. Clement, J.L. Bengtson, and B.P. Kelly, *Managing for the future in a rapidly changing Arctic - A report to the President. Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska*, 59 (2013), http://arcticlcc.org/assets/resources/Managing_for_the_Future_in_a_rapidly_changing_arctic.pdf (accessed August 16, 2017).

[91] Arctic Council, *supra* n. 77.

[92] Clement, et al., *supra* n. 90.

[93] Kiley Kroh and Michael Conathan, *Arctic Drilling Debacle* (2013), https://thinkprogress.org/timeline-documenting-shells-2012-arctic-drilling-debacle-6258b89aeead/ (accessed August 16, 2017).

[94] National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *Final Report to the President: Deep Water The Gulf Oil Disaster and the Future of Offshore Drilling* 302 (January 2011), http://www.gpo.gov/fdsys/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf (accessed August 16, 2017).

The gravest challenges to drilling probably are associated with ice. As Shell found,[95] even in the summer, ice intrudes on drill sites.[96] Throughout the summer, ice conditions in the Chukchi and Beaufort are highly variable,[97] and ice free waters transition to ice cover in a matter of days when freeze up comes.[98] As new ice forms, it rapidly encapsulates oil, to release it later on the surface during break up, but the details of encapsulated oil fate are poorly understood.[99] Once encapsulated, the oil can travel enormous distances before being released during the spring breakup, as much as 1200 miles net of backtracking.[100] And while ice is thought to make burning oil more feasible by containing its spread, in practice, burning oil on ice creates more problems than it solves.[101]

Additionally, meteorological conditions that can be much more severe than those encountered in the Gulf, after the BP spill, aggravate those problems. Fog persists for long periods of time and weeklong storms occur with extreme winds.[102] Ocean currents flow in complex patterns reversing direction rapidly and varying significantly in both magnitude and local direction.[103] Subsurface circulation can be just as complex and trend in the opposite direction.[104] Waves run to 20 feet.[105] And while eventually polar ice cap shrinkage may reduce the impact of ice during summer months, that will likely be accompanied by significant increases in wave height extremes and wind intensification.[106] Indeed, winds already show an increasing trend over the past 30 years, and large waves over the past decade.[107]

Taken together, these phenomena sharply limit the potential for effective oil spill response. No comprehensive assessment has been done of the "response gap" during which spill containment and remediation would be rendered impossible by conditions in the Chukchi and Beaufort Seas.[108] However, in a study of two sites in the Canadian Beaufort (a near shore site roughly as far offshore as Shell's existing Beaufort Sea leases and another comparably offshore to Shell's Chukchi leases), a study commission by the National Energy Board of Canada concluded that oil spill response countermeasures often could not be brought to bear effectively even during "open water" conditions. Containment and recovery would be impossible for an average of 46 percent of the open water time from June through October for the near offshore site and 47 percent for the far offshore one.[109]

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[95] Kim Murphy, *Ice threat halts Shell's drilling in Arctic Ocean after one day* (September 10, 2012), http://articles.latimes.com/2012/sep/10/nation/la-na-nn-shell-ice-arctic-drilling-chukchi-20120910 (accessed August 16, 2017).
[96] National Research Council*, Responding to Oil Spills in the U.S. Arctic Marine Environment* (2014).
[97] *Id.*
[98] *Id.*
[99] LOOKNorth, *Oil Spill Detection and Modeling in the Hudson and Davis Straits, Final Report R-13-087-1096* (May 2014) http://www.nunavut.ca/files/2014-05-29%20Oil%20Spill%20Detection%20and%20Modelling%20Report.pdf (accessed August 16, 2017).
[100] National Research Council, *supra* n. 96.
[101] M. McKinnon. Burning Oil on Ice Doesn't Work as Hoped (May 28, 2014), http://space.io9.com/burning-oil-on-ice-1582310696/+charliejane (accessed Aug. 16, 2017).
[102] Pew Environment Group, *supra* n. 88.
[103] National Research Council, *supra* n. 96.
[104] *Id*.
[105] Pew Environment Group, *supra* n 88.
[106] V.C. Khon et al. Wave heights in the 21st century Arctic Ocean simulated with a regional climate model. 41 Geophys. Res. Letters 2956-61 (April 28, 2014).
[107] National Research Council, *supra* n. 96.
[108] National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *Offshore Drilling in the Arctic: Background and Issues for the Future Consideration of Oil and Gas Activities – Staff Working Paper No. 13* (2011).
[109] National Energy Board of Canada, *Summary Report: Oil Spill Response Gap Assessment for the Canadian Beaufort Sea and Davis Strait* (2011), file:///C:/Users/nlawrence/Documents/Downloads/A2A6U9%20-%20SL%20Ross%20Environmetal%20Research%20Limited%20-%20Summary%20Report-%20Oil%20Spill%20Response%20Gap%20Assessment%20for%20the%20Canadian%20Beaufort%20Sea%20and%20Davis%20Strait.pdf (accessed Aug. 16, 2017). The study has been criticized as substantially underestimating how often during the drilling season remedial measures would be unavailable, because it calculated availability only

Dispersants—whatever their marginal efficacy and irrespective of their environmental impacts—could not be applied aerially 54 percent of that time near shore, and 52 percent at the farther offshore site; for in situ burning the percentages were 50 and 52, respectively.[110]

In addition to the environmental and human risks associated with these factors, they make it impossible for the United States to enhance its energy security through Arctic Ocean drilling. As a former Secretary of Defense recently noted, U.S. efforts to reopen our Arctic Ocean to drilling "will contribute to potential threats to our national security."[111] The United States' Arctic Strategy aligns the region with "a core component of our national security strategy: energy security."[112] At least for offshore drilling however, a less secure domestic source of energy would be hard to imagine. The litany of operational problems suffered by Shell when trying to operate in the region in 2012 makes plain the necessary uncertainty of supply. Production could be halted at any time by environmental factors directly or by human error precipitated by the harsh environment. With a narrow and uncertain window to halt a blowout and remediate a spill, months and even years could readily pass before production were resumed. Moreover, commercial production, even if exploration were successful, would not likely begin for decades,[113] Arctic Ocean oil could only come online long after the United States has to turn the corner on fossil fuel reliance and move the bulk of our energy strategy to other sources, including enhanced efficiency. In addition, because the breakeven point for Arctic Ocean oil is so high,[114] it will only come online if United States energy policy has failed to limit demand for oil enough to keep it affordable for domestic consumers.

Aggravating the risks of drilling in the Arctic Ocean is the large number of gaps in both our understanding and the necessary support and response infrastructure. At the most basic level, we do not know how proposed spill response technology will work in situ.[115] More broadly, "the current state of knowledge regarding the impact of an Arctic oil spill is extremely limited."[116] In particular, though the ability to forecast oil spill behavior in ice is "essential for risk assessment [and] spill response," the state of the art for oil spill modeling in ice is "little advanced."[117] Overall, our National Strategy for the Arctic concedes, "we lack much of the basic knowledge necessary to understand and address Arctic issues."[118] Little is known about the composition, populations, or

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during "open water" conditions, ignoring the other days from June through October when drilling would be allowed but some ice would be present and all conventional remediation therefore ineffective. *See* World Wildlife Fund-Canada. Comments on the Response Gap Study Submitted to the National Energy Board (2011), https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0ahUKEwjWgbe01N3VAhXhrFQKHRNsDZQQFgg1MAM&url=https%3A%2F%2Fapps.neb-one.gc.ca%2FREGDOCS%2FFile%2FDownload%2F712910&usg=AFQjCNFoE7YwGtZqybHf3_9VNLWrMh-5gw (accessed Aug. 16, 2017).

[110] *Id*.

[111] Panetta, L. *Trump's Arctic drilling executive order hurts national security* (2017), http://www.cnn.com/2017/05/12/opinions/improve-arctic-policy-opinion-panetta/ (accessed Aug. 16, 2017).

[112] Executive Office of the President, *National Strategy for the Arctic Region* 7 (2013), http://www.whitehouse.gov/sites/default/files/docs/nat_arctic_strategy.pdf (accessed August 8, 2014).

[113] Starting from scratch, it would take the industry 20-30 years to deliver that oil to consumers—if it really exists in commercial quantities. Shell's CEO estimated, before he quit trying to drill in the Arctic Ocean almost 15 years after leasing was authorized, that production was another 15 years off. http://splash247.com/shell-ceo-says-oil-production-in-arctic-probably-15-years-away/ (accessed Aug. 17, 2017).

[114] https://www.energyglobal.com/upstream/drilling-and-production/13062014/oil_sands_and_arctic_resources_more_expensive_than_shale_836/ (last visited Aug. 17, 2017).

[115] National Research Council, *supra* n. 96 at 5 ("there is a need to validate current and emerging oil spill response technologies on operation scales under realistic environmental conditions").

[116] Pew Environment Group, *supra* n. 88 at 7.

[117]LOOKNorth, *supra* n. 99 at iii.

