

June 19, 2018

Bureau of Land Management
Attn: Coastal Plain Oil and Gas Leasing Program EIS
222 West 7th Avenue, Stop #13
Anchorage, Alaska 99513

Re: Scoping Considerations for Coastal Plain Oil and Gas Leasing Program EIS

Dear Bureau of Land Management (BLM):

Thank you for this opportunity to comment on the scope of the environmental impact statement (EIS) for the proposed Coastal Plain Oil and Gas Leasing Program in the Arctic National Wildlife Refuge (ANWR). We urge BLM to evaluate the following considerations in the environmental review for this proposal:

1. **Whether There is a Compelling Purpose and Need for the Project:** The ANWR is a protected and sensitive landscape possessed of extraordinary cultural, ecological and wildlife value, and disruptive activities such as oil and gas drilling should only occur in this landscape if there is a compelling need for those activities. There are many other oil and gas preserves that are currently producing substantial quantities of these fuels, and production from other federal sources will almost certainly increase under the administration's current policies. At the same time, the demand for oil and gas (and particularly oil) will likely decrease in future years as a result of climate change mitigation policies. The potential increase in production from other oil and gas sources coupled with the projected long-term decrease in demand for these fuels raises the critical question as to whether there is a compelling need for this proposal, and whether the need to protect environmental and cultural values in this area may outweigh the utility of the proposed drilling action.
2. **The Effect of Oil and Gas Leasing on Fossil Fuel Consumption, Greenhouse Gas Emissions, and Climate Change:** The production, transportation, processing, and combustion of the oil and gas produced under this proposal will generate substantial quantities of greenhouse gas (GHG) emissions. The ongoing exploitation of federal fossil fuel reserves will also increase the supply of available oil and gas, which in turn will affect the consumption of oil and gas as compared with other energy resources. BLM should account for these effects in this review, as it has in recent EISs for proposals involving fossil fuel extraction. However, BLM's analysis of impacts on energy markets and consumption should reflect present and foreseeable shifts in fossil fuel demand

driven by: (i) policies aimed at reducing greenhouse gas emissions and fossil fuel use; and (ii) decreases in the cost of alternative energy sources such as solar and wind.

3. **The Effect of Climate Change on the Project Area and Implications for the Environmental Impacts of the Proposal:** As part of its environmental review under NEPA, BLM must consider changing Arctic climatic conditions and their effects on the oil and gas infrastructure associated with the proposed project. Oil and gas infrastructure is vulnerable to climate impacts, including thawing permafrost, reduced periods of frozen ground for ice road construction, and increased risk of coastal erosion due to enhanced wave action from declines in sea ice. BLM should also consider the cumulative impacts of changing climate conditions in combination with oil and gas development on species inhabiting ANWR.

1. Whether there is a Compelling Purpose and Need for the Project

The Arctic National Wildlife Refuge encompasses 19 million acres of largely undisturbed wilderness with significant cultural, ecological, and wildlife resources. A previous assessment of the ANWR Coastal Plain by BLM and other federal bodies noted, “The Arctic Refuge is the only conservation system unit that protects, in an undisturbed condition, a complete spectrum of the Arctic ecosystems in North America,” and that the coastal plain is “the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity.”¹ Over 42 fish species, 37 land mammals, eight marine mammals, and more than 200 migratory and resident bird species inhabit the refuge.² These include polar bears protected under the Endangered Species Act. Additionally, oil and gas development could affect nearby marine mammals protected under the Marine Mammals Protection Act. Some indigenous communities are also highly dependent on the caribou herds that calve on the Coastal Plain for their subsistence.³ Many, if not all, of these species are already vulnerable to the impacts of climate change and would be further threatened by the cumulative impacts of oil and gas development.

Given the unique resource values in the ANWR coastal plain, the area should only be opened for oil and gas leasing if there is a compelling need for additional oil and gas resources from federal lands. The U.S. Energy Information Agency (EIA)’s energy market forecasts suggest that there is no such need. In nearly every scenario examined by EIA, U.S. production of oil and gas will

¹ U.S. Dept. of the Interior, Fish and Wildlife Service, Geological Survey, and Bureau of Land Management, *Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment*, Report and Recommendation to the Congress of the United States and Final Legislative Environmental Impact Statement, 1987, hereinafter known as the *1002 report*.

² U.S. Fish & Wildlife Service, Arctic National Wildlife Refuge: Alaska, available at https://www.fws.gov/refuge/arctic/wildlife_habitat.html (accessed June 15, 2018).

