COLUMBIA LAW SCHOOL

SABIN CENTER FOR CLIMATE CHANGE LAW

March 13, 2019

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

Re: Draft Environmental Impact Statement for Coastal Plain Oil and Gas Leasing Program (DOI-BLM-AK-0000-2018-0002-EIS)

Dear Bureau of Land Management (BLM):

Thank you for this opportunity to comment on the draft 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 address the following issues in the final environmental review for this proposal:

1. **Improve the Greenhouse Gas Emissions Analysis**: BLM should provide quantitative estimates of direct and indirect greenhouse gas (GHG) emissions, including emissions from the combustion of oil and gas produced under the proposed leasing program. In particular, BLM should disclose total (gross) combustion emissions from the proposal, in addition to its estimates of net combustion emissions after energy market substitution. BLM should also provide a more complete disclosure of the assumptions and calculations used to estimate energy market substitution and net emissions. BLM should compare GHG emissions across the four project alternatives, as each alternative entails different levels of oil and gas production. BLM should evaluate the significance of emissions in light of the factors outlined in the NEPA regulations (40 C.F.R. § 1508.27). In this analysis, BLM should use available tools for understanding the potential magnitude of the emissions impacts, such as the social cost metrics developed for GHGs. BLM should evaluate the cumulative impacts of its fossil fuel leasing decisions on fossil fuel use, GHG emissions, and climate change.

2. **Expand Consideration of the Effect of Climate Change on the Project 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. BLM should make sure this analysis is comprehensive, informed by the latest science, and evaluates mitigation of the risks posed by these impacts. BLM should expand its analysis of how to reduce the project's proposed oil and gas infrastructure vulnerability to climate impacts, including thawing permafrost and reduced periods of frozen ground for ice road construction. BLM should also more deeply assess the severity of cumulative impacts of changing climate conditions in combination with oil and gas development on species inhabiting ANWR.

1. Emissions Analysis

a. Quantification of Direct and Indirect Emissions

BLM has acknowledged that this leasing proposal will generate direct GHG emissions from construction, drilling, production, processing, and transport of petroleum products as well as indirect emissions from the combustion of those products in the global marketplace. We appreciate that BLM has quantified these emissions but there are four key deficiencies in the GHG inventory which should be remedied in the final EIS.

First, for indirect emissions from oil and gas combustion, BLM has failed to quantify gross emissions from the combustion of the oil and gas products that will be extracted pursuant to the proposed leasing program. Instead, BLM states that it has used a model ("MarketSim") to estimate how the increase in production will affect US demand for petroleum products and then used a second model ("GHG Model") to estimate the corresponding emissions of those market impacts. There are several problems with BLM's approach:

- As BLM acknowledges, "the MarketSim model considers only the US supply and demand for petroleum; thus, the accuracy of the change (increase) in petroleum demand estimated from MarketSim projections is limited, given its scope is just the US market; however, any type of supply and demand projections must be considered as quite uncertain, given the inherent difficulties in economic projections."[1]

- The EIS contains very little information about the inputs, assumptions, and functions for both models, making it impossible for a reader to understand how BLM actually calculated emissions.

- The EIS does not contain the full results from this modelling exercise. For example, with respect to the MarketSim outputs, BLM simply states that the model projects an increase in oil demand equivalent to 3.4% (low-end case) to 3.9% (high-end case) of the projected Coastal Plain leasing production.

- The model results are presented as a uniform annual projection for the anticipated 70-year duration of oil and gas production, despite the fact that baseline US oil demand will almost certainly decrease dramatically over this period due to the compelling need to reduce GHG emissions and fossil fuel consumption. It is unclear whether and how BLM accounted for factors such as the effect of climate policies on oil demand when applying the model due to the problems noted above.

We recommend that BLM address these deficiencies by: (i) quantifying gross combustion emissions, (ii) more fully disclosing the assumptions, inputs, functions, and outputs of the models used in its net emissions analysis, and (iii) adjusting its model parameters to provide more accurate emissions estimates (e.g., by expanding geographic coverage and energy sources,

[1] DEIS at 3-7.

and by accounting for long-term effects of climate policies on petroleum demand in baseline projections).