[118] Executive Office of the President, *supra* n. 112.

ecology of Arctic Ocean biodiversity, and even less about how climate change will affect the region's marine ecosystems in general and fish populations in particular.[119]

These gaps not only would entail grave risks were leasing to go forward in the Chukchi or Beaufort Sea, they also mean that enormous expenditures of public funds would be needed. Perhaps the single biggest ticket item is U.S. Coast Guard preparedness. "The Coast Guard has zero capability in the Arctic," Admiral Robert Papp, then the Coast Guard commandant, said in 2012. He added: "If we are going to have a permanent presence there, it's going to require some investment. We don't have the infrastructure in place right now."[120] Papp reported that the Coast Guard would need four new icebreakers, something the Congressional Research Service estimates would cost the public $3.2 billion.[121]

The needs with public pricetags, however, far overextend icebreakers. A National Research Council report identified a staggering array of informational and infrastructure gaps associated with drilling in the U.S. Arctic Ocean. Chief among them were:

1) High-resolution satellite and airborne imagery needs to be coupled with up-to-date high-resolution digital elevation models and updated regularly to capture the dynamic, rapidly changing U.S. Arctic coastline.
2) Nearshore bathymetry and topography should be collected at a scale appropriate for accurate modeling of coastline vulnerability and storm surge sensitivity.
3) Short- and long-term Arctic nautical charting and shoreline mapping that have been identified in NOAA and USGS plans should be adequately resourced, so that mapping efforts can be initiated, continued, and completed in timescales relevant to anticipated changes.
4) Arctic mapping priorities should continue to be developed in consultation with stakeholders and industry and should be implemented systematically rather than through surveys of opportunity.
5) A real-time Arctic ocean-ice-meteorological forecasting system is needed to account for variations in sea ice coverage and thickness and should include patterns of ice movement, ice type, sea state, ocean stratification and circulation, storm surge, and improved resolution in areas of potential risk. Such a system requires robust, sustainable, and effective acquisition of relevant observational data.
6) A comprehensive, collaborative, long-term Arctic oil spill research and development program needs to be established. The program should focus on understanding the relationship between oil and sea ice formation, transport, and fate. It should include assessment of oil spill response technologies and logistics, improvements to forecasting models and associated data needs, and controlled field releases under realistic conditions for research purposes. Industry, academic, government, non-governmental, grassroots, and international efforts should be integrated into the program, with a focus on peer review and transparency.
7) Dispersant pre-approval in Alaska should be based on sound science, including research on fates and effects of chemically dispersed oil in the Arctic environment, experiments using oils that are representative of those in the Arctic, toxicity tests of chemically dispersed oil at realistic concentrations and exposures, and the use of representative microbial and lower-trophic benthic and pelagic Arctic species at appropriate temperatures and salinities.
8) The US Coast Guard should:
    a) expand its bilateral agreement with Russia to include Arctic spill scenarios and conduct regularly scheduled exercises to establish joint responses under Arctic conditions and should build on existing bilateral agreements with Russia and Canada to develop and exercise a joint contingency plan;
    b) expedite its evaluation of traffic through the Bering Strait to determine if vessel traffic monitoring systems, including an internationally recognized traffic separation scheme, are warranted. If so, this should be coordinated with Russia;
    c) consider obtaining broader satellite monitoring of AIS signals in the Arctic through government means or from private providers.

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[119] C. Kelly, M. Conathan, and V. Singh, *Helping the Arctic Council Find its True North,* Center for American Progress (April 2014).

[120] Carol Wolf and Kasia Klimasinska, *Shell-Led Arctic Push Finds U.S. Shy in* Icebreakers, (July 18, 2012), http://fuelfix.com/blog/2012/07/19/shell-led-arctic-push-finds-u-s-shy-in-icebreakers/ (accessed Aug. 17, 2017).

[121] *Id.*

9) As oil and gas, shipping, and tourism activities increase, the Coast Guard will need an enhanced presence and performance capacity in the Arctic, including area-specific training, icebreaking capability, improved availability of vessels for responding to oil spills or other emergency situations, and aircraft and helicopter support facilities for the open water season and eventually year-round.
10) Arctic assignments for trained and experienced personnel and tribal liaisons should be of longer duration, to take full advantage of their skills.
11) Sustained funding will be needed to increase the Coast Guard presence in the Arctic and to strengthen and expand their ongoing Arctic oil spill research programs.
12) Infrastructure to support oil spill response should be enhanced in the North Slope and Northwest Arctic Boroughs, with marine facilities for addressing response operations.
13) The Coast Guard and Alaska Department of Environmental Conservation should undertake the development of an oil spill training program for local entities so as to develop trained response teams in local villages.
14) Local officials and trained village response teams should be included in the coordinated decision making and command process during a response event.
15) Input from community experts should be actively solicited for inclusion in response planning and considered in conjunction with data derived from other sources. The Coast Guard should set this as an exercise objective in all government-led oil spill response exercises in the Arctic and should set the expectation that industry-led exercises will do the same.
16) Relevant federal, state, and municipal organizations (such as the Coast Guard, National Oceanic and Atmospheric Administration, Bureau of Safety and Environmental Enforcement, Bureau of Ocean Energy Management, Alaska Department of Environmental Conservation, Alaska Department of Natural Resources, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, North Slope Borough, and Northwest Arctic Borough), local experts, industry, and academia should undertake regularly scheduled oil spill exercises designed to test and evaluate the flexible and scalable organizational structures needed for highly reliable Arctic oil spill response.
17) The U.S. Fish and Wildlife Service, NOAA's National Marine Fisheries Service, the Alaska Department of Fish and Game should work together with industry to explore and improve deterrence and rehabilitation methods for wildlife.
18) Further study should focus on the impact of oil spills on Arctic food webs and dynamics at different trophic levels. The process should involve regulators, resource managers, health authorities, technical specialists, scientific experts, and local experts.[122]

Consistent with all of the above, in Dec. 2016, President Obama permanently withdrew 95% of the U.S. Arctic Ocean from ever being eligible for inclusion in a five-year leasing program.[123] This withdrawal means it would be illegal to include those areas in a revision of the current five-year program, or in any future one.

The President's withdrawal of these areas, the White House noted at the time, strongly aligned with the public interest:

> The U.S. Arctic is a unique, vibrant, and vulnerable ecosystem that is home to several Federally listed and candidate species under the Endangered Species Act, including iconic and culturally valuable species, and upon which many Alaska Native communities rely for subsistence use and cultural traditions;
>
> Even recognizing the substantial steps taken by this Administration to improve the safety of potential Arctic exploration and development, there would still be

[122] National Research Council, *supra* n. 96.

[123] Presidential Memorandum -- Withdrawal of Certain Portions of the United States Arctic Outer Continental Shelf from Mineral Leasing (2106), https://obamawhitehouse.archives.gov/the-press-office/2016/12/20/presidential-memorandum-withdrawal-certain-portions-united-states-arctic

> significant risks associated with offshore drilling operations given that the U.S. Arctic is characterized by harsh environmental conditions, geographic remoteness, and a relative lack of fixed infrastructure and existing oil and gas operations. The consequences of an oil spill in this region could be substantially detrimental to the ecosystem;
>
> Considering these factors, the risks associated with oil and gas activity in remote and harsh Arctic environments are not worth taking when the United States has ample energy sources near existing infrastructure elsewhere. Furthermore, while the withdrawal area does contain oil and gas resources, if oil prices remain at current levels, production of these resources would be cost-prohibitive and would not take place. Even if oil prices were more than 200 percent above their current level, production of these resources would not take place for 10-50 years because of the lead time associated with exploration and development activities.
>
> This action is consistent with the steps the United States and the international community will take in the coming decades to transition energy systems away from fossil fuels - particularly because any potential significant Arctic offshore production would only occur around the middle of this century, a timeline that is incongruous with our nation's need and international commitments to reduce carbon emissions.[124]

While President Trump has attempted to reverse this withdrawal,[125] he lacks the legal authority to do so.[126] As a result, his effort was swiftly challenged in federal court.[127]

In sum, whether from an environmental, security, or economic standpoint, we cannot afford to let oil companies drill in the United States' Arctic Ocean. Because drilling is so flatly contraindicated, inclusion of the Beaufort and Chukchi in any revision of the 2017-2022 OCS program is pointless at best, largely illegal, and an effort to pursue the country's energy needs in the worst possible place we could allow drilling. These areas must thus remain from all five-year offshore leasing programs.

**e. The Cook Inlet Planning Area Should Be Excluded.**

No lease sales should be scheduled in Cook Inlet. A semi-enclosed tidal estuary in south central Alaska, the Inlet is home to a variety of marine mammal species, such as Steller sea lions and harbor porpoises, and bird and fish species, such as salmon, eulachon, and Pacific cod. Among the most significant and vulnerable of these species is the small Cook Inlet population of beluga whales, which was listed under the Endangered Species Act in 2008. Despite the moratorium placed on subsistence hunting more than a decade ago, the beluga has not recovered and, indeed, continues to decline. According to NMFS' status review, it stands a 26% probability of becoming

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[124] *Id.*

[125] Eilprin, J., *Trump signs executive order to expand drilling off America's coasts: 'We're opening it up.'* (2107), https://www.washingtonpost.com/news/energy-environment/wp/2017/04/28/trump-signs-executive-order-to-expand-offshore-drilling-and-analyze-marine-sanctuaries-oil-and-gas-potential/?utm_term=.114c1d48f264 (accessed Aug. 17, 2017).

[126] NRDC and Earthjustice, *Briefer on Presidential Withdrawal Under OCSLA Sec. 12(a)* (2106), https://www.nrdc.org/sites/default/files/briefer-on-ocsla-withdrawal-authority_20161121_0.pdf (accessed Aug. 17, 2017).

[127] Dlouhy, J. and K. Mehrota, *Trump's Arctic Plan Challenged by Environmental Groups* (2107), https://www.bloomberg.com/news/articles/2017-05-03/trump-s-arctic-drilling-plan-challenged-by-environmental-groups (accessed Aug. 17, 2017).

functionally extinct within the next 100 years, and a 70% probability of extinction within 300 years.[128] The U.S. Marine Mammal Commission has repeatedly called for a suspension of geophysical surveys and other disruptive activities in the Inlet, given the individual and cumulative impacts these activities may have on the population's recovery.[129] The beluga's sensitivity to oil spills by itself mandates exclusion of Cook Inlet from the leasing program.

In addition, the beluga should be protected from pre-drilling activities. The Cook Inlet Planning Area sits adjacent to beluga whale critical habitat in the Lower Inlet. Given the large environmental footprint of seismic exploration and the cumulative stressors already operating on this beluga population, no seismic surveys should be permitted there, unless and until the beluga population has recovered.

**f. The Gulf of Mexico Should Be Excluded.**

There should be no new leasing in the Gulf of Mexico under this new five-year plan. Six years ago, a BP blowout killed 11 workers and gushed millions of barrels of toxic crude oil into some of the richest marine life habitats anywhere in the world. This ongoing disaster threw tens of thousands of fishermen, oystermen, shrimpers, and others out of work. It made food unsafe to eat and air unsafe to breathe and has resulted in widespread health problems for the people of the Gulf, where oil spread out across more than 1,000 miles of coastal lands and marsh. It is still taking a toll on marine life.