³ Congressional Research Service, Arctic National Wildlife Refuge (ANWR): An Overview (Jan. 9, 2018), available at <https://fas.org/sgp/crs/misc/RL33872.pdf>. (hereafter “CRS Report”).

considerably outpace domestic demand for and consumption of oil and gas products.⁴ For example, under the reference case, EIA predicts that U.S. natural gas production will be approximately 10 quadrillion Btu higher than consumption by 2050.⁵ Notably, these projections do not account for the effect of federal policies aimed at mitigating climate change, such as the Clean Power Plan, which will further reduce the demand for fossil fuels when and if they are reinstated.⁶

It is also irrational to assume that global demand for fossil fuels will continue to increase in the coming decades when the nations of the world have committed to rapidly reducing greenhouse gas emissions to mitigate global climate change.⁷ The United States and 175 other countries have signed on to the Paris Agreement's commitment to a climate target "well below 2 °C" above pre-industrial levels and to pursue efforts to limit warming to 1.5°C.⁸ The majority of countries, as well as many sub-national governments and private actors, remain committed to the Paris Agreement's targets. Scientists estimate that 68-80% of global fossil fuel reserves must remain in the ground to limit temperature rise to 2 °C (as based on a 1,000 GtCO₂ carbon budget).⁹ Given the high risks and high investment costs of Arctic drilling, it is logical that Arctic resources should be selected for non-extraction.¹⁰

In this context, the demand for fossil fuels will most likely decline – potentially quite sharply – in the decades ahead. This is not merely speculation on the part of environmental advocates or policymakers: even fossil fuel companies have recognized that demand for fossil fuels will decline due to policies aimed at mitigating greenhouse gas emissions.¹¹

These market considerations are even more relevant for fossil fuel development projects with long lead times, as would be the case for this proposal. The EIA has projected that it would take

⁴ EIA, *Annual Energy Outlook 2018 with Projections to 2050* (2018) at 44, 62.

⁵ *Id.* at 62.

⁶ While the Clean Power Plan may not be reinstated in its original form, there is a very high likelihood that subsequent administrations will introduce policies aimed at reducing fossil fuel use, as this is a necessary policy response to the threat of climate change.

⁷ See UNFCCC, Conference of the Parties on its Twenty-First Session, Adoption of the Paris Agreement, Decision 1/CP.21, U.N. Doc. FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

⁸ *Id.*; United Nations Treaty Collection, Status of the Paris Agreement, available at https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=en (accessed May 29, 2018).

⁹ See Carbon Tracker Initiative, *Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?* at 2 (2013); M. Raupach *et al.*, *Sharing a quota on cumulative carbon emissions*, 4 *Nature Climate Change* 873 (2014); Oil Change International, *The Sky's Limit: Why the Paris Climate Goals Require A Managed Decline of Fossil Fuel Production* at 6 (Sept. 2016).

¹⁰ C. McGlade and P. Ekins, The geographical distribution of fossil fuels unused when limiting global warming to 2° C, 517 *Nature* 187, 190, 187 (2015) (“[A]ll Arctic [oil and gas] resources should be classified as unburnable,” because “development of [oil and gas] resources in the Arctic . . . [is] incommensurate with efforts to limit average global warming to 2 °C.”).

¹¹ ExxonMobil, *2018 Energy & Carbon Summary: Positioning for a Lower-Carbon Energy Future* (2018), <https://perma.cc/3UUQ-5T53>; ExxonMobil, *2018 Outlook for Energy: A View to 2040* (2018), <https://perma.cc/C8SP-L59J>.

a minimum of 10 years after oil exploration and drilling is approved before oil production would be able to commence in the ANWR (barring any legal challenges).¹² By that time, the effect of climate change mitigation policies on fossil fuel demand – and in particular, oil demand – will be even more apparent.

In sum: energy market forecasts all indicate that there is not a compelling need for drilling in the ANWR coastal plan. BLM should therefore reconsider this proposal as well as other proposals to expand oil and gas leasing on federal lands.

