

OCEAN CONSERVATION RESEARCH



Science and technology serving the sea

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National Oil and Gas Leasing Program Development and Coordination Branch,
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45600 Woodland Road,
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cc: Senator Kamela Harris
Senator Diane Feinstein
Representative Jarred Huffman

Re: 2019-2024 Outer Continental Shelf Oil and Gas Leasing Program

Dear Ms. Hammerle,

We thank you for this opportunity to comment on the 2019-2024 Draft Program Proposal (hereinafter 2019-2024 DPP) for the leasing of the Outer Continental Shelf (OCS). Ocean Conservation Research is a scientific research and policy development public benefit organization that is focused on the impacts of human generated noise on marine habitat. We will delve into our concerns about noise impacts further into this document, but there are overarching concerns we have that in-and-of themselves should be persuasive enough arguments to not open up 90% of the OCS to fossil fuel development.

I will substantiate this case herein, but just “out the gate” having such vociferous objections from an overwhelming majority of Coastal State Governors, elected officials, businesses, and citizens should clue BOEM in to the fact that this proposal does not serve the public interest in the least. Based on this evidence alone, the entire proposal should be withdrawn.

What is also abundantly clear is that this proposal is a symptom of an industrial coup, wherein the Federal Government (under the “leadership” of a political party heavily funded by fossil fuel interests) seems to be singularly focused on propping up an industry that frankly is losing its footing in a world where sustainable energy sources and strategies are rapidly obviating the need for the 20th Century practice of burning hydrocarbons.

We saw this coming and expressed our concerns to the Senate on the early stages of the current administration about the preponderance of Fossil Fuel professionals being pulled

into the Executive Branch Cabinet.¹ We were warned about the danger of this sort of coup early on in the Federalist Papers by Alexander Hamilton on the need for Senate consent on the appointments and the dangers of not properly administering this grave responsibility.² We are similarly warned by James Madison about the dangers of factions gathering together to promote their own interests – ostensibly at the expense of the public good.³

With these warnings from our Founders, my use of the aforementioned term “industrial coup” is not hyperbolic. We are in the midst of a Constitutional Crisis, and it is incumbent upon anyone who has taken an oath to preserve, protect, and defend the Constitution of the United States to stand up and do some protecting and defending.

It is tragically clear that the Fossil Fuel industry has inordinate power in our current government. This is evidenced by their attacks – through staffing and evisceration of Federal Regulatory Agencies, and legislative attacks on the environmental protections which have for 40 years curbed reckless industrial practices on the land and in the ocean.

It was in fact the bitter harvest of unrestrained corporate greed that caused so many environmental disasters such as the 1969 Santa Barbara Oil Spill, the 1969 Cuyahoga River Fire, and the 1969 Rocky Flats plutonium fire. It was through these tragedies that the public became fed-up with suffering the consequences of the unchecked practices of American Industries. This broad public sentiment ushered in the raft of environmental protection bills including the National Environmental Policy Act of 1970, the Clean Air Act of 1972, the Clean Water Act of 1972, the Marine Mammal Protection Act of 1972, and the Endangered Species Act of 1973. These bills were all passed unanimously in Congress, proudly signed into law by President Nixon, and have been serving the public good since their passage.

All of these bills are under siege right now – because the Fossil Fuel industry sees them as an impediment to their profits – and in fact a threat to their very survival. They want to strip them all away and stumble forth into a questionable future where the suffering will begin again. Ironically, their strategy does not point toward the proposed “US Energy Dominance” advanced by Executive Order 13795,⁴ rather they point to an industry in decline.

If the industry was not “on the ropes” they would not be threatened by the Oil Spill Liability Trust Fund, a 9-cent per-barrel excise tax on all American crude oil that funds

¹ See Appendix 1: Ocean Conservation Research and 18 Public Benefit and Conservation NGOs Letter to the Senate on Cabinet Appointments

² Alexander Hamilton, Federalists Papers #76

³ James Madison, Federalists Papers #10

⁴ 82 Fed. Reg. 20815

ongoing (and frequent) oil spills caused during the use or transport of fossil fuel.⁵ (This excise tax was allowed to expire at the end of 2017.) If the industry was not “hard up” they would not need the \$228 million over ten years (\$23 million/year) “savings” proposed by the Bureau of Safety and Environmental Enforcement (BSEE) “Oil and Gas and Sulphur Operations on the Outer Continental Shelf – Oil and Gas Production Safety Systems Revisions.”⁶”

The original safety systems written in this directive were proposed after the Deepwater Horizon disaster took the lives of eleven workers and wrought untold environmental damage on coastal and marine habitats - all because the Department of Interior (DOI) and Minerals Management Service (MMS) was remiss in properly regulating Industry safety practices. While neither Industry or BSEE has demonstrated that they have improved on their reckless practices,^{7,8} the industry would nonetheless prefer to be “relieved from these burdensome regulations” to save money. Paltry savings from this “relief” (relative to a multi-\$Billion industry) would further endanger offshore workers and all but promise more disastrous oil spills.