The disaster in the Gulf affirmed that there is no way to take the risk out of what is an inherently dangerous industrial operation at sea. Thousands of oil, gas, and chemical spills are reported in the Gulf every year and the region is still at risk of another catastrophe like the BP disaster. Moreover, from sea level rise and extreme storms fueled by climate change, to coastal erosion, the Gulf of Mexico is on the front line of the impacts from the oil and gas industry.

Right now, in the Gulf of Mexico, the oil and gas industry has leased from the federal government over 15 million acres for potential drilling. The industry is getting oil and gas from about 4 million acres, leaving more than 11 million acres of existing leases on the table for development. No more leasing is needed or should be conducted in the Gulf. (It's notable that the Gulf of Mexico Lease Sale 249 on August 16, 2017, the first lease sale under the current Five-Year Leasing Program, generated only light industry interest, with companies bidding on only 90 out over 14,000 blocks.) Instead, there should be accelerated work done, in consultation with communities and workers in the region, helping to ensure that as fossil fuel production ramps down over time, there is a smooth transition that connects the skilled workforce with the clean energy jobs of the future.

There are also environmentally important areas and vulnerable populations of marine wildlife in the Gulf of Mexico that offer further justification for not issuing new leases. A discussion of these follows.

(a) *DeSoto Canyon.*— The DeSoto Canyon, an erosional valley that cuts through Alabama and western Florida's broad continental shelf, represents important habitat for Bryde's whales, the only baleen whale resident to the Gulf of Mexico,[130] as well as habitat for sperm whale and other cetaceans. Virtually all

[128] R.C. Hobbs and K.E.W. Shelden, *Supplemental status review and extinction assessment of Cook Inlet belugas (Delphinapterus leucas)* (2008) (NMFS report).
[129] E.g., Marine Mammal Commission, *Comments on proposed Incidental Harassment Authorization for Apache Alaska Corporation*, from R.J. Lent, Executive Director, to P. Michael Payne, NMFS (Jan. 31, 2014) (available at mmc.gov).
[130] J.G. Mead, *Records of Sei and Bryde's Whales from the Atlantic coast of the United States, the Gulf of Mexico, and the Caribbean, Report of the International Whaling Commission* (Special Issue 1) 113-116 (1977) (information paper SC/SP74/Doc 36 to the Scientific Committee of the International Whaling Commission); D.J. Schmidly, Marine Mammals of the Southeastern United States and the Gulf of Mexico (1981) (U.S. Fish and Wildlife Service Report No. FWS/OBS-80/41); T.A. Jefferson and A.J. Schiro, *Distribution of cetaceans in the offshore Gulf of Mexico*, 27 Mammal Review 27-50 (1997).

reported sightings of Bryde's whales, made during several series of springtime abundance surveys in the northern Gulf, have occurred within the northern part of the DeSoto Canyon, suggesting a highly limited range.[131] Similarly, passive acoustic surveys using towed hydrophone arrays and fixed High-frequency Acoustic Recording Packages detected Bryde's whales only within the DeSoto Canyon, despite commensurate effort in other locations in the Central and Eastern Gulf.[132] This area has accordingly been identified by NMFS experts as a biologically important area for Bryde's whales, an area that is important for reproduction and foraging for this resident marine mammal population.[133]

(b) On December 2, 2016, NMFS proposed listing the Gulf Bryde's whale under the Endangered Species Act as an endangered subspecies. Its reasons for doing so were manifold, including a population size estimated at below 50,[134] leaving it highly vulnerable to human perturbation. Notably, the Biological Review Team for the Bryde's whale listing, followed by NMFS, identified anthropogenic sound from seismic surveys as a high threat to this endangered population.[135] The peak frequencies of Bryde's whale vocalizations, recently modeled by NMFS with a source level of 152 dB in 100 Hz 1/3-octave band, makes the population extremely vulnerable to loss of communication space from seismic exploration,[136] much as, according to the best available models, shipping has an outsized effect on right whale communication space.[137] And indeed, long-term distributional data indicate that energy exploration and production in the Central Gulf may have led to a contraction of the whales' habitat, an "abandonment of the northwestern [Gulf]."[138] Energy production was similarly identified as a high threat.[139]

The DeSoto Canyon, including that portion which falls within BOEM's Central Planning Area, should be entirely excluded from leasing, as should Gulf areas that significantly propagate sound into the DeSoto Canyon. Additionally, BOEM should consider termination or buy-back of development rights within the existing Lease Sale 224, in the Eastern Gulf, to protect this critically endangered whale population.

(c) *Coastal bottlenose dolphin habitat.*— Coastal waters of less than 20 meters depth constitute the entire range of the Gulf's celebrated coastal and near-coastal/ inshore bottlenose dolphins. This ecotype

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[131] K.D. Mullin and G.L. Fulling, *Abundance of cetaceans in the oceanic northern Gulf of Mexico*, 20 Marine Mammal Science 787-807 (2004); K. Maze-Foley and K.D. Mullin, Cetaceans of the oceanic northern Gulf of Mexico: *Distributions, group sizes and interspecific associations*, 8 Journal of Cetacean Research and Management 203–213 (2006); Anonymous, *Bryde's whale (*Baleanoptera edeni*): Northern Gulf of Mexico stock*, *in* G.T. Waring, E. Josephson, K. Maze-Foley, and P.E. Rosel (eds.), *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2015*, at 263-268 (2016).

[132] A. Širović, H.R. Bassett, S.C. Johnson, S.M. Wiggins, and J.A. Hildebrand, *Bryde's whale calls recorded in the Gulf of Mexico*, 30 Marine Mammal Science 399-409 (2014).

[133] E. LaBrecque, C. Curtice, J. Harrison, S.M. Van Parijs, and P.N. Halpin, *Biologically important areas for cetaceans within U.S. waters—Gulf of Mexico region*, 41 Aquatic Mammals 30-38 (2015).

[134] Anonymous, *Bryde's whale*, *supra*.

[135] P.E. Rosel, P. Corkeron, L. Engleby, D. Epperson, K.D. Mullin, M.S. Soldevilla, and B.L. Taylor, *Status review of Bryde's whales (*Balaenoptera edeni*) in the Gulf of Mexico under the Endangered Species Act* (2016) (NOAA Tech. Memo. NMFS-SEFSC-692).

[136] M.-N.R. Matthews, A. Schlesinger, and D. Hannay, *Cumulative and chronic effects in the Gulf of Mexico: Estimating reduction of listening area and communication space due to seismic activities in support of the BOEM Geological and Geophysical Activities Draft Programmatic Environmental Impact Statement*, *in* BOEM, *Gulf of Mexico OCS Proposed Geological and Geophysical Activities Draft Programmatic Environmental Impact Statement*, at App. K (NMFS-directed study of cumulative and chronic efforts of geophysical surveys in the Gulf of Mexico)

[137] 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).

[138] P.E. Rosel and L.A. Wilcox, *Genetic evidence reveals a unique lineage of Bryde's whales in the northern Gulf of Mexico*, 25 Endangered Species Research 19-34 (2014).

[139] P.E. Rosel et al., *Status review*, *supra*.

comprises more than 30 identified stocks across the Northern Gulf, many of which have best population estimates well below 100 individual animals.[140]

These dolphins are in crisis. From February 2010 through 2014, dolphin communities from the Texas border to Franklin County, Florida experienced a die-off that was unprecedented in its duration and magnitude, involving many hundreds of animals and disproportionately affecting neonates and calves.[141] Animals sampled in Barataria Bay, an area that was inundated with oil from the Macondo spill, showed signs consistent with adrenal toxicity, and were five times more likely than the control sample in Sarasota to have moderate to severe lung disease.[142] Many observers witnessed them swimming in and around the spill, demonstrating their inability—studied during previous spills—to avoid sheens and emulsified oil.[143] In all, NMFS estimates that 38% of coastal bottlenose dolphins were killed in the recent Unusual Mortality Event ("UME"), that 37% of their pregnancies were lost, and that 30% of them are suffering from adverse health effects.[144]

The coastal habitat of these small, highly vulnerable dolphin communities, as well as waters that present a heightened risk of behavioral disruption from seismic or a heightened risk of future oil contamination within the dolphins' coastal habitat, should be excluded from all new leasing. BOEM must afford some opportunity for recovery from the population damages caused by the *Deepwater Horizon* spill.

(d) *Mississippi Canyon.*— It is well established, on the basis of historic whaling records, mark-recapture data, and extensive surveys including by GulfCet II and the Sperm Whale Seismic Study, that the Mississippi Canyon constitutes important habitat for the Gulf's small, biologically distinct population of sperm whales,[145] most likely due to the input of a nutrient-rich, freshwater plume from the Mississippi Delta.[146] Nearly all sightings of females and mother-calf groups have occurred there, strongly suggesting that it

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[140] *See passim* G.T. Waring, E. Josephson, K. Maze-Foley, and P.E. Rosel (eds.), *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2015*, at 275-357 (2016).

[141] NOAA, *2010-2014 Cetacean Unusual Mortality Event in Northern Gulf of Mexico*, (2015), http://www.nmfs.noaa.gov/pr/health/mmume/cetacean_gulfofmexico.htm (accessed Aug. 2014).

[142] L.H. Schwacke, C.R. Smith, F.I. Townsend, R.S. Wells, L.B. Hart, B.C. Balmer, T.K. Collier, S. De Guise, M.M. Fry, L.J. Guillette Jr., S.V. Lamb, S.M. Lane, W.E. McFee, N.J. Place, M.C. Tumlin, G.M. Ylitalo, E.S. Zolman, and T.K. Rowles, *Health of common bottlenose dolphins (Tursiops truncatus) in Barataria Bay, Louisiana, following the Deepwater Horizon oil spill*, 48 *Environmental Science & Technology* 93-103 (2014).

[143] M.A. Smultea and B. Würsig, *Behavioral reactions of bottlenose dolphins to the Mega Borg oil spill, Gulf of Mexico 1990*, 21 Aquatic Mammals 171-181 (1995).