2. The Effect of Oil and Gas Leasing on Fossil Fuel Consumption, Greenhouse Gas Emissions, and Climate Change

In 1998, the U.S. Geological Survey (USGS) conducted an assessment of oil reserves in the 1.5 million-acre ANWR coastal plain (also known as the “1002 area”) and estimated that it contained 5.7 – 16.0 billion barrels of technically recoverable oil, with a mean value of 10.4 billion barrels.¹³ Approximately 74% of this oil (~ 7.7 billion barrels) is located on federal lands, with the remaining oil on state and native lands.¹⁴

Drawing on the USGS assessment, the U.S. Energy Information Administration (EIA) published a 2008 report describing how the opening of the ANWR 1002 Area to oil and natural gas would affect domestic crude oil production.¹⁵ EIA looked at three oil resource cases corresponding with the mean, lower bound, and upper bound of the USGS projections.

- In the mean resource case, additional oil production resulting from the opening of ANWR would amount to 780,000 barrels per day within the first decade of production and would then decline to 710,000 barrels per day in subsequent years.
- In the low and high resource cases, additional oil production resulting from the opening of ANWR would peak at 510,000 and 1.45 million barrels per day within the first decade of production.
- During the first twelve years of production, the cumulative additional oil production would be 2.6 billion barrels for the mean resource case, 1.9 billion barrels in the low resource case, and 4.3 billion barrels in the high resource case.¹⁶

The extraction, transportation, processing and combustion of these oil reserves would release considerable quantities of GHG emissions. To illustrate this point, Table 1 (next page) contains

¹² U.S. EIA, *Analysis of Projected Crude Oil Production in the Arctic National Wildlife Refuge*, Issue in Focus from the Annual Energy Outlook, 2018 (May 2018), <https://perma.cc/FAJ5-GL4K>.

¹³ USGS, *Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis*, Fact Sheet 0029-01 (1998), <https://perma.cc/824N-S78W>.

¹⁴ *Id.*

¹⁵ EIA, *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, SR/OIAF/2008-03 (2008), <https://perma.cc/7NHD-TLPD>.

¹⁶ *Id.* at 8.

estimates of the GHG emissions that would be generated from the combustion of oil reserves under all three resource cases (at peak production and cumulatively).¹⁷ Table 2 provides several reference points (GHG equivalencies) to help demonstrate the magnitude of these emissions impacts.¹⁸

Table 1: Potential GHG Emissions Generated by the Combustion of ANWR Coastal Plain Oil

Resource Case	Peak Oil Production (daily)		Cumulative Oil Production (12 years)	
Low	510,000 barrels	219,300 tCO ₂ e	1.9 billion barrels	0.8 billion tCO ₂ e
Mean	780,000 barrels	335,400 tCO ₂ e	2.6 billion barrels	1.1 billion tCO ₂ e
High	1,450,000 barrels	623,500 tCO ₂ e	4.3 billion barrels	1.8 billion tCO ₂ e

Table 2: GHG Equivalencies for Combustion Emissions from ANWR Coastal Plain Oil

Resource Case	Emissions	Equivalent to annual GHG emissions from:		
Daily Production		Passenger vehicle emissions (# cars)	Household electricity use (# homes)	Carbon sequestered by forests (# acres)
Low	219,300 tCO ₂ e	47,000	33,000	258,000
Mean	335,400 tCO ₂ e	72,000	50,000	395,000
High	623,500 tCO ₂ e	134,000	93,000	734,000
Cumulative Production				
Low	0.8 billion tCO ₂ e	171,306,000	119,904,000	942,285,000
Mean	1.1 billion tCO ₂ e	235,546,000	164,868,000	1,295,642,000
High	1.8 billion tCO ₂ e	385,439,000	269,784,000	2,120,141,000

The emissions estimates presented on Table 1 do not include the emissions from extracting, transporting, and processing the oil. Nor do they account for the extent to which the production and use of oil from the ANWR Coastal Plain would offset the production and use of fossil fuels

¹⁷ These are rough estimates derived from EPA's methodology for calculating CO₂ emissions per barrel of crude oil consumed. Specifically, these values are determined by multiplying heat content times the carbon coefficient times the fraction oxidized times the ratio of the molecular weight of carbon dioxide to that of carbon (44/12). The average heat content of crude oil is 5.80 mmbtu per barrel, and the average carbon coefficient of crude oil is 20.31 kg carbon per mmbtu. The fraction oxidized is 100%. Thus, the calculation is: 5.80mmbtu/barrel x 20.31 kg C/mmbtu x 44 CO₂/12 kg C x 1 metric ton/1,000 kg = 0.43 metric tons CO₂ / barrel. See EPA, *Greenhouse Gas Equivalencies Calculator – Calculations and References*, <https://perma.cc/KGK8-4F7P>.