Furthermore, if the industry was in good financial health, they would not be driving the evisceration of the Marine Mammal Protection Act and the Environmental Protection Agency, the elimination of the Marine Mammal Commission,⁹ the gutting of the Environmental Protection Agency, and the draconian budget cuts in National Oceanographic and Atmospheric Administration (NOAA) and NOAA Fisheries – agencies that are protecting public assets owned in common by American Taxpayers from the very same reckless practices that the Industry wants to resume.

If the Industry wants to “be relieved’ of these burdensome guidelines, rules, regulations, and safety standards under which they have been quite profitable for the past forty years, it does not lead to a conclusion of its financial health.

The argument above is constructed around the foolhardy proposal of letting a dying industry drive our offshore energy policies into a reckless and unregulated future, promising environmental damage and the destruction of currently robust and healthy ocean economies comprised of fisheries, tourism, and real estate; eroding the health, safety, and quality of life for American citizens - coastal inhabitants and visitors alike.

⁵ In 2017 this fund was used 6 -7 times in Coast Guard District 17 alone (South East Alaska) See Juneau Empire Dec. 17, 2017. Once the fund is drawn down, these smaller spills will be paid for by US Taxpayers.

⁶ 30 Code of Federal Regulations Part 250: RIN 1014

⁷ Charlie Savage “Sex, Drug Use and Graft Cited in Interior Department” New York Times, Sept. 10, 2009

⁸ David Hammer “Records suggest feds ignoring offshore environmental enforcement” USA Today Sept. 23, 2015

⁹ Daryl J. Boness, Ph.D. Chairman, Marine Mammal Commission announcement on the release of the Administration’s budget proposal to Congress on February 12, 2018.

The assessment above is also made largely in consideration of the threat of a “Catastrophic Discharge Event” – a phrase which pronounced in full just once in the 2019 - 2024 DPP section heading,¹⁰ after which it is blithely abbreviated as a “CDE.” The Catastrophic Discharge Event section also states – without any substantiation that a “catastrophic spill is not expected, and would be considered well outside the normal range of probability...from the 2019 – 2024 Program.”

This is an incredibly specious comment in light of the numerous spills over 100 metric tons which have occurred in the US just in the last 5 years. These include the Keystone Pipeline,¹¹ the Delta House spill,¹² the Colonial Pipeline leak,¹³ the Belle Fourche pipeline leak,¹⁴ the Shell/Brutus Offshore spill,¹⁵ the Refugio Oil Spill,¹⁶ the Mid Valley Oil Spill,¹⁷ the MV Susan/MV Summer Wind collision,¹⁸ the Hiland, North Dakota Pipeline Spill,¹⁹ the North Dakota train collision,²⁰ the Tioga, North Dakota pipeline spill,²¹ the Cushing storage terminal spill,²² the Mayflower oil spill,²³ and the Magnolia refinery spill.²⁴ That these were under-reported likely had to do with their being mostly terrestrial – except for the Refugio Spill, which originated on land but ended up in the ocean. And this, a relatively “small” spill of 22,000 gallons, did get a lot of coverage because the oil did reach the sea. And once oil is in water it becomes a huge problem. The reason there weren’t more offshore spills is due to the fact that except for the Gulf of Mexico, the US Outer Continental Shelf is currently free from oil extraction. BOEM is proposing to change this in the 2019-2024 DPP.

I also suspect that the DPP qualification of a “catastrophic spill is not expected...from the 2019 – 2024 Program,” hinges on the fact that there would likely be no completed wells in production from this proposal until *after* 2024. This is a pretty disingenuous way to present a risk. And who made this determination anyway? Some roughneck nursing his fifth beer in some dark Louisiana bar; or a working group of geologists and offshore technology

¹⁰ 2019-2024 DPP Section 7.2.1.2

¹¹ Nov. 19, 2017, Marshall County South Dakota, 682 metric tons.

¹² Oct. 11, 2017, Gulf of Mexico near Louisiana, 1080 metric tons.

¹³ Sep. 12, 2016, Shelby County, Alabama, 1092 metric tons.

¹⁴ Dec. 5, 2016, Billings county. North Dakota, 571 metric tons.

¹⁵ May 12, 2016, Gulf of Mexico near Louisiana, 316 metric tons.

¹⁶ May 19, 2015, Refugio State Beach, 330 metric tons.

¹⁷ Oct. 13, 2014, Mooringsport Louisiana, 546 metric tons

¹⁸ March 22, 2014, Houston Ship Channel, Texas 546 metric tons.

¹⁹ March 21, 2014, Hiland North Dakota, 110 metric tons.