[144] NOAA, *NRDA-funded marine mammal monitoring, presentation to the National Academy of Science, Effective Approaches for Monitoring and Assessing Gulf of Mexico Restoration Activities* (Oct. 22, 2015); *see also* S.M. Lane, C.R. Smith, J. Mitchell, B.C. Balmer, K.P. Barry, T. McDonald, C.S. Mori, P.E. Rosel, T.K. Rowles, T.R. Speakman, F.I. Townsend, M.C. Tumlin, R.S. Well, E.S. Zolman, and L.H. Schwacke, *Reproductive outcome and survival of common bottlenose dolphins sampled in Barataria Bay, Louisiana, USA, following the* Deepwater Horizon *oil spill*, 282(1818) *Royal Society Proceedings: Biological Science* 20151944 (2015).

[145] C.H. Townsend, *The distribution of certain whales as shown by logbook records of American whaleships*, 19 Zoologica: Scientific Contributions of the New York Zoological Society 3-50 (1935); D.C. Biggs, R.R. Leben, and J.G. Ortega-Ortiz, *Ship and satellite studies of mesoscale circulation and sperm whale habitats in the northeast Gulf of Mexico during GulfCet II*, 18 Gulf of Mexico Science 15-22 (2000); D.W. Weller, B. Würsig, S.K. Lynn, and A.J. Schiro, *Preliminary findings on the occurrence and site fidelity of photo-identified sperm whales (Physeter macrocephalus) in the northern Gulf of Mexico*, 18 Gulf of Mexico Science 35-39 (2000); M.F. Baumgartner, K.D. Mullin, L.N. May, and T.D. Leming, *Cetacean habitats in the northern Gulf of Mexico*, 99 Fishery Bulletin, U.S. 219-239 (2001); A. Jochens, D. Biggs, D. Engelhaupt, J. Gordon, N. Jaquet, M. Johnson, R. Leben, B. Mate, P. Miller, J. Ortega-Ortiz, A. Thode, P. Tyack, J. Wormuth, and B. Würsig, *Sperm whale seismic study in the Gulf of Mexico: Summary report*, 2002-2004 (2006) (OCS Study MMS 2006-034).

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

functions as a nursery ground.[147] Unfortunately, the Canyon was heavily exposed to both oil and dispersants, particularly Corexit 9527 and Corexit 9500A, following the *Deepwater Horizon* blowout in 2010.[148] Given the persistence of oil in the marine environment, the Canyon may be contaminated for decades.[149] Sperm whales sampled in the Canyon during a post-spill biopsy study showed levels of nickel and chromium—two genotoxic metals found in Macondo oil—that were two to five times higher than the global mean for the species.[150] No additional leasing should take place in the Mississippi Canyon, and BOEM should consider termination or buy-back of existing development rights.

Finally, there should be no lease sales scheduled in the Eastern Gulf of Mexico. In 2006, Congress passed the Gulf of Mexico Energy and Security Act which created a moratorium on drilling through 2022 in most of the eastern Gulf of Mexico (within 125 miles off the Florida coastline in the Eastern Planning Area, and a portion of the Central Planning Area).[151] There is a very strong effort to extend this moratorium on the Eastern Gulf for a wide variety of reasons including potential harm to coastal economies, spills and impacts to ecosystems, and Department of Defense use of the area.

Florida's tourism and fishing economy simply cannot afford another BP type spill. And this is especially true for Gulf areas that are still recovering from the BP Deepwater Horizon Disaster. The Gulf of Mexico commercial fishing industry was estimated to have lost $247 million as a result of post spill fisheries closures.[152] The spill also cost the public more than 16 million user days for outdoor recreation such as boating, recreational fishing, and beach-going. Total recreational use damages due to the spill are estimated at $693.2 million.[153] In the Eastern Gulf of Mexico, where tourism, fishing and recreation are such critical economic drivers, communities do not want to risk this for oil company profits.

In addition to potential impacts to communities, ecosystems and economies, the Department of Defense has already weighed in, asking that this area be excluded from drilling due to its importance for the military.[154] Based

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[147] Weller et al., *supra* n. 79; Jochens et al., *supra* n. 79.

[148] E.B. Kujawinski, M.C. Kido Soule, D. L. Valentine, A.K. Boysen, K. Longnecker, and M.C. Redmond, *Fate of dispersants associated with the Deepwater Horizon oil spill*, 45 Environmental Science & Technology 1298–1306 (2011); NOAA, EPA, Department of the Interior, Department of Homeland Security, and University of New Hampshire, Environmental Response Management Application (ERMA) Deepwater Gulf Response (2014) response.restoration.noaa.gov/erma (accessed July 8, 2014).

[149] C.H. Peterson, S.D. Rice, J.W. Short, D. Esler, J.L. Bodkin, B.E. Ballachey, and D.B. Irons, *Long-term ecosystem response to the Exxon Valdez oil spill*, 302 Science 2082-2086 (2003).

[150] J.P. Wise, Jr., J.T.F. Wise, C.F. Wise, S.S. Wise, C. Gianios,, Jr., H. Xie, W.D. Thompson, C. Perkins, C. Falank, and J.P. Wise, Sr., *Concentrations of the genotoxic metals, chromium and nickel, in whales, tar balls, oil slicks, and released oil from the Gulf of Mexico in the immediate aftermath of the Deepwater Horizon oil crisis: Is genotoxic metal exposure part of the Deepwater Horizon legacy?* 48 Environmental Science and Technology 2997-3006 (2014).

[151] https://www.boem.gov/GOMESA/

[152] McCrea-Strub, A., et al., Potential impact of the Deepwater Horizon oil spill on commercial fisheries in the Gulf of Mexico, Fisheries, Vol. 36(7), pp. 332–336, 2011

[153] Deepwater Horizon Natural Resource Damage Assessment Trustees, Deepwater Horizon oil spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement. National Oceanic and Atmospheric Administration (NOAA), February 2016, www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan (accessed February 2017)

[154] https://www.billnelson.senate.gov/sites/default/files/06.27.17%20CSAF%20Letter%20to%20Sen%20Nelson%20Re%20Moratorium%20on%20Leasing%20Land.pdf

on these factors, leaders in Florida from both parties are pressing for an extended moratorium in the Eastern Gulf.[155,156]

**2. New Offshore Oil and Gas Leasing in these OCS Areas is Not Necessary Because U.S. Energy Needs Can Be Better Met in Other Ways.**

The 2019-2024 Five Year Program is based on the Outer Continental Shelf Lands Act (OCSLA) Section 18(a), which requires the Secretary of the Interior to periodically revise the oil and gas leasing program in order to "best meet national energy needs."[157] Pursuant to Section 18(a)(2)(C), the Secretary must consider "the location of such regions with respect to, and the relative needs of, regional and national energy markets" when developing a proposed oil and gas leasing program.[158] The premise of a new 2019-2024 Program—that increasing offshore oil and gas drilling is the best way to meet national energy needs—is false. Opening up new lease sales that could result in increased offshore oil and gas drilling activities for the next 40-50 years is not the best way to meet our energy needs. Instead, we should focus on clean energy that will create jobs and repower America. Offshore drilling will not reduce our dependence on foreign oil, curb global warming pollution, or create new jobs the way that investing in clean renewable energy will. The United States must transition away from fossil fuels and towards a clean energy economy.

**a. Energy and Fuel Efficiency Offer Far Greater Gains Than New Drilling.**

Energy and fuel efficiency – in brief, the opportunity to do more with less – is the smartest way to cut energy consumption and jumpstart the transition to a sustainable green economy. Energy efficiency provides the most cost-effective and environmentally sound way of meeting the nation's energy needs. It can serve as an important bridge to a future of clean renewables.

Significant cost-effective energy savings remain untapped in every sector and in every geographic region of the United States despite the opportunities for enormous benefits, and the fact that energy efficiency has contributed nearly four times as much as any other new energy supply to meeting America's added demand for energy services since 1970.[159]

When assessing the impetus to drill for oil and natural gas off our shores, the Bureau must consider the U.S. demand for these energy sources. The assessment should look many decades into the future when clean alternatives to today's petroleum-based transportation system can be adopted. Due in large part to landmark fuel efficiency and carbon emissions standards, the on-road fleet of cars and light- and heavy-duty trucks are consuming less oil-derived gasoline and diesel. These standards are reducing U.S. demand for oil and displacing the need for increased production.

BOEM's energy need projections must extend beyond the latest assessments of EIA in its Annual Energy Outlook (AEO) Reference Case and consider additional plausible scenarios that describe low demands for natural gas and oil. The AEO Reference Case analyzes only existing policy, which includes light-duty vehicle standards to 2025 and heavy-duty vehicle standards to 2018. BOEM, however, must ensure that its projections of future needs takes account of future trends, including the fact that globally the auto industry will be moving to meet tighter emission and fuel efficiency standards. BOEM should also consider fuel demand reductions as a result of demographic and

[155] https://www.rubio.senate.gov/public/index.cfm/press-releases?ID=23C4DB2C-7410-4875-93CC-30C61A8FE9BD;
[156] https://www.billnelson.senate.gov/newsroom/press-releases/nelson-files-bill-to-block-expansion-of-offshore-drilling
[157] 43 U.S.C. § 1334(a).
[158] 43 U.S.C. § 1344(a)(2)(C)
[159] Natural Resources Defense Council, *American's (Amazingly) Good Energy News* (October 2013) http://www.nrdc.org/energy/energy-environment-report/files/energy-environment-report-2013.pdf (accessed August 8, 2014).

other factors reducing vehicle miles traveled (VMT). Studies by Fehr & Peers[160] and the U.S. Public Interest Research Group[161] as well as EIA's AEO Low VMT Case contemplate plausible futures with less on-road driving and energy demand.

In addition to evaluating the on-road sector, BOEM should consider future fuel demand scenarios in which off-road vehicles, like trains and port equipment, aircraft and marine vessels improve efficiency and become electrified. In 2010, EPA evaluated oil and greenhouse gas reduction opportunities in the non-road efficiency improvements in response to a request from then-Senator John Kerry.[162] A study in California, "Moving California Forward: Zero and Low-Emissions Freight Pathways" evaluated future goods movement opportunities that reduce oil consumption and lower emissions.[163] The transportation sector must transition away from oil (or natural gas) as a primary energy source. In the long-run, the transportation sector must cut carbon pollution in the same way that it can reduce oil demand: maximize vehicle energy efficiency, create alternatives to high-emission driving through clean transit and freight measures and meet remaining demand through low carbon forms of electricity or other clean fuels. Continued reliance on oil from offshore (or from the land) is inconsistent with a low-carbon future.

