ALASKA WILDERNESS LEAGUE, ALASKANS FOR WILDLIFE, ASSOCIATION OF RETIRED U.S. FISH AND WILDLIFE SERVICE EMPLOYEES, AUDUBON ALASKA, CANADIAN PARKS AND WILDERNESS SOCIETY-NATIONAL, CANADIAN PARKS AND WILDERNESS SOCIETY-YUKON CHAPTER, CENTER FOR BIOLOGICAL DIVERSITY, DEFENDERS OF WILDLIFE, EARTHJUSTICE, ENVIRONMENT AMERICA, EYAK PRESERVATION COUNCIL, FAIRBANKS CLIMATE ACTION COALITION, FRIENDS OF ALASKA NATIONAL WILDLIFE REFUGES, GWICH'IN STEERING COMMITTEE, LEAGUE OF CONSERVATION VOTERS, NATIONAL AUDUBON SOCIETY, NATIONAL WILDLIFE FEDERATION, NATIONAL WILDLIFE REFUGE ASSOCIATION, NATIVE MOVEMENT, NATURAL RESOURCES DEFENSE COUNCIL, NATURE CANADA, NORTHERN ALASKA ENVIRONMENTAL CENTER, STAND.EARTH, SIERRA CLUB, THE WILDERNESS SOCIETY, TRUSTEES FOR ALASKA, AND WILDERNESS WATCH

March 13, 2019

Submitted via email and online eplanning comment portal

Nicole Hayes
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Comments re: Notice of Availability of the Draft Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program and Announcement of Public Subsistence-Related Hearings, 83 Fed. Reg. 67,337 (Dec. 28, 2018).

Dear Ms. Hayes,

On behalf of the above-listed organizations and our many millions of members and supporters nationwide and internationally, we submit the following comments in response to the public notice from December 28, 2018 Notice of Availability of the Draft Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program and Announcement of Public Subsistence-Related Hearings, 83 Fed. Reg. 67,337 (Dec. 28, 2018).

We oppose all oil and gas activities on the Coastal Plain of the Arctic National Wildlife Refuge. We stand with the Gwich'in Nation and support their efforts to protect their human rights and food security by protecting the Coastal Plain. Our organizations have dedicated decades to defending the Coastal Plain from oil and gas exploration and development, and we will continue to do so. These unparalleled public lands, and the wildlife that depend on them, are an international treasure that must be conserved for future generations.

While we oppose any attempts to allow oil and gas activities on the Coastal Plain, we provide detailed comments outlining many legal, policy, and resource issues that the Bureau of

Land Management (BLM) failed to adequately address in its draft environmental impact statement (draft EIS or DEIS). Our review of the draft EIS has identified numerous relevant issues that were either not addressed at all or were inadequately addressed. As the agency responsible for managing the oil and gas program, the BLM must ensure the planning process complies with the National Environmental Policy Act, the Alaska National Interest Lands Conservation Act, the Wilderness Act, Title II of the Tax and Jobs Act, the Naval Petroleum Reserves Production Act, the National Wildlife Refuge System Administration Act, the Endangered Species Act, the Marine Mammal Protection Act, and the Federal Land Policy and Management Act, in addition to other substantive laws, treaties, and regulations, as well as the management and permitting requirements of its federal and state cooperating agencies. BLM must also ensure that its analysis of the impacts of an oil and gas program on the Coastal Plain is scientifically accurate and fully considers all of the adverse impacts of an oil and gas program on the Coastal Plain, including seismic exploration. BLM's efforts to date fall far short of what is required. BLM's analysis is so lacking that BLM must revise the draft EIS and reissue it for public review and comment before it can proceed. We believe that any valid scientific review will show that oil and gas activities on the Coastal Plain will have unavoidable and un-mitigatable destructive impacts on Arctic Refuge wildlife and habitat and on the climate.

The U.S. Department of the Interior (DOI) and BLM have continued to move this process forward at a very fast pace, reiterating their goal to hold a lease sale this year. A rushed process is not consistent with DOI's legal obligations when considering an issue as important and controversial as destructive oil and gas exploration and development on the Coastal Plain. Instead of rushing to lease the Coastal Plain, DOI should listen to the millions of Americans and the Gwich'in Nation who support protection for the Coastal Plain and refrain from holding a hasty, ill-considered lease sale. The Coastal Plain is no place for any oil and gas activities, and reckless decision making is not what the Arctic Refuge — the crown jewel of our National Wildlife Refuge System — deserves.

Sincerely,

Kristen Miller, Conservation Director
Alaska Wilderness League

Jim Kowalsky, Chair
Alaskans for Wildlife

Robin L. West, Chair
Association of Retired U.S. Fish and Wildlife Service Employees

Natalie Dawson, Executive Director
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Kristen Monsell, Oceans Legal Director & Senior Attorney
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Bob Dreher, Senior Vice President of Conservation Programs
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Erik DuMont, Stop Drilling Campaign Director
Environment America

Carol Hoover, Executive Director
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Jessica Girard, Director
Fairbanks Climate Action Coalition

David C. Raskin, President
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Bernadette Demientieff, Executive Director
Gwich'in Steering Committee

Alex Taurel, Conservation Program Director
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Sarah Greenberger, Senior Vice President
National Audubon Society

Mary Greene, Public Lands Attorney
National Wildlife Federation

Geoffrey Haskett, President
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Jamie Williams, President
The Wilderness Society

Victoria Clark, Executive Director
Trustees for Alaska

George Nickas, Executive Director
Wilderness Watch

I. OVERVIEW OF COMMENTS

Our organizations have dedicated decades to defending the Coastal Plain of the Arctic National Wildlife Refuge (Arctic Refuge or Refuge) from oil and gas development, and we will continue to do so. These unparalleled public lands, and the wildlife that depend on them, are an international treasure that must be conserved for future generations. While we oppose any attempts to allow oil and gas activities on the Coastal Plain, we provide detailed comments addressing many legal, policy, and resources issues that the Bureau of Land Management (BLM) failed to address or inadequately addressed in the draft environmental impact statement (draft EIS or DEIS) for the leasing program. These comments set out in detail the history of conservation of the Coastal Plain; its current management; the tax legislation that allows for an oil and gas program on the Coastal Plain; legal deficiencies with the draft EIS regarding directives in the Tax Act, the National Environmental Policy Act (NEPA), National Wildlife Refuge mandates, and other relevant laws such as the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA); and provide a critique of BLM's analysis of the impacts of an oil and gas program on the exceptional resources of the Coastal Plain.

At the outset, we note that BLM's draft EIS is so lacking and its analysis so flawed that bringing it into compliance with legal mandates will require significant revisions. Additionally, BLM did not address numerous issues that Groups flagged for BLM in their Scoping Comment Letter.[1] As such, BLM must revise and reissue the draft EIS for public review and comment before it can move to a final EIS.

II. BLM FAILS TO ACKNOWLEDGE THE LONG HISTORY OF ARCTIC REFUGE PROTECTION.

BLM's draft EIS fails to acknowledge the conservation history of the Arctic Refuge and strong public support for its protection, biasing its presentation of the issues and skewing its analysis of an oil and gas program on Refuge resources.

A. THE ARCTIC REFUGE AND ITS COASTAL PLAIN HAVE BEEN PROTECTED FOR DECADES BECAUSE OF THEIR EXCEPTIONAL ECOLOGICAL VALUES.

Groups provided significant background on the Coastal Plain of the Arctic Refuge, including the long history of its conservation, in our scoping comments.[2] As we explained, the Arctic Refuge is the crown jewel of the National Wildlife Refuge System. Because of the remoteness of its intact ecosystems, the Arctic Refuge is unique in the entire National Wildlife Refuge System. It functions as a model for wild nature and for what it contributes to the entire National Wildlife Refuge System, especially in protecting and fostering the health and productivity of migratory species.

[1] Letter from Adam Kolton, Executive Director, Alaska Wilderness League *et al.*, to Nicole Hayes, Bureau of Land Management (June 19, 2018) [hereinafter Scoping Comment Letter].

[2] Scoping Comment Letter at 1–3.

Long before it was ever designated as a protected public land unit by the Federal government, Alaska Native peoples used and relied on the Coastal Plain and the resources it supports. They continue to do so today. Alaska Natives living both north and south of the Brooks Range, as well as Canadian First Nations, depend on the fish and wildlife species that the Coastal Plain supports. This land was never ceded by Alaska Native peoples who rely on it. Leading up to Alaska's statehood, the celebrated conservationists Olaus and Margaret Murie and U.S. Supreme Court Justice William O. Douglas visited the area that is now the Arctic Refuge, recognized its outstanding biological values and wilderness qualities, and upon their return, embarked on an effort to protect the area under federal law.[3] As a result of their and others' efforts, President Eisenhower's Secretary of the Interior designated the Coastal Plain and a large area to its south as the Arctic National Wildlife Range (Range) in 1960.[4] The Range was protected specifically "for the purpose of preserving unique wildlife, wilderness and recreational values" of the area.[5] Designation of the Range "was unique among Alaska conservation units because it was the first for which ecological thinking and concern for maintaining natural processes were significant factors in its establishment."[6] These protections stood for two decades before additional protections were added.

Considering it "one of the most important pieces of conservation legislation ever passed," President Carter signed the Alaska National Interest Lands Conservation Act (ANILCA) into law in 1980.[7] In passing ANILCA, Congress "preserve[d] for the benefit, use, education and inspiration of present and future generations certain lands and waters in the State of Alaska that contain nationally significant natural, scenic, historic, archeological, geological, scientific, wilderness, cultural, recreational, and wildlife values."[8] Through ANILCA, Congress re-designated the Range as the Arctic National Wildlife Refuge.[9] Congress added acreage south and west of the Range to the newly designated Arctic Refuge.[10] In addition to the purposes previously recognized for the Range, Congress identified additional purposes for this unique and spectacular area of America's Arctic. The ANILCA purposes for the Arctic Refuge are:

> (i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, the Porcupine caribou herd (including participation in coordinated ecological studies and management of this herd and the Western

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[3] WILLIAM O. DOUGLAS, MY WILDERNESS: THE PACIFIC WEST 10–31 (Doubleday & Co., Inc. 1960).

[4] Public Land Order 2214, Establishing the Arctic National Wildlife Range at 1 (Dec. 6, 1960) [hereinafter PLO 2214].

[5] PLO 2214 at 1.

[6] Arctic National Wildlife Refuge, Fairbanks, AK, 75 Fed. Reg. 17,763, 17,764 (Apr. 7, 2010).

[7] Alaska National Interest Lands Conservation Act: Remarks on Signing H.R. 39 into Law, Dec. 2, 1980, 16 WEEKLY COMP. PRES. DOCS. 2755 (Dec. 8, 1980).

[8] ANILCA § 101(a), 16 U.S.C. § 3101(a).

[9] ANILCA § 303(2).

[10] *Id.* § 303.

Arctic caribou herd), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds and Arctic char and grayling;

(ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;

(iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents, and

(iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and quantity within the refuge.[11]

These four purposes, along with the original three purposes set out in PLO 2214, apply to the Coastal Plain.[12]

Under ANILCA, the U.S. Department of the Interior (DOI) was required to conduct studies and provide a recommendation to Congress regarding whether the Coastal Plain should be opened to oil and gas development.[13] To be clear, ANILCA did not open the Coastal Plain to oil and gas and BLM's statement in the draft EIS that Congress designated the Coastal Plain as an area for potential oil development is patently incorrect.[14] In 1980, with the passage of ANILCA, Congress designated the Coastal Plain as a National Wildlife Refuge and expressly prohibited oil and gas development.[15] This error must be corrected.

In the 1987 Report to Congress, DOI stated that the Coastal Plain "area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity."[16] Despite the many flaws with the analysis in the Report, it nevertheless concluded that oil and gas production would likely have major effects on the Porcupine Caribou Herd and muskoxen. Specifically with regards to caribou, those effects include "widespread, long-term change in habitat availability or quality which would likely modify natural abundance or distribution of species."[17] The Report also found that full or even limited leasing would have major impacts on water resources, subsistence for residents of Kaktovik, and recreation, wilderness, and aesthetics.[18] Where DOI's findings in the LEIS differ from BLM's findings in

[11] *Id.* § 303(2)(B).

[12] ANILCA § 305; FWS Refuge Management Part 601 National Wildlife Refuge System, 601 FW 1 at 1.16 (July 26, 2006); U.S Fish and Wildlife Service, Arctic National Wildlife Refuge, Revised Comprehensive Conservation Plan Final Environmental Impact Statement, Chapter 1 at 1-21 [hereinafter CCP EIS]; *see also infra* (describing the purposes of the Coastal Plain and BLM's failure to accurately identify and account for them).

[13] 16 U.S.C. § 3142.

[14] DEIS vol. 1 at 3-37.

[15] ANILCA §§ 303, 1003.

[16] U.S. Dep't of the Interior, 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 at 46 (Apr. 1987) [hereinafter LEIS].

[17] LEIS at vii, 123, 187.

[18] LEIS at 166.

this EIS, BLM must explain the basis for this difference. Despite these findings, the Secretary of the Interior (Secretary) recommended leasing the entire Coastal Plain area.[19] For decades, Congress and the President declined to do so.

BLM must recognize and describe this history in the draft EIS to ensure that it is fully considering the purposes and resources of the Coastal Plain, as well as accurately acknowledging the public support for its protection.

B. CURRENT MANAGEMENT OF THE COASTAL PLAIN AND THE WILDERNESS RECOMMENDATION TO PROTECT ITS RESOURCES.

The U.S. Fish and Wildlife Service (FWS) currently administers and manages the entire Arctic Refuge — including the Coastal Plain — under the Comprehensive Conservation Plan (CCP) adopted on April 3, 2015.[20] The CCP establishes "management goals and objectives," "define[s] compatible use," "[u]pdate[s] management direction related to national and regional policies and guidelines used to implement Federal laws governing Refuge management," and "[e]stablish[es] broad management direction for Refuge programs and activities," among other things.[21] Currently, the Coastal Plain is managed under the Minimal Management category as set out in the CCP.[22]

In the CCP, FWS articulated the vision for the Arctic Refuge as follows:

> This untamed arctic landscape continues to sustain the ecological diversity and special values that inspired the Refuge's establishment. Natural processes continue and traditional cultures thrive with the seasons and changing times; physical and mental challenges test our bodies, minds, and spirit; and we honor the land, the wildlife, and the native people with respect and restraint. Through responsible stewardship, this vast wilderness is passed on, undiminished, to future generations.[23]

Throughout the CCP process, whether to recommend Wilderness for the Coastal Plain was one of the main issues considered by the agency and commented on by the public. In 2015, following a multi-year process where nearly one million people submitted comments in support of protecting the Coastal Plain as Wilderness, the FWS recommended Wilderness for the Coastal Plain.[24] In adopting Alternative E (which included a Wilderness recommendation for the

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[19] LEIS at vii, 188–89, 192.

[20] U.S Department of the Interior, Fish and Wildlife Service, Region 7, Record of Decision, Revised Comprehensive Conservation Plan, Arctic National Wildlife Refuge (Apr. 3, 2015) [hereinafter CCP ROD].

[21] CCP EIS Executive Summary at S-9.

[22] CCP EIS vol. 1 at 3-34; CCP ROD at 5.

[23] CCP ROD at 4.

[24] CCP ROD at 3.

majority of the Coastal Plain and the lands to the south added by ANILCA), FWS stated that Wilderness for the Coastal Plain:

> [B]est meets the Service's purpose and need to manage the Arctic Refuge to achieve the mission of the National Wildlife Refuge System and to meet the purposes for which the Refuge was established. This alternative conserves the fish, wildlife and habitats of the Arctic Refuge and facilitates subsistence and recreation in settings that emphasize natural, unaltered landscapes and natural processes.[25]

The agency also stated that:

> [The] Arctic Refuge is nationally recognized for its unique and wide range of arctic and subarctic ecosystems that retain a high degree of biological integrity and natural diversity. The Refuge exemplifies the idea of wilderness embodying tangible and intangible values including natural conditions, natural quiet, wild character, and exceptional opportunities for solitude, adventure, and immersion in the natural world. The Refuge represents deep-rooted American cultural values about frontiers, open spaces, and wilderness. It is one of the finest representations of the wilderness that helped shape our national character and identity.[26]

In advancing the Wilderness recommendation to Congress, the President stated that the Arctic Refuge "is one of the most beautiful, undisturbed places in the world. It is a national treasure and should be permanently protected through legislation for future generations."[27]

Throughout the CCP process, FWS properly declined to consider oil and gas development on the Coastal Plain.[28] Specifically regarding the management of the Arctic Refuge and the lack of consideration of oil and gas development in the CCP process, the CCP states:

> Until Congress takes action to change the provision of ANILCA 1003 or to implement the 1987 report, the Service will not and cannot permit oil and gas leasing in the Refuge under any of the alternatives in the Plan. When Congress makes a management decision, that action will be incorporated into the Plan and implemented.[29]

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[25] CCP ROD at 3–4, *see also id.* at 12.

[26] CCP ROD at 11–12.

[27] Ltr. From the President to the Speaker of the House of Representatives and the President of the Senate (Apr. 3, 2015).

[28] *See*, *e.g.*, CCP EIS vol. 1 at at 3-6.

[29] CCP EIS vol. 1 at 1-1; *see also* Arctic National Wildlife Refuge, Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review, Wild River Plans Final, Dear Reader Letter at 2 (Sept. 1988) (stating, "[w]hen Congress makes a management decision [re: oil and gas], that action will be incorporated into the Plan implemented").

Oil and gas leasing and any related activities on the Coastal Plain are, therefore, inconsistent with the CCP and present management of the Coastal Plain. BLM fails to acknowledge or account for these inconsistencies, or to explain how the oil and gas program it is proposing impacts current Refuge management.[30]

C. TITLE II OF THE TAX CUTS AND JOBS ACT (PUB. L. 115-97, H.R. 1) AND AN OIL AND GAS PROGRAM FOR THE COASTAL PLAIN.

Despite decades of support for protecting the Arctic Refuge's Coastal Plain from oil and gas, Congress included a provision in the Tax Cuts and Jobs Act (Tax Act) to open the Coastal Plain to oil and gas development. This law was adopted through the budget reconciliation process under restrictive Senate procedures that only required a simple majority vote. Senator Murkowski was clear that she only used this legislative vehicle because there was not the support necessary to open the Refuge through the normal legislative process.[31] Throughout the legislative process, Senator Murkowski clearly stated that no laws would be waived or bypassed, no process would be short-cut, that the agencies would take their time and go through the process step-by-step to ensure the protection of the wildlife, fish, habitat, and other values of the Coastal Plain. BLM must uphold these commitments.[32] To date, its efforts fall short.

D. BLM MUST RECOGNIZE THE STRONG PUBLIC SUPPORT FOR PROTECTING THE COASTAL PLAIN.

BLM must acknowledge the strong public support expressed for protecting the Coastal Plain. During the scoping period, BLM received over 700,000 comments, the vast majority of which expressed support for protecting the Coastal Plain. BLM attempts to dismiss these comments as outside of the scope of the EIS.[33] These comments are directly relevant to BLM's analysis and an oil and gas program on the Coastal Plain. They demonstrate that there is significant controversy and interest in the proposal. And by continuing to identify the need to protect the area from oil and gas activities, they make clear that BLM must propose and adequately consider a truncated program with significant protections for the Refuge. BLM's proposal of three virtually indistinguishable and immensely impactful alternatives, which go far beyond the levels BLM is required to consider as part of the oil and gas program in the Tax Act, are inconsistent with the strong public support for protection of the Coastal Plain.

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[30] *See infra*, Part III.C.4 (explaining the conflicts and inconsistencies between the CCP and BLM's proposal, and BLM's failure to clearly address this issue).

[31] Margaret Kriz Hobson, *Road map for ANWR drilling gets clearer*, E&E NEWS, Mar. 12, 2018 [hereinafter Hobson I].

[32] *See, e.g.*, Senator Lisa Murkowski, Floor Speech on Reconciliation Legislation (November 30, 2017), www.murkowski.senate.gov/press/speech/floor-speech-reconciliation-legislation-tax-reform.

[33] DEIS vol. 1 at 1-3.

III. BLM'S DRAFT ENVIRONMENTAL IMPACT STATEMENT IS LEGALLY DEFICIENT.

BLM's fails to meet its legal obligations under numerous legal mandates, including the directives of the Tax Act, the National Environmental Policy Act (NEPA), National Wildlife Refuge laws and policies, other relevant statutes including the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), as well as with international obligations. Each is addressed in more detail below.

A. BLM FAILS TO ESTABLISH AN OIL AND GAS PROGRAM THAT IS CONSISTENT WITH THE DIRECTIVES IN THE TAX ACT.

BLM fails to explain how it is interpreting and applying multiple directives in the Tax Act, including the directive to manage the oil and gas program "in a manner similar to how BLM manages lease sales under the Naval Petroleum Reserve Production Act of 1976 [] (including regulations),"[34] the "2,000-acre limitation" on surface development, and the right-of-way provision. These issues are addressed below.

1. BLM Must Clarify the Lease Sale Process, and Must Ensure Opportunities for Public Input at Each Stage.

It is unclear what process BLM is pursuing to hold a lease sale, and therefore, unclear if BLM is acting consistent with the Tax Act. During scoping, BLM indicated that it may publish a call for lease sale nominations and public comment on the lease sale at the same time that it publishes the draft EIS for the leasing program. BLM would then issue the lease sale notice for the first lease sale at the same time that it issues a record of decision for the leasing EIS. It does not appear that BLM has done this, as no specific call for nominations was issued when BLM issued the notice of availability for the draft EIS. Following such a process also would have been contrary to how BLM conducts leasing in the National Petroleum Reserve–Alaska (NPRA). The process that BLM will use to hold a lease sale is still unclear. BLM must clarify its approach to leasing with specificity. This is critically important so that the public understands the steps in this highly controversial project and is able to provide appropriate input at the right stage in order to inform the specific decision before BLM and ensure compliance with legal mandates.

As Groups explained in their scoping comments, under the Naval Petroleum Reserve Production Act (NPRPA) and its regulations, BLM approaches the development of the programmatic plan and individual lease sales as two distinct steps.[35] First, BLM develops a programmatic EIS called an Integrated Activity Plan (IAP), finalizing that document and completing the programmatic NEPA process prior to holding a lease sale.[36] Consistent with the

[34] Pub. L. 115-97, Title II, sec. 20001(b)(3).

[35] Scoping Comment Letter at 21–22.

[36] U.S. Department of the Interior, Bureau of Land Management, National Petroleum Reserve-Alaska, Integrated Activity Plan, Record of Decision (Feb. 21, 2013); Department of the Interior, Bureau of Land Management, Call for Nominations and Comments for the 2013 National Petroleum Reserve in Alaska Oil and Gas Lease Sale, 78 Fed. Reg. 33103 (June 3,

Tax Act and how BLM conducts lease sales in the NPRA, BLM should be following a similar process here, fully completing the lease program EIS before beginning the distinct administrative process to hold an initial lease sale. These two processes ask different questions and make different decisions. Both require NEPA review and full public participation. We note that the BLM's leasing regulations for the NPRA apply only to the NPRA; by their terms, they do not apply to the Arctic Refuge.[37]

BLM's leasing approach for the Coastal Plain, and in particular the process for holding a lease sale, is very unclear. In the Reasonably Foreseeable Development Scenario in the draft EIS, BLM states that it is assuming that the first lease sale would take place within a year of adoption of the ROD.[38] BLM also states that the ROD will authorize multiple lease sales, and that lease sales will take place after the ROD is issued.[39] BLM goes on to say that not all lands identified in the ROD may be offered for lease.[40] But, in outlining the decisions to be made, BLM states that the decision in the ROD "will include which tracts of land will be offered for lease."[41] Thus, it is unclear if the ROD will identify specific tracts for companies to bid on, or if BLM will follow the process that it employs in the NPRA of having distinct processes, where it completes the entire programmatic-level EIS process, and then engages in a separate public process of identifying specific tracts to offer for bidding.[42] BLM must lay out and explain this process before moving to a final EIS.

Compounding this confusion are conflicting statements between BLM's public website and DOI leadership. BLM's website outlines a process for the Coastal Plain Leasing EIS that includes a call for nominations coming with notice of the draft EIS or prior to publication of the final EIS and indicates that the ROD will be issued concurrently with a lease sale notice.[43] But

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2013); *see* also National Petroleum Reserve-Alaska, Final Integrated Activity Plan/Environmental Impact Statement at iv, 9–10 (explaining the multi-step process for adopting a leasing-program IAP and holding a lease sale); *see also* U.S. Department of Interior, Bureau of Land Management, Anchorage, Alaska, Northeast National Petroleum Reserve-Alaska, Final Supplemental Integrated Activity Plan/Environmental Impact Statement at ES-7 (May 2008) (noting that after completing the leasing EIS, the BLM "may conduct one or more lease sales in the planning area"); U.S. Department of the Interior, Bureau of Land Management, Northwest National Petroleum Reserve-Alaska, Final Integrated Activity Plan/Environmental Impact Statement at I-9–I-10 (Nov. 2003) (noting that the lease sale will be held after the ROD is issued).

[37] 43 C.F.R. § 3130.-1.

[38] DEIS vol. 2 Appendix B at B-11.

[39] DEIS vol. 1 at 1-5.

[40] DEIS vol. 1 at 1-5.

[41] DEIS vol. 1 at ES-1.

[42] DEIS vol. 2 at B-10 (estimated hypothetical development time frames that do not include a separate call for nominations process).

[43] U.S. Department of the Interior, Bureau of Land Management, Frequently Asked Questions, *available at*: https://eplanning.blm.gov/epl-front-

recent comments from Assistant Secretary for Land and Minerals Management Joseph Balash indicate that the call for nominations will be concurrent with the issuance of the final EIS.[44] Again, BLM must clarify its approach to leasing with specificity, ensuring that all steps involve public notice and participation, and appropriate analysis.

As Groups also explained, BLM will need to survey the boundaries for the tracts contemplated for lease before it can issue a Call for Nominations. It does not appear that BLM has accounted for this step in its timeline.[45] The agency also failed to analyze the impacts of the survey efforts on Coastal Plain resources. It must do so.

2. BLM Failed to Address Other Aspects of How It Will Administer the Oil and Gas Program and Lease Sales in a Manner Similar to the NPRPA and Its Regulations.

The Tax Act directs the Department of Interior to "manage the oil and gas program on the Coastal Plain in a manner similar to the administration of lease sales under the Naval Petroleum Reserves Production Act of 1976 (42 U.S.C. 6501, et seq.) (Including regulations)."[46] In addition to the conservation purposes of the Refuge that will require additional protective measures, the Tax Act's direction is relevant to both the manner in which BLM can proceed to leasing as well as the approach the agency must take in structuring the protective provisions related to the oil and gas program. The leasing provisions in the NPRPA expressly state that any activities undertaken pursuant to that statute are required to "include or provide for such conditions, restrictions, and prohibitions as the Secretary deems necessary or appropriate to mitigate reasonably foreseeable and significantly adverse effects on the surface resources."[47] Congress also indicated that oil and gas activities in areas the Secretary designates as containing significant subsistence, recreational, fish and wildlife, or historical or scenic values are to be conducted in a manner that will, consistent with the NPRPA's exploration requirements, "assure maximum protection of such surface values."[48]

BLM's regulations similarly indicate that BLM should take any actions deemed "necessary to mitigate or avoid unnecessary surface damage and to minimize ecological disturbance" and that BLM is obligated to provide maximum protection measures for all areas identified as having significant subsistence, recreational, fish and wildlife, or historical or scenic values.[49] These actions may include limiting, restricting, or prohibiting the use of and access to

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office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=152117 (last visited January 10, 2019).

[44] Shady Grove Oliver, The Arctic Sounder, BLM seeks comments on leasing alternatives (Dec. 30, 2018), *available at*: http://www.thearcticsounder.com/article/1852blm_seeks_comments_on_leasing_alternatives (last visited January 10, 2019),

[45] DEIS vol. 2 at B-10.

[46] Pub. L. 115-97, Title II, sec. 20001(b)(3).

[47] 42 U.S.C. § 6506a(b)

[48] 42 U.S.C. §§ 6504(a), 6506a(n)(2).

[49] 43 C.F.R. § 2361.1(a), (c).

lands, or actions to "protect fish and wildlife breeding, nesting, spawning, lambing or calving activity, major migrations of fish and wildlife, and other environmental, scenic, or historic values."[50] The regulations also set out a process for BLM to identify special areas with significant surface values.[51]

Under these provisions, BLM has a broad obligation to protect the surface values. BLM must ensure that it is providing similar protections as part of the oil and gas program in the Arctic Refuge in order to comply with the Tax Act's mandate that the oil and gas program be conducted in a manner similar to the leasing program in the Reserve.

BLM has failed to comply with its statutory obligations to identify special areas and provide maximum protection for those values in the Arctic Refuge. At no point in BLM's analysis has BLM made any attempt to identify and designate special areas with significant subsistence, recreational, fish and wildlife, or historical or scenic values, despite the fact that those provisions are very closely related to BLM's leasing provisions, including stipulations. BLM should identify those areas with specificity and ensure that it provides maximum protection for those significant values of the Coastal Plain, consistent with its statutory obligations. Any measures to protect those areas must account for the exceptional surface biological values and resources of the Coastal Plain, ensure maximum protection of those values, and be based on updated information and scientific data.

3. BLM's Approach to the 2,000-Acre Limitation Is Inconsistent with the Tax Act.

The Tax Act sets a limit on surface development of 2,000 acres.[52] This limit was repeatedly discussed during proceedings leading to the passage of the legislation as a way to prevent harm to Coastal Plain resources.[53] While Groups believe that this limitation will not achieve this stated goal, BLM must nevertheless interpret and apply the limitation consistent with this overarching protective goal.

In interpreting this language, BLM states that it will limit to 2,000 acres "the total number of surface acres of all Federal land across the Coastal Plain, regardless of whether such land is leased, which may be covered by production and support facilities *at any given time.*"[54]

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[50] *Id.* § 2361.1(e)(1).

[51] *Id.* § 2361.1(c).

[52] Pub. L. 115-97, Title II, section 20001(c)(3).

[53] Chairman Lisa Murkowski, Opening Statement, Full Committee Reconciliation Markup, U.S. Senate Committee on Energy and Natural Resources (Nov. 15, 2017) ("Alaskans know that we must balance the potential impacts of development. And I will be the first to agree that the environment and local wildlife will always be a concern, and that's why we have not avoided environmental review. . . . And that's why we have limited surface development to a total of just 2,000 federal acres."), *available at*: https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=5B08FB7E-B82C-488F-9627-D78DEAF2EBC1.

[54] DEIS vol. 1 at 1-6 (emphasis in original).

The interpretation set forth in the draft EIS and BLM's application of the limitation in the development scenario and alternatives is at odds with protecting the Coastal Plain and Congress' intent behind the provision. Additionally, merely stating there is such a limit is failing to analyze numerous aspects of how such a limit can be applied that will have important effects on the Coastal Plain.

First, BLM is interpreting the limitation to be a rolling limit, as opposed to a cumulative cap on impacted acreage.[55] In the proceedings leading up to bill passage, this provision was described as providing a cap on all surface development on the Coastal Plain.[56] At no point in the legislative history is there any indication Congress intended for this number to be a rolling total or that Congress wanted BLM to rely on wholly unproven reclamation techniques to further expand the footprint of development beyond 2,000 acres. Interpreting the limitation to allow for additional lands to be developed if other lands are reclaimed means that much more than 2,000 acres of the Coastal Plain would be impacted by oil and gas activities. This is contrary to the Tax Act and cannot be permitted. Two-thousand acres is the maximum cumulative acreage that can be impacted by surface development under the Tax Act.

Even if this mistaken interpretation were correct, the final EIS would still have to include clear guides for tracking disturbance, enforcement mechanisms, and standards for how reclamation will be evaluated that are scientifically sound and use an appropriate timeline for judging "complete" reclamation. Additionally, BLM would have to develop clear rules for when impacted acreage needs to be reclaimed so operators do not continue operating at low production levels to avoid reclamation costs.

Second, BLM's interpretation also excludes highly impactful components of oil and gas production and development from the limitation, allowing much greater impact to the Coastal Plain than intended by Congress. Specific to pipelines, BLM is only interpreting the limitation to apply to those lands that are "directly occupied by facilities."[57] This means that BLM is only counting the area where the vertical supports of pipelines physically contact the ground, not the total acreage of elevated pipelines.[58] In the draft EIS, BLM concludes that only 8.4 to 10 acres would be impacted by the vertical supports for elevated pipelines, even though 210 to 250 *miles* of pipelines would be constructed on the Coastal Plain.[59] BLM's basis for this interpretation is that the language of the Tax Act identifies "piers for support of pipelines."[60] BLM's

[55] DEIS vol. 1 at 1-6.

[56] Chairman Lisa Murkowski, Opening Statement, Full Committee Reconciliation Markup, U.S. Senate Committee on Energy and Natural Resources (Nov. 15, 2017) ("We have also limited surface development to just 2,000 federal acres."), *available at*: https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=5B08FB7E-B82C-488F-9627-D78DEAF2EBC1.

[57] DEIS vol. 1 at 1-6.

[58] DEIS vol. 2. Appendix B at B-21. While BLM does not directly address buried pipelines, any portions of buried pipelines must count toward the limitation.

[59] DEIS vol. 2 Appendix B at B-21.

[60] DEIS vol. 1 at 1-6.

interpretation fails to account for the fact that the list included in the Tax Act is an inclusive list, not an exclusive list. Pipelines are unquestionably production and support facilities developed on the surface of the Coastal Plain. As such, all areas impacted by elevated pipelines should count toward this limitation, including the full length of the pipelines themselves as well as the vertical supports. Interpreting the limitation to apply to pipelines in this way is consistent with the overarching goal that this provision be a protective measure for the Coastal Plain. By interpreting the limitation to ignore the miles of actual pipelines, BLM is able to ignore considerable acreage directly impacted by pipelines. BLM's attempt to exclude elevated pipelines themselves from the 2,000-acre limitation cannot carry forward in the final EIS.[61]

Another surface development component that BLM is not including in the 2,000-acre limitation is gravel mines. While it is unclear whether BLM has the authority to even authorize gravel mining on the Coastal Plain, excluding gravel mines from the 2,000-acre limitation is another way in which BLM's narrow interpretation of the limitation allows greater impacts to the Coastal Plain than permitted. BLM concludes that as many as 320 acres could be directly impacted by gravel mining, with 165–176 acres being a low estimate.[62] This is considerable acreage. The high estimate would result in gravel mines being the second highest surface disturbing component of the oil and gas program.[63] BLM asserts that it is not including gravel mines under the category of things subject to the 2,000-acre limitation because gravel mines supply raw materials to build oil and gas facilities, but are not, according to BLM, facilities themselves.[64] This is inconsistent with BLM's own interpretation of the term "facility." According to BLM, a "facility" is something that is "built, installed, or established to serve a particular purpose."[65] It is also inconsistent with the National Research Council's accounting of gravel infrastructure on the North Slope, which included gravel mines in the total impacted area.[66] Gravel mines are built and established to serve the particular purpose of supplying gravel for oil and gas roads and pads. Their only purpose under the oil and gas program is to support oil and gas development.[67] If not for the oil and gas program, these gravel mines would not be built. BLM recognizes as much in the draft EIS.[68] BLM also acknowledges that gravel mines are part of the program by subjecting them to project requirements under ROP 24. If they are part of the program, they must be subject to the 2,000-acre limitation. Including gravel mines under the limitation is entirely consistent with Congress' goal, which was not just to establish an oil and

[61] It is also unclear how BLM is accounting for the assumed connections to the Trans-Alaska Pipeline System in its overall surface disturbance calculations. *See* DEIS vol. 2 at B-8, B-17.