²⁰ December 30, 2013, Casselton North Dakota, 1300 metric tons.

²¹ Sep. 29, 2013, Tioga, North Dakota, 280 metric tons.

²² May 18, 2013, Cushing, Oklahoma, 340 metric tons.

²³ March 30, 2013, Mayflower, Arkansas, 680 metric tons.

²⁴ March 9, 2013, Magnolia, Arkansas, 680 metric tons.

engineers? Did BOEM make this determination? Who will be brought to task when the statement proves false?

But let's just suppose that all of these offshore leases are successfully put in production, and a miracle occurs and there are absolutely no "Catastrophic Discharge Events" during the productive life of the wells, and then they are successfully capped when production becomes unprofitable. What happens to all of the capped wells along the West Coast, which is in a very active subduction zone? Will all of those capped wells behave well in 10, 25, 100, or 1000 years? Probably not; as the pipes will also subduct, it is unlikely that the pipes and capping mechanisms will hold back a pressurized deposit of oil, gas, and brine forever – particularly if the pipes succumb to the sheer and crush of tectonic movement.

On this same topic: How will the active wells behave in one of our occasional California earthquakes? This is an unknown because this geology has not been attempted before.²⁵ So the oil spill risk-continuum presented in the 2019-2024 DPP is woefully inadequate. But the largest and most significant threat of the 2019-2024 DPP is not in our National governance, or in the likelihood of Catastrophic Discharge Events, rather it is in the global existential threat of climate catastrophe. While it is painfully evident that our fossil-fuel driven Federal Government has been exceedingly thorough in scrubbing any mention or consideration of this looming threat to all life on our planet, the 2019-2024 DPP briefly discusses "climate change" in two sections of the proposal; Section 7.3.2.5 "Impact-independent Modifiers, which introduces climate change in the context of a BOEM-devised metric, and Section 8.3.2 "Widely Distributed Risks" wherein the "social costs of greenhouse gasses" is mentioned.²⁶

Without excavating too deeply into the supporting literature it is clear that some consideration went onto the metric and into the expression of the "social costs of greenhouse gas," but in the global context assigning a "Climate Change Impact Scale" to a simple number is myopically akin to measuring a manhole with a micrometer.

It is a known fact; there is absolutely no dispute that the greenhouse gasses produced by burning fossil fuel is causing a disastrous climate disruption. The impacts of this is already becoming quite clear – with climate refugees, unpredictable and exceedingly violent weather, unpredictable water resources, ocean acidification, and sea-level rise. The US Department of Defense has called Climate Disruption "an urgent and growing threat to our

²⁵ Existing offshore wells in California are not in active subduction zones.

²⁶ Wolvovsky, E., and W. Anderson. 2016. OCS Oil and Natural Gas: Potential Lifecycle Greenhouse Gas Emissions and Social Cost of Carbon. U.S. Department of the Interior, Bureau of Ocean Energy Management. Sterling: Virginia. BOEM OCS Report 2016-065.

national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources such as food and water.²⁷”

Marine invertebrates – the base of a trophic pyramid upon where we all feed, are not adapting to climate disruption either. Coral reef bleaching events are occurring in rapidly increasing cycles²⁸ threatening the survival of all life in the ocean – and our very own food supply. Even deep-water corals are suffering the effects of acidification²⁹ with unknown, but likely biologically disruptive consequences. And estimates of sea level rise in the next century vary from one meter to ten meters, but even if we can stop sea level at one meter, the global costs of bunkering all coastal cities against this rising sea and relocating inhabitants of island nations to higher ground is beyond global economic consideration.

These indisputable facts alone should preclude even considering extracting and burning any more fossil fuel than we already have available. But our current fossil fueled administration is prepared to throw the entire planet under the bus to save a dying industry. This is unconscionable, suicidal, and the epitome of madness.

Without opening up the ocean or the land to more fossil fuel resources the US fossil fuel industry is already exporting fossil fuel. The concept of “energy security” purveyed in the Bush Administration has already been met. But the industry is not satisfied with this, so the concept of “Energy Dominance” was introduced in the current administration. But it appears that this “energy dominance” is the industry dominating our national environmental and energy policies. We as a nation and as a thriving species will not survive their strategy.

The Industry argument that the 2018-2024 DPP will drive employment and contribute to the economy can be better, and more truthfully made about renewable energy technologies.³⁰ The shuttered rust-belt factories so often used as a rallying point on restoring American jobs could much more profitably and safely reopened to fabricate solar panels, wind turbines, light rail, and electric cars. These high paying technical jobs will be clean, gender equitable, and contribute so much more to the economy than offshore oil with their flush of offshore submersible platform “man camps” of roughnecks and roustabouts. And it will be a bitter pill to swallow after the Fossil Fuel party is over if we have to buy our solar panels, light rail, electric cars, and wind turbines from China...