¹⁸ The estimates on Table 2 are derived from EPA, *GHG Equivalencies Calculator*, <https://perma.cc/KGK8-4F7P>.

from other sources. Nonetheless, this provides a helpful starting point for assessing the potential magnitude of the effect of this proposal on GHG emissions.

Should BLM attempt to assess the “net emissions impact” from this proposal as compared with the no action alternative,¹⁹ BLM must be careful about its energy market forecasts, and in particular its assumptions regarding the future demand for fossil fuels as compared with cleaner energy sources. As noted above, it is irrational to assume that there will be a long-term increase in demand for fossil fuels when countries and other stakeholders are introducing policies aimed at phasing out the use of such fuels. The price of clean energy sources such as solar and wind are also declining at a considerable pace. Thus, any baseline that BLM uses to calculate the net emissions impact of this proposal should reflect the growing prominence of clean energy in the overall energy portfolio both in the U.S. and abroad.

To assess the significance of the impact of this proposal on GHG emissions and climate change, BLM should refer to the NEPA regulations which instruct the agencies to consider both the context and intensity of the emissions.²⁰ Contextual factors which are relevant to any proposal which would increase the production of fossil fuels include: (i) the fact that climate change is such a massive environmental problem; (ii) the broad scope of interests that will be adversely affected by this problem, and (iii) the compelling need to rapidly reduce dependency on fossil fuels to address this problem.

With regards to intensity, BLM should use the following tools to assess and disclose the magnitude of the emissions impact:

- The Environmental Protection Agency (EPA)’s quantification threshold of 25,000 tons per year of CO₂e to identify major emitters for the purposes of Clean Air Act (CAA) regulation.²¹
- The court-approved approach to calculating social cost of carbon, methane, and nitrous oxide, which can be used to assign a dollar value to the potential impacts of these emissions.²²

¹⁹ The “net emissions impact” would be the total direct and indirect emissions from ANWR Coastal Plain oil and gas minus the direct and indirect emissions that would be generated by substitute energy resources of the proposal is not implemented

²⁰ 40 CFR § 1508.27.

²¹ EPA, *GHG Reporting Program Facts and Figures*, <https://www.epa.gov/ghgreporting/key-facts-and-figures>.

²² See *Zero Zone Inc. v. Dept. of Energy*, 832 F.3d 654 (7th Cir. 2016) (upholding use of methodology for calculating social cost of carbon used by the Interagency Working Group on the Social Cost of Carbon); Interagency Working Group on the Social Cost of Greenhouse Gases, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (May 2013, Revised August 2016); Interagency Working Group on the Social Cost of Greenhouse Gases, *Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866: Application of the Methodology to Estimate the Social Cost of Methane and the Social Cost of Nitrous Oxide* (Aug. 2016). See also *Zero Zone Inc. v. Dept. of Energy*, 832 F.3d 654 (7th Cir. 2016) (upholding use of the metrics derived by the Interagency Working Group on the Social Cost of Carbon); *Montana Environmental Information Center v. U.S.*

- The EPA’s GHG Equivalencies Calculator, which would allow BLM to compare emissions from the proposal with, e.g., emissions from household electricity use or vehicle miles driven.²³

BLM should also refer to other factors outlined in the NEPA regulations for measuring intensity, including: the degree to which the environmental effects are likely to be highly controversial, the degree to which the possible effects are highly uncertain or involve unique or unknown risks, and whether the action is related to other actions with individually insignificant but cumulatively significant impacts.²⁴

3. The Effect of Climate Change on the Project Area and Implications for the Environmental Impacts of the Proposal

Pursuant to its obligations under NEPA, BLM must consider the potential for significant adverse environmental effects of Arctic climate conditions—including thawing permafrost, reduced periods of seasonal ice, sea level rise, increased coastal erosion, and increased frequency and intensity of fall and autumn storms—on oil and gas activities resulting from BLM’s lease sales. These climate-related impacts will affect baseline conditions and result in direct, indirect, and cumulative environmental effects.²⁵ They will also have cumulative impacts on species affected by energy development.²⁶ NEPA’s implementing regulations provide that agencies must consider significant and reasonably foreseeable indirect and cumulative environmental impacts.²⁷ Agencies must define an appropriate baseline for considering projected environmental impacts; such a baseline should incorporate anticipated environmental conditions.²⁸ Several federal courts have confirmed that NEPA regulations require federal agencies to evaluate the impacts of a changing climate on their actions.²⁹ Consideration of climate change impacts has accordingly become an

Office of Surface Mining, 274 F.Supp.3d 1074 (D. Montana 2017) (requiring disclosure of GHG costs in NEPA review where benefits were also disclosed, and citing the federal Social Cost of Carbon as an available disclosure tool); High Country Conservation Advocates v. U.S. Forest Service, 52 F.Supp.3d 1174 (D. Colo. 2014) (same).