With regards to the gross combustion emissions: we note that there is a compelling basis for treating *all* gross emissions as the indirect effects of a project. The Stockholm Energy Institute (SEI), describes this as a "literalist" approach to emissions inventorying due to its specific focus on logic: because of a given project, a certain amount of fuel will be produced, transported, processed, and consumed, and this will generate a certain quantity of greenhouse gas emissions.[2] Such a literal assessment of emissions can of course be accompanied by an net emissions analysis like that contained within the EIS – but one key limitation with the net emissions analysis is that it requires decision-makers to "make assumptions about long-term economic responses that are difficult to assess."[3] The net emissions analysis can also be easily manipulated to achieve a desired outcome (e.g., by adjusting parameters to exclude certain energy sources or geographic regions). Ultimately, we recommend that an assessment of net emissions should be accompanied by a gross emissions inventory because it is: (i) the starting point for the net emissions analysis; (ii) it provides an alternate way of assessing GHG impacts, and(iii) it is more straightforward and less easy to manipulate than the net analysis, as it involves multiplying projected production by an emissions factor.

Second, it is unclear whether BLM considered all transportation emissions. BLM states that the direct emissions estimate includes transport emissions, but it does not specify whether the estimate is confined to transport within the project area or whether it also includes transport from the project area to end users. BLM should disclose the parameters of its analysis and should incorporate estimates of indirect transport emissions (from project location to end use) if they are not already included in the inventory.

Third, BLM acknowledges that methane emissions will be generated as a result of methane leaks during transport and estimates that these emissions will be equal to roughly 5% of indirect emissions from combustion. However, BLM does not include these emissions in its emissions inventory (i.e., the tables summarizing indirect and direct emissions). BLM should include these emissions in its inventory.

Fourth and finally, BLM has failed to quantify total emissions across the lifetime of the project. While BLM does provide annual estimates of direct and indirect emissions, the total lifetime emissions are not readily apparent. BLM should disclose these to give decision-makers and public a more comprehensive sense of potential emissions impacts.

b. Alternatives Analysis

The EIS contains only one emissions inventory for the proposed action. There is no comparison of projected emissions across the four project alternatives. As noted in the NEPA regulations, the analysis of alternatives is "the heart of the environmental impact statement" and agencies

[2] PETER ERICKSON & MICHAEL LAZARUS, STOCKHOLM ENVIRONMENT INSTITUTE, ASSESSING THE GREENHOUSE GAS EMISSIONS IMPACT OF NEW FOSSIL FUEL INFRASTRUCTURE 2–3 (2013).
[3] *Id.* at 6.

"should present the environmental impacts of the proposal and alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and public."[4] BLM should therefore revise its GHG analysis to provide a comparison of both direct and indirect emissions across all alternatives.

c. Significance Determination

The analysis of GHG emissions contains no discussion or conclusion on the significance of those emissions. The only analytical technique BLM uses to assess the magnitude of the emissions is a comparison to global and national total emissions – a technique which produces misleading results, insofar as the project emissions are expressed as a relatively small percentage of these much larger totals (e.g., BLM estimates that the Coastal Plain direct emissions are approximately 0.0001 to 0.0008 % of global emissions). CEQ explicitly rejected this approach in its 2016 *Final Guidance on the Consideration of Climate Change in NEPA Reviews*, explaining that:

> [A] statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact.[5]

We recognize that this guidance has been rescinded, but the CEQ's reasoning holds true: comparisons to global and national totals are at best unhelpful and at worst misleading to decisionmakers and the public.

To assess the significance of these emissions, BLM should refer to NEPA regulations defining the criteria to be used in significance determinations (which instruct agencies to consider both the context and intensity of the impacts).[6] 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 Social Cost of Carbon (SC-CO_2), Methane (SC-CH_4), and Nitrous Oxide (SC-N_2O) metrics that were developed through a federal interagency consultation process and

[4] 40 C.F.R. § 1502.14.
[5] CEQ, *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews* (Aug. 1, 2016) at 11.
[6] 40 CFR § 1508.27.

approved by the courts, which can be used to assign a dollar value to the potential impacts of these emissions.[7]

- The Environmental Protection Agency (EPA)'s quantification threshold of 25,000 tons per year of CO_2e to identify major emitters for the purposes of GHG reporting (as noted by EPA, facilities that surpass this threshold are considered the "largest emitters" in the country).[8]

- 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.[9]

BLM acknowledges that many commenters have urged it to use the social cost metrics in its NEPA analyses, but maintains that this is in appropriate because: (i) the metrics were developed for a rulemaking context, (ii) NEPA does not require a cost-benefit analysis or monetization of costs; (iii) the metrics don't accurately reflect the incremental emissions impact of the proposal; and (iv) the metrics are not useful to decision-makers.