[62] DEIS vol. 2 Appendix B at B-22.

[63] DEIS vol. 2 Appendix B at B-23, Table B-5.

[64] DEIS vol. 1 at 1-6.

[65] DEIS vol. 1 at 1-6.

[66] National Research Council of the National Academies, Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope, Committee on Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope at 44 (2003).

[67] *See* 40.C.F.R. § 1508.25(a) (describing a "connected action" as one that "depend[s] on the larger action for their justification").

[68] DEIS vol. 1 at 3-26, 3-49, vol. 2 Appendix B at B-19, B-22.

gas program on the Coastal Plain as BLM states,[69] but to establish an oil and gas program that is protective of the Coastal Plain's resources. Including gravel mines under the 2,000-acre limitation is also consistent with BLM's inclusion of those things which "substantially disturbs the tundra surface."[70] Gravel mines unquestionably disturb the tundra surface.[71] BLM's attempt to exclude them from the category of things that is subject to the 2,000-acre limitation cannot carry forward in the final EIS.

BLM also does not specify in its 2,000-acre limitation how it will address several other types of infrastructure including buildings without gravel pads that are elevated over the tundra, gravel roads that expand in width following use (a common occurrence on the North Slope), power lines, and snow fences.

In addition to improperly interpreting the limitation, BLM fails to address important components of the 2,000-acre limitation. First, how the surface disturbance is permitted to occur will have vastly different impacts on habitat and, as a result, subsistence uses. As the U.S. Court of Appeals for the Tenth Circuit recognized, having a simple limitation on the amount of surface disturbance but no direction on how that disturbance will occur can result in a significant variation in the effects of that disturbance on plants and wildlife. In *New Mexico ex rel. Richardson v. BLM*, the BLM changed from an alternative that limited surface disturbance associated with oil and gas development to a specific location (along existing roads) to a cap of one percent of lease acreage. The Court found that this required a supplemental NEPA analysis "[b]ecause location, not merely total surface disturbance, affects habitat fragmentation."[72] As the Court elaborated, "the location of development greatly influences the likelihood and extent of habitat preservation. Disturbances on the same total surface acreage may produce wildly different impacts on plants and wildlife depending on the amount of contiguous habitat between them."[73] These effects were significant in the fragile Chihuahuan desert grasslands at issue in the *Richardson* case and even more so in the Coastal Plain, where 2,000 acres of disturbance can be spread in a spider web that could affect areas at magnitudes of difference than if that disturbance was carefully limited. BLM's draft EIS fails to consider what 2,000 acres of development could look like geographically and spatially, and the impacts that could occur depending on the location of activities and development.

The agency also failed to explain what mechanism it is adopting to ensure that the agency has the ability to regulate surface development to actually keep any development below this acreage cap, as well as the enforcement authority available to the agency to ensure compliance if development begins. Importantly, BLM has not elaborated how it intends to track surface disturbance to ensure that limits are not being neared, then reached and exceeded by multiple projects at the same time. BLM needs to demonstrate reliable technology, reporting, verification and monitoring techniques that it intends to use. At a minimum, pilot projects would need to be used to demonstrate that this can be carried out successfully, including use of ground-truthing

[69] DEIS vol. 1 at 1-6.
[70] DEIS vol. 1 at 1-6.
[71] DES vol. 1 at 3-49–3-50.
[72] 565 F.3d 683, 707 (10th Cir. 2009).
[73] 565 F.3d at 706.

before turning to a system that relies on solely technological solutions such as aerial or satellite imagery, global positioning system mapping, and geographic information systems (GIS) analysis.

Moreover, it is unclear when BLM will grant acreage to companies. These types of decisions are important for project developers and will have implications for their development timelines since ensuring adequate acreage available for development will be essential. For example, will BLM grant the acreage:

- Following lease sales to successful bidders?
- When BLM approves development plans?
- When permits are secured?
- When construction begins?

BLM has not elaborated upon how it intends to enforce the surface disturbance limitation once it grants leases to operators. It is not clear if the agency intends to place any limits on individual leases or to simply track the acreage and then send notices to companies to halt activities if acreage limits are reached. Nor is it clear how individual companies will be required to track surface-disturbing activities and report them. The BLM identified various lease stipulations or required operating procedures in the EIS, but all of these can be waived, exempted, or modified. Accordingly, they are insufficient to serve as an enforcement mechanism for the development limitation. For instance, Lease Stipulation 1, which BLM is referring to as a no surface occupancy stipulation, only precludes some permanent disturbance near rivers and streams. However, the EIS lacks a no surface occupancy stipulation applicable to all acreage of the Coastal Plain. In fact, there are no specific stipulations in Chapter 2 that indicate there will be a limitation on surface disturbance or that provide a general notice to the lessors that BLM may require a cessation of surface disturbing activities should the acreage limits by achieved. These types of stipulations must be included in every lease and permit issued to make it clear that BLM and the leaseholders are beholden to these limitations when issuing a lease.

At a minimum, BLM must be very clear in its lease terms that it is not granting any rights to lessees to conduct any oil and gas activities and that BLM retains full authority to outright prohibit oil and gas activities on any lease issued at any time during the lease term. This is contrary to how BLM currently describes leases.[74] BLM also acknowledges that its authority to deny activities on leases is conditioned on what is in the actual lease terms.[75] But without a clear restriction and reservation of rights, BLM could be in the position it now finds itself in the NPRA, where it has granted leases that, according to the agency, do not allow it to reject proposals and prohibit activities.[76] If BLM does not identify an enforcement mechanism and

[74] DEIS vol. 1 at 1-1.

[75] DEIS vol. 1 at 3-1.

[76] Greater Mooses Tooth 2 Oil and Gas Development Project, Joint Record of Decision and Permit Evaluation Bureau of Land Management U.S. Army Corps of Engineers at 8 (Oct. 2018) ("Alternative D is not a practicable alternative in the JROD, due to the fact that BLM cannot select this alternative as its decision for GMT2. Once issued, oil and gas leases provide a right of development, subject to reasonable regulation.").

clearly retain the authority to prohibit activities on any leases it may grant, BLM cannot ensure that it will comply with the 2,000-acre limitation.

BLM has indicated that it intends to rely on use of temporary facilities (on snow and ice) and reclamation so that once some acreage has been disturbed, it can be deemed only temporarily disturbed or reclaimed and then new acreage can be disturbed. As explained above, this interpretation cannot carry forward. And as explained below, reclamation of Arctic tundra and ecosystems is notoriously challenging and long-term. BLM must establish systems to ensure there has not been damage below snow and ice. Further, there must be inspection standards in place to verify reclamation before those acres can be accepted. Using operator "reclamation plans" is not sufficient. A separate review of the ground multiple years later (given the slow speed at which Arctic ecosystems regenerate) must be required before these acres can be deemed reclaimed for purposes of permitting additional surface disturbance.

Finally, BLM failed to explain how it interprets this limitation to apply to the private lands on the Coastal Plain (i.e., the KIC/ASRC lands and Native Allotments). BLM explains how it will apply the limitation on Federal land. But the limitation is also a legal requirement to conserve the Arctic Refuge Coastal Plain. As such, BLM must explain how it could apply to all private lands in the Refuge under section 22(g) of the Alaska Native Claims Settlement Act as well as how it could apply to ASRC/KIC lands under the terms of that Land Exchange Agreement.

4. BLM Fails to Acknowledge Mandatory Existing Legal Mandates for Rights-of-Way and Explain How it Will Implement the Right-of-Way Directives in the Tax Act Consistent with these Existing Legal Mandates.

The Tax Act also states that the "Secretary shall issue any rights-of-way or easements across the Coastal Plain for the exploration, development, production, or transportation necessary to carry out this section."[77] BLM fails to explain how it will address and apply the rights-of-way provision in the Tax Act, particularly in light of other mandatory statutory obligations for rights-of-way under ANILCA Title XI. The Tax Act did not waive any substantive requirements of these laws; any right-of-way or easement applications must first comply with these statutory mandates, including ANILCA Title XI. BLM must clarify and recognize this in the final EIS.

Additionally, the DEIS asserts that it lists all "requirements of federal, state, and local laws and regulations associated with future development in the Coastal Plain."[78] That list mentions some sections of ANILCA but fails to mention Title XI, which provides the "single comprehensive statutory authority for the approval or disapproval" of transportation and utility systems (TUSs) on conservation system units (CSUs) in Alaska.[79] TUSs include roads, pipelines, and energy transmission systems, and all related structures and facilities needed to construct,

[77] Pub. L. 115-97, Title II, section 20001(c)(2).
[78] DEIS vol. 2 App. D at D-1.
[79] ANILCA sec 1101(c), 16 U.S.C. § 3161(c).

maintain and operate them.[80] Sections 1104–1106 of ANILCA set forth the detailed procedural and substantive requirements governing any approval or disapproval of a proposed TUS in a CSU.[81] A decision that purports to authorize a TUS in a CSU without complying with the requirements of Title XI can have no effect.[82] This means that the leasing process cannot convey a right to develop virtually any of the typical components of an oil and gas development unless it complies with Title XI.[83]

The DEIS ignores Title XI, instead simply noting that the Tax Act "authorizes the BLM to issue rights-of-way or easements across the Coastal Plain for the exploration, development, production, or transportation necessary to carry out the oil and gas leasing program."[84] That provision, however, simply reinforces the existing language in ANILCA, providing minimum

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[80] ANILCA sec 1102(4), 16 U.S.C. § 3162(4).

[81] Among other notable features, these provisions require detailed findings supported by substantial evidence, with respect to:

(A) the need for, and economic feasibility of, the transportation or utility system;

(B) alternative routes and modes of access, including a determination with respect to whether there is any economically feasible and prudent alternative to the routing of the system through or within a conservation system unit, national recreation area, or national conservation area and, if not, whether there are alternative routes or modes which would result in fewer or less severe adverse impacts upon the conservation system unit;

(C) the feasibility and impacts of including different transportation or utility systems in the same area;

(D) short- and long-term social, economic, and environmental impacts of national, State, or local significance, including impacts on fish and wildlife and their habitat, and on rural, traditional lifestyles;

(E) the impacts, if any, on the national security interests of the United States, that may result from approval or denial of the application for a transportation or utility system;

(F) any impacts that would affect the purposes for which the Federal unit or area concerned was established;

(G) measures which should be instituted to avoid or minimize negative impacts; and

(H) the short- and long-term public values which may be adversely affected by approval of the transportation or utility system versus the short- and long-term public benefits which may accrue from such approval.

ANILCA sec. 1104(g)(2), 16 U.S.C. § 3164(g)(2).

[82] ANILCA sec. 1104(a), 16 U.S.C. § 3164(a) ("Notwithstanding any provision of applicable law, no action by any Federal agency under applicable law with respect to the approval or disapproval of the authorization, in whole or in part, of any transportation or utility system shall have any force or effect unless the provisions of this section are complied with.").

[83] The DEIS repeatedly states that "certain rights" are conveyed to lessees at the lease sale stage. E.g., DEIS vol. 1 at 3-133. BLM should clarify what it believes these rights to be and explain that any proposed TUS is conditional on compliance with the Title XI process, which inherently includes agency discretion to approve or disapprove. BLM cannot circumvent or rewrite Title XI with a lease.

[84] DEIS vol. 2 App. D at D-2; P.L. 115-97 sec 20002(c)(2).

terms and conditions that the Secretary must include when issuing rights-of-way for TUSs.[85] But the approval of any TUSs must first be made pursuant to Title XI.

The DEIS's characterization of the Secretary's authority to issue rights-of-way, and especially its complete omission of Title XI from the list of applicable federal laws, leave the distinct impression that BLM believes that the substantive and procedural requirements of Title XI have somehow been waived for oil and gas development in the coastal plain. They have not been waived. As stated during bill passage, and as is discussed further in these comments, no laws were being waived by the Tax Act.[86] BLM must make clear the applicability of Title XI to the approval or disapproval of any TUS that a future lessee may seek to establish.

5. *BLM Has Failed to Establish or Identify Standards for Its Decisions Through a Rulemaking Process Involving the Public, Subverting Meaningful Public Participation in the Current EIS Process, and Has Failed to Address the Possible Applicability of FLPMA Requirements.*

In the current process, BLM is pressing forward with making determinations about where to lease, and under what terms, before it has engaged in any rulemaking to establish the regulatory scheme that will govern lease sales and subsequent development related activities. In particular, it has failed to engage in rulemaking to establish what substantive standards apply to its decisions about leases and the authorization of development related activities. The agency has also failed to point to any existing BLM regulations that actually apply to the Coastal Plain to explain what standards apply to its decisions.

Although the Tax Act directs BLM to "manage the oil and gas program on the Coastal Plain *in a manner similar to* the administration of lease sales under the Naval Petroleum Reserves Production Act of 1976 (42 U.S.C. 6501, et seq.) (including regulations),"[87] it does not state that either the NPRPA or the regulations thereunder are directly applicable to the Coastal Plain, and, on their face, the NPRPA and the regulations apply only to the geographic area of the NPRA.[88] The DEIS fails to acknowledge that BLM is engaged in what is really a rulemaking endeavor to establish the standards and procedures for leasing in the Coastal Plain. Instead, BLM appears to be tacitly making those decisions without following the procedures required by the Administrative Procedure Act (APA) or followed for the NPRA.

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[85] ANILCA sec 1107(a), 16 U.S.C. § 3167(a).

[86] *See, e.g.*, Senator Lisa Murkowski, Floor Speech on Reconciliation Legislation (November 30, 2017), www.murkowski.senate.gov/press/speech/floor-speech-reconciliation-legislation-tax-reform.

[87] Pub. L. 115-97, Title II, sec. 20001(b)(3) (emphasis added).

[88] *See, e.g.*, 43 U.S.C. § 6506a(a) ("The Secretary shall conduct an expeditious program of competitive leasing of oil and gas *in the Reserve* in accordance with this Act." (emphasis added)); 43 C.F.R. § 3130-1 (These regulations establish the procedures under which the Secretary of the Interior will exercise the authority granted to administer a competitive leasing program for oil and gas *within the National Petroleum Reserve - Alaska*." (emphasis added)).

This failure undermines the public participation in the current process required by NEPA because the public is unable to evaluate, for example, whether the proposed lease stipulations satisfy the applicable protective standards. It is impossible to do so because BLM has failed to articulate to the public what those standards are and what regulatory scheme or schemes are the proper ones. As discussed above, the direction in the Tax Act constrains BLM to provide, among other protections, the resource protections identified in the NPRPA and the regulations thereunder, but BLM has failed to articulate how it will provide even those protective standards; nor has it articulated how it will adjust those standards to provide the greater level of protection necessary for any oil and gas program to be consistent with the requirements of ANILCA and the National Wildlife Refuge System Administration Act to continue to fulfill the primary purposes of the Refuge.

In addition to violating NEPA's requirements, this failure potentially also violates the requirements of the APA and FLPMA to the extent they may apply. The DEIS makes no attempt at explaining whether or not FLPMA applies to its management of the interests in land addressed by the Tax Act. It does not list FLPMA as one of the laws that applies to its decision. An explanation is necessary because FLPMA is generally applicable to the NPR-A, but is not applicable to National Wildlife Refuges. The question of whether FLPMA applies is relevant to the current DEIS process. For example, as described above, it is relevant to determining whether BLM is complying with the proper procedures for establishing standards for its decisions prior to engaging in processes that apply those standards. Moreover, it is also important to understanding what substantive standards apply to the decisions at hand. However, any application of FLPMA must also take into account the more protective substantive laws that apply to the Arctic Refuge and FWS's administration and management of the lands to achieve Refuge and Refuge System purposes.

Rather than frustrating public participation by obscuring much of the decision making underlying and informing the current process, BLM should clarify what regulations and laws apply to the decisions at hand, explain its interpretations transparently, and provide for public participation.

B. BLM'S DRAFT EIS FAILS TO COMPLY WITH NEPA.

NEPA is "our basic national charter for protection of the environment."[89] NEPA's analysis and disclosure goals are two-fold: (1) to ensure informed agency decision making, and (2) to ensure public involvement.[90] NEPA requires that federal agencies prepare a detailed EIS for any major Federal action that may significantly affect the quality of the human environment.[91] By focusing the agency's attention on the environmental consequences of its proposed action, NEPA "ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast."[92] NEPA

[89] 40 C.F.R. § 1500.1(a).
[90] *Robertson v. Methow Valley Citizen Council*, 490 U.S. 332, 349 (1989).
[91] 42 U.S.C. § 4332; 40 C.F.R. § 1508.18(b)(4).
[92] *See also Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 371 (1989))).

"is not designed to postpone analysis of an environmental consequence to the last possible moment;" it is "designed to require such analysis as soon as it can reasonably be done."[93]

BLM's draft EIS fails to comply with NEPA in multiple respects. Indeed, the draft EIS is so deficient that BLM must revise it and re-release it for public comment. BLM fails to consider a reasonable range of alternatives, fails to acknowledge and address the considerable missing information, and fails to properly evaluate mitigation measures. Further, BLM's approach to the impacts analysis is deeply flawed, the agency cannot defer its analysis of an oil and gas program; it must do that analysis now, and the agency wholly fails to consider any 3-dimensional (3D) seismic surveying. Finally, BLM's draft EIS fails to ensure public participation, engage important cooperating agencies, or properly rely on other documents and analysis. Each of these issues is described below.

1. BLM's Draft EIS is Inadequate and Must Be Revised and Re-Released for Public Comment.

As an initial NEPA issue, BLM's draft EIS is so inadequate that it prevents a meaningful analysis and review by the public. It must be revised and re-released for public comment. To achieve NEPA's goals, the statute requires federal agencies to "[e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment."[94] To help guarantee public participation and informed decisions, the language of an EIS must be "clear," "be written in plain language," and presented in a way that "the public can readily understand."[95] It must also be "supported by evidence that the agency has made the necessary environmental analyses."[96] "The information must be of high quality" because "[a]ccurate scientific analysis . . . and public scrutiny are essential to implementing NEPA."[97]

In responding to public comments on a draft EIS, an agency may: (1) "[m]odify alternatives including the proposed action;" (2) "[d]evelop and evaluate alternatives not previously given serious consideration by the agency;" (3) "[s]upplement, improve, or modify its analyses;" (4) "[m]ake factual corrections;" or (5) "[e]xplain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position."[98] "If changes [in an EIS] in response to comments are minor and are confined to the

[93] *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1072 (9th Cir. 2002).

[94] 40 C.F.R. § 1500.2(d).

[95] *Earth Island Inst. v. U.S. Forest Service*, 442 F.3d 1147, 1160 (9th Cir. 2006); 40 C.F.R. § 1502.8; *see also Or. Envtl. Council v. Kunzman*, 817 F.2d 484, 493 (9th Cir. 1987) ("An EIS must be organized and written so as to be readily understandable by governmental decisionmakers and by interested non-professional laypersons likely to be affected by actions taken under the EIS.").

[96] 40 C.F.R. § 1502.1; *see also* 40 C.F.R. § 1502.8.

[97] 40 C.F.R. § 1500.1(b).

[98] 40 C.F.R. § 1503.4(a).

responses described in paragraphs (a)(4) and (5) of this section, agencies may write them on errata sheets and attach them to the statement instead of rewriting the draft statement."[99]

Conversely, non-minor changes that require modified or new alternatives or analyses generally require revision or supplementation of the draft EIS.[100] "If a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion."[101] The agency must then seek public comment on the revised draft EIS.[102] An EIS that fails to enable meaningful public review and understanding of the agency's proposal, methodology, and analysis of environmental consequences violates NEPA.[103] BLM's draft EIS will need to be revised for at least three reasons: it fails to include key information and analysis, fails to analyze a reasonable range of alternatives, and fails to take a hard look at the impacts of the oil and gas program on the Coastal Plain.

BLM's draft EIS for the Coastal Plain oil and gas leasing program contains numerous gaps in information and analysis that seriously frustrate public review and understanding. Certain highly significant issues that affect important resources and uses of the Coastal Plain, such as pre-leasing seismic operations, impacts to public health, a quantitative analysis of air quality impacts, the social costs of carbon and other greenhouse gas emissions, contributions of climate-forcing black carbon, a viewshed and visibility analysis, a cost-benefit analysis that quantifies losses to the significant ecological and socio-economic benefits of the Coastal Plain, and consideration of reasonable alternatives and measures designed to maximize protection of Coastal Plain resources and uses to the greatest extent consistent with the Tax Act are largely missing from the draft EIS. Many other issues, such as impacts to polar bears, caribou, and other wildlife, impacts to wilderness and recreation, water resources, and vegetation and permafrost, are only partially addressed, with key elements of the draft EIS analysis missing, incomplete, inaccurate, inconsistent with the best available science, or otherwise inadequate. Our comments address these and numerous other serious deficiencies in detail below. The significant and numerous information and analytical gaps render BLM's draft EIS "so inadequate as to preclude meaningful analysis" and review by the public, and therefore necessitate a revised draft EIS.[104] To remedy the extensive gaps in information and analysis, a revised draft EIS is necessary.

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[99] 40 C.F.R. § 1503.4(c).

[100] *See* 40 C.F.R. §§ 1503.4, 1502.9(a) & (c).

[101] 40 C.F.R. § 1502.9(a).

[102] *See* 40 C.F.R. §§ 1502.9(a), 1503.1(a)(4); *see also California v. Block*, 690 F.2d 753, 771 (9th Cir. 1982) ("Only at the stage when the draft EIS is circulated can the public and outside agencies have the opportunity to analyze a proposal and submit comment. No such right exists upon issuance of a final EIS.").

[103] *See, e.g.*, *California ex rel. Lockyer v. U.S. Forest Serv.*, 465 F. Supp. 2d 942, 948-50 (N.D. Cal. 2006) ("incomprehensible" national monument management plan and corresponding EIS violated NEPA where it contained conflicting and confusing statements regarding applicable standards for management).

[104] *See* 40 C.F.R. § 1502.9(a).

BLM's failure to analyze a reasonable range of alternatives also necessitates a revised draft EIS. NEPA requires that an EIS analyze a range of reasonable alternatives. The analysis of alternatives is the "heart" of an EIS.[105] An agency must "[r]igorously explore and objectively evaluate all reasonable alternatives" to a proposed action.[106] Consistent with NEPA's basic policy objective to protect the environment, this includes more environmentally protective alternatives.[107] It also includes reasonable alternatives submitted by the public at scoping.[108] "The existence of a viable but unexamined alternative renders an [EIS] inadequate."[109] The "touchstone" of the inquiry is "whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation."[110]

The draft EIS's range of alternatives is inadequate for multiple reasons. The draft EIS fails to analyze many reasonable alternatives and proposals submitted by the public at scoping.[111] This includes minimized lease acreage; deferred leasing; alternatives with non-waivable stipulations, best management practices, and required operating procedures; alternatives that do not allow development until specific FWS findings are made; alternatives that preclude future development or only permit contiguous development; and economics-based alternatives.[112] These recommendations are not reflected in BLM's three action alternatives. The range of alternatives included in the analysis is also inadequate to facilitate informed decision making and public involvement. For instance, the range of alternatives does not include an alternative that makes fewer than 1 million acres available for leasing despite the fact that only 400,000 acres is required by law to be offered in each lease sale. Arctic lease sale experience counsels that much of the area offered is not ultimately bid on or leased, providing for consideration of a phased approach that re-offers unbid lands. Additionally, there is no alternative that caps surface infrastructure at fewer than 2,000 acres. For all alternatives, the lease stipulations and required operating procedures are very similar and waivable, can be granted exceptions, or modified with BLM approval. Each of these examples and others are addressed in detail in the comments below.[113] Importantly, the new and revised alternatives that will be necessary to remedy these

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[105] 40 C.F.R. § 1502.14.

[106] 40 C.F.R. § 1502.14(a); *see also* 42 U.S.C. § 4332(2)(E) (agencies must "study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources").

[107] 40 C.F.R. § 1500.2(e) (agencies must "[u]se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment"); *see also, e.g.*, *Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1121-22 (9th Cir. 2002) (citing cases), *abrogated on other grounds by The Wilderness Soc'y v. U.S. Forest Serv.*, 630 F.3d 1173, 1178-80 (9th Cir. 2011) (en banc).

[108] *See* 40 C.F.R. §§ 1501.7, 1502.1.

[109] *Mont. Wilderness Ass'n v. Connell*, 725 F.3d 988, 1004 (9th Cir. 2013) (quotations and citation omitted).

[110] *Mont. Wilderness Ass'n*, 725 F.3d at 1005 (quotations and citation omitted).

[111] Scoping Comment Letter at 26–27.

[112] Scoping Comment Letter at 26–27.

[113] *See infra* Part III.B.2 (explaining why the action alternatives are an inadequate range of alternatives).

significant gaps will not be "minor variation[s]" of the existing alternatives that are "qualitatively within the spectrum of alternatives that were discussed in the draft."[114] To remedy the inadequate range of alternatives, a revised draft EIS is necessary.

Finally, NEPA dictates that BLM take a "hard look" at the environmental consequences of a proposed action, including its direct, indirect, and cumulative effects.[115] The required hard look encompasses effects that are "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative."[116] The numerous and significant gaps in information, analysis, and alternatives renders the draft EIS impacts analysis invalid. For instance, absent information about baseline air quality, data about how caribou utilize the entirety of the Coastal Plain during various seasons, water quantity and use, and other important baseline conditions integrated into the environmental baseline and each of the alternatives, the draft EIS fails to take the required hard look at impacts. As the Ninth Circuit has explained, "without establishing the baseline conditions . . . , there is simply no way to determine what effect the proposed [action] will have on the environment and, consequently, no way to comply with NEPA."[117] Many other elements of the impacts analysis are incomplete, unsupported by the best available science, or otherwise inadequate, as explained in detail below. The deficient impacts analysis renders the draft EIS so inadequate as to preclude meaningful review. A revised draft EIS is required.[118]

2. BLM's Range of Alternatives is Inadequate; BLM Must Consider a Protective Alternative or Alternatives.

The draft EIS glaringly fails BLM's legal obligation — and NEPA's core mandate — to study in depth and disclose the environmental consequences of reasonable alternatives to the agency's preferred course of action. The entire Refuge is subject to an extremely protective statutory scheme. Management must conserve fish and wildlife populations and habitats in their full natural diversity, protect subsistence uses and water quality and quantity to the maximum extent consistent with the fish and wildlife mandate, and fulfill international fish and wildlife related treaties.[119] In addition, because Congress has not acted on the Secretary of Interior's 2015 formal recommendation that virtually all federal lands in the Coastal Plain be designated

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[114] *Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, 46 Fed. Reg. 18,026, 1,035 (Mar. 17, 1981).

[115] *Robertson*, 490 U.S. at 348; 42 U.S.C. § 4332(2)(C); 40 C.F.R. §§ 1502.16, 1508.7, 1508.8.

[116] 40 C.F.R. § 1508.8.

[117] *Half Moon Bay Fisherman's Marketing Ass'n v Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988).

[118] Given the numerous significant deficiencies in the draft EIS, the standard for preparing a supplemental draft EIS, *see* 40 C.F.R. § 1502.9(c), is far exceeded in this instance, and a revised draft EIS is necessary.

[119] ANILCA § 303(2)(B); *see also* 16 U.S.C. § 3101(b) (Congress intended ANILCA to preserve "unaltered arctic tundra").

Wilderness, BLM must exercise its management responsibilities under the Tax Act consistent with the Refuge CCP's highly restrictive management regime.[120]

BLM's formulation and study of alternatives for the Coastal Plain must reflect these dictates. While the Tax Act sets out one development-oriented statutory purpose for the Coastal Plain, it preserves the other protective purposes and mandates. BLM is obligated "to reconcile the two, if possible, and to give effect to each."[121] The agency can do this only if it develops one or more alternative approaches to a leasing program to maximize protection of the biophysical environment and other wilderness characteristics of the Coastal Plain. Alternatives can accomplish this by minimizing and phasing the acreage leased, by reducing the area of surface disturbance, by proposing more restrictive and non-waivable lease provisions, by deferring leasing or implementation, or through a combination of these approaches. Because the draft EIS includes no such alternatives, and fails to provide rational, legally-sufficient reasons for that failure, as elaborated below, it is deficient under NEPA and must be revised and reissued.

NEPA requires that an EIS include "alternatives to the proposed action."[122] The analysis of alternatives is the "heart" of an EIS.[123] An agency must "[r]igorously explore and objectively evaluate all reasonable alternatives" to a proposed action.[124] The purpose of the alternatives requirement is to analyze a variety of impacts and present a range of choices to the decision maker.[125] The "touchstone" of the inquiry is "whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation."[126] Accordingly, the EIS must include an evaluation of "all reasonable alternatives," and provide the decision maker with a "range of alternatives" from which to elect.[127] Consistent with NEPA's basic policy objective to protect the environment, this includes more environmentally protective alternatives.[128] It also includes reasonable alternatives submitted by the public at scoping.[129] "The existence of a viable but unexamined alternative renders an [EIS] inadequate."[130] The range

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[120] *See* 16 U.S.C. § 668dd(e)(1)(E); *see also* 16 U.S.C. § 3101(b) (congressional intent "to preserve wilderness resource values and related recreational opportunities . . . within large arctic and subarctic wildlands.").

[121] *Fed. Trade Comm'n v. A.P.W. Paper Co.*, 328 U.S. 193, 202 (1946).

[122] 42 U.S.C. § 4332(2)(C)(iii).

[123] 40 C.F.R. § 1502.14.

[124] 40 C.F.R. § 1502.14(a).

[125] 40 C.F.R §§ 1502.14, 1505.1(e).

[126] *State of Cal. v. Block*, 690 F.2d 753 (9th Cir. 1982) (citation omitted).

[127] 40 C.F.R. §§ 1502.14(a), 1505.1(e).

[128] 40 C.F.R. § 1500.2(e) (agencies must "[u]se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment"); *see also, e.g., Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1121-22 (9th Cir. 2002) (citing cases), *abrogated on other grounds by The Wilderness Soc'y v. U.S. Forest Serv.*, 630 F.3d 1173, 1178-80 (9th Cir. 2011) (en banc).

[129] *See* 40 C.F.R. §§ 1501.7, 1502.1.

[130] *Mont. Wilderness Ass'n v. Connell*, 725 F.3d 988, 1004 (9th Cir. 2013) (quotations and citation omitted).

of alternatives in the draft EIS is woefully inadequate. Groups do not support any of the proposed action alternatives. BLM must comply with its legal obligations under NEPA to consider a reasonable range of alternatives.

A recent decision by a federal court in Colorado reinforces the importance of evaluating specific alternative approaches, including alternatives with differing approaches to fossil fuel development. In *Wilderness Workshop v. Bureau of Land Management*, the plaintiffs proposed an alternative where low and medium potential lands were closed for leasing. BLM declined to consider the alternative, claiming it had already considered and discarded a "no leasing" alternative. The court found: "This alternative would be 'significantly distinguishable' because it would allow BLM to consider other uses for that land."[131] Further, in defining what is a "reasonable" range of alternatives, NEPA requires consideration of alternatives "that are practical or feasible" and not just "whether the proponent or applicant likes or is itself capable of carrying out a particular alternative"; in fact, "[a]n alternative that is outside the legal jurisdiction of the lead agency must still be analyzed in the EIS if it is reasonable."[132]

This draft EIS considers three action alternatives. Two provide for leasing the entire Coastal Plain, while the third provides for leasing over 2/3 of it.[133] Further, alternatives B and C differ only modestly, while proposing precisely the same acreage for leasing. The only difference is that alternative B includes fewer acres subject to non-surface occupancy stipulations and more on which timing limitations apply. No alternative would offer fewer than 1,037,200 acres for lease, considers phased leasing, or examines the benefits of deferring either leasing or operations.

The stipulations and required operating procedures vary little by alternative and many of the exact same lease stipulations are proposed for alternatives B and C.[134] The majority of the required operating procedures are the same for all three action alternatives — and none vary between alternatives B and C.[135] For all of the alternatives, the stipulations and required

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[131] *Wilderness Workshop v. Bureau of Land Management*, No. 1:16-cv-01822-LTB, Memorandum Opinion and Order at 38 (D. Colo. October 17, 2018); *see also Colorado Environmental Coalition v. Salazar*, 875 F. Supp. 2d 1233, 1249–50 (D. Colo. 2008) (Community Alternative for protecting the top of the Roan Plateau while keeping majority open to leasing through use of no surface occupancy stipulations was feasible and distinct from other alternatives under consideration. BLM's failure to separately analyze the Community Alternative violated NEPA).

[132] Council on Environmental Quality, *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, *Questions 2A and 2B*, *available at* https://www.energy.gov/sites/prod/files/2018/06/f53/G-CEQ-40Questions.pdf; *see also,* 40 C.F.R. §§ 1502.14, 1506.2(d).

[133] DEIS vol. 1 at 2-2.

[134] DEIS vol. 1 at 2-6–2-12, 2-15–2-16 (same lease stipulations for alternatives B and C for springs and aufeis, nearshore marine habitat, polar bear denning habitat, and caribou summer habitat, and wilderness).

[135] DEIS vol. 1 at 2-16–2-19, 2-24–2-30, 2-32–2-39.

operating procedures can all be waived, exempted, or modified,[136] meaning that the level of protection provided by the different alternatives is potentially largely similar and any differences illusory. In no alternative is the acreage for the physical footprint of surface infrastructure smaller than the 2,000 acre maximum provided by law.[137] Additionally, all of the action alternatives assume the entire Coastal Plain will be open to seismic and fail to evaluate the difference in impacts if a smaller area were available for seismic. Indeed, BLM's own impacts analysis illustrates just how inadequate the range of alternatives is by repeatedly acknowledging that there would be little or no difference in impacts under the action alternatives.[138] If BLM does not analyze an actual range of alternatives in its revised EIS, this would in effect pre-determine the scale of leasing and its impacts, the very thing that NEPA was enacted to prevent.[139]

BLM must develop and fully analyze alternatives that provide stronger protections for Coastal Plain resources. These include but are not necessarily limited to the components set out below. These proposed alternatives are consistent with the purpose and need statement in the draft EIS, and some impact-minimizing alternative must be not just considered, but also adopted, to harmonize the leasing program with Refuge-protective statutes as much as possible, they should be considered.[140] Importantly, while the following alternatives will help reduce impacts, all still entail serious damage to Coastal Plain resources and values. Thus, the undersigned groups do not advocate for any particular one of these alternatives, but believe they are necessary to comply with NEPA's goal of informed decision-making and other legal mandates.

a. BLM fails to consider alternatives that lease less than 1 million acres or consider phased leasing.

Because oil and gas exploration and development of the Coastal Plain necessarily entails damage to natural values, as BLM concedes, the agency must consider alternatives — and ultimately adopt one — that reconcile as much as possible those activities with PLO 2214 and ANILCA's original purposes and direction for the Refuge, retained by Congress, and other protective statutory mandates. The Tax Act requires that BLM offer a minimum of 400,000

[136] DEIS vol. 1 at 2-2–2-3.

[137] DEIS vol. 2, Appendix B at B-19–B-21, B-23 Table B-5.

[138] *See, e.g.*, DEIS vol. 1 at 3-16 (air quality impacts identical under all alternatives).

[139] It is in part to avoid this kind of restriction that agencies are prohibited from taking actions during the NEPA process that would limit the range of reasonable alternatives. *See* 40 C.F.R. § 1506.1; *see also, e.g. W. Watersheds Project v. Zinke*, 336 F. Supp. 3d 1204, 1239 (D. Idaho 2018) ("decision by BLM to commit to a particular outcome before completing a full NEPA analysis may foreclose or diminish the prospect for an open-minded examination of alternatives down the road.").