Americans today spend almost $400 billion annually just on electricity to power their homes, offices and factories.[164] While the full amount of efficiency's potential remains unknown, stretching energy dollars is far less costly than adding other energy resources like fossil fuels and it already is saving the nation hundreds of billions of dollars annually, preventing millions of tons of carbon emissions, helping U.S. workers and companies compete worldwide, and making America more energy-secure.[165]

A 2013 report concluded U.S. energy productivity could be doubled by 2030 with cost-effective technologies and practices that would produce "monumental" benefits to America, including over $1,000 a year in average household savings in utility and transportation costs, over a million added jobs, a one-third reduction in carbon dioxide emissions, and a similar reduction in oil imports. Reaching this "aggressive" but achievable goal would require greater investment, modernization and education as recommended by the Alliance to Save Energy's bipartisan Commission on National Energy Efficiency Policy.[166]

Transitioning to clean energy will create a new economic sector with millions of sustainable jobs here at home and allow America to compete in the global marketplace. Discussions of offshore drilling continue to distract the nation from the real wealth and benefit that can be achieved by improving energy efficiency and through developing clean, safe, renewable energy.

**b. Offshore Renewable Energy Should be Given Strong Preference Over Offshore Oil and Gas Development.**

The United States also must ramp up investment and development in renewable energy development, including offshore sources of energy. The Department of the Interior has the ability to choose renewable energy over

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[160] Fehr & Peers, *Demographic Trends and The Future Of Mobility*, (March 2014).
[161] U.S. PIRG*, A New Direction: Our Changing Relationship with Driving and the Implications for America's Future*, (May 2013).
[162] U.S. EPA, *EPA Analysis of the Transportation Sector Greenhouse Gas and Oil Reduction Scenarios* (February 2010; updated March 18, 2010) http://www.epa.gov/otaq/climate/GHGtransportation-analysis03-18-2010.pdf (accessed August 8, 2014).
[163] California Cleaner Freight Coalition, *Moving California Forward: Zero and Low-Emissions Freight Pathways*, (2014), http://docs.nrdc.org/air/files/air_14011703a.pdf (accessed August 8, 2014).
[164] U.S. Energy Information Administration, Electric Power Monthly (April 2014), http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_02 (Accessed August 8, 2014).
[165] Bipartisan Policy Center, *America's Energy Resurgence* 68 (2013).
[166] Alliance Commission for National Energy Policy, *Doubling U.S. Energy Productivity by 2030,* (2013), http://www.ase.org/sites/ase.org/files/full_commission_report.pdf (accessed August 8, 2014).

expanded oil and gas leasing because it has jurisdiction over both activities in the OCS; in achieving the energy-production component of the OCSLA, the Secretary of Interior has significant discretion.[167]

The Department of Energy has recognized that increasing the country's use of renewable energy, including offshore wind, "is crucial to mitigate the risks of climate change and to shift the nation to a long-term, low-carbon economy."[168] Offshore wind offers an immense and uniquely scalable renewable resource to help meet the nation's carbon pollution reduction goals.

Along the Atlantic Coast there is a massive, world-class wind energy resource. Harnessing just a fraction of this resource, estimated to have the technical potential to achieve over 1,300 gigawatts (GW) of electricity capacity, would result in a fundamental transformation in how and where this country produces energy - decreasing our reliance on fossil fuels, stabilizing energy prices, creating local good-paying jobs, and helping protect ocean wildlife and future generations from the dangerous impacts of climate change.[169] Indeed, just along the Atlantic Coast, BOEM has already designated over 1.5 million acres off the Atlantic coast for wind energy development, an area that could support over 16,000 MW electricity capacity—enough to power 5 million average American homes.[170]

Today we are privy to the development of new ocean renewable energy technologies that were never before viable. Ocean renewable energy projects could make a significant contribution to our energy needs. Given the importance of protecting our coastal and ocean resources, the dangers presented to these resources by oil and gas development offshore, and the availability of viable renewable energy alternatives, BOEM should focus its efforts on promoting renewable energy.

**c. Climate Change Impacts Should Be Considered.**

In addition to reducing energy demand, the Bureau must consider the urgent imperative of addressing oil-based carbon pollution. Failure to address the emissions impacts of U.S. fossil fuel development actions can undermine progress. The International Energy Agency has determined that – absent massive implementation of carbon capture and storage (CCS) – two thirds of all proven fossil fuel reserves must be left safely underground, if the world is to limit anthropogenic warming to no more than 2°C.[171] Because two thirds of those reserves are coal,[172] failure to limit extraction of oil and gas would require immediate and complete worldwide cessation of all coal production not subject to CCS. Since no mechanism exists to achieve that, much of our oil and gas cannot be extracted in order to have a chance at avoiding the worst impacts of climate change.

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[167] The Energy Policy Act of 2005, amended the Outer Continental Shelf Lands Act. Under new authority in these amendments, the Secretary maintains discretionary authority to issue leases, easements, or ROWs on the OCS for previously unauthorized activities that: (i) Produce or support production, transportation, or transmission of energy from sources other than oil and gas; or (ii) use, for energy-related or other authorized marine-related purposes, facilities currently or previously used for activities authorized under the OCS Lands Act. Department of the Interior, Minerals Management Service, *Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf; Final Rule,* 30 CFR Parts 250, 285, 290 (April 29, 2009), http://www.boem.gov/Renewable-Energy-Program/FinalRenewableEnergyRule-pdf.aspx (accessed July 29 2014).

[168] United States Department of Energy, *A National Offshore Wind Strategy: Creating an Offshore Wind Energy Industry in the United States* 5 (February 2011) http://www1.eere.energy.gov/wind/pdfs/national_offshore_wind_strategy.pdf (accessed July 14, 2014).

[169] M. Schwartz, M.D. Heimiller, S. Haymes, and W. Musial, *Assessment of Offshore Wind Energy Resources for the United States,* National Renewable Energy Laboratory Technical Report TP-500-45889 (2010) http://www.nrel.gov/docs/fy10osti/45889.pdf (accessed August 8, 2014).

[170] National Wildlife Federation, Catching the Wind 10 (2014), http://www.nwf.org/~/media/PDFs/Global-Warming/Reports/Offshore-Wind/NWF_2014OffshoreWind7-9Pagesopt.pdf

[171] International Energy Agency, *World Energy Outlook 2012,* (2012) http://www.iea.org/publications/freepublications/publication/english.pdf (accessed July 28, 2014).

[172] *Id*.

Measures to reduce demand for fossil fuels are critical and must remain a core component of our climate strategy. However, the United States, on track to become a net exporter of oil and natural gas,[173] cannot simply increase fossil fuel supplies heedlessly and expect to make its needed contribution to the critical objective of climate protection. As our domestic consumption falls, if the United States leaves domestic production unconstrained, we may simply change the location where fossil fuels are burned rather than reducing the total amount the planet burns. Unconstrained increases in global supply will encourage consumption in other countries,[174] making their adoption of meaningful demand-side policies more challenging and/or less effective, thereby undercutting United States progress on climate and defeating the 2°C goal.

Rather than leading the world in business-as-usual production of fossil fuels, the United States must pair our demand side gains on the climate front with supply side reductions. This will entail, at a minimum, a phase-down based on the country's production-weighted pro rata share of the necessary global reductions in oil and gas extraction. Our national energy strategy will need to scale leasing decisions so that we can achieve the needed reductions in an orderly and timely manner. And the place to start that process is with lands and waters that are wholly within the federal government's control, like the OCS. While full development of that strategy is beyond the scope of the current administrative process, ensuring that the 2019-2024 Program does not lock in future production that is inconsistent with such a strategy is well within DOI's power. In particular, because even proven reserves must, on average, be left two thirds underground, leasing of technically unproven reserves, like most of those discussed in these comments, must be off limits to development from the start.

**3. Key Safety Recommendations and Improvements Have Not Yet Been Fully Implemented since the BP *Deepwater Horizon* spill and Those that have been are now being Reviewed and are in danger of being Revised**

The National Commission on the BP *Deepwater Horizon* disaster found "no less than an overhauling of both current industry practices and government oversight is now required."[175] Yet many of the fundamental recommendations have not yet been implemented. The Drilling Safety Rule went into effect in 2010. At that time, BOEM recognized that the rule "does not fully address all issues associated with OCS drilling operations."[176]Many gaps identified when the rule was finalized still remain.[177] For example, the training and maintenance, testing, and equipment requirements are all insufficient.[178] Even though the Workplace Safety Rule was initiated four years before the BP disaster, the government failed to finalize the rule until after the blowout, and it also went into effect in 2010. Additional requirements were added in 2011. Again, many gaps identified when the rule and modifications were finalized still remain.[179]

The Arctic Exploration Rule is a step in the right direction, but goes no further than requirements that proved

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[173] International Energy Agency, *supra* note 106. and U.S. Energy Information Administration. August 8, 2017. "Short-Term Energy Outlook August 2017."

[174] *See e.g*. Peter Erickson and Michael Lazarus, Impact of the Keystone XL pipeline on global oil markets and greenhouse gas emissions, *Nature Climate Change* (2014) http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate2335.html (accessed August 13, 2014).

[175] National Oil Spill Commission Report, *supra* n. 282 at 293.

[176] 75 Fed. Reg. 63346, 63362 (Oct. 14, 2010).

[177] *See, e.g,* comments by the following groups in the federal regulations docket on Sulfur Operations in the Outer Continental Shelf Increased Safety Measures for Energy Development on the Outer Continental Shelf, Information Collection 1010-AD68, Docket ID BOEM-2010-0034: Pew Charitable Trusts (Dec. 13, 2010); the Wilderness Society et al (December 13, 2010); the

[178] *See, e.g.* Craig, M. and Savitz, J. *False Sense of Safety Measures Will Not Make Offshore Drilling Safe.* (2011). http://oceana.org/sites/default/files/reports/OffshoreSafetyReport_Oceana_10-18-11.pdf

[179] *See, e.g.,* comments by the Wilderness Society regarding Oil and Gas and Sulphur Operations in the Outer Continental Shelf – Revisions to Safety and Environmental Management Systems (Nov. 14, 2011).

inadequate to keep Shell from a cascade of mishaps in 2012, and fails to address many additional improvements that are necessary.[180] Moreover, review and revision of this rule is called for by the Trump Executive Order, so there is a good chance it will be rolled back.