²⁷ Response to Congressional Inquiry on National Security Implications of Climate-Related Risks and a Changing Climate. DOD July 2015.

²⁸ Terry P. Hughes et. al (2018) “Spatial and temporal patterns of mass bleaching of corals in the Anthropocene.” Science 05 Jan 2018: Vol. 359, Issue 6371, pp. 80-83

²⁹ F.F. Perez et. al “Meridional overturning circulation conveys fast acidification to the deep Atlantic Ocean” Nature Feb. 12, 2018

³⁰ Andrew Menaquale, January 2015 “Offshore Energy by the Numbers: An Economic Analysis of Offshore Drilling and Wind Energy in the Atlantic” Oceana publication.

Fossil fuel is handy, but it is also the source of a preponderance of the human-generated toxic substances on our planet – from plastics, to synthetic fertilizers, to herbicides and insecticides, to greenhouse gasses. These substances are ubiquitous and are directly correlated to health and environmental degradation across all taxa and all habitats. It is becoming painfully apparent that we need to back away from overuse.

There will still likely be a fossil fuel industry in 2075, but it is highly unlikely that they will have the largess to drive the richest nation in the world backwards into the 20th century. The dinosaur will not leave the room gracefully, so it is critical that we as a nation, and BOEM in particular, show them the door and take control of our publicly-owned offshore assets.

So to reiterate the above circumstantial and philosophical arguments:

1. A majority of Americans, from elected officials to business leaders, to the general public, particularly those in ocean states, object to the 2019-2024 DPP.
2. The proposal is being driven by a faction of Fossil Fuel industry representatives that do not represent the interests of American citizens – and is thus questionable from a Constitutional perspective.
3. This faction has taken over the governance of American energy policy to suit their narrow interest in what can only be called an “industrial coup.”
4. They are doing so in a desperate attempt to save their waning industry.
5. The Industry has an extremely poor environmental safety record, and continues to perform poorly on many terrestrial projects.
6. There is no reason to believe that the industry will perform any better in the ocean where the risks are much higher and the work environment is much more challenging.
7. In order to “appear” that they would perform better, industry representatives are now managing our regulatory agencies, and are systematically eviscerating environmental and workplace safety protections.
8. The industry has no succession plan in place for abandoning non-productive wells in seismically active areas in Northern California, Oregon, and Washington.
9. The proposal is made with completely inadequate consideration of the impacts of their operations and product lifecycle on climate disruption.
10. The inadequate climate disruption model of the proposal does not take into consideration the global impacts of sea-level rise.
11. The inadequate climate disruption model of the proposal does not take into consideration the global impacts of ocean acidification.
12. As the US is now exporting fossil fuel, the claim of aspiring to “Global Energy Dominance” is merely a ruse to cover up the fact that the industry wants to export

even more of their product to maintain the momentum of their otherwise faltering business.

13. The industry claim that the DPP will expand US employment and contribute to the economy would be better made by expanding development of renewable energy technologies.
14. While there will be a fossil fuel industry in the future, it will soon be humbled by the rise of renewable energy sources and increased efficiency of energy utilization.

The facts above should be more than adequate to prove the case against the 2019-2024 DPP. But my suspicions are that the Department of the Interior is not really interested in representative democracy (substantiating facts 1 through 4 above) and will continue to advance this lousy and dangerous proposal, throwing the entire planet “under the bus” to save their own skin.

Under this assumption, the following arguments expand on the environmental damage that the proposal will cause irreversible and irreparable damage to the ocean. Surrendering to the 2019-2024 DPP will be sacrificing the stable marine economies, marine-sources food supplies and the quality of life for all living beings on the planet, but particularly those marine animals living within the acoustic footprint of offshore oil operations from the first seismic survey to the final capping of the last productive well (which would be done in an ocean full of algae and jellyfish, and not much else).

I know that the current administration is not particularly interested in science,³¹ but the following arguments are substantiated by peer reviewed scientific literature; so put your thinking caps on, you might learn something!

Technical arguments – Offshore hydrocarbon extraction and marine bioacoustics

As I mentioned in the first paragraph of this letter, the primary focus of Ocean Conservation Research is on marine bioacoustics; our concern being for the impacts of human generated noise on marine habitats. This concern is driven by the fact that the ocean is primarily an acoustic environment when it comes to biological sensing and adaptations, so any noise we create will have biological impacts on all marine taxa.

The offshore fossil fuel industry is completely bound to noise generation. From seismic surveys, to seafloor profiling, to the installation and of subsea equipment, the running of that equipment, and the acoustic telemetry required to control subsea operations. There is not one stage or phase of this industry that does not introduce noises that are disruptive to marine life.