With regards to the first point: the metrics may have been developed for a rulemaking context, but they can readily be used in an environmental analysis to better understand the potential costs associated with greenhouse gas emissions – and those cost estimates are a useful proxy for the actual impacts of climate change. The fact that the metrics were developed for rulemaking are irrelevant to the question of whether they would be useful in NEPA analyses.

With regards to the second point: while it is true that NEPA does not require cost-benefit analysis or monetization of all adverse environmental impacts, an agency cannot arbitrarily monetize some costs and benefits while ignoring others in its EIS. Recognizing this, courts have held NEPA analyses to be inadequate where economic costs and benefits are monetized and the effect of GHG emissions is not monetized.[10] In this EIS, BLM alleges that it has not conducted

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[7] The Social Cost of Carbon, Methane, and Nitrous Oxide, despite being officially "rescinded" by President Trump, are scientifically credible estimates of the societal costs of greenhouse gas emissions, developed through a lengthy process of interagency consultation and peer review, and that cost is absolutely relevant to assessing the nature and significance of the proposed program's environmental consequences. 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* Montana Environmental Information Center v. U.S. 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).

[8] EPA, GHG Reporting Program Facts and Figures, https://www.epa.gov/ghgreporting/key-facts-and-figures

[9] EPA, GHG Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

[10] Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin., 538 F.3d 1172, 1200-1203 (9th Cir. 2008); High Country Conservation Advocates v. U.S. Forest Service, No. 13-CV-01723-RBJ, 2014 WL 2922751 (D. Colo.

an actual cost-benefit analysis requiring monetization of GHG impacts but rather a "regional economic analysis" in which "[a]ny increased economic activity… is simply an economic impact, rather than an economic benefit" and thus, BLM maintains that because it is monetizing *impacts* as opposed to *benefits*, it is not required to monetize the costs of GHG emissions. This is a distinction without a difference. The EIS contains an "economic impact analysis" in which BLM has quantified beneficial economic impacts (e.g., oil and gas revenues, govt. revenue, labor income) as well as costs (e.g., construction costs, operating costs, transportation costs, and tariffs)[11] and then used these estimates to evaluate the pros and cons of the different alternatives. Labelling this as a "regional economic analysis" does not change the fact that BLM has quantified many of the costs and benefits of the proposal. In light of this, it is arbitrary and capricious for BLM to ignore one of the most significant costs of the proposal – the cost of the GHG emissions.[12]

With regards to the third argument: BLM asserts that the "SCC protocol does not measure the actual incremental impacts of a project on the environment and does not include all damages or benefits from carbon emissions." This statement is partially incorrect. The SC-CO_2, SC-CH_4, and SC-N_2O measure the actual incremental impacts of a project on the physical and human environment by specifying the incremental costs associated with an incremental increase in greenhouse gas emissions. These impacts are expressed as monetary costs rather than specific physical impacts because this is a reasonable and comprehensible way to aggregate many different impacts in a single metric. While it is true that the metrics do not capture *all* costs associated with GHG emissions, they at least capture a portion of those costs (and BLM can always disclose the costs that are not covered).

With regards to the fourth argument: BLM states that "the dollar cost figure is generated in a range and provides little benefit in assisting the BLM Authorized Officer's decision for program or project-level analyses, especially given that there are no current criteria or thresholds that determine a level of significance for social cost of carbon monetary values."[13] While we agree that there is no significance threshold defined for GHGs, this is true for many different types of impacts that are evaluated in NEPA reviews – there are no bright line rules for assessing significance, and agencies typically must use their discretion to determine when impacts pass the threshold of significance. The monetization of climate change impacts, however, is useful in informing significance determinations insofar as it provides a standard metric for comparing different impacts.

Finally, we acknowledge that President Trump has ordered a review of the social cost of carbon, methane, and nitrous oxide, and has rescinded the technical support documents underpinning

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June 27, 2014); Montana Environmental Information Center v. U.S. Office of Surface Mining, No. 9:15-cv-00106 (D. Mont. Nov. 3, 2017); WildEarth Guardians v. Zinke, No. 1:17-cv-00080 (D. Mont. Feb. 11, 2019).

[11] DEIS at 3-233.

[12] *See supra* FN 10 (decisions invaliding EISs for failure to disclose climate costs where project benefits are quantified).