²³ EPA, *GHG Equivalencies Calculator*, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

²⁴ 40 CFR § 1508.27(b).

²⁵ See e.g., *infra* Parts 3.A-3.B.

²⁶ For impacts on oil & gas development on species in ANWR, see e.g., U.S. Geological Survey, Arctic Refuge Coastal Plain: Terrestrial Wildlife Research Summaries, Biological Science Report USGS/BRD/BSR-2002-0001, available at <https://alaska.usgs.gov/products/pubs/2002/2002-USGS-BRD-BSR-2002-0001.pdf>.

²⁷ See 40 C.F.R. §§ 1508.7 (defining “cumulative impact”), 1508.8 (defining “effects” as including direct and reasonably foreseeable indirect effects), 1508.25(c) (providing that EISs must consider direct, indirect, and cumulative impacts); see also CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (1997) [hereinafter “Considering Cumulative Effects under NEPA”], available at <http://1.usa.gov/JLkM2I>.

²⁸ See *Considering Cumulative Effects under NEPA*, *supra* note 28, at 41; 40 C.F.R. 1502.15 (defining “affected environment”).

²⁹ AquaAlliance, et al., v. U.S. Bureau of Reclamation, No. 1:15-CV-754-LJO-BAM, 2018 WL 903746, at *38-*39 (E.D. Cal. Feb. 15, 2018) (finding that the Bureau failed to adequately account for effects of climate change on water management project); Central Oregon Landwatch v. Connaughton, 969 F. App’x 816 (9th Cir. 2017) (finding that qualitative rather than quantitative analysis of climate change impacts on proposal and stream flows was sufficient); Idaho Rivers United v. United States Army Corps of Engineers, No. C14-1800JLR, 2016 WL 498911, at *17 (W.D. Wash. Feb. 9, 2016) (finding the USACE analysis of the effect of climate change on sediment disposition was adequate); Kunaknana v. U.S. Army Corps of Engineers, No. 3:13-CV-00044-SLG, 2015 WL 3397150, at *10-

integral part of the NEPA process.³⁰ Furthermore, the withdrawal of the CEQ guidelines does not affect judicially upheld obligations, as was explicitly noted in the withdrawal notice.³¹

Previous surveys of federal EISs indicate that BLM has performed this type of analysis in the past for fossil fuel and land management projects.³² Other federal agencies have also begun to incorporate climate change adaptation concerns into their environmental review process for energy-related projects. For instance, FERC required consideration of climate change impacts in connection with a proposed LNG export facility in flood-prone coastal Louisiana (the “Mississippi River LNG Project”).³³ After the applicant for the Mississippi River LNG Project submitted draft resource reports to the Commission, FERC directed the applicant to supplement the reports with information regarding potential impacts of sea level rise and storm impacts for the design life of the facility.³⁴ Similarly, FERC’s Environmental Assessments for the Dominion Cove Point LNG export facility on the Chesapeake Bay and the Cameron LNG facility in coastal Louisiana both consider several implications of climate change for their respective facilities.³⁵ The Forest Service

*12 (D. Alaska May 26, 2015) (finding the USACE reasonably concluded, based on a supplemental information report, that a supplemental EIS was not necessary); *Kunaknana v. U.S. Army Corps of Engineers*, 23 F. Supp. 3d 1063, 1092-98 (D. Alaska 2014) (determining that USACE should consider whether to prepare supplemental EIS for issuance of § 404 permit in light of new information on climate change).

³⁰ See e.g., *AquaAlliance* 2018 WL 903746 at *38-*39 (“Nonetheless, the FEIS/R fails to address or otherwise explain how this information about the potential impacts of climate change can be reconciled with the ultimate conclusion that climate change impacts to the Project will be less than significant: . . . [T]his amounts to a ‘failure to consider an important aspect of the problem’ . . .”) (internal citation omitted).