The Executive Order also calls for review and revision of the Well Control Rule, one of the most important safety improvement measures adopted following the spill. Despite weaknesses in the rule (for example, a five-year delay in the implementation of the requirements for redundant blind sheer rams for blowout preventers[181] ) this rule is vital to reducing the risk of another BP spill type blowout. Rollback of this rule would be inexcusable.

**4. Impacts of Seismic Surveys and Other Sources of Disruptive Industry Noise**

The ocean is an acoustic world. Unlike light, sound travels extremely efficiently in seawater; and marine mammals and many fish depend on sound for finding mates, foraging, avoiding predators, navigating, and communicating – in short, for virtually every vital life function. When loud sounds are introduced into the ocean, it degrades this essential part of the environment. Some biologists have analogized the increasing levels of noise from human activities as a rising tide of "smog" that has industrialized major portions of the marine environment off our coasts. This acoustic smog is already shrinking the sensory range of marine animals by orders of magnitude from pre-industrial levels.[182]

For offshore exploration, the oil and gas industry typically rely on arrays of airguns, which are towed behind ships and release intense pulses of compressed air into the water about once every 10-12 seconds.[183] A large seismic airgun array can produce effective peak pressures of sound higher than those of virtually any other man-made source save explosives;[184] 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.[185] 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.[186]

The impacts of airgun surveys are felt on an extraordinarily wide geographic scale – including by baleen and sperm whales, whose vocalizations and acoustic sensitivities overlap with the enormous low-frequency energy that airguns put in the water. In baleen whales, for example, seismic airguns have repeatedly been shown to disrupt behaviors essential to foraging and mating over vast areas of the ocean, on the order in some cases of 100,000 square kilometers and greater, and across a wide range of behavioral contexts (foraging, breeding, and

[180] *See, e.g.,* comments by the Pew Charitable Trusts on the Oil and Gas and Sulphur Operations on the Outer Continental Shelf—Requirements for Exploratory Drilling on the Arctic Outer Continental Shelf,'' RIN: 1082–AA00; Federal Rulemaking BSEE-2013-0011 (May 27, 2015).

[181] 74 Fed. Reg. 21504, 21511 (Apr. 17, 2016).

[182] M. Bode, C.W. Clark, J. Cooke, L.B. Crowder, T. Deak, J.E. Green, L. Greig, J. Hildebrand, C. Kappel, K.J. Kroeker, L.L. Loseto, M. Mangel, J.J. Ramasco, R.R. Reeves, R. Suydam, and L. Weilgart, *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).

[183] It should be noted that deep-penetration seismic surveys are not used for renewable energy projects.

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

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

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

migrating).[187] Notably, recent work on western North Pacific gray whales has linked seismic exploration, together with shore-based piling, to significant reductions in the probability of calf survival—by about two standard deviations—in that endangered baleen whale population.[188] In sperm whales, airguns have been demonstrated to compromise foraging success at moderate levels of exposure on important feeding grounds; in some areas, it has been found to silence the species over great distances.[189] As numerous commentators have observed, such impacts experienced repeatedly and at the geographic scale of populations can accumulate to population-level harm.[190]

Similarly, seismic surveys are known to elevate background levels of noise, masking conspecific calls and other biologically important signals, compromising the ability of marine wildlife to communicate, feed, find mates, and engage in other vital behavior.[191] 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.[192] Indeed, the enormous scale of this acoustic footprint in some locations has been confirmed by studies in many regions of the globe, including the Arctic, the northeast Atlantic, Greenland, and Australia, where it has been shown to raise ambient noise levels and mask whale calls from distances of thousands of kilometers.[193] Even in the complex canyon bathymetry of the Gulf of Mexico, cumulative ambient noise metrics are elevated in some areas from surveys taking place as far as 500 kilometers away, according to a recent NMFS-directed modeling effort, substantially reducing the sensory range available to marine mammal species.[194] Repeated insult from airgun surveys, over

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[187] *E.g.*, M. Castellote, C.W. Clark, and M.O. Lammers, *Acoustic and behavioural changes by fin whales (Balaenoptera physalus) in response to shipping and airgun noise*, `147 Biological Conservation 115-122 (2012); S. Cerchio, S. Strindberg, T. Collins, C. Bennett, and H. Rosenbaum, *Seismic surveys negatively affect humpback whale singing activity off Northern Angola*, 9(3) PLoS ONE e86464 (2014); S.B. Blackwell, C.S. Nations, T.L. McDonald, A.M. Thode, D. Mathias, K.H. Kim, C.R. Greene, Jr., and M. Macrander, *Effects of airgun sounds on bowhead whale calling rates: Evidence for two behavioral thresholds*, 10(6) PLoS ONE e0125720 (2015).

[188] J.G. Cooke, D.W. Weller, A.L. Bradford, O. Sychenko, A.M. Burdin, A.R. Lang, and R.L. Brownell, Jr., *Updated population assessment of the Sakhalin gray whale aggregation based on the Russia-US photoidentification study at Piltun, Sakhalin, 1994-2014* (2015) (Western Gray Whale Advisory Panel Doc. WGWAP/16/17).

[189] *E.g.*, P.J.O. Miller, M.P. Johnson, P.T. Madsen, N. Biassoni, M. Quero, and P.L. Tyack, *Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales in the Gulf of Mexico*, 56 Deep-Sea Research I 1168-1181 (2009); A.E. Bowles, M. Smultea, B. Wursig, D.P. DeMaster, and D. Palka, *Relative abundance and behavior of marine mammals exposed to transmissions from the Heard Island Feasibility Test*, 96 Journal of the Acoustical Society of America 2469-2484 (1994).

[190] *E.g.*, C.W. Clark, and G.C. Gagnon, *Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales* (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E9); E.C.M. Parsons, S.J. Dolman, M. Jasny, N.A. Rose, M.P. Simmonds, and A.J. Wright, *A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice?* 58 Marine Pollution Bulletin 643-651 (2009); D.P. Nowacek, C.W. Clark, D. Mann, P.J. Miller, H.C. Rosenbaum, J.S. Golden, M. Jasny, J. Kraska, and B.L. Southall, *Marine seismic surveys and ocean noise: Time for coordinated and prudent planning*, 13(7) Frontiers in Ecology and the Environment 378-386 (2015).

[191] *E.g.*, S.L. Nieukirk, D.K. Mellinger, S.E. Moore, K. Klinck, D.P. Dziak, and J. Goslin, *Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009*, 131 Journal of the Acoustical Society of America 1102-1112 (2012).

[192] *Id.*; M. Guerra, A.M. Thode, S.B. Blackwell, A.M. Macrander, *Quantifying seismic survey reverberation off the Alaskan North Slope*, 130 Journal of the Acoustical Society of America 3046-3058 (2011).

[193] J. Gedamke, *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); S.L. Nieukirk et al., *Sounds from airguns and fin whales*, *supra*; E.H. Roth, J.A. Hildebrand, S.M. Wiggins, and D. Ross, D., *Underwater ambient noise on the Chukchi Sea continental slope*, 131 Journal of the Acoustical Society of America 104-110 (2012).

[194] M.N.R. Matthews et al., *Cumulative and chronic effects in the Gulf of Mexico*, *supra* (NMFS-directed study of cumulative and chronic efforts of geophysical surveys in the Gulf of Mexico); *see also* B.J. Estabrook, D.W.

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.

In short, the biological impacts of seismic surveys include, but are not limited to:[195]

- *Disruption of essential vocalizations*. Seismic airgun noise can cause whales to stop producing vocalizations essential to breeding success, individual and cooperative foraging, predator avoidance, and mother-calf interactions.[196]

- *Direct disruption of foraging*. Seismic airgun noise can disrupt feeding behavior and significantly reduces foraging success even in whales that are frequently exposed to airgun noise.[197]

- *Masking and loss of communication space.* Seismic airgun noise can shrink the space whales need to communicate with their conspecifics, interfering over a vast scale with foraging, breeding, mother-calf contact, and other essential behavior. The noise also interferes with the animals' ability to hear other biologically important sounds.[198]

- *Large-scale habitat avoidance or abandonment.* Seismic airgun noise can displace marine mammals from preferred feeding, breeding, and migratory habitat, over both the short- and long-term, with potentially serious energetic consequences.[199]

- *Startle response and sensitization.* Seismic airgun blasts, with their extremely rapid onset time, can induce a startle response, sensitizing animals to sound and causing longer-term avoidance.[200]

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Ponirakis, C.W. Clark, and A.N. Rice, *Widespread spatial and temporal extent of anthropogenic noise across the northeastern Gulf of Mexico shelf ecosystem*, 30 Endangered Species Research 267-382 (2016).

[195] For a general review of seismic impacts on marine mammals, see L. Weilgart, *A review of the impacts of seismic airgun surveys on marine life* (2013) (submitted to the Convention on Biological Diversity Expert Workshop on Underwater Noise and Its Impacts on Marine and Coastal Biodiversity, 25-27 Feb. 2014, London, UK); *see also* L.S. Weilgart, *The impacts of anthropogenic ocean noise on cetaceans*, *supra*.

[196] *E.g.*, M.A. McDonald, J.A. Hildebrand, and S.C. Webb, *Blue and fin whales observed on a seafloor array in the Northeast Pacific*, 98 Journal of the Acoustical Society of America 712-21 (1995); L. Di Iorio, and C.W. Clark, *Exposure to seismic survey alters blue whale acoustic communication*, 6 Biology Letters 51–54 (2010); M. Castellote et al., *Acoustic and behavioral changes by fin whales*, *supra*; S.B. Blackwell et al., *Effects of airgun sounds on bowhead whale calling rates*, *supra*; S. Cerchio et al., *Seismic surveys negatively affect humpback whale singing activity*, *supra*.