[140] DEIS vol. 1 at 1-1–1-2 (setting out the purpose and need as to implement a leasing program consistent with the Tax Act); *City of Carmel-by-the-Sea v. U.S. Dep't of Transportation*, 123 F.3d 1142, 1155 (9th Cir. 1997) (explaining that because the purpose and need statement drives the alternatives development, alternatives that meet the purpose and need should be considered in the analysis).

acres in the first lease sale, and at least 400,000 in the second lease sale. No alternative considers making 800,000 acres available and none considers leasing in a phased approach that reduces total acreage ultimately leased below that level because areas offered initially and not leased may be included in the second 400,000-acre sale. Both of those alternatives need development and study in a revised DEIS.

BLM states that it initially considered an 800,000-acre alternative but eliminated it from detailed analysis on three grounds, none of which is minimally rational. First, the agency argues that it has to lease medium and low potential areas, because only 427,900 acres show the highest potential for hydrocarbon discovery.[141] Second, BLM asserts that the "actual potential development area" will be restricted by the Tax Act's 2,000 acre limit on certain kinds of surface disturbance. And finally, BLM claims that the rejected approach would be similar to Alternative D.[142] None of these three of these rationales is supportable.

In the first place, it is patently wrong that BLM needed to include areas with medium and low hydrocarbon potential to meet the 800,000-acre minimum required by the Tax Act.[143] Even were it the case that the Tax Act required leasing of 800,000 acres, that would not require inclusion of all medium potential areas, let alone any low potential ones. BLM is required to offer "those areas that have the highest potential for the discovery of hydrocarbons."[144] BLM states that 427,900 acres have high potential, 658,400 acres have medium potential, and 477,200 acres have low potential.[145] BLM then states that to reach the 800,000 minimum acreage, it must make acreages within low and medium potential areas available.[146] If there are 427,900 acres of high potential areas, BLM would only need to identify 372,100 acres of medium potential areas, about 57% of them, to reach 800,000 acres, and no acreage in the low-potential areas. The acres identified of medium potential areas must also be the acreage identified as having the highest potential within this category. Moreover, the draft EIS does not even discuss what an alternative leasing only 800,000 acres would entail in terms of the potential location of leased lands or the conditions imposed upon the leases.[147]

Equally fatal to BLM's justification, the agency is not required to affirmatively lease 800,000 acres, only to offer that acreage in two lease sales.[148] Notably, though, in recent bidding for federal on-shore oil and gas leases on the North Slope, BLM sold only 6% of the acreage offered, and none estimated as having high potential for hydrocarbon development.[149] Thus it is

[141] DEIS vol. 1 at 2-39.
[142] DEIS vol. 1 at 2-39.
[143] DEIS vol. 1 at 2-39.
[144] Pub. L. 115-97, Title II, sec. 20001(c)(1)(B)(i)(II).
[145] DEIS vol. 1 at 2-39.
[146] DEIS vol. 1 at 2-39.
[147] DEIS vol. 1 at 2-39.
[148] Pub. L. 115-97, Title II, sec. 20001(b)(2)(i). In fact, BLM has no control over how much acreage is actually bid on by companies.
[149] *See, e.g.*, U.S. Department of the Interior, Bureau of Land Management, Alaska NPR-A Oil & Gas Lease, December 12, 2018, Sale Summary (noting that of the 2,852,803 acres

highly unlikely that the agency will sell all, or even most, of its initial offering. Under the terms of the Tax Act, it is very likely that BLM would then be required to re-offer in the second lease sale any unsold high-potential acres up to 400,000, as being among "those areas that have the highest potential for the discovery of hydrocarbons."[150] The second lease sale could readily offer for lease few, or conceivably no, additional acres to the initial 400,000 acres offered. In short, not only does the Tax Act not require BLM to lease more than 800,000 acres, it makes it possible to lease far less. This phased approach is one that the agency must develop into a full alternative, consider, and disclose the impacts from in a revised draft EIS,[151] consistent with the Tax Act and the numerous other legal obligations that apply to an oil and gas program.

It is no answer, as BLM states,[152] that the Tax Act limits certain kinds of surface-disturbing activities within the Coastal Plain to 2,000 acres. In the first place, BLM has discretion to limit such activities to far fewer than 2,000 acres — and for obvious environmental reasons needs to consider alternatives that do so. In the second, all of BLM's action alternatives allow the same level of development — the full 2,000 acres. Even if the full 2,000 acres were needed for any leasing program (based on BLM's erroneous interpretation), increasing leased acreage beyond the minimum statutorily required would occasion impacts from numerous other activities. Developing greater lease acreage necessarily entails more equipment, man hours, vehicle trips, ice road traffic, barging, coastal landings, pipeline miles and similar undertakings that affect the environment. It also likely occasions more exploratory activity, such as seismic surveying. If the leasing serves its commercial purpose, it increases harms from extracting, producing, transporting, and combusting a greater total volume of oil and gas, harms that include more spills and more contribution to global warming. Aggravating these differential impacts from leasing unnecessary acreage, under the interpretation BLM adopts in the draft EIS, the 2,000-acre limitation allows additional areas to be destroyed as areas covered by facilities are "reclaimed," expanding impacts to still more acreage. Furthermore, higher and different total harms from impact dispersal and habitat fragmentation would result from various configurations and locations of that 2,000-acre footprint over time. Making additional acres available for oil and gas leasing would affect how that footprint was configured, and how extensive the resulting impacts, including habitat fragmentation, might be.

The third reason the draft EIS asserts for failing to consider alternatives that lease 800,000 (or fewer) acres is that it would be "similar in concept to Alternatives D1 and D2, which make only 1,037,200 acres available for lease sales."[153] But either version of alternative D would offer 237,200 acres, almost 30%, more in the Coastal Plain for leasing than an alternative

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offered, only 174,044 acres — and none of the high potential acres — were bid on and leased), available online at https://www.blm.gov/sites/blm.gov/files/uploads/OilandGas_Alaska_2018_NPR-A_Lease-Sale-Bid-Recap.pdf.

[150] Pub. L. 115-97, Title II, sec. 20001(b)(1)(ii).

[151] Indeed, BLM acknowledges that a phased approach is possible, making its failure to include such an alternative particularly suspect. DEIS vol. I at 1-5.

[152] DEIS vol. 1 at 2-39.

[153] DEIS vol. 1 at 2-39

offering only 800,000 acres.[154] Put another way, the eliminated alternative would offer only 51% of the acreage of the Coastal Plain, versus Alternative D, which offers 66% of the program area. Encumbering an additional 15%[155] of the Coastal Plain with rights to extract the underlying oil and gas resources affects the management of those lands, and adjacent lands, interfering with the other purposes of, and statutory protections for, the Refuge by increasing the total amount of disturbance that will occur from all phases of oil and gas activities. This cannot be squared with BLM's obligation to reconcile statutory mandates to the maximum extent it can. BLM's proffered reasons for not analyzing acreage minimizing alternatives are arbitrary and capricious, and its failure to assess them violates NEPA's requirement to evaluate a reasonable range of alternatives. Similarly, BLM's statement that an 800,000-acre alternative would be similar in concept to Alternative D is faulty because it is based on the premise that only acreage numbers would be different, and that BLM need not offer any additional and different protections. Alternatives could be meaningfully different if BLM offers meaningfully different protections. Additionally, this fails to account for the fact that under BLM's three action alternatives (including the two variations under Alternative D), there are only two acreage amounts offered.

Relatedly, BLM assumes that the focus of development will occur in the Topset Play, which is expected to be the first anchor field discovered,[156] and which BLM states contains "over half of the recoverable undiscovered oil in the program area."[157] BLM should consider an alternative that looks specifically at leasing and development focused in this area, including considering leasing approaches and protective measures in this geographic focus. (BLM should include a map of the location of this play, given its significance.)

b. Locating Infrastructure Outside the Coastal Plain and Limiting Exploration to Leased Areas

BLM should also consider an alternative in which there is no central processing facility, production pads, gravel mines or other infrastructure constructed on the Coastal Plain. Oil and gas resources could be produced and/or transported via pipeline for processing at another location and gravel mining could occur outside of the Coastal Plain. Such an alternative could decrease impacts to surface resources on the Coastal Plain by limiting construction and human activity associated with oil and gas development processing.

Relatedly, BLM should also modify its alternatives analysis to consider whether additional areas should be closed to exploration activities, particularly in areas where seismic damage is likely to be exacerbated because of the topography or other concerns, or where those areas will be closed to leasing. For example, in the draft EIS, BLM asserts for purposes of Alternative D that it would close 476,600 acres of caribou calving habitat to lease sales, but would still allow seismic activity over the entire program area.[158] BLM needs to modify Alternative D so it does not allow seismic exploration in areas that are closed to leasing.

[154] 237,200 acres/800,000 acres = 29.65%
[155] 237,200 acres/1,563,500 acres = 15.17%.
[156] DEIS vol. 2 at B-16.
[157] DEIS vol. 2 at B-5.
[158] DEIS vol. 1 at 3-120.

c. More Heavily Stipulated Alternative, Including Non-Waivable Stipulations

BLM should also consider an alternative where all lease stipulations and required operating procedures (ROPs) are not subject to waivers, exceptions, and modifications. This alternative would ensure that the protections ascribed to the stipulations could actually be relied upon to safeguard resources. Since the current alternatives do not include any limits on waivers, exceptions and modifications, BLM should evaluate the impacts of fully enforcing all stipulations to inform any decision to vary from this approach. Conversely, since all stipulations and ROPs can be waived, excepted, or modified, BLM should analyze the impacts of the program based on granting these exemptions.

Given the general inefficacy of many of the proposed stipulations and ROPs in avoiding or mitigating adverse impacts to sensitive Coastal Plain resources, BLM should also include more protective stipulations and ROPs. For instance, BLM should develop an alternative that encompasses the recommendations of the International Porcupine Caribou Board, as required under the International Agreement on the Conservation of the Porcupine Caribou Herd, and another designed to avoid or minimize aesthetic impacts based on the results of comprehensive visibility analysis. BLM should also consider a stipulation requiring compact siting of all oil and gas facilities and infrastructure, and mandating that any development be contiguous, even under the 2,000-acre limitation.

d. Deferred Leasing and Development Alternatives

Although the Tax Act directs BLM as to when lease sales should occur and the acreage to be offered in those sales, it does not mandate that leases be issued, nor does it limit what protective stipulations may be applied to the leases, or the timing of production. Consequently, BLM could and should have considered alternatives that would delay leasing or constrain the timing of extraction to reduce or eliminate the impact of the oil and gas program on climate change and account for principles of option or informational value. This is particularly true because the oil and gas program necessarily must comport with the other purposes of the Refuge, and the Arctic is highly vulnerable to climate change and is already experiencing its effects more severely than other areas. Further exacerbating the impacts of climate change on the Refuge does not comport with the primary purposes of the Refuge.

The draft EIS concedes that oil and gas extraction from the Coastal Plain has a magnitude that would result in increased net demand, resulting in a net increase in greenhouse gas (GHG) emissions relative to the no leasing alternative.[159] However, as described in Part V.A. of these comments, the draft EIS fails to provide any analysis of how that increase in emissions, and the timing of those emissions, considered either individually or cumulatively, would affect the severity or timing of climate change impacts on any scale. The draft EIS ignores the need to protect the resources of the Refuge from climate change by tailoring lease terms that would delay or stagger the extraction and combustion of the leased oil and gas to mitigate the effect on stimulating demand. The draft EIS does not even provide any discussion of why it did not

[159] DEIS vol. 1 at 3-7–3-9.

consider such an alternative, despite comments raising the need to evaluate such alternatives.[160] Further, the draft EIS fails to consider mitigation measures to offset the climate change exacerbating impacts of the proposed action.

BLM also should consider an alternative to delay leasing and/or lease implementation, based on applying the principles of option value or informational value, which provides for BLM to look at the benefits of delaying irreversible decisions. It is well-established that issuance of an oil and gas lease can be an irreversible commitment of resources.[161] In the context of the Coastal Plain, there are significant considerations that would support delaying. As the U.S. Court of Appeals for the D.C. Circuit held in the context of considering the informational value of delaying leasing on the Outer Continental Shelf, "[t]here is therefore a tangible present economic benefit to delaying the decision to drill for fossil fuels to preserve the opportunity to see what new technologies develop and what new information comes to light.[162] This is also consistent with national policy, such as that set out in the Mineral Leasing Act, which prescribes "the orderly and *economic development of domestic mineral resources*, reserves, and reclamation of metals and minerals to help *assure satisfaction of industrial, security and environmental needs*."[163] Consequently, the BLM should not commit to moving forward with oil and gas leasing on the Coastal Plain of the Arctic Refuge when economic and other considerations indicate it is not the right time to do so.

Similar reasoning also applies to delaying approvals to conduct activities connected with exploration and development of leases. Once a lease is issued, the BLM still has to evaluate and issue approvals for on-the-ground activities associated with exploration and development and can condition exploration and development based on specific circumstances being met. After an approval is issued, activities may proceed that may harm the resources of the Coastal Plain. Delaying exploration and development will avoid immediate harm and provide an opportunity to consider new data and technology. BLM should consider an alternative to suspend leases, which permits the agency to toll the terms of leases, as well as the obligations of leaseholders to make rental payments. BLM has used this authority to suspend leases in the interest of conservation of natural resources, which the agency defines as both preventing harm to the environment and preventing loss of mineral resources.

Alternatives that delayed leasing and/or development, including suspending leasing, would provide economic benefits in terms of improvements in technology, additional information on risks to other resources in the Coastal Plain and ways to avoid those risks, and additional information on the impacts of climate change and ways to avoid or mitigate resulting changes to the affected environment. BLM has the ability and obligation to undertake an analysis of the benefits of delaying leasing, which can be both qualitative and quantitative. Given the importance and vulnerability of the Coastal Plain of the Arctic Refuge, these

[160] Scoping Comment Letter at 26–27.

[161] *See Pennaco Energy, Inc. v. U.S. Dep't of the Interior*, 377 F.3d 1147 (10th Cir. 2004).

[162] *Ctr. for Sustainable Economy v. Jewell*, 779 F.2d 588, 610 (D.C. Cir. 2017).

[163] 30 U.S.C. § 21a (emphasis added).

alternatives, which were proposed at scoping, were reasonable, distinguishable from the alternatives considered in the Draft EIS and should have been analyzed.

e. The DEIS Pursues Only Pre-Determined Outcomes.

NEPA's twin aims are to facilitate informed government decision making and ensure public transparency.[164] Courts have held that those aims are undermined and a violation of NEPA has occurred where an agency "pre-determines" the outcome of the analysis by "irreversibly and irretrievably commit[ting] itself to a plan of action" before completing the necessary analysis.[165] As described above, the draft EIS contemplates only those alternatives that would achieve a pre-determined outcome of making substantial portions of the Coastal Plain available for oil and gas leasing and development. Each of the alternatives would result in similar levels of production and infrastructure and the same faulty interpretation of the 2,000-acre cap on surface disturbance. Moreover, BLM's anticipated permitting of pre-leasing 3D seismic operations across the entire Coastal Plain further illustrates the agency's commitment to pursuing only intensive development scenarios that go far beyond the requirements of the Tax Act. To avoid improper pre-determination, BLM must develop and meaningfully analyze the alternatives described above.

3. BLM Fails to Identify and Obtain Missing Information.

For the purpose of evaluating significant impacts in the EIS, if there is incomplete information relevant to reasonably foreseeable significant adverse impacts and the information is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," the information must be gathered and included in the EIS.[166] This requirement helps "insure the professional integrity, including scientific integrity, of the discussions and analyses" in an EIS.[167] It also ensures that the agency has necessary information before it makes a decision, preventing the agency from acting on "incomplete information, only to regret its decision after it is too late to correct."[168] "[T]he very purpose of NEPA's requirement that an EIS be prepared for all actions that may significantly affect the environment is to obviate the need for [ ] speculation by insuring that available data is gathered and analyzed prior to the implementation of the proposed action."[169] Accordingly, NEPA's missing information regulation "clearly contemplates original research if necessary."[170]

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[164] *See* 40 C.F.R. § 1500.1; *Robertson*, 490 U.S. at 349.

[165] *Forest Guardians v. U.S. Fish & Wildlife Serv*., 611 F.3d 692, 714 (10th Cir. 2010).

[166] 40 C.F.R. § 1502.22(a); *see also* 43 C.F.R. § 46.125.

[167] 40 C.F.R. § 1502.24.

[168] *Churchill County v. Norton*, 276 F.3d 1060, 1072–73 (9th Cir. 2001) (quoting *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1216 (9th Cir. 1998)).

[169] *Found. for N. Am. Wild Sheep v. U.S. Dep't of Agric.*, 681 F.2d 1172, 1179 (9th Cir. 1982).

[170] *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1244 n.5 (9th Cir. 1984).

In their scoping letter, Groups identified a substantial amount of baseline data missing or out of date that BLM had to address before the agency could meaningfully evaluate and comply with DOI's numerous statutory mandates for managing and protecting the Arctic Refuge and the public can fully understand the potential impacts from oil and gas activities on the Coastal Plain.[171] BLM's failure to address or obtain this lacking information renders its draft EIS deficient and necessitates a revised document.

As Groups identified, additional information is required in many critical areas to fully evaluate the impacts of oil and gas activities on the Coastal Plain and to develop necessary stipulations or BMPs for leasing or subsequent oil and gas activities. These areas include, but are not limited to:

- Polar bears, including use, feeding, denning, and population distribution;
- Air quality, including modeling and monitoring;
- Bird usage, including breeding, staging, feeding, habitat use, population and abundance, and distribution, for raptors, resident species, migratory birds, and waterfowl;
- Fish inventories and distribution;
- Water resources, including water chemistry/quality information, and water quantity availability;
- Snow cover and variation across terrain;
- Predator distribution within the Coastal Plain and adjacent areas, including for wolves, wolverines, brown bears, and golden eagles;
- Caribou use, including calving and post-calving habitat, seasonal ranges, and migration routes, and impacts of oil and gas activities on herd behavior and population dynamics;
- Cultural resources and a completed inventory;
- Wetlands distribution and coverage, including updated mapping;
- Vegetation distribution and coverage, permafrost, and soils, including updated mapping;
- Human health and food security;
- Acoustic and soundscape data;
- Subsistence use patterns; and
- The impacts on Coastal Plain resources from climate change.

BLM failed to obtain missing and/or updated information about these issues and other issues before proceeding with the EIS. This renders BLM's baseline information regarding the

[171] Scoping Comment Letter at 27–29. *See also* John M. Pearce, et al., U.S. Department of the Interior, U.S. Geological Survey, Summary of Wildlife-Related Research on the Coastal Plain of the Arctic National Wildlife Refuge, Alaska, 2002-17, Open-File Report 2018-1003 [2018 USGS Report] (2018) (providing a simply survey of current information and identifying some necessary updates or additional studies); *see also* Janet C. Jorgenson, et al., U.S. Department of the Interior, U.S. Geological Survey, Arctic Refuge Coastal Plain Terrestrial Wildlife Research Summaries, USGS/BRD/BSR-2002-0001 (2002).

affected environment incomplete and calls into question the analysis of impacts and development of mitigation measures. While BLM purports to comply with NEPA's mandate, the agency does not in fact do so. BLM states that "where information is missing, this EIS complies with 40 CFR 1502.22."[172] In order for BLM to be able to move forward in the face of missing or incomplete information, the agency is required to take specific steps.[173] But nowhere in the draft EIS does BLM actually identify information or data gaps or make the required findings to allow it to move forward in the face of that missing or incomplete information. As described in our scoping comments and throughout these comments, much of the information necessary to assess the potentially significant impacts of the leasing program is missing, and BLM must comply with the applicable regulation when assessing the leasing program in the face of this missing information.

As Groups also pointed out, much of the existing information for the Arctic Refuge is likely out of date to due climate change; the environment and resources of the Arctic Refuge are not the same as they were 30, 20, or even 10 years ago because of climate change, and will not be the same in 5 or 10 years, or the timespan of a lease and oil and gas project. BLM does not appear to have factored this into its impacts analysis or consideration of missing or incomplete information.

4. BLM's Approach to its Impacts Analysis is Flawed.

BLM has failed to adequately analyze and quantify the potential impacts to resources on the Coastal Plain. The draft EIS does not include impact criteria and overall rankings that show the level of impact by alternative for impacts to all resources. BLM provides no explanation for the arbitrary absence of impact criteria or analysis of the level of impacts by alternative. Through its NPR-A planning and leasing efforts, BLM has developed specific impact criteria for nearly every resource present on the Coastal Plain. These criteria were well-vetted and subject to public comment in the GMT1 Final SEIS and GMT2 Draft SEIS.[174] There is seemingly no reason that BLM should refuse to use impact criteria in the Draft EIS for the Coastal Plain.

BLM's failure to characterize impacts makes it difficult to compare impacts between alternatives or synthesize information in a manner that is easy for the public to understand. It is particularly troubling that the analysis of impacts lacks conclusions on levels of impacts given the short timeframe allowed for public review of the draft EIS. It is critical that BLM provide a meaningful analysis, conclusions for the levels of impacts, and a comparison between alternatives for all resources. BLM must fully inform the public of the level and nature of

[172] DEIS vol. 1 at 3-2.

[173] 40 C.F.R. § 1502.22(b); *Native Village of Point Hope v. Salazar*, 730, F. Supp. 2d 1002, 1017–18 (D. Alaska 2010).

[174] *See* Alpine Satellite Development Plan for the Proposed Greater Mooses Tooth 1 Development Project: Final Supplemental Environmental Impact Statement, Vol. 1 219-220 (2014); *See also* Alpine Satellite Development Plan for the Proposed Greater Mooses Tooth 2 Development Project: Draft Supplemental Environmental Impact Statement 235 (2018) "A resource specific description of the impact criteria is included in each section of this chapter."

impacts anticipated for all resources; indeed, the agency has fully quantified these impacts in the past. BLM should not eliminate these determinations to avoid making findings of significance.

Additionally, as explained below, BLM's reasonably foreseeable development scenario (RFD) is deeply flawed. This in turns renders the impacts analysis, which is based on the RFD, fatally flawed as well. A revised RFD will require a revised approach to the impacts analysis.

5. BLM's Approach to the Cumulative Impacts Analysis is Flawed.

BLM's approach to cumulative actions and impacts is flawed. NEPA requires that BLM "consider the cumulative impacts of [this] project together with 'past, present and reasonably foreseeable future actions.'"[175] "Cumulative actions" are those "which when viewed with other proposed actions have cumulatively significant impacts."[176] "Cumulative impact" is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."[177] Such impacts can result from individually minor but collectively significant actions taking place over a period of time.[178] To comply with NEPA's mandate to consider the cumulative impacts of a project, a cumulative impacts analysis requires "some quantified or detailed information; ... [g]eneral statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided."[179] Additionally, agencies cannot defer analysis of the cumulative impacts if meaningful analysis can be conducted when considering a project.[180] Agencies "must do more than just catalogue 'relevant past projects in the area.'"[181] This means a discussion and an analysis in sufficient detail to assist "the decisionmaker in deciding whether, or how, to alter the program to lessen cumulative impacts."[182]

Overall, and as explained in greater detail below for specific resources, the BLM's cumulative impacts analysis fails to contain the "quantified or detailed information" required. Instead, it largely consists of general statements regarding potential effects and contains very little substantive information. In large part, BLM's presentation of past, present, and reasonably foreseeable future actions consists of a table generally describing categories of activities and

[175] *Native Ecosystems Council v. Dombeck*, 304 F.3d 886, 895 (9th Cir. 2002) (quoting 40 C.F.R. § 1508.7).

[176] 40 C.F.R. § 1508.25(a)(2).

[177] *Id*. § 1508.7.

[178] *Id.*

[179] *Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372, 1379–80 (9th Cir. 1998); *see also Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 810 (9th Cir. 1999).

[180] *See Neighbors of Cuddy Mountain*, 137 F.3d at 1380; *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1312–13 (9th Cir. 1990).

[181] *Churchill Cty. v. Norton*, 276 F.3d 1060, 1080 (9th Cir. 2001) (*quoting City of Carmel–by–the–Sea v. United States Dep't of Transp.*, 123 F.3d 1142, 1160 (9th Cir.1997)).

[182] *Id.*

actions and a bulleted list of reasonably foreseeable future projects.[183] It also includes a list of identified projects, but again with an inadequate analysis of the actual cumulative impacts from the identified project and an oil and gas program on the Coastal Plain.[184] While BLM states that the projects are discussed below, there is actually very little discussion with any level of specificity of the past, present and reasonably foreseeable future actions.[185]

Instead, in some resource sections, BLM avoids discussing the cumulative impacts associated with reasonably foreseeable post-lease oil and gas activity by suggesting those would be discussed in later NEPA analysis.[186] In others, it avoids the discussion by making mere conclusory statements about the cumulative impacts. These statements acknowledge the potential for cumulative impacts, but fail to provide any explanation or analysis of what they would be.[187] At most, in many of the resource sections, BLM's cumulative impacts analysis consists of pointing out that alternatives allowing the most land development would have the most cumulative impacts, which fails to meaningfully explain any cumulative impacts.

The agency also avoids discussing the cumulative impacts for this project by referring readers to cumulative impacts analysis done for other projects. For example, under Air Quality, BLM points to existing analyses but admits those analyses did not account for proposed oil and gas development in the Coastal Plain, and "therefore the potential cumulative effects of future oil and gas activities are not fully known at this time."[188] Confusingly, BLM acknowledges that it has undertaken its own study of cumulative effects of BLM-authorized oil and gas development on the North Slope, including the Coastal Plain, reflecting that such development is a reasonably foreseeable activity, but has proceeded to issue this draft EIS prior to completing even that study.[189]

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[183] DEIC vol. 2 Appendix F at F-6–F-9.

[184] DEIS vol. 2 Appendix F at F-5–F-9.

[185] DEIS vol. 2 Appendix F at F-7–F-11.

[186] *See, e.g.* DEIS vol. 1 at 3-15,

[187] *See, e.g.* DEIS vol. 1 at 3-23 (stating potential cumulative impacts on the acoustic environment would affect the community of Kaktovik and individuals throughout the program area, as well as noise-sensitive resources along aircraft flight paths outside of the program area," but providing no explanation of how); 3-48 (acknowledging that previous seismic exploration has affected surface vegetation and permafrost and that future additional seismic exploration would have similar impacts, but fails to analyze how the future actions would have a synergistic effect on vegetation and permafrost); 3-65 (recognizing past spills and potential future spills would have cumulative impacts, but instead of explaining what those would be, merely stating that spills are cleaned up according to regulations).

[188] DEIS vol. 1 at 3-17; *see also id.* at 3-16 (admitting "[n]o quantitative cumulative analysis has been prepared specifically for this EIS" and that instead the air analyses developed for other projects where used, even though those "did not include oil and gas development on the Coastal Plain in the modeling of potential effects on air quality and AQRVs").

[189] DEIS vol. 1 at 3-17.

Similarly, BLM asserts there is existing information on cumulative impacts to some resources, but fails to explain whether or how that information has been considered in this planning process. For example, in its "Cumulative Impacts" section for Climate and Meteorology, the agency provides a statement that GHG emissions disperse quickly relative to how long it takes for climate change to occur, and simply states "[t]he potential cumulative climate impacts of global development and associated GHG emissions have been discussed extensively in the published literature, including several reports by the Intergovernmental Panel on Climate Change and numerous scientific journals, and therefore, are not repeated here."[190] As discussed in other sections of these comments, BLM also fails throughout the Draft Leasing EIS to analyze how climate change will have cumulative impacts on various resources in their cumulative impacts sections. Overall, this approach is insufficient to satisfy NEPA and fails to acknowledge and account for the considerable cumulative impacts of oil and gas activities.[191] BLM must identify and describe, with specificity, the projects and impacts.

a. Geographic Scope

BLM defines the geographic scope of the cumulative impacts analysis as the program areas and the North Slope of Alaska, but notes that for some resources the impacts areas is broader.[192] But in setting out the agency's approach to impacts analysis, it is clear that the agency is limiting its impacts analysis improperly to the program area, i.e., the Coastal Plain.[193] BLM

[190] DEIS vol. 1 at 3-9.

[191] *See* National Research Council of the National Academies, Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope, Committee on Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope at 10, 156 (2003).

[192] DEIS vol. 2 Appendix F at F-5.

[193] *See, e.g.*, DEIS vol. 2 Appendix F at F-13 (acoustic environment limited to the program area even though sound travels bound boundaries), F-16 (limiting consideration of impacts to soils even though there could be changes to soils, permafrost, and drainage to adjacent areas), F-16-F-17 (limiting consideration of impacts to sand and gravel to the program area even though gravel could come from outside the program area for oil and gas activities), F-18 (limiting consideration of the impacts to water resources to the program area even though there could be impacts to nearshore marine waters and adjacent hydrology), F-21 (limiting consideration of impacts to wetlands and vegetation even though there could be impacts to adjacent wetlands and the vegetation systems they support), F-26 (limiting consideration of the impacts to birds to the North Slope west to the NPRA's eastern boundary and east to Canada even though many of the birds that use the Coastal Plain are migratory and use other areas of the Arctic Refuge and Alaska), F-28 (limiting consideration of the impacts of many terrestrial mammals despite the fact that many migrate beyond the program area), F-31 (limiting consideration of cultural resources to the program area and the North Slope despite the clear connection of the Coastal Plain to the Gwich'in), F-35 (limiting the sociocultural systems and environmental justice impacts to only four identified communities), F-36 & F-38 (limiting the recreation and visual impacts to the program area despite the impacts that could occur to people recreating on adjacent areas, including the Wilderness), F-39 (limiting transportation impacts to the program area despite the impacts the developing roads could have on lands outside of the

must properly define the geographic scope of its impacts analysis by resource issues, taking into consideration geographic formations, habitat and resources uses, migrations, and landscapes.

b. Temporal Scope

BLM defined the temporal scope of the cumulative impacts analysis as from the 1970s through realization of the hypothetical development scenario, which it estimated at 50 years.[194] This is an insufficient temporal scope as it does not necessarily account for full reclamation, including ongoing monitoring, of oil and gas development on the Coastal Plain. It is also inconsistent with the development scenario that BLM puts forth. The timeline considered there indicates that additional oil fields could be developed as many as 85 years after the ROD is signed, and that abandonment and reclamation could occur up to 130 years after the ROD.[195] BLM's temporal scope of the cumulative impacts should be at least as long as the timeline the agency identifies could follow its implementation of an oil and gas program.

c. Non-Federal Lands

BLM also improperly excludes oil and gas activities on non-federal lands, including State of Alaska lands adjacent to the Coastal Plain and private lands within the boundaries of the Coastal Plain, asserting that it is not reasonably foreseeable.[196] These both should be analyzed to the extent practicable in the leasing program EIS. With regards to the oil and gas activities on non-federal lands, it does not appear that BLM considered 3D seismic exploration proposed by SAExploration and permitted by the Alaska Department of Natural Resources to take place this winter on State of Alaska lands immediately adjacent to the Coastal Plain as a present action.[197] Additionally, there is information available regarding leases in marine waters, including State of Alaska leases and federal Outer Continental Shelf leases.[198] BLM must analyze what the

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Coastal Plain, particular to the west), & F-41 (limiting the public health impacts to the program area despite the impacts that could occur to other North Slope and Gwich'in communities).

[194] DEIS vol. 2 Appendix F at F-5.

[195] DEIS vol. 2 Appendix B at B-2.

[196] DEIS vol. 2 Appendix F at F-11.

[197] DEIS vol. 2 Appendix F at F-8–F-9; Letter from Graham Smith, Permitting Manager, Division of Oil and Gas, Alaska Department of Natural Resources, to Sue Simonds, Permits Manager, SAExploration, Inc. (Dec. 31, 2018).

[198] *See* https://www.boem.gov/National-OCS-Program/ (proposal for a new leasing plan that would include six lease sales by 2024 in federal waters of the Arctic Ocean); http://dog.dnr.alaska.gov/Documents/Leasing/Legislature5YearLeasingReport_20180130.pdf (showing planned Alaska lease sales in state waters); http://dog.dnr.alaska.gov/Documents/Maps/ActivityMaps/NorthSlope/NS_ActivityMap_Oct2018.pdf (showing activities in state waters); Audubon Alaska, Ecological Atlas of the Bering, Chukchi, and Beaufort Seas at 280-281 (2017), https://ak.audubon.org/sites/g/files/amh551/f/arctic_atlas_composite_144ppi-final.pdf (describing impacts of offshore oil and gas activity); Nuka Research & Planning Group, LLC, Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable

cumulative impacts of oil and gas activities on these leases could be to resources in the Coastal Plain.

It is unclear from BLM's description whether it is excluding consideration of projects on State lands or only inholdings owned by Alaska Native Corporations. As explained above, there are plans to undertake oil and gas activities on adjacent State lands and BLM must analyze them. Additionally, excluding oil and gas activities and development on inholdings held by Kaktovik Inupiat Corp. and Arctic Slope Regional Corp. is unreasonable. BLM and DOI are well aware that ASRC has advocated for years to be able to develop these lands, and were a leading voice in advocating for passage of the Tax Act.[199] It is therefore reasonably foreseeable that the corporations will act quickly to do so. We also note that provisions of the Chandler Lake Agreement grant ASRC extensive rights to develop and sell sand and gravel from their lands. BLM must analyze the likely impacts from the exercise of those rights as currently written.[200] Additionally, SAExploration's pending 3D seismic proposal includes operations on these lands.[201] Because facilities to support a Coastal Plain oil and gas program could be located on these lands (such as gravel mines, pipelines, road, central processing facilities), BLM must analyze that.[202] Related to this point, BLM seems to acknowledge that uses of these lands related to and oil and gas program will increase.[203] BLM's conclusions and assumptions are, therefore, inconsistent.

BLM also excludes the Alaska Strategic Transportation and Resources (ASTAR) project from its cumulative impacts analysis.[204] BLM should analyze the impacts of this project on the Coastal Plain. First, BLM states that the cumulative impacts analysis is often based on plans,

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Consequences (2010), https://www.pewtrusts.org/~/media/legacy/oceans_north_legacy/page_attachments/oil-spill-prevention.pdf (similar); NRDC, Environmental Risks with Proposed Offshore Oil and Gas Development off Alaska's North Slope (Aug. 2012), https://www.nrdc.org/sites/default/files/drilling-off-north-slope-IP.pdf (similar); NRDC, The Fate of the Arctic in Offshore Oil Blowouts (Dec. 2016), https://www.nrdc.org/sites/default/files/fate-oil-arctic-ocean-blowouts-report.pdf (similar); National Research Council, 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 (similar).

[199] Written Testimony of Richard K. Glenn, Executive Vice President for Lands and Natural Resources, Arctic Slope Regional Corporation (Nov. 2, 2017).

[200] *See* Chandler Lake Land Exchange Agreement, Appendix 2. C., pp. 29-32 (1983); *see also supra*.

[201] Marsh Creed 3D Plan of Operations Winter Seismic Surveys at 3.

[202] Groups question whether location or development of these lands is permitted. *See supra*. If BLM's positon is that it is, BLM cannot skirt its obligations to consider the impacts of development of the lands to support BLM's proposal.

[203] DEIS vol. 2 at F-30 (assuming that "[d]emand for ancillary uses and permits . . . will increase in conjunction with oil and gas development").