³¹ David Kramer “Trump shows apathy for science.” *Physics Today* V71:2.p 26 February 2018

In the course of exploiting fossil fuel deposits geophysical and geological surveys are required – first to locate the deposits, and then to monitor them while the extraction takes place. Current technology involves seismic surveys to locate (3D) and monitor (4D) using towed arrays of seismic airguns. Despite the erroneous, and continued insistence of BOEM that “there has been no documented scientific evidence of noise from air guns used in geological and geophysical (G&G) seismic activities adversely affecting marine animal populations...”³² there is in fact a lot of scientific evidence documenting and substantiating seismic survey impacts to marine life.³³

For marine mammals there are many published accounts of migratory disruptions,^{34,35,36} communication disruptions,^{37,38} population displacement^{39,40} feeding disruptions,⁴¹ system compromise,^{42,43} and even seismic survey associated strandings.⁴⁴ Additionally there is evidence of increased metabolic stress in marine mammals due to anthropogenic (shipping) noise that would compromise health and breeding success.⁴⁵ There is no reason to believe

³² William Yancy Brown “The science behind the decision” in BOEM *Science Notes*, August 22, 2014.

³³ William Brown’s use of the word “populations” is a disingenuous attempt to side-step the well documented impacts on individual and “non-population scale” groups. Because the impacts have not been studied in “population scales” does not substantiate the intention of Brown’s prevarication.

³⁴ Manuel Castellote, Christopher W. Clark, Marc O. Lammers 2012 “Acoustic and behavioral changes by fin whales (*Balaenoptera physalus*) in response to shipping and airgun noise.” *Biological Conservation* 147 (2012) 115–122

³⁵ Richardson, W.J., G.W. Miller, and C.R. Greene Jr., “Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea.” *Journal of the Acoustical Society of America* 106:2281 (1999)

³⁶ Castellote, M. Clark, C.W., Lammers M.O. “Potential negative effects in the reproduction and survival on fin whales (*Balaenoptera physalus*) by shipping and airgun noise.” *International Whaling Commission report SC/62/E3 - 2010*

³⁷ Di Iorio, L., and C. W.Clark, “Exposure to seismic survey alters blue whale acoustic communication.” *Biology Letters*, doi:10.1098/rsbl.2009.0651 (2009)

³⁸ Blackwell, S.B., et al., “Effects of airgun sounds on bowhead whale calling rates in the Alaskan Beaufort Sea” *Marine Mammal Science*, DOI: 10.1111/mms.12001 (2013)

³⁹ Parente, C.L., J.P. Araújo, and M.E. Araújo, “Diversity of cetaceans as a tool in monitoring environmental impacts of seismic surveys,” *Biota Neotropical*, 7 (1): 49-55 (2007)

⁴⁰ Weller, D.W., et al., “Influence of seismic surveys on western gray whales off Sakhalin Island, Russia in 2001.” Paper No. SC/54/BRG14 presented to the International Whaling Commission Scientific Committee (2002)

⁴¹ Frances C. Robertson, William R. Koski, Tannis A. Thomas, W. John Richardson, Bernd Würsig, Andrew W. Trites “Seismic operations have variable effects on dive-cycle behavior of bowhead whales in the Beaufort Sea” *Endangered Species Res.* Vol. 21: 143–160, 2013

⁴² Gray, H. and K. Van Waerebeek, “Postural instability and akinesia in a pantropical spotted dolphin, *Stenella attenuata*, in proximity to operating airguns of a geophysical seismic vessel.” *Journal for Nature Conservation*; 19:363-367.(2011)

⁴³ Mann, D., et al., “Hearing loss in stranded odontocete dolphins and whales.” *PLoS ONE*, 5(11): (2010).

⁴⁴ Hildebrand, J.A., “Impacts of anthropogenic sound” in *Marine mammal research: conservation beyond crisis*. The Johns Hopkins University Press, Baltimore, Maryland, pp. 101-124 (2005)

⁴⁵ Rosalind M. Rolland, Susan E. Parks, Kathleen E. Hunt, Manuel Castellote, Peter J. Corkeron, Douglas P. Nowacek, Samuel K. Wasser and Scott D. Kraus. 2012 “Evidence that ship noise increases stress in right whales” *Proc. R. Soc. B*

that seismic survey noise would be any less stressful to marine mammals than shipping noise.

BOEM has also missed the literature on the impacts of seismic surveys on fisheries and catch rates^{46,47} and at least at close range, physiological impacts on fish.⁴⁸ The evidence that decreased fisheries catch rates return after some period⁴⁹ may speak to the apparent evidence of no short-term or catastrophic impacts on some commercial fish species, but without more comprehensive longitudinal studies on the same populations any assumptions about long-term impacts are purely speculative. This is particularly in light of the repeated fish population exposures that will occur throughout the 4D seismic survey regimes in ongoing deep-water fossil fuel Extractions and Production (E&P) operations.⁵⁰

Seismic surveys are known to cause migratory disruptions of important fisheries species.⁵¹ With the likely scenario of multiple and concurrent 4D seismic surveys, the impact of offshore fossil fuel disruptions to commercial and recreational fisheries would be inevitable. That these disruptions have not been recognized in the Western and Central Gulf of Mexico (GOM) is likely due to a lack of any baseline studies than to a paucity of evidence. This absence of clear correlations between seismic impacts and fisheries compromise is exacerbated by the complex synergy between other environmental stressors to fisheries such as seasonal marine hypoxia, questionably regulated fishing practices, receding coastal wetlands, coastal subsidence, and other environmental, social, and economic effects of a predominantly fossil fuel-driven economy in the GOM.