[197] *E.g.*, P.J.O. Miller et al., *Using at-sea experiments to study the effects of airguns*, *supra*; E. Pirotta, K.L. Brookes, I.M. Graham, and P.M. Thompson, *Variation in harbour porpoise activity in response to seismic survey noise*, 10(5) Biology Letters 20131090 (2014); *see also* S. Isojunno, C. Curé, P.H. Kvadsheim, F.-P.A. Lam, P.L. Tyack, P.J. Wensveen, and P.J.O. Miller, *Sperm whales reduce foraging effort during exposure to 1-2 kHz sonar and killer whale sounds*, 26 Ecological Applications 77-93 (2016).

[198] *E.g.*, C.W. Clark, W.T. Ellison, B.L. Southall, L. Hatch, S.M. Van Parijs, A. Frankel, and D. Ponirakis, *Acoustic masking in marine ecosystems: intuitions, analysis, and implication*, 395 Marine Ecology Progress Series 201-222 (2009); L.T. Hatch, C.M. Wahle, J. Gedamke, J. Harrison, B. Laws, S.E. Moore, J.H. Stadler, and S.M. van Parijs, *Can you hear me here? Managing acoustic habitat in U.S. waters*, 30 Endangered Species Research 171-186 (2016).

[199] *E.g.*, D.E. Bain and R. Williams, *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); C.W. Clark and G.C. Gagnon, *Considering the temporal and spatial scales of noise exposures*, *supra*; P.E. Rosel and L.A. Wilcox, *Genetic evidence reveals a unique lineage of Bryde's whales*, *supra.*

[200] *E.g.*, T. Götz and V.M. Janik, *Repeated elicitation of the acoustic startle reflex leads to sensitisation in subsequent avoidance behaviour and induces fear conditioning*, 12 BMC Neuroscience 30 (2011).

- *Impacts on prey species.* Seismic airgun noise can kill, injure, and disrupt the behavior of marine mammal prey species, from zooplankton to fish.[201]

- *Temporary and permanent hearing loss.* Seismic airgun noise can induce temporary or permanent hearing loss, impairing the animals' ability to feed, breed, and communicate.[202]

- *Increased injury and mortality risk.* Seismic airgun noise can exacerbate the risk of marine mammal stranding and vessel collision, of mother-calf separation, and of other mechanisms of injury and mortality.[203]

- *Physiological stress.* Seismic airgun noise can induce acute and, over time, chronic physiological stress, which may compromise the health of individual marine mammals and reduce reproductive success.[204]

- *Loss in cetacean biodiversity.* Seismic airgun noise is associated over the long term with a loss in the biodiversity of cetacean species.[205]

The same high-intensity pulses can also affect non-marine mammal taxa and the communities that depend on them. For example, airguns have been shown to dramatically decrease catch rates of various commercial and recreational fish species (such as cod, haddock, pollock, and tuna), by 40–80% in some conditions, over thousands of square kilometers around a single array, indicative of substantial horizontal and/or vertical displacement.[206] One study found higher fish populations outside a seismic shooting area, indicating what is described as a "long-

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[201] *E.g.*, R.D. McCauley, R.D., Day, K.M. Swadling, Q.P. Fitzgibbon, R.A. Watson, and J.A. Semmens, *Widely used marine seismic survey air gun operations negatively impact zooplankton*, 1 Nature Ecology & Evolution art. 0195 (2017); N. Aguilar de Soto, N. Delorme, J. Atkins, S. Howard, J. Williams, and M. Johnson, *Anthropogenic noise causes body malformations and delays development in marine larvae*, 3 Scientific Reports art. 2831 (2013).

[202] *E.g.*, K. Lucke, U. Siebert, P.A. Lepper, and M.-A. Blanchet, *Temporary shift in masked hearing thresholds in a harbor porpoise (Phocoena phocoena) after exposure to seismic airgun stimuli*, 125 Journal of the Acoustical Society of America 4060-4070 (2009); NMFS, *Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing: Underwater acoustic thresholds for onset of permanent and temporary threshold shifts* (2016) (NOAA Tech. Memo. NMFS-OPR-55).

[203] *E.g.*, J.A. Hildebrand, *Impacts of anthropogenic sound*, *supra*; D.P. Nowacek, M.P. Johnson, and P.L. Tyack, *Right whales ignore ships but respond to alarm stimuli*, 271 Proceedings of the Royal Society of London, Pt. B: Biological Sciences 227-231 (2004); J.G. Cooke et al., *Updated population assessment of the Sakhalin gray whale aggregation*, *supra*; H. Gray and K. Van Waerebeek, *Postural instability and akinesia in a pantropical spotted dolphin,* Stenella attenuate*, in proximity to operating airguns of a geophysical seismic vessel*, 19 Journal for Nature Conservation 363-67 (2011).

[204] *E.g.*, R.M. Rolland, S.E. Parks, K.E. Hunt, M. Castellote, P.J. Corkeron, D.P. Nowacek, S.K. Wasser, and S.D. Kraus, *Evidence that ship noise increases stress in right whales*, 279 Proceedings of the Royal Society B 2363-2368 (2012).

[205] C.L. Parente, J.P. Araújo, and M.E. Araújo, *Diversity of cetaceans as tool in monitoring environmental impacts of seismic surveys*, 7 Biota Neotropica 49-55 (2007); *see also* G. Shannon, M.F. McKenna, L.M. Angeloni, K.R. Crooks, K.M. Fristrup, E. Brown, K.A. Warner, M.D. Nelson, C. White, J. Briggs, S. McFarland, and G. Wittemyer, *A synthesis of two decades of research documenting the effects of noise on wildlife*, 91 Biological Reviews 982-1005 (2016).

[206] A. Engås, S. Løkkeborg, E. Ona, and A.V. Soldal, *Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*)*, 53 Canadian Journal of Fisheries and Aquatic Sciences 2238-2249 (1996); *see also* S. Løkkeborg, E. Ona, A. Vold, H. Pena, A. Salthaug, B. Totland, J.T. Øvredal, J. Dalen, and N.O. Handegard, *Effekter av seismiske undersøkelser på fiskefordeling og fangstrater for garn og line i Vesterålen sommeren 2009* [*Effects of seismic surveys on fish distribution and catch rates of gillnets and longlines in Vesterålen in summer 2009*], Fisken og Havet: 2-2010 (2010) (Institute of Marine Research Report for Norwegian Petroleum Directorate); J.R. Skalski, W.H. Pearson, and C.I. Malme, *Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish* (Sebastes ssp.), 49 Canadian Journal of Fisheries and Aquatic Sciences 1357-1365 (1992).

term" effect of seismic activity displacing fish away from these sound sources.[207] Decreased catch rates have led fishers in British Columbia, Norway, Namibia, and other jurisdictions to seek compensation for their losses from the industry.[208] Other effects on fish, derived from tests involving both seismic airguns and other low-frequency noise sources, include habitat abandonment, chronic stress, reduced reproductive performance, and hearing loss.[209] Even brief playbacks of predominantly low-frequency noise from speedboats have been shown to significantly impair the ability of some fish species to forage.[210] Most recently, a study showed that most zooplankton species—which serve a vital function as prey species in the ocean ecosystem—[211] were decimated within a 1.5-mile swath around a single 150 $in^3$ airgun.[212] Contextually, the past few years have seen expansive research on the impacts of anthropogenic noise on fish and invertebrates and a concomitant increase in management concern in both the United States and Europe.

Beyond airguns, substantial new information has become available on the impacts and mitigation of other geophysical noise sources, such as those used in high-resolution geophysical surveys. Many of these sources were previously thought to be of small concern given their acoustic characteristics, particularly their high-frequency output. For example, a relatively low-frequency (center carrier frequency of 12 kHz) multibeam echosounder, employed by Exxon, was found to be "most plausible and likely behavioral trigger" of a mass stranding of melon-headed whales on Madagascar, in 2008. Even though echosounders are directed towards the seafloor, such equipment could still easily propagate noise at levels above 120 decibels—a level frequently associated with the onset of significant behavioral impacts in some marine mammal species—over a greater than 30 km radius, as a report on the Madagascar strandings found.

Additionally, two recent papers document the significant frequency "leakage" that can occur in some high-frequency geophysical sound sources, such as echosounders, that combine high source levels with rapid rise times. The leakage is so significant that tested sources with peak frequencies at and above 200 kHz, well beyond the range of marine mammal hearing, produced substantial noise within marine mammal hearing ranges in much lower bands.[213] While these source levels are appreciably lower, at relevant frequencies, than those generated by sub-bottom profilers and other lower-frequency systems, their amplitude is sufficient to induce behavioral effects.

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[207] A. Slotte, K. Hansen, J. Dalen, and E. Ona, *Acoustic mapping of pelagic fish distribution and abundance in relation to a seismic shooting area off the Norwegian west coast*, 67 Fisheries Research 143-150 (2004).

[208] *See, e.g.,* British Columbia Seafood Alliance, *Fisheries and offshore seismic operations: Interaction, liaison, and mitigation: The east coast experience* (2004) (*available at* bcseafoodalliance.com/documents/ Canpitt.pdf (accessed July 2017)); Anonymous, *Presentation given at the Benguela Current Commission 5th Annual Science Forum: Key issues and possible impacts of seismic activities on tunas, for the Large Pelagic and Hake Longlining Association in Namibia* (Sept. 24, 2013) (provided to NRDC by the Namibian Ministry of Fisheries and Marine Resources).

[209] *E.g.,* 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, *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) (Australian Petroleum Production Exploration Association CMST 163: Report R99-15); R. McCauley, J. Fewtrell, and A.N. Popper, *High intensity anthropogenic sound damages fish ears*, 113 Journal of the Acoustical Society of America 638-642 (2003); A.R. Scholik and H.Y. Yan, *Effects of boat engine noise on the auditory sensitivity of the fathead minnow* Pimephales promelas, 63 Environmental Biology of Fishes 203-209 (2002).

[210] J. Purser and A.N. Radford, *Acoustic noise induces attention shifts and reduces foraging performance in three-spined sticklebacks (*Gasterosteus aculeatus*)*, 6(2) PLoS ONE e17478 (2011).

[211] M.R. Landry, *A review of important concepts in the trophic organization of pelagic ecosystems*, 30 Helgoländer Wissenschaftliche Meeresuntersuchungen 8-17 (1977).