[204] DEIS vol. 2 Appendix F at F-11.

permits, or fiscal appropriations, and that projects should be considered even if there is a degree of uncertainty.[205] The State of Alaska currently has $7.3 million in funding allocated for the project and the FY2020 Governor's Amended Budget includes an additional $2.5 million.[206] As currently proposed, in addition to other roads across the North Slope, there would be an access road running up and adjacent to the western boundary of the Coastal Plain.[207] A pilot program for the project was conducted last winter. A purpose of the project is also to invest in new infrastructure that supports the value of the Trans-Alaska Pipeline System,[208] which the BLM assumes would transport oil developed from the Coastal Plain. The Alaska Department of Natural Resources indicated in an update to the Alaska Legislature in early 2018 that state and federal permitting process are underway.[209] Additionally, in a recently-initiated NEPA process for the NPR-A, the BLM indicates that it will be considering the ASTAR project.[210] Including it in one planning process but excluding it here is unreasonable. In sum, there is sufficient information and certainty for BLM to use to analyze the impacts of the ASTAR project in the draft EIS.

Finally, BLM states that the permitting requirements of other agencies would reduce cumulative impacts.[211] BLM makes the assertion without any analysis, citation, or support. Unless BLM actually analyzes the impacts resulting from various agencies permitting requirements, BLM cannot make this conclusion. BLM must explain the basis for this conclusion, including conducting the necessary analysis to support it.

6. BLM Fails to Analyze the Effectiveness and Enforceability of Its Mitigation Measures

"Implicit in NEPA's demand that an agency prepare a detailed statement on 'any adverse environmental effects which cannot be avoided should the proposal be implemented,' is an understanding that the EIS will discuss the extent to which such adverse effects can be avoided."[212] Accordingly, an EIS must discuss appropriate mitigation measures.[213] Those

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[205] DEIS vol. 2 Appendix F at F-6.

[206] https://www.omb.alaska.gov/ombfiles/20_budget/DNR/Amend/2020proj62649.pdf.

[207] http://soa-dnr.maps.arcgis.com/apps/Cascade/index.html?appid=ab8be9349a08477ebfb66d017e0aec8d

[208] http://soa-dnr.maps.arcgis.com/apps/Cascade/index.html?appid=ab8be9349a08477ebfb66d017e0aec8d

[209] http://www.akleg.gov/basis/get_documents.asp?session=30&docid=39624.

[210] Department of the Interior, Bureau of Land Management, Notice of Intent to Prepare an Integrated Activity Plan and Environmental Impact Statement for the National Petroleum Reserve in Alaska, 83 Fed. Reg. 58,786 (Nov. 21, 2918)

[211] DEIS vol. 2 Appendix F at F-3.

[212] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351-52 (1989) (quoting 42 U.S.C. § 4332(2)(C)(ii)).

[213] *See* 40 C.F.R. §§ 1502.14(f), 1502.16(h), 1508.25(b). 40 C.F.R. § 1508.20 defines mitigation to include:

Avoiding the impact altogether by not taking a certain action or parts of an action.

measures "must be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated."[214] Simply identifying mitigation measures, without analyzing their effectiveness, violates NEPA. Rather, an "essential component of a reasonably complete mitigation discussion" must include "an assessment of whether the proposed mitigation measures can be effective."[215] In addition, CEQ has instructed that the "possibility of mitigation" should not be relied upon to avoid further environmental analysis.[216] In sum, the effectiveness of mitigation measures must always be disclosed in a NEPA analysis and their prominence in the range of alternatives and role in the effects analysis requires substantial treatment in the EIS.

The draft EIS fails to provide sufficient detail about the stipulations and ROPs being contemplated, or to analyze their effectiveness. This is because the approach to analyzing the mitigation measures is fundamentally flawed: it considers the amount and purported benefit of the measures, instead of analyzing the adverse effects that are still likely to occur. This means that the EIS fails to disclose the effects that will occur despite mitigation. For example, Table 2-2 in Section 2.2.5 of the draft EIS lists the lease stipulations and ROPs that constitute the "[p]rotective measures in Alternatives B, C, and D" that BLM is considering.[217] While the impacts analysis in Chapter 3 occasionally references a stipulation or ROP where they happen to differ by alternative, it does so only in cursory fashion that in no way constitutes the required analysis of their effectiveness. For example, Appendix E contains this statement: "The mitigation measures proposed under Alternative B (Lease Stipulations 3, 4, 7, and 9, and ROPs 23 and 42) would be adequate to maintain caribou passage to coastal areas."[218] But there is no meaningful analysis of how these stipulations and ROPs would be effective. To that end, BLM merely provides a caveat that "The potential impacts of this alternative on caribou would depend on how well the area off limits to surface occupancy captures the preferred calving areas for the PCH, how well these TLs and ROPs avoid displacing calving caribou in areas with surface occupancy, and how well it minimizes impediments to caribou movements during other times of the year."[219] In some instances, the impacts analysis mentions a potential mitigation measure without even referring back to a specific stipulation or ROP, leaving the reader guessing if and how such a

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Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

Compensating for the impact by replacing or providing substitute resources or environments.

[214] *Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372, 1380 (9th Cir. 1998) (quotations and citation omitted).

[215] *S. Fork Band Council of W. Shoshone of Nevada v. U.S. Dep't of Interior*, 588 F.3d 718, 727 (9th Cir. 2009).

[216] *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*; *see also Davis v. Mineta*, 302 F.3d 1104, 1125 (10th Cir. 2002).

[217] DEIS vol. 1 at 2-2.

[218] DEIS vol. 2 at E-7.

[219] DEIS vol. 1 at 3-120.

measure might be implemented.[220] The draft EIS utterly fails to analyze the effectiveness of its proposed mitigation measures.

Additionally, BLM does not describe or analyze the difference between the stipulations and ROPs, and if they are treated by the agency differently or will have different impacts. For example, Lease stipulation 6 refers to ROP 23 for its requirements. What does this mean for how BLM will apply them? Also, the term "BMPs" is sometimes used but it is unclear what they are or how BLM will incorporate them into the program. For example, the draft EIS states, "the frequency of spills would be limited by BMPs."[221] BMPs must be explained and required, and their effectiveness demonstrated, for BLM to reach such conclusions.

In fact, what information the draft EIS does include demonstrates that the proposed mitigation measures articulated in the stipulations and ROPs are unlikely to be effective. NSO stipulations, timing limitations, and surface use limitations designed to protect Arctic Refuge resources are only effective to the extent that the safeguards will actually be applied. Waivers (permanent exemption that applies to the entire leasehold), exceptions (one-time exemption for a particular site within the leasehold), and modifications (change to the lease stipulation, either temporarily or for the term of the lease, can apply to the entire leasehold or certain areas) all permit an operator to avoid compliance with the requirements of a stipulation. Where these loopholes are permitted and used, the protections that the stipulations are supposed to provide can be undermined.

The draft EIS states broadly that:

> A stipulation included in an oil and gas lease would be subject to the following, as appropriate:
>
> - A waiver—A permanent exemption to a stipulation on a lease
> - An exception—A one-time exemption to a lease stipulation, determined on a case-by-case basis
> - A modification—A change attached to a lease stipulation, either temporarily or for the life of the lease
>
> The BLM Authorized Officer may authorize a modification to a lease stipulation only if they determine that the factors leading to the stipulation have changed sufficiently to make the stipulation no longer justified; the proposed operation would still have to meet the objective stated for the stipulation.
>
> While the BLM may grant a waiver, exception, or modification of a stipulation through the permitting process, it may also impose additional requirements through permitting terms and conditions to meet the objectives of any

[220] *See, e.g.*, DEIS vol. 1 at 3-205 (referencing unspecified protective measures to mitigate adverse impacts to night sky conditions from artificial light).

[221] DEIS vol. 1 at 3-116.

stipulation. This would be the case if the BLM Authorized Officer considers that such requirements are warranted to protect the land and resources, in accordance with the BLM's responsibility under relevant laws and regulations.[222]

The only other detail regarding how waivers, exceptions and modifications might be limited states:

> While the language in Table 2-2 refers only to the BLM or its Authorized Officer, it is understood that all activities, including plan development and consideration of exceptions, modifications, or waivers would include coordination with the USFWS as the surface management agency. In addition, the BLM would coordinate with other appropriate federal, state, and NSB agencies, tribes, and ANCSA corporations.[223]

The *only* specific conditions noted for granting a waiver, modification or exception appear in connection with Required Operating Procedure 46, which states: "Exemption waivers to this operating condition may be issued by the NMFS and USFWS on a case-by-case basis, based on a review of seasonal ice conditions and available information on marine mammal distributions in the area of interest."[224] BLM is fully capable of identifying specific conditions for waiver, modification and exception for lease stipulations. For example, in the recently-released proposed plan for managing greater sage-grouse in Colorado, BLM included the following detailed criteria for a modification to an NSO stipulation for drilling in priority habitat:

> ****Modification**:
> The BLM will grant modifications (changes to the stipulation either temporarily or for the term of either part of the entire lease) to NSO-2 after consultation with the State of Colorado, consistent with MD-SSS-3 and based on the following factors:
>
> 1. It is determined that there is no impact on Greater Sage-Grouse based on an evaluation of the proposed lease activities in relation to the site-specific terrain and habitat type. For example, in the vicinity of leks, local terrain features such as ridges and ravines may shield potential disruptive impacts from affecting nearby Greater Sage-Grouse habitat
>
> **or**
>
> 2. It is determined, based on site-specific information (using tools such as the Habitat Assessment Framework, the Colorado Habitat Exchange Habitat Quantification Tool, or others), that the impacts anticipated by the proposed activity would be fully offset through compensatory mitigation developed in coordination with the State of Colorado (as a requirement of State policy or authorization or as offered voluntarily by leaseholder) that meets principles of compensatory mitigation including:

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[222] DEIS vol. 1 at 2-3.
[223] DEIS vol. 1 at 2-4.
[224] DEIS vol. 1 at 2-37.

- achieving measurable outcomes for Greater Sage-Grouse habitat function that are at least equal to the lost or degraded values;
- providing benefits that are in place for at least the duration of the impacts;
- accounting for a level of risk that the mitigation action may fail or not persist for the full duration of the impact[225]

Without any criteria for granting waivers, exceptions and modifications, there is not reliability or foreseeability as to how and when the stipulations will be applied, resulting in little certainty that the stipulations will protect fish, wildlife, water, air, vegetation or wilderness. The lack of sideboards on granting waivers, exceptions and modifications also renders a NEPA analysis that relies on their effectiveness deficient, since their continued application depends on the unfettered discretion of the BLM authorized officer. The U.S. Government Accountability Office has opined that BLM's failure to have consistent standards or practices in waiving lease stipulations and operating procedures means that the effectiveness cannot be measured: "[W]ithout sufficiently detailed documentation of inspections and effective use of data from inspectors, BLM is unable to fully assess the effectiveness of its best management practices polity to mitigate environmental impacts."[226]

The draft EIS also relies on the ROPs to protect the other resources of the Coastal Plain, stating that the ROPs "describe the protective measures that the BLM would impose on applicants during the permitting process" and "with the lease stipulations, the ROPs also provide a basis for analyzing the potential impacts of the alternatives in this Leasing EIS."[227] While the ROPs similarly lay out requirements that apply to a variety of resources, the language on page 2-36 of the draft EIS for conditions permitting a waiver of ROP 46 implies that ROPs are also subject to waivers, exceptions and modifications, rendering them similarly questionable as a "basis for analyzing the potential impacts of the alternatives in this Leasing EIS." Moreover, the language in the draft EIS should be clearer that any and all applicable ROPs must be included in permits to drill. The current language provides that:

> Any applicant requesting authorization for an activity from the BLM will have to address the applicable ROPs in one of the following ways:
> - Before submitting the application (e.g., performing and documenting subsistence consultation or surveys)
> - As part of the application proposal (e.g., including in the proposal statements that the applicant will meet the objective of the ROP and how the applicant intends to achieve that objective)
> - As a term imposed by the BLM in a permit[228]

[225] Northwest Colorado Greater Sage-Grouse Proposed RMP Amendment and Final EIS at 2-7–2-8.

[226] U.S. Government Accountability Office, Oil and Gas Development: Improved Collection and Use of Data Could Enhance BLM's Ability to Assess and Mitigate Environmental Impacts (Apr. 2017).

[227] DEIS vol. 1 at 2-3.

[228] DEIS vol. 1 at 2-3.

This language implies that an operator could merely "address" ROPs in an application and not have the applicable requirements incorporated as legal requirements in a permit to drill that would be apparent in applicable NEPA review by the public and easily enforceable by the BLM. All ROPs must be incorporated into all relevant permits, just as all applicable lease stipulations must be incorporated into leases.

In order to rely on lease stipulations, BLM must set out narrowly prescribed waivers, exceptions and modifications to lease stipulations that are based on very specific criteria; having no sideboards, as the draft EIS currently proposes is not acceptable. Additional conditions governing waivers, exceptions and modifications that we propose include:

- Overall, one-time exceptions should be the preferred approach where relief is sought from protective stipulations, such that the safeguards prescribed in the stipulations will remain in place for the majority of oil and gas leases. If the BLM determines that a waiver or modification is more appropriate for any stipulation, the reasons for such decisions will be documented.

- Waivers, exceptions and modifications should only be granted from no surface occupancy (NSO) stipulations after a 30-day public notice and comment period.

- The U.S. Fish and Wildlife Service should have the opportunity to submit information for consideration prior to granting waivers, exceptions, or modifications to address its expertise, surface management obligations, and potential impacts on any listed species.

- Finally, it is critical that BLM track waivers, exceptions, and modifications requested and those granted, and make that information available to the public on a quarterly basis. These records will provide important insight into how the stipulations are being applied and the potential impact of waivers, exceptions, and modifications on the overall function of the EIS. This information will also allow BLM to determine if the availability of or criteria for granting waivers, exceptions and modifications needs to be further narrowed in order to ensure sufficient protection for affected species.

- ROPs should not be subject to waiver, exception, or modification and justification should be provided as to the use of any reason that an ROP would not apply.

In short, the draft EIS provides no analysis of or assurance that the mitigation measures it is considering will be effective or enforced. This violates NEPA. In light of these unanswered questions about the effectiveness and waivability of mitigation measures, BLM's repeated description in the draft EIS that they will reduce impacts is misleading and violates NEPA.

7. BLM Cannot Defer Its NEPA Analysis to Subsequent Stages of the Oil and Gas Process.

BLM acknowledges in the draft EIS that the issuance of a lease is an irretrievable commitment of resources.[229] But BLM also says that lease issuance does not cause any direct impacts in and of itself because it does not authorize any activities.[230] As a result, BLM defers a site-specific analysis until later.[231] This is contrary to law.

a. BLM Cannot Make an Irretrievable Commitment of Resources Without First Conducting a Site-Specific NEPA Analysis.

In the oil and gas context, projects and agency review typically follow a tiered process, with NEPA review beginning broad and becoming more site-specific at each later step. As part of the earliest and broadest level of decision-making, BLM develops a broad programmatic-level environmental analysis, such as a land use plan.[232] BLM next holds lease sales and issues leases for the use of a specific area.[233] Third, the lessee may apply for a permit to drill to develop its lease.[234] The level of detail required by NEPA at each step varies, and depends on the nature and scope of the proposed action.[235]

NEPA requires that agencies evaluate the environmental consequences of a project at an early stage of the planning process.[236] While agencies can "defer detailed analysis until a concrete development proposal crystallizes the dimensions of a project's probable environmental consequences,"[237] agencies are required to undertake site-specific analysis prior to making an irretrievable commitment of resources. As the Ninth Circuit explained, the key inquiry is not "*whether* the project's site-specific impact should be evaluated in detail, but *when* such detailed evaluation should occur."[238] An agency is required to fully evaluate site-specific impacts once it reaches the point of making "a critical decision . . . to act on site development."[239] An agency reaches the threshold triggering site-specific review when it proposes to make an irreversible and

[229] DEIS vol. 2 Appendix F at F-1.

[230] DEIS vol. 2 Appendix F at F-1.

[231] *See, e.g.*, DEIS vol. 1 at ES-4 ("Direct and indirect impacts cannot be analyzed on a site-specific basis within this EIS, but they are analyzed for the program area generally, based on the hypothetical development scenario.".

[232] *Pennaco Energy, Inc. v. U.S. Dep't of the Interior*, 377 F.3d 1147, 1151 (10th Cir. 2004).

[233] *New Mexico ex. rel. Richardson v. Bureau of Land Mgmt.*, 565 F.3d 683, 716 (10th Cir. 2009).

[234] *Id.*

[235] *California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982).

[236] *Id.*

[237] *Id.*

[238] *Id.* (emphasis added).

[239] *Friends of Yosemite Valley*, 348 F.3d at 800 (quoting *N. Alaska Envtl. Ctr. v. Lujan* (*NAEC*), 961 F.2d 886, 890–91 (9th Cir. 1992)); *see also Block*, 690 F.2d at 761 ("The standards normally applied to assess an EIS require further refinement when a largely programmatic EIS is reviewed.").

irretrievable commitment of resources.[240] In the oil and gas context, this occurs when an agency decides to issue a lease that does not contain an express provision retaining the agency's authority to fully prohibit later activities on those leases.[241] Once this critical decision-point is reached, "any vague prior programmatic statements are no longer enough" to satisfy NEPA.[242] Here, if BLM is going to make an irretrievable commitment of resources, it cannot defer its site-specific analysis and cannot rely on vague programmatic statements in the draft EIS.

BLM makes conflicting statements about the exact scope of the authority it will retain under any leases. On the one hand, BLM states that issuance of a lease constitutes an irreversible and irretrievable commitment of resources.[243] On the other hand, BLM claims that it retains at each decision stage "the authority to approve, deny, or reasonably condition any proposed on the ground-disturbing activity based on compliance with the terms and conditions of the lease and applicable laws and policies."[244] Because BLM has failed to provide even a template lease, and provides conflicting statements about the nature of the right it is granting under the leases, the public is unable to meaningfully determine the exact nature of these leases or whether BLM has truly retained the right to later preclude all activities on those leases. This is particularly concerning in light of how BLM has proceeded with issuing leases in the NPRA. In the NPRA, BLM has issued leases constituting an irretrievable commitment of resources, without first conducting a site-specific NEPA analysis; once development projects have arisen, BLM claims that it no longer retains the right to deny development proposals by adopting the no action alternative because "oil and gas leases provide a right of development."[245] BLM cannot play that shell game here. BLM needs to either fully retain the authority to preclude all activities pending submission of later site-specific proposals — i.e., not make an irretrievable commitment of resources — or conduct a far more robust, site-specific analysis at this stage. Put another way, BLM should acknowledge the difference between retaining authority to deny a particular application for a permit to drill or conduct other activities pursuant to a lease, and retaining the authority to preclude development altogether, even if that means barring access to some or all of the oil and gas associated with the leased parcel. Anything short of the latter irretrievably commits resources because some amount of damage will inevitably occur for the lessee to explore and extract the oil and gas resources. If BLM is granting rights with its leases and not retaining the authority to deny all activities, the exercise of those rights is a direct effect of this decision, which is contrary to BLM's often-repeated statement throughout the EIS that granting leases does not have direct impacts.[246] The effects of foreclosing a no action alternative for future

[240] *Block*, 690 F.2d at 761.

[241] *Conner v. Burford*, 848 F.2d 1441, 1448 (9th Cir. 1988).

[242] *Pit River Tribe v. U.S. Forest Serv.*, 469 F.3d 768, 784 (9th Cir. 2006).

[243] DEIS vol. 2 Appendix F at F-1.

[244] DEIS vol. 1 at 3-1.

[245] *See, e.g.*, BUREAU OF LAND MGMT., GREATER MOOSES TOOTH 2 OIL AND GAS DEVELOPMENT PROJECT: JOINT RECORD OF DECISION AND PERMIT EVALUATION 8 (2018) ("Alternative D is not a practicable alternative in the JROD, due to the fact that the BLM cannot select this alternative as its decision for GMT2. Once issued, oil and gas leases provide a right of development, subject to reasonable regulation.").

[246] *See, e.g.*, DEIS vol. 2, Appendix E, at E-4.

decisions must be disclosed now and evaluated as a direct effect of the leases. BLM should also provide the public with template lease language in the final EIS so it is clear that BLM has in fact retained the authority to fully preclude development on the leases to protect resources based on site-specific considerations. As discussed earlier, BLM should retain its authority to preclude all later activities on the leases to ensure that it is able to fully comply with the Tax Act's 2,000-acre provision.

BLM similarly fails to distinguish between what decisions are irreversible or irretrievable at this point in time and instead improperly defers to the IAP for the NPRA. The draft EIS states that a "detailed description of irreversible or irretrievable commitments of resources from oil and gas development on the North Slope is in Section 4.10 of the NPR-A EIS" and includes a bullet list of types of effects that would be irreversible.[247] These are effects of the leasing program as a whole, and fail to distinguish between what becomes irreversible now and what becomes irreversible at later decision points. It is important for the public to understand the effects that would occur solely because of a lease and this specific oil and gas program — as opposed to those that might occur from a potentially different program hundreds of miles away in the NPRA.

Relatedly, BLM cannot defer the analysis of foreseeable impacts by asserting that the consequences are unclear or that the agency will analyze the impacts at a later point in time when there is a development proposal if it is going to make an irretrievable commitment of resources.[248] Here, BLM claims that until it "receives and evaluates an application for an exploration permit, permit to drill, or other authorization that includes site-specific information about a particular project, impacts of actual exploration and development that might follow lease issuance are speculative, as so much is unknown as to location, scope, scale, and timing of that exploration and development."[249] If BLM does not have sufficient information at the lease sale stage to conduct a site-specific NEPA analysis, it can delay that analysis "provided that it reserves both the authority to *preclude* all activities pending submission of site-specific proposals and the authority to *prevent* access to oil and gas completely if the environmental consequences are unacceptable."[250] If there is too much uncertainty to conduct a more robust analysis at this stage, BLM has a choice: it must either reserve the authority to preclude all access to oil and gas and related activities on the leases or it must conduct a site-specific analysis prior to making an irretrievable commitment of resources.[251]

[247] DEIS vol. 1 at 3-248.

[248] *Kern*, 284 F.3d at 1072.

[249] DEIS vol. 1 at 3-1.

[250] *Ctr. for Biological Diversity v. BLM*, 937 F. Supp. 2d 1140, 1153 (N.D. Cal. 2013) (quoting *Sierra Club v. Peterson*, 717 F.2d 1409, 1415 (D.C. Cir. 1983)).

[251] *Id.*

b. BLM Cannot Shirk Its Responsibility to Consider All Foreseeable Direct and Indirect Impacts.

NEPA requires that an agency analyze the environmental consequences of a proposal as soon as it is "reasonably possible" to do so.[252] Although the scope of the agency's analysis in an EIS must be appropriate to the action in question, NEPA is also not "designed to postpone analysis of an environmental consequence to the last possible moment."[253] NEPA requires that this analysis be done "as soon as it can reasonably be done."[254] "Reasonable forecasting and speculation is . . . implicit in NEPA," and agencies cannot "shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry.'"[255] If it is "reasonably possible to analyze the environmental consequences in [a programmatic-level EIS], the agency is required to perform that analysis."[256] The EIS is required to provide "as much environmental analysis as is reasonably possible under the circumstances, thereby 'provid[ing] sufficient detail to foster informed decision-making' at the stage in question."[257]

There are several areas in the draft EIS where BLM does not analyze impacts on the basis that it will analyze those impacts at later stages. Examples where BLM has improperly deferred or completely failed to analyze impacts include the following:

- BLM did not complete a health impact assessment at this stage or analyze the potential health impacts of the oil and gas program, and instead plans to conduct that analysis as part of its analysis of later development projects.
- BLM improperly segmented its review and failed to analyze the foreseeable impacts of SAExploration, LLC's proposed seismic exploration program.
- BLM failed to analyze the foreseeable impacts to air quality that would be likely to occur from oil and gas activities on the Coastal Plain.
- BLM failed to conduct a visual resource impacts analysis and states it will do so in post-leasing NEPA processes.
- BLM inadequately considered the impacts of water withdrawals for oil and gas on water quantity despite there being much more information available to the agency regarding water quantity on the Coastal Plain and wildlife and habitat needs related to stream flow and water quantity.

BLM is obligated to analyze these foreseeable impacts to the extent possible at this stage and cannot postpone this analysis. BLM's failure to analyze these foreseeable impacts deprives the public of the ability to fully understand the potential consequences of the oil and gas

[252] *Native Village of Point Hope v. Jewell*, 740 F.3d 489, 497 (9th Cir. 2014).
[253] *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1072 (9th Cir. 2002).
[254] *Id.*
[255] *Id.* (quoting *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1246 n.9 (9th Cir. 1984)).
[256] *Id.*
[257] *Native Vill. of Point Hope*, 740 F.3d at 498 (quoting *Friends of Yosemite Valley*, 348 F.3d 789, 800 (9th Cir. 2003)).

program. BLM needs to revise and release the EIS with this information available for public review.

8. *BLM's Failure to Analyze SAExploration's Seismic Proposal in the Draft EIS Violates NEPA.*

a. BLM Has Improperly Segmented and Omitted Any Review of SAExploration's Seismic Proposal from Its Analysis of the Oil and Gas Program.

BLM's treatment of SAExploration, Inc.'s (SAE) proposal to conduct 3-Dimensional (3D) seismic surveys across the Coastal Plain of the Arctic Refuge is unacceptable and contrary to law. BLM is currently in the process of reviewing an application from SAE to conduct extensive 3D seismic surveys across the entire Coastal Plain.[258] Currently re-proposed for 2019–2020 and 2020–2021, the seismic program will involve two camps of 160 people, 12–15 tracked vibrators, 20,000 to 25,000 nodes, and 6,000–7,000 gallons of fuel usage per day, for each camp.[259] There would be approximately 50 trailers and support trailers that make up each camp, with generators, lighting, temporary airstrips, incinerators and waste discharges, and other industrial equipment and activities.[260] SAE would move the camps with heavy vehicles every two to three days, eventually covering the entire Coastal Plain.[261] Given the extent of the proposed program, there would be approximately forty to fifty different camp locations for each of the two crews throughout the Coastal Plain. Operations would continue 24 hours a day, 7 days a week.[262] The impacts from this extensive proposal from SAE will be significant — far more so than those associated with the two-dimensional seismic survey conducted in the 1980s, the scars of which remain detectable on the Refuge to this day.

To date, BLM has not publicly identified any source of authority for permitting pre-leasing seismic exploration anywhere in the Coastal Plain, nor is any such authority apparent. BLM should not pursue authorization for SAE to explore for oil and gas on the Coastal Plain unless and until it can identify such authority, and it should do so publicly, to justify the time and resources that BLM, other agencies, and the public would invest in a permitting process. Regardless, we oppose authorizing SAE to conduct seismic surveys even if BLM claims to have that authority, and strongly oppose any oil and gas activities on the Coastal Plain, including seismic exploration.

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[258] *See* U.S. Dep't of the Interior, Bureau of Land Mgmt., NEPA Register, DOI-BLM-AK-R000-2018-0040-EA (SAExploration, Inc. Seismic Application), *available at* https://eplanning.blm.gov/epl-front-office/eplanning/projectSummary.do?methodName=renderDefaultProjectSummary&projectId=111085 [hereinafter BLM NEPA Register].

[259] SAEXPLORATION, INC., MARSH CREEK 3D PLAN OF OPERATIONS WINTER SEISMIC SURVEY (2018), https://eplanning.blm.gov/epl-front-office/projects/nepa/111085/153349/187888/Marsh_Creek_Plan_of_Operations_Submitted_May2018.pdf [hereinafter SAExploration Plan].

[260] *Id.*

[261] *Id.*

[262] *Id.* at 9.

Legal authority aside, we also have significant concerns about BLM's failure to comply with NEPA with regard to SAE's proposal. BLM has a legal obligation to comply with NEPA's mandate to prepare a detailed EIS for any major federal action that may significantly affect the quality of the human environment. Despite this, BLM is currently in the process of preparing only an Environmental Assessment for SAE's proposal and is separately preparing the draft EIS for the leasing program.

In the draft EIS, BLM completely disregards the potentially serious direct, indirect, and cumulative impacts of SAE's proposal and omits any discussion about the significant impacts that will occur from the proposal. BLM makes only a handful of cursory references to SAE's proposal in the appendix for the EIS: (1) in a table where BLM notes that 3D seismic will be complete by the time BLM publishes the record of decision for the leasing EIS; (2) when noting in passing that BLM is preparing an EA related to a seismic proposal, and (3) when BLM provides a cursory summary of SAE's proposal and makes the wholly unsubstantiated claim that the agency considered SAE's proposal in its cumulative effects analysis.[263] The remainder of BLM's references to seismic activities in the EIS are only to post-leasing seismic activities and in no way address this hugely impactful seismic proposal.[264]

There is no indication BLM took a hard look at any of the potential direct, indirect, and cumulative impacts of SAE's seismic proposal in the EIS, as required by NEPA. BLM should have addressed the potentially significant impacts of seismic exploration on every resource considered in the EIS, but failed to do so. In one of the few areas where BLM acknowledged it is preparing an EA related to seismic, it stated "[s]eismic exploration will be further detailed in the seismic environmental assessment, which is in preparation."[265] In other words, BLM wholly omitted any substantive discussion of these significant impacts based on the assertion that it will discuss them in a separate, yet-to-be-completed EA. That is contrary to NEPA. BLM is obligated to take a hard look at the direct, indirect, and cumulative impacts of the entire oil and gas program in the draft EIS. BLM cannot simply ignore these significant impacts by pointing to another analysis that has yet to be completed and has yet to be made available to the public for meaningful review as a way to bypass its current NEPA obligations.

BLM's failure to adequately consider SAE's proposal also leads it to dramatically underestimate the potential impacts of seismic as a whole. BLM assumes that only 900 square miles will be surveyed by 3D seismic vehicles.[266] BLM makes this assumption based on what it

[263] DEIS vol. 2 at B-10, B-12, F-8.

[264] *See, e.g.*, DEIS vol. 1 at ES-1, ES-4, 1-2, 3-5, 3-13, 3-33.

[265] DEIS vol. 2 at B-12.

[266] DEIS vol. 2 at B-12; DEIS vol. 1 at 3-48. For purposes of its analysis of Alternative B, BLM asserts that it only anticipates there will be 500 line miles of seismic data collected. DEIS vol. 1 at 3-117. It is unclear whether this number is inconsistent with its assertion elsewhere that there would be only 900 square miles that would be surveyed. BLM should clarify or correct this potential inconsistency.

concludes is the size of a typical 3D survey, as seen in the NPRA and adjacent state lands.[267] But SAExploration's seismic proposal alone, which would encompass the entire Coastal Plain, is projected to cover 2,602 square miles.[268] Despite the significant impacts likely to occur from that proposal alone, BLM fails to discuss any of the impacts of pre-leasing seismic. It is also unclear how BLM's conclusion that there will only be 900 square miles of additional seismic surveys is consistent with reality. It does not appear to take into consideration the fact that seismic is often conducted as an ongoing activity that occurs throughout other stages of the oil and gas process, such as at the development and production stages for purposes of delineating oil and gas reservoirs, and not only prior to exploratory well drilling.

BLM also needs to revise its analysis to take into account potential delays in SAExploration's plans to conduct seismic exploration. The draft EIS assumes that multiple lease sales will be held within the first year after the signing of the Record of Decision, but also assumes that processed areawide three-dimensional seismic data will be available to all potential bidders at the time of the first lease sale.[269] If BLM still rushes to hold a lease sale by the end of 2019, that will presumably occur prior to SAE completing its proposed seismic activities. BLM needs to revise the draft EIS to account for any changes in SAExploration's proposal to ensure that the reasonably foreseeable future development scenario and any analysis stemming from those assumptions is accurate.

BLM's complete omission of any discussion about pre-leasing seismic activities, even outside of SAE's proposal, is also inconsistent with its statements in the EIS. On the one hand, BLM asserts for purposes of Alternative D that it would close 476,600 acres of caribou calving habitat to lease sales, but would still allow seismic activity over the entire program area.[270] First, BLM should not allow seismic activities in areas that are not subject to leasing. Areas that are off limits for purposes of leasing should also be off limits for purposes of seismic exploration. But second, BLM's statement that it will allow seismic in areas closed to leasing makes no sense unless BLM anticipates authorizing pre-leasing seismic in those areas, and yet BLM has wholly failed to consider pre-leasing seismic in the EIS. BLM's statement that it will allow seismic in areas that are closed to leasing, without any analysis of the potential impacts of those seismic activities, is contrary to NEPA and leads to the agency underestimating the potential impacts in its analysis. BLM's omission of any meaningful analysis of the impacts of SAE's proposal and other pre-leasing seismic activities, as well as its arbitrary conclusion that there will only be 900 square miles of seismic impacts, is contrary to NEPA and means BLM has dramatically underestimated the direct, indirect, and cumulative impacts of seismic surveys in the program area.

BLM cannot unlawfully segment out its review of SAE's seismic proposal from its consideration of the broader oil and gas program; the agency must prepare an EIS that examines the full range of potential impacts from all phases of oil and gas activities. BLM needs to

[267] DEIS vol. 2 at B-12.
[268] SAExploration Plan, *supra*, at 3.
[269] DEIS vol. 2 at B-8 & tbl.B-3.
[270] DEIS vol. 1 at 3-120.

examine how the potential impacts of seismic exploration would combine with those of all other ensuing, reasonably foreseeable oil and gas related authorizations in the region—including leasing, exploration, development, production, and transportation—in a single EIS to ensure that BLM will protect the resources of the Arctic Refuge.[271] The entire purpose of SAExploration's seismic program is to conduct seismic imaging to help inform potential targets for future lease sales on the Coastal Plain.[272] It is therefore intricately tied to BLM's consideration of the leasing program, and its impacts should be considered as part of the current EIS and not in a separate environmental analysis. BLM cannot improperly separate out its NEPA reviews of these directly connected and foreseeable actions, all of which have the potential to cause substantial impacts to the habitat and values of the Coastal Plain that have not been adequately considered by BLM as a result of its improperly carved up NEPA analysis.

b. BLM Has Prejudiced the EIS Process by Evaluating a Seismic Survey Application Prior to Finalizing the Current Leasing Program Decision.

When an EIS for a program is underway, as here, NEPA regulations established by the Council of Environmental Quality ("CEQ") prohibit an agency from taking any actions that could undermine that decision-making process. *See* 40 C.F.R. § 1506.1(c). The purpose of NEPA is to study the impact of an action on the environment before the action is taken. *See Conner*, 848 F.2d at 1452 (NEPA requires that agencies prepare an EIS before there is "any irreversible and irretrievable commitment of resources"). Where "[i]nterim action prejudices the ultimate decision on the program," NEPA forbids it. 40 C.F.R. §§ 1506.1(c)(1)-(3). Action prejudices the outcome "when it tends to determine subsequent development or limit alternatives." *Id*. Further, the agency may not take such interim action when that action is not "justified independently of the program" subject to the ongoing NEPA process. *Id*. at § 1506.1(c)(1).