³¹ Withdrawal of Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 82 Fed. Reg. 16576 (April 5, 2017), available at <https://www.federalregister.gov/documents/2017/04/05/2017-06770/withdrawal-of-final-guidance-for-federal-departments-and-agencies-on-consideration-of-greenhouse-gas> (“The withdrawal of the guidance does not change any law, regulation, or other legally binding requirement.”).

³² See Jessica Wentz et al., *Survey of Climate Change Considerations in Federal Environmental Impact Statements, 2012-2014* (Sabin Center for Climate Change Law, 2016); Saloni Jani et al., *How Did Federal Environmental Impact Statements Address Climate Change in 2016?* (Sabin Center for Climate Change Law, 2017).

³³ Louisiana LNG Energy, LLC, Proposed Mississippi River LNG Project (PF14-17-000).

³⁴ Letter to Louisiana LNG Energy, LLC providing comments on Draft Resource Reports 2 through 9 re the Mississippi River LNG Project under PF14-17 (Nov. 24, 2014).

³⁵ See FERC, Environmental Assessment for the Cove Point Liquefaction Project, Dominion Cove Point LNG, LP Docket No. CP13-113-000, at 40, 169–171 (May 2014), <http://bit.ly/1k5fNM0> (“Climate change in the northeast region could have two effects that may cause increased storm surges: temperature increase of the Chesapeake Bay waters, which would increase storm intensity; and a rising sea level. The final grade elevation of the Liquefaction Facilities Project site would range between 70 and 130 feet above mean sea level. Therefore, even with increased sea levels due to climate change and increased storm surge, the Project facilities would not be vulnerable to even a 100-year climate change-enhanced storm surge because of its significant elevation above sea level.”); FERC, Environmental Assessment for the Cameron LNG Expansion Project, Cameron LNG, LLC Docket No. CP15-560-000, at 115 (Feb. 2016), <https://perma.cc/7MA8-DW2W> (“Climate change in the region would have two effects that may cause increased storm surges, increased temperatures of Gulf waters, which would increase storm intensity, and a rising sea level. In Louisiana, relative sea level changes have been estimated by the NOAA to be about 14 inches by 2050. This is greater than the global average because of regional ground subsidence. The Cameron LNG Terminal is designed for a 500-year storm surge elevation level of 12.4 feet amsl. Given that the Expansion Project’s process equipment minimum elevation point of support would be 12.5 feet amsl and the LNG storage tank (T-205) would be 14.0 amsl at top of the elevated pile cap, climate change-enhanced sea level rise and subsidence are considered adequately addressed in the Expansion Project design.”).

also frequently accounts for climate change-related impacts when making decisions about energy and natural resource management in National Forests.³⁶

BLM should analyze climate change impacts to oil and gas infrastructure during environmental review and the cumulative impacts of climate change and energy development on vulnerable species and ecosystems. Below is a summary of several climate change impacts and the risk that they pose to oil and gas infrastructure.

A. Impacts of Climate Change in Alaska

Alaska is situated on the frontlines of climate change. Climate change in Alaska and the Arctic continues to outpace the average across the globe. Arctic temperatures are rising more than twice as fast as average global temperatures³⁷ and Alaska's average annual minimum temperature (1.91°F) rose more than any other US region.³⁸ As the Arctic warms, melting permafrost releases CO₂ and CH₄, causing further warming through a positive feedback loop. Further, permafrost in colder regions including the North Slope, where ANWR is situated, is warming more rapidly than in the interior of Alaska.³⁹ Changing conditions in the Alaskan tundra have also increased the risk of wildfires. Over the last 5,000 years, the Alaskan tundra was too cold and wet to support extensive fires, but a single large fire in 2007 released as much carbon to the atmosphere as had been absorbed by the entire circumpolar Arctic tundra during the previous quarter-century.⁴⁰

Additionally, as anthropogenic greenhouse gas emissions warm the planet, causing glaciers and ice sheets to melt and oceans to absorb increasing volumes of heat, global sea levels will continue to rise, and will do so at increasing rates.⁴¹ In the next several decades, storm surges and

³⁶ See Wentz et al. (2016), Jain et al. (2017), *supra* note 32.

³⁷ Taylor, P.C., W. Maslowski, J. Perlwitz, and D.J. Wuebbles, *Arctic Changes and their Effects on Alaska and the Rest of the United States* in 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I 303-332 (Wuebbles et al. eds.)

³⁸ Vose, R.S., D.R. Easterling, K.E. Kunkel, A.N. LeGrande, and M.F. Wehner, 2017: Temperature changes in the United States in Climate Science Special Report: Fourth National Climate Assessment, Volume I 185-206, 6.1.1 table (Wuebbles, D.J. et al. eds.).