[13] DEIS at F-4.

these metrics as "no longer representative of government policy."[14] But in that same executive order, President Trump also stated that "it is essential that agencies use estimates of costs and benefits… that are based on the best available science and economics."[15] The existing estimates were based on the best available science and economics, they were peer-reviewed, and they were developed in consultation with all major federal agencies. Since the administration has not proposed a viable alternative, we believe that these estimates remain the best available metric for monetizing and disclosing the costs of greenhouse gas emissions. Attesting to this is the fact that many states continue to use these estimates in their energy planning activities.[16]

Below, we present our own estimates of the social costs of this proposal, applying the SC-CO_2 at a 3% discount rate to the total anticipated direct and indirect emissions (using BLM's net emissions projections for indirect emissions) under both the low- and high-case.[17]

Years	SC-CO2	Low case (756,739 tons CO2e/yr)		High case (5,378,261 tons CO2e/yr)	
	(3%)	Annual cost	5-yr cost	Annual cost	5-yr cost
2020-2024	$42	$31,783,038	$158,915,190	$225,886,962	$1,129,434,810
2025-2029	$46	$34,809,994	$174,049,970	$247,400,006	$1,237,000,030
2030-2034	$50	$37,836,950	$189,184,750	$268,913,050	$1,344,565,250
2035-2039	$55	$41,620,645	$208,103,225	$295,804,355	$1,479,021,775
2040-2044	$60	$45,404,340	$227,021,700	$322,695,660	$1,613,478,300
2045-2049	$64	$48,431,296	$242,156,480	$344,208,704	$1,721,043,520
			40-yr cost		**40-yr cost**
2050-2090	$69	$52,214,991	$2,088,599,640	$371,100,009	$14,844,000,360
TOTAL LIFETIME COST (low case):			**$3,288,030,955**	**(high case):**	**$23,368,544,045**

With these figures on hand, we return to the question of significance. We recognize that it may be difficult to precisely define a significance threshold for GHG emissions – but such a precise definition is unnecessary for this project because the total lifetime emissions and corresponding costs clearly surpass any reasonable threshold of significance. The following facts support this finding:

- The total lifetime costs of emissions generated as a result of this proposal would range from approximately $3.3 billion (low case) to $23.4 billion (high case). These are

[14] Executive Order 13783: Promoting Energy Independence and Economic Growth §5 (2017).
[15] *Id.*
[16] Peter Fairley, States are Using Social Cost of Carbon in Energy Decisions, Despite Trump's Opposition, INSIDE CLIMATE NEWS (Aug. 14, 2017).
[17] In applying the SC-CO_2, we use the 3% discount rate and we conservatively apply the metrics for 2020, 2025, etc. to the entire five-year period following those years and we assume that the 2050 metric applies to the remaining 40 years of anticipated project duration.

significant costs by any measure. The annual costs ($32 to $159 million) are also significant by any measure.

- The emissions far surpass the reporting and quantification threshold of 25,000 tons per year of CO_2e which has previously been used by CEQ and EPA to identify major emitters. Indeed, the annual emissions in the first year are 30x higher under the low case and 215x higher under the high case.

- According to EPA's GHG Equivalencies Calculator, the annual emissions from this proposal are equivalent to the emissions from: (i) approximately 160,000 – 1,142,000 passenger vehicles driven each year, or (ii) approximately 132,000 – 938,000 homes' electricity use for one year. Again, these are very large numbers which would be viewed as significant in other contexts.

d. Cumulative Impacts Analysis

BLM's analysis of the cumulative impacts of GHG emissions simply refers readers back to its analysis of direct and indirect emissions and the comparisons to global and national GHG totals. BLM does not consider the cumulative GHG effects across multiple leasing decisions at any geographic scope. BLM should update this analysis to account for the cumulative effects of oil and gas leasing decisions in Alaska and the entire United States, as well as the cumulative effects of *all* federal fossil fuel development. We are not suggesting that BLM should conduct an entirely new nationwide analysis of GHG impacts from fossil fuel leasing for each leasing plan and decision – rather, the federal government should prepare such an analysis, update it regularly, and incorporate it into NEPA reviews for fossil fuel leasing decisions.

2. 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. They will also have cumulative impacts on species affected by energy development.[18] NEPA's implementing regulations provide that agencies must consider significant and reasonably foreseeable indirect and cumulative environmental impacts.[19] Agencies must define an appropriate baseline for considering projected environmental impacts; such a

[18] 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.
[19] *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.

baseline should incorporate anticipated environmental conditions.[20] Several federal courts have confirmed that NEPA regulations require federal agencies to evaluate the impacts of a changing climate on their actions.[21] Consideration of climate change impacts has accordingly become an integral part of the NEPA process.[22] Furthermore, the withdrawal of the CEQ guidelines does not affect judicially upheld obligations, as was explicitly noted in the withdrawal notice.[23]

In the EIS, BLM references general climate change effects pertinent to the specific categories of affected environment and environmental consequences. However, these references provide insufficient information to evaluate the significance of these impacts on the project or how the project will cumulatively affect the environment and vulnerable species in combination with these climate impacts. BLM should ensure its assessment reflects the latest climate science and risks, further analyze how the cumulative impacts of climate change and energy development could negatively affect species and ecosystems, and more substantively address how climate change will impact oil and gas infrastructure and how those effects can be mitigated to reduce the risk of fuel leaks and fires.