During the scoping process for the DEIS, BLM asserted that the EIS here "will serve to inform BLM's implementation of the Tax Act, including the requirement to hold…lease sales" and "may also inform post-lease activities, including seismic and drilling exploration" and "will consider and analyze the potential environmental impacts of various leasing alternatives, including … the terms and conditions (i.e., lease stipulations and best management practices) to be applied to leases *and associated oil and gas activities* to properly balance oil and gas development with existing uses and conservation of surface resources."[273] As the DEIS itself evinces, the requirements and limitations to be imposed upon seismic surveys cannot be considered in isolation of the leasing program. Indeed, the alternatives presented in the DEIS include specific required operating procedures (ROPs) addressing seismic surveys.[274] The DEIS also contains lease stipulations that would ostensibly apply to seismic surveys conducted by lessees, such as keeping all oil and gas "activities" out of specified geographic areas during certain times of the year.[275] Plainly, these requirements to protect resources should constrain

[271] *See* 40 C.F.R. § 1508.25.
[272] SAExploration Plan, *supra*, at 3.
[273] 83 Fed. Reg. 17,562 (Apr. 20, 2018) (emphasis added).
[274] *See* DEIS vol. 1 at 2-20.
[275] *See* DEIS vol. 1 at 2-10.

seismic surveys regardless of whether the seismic survey occurs before or after leasing. Thus, in the current EIS process, BLM is making decisions on the standards to apply to seismic surveys.[276]

For BLM to authorize an extensive seismic survey prior to concluding this process, whereby it will decide upon the protective measures to apply to seismic exploration, invariably prejudices the process. To the extent that BLM has any authority to authorize seismic surveys at all, which is unclear and we do not concede, BLM would be confined by the requirement that BLM not authorize activities that would result in undue or unnecessary degradation to the resources of the Refuge. Consequently, if BLM authorizes extensive seismic surveys, like the one SAExploration has proposed, the necessity of any subsequent seismic surveys would have to be evaluated in light of the SAExploration survey having already collected information. In short, the effort to regulate the future surveys by developing requirements for them in this current EIS process will be circumvented by authorizing an extensive survey beforehand.

Moreover, any seismic survey authorized by BLM would lack justification in the absence of the leasing program. Again, if BLM actually has any authority to authorize seismic, which we do not concede, BLM still cannot authorize an activity that would result in undue or unnecessary degradation. Therefore no survey can occur without the program itself. There would be no reason to survey for oil and gas resources on lands unless they can be leased, thus the purpose of the proposed seismic survey as a practical matter turns on the leasing program. For this independent reason, BLM's approval of SAExploration's application prior to completion of the current process violates NEPA even if the ongoing NEPA process were not prejudiced by the interim action.

To correct this NEPA violation, BLM at a minimum should defer any authorization of seismic surveys at least until after it has properly completed the current EIS process and issued a record of decision on the program. Moreover, the current EIS process should transparently address that BLM is developing the standards and terms applicable to seismic survey applications, and the draft EIS must be revised to properly evaluate the impacts of those activities in this EIS and not a separate EA process.

9. DOI's process is insufficient to meet legal requirements for public participation and consultation.

To achieve NEPA's goal of ensuring public participation, the statute requires federal agencies to "[e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment."[277] "Accurate scientific analysis, expert agency comments, and

[276] Notably, although BLM puts forward ROPs and stipulations pertaining to seismic surveys, the draft EIS fails to analyze the foreseeable impacts of SAExploration, LLC's proposed seismic exploration program in the EIS process, despite purporting to analyze seismic exploration on the Coastal Plain generally.

[277] 40 C.F.R. § 1500.2(d).

public scrutiny are essential to implementing NEPA."[278] BLM must ensure that its process to consider an oil and gas program on the Coastal Plain allows for robust participation by the interested public.[279] Groups pointed out in scoping comments that the time and page limits envisioned by DOI Secretarial Order 3355 and associated guidance memoranda are particularly inappropriate for an oil and gas program for the Coastal Plain. Groups also pointed out that any leasing process on the Coastal Plain should be based on science and sound decision-making and not driven by political deadlines. Groups' also supported requests by the Gwich'in Steering Committee to translate all EIS documents into Gwich'in, so that affected communities could engage in this process. Though BLM provided some resources for the Arctic Village Council to undertake translation which was completed on March 10, 2019 — a mere three days before the close of the public comment period. Moreover, only a portion of the EIS was translated into Gwich'in, such as the sections on cultural resources, subsistence uses and resources, and ANILCA 810, while the vast majority of the document remains in English only. While we appreciate that BLM responded to requests to provide such resources, translated materials were necessary during the entirety of comment period to allow for meaningful review and comment. Even more concerning, appears to have failed to translate scoping comments from Gwich'in speakers into English so that they could be incorporated into the agencies analysis.[280] BLM thus ignored important input from affected communities during scoping, and has made further continued participation by these communities exceedingly difficult. BLM's flawed analysis and public process have shown these concerns to be well-founded.

a. BLM's Approach to Issue a Short EIS Improperly Truncates the EIS Analysis.

An oil and gas program for the Coastal Plain is unprecedented and BLM has failed to provide the public with a document sufficient for commenting. Because BLM has not considered the full scope of impacts in the draft EIS, such as impacts from all phases of oil and gas development, meaningful mitigation measures, and meaningful analysis of differing impacts among alternatives, the public cannot review or comment on these issues. BLM's attempt to adhere to arbitrary page limits has resulted in less transparency in the analysis, more mistakes, and missing key data and analysis, as explained in detail below. While BLM did not necessarily adhere to the page limits in the Executive Order and guidance memorandum, its attempt to do so has led to the many documents simply being incorporated as appendices, resulting in a disjointed analysis that is hard for the public to follow.

As discussed later in these comments, BLM has also referred to or incorporated by reference numerous documents into its current analysis as a way of further truncating its analysis in the draft EIS. However, BLM has done so without citations to specific pages in those documents and often without any clear indication of how the analysis in the previous document applies in the context of the current proposal before the agency. This is improper and deprives the public of the ability to fully understand and comment on BLM's analysis and the potential impacts of the oil and gas program.

[278] *Id.* § 1500.1(b).
[279] 40 C.F.R. § 1503.1(a)(4).
[280] *See e.g.*, Transcript from Venetie scoping meeting, at 19-20 (Jun. 12, 2018).

b. BLM's Hasty Timeframes are Impeding Meaningful Public Review.

Moreover, BLM's timeframes for review of the draft EIS are insufficient to allow for meaningful public involvement. Ensuring that the public has sufficient time to receive and review all of the documents and understand their relationship to what is being proposed is essential to the public's ability to analyze and provide meaningful comments to the agency on the project. BLM has stated that it intends to hold a lease sale this year and is rushing toward that goal at the expense of the public and a thorough analysis. Rushing the analysis and public review is not consistent with BLM's obligations when considering an issue as important and controversial as destructive oil and gas exploration and development on the Coastal Plain. The public interest and controversy of this project is demonstrated by the over 700,000 comments submitted during scoping. Careful public scrutiny of BLM's proposal is needed.

The public comment period offered for this EIS was simply too short to allow for meaningful opportunity to comment. BLM established a 7-week comment period over the winter holiday season, when workplaces, including federal offices, are closed and many people travel to visit family. Having the comment period include the holiday season effectively shortened the comment period by a number of days. In light of this, many of our groups and tribal entities submitted requests for a comment extension before the winter holidays for an additional 77 days. BLM rejected this request, adding only 30 days to the comment period to account for the government shutdown (which was in fact longer than 30 days). It is particularly inappropriate for BLM to limit the length of public comment periods when tribal entities ask for additional time.

The public comment period was also seriously hindered by the government shutdown, and BLM did not extend the comment period to cover the whole of the shutdown (BLM extended the comment period for 30 days, while the shutdown was 35 days). At the end of the day on December 21st, funding for the Department of the Interior lapsed. Despite agency guidance that websites are to remain active during a shutdown, BLM's Coastal Plain e-planning page and comment portal were unavailable at various points during that time (Dec. 22–26 and Dec. 28, Jan. 21), meaning that no one could access the draft EIS and related documents or utilize the commenting portal. In addition, BLM staff have not been available to answer questions and respond to information requests or to provide cited materials. The lack of staff and online availability during the shutdown made it impossible for the public to engage in meaningful review during that time period. The shutdown also led to confusion over whether and when public meetings will be held on the Draft EIS, due to BLM's continued efforts to schedule these meetings when agency staff should not have been working.[281] As explained in correspondence to the agency requesting extensions, the shutdown seriously hindered public ability to participate.[282]

[281] *See* Alex DeMarban, *Shuttered agency continues efforts to open up drilling in refuge, reserve*, ANCHORAGE DAILY NEWS, Jan. 7, 2019; Elizabeth Harball, *Despite shutdown, Trump administration continues work to begin oil drilling in ANWR*, ALASKA PUBLIC MEDIA, Jan. 4, 2019.

[282] *See* Letter from Alaska Wilderness League, *et al.* (January 23, 2018).

Moreover, the agency failed to provide sufficient notice of its public hearings or hold sufficient public hearings to involve the public in this important process and decision. On the first issue, BLM announced its public hearing schedule on Wednesday, January 30th. The hearing dates were as follows: Fairbanks- February 4th; Kaktovik-February 5th; Utqiagvik-February 6th; Fort Yukon-February 7th; Arctic Village-February 9th; Venetie-February 10th; Anchorage-February 11th; and Washington, D.C.-February 13th. This means that every single hearing was given less than two weeks' notice, and the Fairbanks hearing was given only 4-days notice. Additionally, many meetings were held primarily — or even exclusively in the case of Fort Yukon — during the work day, further limiting the public's ability to participate. On the issue of additional hearings, groups requested that additional hearings be held to allow greater public participation and recommended four cities for additional hearings. BLM denied this request as well. Additionally, we note that only after BLM's attempts in major cities to host "open-houses" failed, did BLM allow the public to provide formal testimony. In Fairbanks, where BLM did not originally provide an opportunity for formal testimony, many individuals provided testimony prior to BLM moving a transcriber into the room. BLM should transcribe any audio or video recordings of that hearing to ensure that the complete hearing and all testimony is part of the administrative record.

This comment period on the Draft EIS was insufficient to meet BLM's NEPA obligations to provide robust participation by the interested public, given the pristine and sensitive resources, the complexity of the issues and analysis required, and the timing of the proposal.[283]

c. BLM is Failing in its Consultation Obligations.

The Gwich'in people live in fourteen small villages across a vast area extending from northeast Alaska to the northern Yukon and Northwest Territories in Canada. It is unclear which communities have been contacted by BLM for consultation. Though the Inupiat community of Kaktovik is the only community located on the Coastal Plain, other villages such as Arctic Village, Fort Yukon, Venetie, Chalkyitsik, Beaver, and Canadian villages such as Old Crow and Fort McPherson, are located within the range for the Porcupine Caribou Herd and will be impacted by any oil and gas activities on the Coastal Plain.[284] BLM also recognizes that many other communities, such Wiseman, Birch Creek, and Stevens Village, have reported geographic, historic/prehistoric, or cultural ties to the Arctic Refuge as a whole.[285] BLM further acknowledges that subsistence harvesting and sharing patterns for "22 Alaskan communities and seven Canadian user groups are relevant if post-lease oil and gas activities changes caribou resource availability or abundance for those users."[286] However, BLM has not meaningfully engaged with all of these potentially affected communities.

[283] 40 C.F.R. § 1503.1(a)(4).

[284] Gwich'in Steering Committee, Primary Habitat of the Porcupine Caribou Herd Map, *available at*: http://ourarcticrefuge.org/wp-content/uploads/2012/10/mappch.pdf.

[285] DEIS vol. 1 at 3-160.

[286] DEIS vol. 1 at 3-167.

Tribal governments for every affected community within Alaska and Canada should have been contacted for government-to-government consultation. BLM does not provide a list of the tribal governments that the agency reached out to for purposes of government-to-government consultation. The EIS merely lists the 7 meetings which took place.[287] It is concerning that only 7 government-to-government meetings took place for an oil and gas leasing program that may significantly impact subsistence in 29 different communities. Moreover, there is no indication that BLM contacted any communities in Canada for purposes of consultation or public meetings. This is egregious, particularly in light of the fact that Canadian users account for the vast majority – in the past up to 85 percent - of the harvest of the Porcupine Caribou Herd.[288]

Moreover, BLM's ANILCA 810 evaluation finds that the cumulative case may significantly restrict subsistence uses and needs for the community of Kaktovik. Due to these findings, the agency intends to hold a public subsistence hearing in Kaktovik during the Draft EIS comment period, but will not hold ANILCA 810 hearings in any other communities, including any Gwich'in communities. The finding that there may not be impacts to subsistence use and resources for Gwich'in villages is contrary to science and BLM's own discussion elsewhere in the Draft EIS. The Gwich'in of Alaska and Canada are culturally and spiritually connected to the Porcupine Caribou Herd, which in turn relies on the Coastal Plain for calving, post-calving and summer habitat. Because of this connection, protecting the Coastal Plain is vital to their human rights and food security. Despite acknowledging that oil and gas can have impacts on caribou, BLM concludes that there will not be an impact on the subsistence resources for the Gwich'in. This ignores the traditional knowledge and human rights of the Gwich'in, a problem which is exacerbated by the fact that BLM will not hold ANILCA 810 hearings in any Gwich'in communities.

BLM has repeatedly failed to listen carefully to the millions of Americans and the Gwich'in Nation and take the time to conduct the necessary analysis comply with its federal and international legal obligations. BLM failed to engage the public, the scientific community, and Alaska Natives and Canadian First Nations people who will be most impacted by this decision.

10. DOI and BLM's FOIA Deadline Violations Impeded Public Participation.

DOI and BLM's failure to disclose information sought by our numerous outstanding Freedom of Information Act (FOIA) requests hindered the public's ability to participate. FOIA promotes government transparency and requires agencies to make certain information available to the public.[289] An agency has twenty workdays to respond to a request, and may take an additional ten when unusual circumstances are involved.[290] Some Groups have numerous outstanding FOIAs to BLM, DOI (denoted by OS below), FWS, and USGS, specifically seeking information to assist the public and our preparation of leasing DEIS comments. These include but are not limited to:

[287] DEIS vol. 2 at Appendix C-3.
[288] DEIS vol. 1 at 3-168.
[289] 5 U.S.C. 552.
[290] 43 C.F.R. §§ 2.16, 2.19.

- BLM-2018-00690 due May 1, 2018
- BLM-2018-00695 due May 3, 2018
- OS-2018-00980 due May 3, 2018
- USGS-2018-00130 due May 3, 2018
- OS-2018-00971 due May 15, 2018
- FWS-2018-00940 due July 18, 2018
- USGS-2018-00126 due July 26, 2018
- OS-2018-01415 due July 26, 2018
- BLM-2018-01011 due July 26, 2018
- FWS-2018-1008 due July 26, 2018
- BLM-2018-01143 due September 4, 2018
- FWS-2018-01120 due September 4, 2018
- OS-2018-01484 due September 18, 2018
- BLM-2018-01234 due October 23, 2018
- OS-2019-00166 due December 21, 2018
- OS-2019-00205 due January 3, 2019
- OS-2019-00241 due January 15, 2019
- OS-2019-00261 due January 17, 2019
- BLM-2019-00324 due February 7, 2019
- OS-2019-00314 due February 7, 2019
- OS-2019-00315 due February 7, 2019
- OS-2019-00378 due March 7, 2019

The above FOIAs request material related to the leasing DEIS including: the Tax Cut and Jobs Act of 2017; SAExploration's seismic proposal, development of lands owned by Kaktovik Inupiat Corporation and Arctic Slope Regional Corporation; David Bernhardt, Joseph Balash, James Cason, and Steve Wackowski's schedules, ethical pledges, meeting requests; records related to the leasing DEIS's compliance with Secretarial Order 3355; leasing DEIS records subject to the National Archives and Records Administration notice of availability of proposed records schedules;[291] and communications and records concerning the Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd and the U.S.-Canada International Porcupine Caribou Board. The documents sought by our requests are records, communications, policies, plans, technical and scientific assessments relevant to the DEIS. Our requests and subsequent follow-up letters have emphasized that time is of the essence to receive the documents as we planned to use the information to engage and inform the public about proposed oil and gas development in the Arctic National Wildlife Refuge, including during the DEIS comment period. BLM and DOI's FOIA violations thwarted the purpose of FOIA and hindered public participation, as we were unable to disseminate the relevant requested information during the public comment period.

[291] 83 Fed. Reg. 45,979 (Sept. 11, 2018).

11. BLM Failed to Engage or Adequately Involve Important Cooperating Agencies.

CEQ regulations call for early and significant involvement by other federal agencies with jurisdiction by law or special expertise.[292] While the draft EIS lists the Environmental Protection Agency and U.S. Fish & Wildlife Service as other federal cooperating agencies, it inexplicably does not include the U.S. Geological Survey (USGS) or the National Marine Fisheries Service (NMFS) — both of which have significant and critical expertise relevant to the development of an oil and gas program for the Coastal Plain. Indeed, BLM's Reasonably Foreseeable Development (RFD) Scenario — which underpins the alternatives and impacts analysis — is premised largely on USGS data and information. Yet, our understanding is that USGS did not participate in the preparation of the RFD and was unable to lend its critical expertise, resulting in fundamental and significant flaws in the entire basis for the draft EIS.[293]

Similarly, NMFS has significant expertise in and jurisdiction by law over marine mammals and fish species. For instance, NMFS is responsible for designating, managing, and consulting with BLM on Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation & Management Act. NMFA also has statutory obligations regarding management of marine mammals relevant to BLM's analysis of the impacts of an oil and gas program under the Endangered Species Act and Marine Mammal Protection Act. Absent meaningful cooperation with these federal agencies, BLM's analysis lacks important information that these expert federal agencies could contribute.

Additionally, it appears that existing cooperating federal agencies' participation has been truncated or limited. Specifically regarding FWS, there are numerous issues and impacts identified by BLM that are highly relevant to FWS's administration and management of the Refuge, but it is unclear how BLM and FWS are working to address these issues or how FWS will undertake its independent obligations in light of the oil and gas program.

12. BLM Improperly Relies on Other Documents in the Draft EIS.

To "eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision," NEPA regulations allow agencies to "tier" environmental assessments and environmental impact statements to previous environmental impact statements.[294] "Tiering" means the agency may incorporate by reference discussions from a prior, broader environmental impact statement into the current environmental analysis so that the agency can concentrate on the issues specific to the current environmental analysis.[295] Tiering is appropriate when the sequences of analysis is either from a programmatic-level statement to an analysis of lesser scope or to a site-specific analysis, or when an EIS is done on a specific action at an early stage to a supplement or subsequent statement at a later stage.[296] BLM's NEPA Handbook similarly states

[292] 40 C.F.R. § 1501.6.
[293] *See infra* Part IV.A.
[294] 40 C.F.R. § 1502.20.
[295] 40 C.F.R. § 1502.28.
[296] *Id.*

that tiering is appropriate when the analysis for the proposed action will be a more site-specific or project-specific refinement or extension of the existing NEPA document.

The Council on Environmental Quality's (CEQ) regulations also indicate that agencies can incorporate material by reference "when the effect will be to cut down on bulk without impeding agency and public review of the action."[297] Any incorporated material is required to be cited in the statement along with a brief description of its content.[298] Material cannot be incorporated by reference unless it is reasonably available for inspection within the public comment period.[299] BLM's NEPA Handbook explains that incorporation by reference involves two steps: citation and summarization.[300] In citing documents, BLM must provide the name of the document and the page numbers where the incorporated material can be found.[301] BLM is supposed to "[m]ake this citation as specific as possible so there is no ambiguity for the reader about what material is being incorporated."[302] BLM is also supposed to summarize the incorporated material. BLM is supposed to describe the content of the incorporated material and place it in the context of the specific NEPA document.[303] The NEPA document is where the agency's explanation of its findings and conclusions must be found.[304] BLM should "summarize the previous analysis, and explain what you conclude based on that previous analysis and how it relates to the action in question."[305] This summary is supposed to be "sufficient to allow the decision-maker and other readers to follow the analysis and arrive at a conclusion."[306]

BLM refers to and incorporates by reference numerous documents that collectively amount to thousands of pages, without providing citations to specific pages in these documents and without an adequate explanation of how they are being relied on in this specific context.[307]

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[297] 40 C.F.R. § 1502.21.

[298] *Id.*

[299] *Id.*

[300] BUREAU OF LAND MGMT., NATIONAL ENVIRONMENTAL POLICY ACT HANDBOOK H-1790-1, at § 5.2.1 (2008).

[301] *Id.*

[302] *Id.*

[303] *Id.*

[304] The Supreme Court has held that NEPA "guarantees that the relevant information will be made available to the larger [public] audience." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349, (1989). A NEPA document must "provide the public with a basis for evaluating the impact" of the proposed action. *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1150 (9th Cir. 1998).

[305] *Id.*

[306] *Id.*

[307] *See, e.g.*, DEIS vol. 1 at 3-133 ("The Final EIS on Effects of Oil and Gas Activities in the Arctic (NMFS 2016a) provides detailed descriptions of potential impacts of petroleum-related industrial activities on marine mammal populations, including seismic exploration and drilling activities.").

This is improper.[308] BLM cannot reasonably expect the public to pore over entire EIS's in order to locate the basis for its assertions. BLM is required to provide this information to the public and to fully explain how the information applies in the context of this specific decision. The EIS must be revised to include page numbers for all citations to external documents and re-released. BLM must also summarize and describe the information that it is incorporating, rather than simply offering unexplained and conclusory statements that point to other documents.[309] The summary of the incorporated material must be sufficient to allow the decision-maker and other readers to follow the analysis and arrive at a conclusion. The EIS should be revised to ensure that analyses and conclusions incorporated by reference allow readers to follow the analysis and arrive at a rational conclusion.

As a general matter, BLM's reliance on documents and materials concerning the NPR-A to support its analysis for the impacts of oil and gas activities on the Coastal Plain is questionable. As explained in greater detail and specificity below, the Coastal Plain is very different in fundamental ways from the western Arctic. For example, the main physiography of the NPR-A is thaw-lake plain, but this regime only covers 3% of the Coastal Plain. Additionally, the hydrology of the NPRA and the Coastal Plain is very different. Relying on the analysis for an area that is distinct from the Coastal Plain is improper. If BLM believes that there are relevant parts of analyses despite these differences between the two areas, the agency must explain that, articulating the differences and providing its rational for why it can still rely on that analysis. This was not done in the draft EIS but it is critically important. Additionally, to the extent that the BLM is relying on the CCP in this draft EIS, BLM cannot rely on this document for its analysis of the impacts of oil and gas, as the FWS did not consider oil and gas impacts in that document.

BLM also improperly tiers to multiple documents, including the Greater Mooses Tooth 2 decision and the NPRA Integrated Activity Plan, amongst other documents. For example, BLM in its analysis of solid and hazardous waste indicates generally that its analysis of the impacts of solid waste, wastewater, produced fluids, drilling muds, and spills of oil, salt water, and hazardous substances are tiered in general to the GMT-2 and IAP decisions.[310] BLM expands to a very limited extent on the spill information, but otherwise wholly bypasses any analysis of these impacts on the basis that it is tiering to those other documents. At no point does BLM provide any page cites for precisely what it is tiering to in those documents. BLM also fails to

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[308] *See* DEIS vol. 1 at 3-61, 3-210; *see, e.g.. Kern v. Bureau of Land Mgmt.*, 284 F.3d 1062 (9th Cir. 2002) (stating that it is not enough to cite to documents to which an EA is tiered as a justification for failure to consider cumulative impacts analysis in a site-specific EA and that those documents must have addressed the impacts in question). In order to properly tier to these documents, BLM must point to where these documents considered all relevant cumulative impacts.

[309] *See e.g.*, DEIS vol. 1 at 3-137 ("The USFWS (2006, 2008b, 2009; 81 FR 52276) has concluded that the types of activities typical of oil and gas exploration, development, and production projects in northern Alaska were not likely to have population-level effects on polar bear populations at the levels analyzed in developed areas.").

[310] DEIS vol. 1 at 3-61.

provide a meaningful summary of the information in those documents so the public can understand what analysis it is relying on and how that analysis might apply or not apply in this context. The public cannot meaningfully determine what BLM is relying on or how it may or may not apply in the Coastal Plain from such a limited and cursory cross-reference to those other documents. The GMT-2 decision and the IAP also relate to wholly different areas and completely different developments and decisions. It is generally not appropriate for BLM to tier to those analyses, which in no way relate to the area or action at issue in this draft EIS. As the CEQ regulations state, a document can be tiered "whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action *included within* the entire program or policy."[311] BLM can hardly argue an analysis of impacts to the Coastal Plain was "included within" the GMT-2 and IAP decisions when the Coastal Plain was not a part of that analysis.

13. The Draft EIS Contains Inconsistencies Making Commenting Extremely Challenging

The draft EIS contains important inconsistencies that must be remedied in a revised draft EIS to enable reasonable public comments. These inconsistencies include but are not necessarily limited to the following two examples.

Appendix B says that mean oil production in the Coastal Plain is estimated at 3.4 BBO by 2050.[312] This estimate is used to develop the number of spills and spill sizes.[313] Appendix B also says, however, that "the projected ultimate recovery in the Coastal Plain is estimated to be anywhere from 1.5 BBO to 10 BBO…"[314] This range of values is not used in the spill analysis. Based on the limited seismic, well, and geologic data available to estimate production, it seems technically supportable for BLM to utilize a range of production values in its analyses.

The draft EIS is inconsistent in its acreage numbers for each anchor development, listed in most places as 750 acres.[315] In the draft EIS analysis of development impacts on subsistence, however, it states in two places that an anchor development consists of only 488 acres.[316]

Note that these two examples are not insignificant or unimportant parts of the NEPA analysis and its ultimate findings and conclusions.

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[311] 40 CFR § 1502.20 (emphasis added).
[312] DEIS at B-1.
[313] DEIS at 3-38.
[314] DEIS at B-18.
[315] DEIS at 3-71, 3-93, 3-95, 3-97, 3-112, F-21 and F-27.
[316] DEIS vol. 2 Appendix E at E-9.

C. BLM'S DRAFT EIS FAILS TO ACKNOWLEDGE AND COMPLY WITH REFUGE LEGAL MANDATES.

The Coastal Plain is part of the Arctic National Wildlife Refuge, the largest and wildest unit of the National Wildlife Refuge System. In scoping comments, Groups identified that in developing the EIS, BLM must pay particular attention to refuge law and polices that govern both the Arctic Refuge specifically and the National Wildlife Refuge System more broadly, including addressing the management role of FWS, the conservation purposes of the Coastal Plain, and Refuge System management laws and policies.[317] BLM has failed to do so in the draft EIS, rendering the draft EIS deficient.

1. BLM Failed to Acknowledge and Fully Account for the U.S. Fish and Wildlife Service's Role as the Sole Administrator and Primary Management Agency of the Coastal Plain.

The U.S. Fish and Wildlife Service is the administrator and management agency for the entire Arctic Refuge.[318] While the Tax Act instructed that the Secretary, acting through the BLM, will establish and manage the oil and gas program on the Coastal Plain,[319] the legislation did not otherwise alter or supplant the FWS administration and management role and obligations for the Coastal Plain or for the entire Arctic Refuge. FWS is the science and resource expert for the Arctic Refuge and the Coastal Plain.[320] The Secretary cannot abdicate any management authority to the BLM beyond the limited role provided for in the Tax Act to establish and manage an oil and gas program in the Coastal Plain.[321] FWS and Interior are still subject to the requirements of other statutes, such as the NWRSAA and ANILCA, which were in no way abrogated or limited by the Tax Act.

Despite having raised this issue during scoping, BLM fails to fully acknowledge or explain FWS's role. While BLM states that FWS "is the predominate land manager in the program area,"[322] BLM does not explain what this means. To be clear, FWS is the sole administrator of the Arctic Refuge. BLM has failed to explain how FWS's superior role impacts both BLM's management of the oil and gas program as well as how the oil and gas program fits into FWS's administration of the Refuge overall. In other situations where DOI has granted some measure of jurisdiction over refuge management to agencies other than FWS, courts and Congress have clarified that the ultimate decisions about resource uses, impacts, mitigation, and

[317] Scoping Comment Letter at 12–16.

[318] 16 U.S.C. § 668dd(a)(1); ANILCA § 304(a).

[319] Pub. L. 115-97, Title II, sec. 20001(a)(2), (b)(2)(A), (3).

[320] In this capacity, FWS should approve all Refuge activities, including oil and gas activities.

[321] *Trustees for Alaska v. Watt*, 524 F. Supp. 1303, 1309–10 (D. Alaska 1981), aff'd 690 F.2d 1279 (9th Cir. 1982).

[322] DEIS vol. 1 at ES-2, 1-2.

regulatory compliance must be made by FWS.[323] In particular, as the court recognized in *Trustees v. Watt*, ANILCA and the NWRSAA mandate that refuges be administered solely by FWS; split administration is not permitted.[324] As the sole administrator of the Arctic Refuge, FWS has a superior role to BLM, and no administration functions may be performed by BLM. The EIS must be revised to explain and accurately characterize this structure.

Without more information about how DOI is structuring the relationship between the BLM and FWS, and how FWS administration and management actions may be impacted by the oil and gas program, the public cannot be sure that Secretary is complying with ANILCA and the NWRSAA regarding administration and management of the Refuge by FWS. BLM must clarify this information, and in doing so, it must be sure that its roles and responsibilities are consistent with current laws regarding Refuge administration.

2. BLM Fails to Acknowledge or Address the Original Conservation Purposes of the Arctic Refuge.

While BLM purports to recognize the purposes of the Arctic Refuge, it repeatedly recognizes only an incomplete set of purposes, fails to acknowledge that the conservation purposes are the priority purposes, and overall fails to ensure that the oil and gas program will be consistent with these priority conservation purposes.

Prior to the passage of the tax bill, there were seven articulated purposes for the Coastal Plain: those from the original 1960 Range designation and the additional four added by ANILCA.[325] Those seven purposes include (1) preserving wildlife values, (2) preserving wilderness values, (3) preserving recreation values, (4) conserving fish and wildlife and habitat, (5) meeting international treaty obligations regarding fish, wildlife, and habitat, (6) continuing to provide for subsistence, and (7) protecting water quantity and quality needed to meet fish, wildlife, and habitat needs.[326]

BLM repeatedly fails to include the original three purposes from the 1960 Range designation among the recognized Arctic Refuge purposes in the draft EIS, acknowledging only the four ANILCA purposes.[327] FWS policy is clear the original three purposes set out in PLO 2214 apply to the Coastal Plain equally.[328] BLM must include the three purposes from PLO 2214

[323] Pub. L. No. 94-223, 90 Stat. 199 (Feb. 27, 1976) (codified at 16 U.S.C. § 668dd(a)(1); *Trustees for Alaska v. Watt*, 524 F. Supp. at 1309–10.

[324] 524 F. Supp. at 1305, 1310.

[325] ANILCA §§ 303, 305; CCP Final EIS, Chapter 1 at 1-21.

[326] PLO 2214 at 1; ANILCA § 303(2)(B). There are numerous other purposes that apply as well from broader management statutes and policies, like the National Wildlife Refuge Administration Act and the Wilderness Act.

[327] DEIS vol. 1 at ES-1. 1-1, 2-1, DEIS vol. 2 at D-3.

[328] ANILCA § 305; FWS Refuge Management Part 601 National Wildlife Refuge System, 601 FW 1 at 1.16 (July 26, 2006); U.S Fish and Wildlife Service, Arctic National

among the purposes of the Coastal Plain outlined in the draft EIS. Additionally, the BLM must include these three purposes with the ANILCA purposes when identifying the Refuge purposes with which the oil and gas program must be consistent. By not recognizing or including the original three purposes in its analysis, BLM cannot ensure that an oil and gas program would be consistent with Refuge purposes. For example, by failing to recognize that protecting wilderness is a purpose of the Coastal Plain, BLM is not including any stipulation or required operating procedure that would protect these values in the Coastal Plain. Instead, the wilderness-related stipulation only attempts to protect the wilderness values in the Mollie Beattie designated Wilderness area of the Refuge, and even then only for one alternative.[329]

Additionally, while the Tax Act added an additional purpose for the Coastal Plain of an oil and gas program,[330] the Tax Act did not prioritize the oil and gas purpose over any of the seven pre-existing purposes and in no way altered the applicability of the NWRSAA or ANILCA. Accordingly, as Groups pointed out in their scoping comments, FWS policy instructs that the oil and gas purpose of the Coastal Plain is subservient to the seven conservation purposes. FWS's policy manual states the following regarding refuges with multiple purposes and priority of purposes:

> **1.15 If a refuge has multiple purposes, do some purposes take priority over others?** Purposes dealing with the conservation, management, and restoration of fish, wildlife, and plants and the habitats on which they depend *take precedence over other purposes* in the management and administration of a refuge unless otherwise indicated in the establishing law, order, or other legal document. The Improvement Act states that "compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management."[331]

Despite this clear and directly applicable policy, the EIS fails to recognize that the seven conservation purposes are the priority purposes for the Coastal Plain and BLM fails to address how the proposed program will impact these existing purposes. For example, the draft EIS does not specifically evaluate whether the existing purposes will be met by each alternative and does not include an analysis of whether the lease stipulations, required operating procedures, and proposed mitigation measures are sufficient to ensure that the pre-existing Refuge purposes will continue to be achieved. The EIS must be revised to thoroughly consider these issues. The failure of the EIS to specifically consider the purposes when considering protective measures is

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Wildlife Refuge, Revised Comprehensive Conservation Plan Final Environmental Impact Statement, Chapter 1 at 1-21 [hereinafter CCP Final EIS].

[329] DEIS vol. 1 at 2-15–2-16. As explained below, this stipulation is insufficient. *See supra*, part V.T.3.

[330] Pub. L. 115-97, Title II, sec. 20001(b)(2)(B)(iii).

[331] U.S. Fish and Wildlife Service, 601 FW 1, 1.15, National Wildlife Refuge System Mission and Goals and Refuge Purposes (July 26, 2006) (emphasis added), *available at:* https://www.fws.gov/policy/601fw1.html. Congress is presumed to know these policies when it passes laws.

particularly concerning given that the lease stipulations and required operating procedures can all be waived, exempted, or modified on a case-by-case basis.[332] It is equally unclear what role FWS had developing the program to ensure consistency with FWS's administration of the Refuge to ensure that refuge purposes can be met, as required by law.

3. BLM Fails to Address the Refuge Compatibility Mandate.

Compatibility is a cornerstone of refuge management.[333] The compatibility requirement obliges FWS to determine whether proposed "uses are compatible with the major purposes for which such areas were established."[334] Section 304(b) of ANILCA adopted the compatibility standard for refuges in Alaska and indicates that the Secretary cannot authorize any use or grant easements for any purposes unless that use is compatible with the purposes of the Refuge. FWS policy describes a "compatible use" as "[a] proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the national wildlife refuge."[335] "Refuge use" is defined as "[a] recreational use (including refuge actions associated with a recreational use or other general public use), refuge management economic activity, or other use of national wildlife refuge by the public or other non-National Wildlife Refuge System entity."[336]

Despite the clear compatibility requirements, BLM fails to acknowledge them, let alone discus them in the EIS. In fact, entirely absent from BLM's discussion of the NWRSAA in Appendix D is any mention of the compatibility requirement or how BLM is working with FWS to ensure that the proposed oil and gas program is compatible. For instance, the FWS compatibility policy states uses, such as roads and pipelines that may reasonably be anticipated "to reduce the quality or quantity or fragment habitat on a national wildlife refuge will not be compatible."[337] Yet, the DEIS does not address how the impacts of the leasing program will comply with this clear statement of activities that are not compatible with the refuge system mission.

The BLM cannot dismiss the obligation to consider and account for these purposes as outside the scope of its obligations or as something limited to only FWS decisions when the BLM is considering various uses of the Refuge as part of the oil and gas program. We note that FWS has not proposed any compatibility determinations as part of this leasing EIS and there are no current compatibility determinations that cover the proposed oil and gas program.[338] It is unclear how the Secretary will ensure that compatibility mandates are complied with for the oil

[332] DEIS vol. 1 at 2-2–2-3.
[333] 16 U.S.C. § 668dd(d).
[334] *Id.* § 668dd(d)(1)(A).
[335] U.S. Fish and Wildlife Service, Compatibility, 603 FW 2, 2.6.B. A (Nov. 17, 2000), *available at*: https://www.fws.gov/policy/603fw2.html.
[336] 603 FW 2 2.6.Q.
[337] 65 Fed. Reg. 62,486 (2000); 603 FW 2.5.
[338] CCP Final EIS at Appendix G.

and gas program, or when FWS will propose compatibility determinations to cover the activities proposed by BLM in the EIS. No oil and gas activities, including a lease sale, can proceed prior to completion of a compatibility determination by FWS.