BOEM's "Science behind the decision" article^(FN 32) does not mention concern for seismic impacts on invertebrates, but because they are part of the food chain, any compromise to vitality of squid^{52,53} (for example) will certainly impact commercial fisheries as well as

⁴⁶ Engås, A. S. Løkkeborg, E. Ona, and A.V. Soldal. 1996." Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*)". Can. J. Fish. Aquat. Sci. 53:2238-2249.

⁴⁷ Løkkeborg, S. and A.V. Soldal. 1993. The influence of seismic exploration with airguns on cod (*Gadus morhua*) behaviour and catch rates. ICES mar. Sci. Symp., 196:62-67.

⁴⁸ McCauley, R. D., Fewtrell, J. & Popper, A. N. (2003). "High intensity anthropogenic sound damages fish ears." Journal of the Acoustical Society of America 113, 638–642

⁴⁹ Skalski, J. R., W. H. Pearson, and C. I. Malme. 1992. Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish (*Sebastes spp.*). Canadian Journal of Fisheries and Aquatic Science 49:1357-1365.

⁵⁰ Active Fossil Fuel E&P operations typically require three to four 4D surveys per year in the areas above and adjacent to producing deposits.

⁵¹ Slotte, A., K. Hansen, J. Dalen, E. Ona. 2004. Acoustic mapping of pelagic fish distribution and abundance in relation to a seismic shooting area off the Norwegian west coast. Fisheries Research 67:143-150.

⁵² Michel André, Marta Solé, Marc Lenoir, Mercè Durfort, Carme Quero, Alex Mas, Antoni Lombarte, Mike van der Schaar, Manel López-Bejar, Maria Morell, Serge Zaugg, and Ludwig Houégnigan (2011) "Low-frequency sounds induce acoustic trauma in cephalopods" Front. Ecol. Environ. 2011; doi:10.1890/100124

compromise the major food stock for many odontocetes. There is also recent evidence of impacts of seismic airgun noise on the larval development of scallops⁵⁴ and evidence that anthropogenic (shipping) noise disturbs mollusks that are not otherwise disturbed by natural noises at the same exposure levels.⁵⁵ So with all of the evidence that seismic airgun surveys do impact marine biota at all trophic levels, BOEM's maintaining that "there is no scientific evidence of impacts" is irresponsible and inexcusable.

These impacts mentioned above of both 3D and 4D seismic surveys required for OCS fossil fuel development should be sufficient evidence that offshore fossil fuel operations will significantly disrupt marine life and commercial and recreational fisheries, and should thus be limited to areas currently in production and where existing offshore fossil fuel infrastructure can play out its remaining investment life.

Seismic surveys notwithstanding, it is clear that once the airguns go into the water the soundscapes of the proposed areas will be transformed forever. This will be due to a number of noise producing equipment and technologies required for new offshore and deep-water technologies:

Ongoing and expanding acoustical impacts from offshore fossil fuel E&P

In deep-water OCS, Fossil Fuel E&P operations will most likely be managed from dynamically positioned, thruster stabilized operating platforms, or Floating Production, Storage, and Offloading (FPSO) vessels. These are stabilized by six to eight motor-driven propellers in the 5000-6000hp power range. So these drilling and operations platforms are stabilized by the equivalent of three to four mid-weight cargo ships concentrated in the area of a single drilling and operations rig. In calmer sea states these may not be kicking up that much broad-band noise, but there is a reason that these platforms have all their horsepower – because they need it in high-swell conditions.

These platforms also do not have anchors – which means that as soon as the rig is put in service it is driving the propellers continuously. The propellers are typically steep pitch, high torque configurations that are not designed for reduced cavitation, so in the world of propellers they are among the noisiest. These platforms need to be evaluated under all

⁵³ A. Guerra, A.F. González and F. Rocha (2004) "A review of the records of giant squid in the north-eastern Atlantic and severe injuries in *Architeuthis dux* stranded after acoustic explorations" International Council for the Exploration of the Sea CC:29

⁵⁴ de Soto, Natacha Aguilar; Delorme, Natali; Atkins, John; Howard, Sunkita; Williams, James; Johnson, Mark "Anthropogenic noise causes body malformations and delays development in marine larvae." Scientific reports 2013 v3