A. The EIS Should Reflect the Latest Climate Change Science and Risks

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 temperatures[24] and Alaska's average annual minimum temperature (1.91°F) rose more than any other US region.[25] Further, permafrost in colder regions

[20] *See* Considering Cumulative Effects under NEPA, *supra* note 28, at 41; 40 C.F.R. 1502.15 (defining "affected environment").
[21] 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-*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).
[22] *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]this amounts to a 'failure to consider an important aspect of the problem'. . .") (internal citation omitted).
[23] 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.").
[24] 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.)[hereinafter "Fourth National Climate Report Volume 1, Alaska Chapter"].
[25] Vose, R.S., D.R. Easterling, K.E. Kunkel, A.N. LeGrande, and M.F. Wehner, 2017: Temperature changes in

including the North Slope, where ANWR is situated, is warming more rapidly than in the interior of Alaska.[26] Changing conditions in the Alaskan tundra have also increased the risk of wildfires.[27] Looking toward the coastline, 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).[28] A loss of sea ice also increases wave action and risk of coastal erosion.[29]

BLM notes a number of climate change impacts in passing, but should expand evaluation of the increased risks of wildfire, thawing permafrost, flooding, coastal erosion, loss of wetlands, and sea level rise as discussed in the most recent reports of the U.S. Global Change Research Program:

- 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/.[30]

- U.S. Global Change Research Program, Chapter 26: Alaska, in the Fourth National Climate Assessment, Volume II, at 1185-1241, *available at* https://nca2018.globalchange.gov/.[31]

The EIS should additionally address how the project will avoid exacerbating these additional risks to the environment. For example, the draft EIS contains no mention of wildfire risk or how the project will mitigate increased risk from human activity. Mitigating increased climate-related risks to species and project infrastructure are discussed below.

B. Analyze Cumulative Impacts of Climate Change on Species and Habitats

The cumulative effects of oil and gas activities on species and their habitats in conjunction with climate change impacts should also be considered as part of environmental review. For example, declining sea ice will directly and negatively impacts polar bears and walrus and also causes

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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.).

[26] 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. U.S. Global Change Research Program, 2014: Climate Change Impacts in the United States: The Third National Climate Assessment at 520 (Melillo, Jerry M. et al., eds., 2014).

[27] Fourth National Climate Report Volume 1, Alaska Chapter, *supra* note 23, at 309-310.

[28] 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.

[29] 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.

[30] Fourth National Climate Report Volume 1, Alaska Chapter, *supra* note 23, at 303-332.

[31] Markon, C. et al., *Alaska*, in 2018: Climate Change Impacts in the United States: The Fourth National Climate Assessment (Reidmiller, D.R. et al., eds., U.S. Global Change Research Program, 2018)[Hereafter "Fourth National Climate Assessment Volume II, Alaska Climate Impacts Chapter"]..

decreased algal production which negatively impacts a wide variety of species up the foodchain.[32] Drier conditions will also affect migratory birds dependent on wetlands.[33] These stressors are additional to the negative impacts of potential oil and gas development on species in ANWR.[34] While BLM's analysis makes reference to some of the climate impacts on species and habitats in different sections of the DEIS, it should more fully analyze how the combination of climate impacts and development may cumulatively impact species and habitat.