4. BLM Fails to Account for Current Management of the Coastal Plain Under the Comprehensive Conservation Plan.

FWS currently manages the entire Arctic Refuge — including the Coastal Plain — under the Comprehensive Conservation Plan (CCP) adopted on April 3, 2015.[339] The CCP establishes "management goals and objectives," "define[s] compatible use," "[u]date[s] management direction related to national and regional policies and guidelines used to implement Federal laws governing Refuge management," and "[e]stablish[es] broad management direction for Refuge programs and activities" among other things.[340] Currently, the Coastal Plain is managed under the Minimal Management category as set out in the CCP.[341]

Throughout the CCP revision process, FWS properly declined to consider oil and gas development on the Coastal Plain.[342] Specifically regarding the management of the Arctic Refuge and the lack of consideration of oil and gas development in the CCP process, the CCP states:

> Until Congress takes action to change the provision of ANILCA 1003 or to implement the 1987 report, the Service will not and cannot permit oil and gas leasing in the Refuge under any of the alternatives in the Plan. *When Congress makes a management decision, that action will be incorporated into the Plan and implemented*.[343]

Congress bound the Secretary to "manage the refuge . . . in a manner consistent with the plan."[344] Oil and gas leasing and any related activities on the Coastal Plain are, therefore, inconsistent with the CCP and present management of the Coastal Plain.

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[339] U.S Department of the Interior, Fish and Wildlife Service, Region 7, Record of Decision, Revised Comprehensive Conservation Plan, Arctic National Wildlife Refuge (Apr. 3, 2015) [hereinafter CCP ROD].

[340] CCP Final EIS, Summary at S-9.

[341] CCP Final EIS, Chapter 3 at 3-34; CCP ROD at 5.

[342] *See, e.g.*, CCP Final EIS, Chapter 3 at 3-6.

[343] CCP Final EIS, Chapter 1 at 1-1 (emphasis added); *see also* Arctic National Wildlife Refuge, Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review, Wild River Plans Final, Dear Reader Letter at 2 (Sept. 1988) (stating, "[w]hen Congress makes a management decision [re: oil and gas], that action will be incorporated into the Plan implemented").

[344] 16 U.S.C. § 668dd(e)(1)(E); *see also e.g.*, *Ctr. for Food Safety v. Jewell*, 83 F. Supp. 3d 126 (D. D.C. 2015) (overturning certain farming activities on a refuge unit because its CCP had not addressed site-specific impacts of the activities).

In scoping comments, Groups flagged this issue and explained that the draft EIS must acknowledge this inconsistency.[345] The draft EIS, however, fails to explain how BLM and the Secretary are addressing this problem. For example, under Alternative A, BLM states that the "current management will be maintained."[346] But then when describing the impacts of oil and gas under the action alternatives, the draft EIS states that minimal management will have to change to account for the oil and gas program. BLM states on the one hand that "the minimal management standard for the Coastal Plain must now be adjusted to account for the oil and gas program," but then fails to explain how FWS's minimal management will be in fact adjusted.[347] Similarly, while BLM states that under Alternative A, the no-action alternative, current management actions would continue, the agency does not explain how current management actions would be impacted under the three action alternatives.[348] It is important to note that under the Minimal Management category governing present use of the Coastal Plain,[349] many of the activities that BLM is considering as part of the oil and gas program are not permitted.[350] But BLM cannot take any action that is inconsistent with the CCP.

Groups are deeply concerned that BLM is attempting to indirectly and implicitly amend or alter the CCP through this EIS process. This cannot be permitted. To amend the CCP, FWS must take clear action and do so and in compliance with multiple statutes and regulations that mandate notice and public participation.[351]

D. BLM'S DRAFT EIS FAILS TO COMPLY WITH ADDITIONAL RELEVANT LEGAL REQUIREMENTS.

1. BLM Fails to Explain How its Oil and Gas Program and Lease Sales Will Comply with the Endangered Species Act.

NEPA's implementing regulations require an EIS to "state how alternatives considered in it and decisions based on it will or will not achieve the requirements [of NEPA] and other environmental laws and policies."[352] Here, the draft EIS fails to explain how BLM will comply

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[345] Scoping Comment Letter at 4-6.

[346] DEIS vol. 1 at 2-2.

[347] *See, e.g.*, DEIS vol. 1 at 3-211 (stating that Minimal Management related to wilderness characteristics will be adjusted but failing to explain what that means or how it will be adjusted).

[348] DEIS vol. 1 at 2-2.

[349] CCP Final EIS, Chapter 3 at 3-34; CCP ROD at 5.

[350] For example, gravel mining is not permitted under Minimal Management in the Arctic Refuge. CCP Final EIS vol. 1 at 2-72. But under the action alternatives proposed by BLM, gavel mining would proceed. DEIS vol. 1 at 3-49–3-50.

[351] ANILCA § 304(g); U.S. Fish and Wildlife Service, Comprehensive Conservation Planning Process, 602 FW 3 at 8(b) (June 21, 2000).

[352] 40 C.F.R. § 1502.2(d); *see Montana Wilderness Ass'n v. McAllister*, 658 F. Supp. 2d 1248, 1255–56 (D. Mont. 2009); *Pac. Coast Fed. of Fishermen's Ass'ns v. Interior*, 929 F. Supp. 2d 1039, 1059–60 (E.D. Cal. 2013).

with its substantive and procedural obligations under the Endangered Species Act (ESA). In their scoping letter, the Groups identified the statutory mandate for BLM to ensure that the leasing program met the agency's obligations under the ESA as a key issue that the EIS must address.[353] Several species protected under the ESA[354] inhabit the Arctic Refuge and its nearshore waters, including bowhead whales, ringed and bearded seals, spectacled eider, and polar bears.[355] The majority of the Coastal Plain (approximately 77 percent) is designated as critical habitat for threatened polar bears.[356]

Congress enacted the ESA to conserve endangered and threatened species and the habitats and ecosystems upon which they depend. [357] As the Supreme Court observed, the ESA is "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[358] Federal agencies must scrupulously comply with the ESA to effectuate Congress' intent to require them to "afford first priority to the declared national policy of saving endangered species," even above their primary missions.[359]

"The heart of the ESA is section 7(a)(2)."[360] Section 7(a)(2) mandates that every federal agency, in consultation with the appropriate wildlife agency, ensure that any action over which it has discretionary involvement or control is not likely to (1) jeopardize the continued existence of any threatened or endangered species or (2) result in the destruction or adverse modification of critical habitat.[361] "This language admits of no exception."[362]

Once a species is listed as endangered or threatened, Section 9 of the ESA prohibits any person, including any federal agency, from "taking" any member of an endangered species

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[353] Scoping Comment Letter at 18.

[354] 16 U.S.C. §§ 1531–1544.

[355] *See* U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, Mammal List, *available at*: https://www.fws.gov/refuge/arctic/mammlist.html; U.S. Fish and Wildlife Service, Arctic Refuge, Bird List, *available at:* https://www.fws.gov/refuge/arctic/birdlist.html; *see also* 35 Fed. Reg. 18319 (Dec. 1, 1970) (bowhead whale listing); 77 Fed. Reg. 76706 (Dec. 28, 2012) (ringed seal listing); 77 Fed. Reg. 76740 (Dec. 28, 2012) (bearded seal listing); 73 Fed Reg. 28212 (May 15, 2008) (polar bear listing); 58 Fed Reg. 27474 (May 10, 1993) (spectacled eider listing).

[356] 75 Fed. Reg. 76086 (Dec. 7, 2010).

[357] *Id*.

[358] *Tenn. Valley Authority v. Hill*, 437 U.S. 153, 180 (1978).

[359] *Id.* at 184–85; *see also id.* at 173–74

[360] *W. Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 495 (9th Cir. 2011).

[361] 16 U.S.C. § 1536(a)(2); 50 C.F.R. §§ 402.03, 402.14(a). "*Action*," "*jeopardize the continued existence of*," and "*destruction or adverse modification*" are defined by regulation. 50 C.F.R. § 402.02.

[362] *TVA v. Hill*, 437 U.S. at 173. Congress later amended Section 7(a)(2) to allow exceptions in extraordinary circumstances, none of which apply here. *See* 16 U.S.C. § 1536(h).

without a valid permit.[363] "Take" includes habitat modification or degradation that results in actual injury.[364] Only through the Section 7(a)(2) consultation process may a federal agency (the "action agency") receive authorization, via an incidental take statement included in a biological opinion, to undertake agency actions that may result in incidental take of listed species.[365] The U.S. Fish and Wildlife Service and the National Marine Fisheries Service (generically, "wildlife agency" or "Service") administer the ESA and have promulgated regulations governing the consultation process.[366]

The Section 7 process begins when the action agency determines whether its action "may affect" listed species in the "action area".[367] The threshold for triggering consultation is low: if its action *may* affect any listed species or critical habitat, the action agency *must* engage in formal or informal consultation with the Service.[368] "Any possible effect, whether beneficial, benign, adverse, or of an undetermined character, triggers the formal consultation requirement."[369] The "threshold for formal consultation must be set sufficiently low to allow Federal agencies to satisfy their duty to 'insure' under Section 7(a)(2)."[370] Only where the action agency determines its actions will have *no* effect on listed species or critical habitat may it forego consultation.[371]

If the action agency properly determines with the written concurrence of the Service that its action is likely to affect, but not likely to adversely affect, listed species or critical habitat ("NLAA finding"), consultation may terminate at the informal stage without formal consultation.[372] To concur in an NLAA finding, the Service must find that "effects on listed species are expected to be discountable, or insignificant, or completely beneficial."[373]

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[363] 16 U.S.C. § 1538(a)(1)(B); 50 C.F.R. § 17.31(a) (FWS regulation extending the "take" prohibition to threatened species under FWS jurisdiction). The prohibition against jeopardy, however, extends to both endangered and threatened species.

[364] 16 U.S.C. § 1532(19); 50 C.F.R. § 17.3.

[365] 16 U.S.C. §§ 1536(b)(4)(iv), (o)(2).

[366] 50 C.F.R. Part 402.

[367] 16 U.S.C. § 1536, 50 C.F.R. §§ 402.11, 402.14. The "*action area*" includes "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." 50 C.F.R. § 402.02.

[368] 50 C.F.R. §§ 402.13(a), 402.14(a).

[369] 51 Fed. Reg. 19,926, 19,949 (June 3, 1986).

[370] *Id.*

[371] 50 C.F.R. § 402.14(a); *see also Sw. Ctr. for Biological Diversity v. USFS*, 100 F.3d 1443, 1447–48 (9th Cir. 1996).

[372] 50 C.F.R. §§ 402.13(a), 402.14(b).

[373] U.S. Fish and Wildlife Service and National Marine Fisheries Service, *Endangered Species Consultation Handbook* (1998) at 3–12. https://www.fws.gov/ENDANGERED/esa-library/pdf/esa_section7_handbook.pdf. "*Insignificant effects* relate to the size of the impact and should never reach the scale where take occurs. Based on best judgment, a person would not . . . be able to meaningfully measure, detect, or evaluate insignificant effects[.]" *Id.* at 3–12—3–13.

If the action may adversely affect listed species or critical habitat, including via potential incidental take, the action agency must request formal consultation.[374] The request "shall include" descriptions of: the action, the specific area that may be affected, listed species and critical habitat that may be affected, and the manner in which the action may affect listed species.[375] It must also include a cumulative effects analysis.[376] The action agency has an obligation to provide the Service "with the best scientific and commercial data available . . . for an adequate review of the effects" of the action on listed species and critical habitat.[377]

At the conclusion of formal consultation, the Service provides the action agency with its biological opinion. This opinion must be based on the best available scientific information.[378] A biological opinion advises the action agency as to whether the proposed action, standing alone or considered together with cumulative effects, is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.[379] "Jeopardy" results when an action "reduce[s] appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."[380]

If the biological opinion determines that jeopardy will result from the agency action as proposed, the Service must provide the action agency with "reasonable and prudent alternatives" to the proposed action that "would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat."[381]

If the Service makes a no-jeopardy finding, it provides an incidental take statement (ITS) specifying the amount or extent of permitted incidental take, reasonable and prudent measures (RPMs) necessary to minimize the impacts of take, and terms and conditions to implement the RPMs.[382] RPMs and the associated terms and conditions are conservation measures intended to

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[374] 50 C.F.R. § 402.14(a).

[375] *Id.* §§ 402.14(c)(1)–(4). The "*effects of the action*" include: "the *direct and indirect effects* of an action . . . that will be added to the *environmental baseline*. The *environmental baseline* includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of [contemporaneous] State or private actions[.]" 50 C.F.R. § 402.02.

[376] *Id*. § 402.14(c)(4). "*Cumulative effects*" are "effects of future State or private activities . . . that are reasonably certain to occur within the action area of the Federal action[.]" 50 C.F.R. § 402.02.

[377] *Id.* § 404.14(d).

[378] 16 U.S.C. § 1536(a)(2).

[379] 50 C.F.R. §§ 402.14(g)(1)–(4).

[380] 50 C.F.R. § 402.02.

[381] 16 U.S.C. § 1536(b)(3)(A); 50 C.F.R. §§ 402.02, 402.14(h)(3).

[382] 16 U.S.C. § 1536(b)(4)(C); 50 C.F.R. § 402.14(i).

mitigate or remove any adverse effects on endangered or threatened species.[383] These recommendations are based upon the statutory responsibility of agencies to carry out programs for the conservation of endangered species.[384] The ITS establishes a trigger level for permitted incidental take that, when exceeded, invalidates the "safe harbor" provision that protects the action agency from civil and criminal liability for take.[385] The ITS enables the action agency to engage in the required monitoring and reporting to determine if the actual amount of incidental take exceeds the permitted amount, thus triggering re-initiation.[386]

Because the duty to avoid jeopardy continues as long as an action agency has discretionary control over its action, it must also reinitiate (and the Service must request it to reinitiate) consultation in any of three additional circumstances: "(b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) If a new species is listed or critical habitat designated that may be affected by the identified action."[387]

Section 7's procedural and substantive duties cannot be separated. Courts require stringent procedural compliance to ensure substantive compliance.[388] This also promotes other vital statutory objectives. First, Section 7(a)(2) is the ESA's only mechanism to ensure against the destruction or adverse modification of critical habitat.[389] Second, unlike Section 9, which authorizes penalties only after unlawful take has happened, Section 7 is designed to prevent and mitigate harm to protected species and critical habitat. The consultation process "ensures that environmental concerns will be properly factored into the decision-making process as intended by Congress."[390] Section 7 thus embodies the "institutionalization of . . . caution" that Congress intended in enacting the ESA.[391]

Here, however, the draft EIS fails to acknowledge these important mandates or explain how BLM will comply with the ESA's substantive and procedural requirements when conducting leasing. BLM has made it clear throughout the draft EIS that the agency intends to authorize extensive oil and gas leasing on the Coastal Plain. This predecisional posture is especially alarming given BLM's substantive obligation to avoid jeopardizing endangered and

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[383] *Fla. Key Deer v. Stickney*, 864 F. Supp. 1222, 1229 (S.D. Fla. 1994) (citing *Romero–Barcelo v. Brown*, 643 F.2d 835, 857 (1st Cir. 1981)).

[384] *Id*. (quoting 16 U.S.C. § 1536(a)(1)).

[385] 50 C.F.R. § 402.14(i)(5). *See Or. Natural Resources Council v. Allen*, 476 F.3d 1031, 1039–40 (9th Cir. 2007).

[386] 50 C.F.R. §§ 402.14(i)(4), 402.16(a).

[387] 50 C.F.R. §§ 402.16(b)–(d).

[388] *Conner v. Burford*, 848 F.2d 1441, 1458 (9th Cir. 1988); *Thomas v. Peterson*, 753 F.2d 754, 764 (9th Cir. 1985).

[389] 16 U.S.C. § 1532(5)(A).

[390] *NRDC v. Houston*, 146 F.3d 1118, 1128–29 (9th Cir. 1998).

[391] *TVA v. Hill*, 437 U.S. at 178.

threatened species and destroying or adversely modifying their critical habitats. The range of alternatives in the EIS does not include an alternative that makes less than 1 million acres available for leasing. Additionally, there is no alternative that caps surface development at less than 2,000 acres, and for all alternatives, the lease stipulations and required operating procedures are very similar and waivable, can be granted exceptions, or BLM can provide modifications. BLM repeats that it will not even consider adoption of the No Action Alternative. Such a range of alternatives raises serious questions as to whether BLM can make leasing decisions consistent with its substantive ESA obligations.

The draft EIS also fails to adequately describe how BLM will comply with Section 7's procedural requirements. The EIS merely states that "BLM consults with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) regarding the effects of its actions on threatened and endangered species and designated critical habitat."[392]

It is unclear when Section 7 consultation will occur and what level of activities BLM intends to consult on for purposes of this EIS with either FWS (for polar bears and spectacled eider) or NMFS (for whales and seals). As an initial matter, the draft EIS does not contain a preferred alternative, which is typically the alternative used for purpose of Section 7 consultation. Though BLM itself recognizes that there is little to no difference in impacts to polar bears among its action alternatives,[393] the agency should clarify which of these action alternatives are being defined as the "agency action" for purposes of consultation with FWS and NMFS. BLM should also confirm that FWS and NMFS will issue biological opinions prior to any Record of Decision being issued to authorize a lease sale on the Coastal Plain.

Additionally, the EIS does not expressly state which ESA-listed species BLM intends to consult with NMFS and FWS on. For instance, BLM acknowledges that spectacled eiders are protected under the ESA and may be present in the program area in low numbers,[394] but these ESA-protected birds are never again mentioned in the impacts analysis. BLM is obligated to satisfy its consultation obligations on any action that *may* affect any listed species or its critical habitat.[395] The threshold for triggering formal consultation is very low, and "the burden is on the Federal agency" to show that the action is not likely to affect adversely species or critical habitat and "[a]ny possible effect" triggers formal consultation requirements.[396] Only if and when BLM obtains a written NLAA determination from a Service that the leasing program may affect, but is not likely to adversely affect, a particular listed species may BLM forego formal consultation on the effects of its action on such species. Otherwise, BLM must formally consult on *all* species that may be adversely affected by the agency's authorization of an oil and gas leasing program.

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[392] DEIS vol. 2 at D-2.

[393] *See, e.g.*, "All the action alternatives would affect large areas of the designated terrestrial-denning unit of critical habitat for polar bears…" 3-133

[394] DEIS vol. 1 at 3-86.

[395] 50 C.F.R. § 402.14.

[396] *See* Interagency Cooperation—Endangered Species Act of 1973, as Amended; Final Rule, 51 Fed. Reg. 19949 (June 3, 1986)

BLM also recognizes that several species of marine mammals present in or adjacent to the program area are protected under the ESA: polar bear, bowhead whales, and bearded and ringed seals.[397] BLM does not, however, acknowledge its obligations to consult under the ESA for these species, and instead repeatedly points to the MMPA as the sole source for mitigation measures and procedural protections for these ESA-listed species. BLM must engage in formal consultation for all these species and BLM must explain what activities will be considered as part of that consultation process.

BLM's analysis assumes that issuance of oil and gas leases will have no direct impact on the environment, but BLM states it will consider "direct and indirect impacts" of leasing in this EIS.[398] These vague and confusing statements repeated throughout the document make it impossible to predict what oil and gas activities will be subject to Section 7 consultation prior to BLM conducting lease sales or issuing leases. The ESA makes it clear that BLM is obligated to consult on all reasonably foreseeable future effects from its leasing program on listed species. ESA regulations require that the consultation process consider "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action . . . ." as well as the action's "cumulative effects."[399] Cumulative effects "are those effects of future State or private activities . . . that are reasonably certain to occur within the action area of the Federal action subject to consultation."[400] In interpreting these regulations, courts require agencies to consider all related impacts of agency actions that may affect listed species.[401] To comply with its Section 7 consultation requirements, BLM must consult not only on the leasing program, but on the impacts of exploration, production and development to federally protected species.

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[397] DEIS vol. 1 at 3-129, 3-130.

[398] *See, e.g.*, DEIS vol. 1 at 3-133. "Issuance of oil and gas leases under the directives of Section 20001(c)(1) of PL 115-97 would have no direct impacts on the environment because by itself a lease does not authorize any on the ground oil and gas activities; however, a lease does grant the lessee certain rights to drill for and extract oil and gas subject to further environmental review and reasonable regulation, including applicable laws, terms, conditions, and stipulations of the lease."

[399] 50 C.F.R. § 402.02.

[400] *Id.*

[401] *See, e.g.*, *Defenders of Wildlife v. Babbitt*, 130 F. Supp. 2d 121, 128–30 (D.D.C. 2001) (requiring consultation analysis to include impacts of all activities within the action area that affect listed species); *Conner v. Burford*, 848 F.2d 1441, 1453–54 (9th Cir.1988) (requiring consultation to consider not only oil and gas leases but also impacts from future exploration and development); *Nat'l Wildlife Fed'n v. Coleman*, 529 F.2d 359, 373 (5th Cir. 1976) (requiring analysis of residential and commercial development that was expected as a result of the construction of a highway as an indirect effect of highway construction) (internal quotations omitted); *see also San Luis & Delta-Mendota Water Auth. v. Locke*, 776 F.3d 971, 1009 (9th Cir. 2014) (referencing the facts at issue in *Nat'l Wildlife Fed'n*, 529 F.2d at 373, as a clear, oft-cited example of an "indirect effect").

In conclusion, the ESA requires federal agencies to give first priority to the declared national policy of conserving endangered and threatened species—i.e., by using all methods and procedures necessary to bring such species to the point at which ESA protections are no longer necessary.[402] BLM cannot lawfully authorize an oil and gas leasing program in the Arctic Refuge that is likely to jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. Nor can it engage—or permit others to engage—in activities that will result in unauthorized incidental take of listed species. These requirements are put into practice through the Section 7 consultation process. The draft EIS fails to explain how BLM will comply with these important substantive and procedural legal requirements, in violation of NEPA's implementing regulations. [403] At this time, it does not appear that BLM has completed formal consultations under the ESA. Before the agency can make its final decision as memorialized in the Record of Decision, it must complete consultations under Section 7 and obtain biological opinions (or written NLAA concurrences) from NMFS and FWS. It must also fully explain in the Final EIS how it has ensured that its considered alternatives and its ultimate choice of alternatives, as reflected in the ROD, will or will not achieve the requirements of the ESA.

2. BLM Fails to Analyze How its Oil and Gas Program and Lease Sales Will Comply with the Marine Mammal Protection Act.

The draft EIS also fails to discuss how BLM will ensure compliance with the Marine Mammal Protection Act of 1972 (MMPA).[404] In their scoping letter, Groups identified the need for BLM to ensure that the leasing program meets the agency's obligations under the MMPA as a key issue to address.[405] Similar to the ESA, jurisdiction of the MMPA is shared by NMFS and the FWS (generically, "the Service"). For marine mammal resources relevant to the Coastal Plain, FWS has jurisdiction over polar bears and walrus while NMFS has jurisdiction over seals, porpoises, and whales.

Congress enacted the MMPA in 1972 based on its finding that "marine mammals have proven themselves to be resources of great international significance, esthetic and recreational as well as economic[.]"[406] The MMPA's stated purpose is "that [marine mammals] should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem."[407] To carry out its protective and conservation purposes, the MMPA imposes a moratorium on the taking of marine mammals.[408] Within the context of the MMPA, "take" is broadly defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal."[409] Harassment is further defined

[402] 16 U.S.C. § 1362(3).
[403] 40 C.F.R. § 1502.2(d).
[404] 16 U.S.C. §§ 1361–1389.
[405] Scoping Comment Letter at 17–18.
[406] *Id*. § 1361(6).
[407] *Id*.
[408] *Id*. § 1371(a).
[409] *Id*. § 1362(13).

as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal (Level A harassment) or has the potential to disturb a marine mammal (Level B harassment).[410] Prohibited harassment includes any act that may disrupt behavioral patterns such as migration, breeding, and feeding.[411]

The MMPA contains several narrow exceptions to the moratorium on take. The MMPA authorizes the Service to allow upon request the incidental, but not intentional, taking of marine mammals that occurs during otherwise lawful activities.[412] To allow incidental take, the agency must find that the authorized activity will affect only "small numbers of marine mammals of a species or population stock," will have only a "negligible impact on such species or stock," will not have an "unmitigable adverse impact" on subsistence uses of such species or stock, and must prescribe means of "effecting the least practicable impact" on the species or stock to be taken.[413]

The Service may allow incidental take through an Incidental Take Regulation (ITR) or an Incidental Harassment Authorization (IHA). An ITR is a formal regulation promulgated by the Service, subject to a full administrative rulemaking process and allows the Service, upon request, to promulgate ITRs for a period up to five years. A Letter of Authorization is required to conduct activities pursuant to an ITR, including activities that may seriously injure or kill a marine mammal or result in harassment[414] An IHA is effective up to 1 year and can be used to authorize harassment only (i.e., injury or disturbance). The MMPA achieves its purpose of protecting marine mammals from unpermitted incidental take through this process of ITRs and IHAs. The EIS raises—but does not answer—many questions as to how BLM and future lessees will be able to comply with these important procedural and substantive requirements.

In describing the MMPA in Appendix D, BLM mischaracterizes the statutory program itself. The EIS states that "USFWS may issue a letter of authorization for incidental take, for up to 1 year, of small numbers of marine mammals, where the take would be limited to harassment (Incidental Harassment Authorization)."[415] This statement is incorrect. As described above, letters of authorization are issued pursuant to ITRs, which are not limited to harassment but may authorize injurious or lethal take. On the other hand, IHAs are individual one-year harassment-only authorizations. Furthermore, nowhere in Appendix D's description of MMPA requirements does BLM mention the process or requirements for ITRs. However, BLM assumes, without

[410] *Id*. § 1362(18)(A).

[411] *Id.*

[412] *Id*. § 1371(a)(5).

[413] An activity: (i) must be "specified" and limited to a "specific geographical region," (ii) must result in the incidental take of only "small numbers" of marine mammals of a species or stock, (iii) can have no more than a "negligible impact" on species and stocks, and (iv) cannot have "an unmitigatable adverse impact on the availability of such species or stock for taking for subsistence uses." *See id*. §§ 1371(a)(5)(A)(i), (ii) (incidental take regulation); 1371(a)(5)(D)(i),(ii) (incidental harassment authorization).

[414] 50 C.F.R. § 18.27(f)(1).

[415] DEIS vol. 2 at D-4.

explanation, that ITRs will be necessary to authorize take of threatened polar bears.[416] BLM must not conflate these two very different and very important authorizations in its EIS.

Even more troubling is the confusion contained in the BLM's discussion of MMPA requirements in chapter 3. First, BLM seems to assume that polar bears—but no other marine mammal —are subject to MMPA protections. There is absolutely no mention of ITRs or IHAs in its analysis for whales, bearded seals, or ringed seals. This oversight is particularly troubling given that the EIS expressly recognizes that on-ice seismic activity "could be lethal to a small number of seals."[417] Such lethal take may only be authorized under the MMPA via issuance of ITR by NMFS. BLM fails to describe this requirement in either Appendix D or Chapter 3. Thus, BLM failed address how take of all marine mammals under its proposed oil and gas leasing program will comply with the MMPA.

Turning to polar bears, though BLM acknowledges the MMPA protections for this species, its analysis is either confusing or outright incorrect. FWS has issued incidental take regulations for the taking of polar bears by oil and gas activities in the Beaufort Sea and along the coast, but these regulations expressly exclude and do not take into consideration potential oil and gas activities in the Arctic Refuge.[418] BLM repeatedly relies on the idea that ITRs will prevent harm to polar bears from leasing impacts, in some cases relying upon ITRs as the *sole* source of mitigation of impacts to polar bears.[419] However, BLM does not expressly state whether the agency believes an ITR will be required for oil and gas leasing on the Coastal Plain. Groups are not aware at this time of any application for an ITR under consideration by the FWS for purposes of Coastal Plain lease sales. (Groups understand that there is an ITR under consideration for 3-dimensional seismic surveys, but not leasing.[420]) These characterizations of the ITR process and the protections it provides to polar bears are improper and misleading to the public. BLM must clarify whether it believes ITRs or IHAs will be required for leasing activities. Without clearly articulating when and for what activities ITRs will be issued, BLM cannot assume future mitigation measures will be put in place via these ITRs or fully comply with its NEPA obligation to "state how alternatives considered in it and decisions based on it will or will not achieve the requirements [of] other environmental laws and policies."[421]

Moreover, BLM relies on future ITR protections for polar bears without articulating what specific measures would be necessary or effective or explaining at what stage of oil and gas activities it assumes which ITR protections would be required. Similar to our concerns described

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[416] *See, e.g.*, DEIS vol. 1 at 3-134, 3-135, 3-137, 3-138, 3-146

[417] DEIS vol. 1 at 3-135.

[418] 81 Fed. Reg. 52276 (Aug. 5, 2016).

[419] *See* DEIS vol. 1 at 3-146 "The coastline survey required under Lease Stipulation 9 for this alternative would provide some specific information for planning purposes but would not specifically restrict activities that could disturb polar bears using coastal habitats. This would leave the regulatory requirements of ITRs as the sole mitigation measures in effect in the coastal area."

[420] *See infra* Part V.K.

[421] 40 C.F.R. § 1502.2(d).

in the ESA section above, BLM assumes for purposes of this EIS that leasing itself presents no direct impacts on the environment. Thus it is not clear at what stage—pre-leasing seismic testing, post-lease exploration, development, and/or production—that the potential protections from IHAs or ITRs (that are not yet developed) would come into play. BLM further seems to assume that any mitigation required by ITRs would preclude negative impacts to polar bears, which is unrealistic and contrary to recent studies and research.[422] The EIS must plainly state what specific mitigation measures it believes will be in place at which phase of oil and gas activities to protect marine mammals. BLM cannot not treat the MMPA as a loophole to avoid its obligation to fully consider impacts to marine mammals in this EIS.

3. BLM Must Comply with the Migratory Bird Treaty Act.

BLM must comply with the Migratory Bird Treaty Act (MBTA) in the development of the oil and gas program for the Coastal Plain.[423] More than 200 bird species found on the Arctic Refuge are migratory birds protected under the MBTA.[424] Congress enacted the MBTA in 1918 to implement a 1916 convention with Canada to protect migratory birds.[425] The United States later signed three more bilateral conventions with Mexico, Japan, and Russia to protect migratory birds.[426] After each convention, Congress amended the MBTA to cover the species addressed in the new convention. The MBTA makes it unlawful "at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, [or] possess . . . any migratory bird" unless otherwise permitted by regulation.[427] Any oil and gas activities that take or kill migratory birds on the Coastal Plain without authorization would violate the MBTA.[428] BLM must address how it will ensure compliance with the MBTA for an oil and gas program on the Coastal Plain, in particular with regards to the identification of the tracts to offer for lease. BLM has, to date, failed to ensure compliance with this statute.

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[422] *See infra* Part V.K.

[423] 16 U.S.C. §§ 703–712.

[424] *See* U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, Bird List, *available at*: https://www.fws.gov/refuge/arctic/birdlist.html.

[425] Convention between United States and Great Britain for the Protection of Migratory Birds, 39 Stat. 1702 (Aug. 16, 1916) (Canada Convention); *see also infra* Part V.G.3.

[426] Convention for the Protection of Migratory Birds and Game Mammals, 50 Stat. 1311 (Feb. 7, 1936) (Mexico Convention); Convention for the Protection of Migratory Birds and Birds in Danger of Extinction, and Their Environment, 25 U.S.T. 3329, T.I.A.S. No. 7990 (Mar. 4, 1972) (Japan Convention); Convention Concerning the Conservation of Migratory Birds and Their Environment, T.I.A.S. No. 9073 (Russia Convention).

[427] 16 U.S.C. § 703.

[428] The recent contrary M-Opinion (M-37050) conflicts with the longstanding Department of the Interior interpretation and multiple circuit court rulings on application and enforcement of the MBTA. *See* Solicitor Opinion M-37041, "Incidental Take Prohibited Under the Migratory Bird Treaty Act" (Jan. 10, 2017).

E. BLM'S LEASING PROGRAM FAILS TO CONSIDER TRANSBOUNDARY EFFECTS AND COMPLY WITH INTERNATIONAL TREATY OBLIGATIONS.

In 1997, the Council on Environmental Quality (CEQ) "determined that agencies must include analysis of reasonably foreseeable transboundary effects of proposed actions in their analysis of proposed actions in the United States."[429] The mandate to consider transboundary effects is also required under NEPA, where agencies are required "to consider reasonably foreseeable transboundary effects resulting from a major federal action taken within the United States."[430] CEQ specifically counseled federal agencies to use the scoping process to identify transboundary effects:

> [F]ederal agencies should use the scoping process to identify those actions that may have transboundary environmental effects and determine at that point their information needs, if any, for such analyses. Agencies should be particularly alert to actions that may affect migratory species, air quality, watersheds, and other components of the natural ecosystem that cross borders, as well as to interrelated social and economic effects."[431]

Consideration of transboundary effects of the proposed oil and gas leasing program in the Arctic Coastal Plain is also required by the 1987 International Agreement on Conservation of the Porcupine Caribou Herd between the U.S. and Canadian national governments. As acknowledged by the DEIS, the Agreement states that "when evaluating the environmental consequences of a proposed activity, the Parties will consider and analyze potential impacts, to the Porcupine Caribou Herd, its habitats and affected users of Porcupine Caribou."[432] However, as discussed below, the DEIS falls far short of meeting the BLM's duty to consider transboundary effects.

1. The DEIS Fails to Consider Transboundary Effects

The DEIS gives shockingly little attention to transboundary impacts. While the DEIS mentions the International Porcupine Caribou Agreement and devotes some attention to the indirect effects of oil and gas leasing on caribou and other migratory and transboundary species in Alaska, it almost entirely ignores such impacts in Canada.

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[429] Council on Env'l Quality Guidance on NEPA Analyses for Transboundary Impacts, http://ceq.hss.doe.gov/nepa/regs/transguide.html.

[430] *Manitoba v. Salazar*, 691 F. Supp. 2d 37 (D.D.C. 2010); *See also Swinomish Tribal Cmty. v. FERC*, 627 F.2d 499, 510-12 (D.C. Cir. 1980) (concluding that the agency took a "hard look" at the Canadian impacts of dam construction in Washington State); *Wilderness Soc'y v. Morton*, 463 F.2d 1261, 1261-63 (D.C. Cir. 1972) (granting intervenor status to Canadian environmental groups seeking to challenge the trans-Alaska pipeline under NEPA).

[431] Council on Env'l Quality Guidance on NEPA Analyses for Transboundary Impacts at 4.

[432] DEIS vol. 1 at 3-160.

The potential transboundary effects of oil and gas leasing associated with the Porcupine Caribou Herd (PCH) is of paramount concern, given that 85 percent of the PCH harvest occurs in Canada.[433] The data upon which the draft EIS's transboundary effects analysis relating to the PCH are based basically consist of the following:

(1) a map in Appendix A showing the range of the PCH and some affected communities in Alaska and Canada (Map 3-27);
(2) a pie chart in Appendix A comparing caribou harvests by Alaskan and Canadian users between 1992 and 1994 (Figure 3-7); and
(3) a one-page table in Appendix M showing the number of caribou harvested by seven Canadian user groups annually between 2010 and 2016 (Table M-21).