⁵⁵ Hansjoerg P. Kunc, Gillian N. Lyons, Julia D. Sigwart, Kirsty E. McLaughlin, and Jonathan D. R. Houghton "Anthropogenic Noise Affects Behavior across Sensory Modalities." *The American Naturalist* Vol. 184, No. 4 (October 2014), pp. E93-E100

likely drive conditions to make sure that the National Marine Fisheries Service (NMFS) “Level B take” 120dB re:1uPa continuous noise threshold is not exceeded.⁵⁶

Additionally subsea operations employ various acoustical navigation and orienting beacons to locate equipment (Acoustic Positioning and Control Systems – APCS)⁵⁷, Acoustic Doppler Current Profilers (ADCP) to monitor currents and depth,⁵⁸ and sighting beacons to locate operation areas.⁵⁹ These noise sources are similar in function to airport radio beacons, except they are acoustical – and often operate on the 10kHz – 100kHz range – overlapping the communication and bio-sonar ranges of odontocetes, and the detection frequencies of clupeiforme fishes (shad, herring, menhaden, and sardines)⁶⁰ which are important commercial species as well as feeding stock for marine mammals and larger commercial species.

These noises are usually continuous so they must be below the NMFS “Level B take” 120dB re:1uPa continuous noise criteria. And as these noises are coded digital noise and alien to fish and marine mammals, they also need to be assessed in terms of migratory disruptions and elevated stress levels in stand-alone applications as well as in installed and operating environments.

Additionally, deep-water operations are introducing equipment and practices that involve seafloor mounted (“subsea”) equipment used to “pre-refine” (separate wanted product from unwanted brine, gas, mud, and solids), re-inject unwanted materials and substances back into a deposit, and pump or pressure-drive wanted product to the surface. In many locations this multi-phase materials handling is being done across high differential pressures, and likely some consequent noise.

The various noises from these subsea processes need to be evaluated and accounted for prior to opening up new lease areas, because unless this information is brought into the impacts discussion prior to deployment it could become an environmental liability that will be “too expensive to mitigate” once in place. This is particularly the case in areas where high overpressure exists at the wellhead with multiphase materials (sand, brine, gas, oil).

⁵⁶ NOAA Fisheries Interim Sound Threshold Guidance:

http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/threshold_guidance.html

⁵⁷ J-E. Rygh, Arnijot Skogvang “Challenging the Hydro-Acoustics” Offshore Technologies Conference 1992 DOI <http://dx.doi.org/10.4043/7047-MS>

⁵⁸ Martin Visbeck, “Deep Velocity Profiling Using Lowered Acoustic Doppler Current Profilers: Bottom Track and Inverse Solutions.” 2002: J. Atmos. Oceanic Technol., 19, 794–807

⁵⁹ Adam Weintrit “Marine and Offshore Telematics Systems” 2012 in “Marine and Offshore Telematics Systems” Springer Berlin Heidelberg

⁶⁰ David A. Mann, Zhongmin Lu, Mardi C. Hastings and Arthur N. Popper” Detection of ultrasonic tones and simulated dolphin echolocation clicks by a teleost fish, the American shad (*Alosa sapidissima*)” J. Acoust. Soc. Am. 104 , 562 (1998)

Increasingly offshore enterprises are managed by Autonomous Underwater Vessels (AUV) or Remotely Operated Vessels (ROV). ROVs are typically controlled through communication cables in their umbilical tether. AUV's on the other hand are controlled by way of acoustical communication networks.⁶¹ These also often operate in the 12kHz – 100kHz range and as they are continuous noise need to comply with the NMFS continuous noise criteria of 120dB re:1uPa.

These acoustic technologies and noise sources above are only an overview of what will be deployed and utilized in offshore fossil fuel E&P operations. To date none of these equipment and technologies have been tested for impacts on marine mammals and fish. It must also be noted that *in situ* all of these noise sources will be operating concurrently and that together they create a very non-biological soundscape which may have cumulative stress impacts greater than the arithmetic sum of the impacts of the individual sources.⁶²

This is particularly important as multiple human enterprises expand into the OCS which all have some measurable impacts but are not considered cumulatively or synergistically in individually NEPA mandated Environmental Impact Statements.⁶³ These enterprises include ongoing seismic surveys, benthic profile surveys, fisheries management surveys, military training range exercises, commercial and industrial shipping, commercial fishing operations, recreational boating and fishing, offshore wind energy development, offshore wave, current, and tidal energy development, seafloor mining, dredging, and dumping.

The long-used, and often erroneous assumption that disturbed animals will avoid areas of disturbance⁶⁴ is obviated by the increasing ubiquity of anthropogenic disturbances. Under continued stress animals will succumb to physiological compromise effecting the breeding success of every animal in the compromised environment – fish stocks will slowly erode, whales will not replenish at the death rates, corals will become subject to viral and fungal infection, there will be a slowly decreasing supply of food at all trophic levels – even while all individual disturbances or “takes” are all within “managed guidelines” that supposedly do not cause population-level impacts. The “straw the breaks the camel’s back” analogy comes to mind here.