³⁹ Permafrost near the Alaskan Arctic coast has warmed 4°F to 5°F at 65 foot depth, since the late 1970s and 6°F to 8°F at 3.3 foot depth since the mid-1980s...

⁴⁰ U.S. Global Change Research Program, 2014: Climate Change Impacts in the United States: The Third National Climate Assessment (Melillo, Jerry M. et al., eds., 2014) [hereinafter "The Third National Climate Assessment"].

⁴⁰ Taylor, P.C., W. Maslowski, J. Perlwitz, and D.J. Wuebbles, *Arctic Changes and their Effects on Alaska and the Rest of the United States* in 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I 303-332 (Wuebbles et al. eds.).

⁴¹ Walsh et al., *Ch. 2: Our Changing Climate*, in Climate Change Impacts in the United States: The Third National Climate Assessment at 44 (J. M. Melillo et al., eds., U.S. Global Change Research Program, 2014) [hereinafter "Third National Climate Assessment Chapter 2"]; See also Wuebbles, D.J., et al., 2017: Executive summary, in Climate Science Special Report: Fourth National Climate Assessment, Volume I 12-34 (Wuebbles, D.J., et al. eds., U.S. Global Change Research Program, 2017).

high tides will combine with sea level rise to increase flooding, threatening coastal communities and industries.⁴² The fourth National Climate Assessment Climate Science Special Report suggests that by 2060, the level of flooding near ANWR that now happens once every five years will be happening five times *per year* (Figure 12.5).⁴³ A loss of sea ice also increases wave action and risk of coastal erosion.⁴⁴

The cumulative effects of oil and gas activities on species in conjunction with climate change impacts should also be considered as part of environmental review. For example, declining sea ice will negatively impact polar bears and drier conditions will affect migratory birds.⁴⁵ These stressors are additional to the negative impacts of oil and gas development on species in ANWR.⁴⁶

Many sources provide current and credible data regarding sea level rise, thawing permafrost, and other climate change impacts in Alaska and more generally. As relevant examples, the Sabin Center points the BLM's attention to:

- U.S. Global Change Research Program. Alaska. 2014: Climate Change Impacts in the United States: The Third National Climate Assessment, at 514-536, *available at* <http://nca2014.globalchange.gov/>.⁴⁷
- U.S. Global Change Research Program, Arctic Changes and their Effects on Alaska and the Rest of the United States. In Climate Science Special Report: Fourth National Climate Assessment, Volume I, at 303-332, *available at* <https://science2017.globalchange.gov/>.⁴⁸
- Intergovernmental Panel on Climate Change (“IPCC”), Chapter 2.2.3 Ocean, cryosphere and sea level. In Climate Change 2014 Synthesis Report, Fifth Assessment Report, at 65,

⁴² Third National Climate Assessment Chapter 2, *supra* note 36, at 45; Kate Gordon et al., The Risky Business Project, *Risky Business: The Economic Risks of Climate Change in the United States* at 20 (2014) [hereinafter “Risky Business”], *available at* <http://bit.ly/1GxEzZc>.

⁴³ Sweet, W.V., R. Horton, R.E. Kopp, A.N. LeGrande, and A. Romanou, 2017: Sea level rise. In: Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, figure 12.5(d) pp. 333-363, doi: 10.7930/J0VM49F2.

⁴⁴ Overeem et al., Sea Ice Loss Enhances Wave Action at the Arctic Coast, *GEOPHYSICAL RESEARCH LETTERS*, VOL. 38, L17503, (2011), *available at* <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2011GL048681>.

⁴⁵ Chapin, F. S., et al., 2014: Ch. 22: Alaska. Climate Change Impacts in the United States: The Third National Climate Assessment, (J. M. Melillo, et al. eds.) U.S. Global Change Research Program, 514-536. doi:10.7930/J00Z7150 (hereafter “Third NCA Alaska Chapter”).

⁴⁶ U.S. Geological Survey, Arctic Refuge Coastal Plain: Terrestrial Wildlife Research Summaries, Biological Science Report USGS/BRD/BSR-2002-0001, *available at* <https://alaska.usgs.gov/products/pubs/2002/2002-USGS-BRD-BSR-2002-0001.pdf>.