Based on this information, the DEIS makes broad observations about indirect transboundary impacts in the section on subsistence uses of caribou. The DEIS provides considerably less detailed information about impacts in Canada than in Alaska, even though 85 percent of the PCH harvest occurs in Canada. For example, Appendix M contains five pages of detailed caribou harvest data for 22 Alaska "caribou study communities" versus one page of summary data for seven Canadian "user groups."[434]

More egregious is the complete lack of information about transboundary impacts on Canadian communities in the Sociocultural Systems and Environmental Justice sections of the DEIS.[435] The DEIS largely focuses on impacts to four Alaskan communities — Kaktovik, Nuiqsut, Arctic Village, and Venetie — and never mentions any affected Canadian communities such as Old Crow, Aklavik, or Fort McPherson. The only potential hint of transboundary impacts of the action alternatives is a single sentence: "Changes related to disruption of subsistence activities and uses could extend outside the North Slope region to other communities that rely on the PCH and CAH herds."[436] Caribou do not perceive borders and BLM must acknowledge the calving grounds of the PCH are sacred to all Gwich'in people, whether Canadian or Alaskan.

The DEIS also omits important information about transboundary effects on the effectiveness of Canada's protection of PCH habitat. In particular, the DEIS fails to recognize that Canada has protected all of the PCH calving and post-calving habitat in the Canadian portion of the Arctic coastal plain, primarily through designation of the Ivvavik National Park (3,926 sq. mi., established in 1984) and Vuntut National Park (1,678 sq. mi., established in 1995), thus providing a total of 3.6 million acres of national park protection for the PCH in Canada.

The DEIS also fails to mention the PCH in the context of numerous declining caribou herds in Canada. Barren-ground caribou have recently been assessed as Threatened by the Canadian national government's Committee on the Status of Endangered Wildlife in Canada.

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[433] *Id.* at 3-168.
[434] DEIS vol. 2 at M-27–M-32. Contrast Table M-20 with Table M-21.
[435] DEIS vol. 1 at 3-178–3-202.
[436] *Id*. at 3-191.

While the DEIS discusses the status of three caribou herds in Alaska, the DEIS makes no mention of the imperiled status of other barren-ground caribou herds in Canada. The DEIS needs to discuss the PCH in its larger North American context to truly reflect transboundary impacts.

BLM has also failed to consider the transboundary impacts of Coastal Plain oil and gas development on migratory birds that migrate between the coastal plain and other countries. For example, shorebirds such as Dunlin that use the East Asian-Australasian Flyway are experiencing increased coastal development along migratory and wintering areas.[437] Development in the project area could exacerbate the pressures faced by Dunlin and other transboundary migratory birds.

2. BLM has Ignored Scoping Comments from Canadian Governments

The DEIS's lack of information and analysis of transboundary effects is particularly inexcusable given the large amount of input from Canadian governments and First Nations during the scoping process. Detailed comment letters came from the Vuntut Gwitchin Government in Old Crow, Northwest Territories Government in Yellowknife, Tr'ondek Hwech'in Government in Dawson City, and Yukon Government in Whitehorse, as well as the national Canadian government in Ottawa. Detailed comments were also submitted by a consortium of fish and wildlife management bodies established by the 1984 Inuvialuit Final Agreement between Canada and the Inuvialuit people, including the Inuvialuit Game Council, Wildlife Management Advisory Councils for North Slope and Northwest Territories, and the Fisheries Joint Management Committee. In addition, hundreds of individuals from Canada submitted scoping comments voicing concern about the transboundary impacts of the proposed oil and gas development in the Arctic Coastal Plain.

The DEIS fails to disclose that the Canadian governmental comments expressed grave concerns and opposition to oil and gas drilling in the Coastal Plain because of the potentially disastrous transboundary impacts on the PCH and the indigenous people that rely on the Herd for material, cultural, and spiritual sustenance. For example, the national government of Canada's scoping comment letter stated:

> Canada is concerned about the potential transboundary impacts of oil and gas exploration and development planned for the Arctic National Wildlife Refuge (ANWR) Coastal Plain, including impacts on shared species that migrate between our countries, as well as impacts on our Indigenous peoples, including their customary and traditional use of Porcupine Caribou. Canada is particularly concerned that oil and gas exploration development (including pre- and post-lease activities such as seismic and drilling exploration and transportation of oil and gas from the Coastal Plain) will negatively affect the long-term reproductive success of the Porcupine Caribou herd. This may occur by direct effects such as behavioral changes and physiological stress, and by affecting the habitat that the herd relies on for calving, post-calving, and migration and insect relief.

[437] Szabo, J. K., C.-Y. Choi, R. S. Clemens, and B. Hansen. 2016. Conservation without borders–solutions to declines of migratory shorebirds in the East Asian–Australasian Flyway. *Emu* 116:215-221.

Similarly, the Vuntut Gwitchin Government's scoping comments stated:

> The Vuntut Gwitchin view the prospect of oil and gas exploration and development in the Arctic Refuge Coastal Plain with deep alarm. Oil and gas disturbance, noise, smells, pollution, roads, pipelines, and massive infrastructure threaten the intricate wholeness and habitat integrity of the calving and post-calving grounds, migratory movements, and the long-term stability of the Porcupine Caribou herd. A threat to the health of the herd is a threat to our community and our way of life.

The DEIS also ignores the concerns and information provided by the Porcupine Caribou Management Board (PCMB), which was established in 1985 as an advisory board appointed by the national, territorial, and indigenous Canadian governments representing traditional users of the Porcupine Caribou Herd within the Yukon and Northwest Territories. The Chair of the PCMB is also a member of the International Porcupine Caribou Board (discussed below). In its scoping comments, the PCMB stated that it is "extremely concerned about any industrial development" in the historical calving grounds of the Coastal Plain. The PCMB comments included maps showing PCH calving areas in both Alaska and Canada, along with parks and other protected areas in both countries. In contrast, the DEIS map of PCH calving areas cuts off at the international boundary, [438] and none of the DEIS maps show parks and protected areas in both Alaska and Canada. BLM violates the mandate of the International Treaty for the United States and Canada to manage the PCH in a sustainable way. BLM's failure to account for the PCH's entire range during development of the DEIS is inconsistent with this mandate.

3. *BLM's Rushed Process Bypasses Important Canadian Input Required by International Treaty*

An important international mechanism for consideration of transboundary effects is provided in the International Agreement on Conservation of the Porcupine Caribou Herd. The Agreement established an International Porcupine Caribou Board to "make recommendations and provide advice on those aspects of the conservation of the Herd and its habitat that require international co-ordination," including "the identification of sensitive habitat requiring special consideration."[439] The Agreement specifies that the U.S. and Canada will "promptly notify the Board of proposed activities that could significantly affect the conservation of the Porcupine Caribou Herd or its habitat and *provide an opportunity to the Board to make recommendations*."[440] The DEIS (at pages 1-5 and 3-160) briefly acknowledges the existence and objectives of the International Treaty and PCH Board, but it completely fails to address how the proposed oil and gas leasing will comply with the treaty's terms or the board's advice and recommendations.[441]

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[438] DEIS vol. 2 at Appendix A, Map 3-21.

[439] Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd**,** E100687 - CTS 1987 No. 31 (July 17, 1987) *available at* http://www.treaty-accord.gc.ca/text-texte.aspx?id=100687.

[440] *Id*. (emphasis added).

[441] DEIS vol. 1 at 1-5, 3-160.

In the BLM's rush to meet its unrealistic timeline to lease the Coastal Plain, the BLM has failed to provide the Board with a reasonable opportunity to make recommendations to protect the Herd from the harmful effects of oil and gas development. The U.S. government only recently filled its vacancies on the Board and the Board has just held one meeting so far, in Kaktovik in August 2018. Yet, the BLM has moved ahead with the DEIS without giving the Board an opportunity to make recommendations that could avoid or significantly mitigate transboundary effects on the Herd and users of the Herd. Once the Board makes its recommendations, the BLM will need to revise the DEIS to evaluate a new alternative based on the Board's recommendations.

Similarly, the BLM was not willing to wait for the results of an important new scientific study of the Porcupine Caribou Herd prepared by Canadian wildlife biologists for various Canadian governmental entities and submitted to BLM.[442] This study provided relevant new information that helps to fill many gaps about cross-boundary impacts in the DEIS. This includes a science-based risk assessment of PCH vulnerability to proposed Coastal Plain development that quantifies expected population-level consequences for the PCH and implications for Canadian subsistence hunters under baseline conditions, the DEIS action alternatives, and full Coastal Plain development. BLM needs to consider this new information in a revised DEIS, as well as build upon it to provide a more robust analysis of impacts to caribou and subsistence uses in both the United States and Canada.[443]

4. BLM Denied Canadian Requests for Public Meetings

The Canadian governments requested that the BLM conduct public hearings in Canadian communities such as Whitehorse, Old Crow, Inuvik, Fort McPherson, and Aklavik. Likewise, the PCMB scoping comment letter states: "The PCMB requests, on behalf of [national, territorial, and First Nation governments], that meetings be held in Porcupine Caribou user communities in Canada to consider the impacts of development in the core calving area of this shared herd, and how subsistence harvesters may be adversely affected."

If the BLM had honored the Canadian governments' request to hold public meetings in affected communities, the BLM would have gathered a wealth of information about transboundary effects for consideration in the DEIS. Unfortunately, the BLM opted to ignore the opportunity to obtain this potentially valuable community-level information during the scoping stage. The BLM has also failed to hold any public meetings in Canada during the public comment period on the DEIS.

The BLM cannot continue to disregard Canadian input about transboundary impacts. To help correct this unacceptable problem, the BLM should re-open the public comment period on the DEIS and work with the Canadian governments to organize public meetings in all affected Canadian communities. Additional meetings in Canada should be held when the BLM revises the

[442] *See* Russell and Gunn (2019).

[443] For more information on the Canadian study and BLM's failure to adequately analyze impacts to caribou, *see* Part V. I. (caribou impacts section).

DEIS to consider the Yukon government's scientific study and the International Porcupine Caribou Board's recommendations.

5. The DEIS Fails to Consider International Agreements on the Conservation of Polar Bears

In assessing the effects of an oil and gas program on the Coastal Plain, BLM is required to consider the transboundary impacts on polar bears in the context of our international obligations under the 1973 Agreement on the Conservation of Polar Bears and the 1988 Inuvialuit-Inupiat Polar Bear Management Agreement in the Southern Beaufort Sea.[444] BLM has failed to do so.

The United States, along with Canada, Denmark (on behalf of Greenland), Norway and the Russian Federation, is a Party to the 1973 Agreement on the Conservation of Polar Bears. The Agreement requires these Polar Bear Range States to take appropriate action to conserve polar bears and protect their habitat.[445] Specifically, this multilateral agreement requires that each Party "shall take appropriate action to protect the ecosystems of which polar bears are a part," with special attention to denning areas, feeding sites, and migration corridors, and manage polar bears based on best available science through coordinated research. The United States signed the agreement on November 15, 1973, in Oslo, Norway and ratified it on September 30, 1976; it entered into force in this country on November 1, 1976.[446] The Polar Bear Range States approved a collaborative Circumpolar Action Plan (CAP) in 2015, which emphasizes reduction of threats (especially climate change and human caused mortality), cooperation among member parties, monitoring and adaptive management.[447] The 1973 Agreement also relies on the efforts of each Party to implement a conservation plan for polar bears within their jurisdiction. The FWS Polar Bear Conservation Plan serves as the United States' contribution to the CAP.

The Inuvialuit Game Council and the North Slope Borough Fish and Game Management Committee signed the Inuvialuit-Inupiat Polar Bear Management Agreement in the Southern Beaufort Sea (I-I Agreement) in 1988 and reaffirmed it in 2000.[448] Polar bears harvested from the communities of Barrow, Nuiqsut, Kaktovik, Wainwright and Atqasuk are considered part of the SBS population and are thus subject to the terms of this voluntary Native-to-Native agreement between the Inupiat from Alaska and the Inuvialuit in Canada. The I-I Agreement

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[444] Council on Environmental Quality Guidance on NEPA Analyses for Transboundary Impacts, http://ceq.hss.doe.gov/nepa/regs/transguide.html.

[445] Agreement on the Conservation of Polar Bears (Nov. 15, 1973), *available at* http://pbsg.npolar.no/en/agreements/agreement1973.html.

[446] *Id.*

[447] Polar Bear Range States, Circumpolar Action Plan: Conservation Strategy for Polar Bear (2015) (a product of the representatives of the parties to the 1973 Agreement for the Conservation of Polar Bears (Norway, Canada, Greenland, the Russian Federation and the United States)).

[448] Inuvialuit-Inupiat Polar Bear Management Agreement in the Southern Beaufort Sea, Mar. 4, 2000.

provides for annual quotas and recommendations concerning protection of denning female polar bears, family groups and methods of harvest. Quotas are based on estimates of population size and age-specific estimates of survival and recruitment. The I-I Agreement established a Joint Commission to implement it, and a Technical Advisory Committee, consisting of biologists from agencies in the U.S. and Canada involved in polar bear research and management, to collect and evaluate scientific data and make recommendations to the Joint Commission.[449] BLM has failed to consider how an oil and gas program in the Coastal Plain and its impacts on SBS polar bears will affect the quotas and management protocols established through the I-I Agreement.

The Coastal Plain of the Arctic Refuge provides very important habitat for the Southern Beaufort Sea population (SBS) of polar bears, whose range includes Canada. The Coastal Plain has the highest density of on-shore polar bear dens found anywhere in America's Arctic, and more and more bears are using onshore habitat as sea ice diminishes due to climate change. Multiple scoping comments from Canadian territorial and national governments and wildlife agencies stress the importance of SBS bears to Inuvialuit culture, and in turn the importance of the Coastal Plain to SBS bears.[450] According to multiple Canadian wildlife agencies, "[p]olar bears are highly valued in Inuvialuit mythology, spirituality, storytelling, art, song and other forms of cultural expression, and the well-being of this population is extremely important because of the ongoing relationship Inuvialuit have with these animals."[451] The EIS fails to analyze how the proposed oil and gas leasing program will affect polar bears and subsistence users in Canada. Additionally, the EIS fails to address how BLM will ensure adequate coordination with Canada to protect polar bears that will be affected by oil and gas leasing in the Arctic Refuge Coastal Plain.

[449] *Id.*

[450] *See, e.g.*, Government of Canada, Scoping Comment on the Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, Alaska (June 18, 2018); Government of the Northwest Territories, Scoping Comment on the Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, Alaska (June 7, 2018); Government of Yukon, Scoping Comment on the Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, Alaska (June 18, 2018); Inuvialuit Game Council (IGC), Wildlife Management Advisory Council (North Slope) (WMAC(NS)), Wildlife Management Advisory Council (Northwest Territories) (WMAC(NWT)) and the Fisheries Joint Management Committee (FJMC), Scoping Comment on the Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, Alaska (June 18, 2018) (Canadian Wildlife Agencies' Comments); Government of the Northwest Territories, Scoping Comment on the Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, Alaska (June 7, 2018).

[451] Canadian Wildlife Agencies' Comments at 7.

6. *The DEIS Fails to Analyze the Transboundary Impacts of Oil and Gas Development on Qualification for World Heritage Site Designation.*

Under the 1972 World Heritage Convention, an international treaty, the United Nations Educational, Scientific and Cultural Organization (UNESCO) evaluates and designates natural and cultural heritage sites as World Heritage Sites that have "outstanding universal value" based on ten criteria.[452] These sites are nominated by a country or by multiple countries. We requested at scoping that BLM analyze how oil development in the Coastal Plain would adversely impact the potential for the Arctic Refuge to be recognized as a binational World Heritage Site along with adjacent Canadian lands that currently are on the "Tentative List" for World Heritage Site designation.

Eligible sites must meet at least one of the ten World Heritage List criteria, so it is very significant that the binational region including the Arctic Refuge appears to meet at least six of the ten criteria. Indeed, the Arctic Refuge was previously on the United States' Tentative List for nomination.[453] The region has outstanding cultural universal value for Alaska Natives and First Nations peoples, especially the Gwich'in, and outstanding natural universal value for its scenic, geologic, and ecologic characteristics. Specifically, the Refuge likely satisfies criteria iv-v and vii-x:

> Cultural –
>
> (iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
> (v) to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;
>
> Natural –
>
> (vii) to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;
> (viii) to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;
> (ix) to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;
> (x) to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species

[452] UNESCO, Operational Guidelines for the Implementation of the World Heritage Convention (July 12, 2017), available at: https://whc.unesco.org/en/guidelines/.

[453] See http://whc.unesco.org/archive/websites/arctic2008/usa.html

of outstanding universal value from the point of view of science or conservation.

Becoming a World Heritage Site has important value for increased tourism and wildlife protection. BLM needs to analyze the impacts to the U.S., including to Alaskan tourism and to the Porcupine Caribou Herd, of the Arctic National Wildlife Refuge no longer meeting the criteria to become a World Heritage Site due to oil development on the Coastal Plain. BLM also must analyze whether such development will have transboundary impacts on Canada's nomination of the adjacent Ivvavik/Vuntut/Herschel Island (Qikiqtaruk) as a World Heritage Site. The DEIS, however, does not even mention the Arctic Refuge's qualification for World Heritage Site designation or the fact that Canada has nominated the adjacent site (both important components of the affected environment), much less perform any analysis of the foreseeable domestic and transboundary impacts that oil and gas development will have on the areas' potential to become a World Heritage Site. BLM must perform such an analysis.

IV. BLM'S ANALYSIS OF IMPACTS FROM ALL PHASES OF OIL AND GAS DEVELOPMENT IS DEFICIENT

A. THE REASONABLY FORESEEABLE DEVELOPMENT SCENARIO IS FAULTY

BLM's reasonably foreseeable development (RFD) scenario in Appendix B purportedly provides the basis for its impacts analysis and comparison of alternatives. The RFD suffers from a number of significant flaws that render it and the resulting impacts analysis deficient in ways that may seriously misrepresent the potential impacts of the leasing program. The RFD must be revised and the impacts analysis redone in a revised EIS.

First, the RFD ignores best available scientific information and data from the U.S. Geological Survey (USGS). It is well recognized that because there has been very little oil and gas exploration within the Coastal Plain, it is difficult to identify the highest potential areas and likely total oil production. The limited information available for the approximately 2,600 square miles of Coastal Plain is: 1,400 miles of 2D seismic collected by a petroleum industry consortium in 1984–86; one well drilled in 1985–86 with data that are confidential; data from a number of other wells to the west and north; and geological and geophysical field work over a number of years. In 1998, USGS analyzed the available data and produced a "Petroleum Assessment" paper,[454] the most recent comprehensive analysis. BLM used the findings of this paper in developing its RFD. However, BLM ignored more recent USGS work to reprocess the 2D seismic data and conduct fieldwork. That information is not referenced in the RFD or the DEIS and must be included. Moreover, USGS is not a cooperating agency in the leasing EIS and, to our knowledge, did not participate in developing the RFD or DEIS — despite USGS' critical knowledge of the best available information that must inform the RFD.[455]

Second, the RFD's reliance on an estimated oil production amount of 3.4 billion barrels of oil (BBO), for example to determine oil spill risk, is flawed. As described below, the basis for that figure is opaque, likely includes oil from non-federal land, reflects production during only a

[454] USGS 1998, *available at* https://pubs.usgs.gov/fs/fs-0028-01/fs-0028-01.htm.
[455] *See supra* Part III.B.3.

fraction of the time period BLM assumes production will occur, and is towards the bottom end of the range of production BLM describes elsewhere in the DEIS.

The 3.4 BBO figure uses a value for production that includes Alaska Native lands and state waters. USGS's 1998 paper provided two estimates of technically recoverable oil: one including Native lands near Kaktovik and the three miles of state waters north of the Coastal Plain, and one not including those lands and waters.[456] The two corresponding results of USGS's modelling were:

1. Technically recoverable oil likely is between 5.7 and 16.0 billion barrels of oil (BBO) in the assessment area including Native lands and state waters. There is a 95 percent probability of over 5.7 billion barrels of oil and a 5 percent probability of over 16.0 BBO.

2. Technically recoverable oil likely is between 4.3 and 11.8 BBO in the assessment area not including Native lands and state waters. There is a 95 percent probability of over 4.3 BBO and a 5 percent probability of over 11.8 BBO. This second scenario more closely aligns with the definition of the Coastal Plain in the Tax Act and ANILCA § 1002.

In May 2018, following passage of the 2017 Tax Act, the Energy Information Administration (EIA) issued a paper entitled "Analysis of Projected Crude Oil Production in the Arctic National Wildlife Refuge."[457] This analysis utilized various factors to "determine the economic viability"[458] of Alaskan oil production based on the technically recoverable oil estimates under the first scenario (including Native lands and state waters) from USGS's 1998 paper as well as a number of assumptions.[459] Using these assumptions, the limited data used by USGS, and its internal models, EIA projected mean oil production from the Coastal Plain for the period 2031–2050 at 3.4 BBO.[460] This figure is essentially impossible for the public to verify as it was developed using EIA's internal models. Moreover, EIA's estimate only projects out to 2050 and not the much longer 85-year development scenario used by BLM. It is also in the bottom quartile of the range of production, 1.5 to 10 BBO, that BLM uses elsewhere in the DEIS,[461] which most likely derives from Table 1 of the EIA paper showing mean Technically Recoverable Crude Oil Resources ranging from 1.4 to 10.4 BBO.[462] BLM needs to verify the 3.4 BBO figure and the 1.4 and 10.4 BBO figures by analyzing and disclosing the details of EIA's models, including how and why it uses USGS' estimated production values that include oil produced from Native lands and state waters.

Because of the wide range of oil production values BLM uses, i.e., from 1.5 to 10 BBO,[463] BLM also should utilize a range of oil production values in its impact analyses to take

[456] *See* Figure 2 in USGS 1998.
[457] EIA 2018, *available at* https://www.eia.gov/outlooks/aeo/pdf/ANWR.pdf.
[458] EIA 2018 at 4.
[459] *Id.*
[460] DEIS vol. 2 Appendix B at B-1.
[461] DEIS vol. 2 Appendix B at B-18.
[462] EIA 2018 at 5.
[463] *Id.* at B-18.

into account the uncertainty of the estimates. Moreover, BLM should consider developing a range of alternative development scenarios based on different predictions of the available petroleum resource.

Third, questionable assumptions in the RFD likely result in BLM underestimating development impacts.

- BLM bases its RFD on factors that the public cannot verify or test — things like "its own knowledge of the almost entirely unexplored petroleum endowment of the Coastal Plain" and its "professional judgment."[464] It must do a better job explaining the basis for its assumptions. For example, it cites the "history of development in the National Petroleum Reserve—Alaska" as one of the bases for the scenario.[465] BLM should explain more fully why it is reasonable to assume that development in the Coastal Plain will approximate development in a geographically and geologically very different region of Alaska. For example, there are no data showing the viability of Nanushuk formation oil in the Refuge, even though the Nanushuk formation is the basis for development of the NPR-A's Willow project.

- BLM does not describe how its development scenario infrastructure predictions relate to the potential oil it estimates could be produced from the Coastal Plain. This is an important omission. BLM states that the range of potential oil production is from 1.5 to 10 BBO.[466] Presumably the infrastructure required to produce these very different amounts of oil, and the amount of likely spilled oil, differs dramatically. BLM should explain how the estimates of the amount of the technically recoverable oil resource in the Coastal Plain connects with the scenario it uses to assess impacts.

- Table 1 from the EIA report shows that there likely would be 3 anchor fields if the field sizes were at least 400 million barrels of oil, and that there would be 8 anchor fields if the field sizes were merely 10 percent less (i.e., at least 360 million barrels of oil).[467] Thus, if industry chooses to develop slightly smaller fields due to any number of factors (e.g., if the projected price of oil was slightly higher or if the oil discovered is of higher quality than expected), there would be far more development across the Coastal Plain than assumed in the RFD scenarios and the DEIS alternatives. As a result, BLM's assertion that, "[t]o minimize the chance that the . . . impact analysis will understate potential impacts, [its RFD scenarios] represent optimistic high-production, successful discovery and development scenarios in a situation of favorable market prices"[468] is not supported. The RFD must include scenarios that accurately reflect different potential ways of developing oil fields, such as through smaller and more numerous fields that could have very different levels and types of impacts. Relatedly, BLM should also use a

[464] *Id.* at B-7.
[465] *Id.*
[466] DEIS vol. 2 Appendix B at B-18.
[467] EIA 2018 at 5.
[468] DEIS vol. 2 Appendix B at B-2.

development scenario based on a petroleum estimate that represents potential maximum impacts, which is particularly appropriate for a programmatic decision with the degree of uncertainty that BLM is facing.

- BLM appears to assume that no gas will be developed in the Coastal Plain because there does not yet exist a transmission pipeline to bring natural gas to market from the North Slope.[469] However, plans for such a pipeline are presently being developed through a Federal Energy Regulatory Commission process. In light of the long time horizon for the development scenario and the current planning process for delivering North Slope gas to market, BLM should consider assessing fully the potential effects of natural gas production in its development scenario.

- BLM states that production wells would be fractured to stimulate initial production, but assumes that there will be no oil or gas developed on the Coastal Plain through hydraulic fracturing of shale. This type of development would be much denser and would require different production processes than conventional oil and gas development including the need to utilize and manage large quantities of sand, water, and hydraulic fracturing chemicals. BLM should assess fully the potential effects of fracturing during initial production and fir shale oil or gas development in a revised draft EIS.

- BLM does not vary the amount of oil that would be produced among the different alternatives it assesses.[470] It is reasonable to assume that varying the areas available for leasing would vary the amount of oil that could be discovered and developed in the Coastal Plain. BLM should consider utilizing a range of oil production values in alternative scenarios. Relatedly, if BLM is assuming that one area or play is likely to be developed first — like the Topset play —BLM should pay particular attention to the effects of this and fully evaluate the likely development and associated impacts now, as it is more likely to happen.[471]

Fourth, the RFD unreasonably assumes that development may occur in low potential areas. The Tax Act requires BLM to hold two lease sales that offer at least 400,000 acres each in "areas that have the highest potential for the discovery of hydrocarbons." As described above, the Tax Act does not require low hydrocarbon potential areas to be made available, and BLM should eliminate them. Relatedly, the EIS assumes that there will be multiple lease sales held while the Tax Act only mandates two.[472] It is unclear if and how BLM's RFD is based on more than two lease sales, but BLM should clarify this.

[469] DEIS vol. 2 Appendix B at B-2.
[470] DEIS vol. 1 at 3-38, vol. 2 Appendix. B at B-18.
[471] DEIS vol. 2 Appendix B at B-5.
[472] DEIS vol. 2 Appendix B at B-8.

B. THE REASONABLY FORESEEABLE DEVELOPMENT SCENARIO SHOULD INCLUDE A VISUALIZATION.

The DEIS does not contain a map drawn to scale showing the realistic and sprawling nature of oil development under the different alternatives. Such a map – which could use symbols to show well pads, pipelines, gravel and ice roads and gravel mines, Central Processing Facility and other building infrastructure – would allow the public to visualize and comment on the extensive nature of the development. Oil development infrastructure is likely to be more dense in the portion of the Coastal Plain with high hydrocarbon potential and less dense in areas with lower hydrocarbon potential, for example.

The public has a right to full disclosure of the impacts that would result from each of the alternatives. Such a map would provide the public with a more realistic understanding of the nature of the development, especially because it would counter the misimpression that only 2,000 acres of the Coastal Plain will be impacted. BLM should include a map in a revised draft EIS showing the build-out of all likely oil development on the Coastal Plain following the lease sales.

C. THE DEIS FAILS TO ADEQUATELY ANALYZE IMPACTS ASSOCIATED WITH INFRASTRUCTURE.

1. Planned vs. Unplanned Development

The DEIS does not discuss any means to ensure that oil and gas infrastructure development is consolidated and avoids duplicative or unnecessary infrastructure such as excessive gravel road mileage through lack of coordination among fields, multiple CPFs owned by different companies, etc. When unnecessary infrastructure is built through lack of planning and oversight by BLM, the infrastructure footprint is not minimized and environmental impacts are greater than they would otherwise be. The DEIS states that "operators would enter agreements to share road and pipeline infrastructure, where feasible,"[473] but offers no mechanism to ensure that sharing occurs, e.g., through required coordination of development plans by multiple operators. BLM should ensure there is an administrative means that minimizes the overall footprint of the infrastructure beyond relying only on the 2,000 acre limit.

2. Pipeline Infrastructure

Because multi-phase (i.e., oil, gas and produced water) pipelines are not well-regulated either by the federal government or by the state, there is a need for a new ROP addressing pipeline safety for these lines. Releases from multi-phase lines in remote, sensitive parts of the Arctic Refuge would be particularly damaging to the environment as compared to spills that have been analyzed near Prudhoe Bay infrastructure. BLM should include an ROP that requires annual smart-pigging (i.e., inline inspection) of multi-phase pipelines to detect wall thinning and reduce the likelihood of releases. Moreover, BLM should ensure that a ROP for pipelines

[473] DEIS vol. 2 Appendix B at B-8.

includes specifics on the performance capabilities of leak detection systems and the required locations of shut-off valves to prevent sizeable releases into surface waters.

Additionally, BLM should include an ROP that requires staging of emergency response equipment at key locations on the Coastal Plain to allow responders to rapidly address oil pipeline spills, including for pipelines that do not have roads that parallel them.

As discussed in the section above on Planned vs. Unplanned Development, BLM does not appear to have a mechanism to ensure that pipeline mileage is minimized through consolidated infrastructure. This is especially important if a CPF is located west of the Coastal Plain as there may be multi-phase pipeline segments that are many miles long. Again, BLM should ensure there is an administrative means that minimizes the overall footprint of, in this case, multi-phase pipeline infrastructure.

3. Earthquakes

The DEIS states that "the Coastal Plain is in an area of relatively low seismic risk. This risk may be revised in the future, based on August 2018 seismic activity…"[474] Since the August 12, 2018 magnitude 6.4 earthquake that occurred 52 miles southwest of Kaktovik, "the largest earthquake ever recorded north of the Brooks Range in Alaska,"[475] there have been numerous earthquakes in the region above magnitude 4.0. BLM needs to work with USGS' seismic experts to review aftershock and other more recent data compiled since August 2018 and reassess the likelihood of seismic risk in the region. That reassessment should occur now, to inform this EIS. BLM then must ensure, through ROPs, that all oil and gas infrastructure is designed and constructed to address that risk.

4. Oil and Gas Releases (Spills, Blowouts, Venting and Flaring)

The DEIS states that "[i]n the NPR-A the average crude oil spill rate from 1985 to 2010, for large (500 barrels or greater) spills is 0.65 spills per BBO produced, with an average spill size of 1,229 barrels. During that time the North Slope produced a total of 12.40 BBO. The historic small (less than 500 barrels) crude oil spill rate from 1989 to 2009 for the Alaska North Slope is 187 spills per billion barrels produced, with an average spill size of 2.8 barrels (117.6 gallons). During this time 9.4 BBO were produced (BLM 2012)."[476] This analysis is inadequate as the spill data have not been updated by BLM for roughly ten years. We request that BLM use the most recent North Slope spill data available from the Alaska Department of Environmental Conservation (DEC) for its spill analysis.

Moreover, the table presenting the relative rate of occurrence for spills is taken from a 2004 EIS.[477] There is no indication that BLM has updated this information or otherwise

[474] DEIS vol. 1 at 3-29.
[475] DEIS vol. 1 at 3-30.
[476] DEIS vol. 1 at 3-38.
[477] DEIS vol. 1 at 3-64.

confirmed whether it is still correct. The source of that information — the 2004 Alpine Satellite Development Plan EIS — indicates that the information is not only out of date, but questionable to begin with. In describing the presentation of this information in the Alpine EIS, BLM stated that it is a subjective evaluation, not necessarily a statistically-based quantitative assessment.[478] BLM must ensure that its spills information and analysis is based on up-to-date information and scientifically sound.

Another source of spill data and analysis that BLM should utilize is a State of Alaska report completed in November 2010.[479] The authors reviewed over 6,000 North Slope spills from 1995–2009 and the report showed that there were 44 loss-of-integrity spills each year[480] with 4.8 of those each year greater than 1,000 gallons,[481] meaning that there is a spill of 1,000 gallons or more nearly every two months.

BLM also did not analyze in the draft EIS the biggest, most damaging spills. BP's March 2006 spill of over 200,000 gallons was the largest crude oil spill to occur in the North Slope oil fields and it brought national attention to the chronic nature of such spills. Another pipeline spill in August 2006 resulted in shutdown of BP's production in Prudhoe Bay and brought to light major concerns about systemic neglect of key infrastructure. BLM needs to analyze likely impacts from the worst-case spills.

Additionally, as discussed above, the estimated quantity of crude oil spilled is correlated with the amount of oil produced. BLM needs to utilize the 1.5-10 BBO[482] range of likely oil production and calculate the likely range of crude oil that will be spilled. BLM also states that the spill rate may decrease over time as industry practice changes.[483] This is an unsupported conclusion. Spills have occurred and continue to occur across the North Slope. BLM must explain its basis for this conclusion with specificity.

Another missing component in BLM's analyses that it must include in the EIS are produced/process water and hazardous materials spills. These releases can damage the tundra and surface waters and are required to be reported to Alaska DEC. BLM should utilize DEC's produced/process water and hazardous materials spill reports to compile additional spill analysis and analyze these likely spills and impacts.

There have been several blowouts — also known as uncontrolled releases from wells — in recent years on the North Slope. BP had two blowouts from existing production wells in April 2017 and December 2018, and Repsol had a blowout in February 2012 from an exploration well.

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[478] Alpine Satellite Development Plan Final EIS sec. 4 at 379, 381 (Table 4.3.2-2).

[479] Nuka Research & Planning Group, LLC, North Slope Spills Analysis: Final Report on North Slope Spills Analysis and Expert Panel Recommendations on Mitigation Measures, for the Alaska Department of Environmental Conservation, 244 pp., retrieved November 1, 2017 from dec.alaska.gov/media/7570/nssa-final-report.pdf. (November 2010).

[480] *Id.*, p. 21.

[481] *Id.*, p. 23.

[482] DEIS at B-18.

[483] DEIS vol. 1 at 3-39.

All of these blowouts had some oil released and posed worker safety hazards. Table 3-15 shows the risk of blowouts with oil spills of any size to be Very Low. Given these three recent onshore incidents on the North Slope, the risk of a blowout with full-scale development on the Coastal Plain does not appear to be Very Low as stated in the DEIS. Working with the Alaska Oil and Gas Conservation Commission, BLM should reassess this risk in revising the EIS.

BLM should take into account the fact that the Coastal Plain would be a frontier development area with many more unknowns than fields to the west, so blowout data for those fields may underrepresent the risk of drilling in the Coastal Plain, especially at a time when there is known permafrost thawing. BLM also should assess the risks and consequences of spills in or reaching nearshore waters in the Beaufort Sea or occurring in rivers during times when there is running water not covered by ice. This is lacking from the EIS.

The release of vented and flared gas from oil and gas operations contributes to greenhouse gas emissions, with vented gas contributing as methane and flared gas causing localized impacts from particulates deposited on snow and ice as black carbon. The Alaska Oil and Gas Conservation Commission collects data on vented and flared gas releases greater than one hour. BLM should analyze these data — similar to how BLM analyzed spill data for the North Slope — and quantify the rate and total projected quantity of these releases. Additionally, BLM should reduce the releases of vented and flared gas to the maximum extent through stringent requirements to reduce venting and flaring.