[212] R.D. McCauley et al., *Widely used marine seismic survey air gun operations negatively impact zooplankton*, *supra*.

[213] Z.D. Deng, B.L. Southall, T.J. Carlson, J. Xu, J.J. Martinez, M.A. Weiland, and J.M. Ingraham, 200 kHz commercial sonar systems generate lower frequency side lobes audible to some marine mammals, 9(4) PLoS ONE e95315.doi:10.1371/journal.pone.0095315 (2014); G.D. Hastie, C. Donovan, T. Götz, and V.M. Janik, *Behavioral responses by grey seals (Halichoerus grypus) to high frequency sonar*, 79 Marine Pollution Bulletin 205-210 (2014).

The short rise times that these sources exhibit are correlated across mammalian species with startle response, raising concerns about sensitization.[214]

Over the last several years, the scientific literature on anthropogenic noise, much of it funded by the Navy, has begun to produce evidence of population-level effects from disruptive activities on disparate marine mammal taxa. This includes evidence of substantial demographic alteration in beaked whales resident to the Navy's AUTEC testing range in the Bahamas,[215] and evidence of disruption by naval mid-frequency sonar of metabolic rates in blue whales on the Navy's Southern California range, which the authors conclude may pose a significant risk to the recovery of blue whales in the Pacific.[216] These new studies join a larger cohort on diverse sources of anthropogenic noise, many of them referenced in our comments on previous five-year Lease Program EIS, showing effects that are conducive to long-term impacts on individuals and populations. Additionally, a satellite tagging study of humpback whale movements off western Africa demonstrated how even a wide-ranging species with coastal and oceanic distribution can be exposed throughout its migratory cycle to localized anthropogenic stressors, requiring effective population-level management.[217] It is essential that BOEM properly account for these impacts.

(a) Leasing decisions.— The enormous amount of undersea noise generated by exploration, development, and production activity – from seismic surveys and shallow hazard surveys to platform stabilizers to vessel traffic to platform decommissioning – can cumulatively impact marine mammals and other marine wildlife at the population level. As NOAA has put it, "There 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."[218] As discussed above, seismic surveys can themselves have widespread effects given their enormous environmental footprint. Some effects of airgun surveys, such as masking, can still occur at distances beyond those practicably mitigable even through the use of conventional time-area closures.

To meet their environmental compliance responsibilities for geophysical activities, BOEM and the National Marine Fisheries Service are engaging in programmatic NEPA review along with permitting and consultations under the Marine Mammal Protection Act, Endangered Species Act, and other statutes. Yet the decision on whether to hold lease sales within particular planning areas—the decision that drives much of the demand for seismic surveys—occurs at the present stage, dislocated from the impact and alternatives analysis of the NEPA reviews and from the other environmental compliance processes. BOEM

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[214] Hastie et al., *supra* n. 129; *see also* T. Götz and V.M. Janik, *Repeated elicitation of the acoustic startle reflex leads to sensitisation in subsequent avoidance behaviour and induces fear conditioning*, 12 BMC Neurosci. doi:10.1186/1471-2202-12-30 (2011).

[215] D.E. Claridge, *Population ecology of Blainville's beaked whales (Mesoplodon densirostris*) (2013) (Ph.D. thesis, University of St. Andrews); *see also* L.F. New, D.J. Moretti, S.K. Hooker, D.P. Costa, and S.E. Simmons, *Using energetic models to investigate the survival and reproduction of beaked whales (family Ziphiidae*), 8(7) PLoS ONE e68725. doi:10.1371/journal.pone.0068725 (2013).

[216] J.A. Goldbogen, B.L. Southall, S.L., DeRuiter, J. Calambokidis, A.S. Friedlaender, E.L. Hazen, E.A. Falcone, G.S. Schorr, A. Douglas, D.J. Moretti, C. Kyburg, M.F. McKenna, and P.L. Tyack, *Blue whales respond to simulated mid-frequency sonar*, 280 Proceedings of the Royal Society Part B: Biological Sciences 20130657 http://dx.doi.org/10.1098/rspb.2013.0657 (2013).

[217] H.C. Rosenbaum, S.M. Maxwell, F. Kershaw, and B. Mate, *Long-range movement of humpback whales and their overlap with anthropogenic activity in the South Atlantic Ocean,* 28 *Conservation Biology* 604-615 (2014).

[218] Letter from Dr. Jane Lubchenco, Undersecretary of Commerce for Oceans and Atmosphere, to Nancy Sutley, Chair, Council on Environmental Quality at 2 (Jan. 19, 2010); *see also* J. Gedamke, J. Harrison, L. Hatch, R. Angliss, J. Barlow, C. Berchok, C. Caldow, M. Castellote, D. Cholewiak, M.L. De Angelis, R. Dziak, E. Garland, S. Guan, S. Hastings, M. Holt, B. Laws, D. Mellinger, S. Moore, T.J. Moore, E. Oleson, J. Pearson-Meyer, W. Piniak, J. Redfern, T. Rowles, A. Scholik-Schlomer, A. Smith, M. Soldevilla, J. Stadler, S. Van Parijs, and C. Wahle, *Ocean Noise Strategy Roadmap* (2016)..

must therefore fully consider the impacts of seismic surveys in defining a lease schedule, keeping in mind that the best available science is indicative of population- and ecosystem-level harm and that this harm should weigh significantly in the agency's consideration of environmental factors. *See*, *e.g.*, 43 U.S.C. § 1344(a) (requiring consideration of, *inter alia*, "the potential impact of oil and gas exploration on other resource values of the outer Continental Shelf and the marine, coastal, and human environments," of "the relative environmental sensitivity and marine productivity of different areas of the outer Continental Shelf," and of "the potential for environmental damage… and the potential for adverse impact on the coastal zone"). To further address cumulative impacts, the agency should commit itself to seek programmatic authorization, under the Marine Mammal Protection Act, for geophysical activities in each of its active planning regions.

(b) Funding alternatives.— New technology represents a promising means of reducing the environmental footprint of seismic exploration. Industry experts and biologists participating in a September 2009 workshop reached the following conclusions: that airguns produce a great deal of "waste" sound and generate peak levels substantially higher than needed for offshore exploration; that a number of quieter technologies are either available now for commercial use or can be made available within the next five years; and that governments should accelerate development and use of these technologies through both research and development funding and regulatory engagement.[219] A 2007 report by Noise Control Engineering reached similar conclusions,[220] and, in 2013, BOEM hosted an international workshop focused in substantial part on seismic oil and gas surveys as a target for mitigation.

One of the most promising of these new technologies is marine vibroseis, an alternative to airguns that significantly reduces source levels and nearly eliminates acoustic output above 100 Hz. A Geo-Kinetics system known as AquaVib was field-tested in the Gulf of Mexico in 2015 for shallow-water application and should soon be commercially available.[221] Three other vibroseis systems are in Joint Industry Program development under the terms of the *NRDC v. Jewell* settlement agreement, with field tests to be conducted on at least one device and final results submitted for publication by mid-2017.[222] Researchers report general reductions in both SPL and SEL exposures from an experimental vibroseis system, as compared with a similarly sized airgun array, across several operational scenarios.[223] Other quieting technology in development includes BP's "staggered-fire" method, which is compatible with both conventional and modified airguns and could reduce amplitudes by as much as 20 dB.[224] A modified airgun that reduces noise output by 15 dB (SPL) or more in frequencies above 80–120 Hz, is newly

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[219] L. Weilgart (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).

[220] J. Spence, R. Fischer, M. Bahtiarian, L. Boroditsky, N. Jones, and R. Dempsey, *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).

[221] Pers. comm. from B. Pramik, Geo-Kinetics, to M. Jasny, NRDC (Apr. 2015).

[222] Settlement Agreement, *NRDC v. Jewell*, Case. No. 2:10-cv-01882 (E.D. La.) (settlement entered June 24, 2013); *see also* M. Jenkerson, *The marine vibrator JIP: Technical and operational specifications—Status update* (presentation given at OceanNoise2017, May 11-15, 2017, Barcelona, Spain).

[223] A.J. Duncan, L.S. Weilgart, R. Leaper, M. Jasny, and S. Livermore, *A modelling comparison between received sound levels produced by a marine Vibroseis array and those from an airgun array for some typical seismic survey scenarios,* Marine Pollution Bulletin http://dx.doi.org/10.1016/j.marpolbul.2017.04.001 (2017).

[224] BP, *Patent application: Seismic acquisition method and system* (filed Dec. 9, 2011) (Patent No. 8837255) (*available at*: http://patents.justia.com/patent/8837255 (accessed July 2017)); *see also*, *e.g.*, J.Y. Guigné, A.J. Stacey, C. Clements, S. Azad, A. Pant, A. Gogacz, W. Hunt, and N.G. Pace, *Acoustic zoom high-resolution seismic beamforming for imaging specular and non-specular energy of deep oil and gas bearing geological formations*, 21 Journal of Natural Gas Science and Engineering 568 (2014).

commercially available to the seismic industry, but, to our knowledge, has not been adopted by any seismic company for U.S. operations.[225]

BOEM should commit resources at the leasing program stage—with its collective treatment of seismic surveys across planning areas and with its clear implications for Congressional and administrative budgeting—to the development and adaptive management of mitigative quieting technology. It should further require that each subsequent NEPA compliance document for geophysical activities include alternatives that significantly reduce the amount of acoustic energy entering the marine environment, including through required consolidation of or other limits on seismic exploration activity, as well as through noise-reduction technology.

[225] Teledyne Bolt, eSource Introduction (c. 2015) (undated PowerPoint presentation); *see also* Teledyne Bolt, eSource (c. 2015) (*available at* http://www.teledynemarine.com/eSource?ProductLineID=70 (accessed July 2017)) (company webpage on eSource, providing product information and putting product on offer).

**Conclusion**

For all of the reasons outlined in detail above, we urge you not to include the Atlantic, Pacific, Arctic Oceans, North Aleutian Basin/Bristol Bay, Cook Inlet, and the Gulf of Mexico in the 2019 - 2024 Outer Continental Shelf Oil & Gas Leasing Program.

Thank you for your consideration of our comments.

Sincerely,

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