⁶¹ An, E. ; Beaujean, P.-P. ; Baud, B. ; Carlson, T. ; Folleco, Andres ; Tzyh Jong Tarn “Multiple communicating autonomous underwater vehicles.” IEEE International Conference on Robotics and Automation, 2004. Proceedings. ICRA 2004 Vol.5 4461 - 4464

⁶² Andrew J. Wright and Line A. Kyhn “Practical management of cumulative anthropogenic impacts with working marine examples” 2014 Conservation Biology, Volume 00, No. 0, 1–8

⁶³ Currently the Mid and South Atlantic is operating under the PEIS for the US Navy Atlantic Fleet Testing and Training Range. See 77 Fed. Reg. 27771 (May 11, 2012); 77 Fed. Reg. 29636 (May 18, 2012) and may soon be operating under the PEIS for the Atlantic OCS Geological and Geophysical survey plan.

⁶⁴ Beale CM. “The behavioral ecology of disturbance responses.” International Journal of Comparative Psychology 2007, 20:111–120

The above assaults all adding to the habitat stress of climate disruption and ocean acidification makes it all the more critical to not support or encourage fossil fuel development and expansion into the US OCS - because burning hydrocarbon is at the very core of the climate disaster.

Summary of concerns:

- 1) Preparatory 3D and ongoing 4D seismic surveys will harm marine mammals, compromise commercials and recreational fisheries, and harm various marine invertebrates that are critical to the entire marine food chain.
- 2) Dynamically positioned offshore deepwater operations platforms and FPSOs will generate continuous mechanical noise and needs to be regulated under the NMFS “Level B take” from continuous noise exposure guidelines of 120dB re: 1uPa.
- 3) Acoustic Positioning and Control Systems, Acoustic Doppler Current Profilers and other navigation and sighting beacons need to be evaluated for impacts to marine mammals and clupeiforme fish and due to their continuous operation need to be regulated under the NMFS “Level B take” from continuous noise exposure guidelines of 120dB re: 1uPa.
- 4) Subsea processing equipment such as separators, re-injectors, multi-phase pumps, and power distribution systems used in deepwater E&P operations need to be evaluated for impacts to marine mammals, and due to their continuous operation need to be regulated under the NMFS “Level B take” from continuous noise exposure guidelines of 120dB re: 1uPa
- 5) Acoustical control of ocean equipment through direct modems or multi-nodal acoustical communications networks that operate below 250 kHz need to be evaluated for impacts to marine mammals and clupeiforme fish and due to their continuous operation need to be regulated under the NMFS “Level B take” from continuous noise exposure guidelines of 120dB re: 1uPa.
- 6) Acoustical impacts of all noise sources used in OCS Oil and Gas E&P need to be evaluated as a complete soundscape, and not just as an assembly of individual noise sources. The industrial soundscape resulting from all of the contributing noises need to be considered as a whole, in terms of cumulative impacts and life-term effects.

The above bio-acoustic arguments hinge on the existing protections found in the directives and guidelines of the Marine Mammal Protection Act and the Endangered Species Act. These protections were crafted over decades of scientific research and discussions with both scientific and industry stakeholders – and as such, the protections represent the most tenable compromise between industry needs and scientific certainty. Cases we have made for environmental protection that are not written into law are nonetheless substantiated by peer reviewed literature and make common sense in the context of ecosystem based management.

Unfortunately, it has become apparent that industry is not interested in science, a healthy planet, a secure food supply, or the survival of marine life that provides deeper meaning to our lives and relationships. They are interested in only one thing – their financial survival. Toward this priority they are aiming to eviscerate all of the protections upon which the above arguments are made. They are proposing eliminating the Marine Mammal Protection Act – and if they are successful, none of the arguments based on these protections herein will be valid.

The industry aims to externalize all of their costs to the environment, American taxpayers, and all of life on the planet. In coming up with a rebuttal for this strategy I can only find one phrase that concisely characterizes their proposed actions; “chicken-shit.” If industry is unable to survive under the well-developed, deeply considered, and endlessly argued environmental guidelines that have been successfully implemented over the past decades, then they need to fail. They need to step aside for more environmentally sound and sustainable energy technologies.

In consideration of the above arguments, leasing areas on the US Outer Continental Shelf for fossil fuel development is unwise, economically and environmentally costly, and portends larger global disasters due to climate disruption which no amount of short-term economic benefits can justify.

Sincerely,

A handwritten signature in black ink that reads "Michael Stocker". The signature is fluid and cursive, with a long horizontal stroke at the end.

Michael Stocker
Director
Ocean Conservation Research