C. Expand Analysis of 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.[35] 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%.[36] As these trends continue, companies could need to switch to gravel structures, with inherently longer-lasting impacts and significantly higher costs.[37] Thawing permafrost also reduces soil stability, threatening buildings, roads, and other oil and gas infrastructure.[38] 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.[39]

In the Draft EIS, BLM's discussion of "impacts of climate change on potential development" covers less than a page and falls far short of the rigor needed to understand project risks associated with climate change. In this section, BLM notes in passing that thawing permafrost could shorten the winter construction season, increase road maintenance costs, and require more substantial support structures. BLM should update and expand this section with the latest data on climate change impacts in Alaska from the Fourth National Climate Assessment put together by the USGCRP. They should further deepen the analysis in this section with a robust consideration of the increased costs of maintaining infrastructure, projected shortening of winter construction season, and mitigation measures to prevent damage to infrastructure. They should further address

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[32] Fourth National Climate Assessment, Volume I at 1192-1193.
[33] 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").
[34] 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.
[35] *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.")
[36] Congressional Research Service, Arctic National Wildlife Refuge (ANWR): An Overview (Jan. 9, 2018), at 16 *available at* https://fas.org/sgp/crs/misc/RL33872.pdf. (hereafter "CRS Report").
[37] Fourth National Climate Assessment Volume II, Alaska Climate Impacts Chapter, *supra* note 30, at 1206-1207.
[38] Fourth National Climate Assessment Volume II, Alaska Climate Impacts Chapter, *supra* note 30, at 1197.
[39] NOAA, Arctic Development and Transport, *available at* https://toolkit.climate.gov/regions/alaska-and-arctic/arctic-development-and-transport (accessed June 15, 2018).

whether measures to mitigate damage to infrastructure or maintain infrastructure in the face of thawing permafrost could cause additional environmental degradation. For example, BLM notes in the draft EIS that roads and gravel pads may need to be thicker to ensure stability.

BLM should particularly address the risks posed by infrastructure that could result in environmental degradation, such as oil spills. In the EIS, BLM acknowledges that thawing permafrost can negatively affect oil and gas infrastructure by causing subsidence. It discusses how "warm production and injection wells can cause thawed areas around the well" and that such warming led to a 2017 oil spill in the NPR-A when a well suffered a cracked casing due to subsidence from thawing.[40] BLM proposes this type of failure can be minimized through "modern well construction methods, including installing thermosyphons around wells to remove heat transfer from wellbore fluids."[41] Elsewhere in the report, BLM also acknowledges that thawing of permafrost is a climate effect.[42] However, BLM should conduct a more in-depth evaluation of projected permafrost thawing in the project area, best practices to reduce the risk of subsidence damaging infrastructure and resulting in oil spills, and associated costs of mitigation activities.

BLM should also acknowledge the unique risks posed by oil spills in the Arctic and conduct an analysis of potential response measures and environmental impacts. One key lesson from the Deepwater Horizon spill was the importance of advance planning on how to respond to an incident if it occurs, both to reduce the risk of a major incident and to ensure that the agency accounts for potential environmental impacts of response measures (e.g., the effect of dispersants used in the Gulf after the Deepwater Horizon spill). For the purposes of the ANWR Coastal Plain oil and gas leasing proposal, BLM's analysis of oil spills and response measures should account for the fact that the remote location and hazardous conditions in the arctic (e.g., hurricane-force storms, 20-foot swells, pervasive sea ice, and frigid temperatures) can complicate the response process, for example by making it difficult to get oil spill cleanup equipment to spill sites. BLM should also discuss the possibility that an oil spill in the Arctic may be impossible to clean up depending on the location and conditions. In this discussion, BLM should address limitations in oil spill response capacity – for example, the U.S. Coast Guard stated in 2017 that it is not ready to clean up oil spills in the Arctic[43] – BLM must grapple with this in its analysis. Finally, BLM should discuss how the cleanup process can itself be environmentally disruptive.

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

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[40] DEIS at 3-35.
[41] *Id*.
[42] E.g., DEIS 3-43.
[43] Scott Waldman, *The U.S. is Not Ready to Clean Up an Arctic Oil* Spill, Scientific American (July 19, 2017), https://www.scientificamerican.com/article/the-u-s-is-not-ready-to-clean-up-an-arctic-oil-spill/ (citing comments from the head of the U.S. Coast Guard). *See also* NAS, *Responding to Oil Spills in the U.S. Arctic Marine Environment* (2014), https://www.nap.edu/catalog/18625/responding-to-oil-spills-in-the-us-arctic-marine-environment (discussing the unique risks of oil spills in the Arctic and the limited capacity of the U.S. Coast Guard to respond to such spills).

change-related risks. BLM should also consider unique risks associated with oil spill response in the Arctic. 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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As a final matter, we note that several key documents detailing the environmental "unknowns" of drilling in the Arctic refuge were apparently excluded from public view during this process and were only released yesterday (March 12) by a government watchdog group. Due to this delay, we have not yet had the opportunity to review and meaningfully respond to these documents and the important findings contained therein. We therefore reserve the right to file supplemental comments in view of the newly leaked documents.

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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