⁴⁷ U.S. Global Change Research Program, 2014: Climate Change Impacts in the United States: The Third National Climate Assessment (Melillo, Jerry M. et al., eds., 2014) [hereinafter “The Third National Climate Assessment”].

⁴⁸ Taylor, P.C., W. Maslowski, J. Perlwitz, and D.J. Wuebbles, *Arctic Changes and their Effects on Alaska and the Rest of the United States* in 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I 303-332 (Wuebbles et al. eds.).

available at http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_LONGERREPORT_Corr2.pdf.⁴⁹

- IPCC, Chapters 5.3.3.1 Severe Storms and 5.3.3.2 Extreme Sea Levels. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, available at http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap5_FINAL.pdf.⁵⁰
- Institute of Marine Science, University of Alaska, Arctic Ocean Synthesis: Analysis of Climate Change Impacts in the Chukchi and Beaufort Seas with Strategies for Future Research, available at http://www.arcodiv.org/news/NPRB_report2_final.pdf.⁵¹
- Risky Business: The Economic Risks of Climate Change in the United States, available at <https://perma.cc/U62D-KRVG>.⁵²

B. Risks to Oil & Gas Infrastructure

There is little question that climate change presents significant risks to infrastructure associated with oil and gas exploration and production activities in ANWR and the transport of extracted resources throughout Alaska.⁵³ Oil and natural gas development in Northern Alaska has become increasingly dependent on ice roads and pads, but already by 2007 warming trends in Arctic latitudes had reduced heavy equipment winter access by more than 50%.⁵⁴ As these trends continue, companies could need to switch to gravel structures, with inherently longer-lasting impacts and higher costs.⁵⁵ Thawing permafrost also reduces soil stability, threatening buildings, roads, and other oil and gas infrastructure.⁵⁶

Thawing permafrost has already damaged, and will continue to threaten, the Trans-Alaska Pipeline (TAP) which would transport North Slope oil to market. Over a period of approximately three years, a vertical support member on one segment of the TAP tilted by seven degrees.⁵⁷

⁴⁹ J. A. Church et al., *Sea Level Change*, in CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [T.F. Stocker et al., eds., Cambridge University Press 2013).

⁵⁰ P. P. Wong et al., *Coastal systems and low-lying areas*, in CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY. PART A: GLOBAL AND SECTORAL ASPECTS, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change 361-409 (C. B. Field et al. eds., Cambridge University Press 2014).

⁵¹ Institute of Marine Science, University of Alaska, Arctic Ocean Synthesis: Analysis of Climate Change Impacts in the Chukchi and Beaufort Seas with Strategies for Future Research (Hopcroft, R. at al. eds. 2008), available at http://www.arcodiv.org/news/NPRB_report2_final.pdf.

⁵² Kate Gordon et al., The Risky Business Project, *Risky Business: The Economic Risks of Climate Change in the United States* at 20 (2014).

⁵³ See e.g., U.S. Geological Survey, [Alaska Technical Regional Report](#) (2012), 69-70 (“With thawing permafrost, decreased sea ice extent and changing weather patterns, oil and gas operations may see impacts both onshore and offshore, such as impacts to infrastructure (for example pipelines, ice roads, and waste pits), exploration and production facilities (such as reduced efficiency of gas compression and reinjection), and shorter and warmer winters have already resulted in reduced operation windows for exploration and development.”)

⁵⁴ CRS Report, *supra* note 3.; see also Third NCA Alaska Chapter, *supra* note 41 at 520.

⁵⁵ *Id.*

⁵⁶ Third NCA Alaska Chapter, *supra* note 41 at 51-52.

⁵⁷ NOAA, [Arctic Development and Transport](#), available at <https://toolkit.climate.gov/regions/alaska-and-arctic/arctic-development-and-transport> (accessed June 15, 2018).

In sum, thawing permafrost, reduced periods of frozen ground, and other impacts due to climate change pose foreseeable risks to the oil and gas infrastructure that will be built as a result of BLM's lease sales. BLM should assess the projected impacts of these changes throughout the life of the oil and gas infrastructure that will be built as a result of new lease sales, assess the costs of those risks and related reductions in potential development, and identify ways to prepare for climate change-related risks. BLM must consider such impacts to adequately protect the infrastructure built as a result of oil and gas lease sales from future climate change impacts and to fulfill its obligations under NEPA.

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Thank you for considering our comments and recommendations on the environmental review for the proposed Coastal Plain Oil and Gas Leasing Program in ANWR. Please let us know if you have any questions.

Sincerely,



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