5. Gravel

As explained below, there are also significant impacts from gravel mining that are not properly accounted for in BLM's RFD. BLM must account for all impacts from gravel mining in its analysis.

6. Worker Safety

The EIS needs to analyze the likelihood of worker injuries and deaths related to oil and gas development on the Coastal Plain. For example, this past December a worker on the North Slope died from an "equipment accident."[484]

D. BLM'S CONSIDERATION OF, AND RELIANCE ON, RECLAMATION IS INADEQUATE.

BLM's consideration of reclamation and the related impacts to tundra and vegetation in the EIS is completely lacking. BLM indicates that it will rely on reclamation to allow further expansion of impacts beyond just the 2,000-acre limitation in the Tax Act. It also states in required operating procedure 35 that it will "[e]nsure ongoing and long-term reclamation of land

[484] https://www.adn.com/alaska-news/2018/12/13/police-equipment-accident-killed-36-year-old-north-slope-oil-field-worker/

to its previous condition and use" through unspecified reclamation requirements.[485] BLM claims that, before final abandonment, "land used for oil and gas infrastructure — including well pads, production facilities, access roads, and airstrips — will be restored to ensure eventual restoration of ecosystem function and meet minimal standards to restore general wilderness characteristics."[486] Leaseholders would need to develop and implement an abandonment and reclamation plan, which would describe "short-term stability, visual, hydrological, productivity objectives and steps to be taken to ensure eventual ecosystem restoration to the land's previous hydrological, vegetation, and habitat condition."[487] BLM also has the authority to grant exceptions to this requirement to satisfy unspecified "environmental or public purposes."[488]

As a threshold matter, BLM's view that it can allow more than 2,000 acres of direct development impacts is flatly inconsistent with the language of the Tax Act. That law permits the Secretary to authorize that "up to 2,000 surface acres of Federal land on the Coastal Plain . . . be covered by production and support facilities . . . during the term of the leases."[489] The metric the Tax Act uses does not mean "at one time." Rather, it provides a single limit for all acreage covered by facilities throughout the life of the leasing program. Even if it was possible to achieve perfectly effective remediation, which it is not, it would still not create license to exceed 2,000 cumulative acres.

Moreover, BLM's reliance on reclamation is deficient on multiple other grounds as well. First, BLM itself acknowledges that it is not realistic or even feasible to restore these areas to their original condition or anything close to it. BLM states in the EIS that "[r]eclamation has not been proven for gravel removal in the arctic environment once operations have ceased."[490] BLM's own acknowledgement that reclamation has not been proven in arctic environments raises substantial questions about BLM's legally questionable reliance on these unproven, vague reclamation measures as a mechanism for further expanding the footprint of development beyond the 2,000 acre cap. Gravel roads, gravel mines, and other infrastructure in Arctic environments will cause long-term impacts to the landscape that cannot be easily recovered or restored and will never recover to their original, wilderness state.[491] Studies have indicated that natural recovery of tundra vegetation may occur on a timeframe that could take millennia or may never occur.[492] There is not a single tundra rehabilitation site that has returned to its original state in thirty-plus

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[485] DEIS vol. 1 at 2-32.
[486] DEIS vol. 1 at 2-32.
[487] DEIS vol. 1 at 2-32.
[488] DEIS vol. 1 at 2-32.
[489] *See* Pub. L. 115-97, Title II, sec. 20001(c)(3).
[490] DEIS vol. 1 at 3-57.
[491] *See, e.g.*, National Research Council of the National Academies, Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope, Committee on Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope 158 (2003).
[492] BENJAMIN SULLENDER, AUDUBON ALASKA, ECOLOGICAL IMPACTS OF ROAD AND AIRCRAFT-BASED ACCESS TO OIL INFRASTRUCTURE 16–17 (2017), https://ak.audubon.org/sites/g/files/amh551/f/road_aircraft_access_report_final.pdf.

years of tundra rehabilitation. Even with intensive rehabilitation efforts, the recovery process takes at least decades.[493] For areas where there has been thermal slumping or subsidence, rehabilitation is very expensive and likely impossible.[494] BLM should not rely on unproven rehabilitation standards to allow for even greater damage than that allowed by Congress in the Tax Act, or use standards that are known to be unachievable and will thus require exemptions to the reclamation requirements.

BLM should also remove the provision that allows it to grant exceptions to any reclamation requirements. The circumstances under which BLM could potentially waive this requirement are unclear in the EIS and appear to completely negate the meaningfulness of any reclamation requirements. There is no circumstance under which BLM should be able to grant exceptions to these reclamation requirements.

BLM's analysis fails to adequately account for the long-term changes that are likely to occur from infrastructure and the challenges related to reclamation that relate to that. It is unrealistic to expect that reclamation will return land to its previous condition and ecosystem function. The ground under a gravel pad or road is compressed over time, lowering the surface elevation. When gravel is removed to meet land lease agreements and USACE regulations, sometimes gravel is left behind to avoid creating a square lake. The only way to maintain an elevation similar to that of the surrounding tundra grade is to leave a certain amount of gravel at the site. Because of the drastic change in soil conditions, and often in hydrology, natural colonization by species similar to those in the surrounding relatively undisturbed tundra is less likely. If grass seed is sown, even species that are expected to decline over time, the resulting plant community does not aesthetically or functionally resemble the surrounding plant community. If a site subsides after gravel is removed and the site becomes covered in more water than was present prior to development, there is little that can be done to reverse this condition. The Coastal Plain tends to have high volumes of ground ice, making it more likely that a site will subside once gravel is removed. BLM needs to account for these long-term impacts and changes in its impact analysis and consideration of reclamation. BLM should require that permafrost core samples be taken at a site at sufficient intervals to calculate the volume of massive and pore ice in the underlying permafrost. Seeding with grass is unacceptable; entities should use locally collected seeds of forbs and sedges or sprig with willows. BLM also needs to account for and provide a long-term plan that addresses where gravel would be placed after field closure, particularly in light of concerns about contamination.

BLM's analysis in the draft EIS also inadequately accounts for potential changes to physiography. The draft EIS states, "This potential long-term impact would begin during the construction phase and would last throughout the development phase until the gravel is removed and the site has been restored to pre-program conditions."[495] As stated above, 1) because of ground compression, removal of all gravel fill may result in a ground surface elevation that is below that of the surrounding tundra, which could in turn fill with water and form lakes that were not present prior to development; and 2) it is unlikely if not impossible that reclamation will

[493] *Id.* at 17.
[494] *Id.*
[495] DEIS vol. 1 at 3-26.

result in pre-program conditions within a human-relevant time frame. Restoration implies that a site will return to its pre-program conditions. Based on over 30 years of tundra rehabilitation activities, it is unrealistic to expect a site on the North Slope to return to pre-program conditions in a human-significant time frame. In addition, road dust, especially within 100 feet of a road, can settle onto surrounding permafrost, altering albedo, evapotranspiration, and vegetation communities. In areas heavily covered in dust, permafrost ice wedges can melt, resulting in degraded polygons (those in which the ice wedges have melted leaving the centers of the polygons higher than the surrounding grade). This is an irreversible long-term impact. BLM should acknowledge all of these long term impacts as part of its analysis and consideration of impacts.

BLM needs to include clear standards that companies will need to meet to ensure areas are fully restored. The cursory statements BLM included in ROP 35 are unobtainable and too vague to give any indication of where and how areas will be restored, over what timeframe, and to what standards. These standards need to be specific, measurable, achievable, reasonable, and time-bound. (Regardless, ROP 35 should be extended to require a bond to cover abandonment.) To justify relying on reclamation as lessening environmental impacts in a NEPA document, BLM needs to incorporate standards into the lease terms to ensure there are clear, achievable obligations for companies to undertake restoration of any impacted areas. BLM should incorporate far more detailed criteria related to restoration standards, including information on the timing of implementation, monitoring methods that will be used to determine success, how any contamination issues will need to be addressed, how companies will restore adjacent areas that have been impacted by dust or other contaminants, and more. BLM's statement that areas would be restored to ensure "eventual" restoration and meet "minimal standards" to restore wilderness provides little assurance that these areas will ever be restored to a level that returns them to anything close to their original condition or functions, or that ensures companies will actually be required to meet any objective, clear standards.

Finally, given the high cost of tundra rehabilitation, there are substantial concerns related to whether adequate funds will be available to undertake reclamation, particularly given the potential for companies to transfer ownership over time. In addition to incorporating more stringent standards and clear obligations for reclamation in the leases, BLM should include formal criteria governing the financial assurances necessary to ensure sufficient funding for restoration and reclamation. BLM should mandate bonding at the time it issues the leases.

BLM mentions the bonding requirements at 43 C.F.R § 3104 in the DEIS as applying to oil and gas activities on the Coastal Plain.[496] Its discussion of the subject is vague and inadequate. First, it is unclear why the DEIS references Mineral Leasing Act (MLA) regulations. Generally, the MLA does not apply to the Arctic Refuge. The Tax Act noted that BLM should manage the oil and gas program similar to how it manages leasing in the NPR-A under the NPRPA and its regulations, which include bonding requirements. BLM should clearly explain what bonding requirements apply in the Coastal Plain and why.

[496] DEIS vol. 1 at 3-248.

Second, the ecological value of the Coastal Plain, coupled with the intensity of potential surface impacts of oil and gas development, demands significantly greater reclamation assurance than that provided by current regulations, under either the MLA or the NPRPA. The program area is particularly sensitive when compared to many other public land areas open for oil and gas leasing, and the surface impacts of oil and gas development on the Coastal Plain are likely to lead to incredibly costly reclamation. Recognizing this, BLM has imposed greater bonding requirements on North Slope oil and gas leases than required elsewhere in the country.[497] Reclamation of the particularly sensitive Coastal Plain necessitates significant bonding requirements. Typical bond amounts are insufficient to provide for adequate restoration in most instances and will be especially inadequate for reclamation efforts on the Coastal Plain, where the ability to reclaim is not proven. Appropriate bonding is particularly important here, where BLM is relying so heavily on reclamation as a tool for attempting to minimizing impacts to the Coastal Plain over the long-term. Absent adequate financial assurances, there is no guarantee companies will ever reclaim these areas.

BLM's brief mention of bonding requirements in the DEIS is insufficient to satisfy the demands of NEPA or ensure adequate financial assurances for reclamation—on which the DEIS relies heavily. BLM must clarify how the generic reclamation bonding requirements will apply to the Coastal Plain leasing program. For instance, the DEIS fails to explain whether new bonds must be filed by operators who have already satisfied the national blanket bond requirement or whether existing bonds are sufficient. The DEIS also fails to address how the various amounts secured by the current bonding regimes will be adequate to cover the likely cost of necessary reclamation measures on the Coastal Plain specifically. Crucially, the DEIS also fails to specify when in the leasing process the bonding requirements go into effect. It states that operators must be covered by a bond "before surface disturbing activity,"[498] but does not elaborate. BLM should clarify that the bond must be furnished "prior to the issuance of an oil and gas lease," as required of lessees in the NPR-A.[499]

BLM also needs to modify ROP 35. ROP 35's objective is to "[e]nsure ongoing and long-term reclamation of land to its previous condition and use."[500] To effectuate this, bonding requirements consistent with the discussion above must be added to ROP 35. BLM should estimate actual, likely reclamation costs of reasonably foreseeable development projects and consider alternatives that impose corresponding bonding amounts. Additionally, BLM should require that bonds be adjusted for inflation at regular intervals to ensure that they remain sufficient to cover any necessary reclamation activities after operations eventually conclude.

BLM also needs to modify ROP 24d. It currently has no gravel mine reclamation specifications. Gravel mine reclamation and associated land rehabilitation can be particularly difficult. Many mines on the North Slope are reclaimed by turning the former pit into deep water fish habitat. Not only does this result in a rather unnatural-looking square lake, but offers little in the way of replacing the habitat loss displaced by the mine. Gravel mines are one of the few

[497] *See* 43 C.F.R. § 3134.1 (NPR-A bonding requirements).
[498] DEIS vol. 1 at 3-248.
[499] 43 C.F.R. § 3134.1(a).
[500] DEIS vol. 1 Table 2-2 at 2-32.

available sources of tundra sod. Because of the way oil and gas companies organize their budgeting and financing of projects, there often is no set-aside to pay for harvesting, storage, and re-use of the surface vegetative mat (tundra sod). This valuable resource is most often pushed into a pile for future use as "organic overburden." When used in tundra rehabilitation, this organic overburden tends to be dried out and devoid of live vegetation. Instead of promoting revegetation of a site, it often inhibits new growth, either from seed or natural colonization. Additionally, salt crusts of sodium sulfates, calcium chloride, calcium sulfate, or a combination of two or three of these salts frequently form on the surface of desiccated organic overburden, inhibiting revegetation.[501] Tundra sod must be cut and preserved using the most current techniques and should be reused on tundra rehabilitation sites.

E. IMPACTS OF INFRASTRUCTURE ON PRIVATE CORPORATION LANDS AND NATIVE ALLOTMENTS

As explained below, the EIS must include an analysis of the impacts of development of oil and gas and support facilities on Corporation and private land. BLM's failure to do so results in a flawed impacts analysis.

F. THE DRAFT EIS FAILS TO ANALYZE THE DIRECT, INDIRECT, AND CUMULATIVE IMPACTS OF HYDRAULIC FRACTURING.

BLM must fully disclose the direct, indirect and cumulative impacts of hydraulic fracturing ("fracking") and other well stimulation techniques that could be used under leases in the Arctic Refuge. Its failure to do so violates NEPA.

Available information indicates that fracking is increasingly being used in Alaska, both onshore and offshore.[502] And the Draft EIS acknowledges that oil companies will frack wells to stimulate initial production. But the Draft EIS wholly fails to analyze the increased risks inherent in these practices. Fracking and other well stimulation techniques can cause environmental damage beyond that of conventional oil and gas development because of the dangerous chemicals used in the practice, additional waste generation and management needs, the heightened risk of earthquakes, the need for large quantities of water, and increased truck traffic, among other harms.

A peer-reviewed study that examined fracking fluid products determined that more than 75% of the chemicals could affect the skin, eyes, and other sensory organs, and the respiratory and gastrointestinal systems; approximately 40 to 50% could affect the brain/nervous system,

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[501] LORENE LYNN, HRD, INC. & BP ENVIRONMENTAL STUDIES GROUP, DRAFT REHABILITATION REPORT FOR WEST BEACH STATE #1/1A, 2, & 3, PRUDHOE BAY OILFIELD, ALASKA, USACE POA-2011-1086, USACE NWP 27, NSB 12-096 (Mar. 15, 2016) (included with attachments).

[502] See Fracfocus.org (search for Alaska).

immune system, cardiovascular system, and the kidneys; 37% could affect the endocrine system; and 25% could cause cancer and mutations.[503]

Another recent study found that oil companies use dozens of extremely hazardous chemicals to acidize wells. Specifically, the study found that almost 200 different chemicals have been used and that at least 28 of these substances are F-graded hazardous chemicals — carcinogens, mutagens, reproductive toxins, developmental toxins, endocrine disruptors or high acute toxicity chemicals.[504] The study notes that acidizing chemicals can make up as much as 18% of the fluid used in these procedures.[505] Further, each acidization can use as much as hundreds of thousands of pounds of some chemicals.[506]

In addition to posing a significant health and safety risk to humans including workers, fracking chemicals can kill or harm a wide variety of wildlife. Scientific research has indicated that 40% of the chemicals used in fracking can harm aquatic animals and other wildlife.[507] For example, in Kentucky, when an oil company dumped fracking waste fluids into the fork of a stream, contaminating it with hydrochloric acid and other chemicals, "the discharges killed virtually all aquatic wildlife in a significant portion of the fork, including fish and invertebrates."[508] According to scientists, the abrupt and persistent changes in post-fracking water quality resulted in toxic conditions.[509] Several spills of fracking fluid from pipelines in Pennsylvania also resulted in significant fish kills.[510] Recent studies using fluids produced by fracking to examine their impact on aquatic animals found that the fluids have significant negative effects on rainbow trout, even at greater than 100-fold dilutions.[511] A similar study

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[503] Colborn, Theo, et al. 2011. Natural Gas Operations for a Public Health Perspective, Human and Ecological Risk Assessment 17:1039; Elliot, E.G. et al. 2016. A systematic evaluation of chemicals in hydraulic –fracturing fluids and wastewater for reproductive and developmental toxicity. Journal of Exposure Science and Environmental Epidemiology 1–10.

[504] Khadeeja Abdullah, Timothy Malloy, Michael K. Stenstrom & I. H. (Mel) Suffet. 2016. Toxicity of acidization fluids used in California oil exploration, Toxicological & Environmental Chemistry.

[505] *Id.*

[506] *Id.*

[507] Colborn, T. et al. 2011. Natural gas operations from a public health perspective. Human and Ecological Risk Assessment 17: 1039-1056 at 1046.

[508] U.S. Fish and Wildlife Service, Office of Law Enforcement. 2009; Case at a Glance: U.S. v. Nami Resources Company, LLC, *available at* www.fws.gov/home/feature/2009/pdf/NamiInvestigation.pdf.

[509] Papoulias, D.M. and A.L. Velasco. 2013. Histopathological Analysis of Fish from Acorn Fork Creek, Kentucky, Exposed to Hydraulic Fracturing Fluid Releases. Southeastern Naturalist 12 (Special Issue 4):92–111

[510] MIT Energy Initiative. 2011. The future of Natural Gas, An Interdisciplinary MIT study, *available at* http://energy.mit.edu/publication/future-natural-gas/.

[511] Yuhe He, et al. 2017. Effects on Biotransformation, Oxidative Stress, and Endocrine Disruption in Rainbow Trout (Oncorhynchus mykiss) Exposed to Hydraulic Fracturing Flowback and Produced Water. Environ. Sci. Technol. 2017, 51, 940−947. DOI:

analyzed the impacts of fracking fluids on water fleas, and found exposure to fracking fluids caused a significant decline in reproduction and increased mortality.[512] And another study found acute toxicity of zebrafish embryos from fracking fluid.[513]

Further, studies have drawn a strong connection between the recent rise in fracking wastewater injection and increased earthquake rates.[514] For example, the USGS has recognized that wastewater disposal from fracking is a "contributing factor" to the six-fold increase in the number of earthquakes in Oklahoma.[515] Another recent study also found that wastewater injection is responsible for the dramatic rise in the number of earthquakes in Colorado and New Mexico since 2001.[516] Wastewater injection has been scientifically linked to earthquakes of

10.1021/acs.est.6b04695; Tamzin A. Blewett, et al. 2017.The effect of hydraulic flowback and produced water on gill morphology, oxidative stress and antioxidant response in rainbow trout (Oncorhynchus mykiss), Nature: Scientific Reports. 7:46582. DOI: 10.1038/srep46582.

[512] Tamzin A. Blewett, et al. 2017. Sublethal and Reproductive Effects of Acute and Chronic Exposure to Flowback and Produced Water from Hydraulic Fracturing on the Water Flea Daphnia magna, Environ. Sci. Technol. 2017, 51, 3032−3039. DOI: 10.1021/acs.est.6b05179.

[513] Yuhe He, et al. 2017. Chemical and toxicological characterizations of hydraulic fracturing flowback and produced water. Water Research 114 (2017) 78-87.

[514] N. J. van der Elst *et al.*, *Enhanced Remote Earthquake Triggering at Fluid-Injection Sites in the Midwestern United States*, 341 SCI. 164, 164-65 (2013); U.S. Geological Survey (USGS), Induced Earthquakes Raise Chances of Damaging Shaking in 2016 (Mar. 28, 2016), *available at* https://www2.usgs.gov/blogs/features/usgs_top_story/induced-earthquakes-raise-chances-of-damaging-shaking-in-2016/.

[515] Sumy, D. F., *et al. 2014.* Observations of static Coulomb stress triggering of the November 2011 *M*5.7 Oklahoma earthquake sequence, J. Geophys. Res. Solid Earth, 119*:*1904–*1923; USGS, 2014. Record Number of Oklahoma Tremors Raises Possibility of Damaging Earthquakes, available at* http://www.usgs.gov/newsroom/article.asp?ID=3880.

[516] Rubinstein, J.L., et al. 2014. The 2001 – Present Induced Earthquake Sequence in the Raton Basin of Northern New Mexico and Southern Colorado. Bulletin of the Seismological Society of America.

magnitude three and greater in several states: Arkansas,[517] Colorado,[518] Ohio,[519] Oklahoma,[520] Texas,[521] and New Mexico.[522] And a recent study attributed wastewater injection from fracking operations to earthquakes in California.[523]

And it is not just wastewater injection that can lead to earthquakes—the practice of fracking itself has been found to contribute to seismic events.[524] Even if the earthquakes that fracking directly generates are small, fracking could be contributing to increased stress in faults that leaves those faults more susceptible to otherwise naturally triggered earthquakes of greater magnitudes.[525] Alaska is seismically active, and the impacts on this seismicity on the project area need to be projected and disclosed, along with potential leaks and spills that could contaminate water and soil.

The water withdrawal from lakes for the use in fracking must be evaluated. Between 2000 and 2014, the average water used for fracking a horizontal well increased from 177,000 gallons to 4 million gallons.[526] The substantial water withdrawals needed for fracking could

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[517] Soraghan, M. 2013. USGS, Okla. warn of more drilling-related earthquakes in State, E&E News, *available at* https://www.eenews.net/energywire/stories/1059989400/search?keyword=USGS%2C+okla.+drilling-related+earthquakes); Soraghan, M. 2017. Okla. officials say state had 623 quakes in 2016 E&E News, *available at* https://www.eenews.net/energywire/stories/1060048830/search?keyword=USGS%2C+okla.+drilling-related+earthquakes.

[518] *Id.*

[519] Ohio Dept. of Nat. Resources, 2012. Executive Summary: Preliminary Report on the Northstar 1 Class II Injection Well and the Seismic Events in the Youngstown, Ohio Area; Fountain, Henry, Disposal halted at well after new quake in Ohio, New York Times, Jan. 1, 2012.

[520] Holland, Austin, 2011. Examination of possibly induced seismicity from hydraulic fracturing in the Eola Field, Garvin County, Oklahoma, Oklahoma Geological Survey Open-File Report OF1-2011.

[521] Frohlich, Cliff. 2012. Two-year survey comparing earthquake activity and injection-well locations in the Barnett Shale, Texas. Proceedings of the National Academy of Sciences 109: 35.

[522] Rubinstein, J. L, et al. 2014.

[523] Goebel, T. H. W. et al. 2016. Wastewater disposal and earthquake swarm activity at the southern end of the Central Valley, California, Geophysical Research Letters. 43: 1092–1099.

[524] Van der Elst et al. 2013; BC Oil & Gas Commission. 2015. Industry Bulletin: 2015-32, *available at* https://www.bcogc.ca/node/12951/download

[525] Van der Elst et al. 2013;

[526] Gallegos, T. J., B. A. Varela, S. S. Haines, and M. A. Engle. 2015. Hydraulic fracturing water use variability in the United States and potential environmental implications, Water Resour. Res. 51: 5839–5845.

cause fish mortality and low water levels in the project area, which could also harm birds like the yellow-billed loon and spectacled eiders.

Fracking also increases the truck traffic associated with drilling because of the additional supplies needed. For example, a U.S. Government Accountability Office study found that up to 1,365 truckloads can be required for the drilling and fracturing of a single well.[527] This traffic will further exacerbate the numerous harms from truck traffic associated with the proposed action.

V. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON THE COASTAL PLAIN IS INADEQUATE.

Overall, and nearly universally, BLM's analysis of the impacts of an oil and gas program on the exceptional resources of the Coastal Plain is inadequate. BLM's analyses suffer time and again from a lack of baseline information that the agency has not taken the time and steps to obtain, the agency's reliance on documents looking at the impacts of oil and gas in other parts of the Arctic that are sufficiently different from the Coastal Plain such that the comparison is faulty, and results in an impacts analysis that over and over understates, misstates, or entirely fails to accurately or adequately describe the impacts of an oil and gas program. BLM's analysis is so deficient that the agency must take substantial steps to gather information and adjust its approach, and must issue a revised draft EIS for public review and comment. We address distinct resources issues below to individually highlight the failings of BLM's draft EIS.

A. THE DEIS FAILS TO PROVIDE A MEANINGFUL DISCLOSURE OF ARCTIC REFUGE LEASING'S IMPACTS ON GREENHOUSE GAS POLLUTION AND CLIMATE CHANGE.

BLM's analysis of the greenhouse gas emissions and associated climate change impacts of leasing in the Arctic Refuge is flawed in several fundamental respects and therefore does not comply with NEPA. First, BLM fails to account for foreign oil consumption, which leads it to assert that the leasing action alternatives will result in only slightly higher greenhouse gas emissions than the No Action Alternative. Second, economic analyses show that near-total substitution for oil and gas production does not occur in the real world and is not a reasonable assumption. To the contrary, numerous studies show that every barrel of oil, and unit of gas, left undeveloped results in significant reductions in global oil and gas consumption with associated decreases in greenhouse gas pollution. Third, the DEIS fails to adequately analyze the impacts of methane emissions. Fourth, BLM's DEIS does not analyze the black carbon emissions from Arctic Refuge drilling and their impacts. The DEIS also fails to evaluate the cumulative impacts of the proposed leasing. It relies on outdated information, improperly attempts to tier to other documents, contains unsupported conclusory assertions, and fails to consider the impact of the proposal on attaining the United States' greenhouse gas commitments or with staying within carbon budgets necessary for avoiding the worst impacts of climate change. Finally, the DEIS

[527] U.S. Government Accountability Office, Oil and Gas: Information on Shale Resources, Development, and Environmental and Public Health Risks, GAO-12-732, at 33 (2012).

misrepresents the economic impacts of the alternatives by failing to provide information to gauge the negative economic impacts associated with climate change.

1. NEPA requires BLM to thoroughly and accurately analyze the potential consequences of Arctic Refuge leasing for the climate.

It is well established that when an agency considers a decision that will result in greenhouse gas emissions, NEPA requires the agency to analyze and disclose the effects of these emissions, including emissions from fossil fuels that will be burned because they will be produced or delivered to market as a result of the agency's decision.[528] Several courts have rejected agency findings of perfect or near-perfect fossil fuel substitution. For example, in *WildEarth Guardians v. Bureau of Land Mgmt.*, the Tenth Circuit rejected BLM's argument that it could ignore the climate effects of extracting coal in Wyoming's Powder River Basin because if BLM had not issued the leases in question, demand would be met with coal from another source.[529] BLM's conclusion that replacement coal was available at a comparable price lacked support in the administrative record.[530] Moreover, the court found BLM's perfect substitution assumption "irrational" in part because it was "contrary to basic supply and demand principles."[531]

[528] *See, e.g.*, *Sierra Club v. Fed. Energy Regulatory Comm'n*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (explaining that agency must "either quantify and consider the project's downstream carbon emissions" or provide a detailed explanation of "why it *cannot* do so" (emphasis added)); *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008) (requiring NHTSA to consider effect of greenhouse gas emissions under automotive fuel efficiency rule); *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549-50 (8th Cir. 2003) (requiring agency to disclose effects of burning coal transported on proposed rail line); *Montana Envt'l Info. Ctr. v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074 (D. Mont. 2017) (requiring agency to assess effects of greenhouse gas emissions from mine expansion).

[529] 870 F.3d 1222, 1234 (10th Cir. 2017).

[530] *Id.* at 1235 ("The blanket assertion that coal would be substituted from other sources, unsupported by hard data, does not provide "information sufficient to permit a reasoned choice" between the preferred alternative and no action alternative.").

[531] *Id.* at 1236; *See also Mid States Coalition for Progress v. Surface Transportation Board*, 345 F.3d 520, 549 (8th Cir. 2003) (noting that the agency's argument that "the demand for coal will be unaffected by an increase in availability and a decrease in price" was "illogical at best."); *Montana Environmental Information Center v. U.S. Office of Surface Mining*, 274 F.Supp.3d 1074, 1098 (D. Mont. Aug. 14, 2017) (rejecting an agency's contention that any coal not produced from a mine expansion would be replaced by coal produced elsewhere, calling it "illogical" and concluding that it "places the [agency's] thumb on the scale by inflating the benefits of the action while minimizing its impacts"); *High Country Conservation Advocates v. U.S. Forest Service*, 52 F. Supp. 3d 1174, 1197-98 (D. Colo. 2014) (same with respect to coal mining approval).

Although a cost-benefit analysis is not necessarily the ideal or exclusive method for assessing contributions to an adverse effect as enormous and potentially catastrophic as climate change, a tool to determine the costs of carbon pollution has been developed by the Interagency Working Group on Social Cost of Greenhouse Gases.[532] The Interagency Working Group has produced estimates for the social cost of carbon in order to "allow agencies to incorporate the social benefits of reducing carbon dioxide (CO_2) emissions into cost-benefit analyses of regulatory actions."[533] The working group presented values for social costs from 2010 to 2050, assuming discount rates of 5 percent, 3 percent, 2.5 percent and the 95th percentile of the 3 percent discount rate.[534] These values range from $10 to $212 (in 2007 dollars per metric ton of carbon dioxide),[535] and can help in analyzing the costs imposed by the net greenhouse gas emissions that might eventually result from development, especially where BLM monetizes the purported economic benefits of the project.[536] However, studies have demonstrated that the numeric value assigned to the social cost of carbon vastly underestimates the true cost.[537] The social cost of carbon is therefore a minimum value.

All of these sources point to BLM's duty under NEPA to perform a thorough and accurate accounting of Refuge leasing's greenhouse gas emissions and their environmental effects. The DEIS does not fulfill BLM's obligations, as explained below.

2. The DEIS fails to account for foreign oil consumption and suffers from other flaws.

BLM's analysis of greenhouse gas emissions relies on a misuse of the MarketSim model that drastically underestimates the greenhouse gas (GHG) pollution that will result from oil and gas leasing in the Arctic Refuge. One of the flaws in BLM's use of the model is its assumption that Arctic Refuge drilling will only affect the U.S. market for oil, rather than the global market.

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[532] Environmental Protection Agency (EPA), EPA Fact Sheet, SOCIAL COST OF CARBON (2015). On March 28, 2017, President Trump directed the Office of Information and Regulatory Affairs to revisit the metric, but he did not rule out its use in the future. *See* Exec. Order No. 13,783, § 5(b), 82 Fed. Reg. at 16,095-96; *see also* H. Hess, *OIRA Works Quietly on Updating Social Cost of Carbon*, GREENWIRE (June 15, 2017).

[533] Interagency Working Group on Social Cost of Greenhouse Gases, Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866 at 3 (Aug. 2016).

[534] *Id.* at 3, Tbl. ES-1.

[535] *Id.*

[536] DEIS vol. 1 at 3-236.

[537] F. Ackerman & E. Stanton, *Climate Risks and Carbon Prices: Revising the Social Cost of Carbon*, 6 ECONOMICS 2012-10 at i, 2, 14 (2012) (the social cost of carbon could be almost $900/tCO_2$ in 2010, rising to $1,500/tCO_2$ in 2050). Relatedly, studies suggest that governmental policy decisions with implications for climate change deserve a very small or even negative discount rate. *See* M. Fleurbaey & S. Zuber, *Climate Policies Deserve a Negative Discount Rate*, 13 CHI. J. INT'L LAW 565, 585-86 (2013).

The draft EIS purports to assess the GHG pollution that will result from extracting and burning Arctic Refuge oil in a section called "Indirect GHG Emissions from Future Development."[538] The draft EIS states that the analysis is based on the MarketSim model that the Bureau of Ocean Energy Management (BOEM) has developed.[539] According to BLM, BOEM applied MarketSim methodology to the Arctic Refuge to calculate the change in demand for oil, and therefore the increase in GHG pollution, from Arctic Refuge drilling. BOEM's calculations of the change in U.S. demand lead to either a 3.4- or a 3.9-percent increase in U.S. oil consumption if Arctic Refuge drilling goes forward.[540]

Unfortunately, BLM has deprived the public of the opportunity to meaningfully comment on the GHG analysis by hiding the calculations that led to these numbers in a white paper that is not part of the draft EIS and is not publicly available.[541] What BLM does make clear, however, is that the calculations are based on changes in U.S. demand for oil, despite the fact that "petroleum is obviously a global commodity."[542] The choice to exclude foreign markets greatly skews the results of the analysis to make the GHG consequences of Arctic Refuge drilling appear much less significant than they are. BLM claims that the MarketSim model on which it relies only models changes in US demand: "[t]he 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."[543] This is not true. "MarketSim models oil as a global market with supply and demand specified separately for the U.S. and the rest of the world."[544] BOEM in fact used MarketSim's global market capabilities when it calculated the GHG pollution from the 2017–2022 Five Year Plan for offshore oil and gas in 2016.[545] When BOEM modeled the true global market effect, rather than a falsely-created U.S. market effect, it found that, for each barrel of U.S. oil left undeveloped, global oil consumption would go down by about half a barrel. In the context of the 2017-2022 Five Year Plan, BOEM estimated that this reduction in foreign oil consumption is highly significant, amounting to roughly 50 percent of BOEM's estimated oil OCS production in those scenarios. According to BLM, the proposed Arctic Refuge drilling is expected to result in the

[538] DEIS vol. 1 at 3-7–3-9.

[539] DEIS vol. 1 at 3-7.

[540] DEIS vol. 1 at 3-7.

[541] *See* DEIS vol. 1 at 3-7, citing for its calculations BOEM 2018a, "Market Substitutions and Greenhouse Gas Downstream Emissions Estimates for BLM's Coastal Plain Project. Bureau of Ocean Energy Management, white paper. Sterling, VA."

[542] DEIS vol. 1 at 3-7.

[543] *Id*.

[544] Industrial Economics, Inc. 2015. Consumer Surplus and Energy Substitutes for OCS Oil and Gas Production: The 2015 Revised Market Simulation Model (MarketSim). U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2015-054, https://www.boem.gov/Market-Simulation-Model/.

[545] E. Wolvovsky & W. Anderson, Oil and Natural Gas: Potential Lifecycle Greenhouse Gas Emissions and Social Cost of Carbon, BOEM Report 2016-065 (Nov. 2016), https://www.boem.gov/OCS-Report-BOEM-2016-065/.

production of between 1.5 and 10 BBO.[546] Removing this oil from the global market could therefore result on a reduction of between .75 and 5 BBO, with corresponding reductions on GHG pollution.

The mechanism for this reduction in foreign oil consumption is clear. An increase of X BBO of imports to the United States under the No Action Alternative is by definition a decrease of X BBO of supply for the rest of the world, which will in its turn decrease oil consumption, and hence GHG pollution, outside the United States. Oil market analysis conducted by the Stockholm Environment Institute (SEI), and consistent with BOEM's own internal MarketSim parameters, has previously confirmed that this reduction in global oil consumption could be around 50 percent of the decrease in rest-of-world supply—a highly significant portion of the carbon accounting for the project.[547]

As summarized by experts at SEI:

> The oil market is also highly global, with oil readily traded among countries, and substantial infrastructure in place to do so. The U.S. both imports and exports oil, and world and domestic oil prices very closely track each other (U.S. EIA 2016). For this reason, we expect that changes in U.S. oil production would affect an integrated global oil market, an assumption also made by many other analysts that have looked at changes in U.S. oil supply (Bordoff and Houser 2015; Rajagopal and Plevin 2013; Allaire and Brown 2012; Metcalf 2007; IEc 2012). Though in the past the oil market could be strongly influenced by cartel behavior among a small number of producers, many analysts now see the market as more likely to behave competitively (The Economist 2016; U.S. EIA 2016), meaning that increases or decreases in supply do translate into shifts in prices and, in turn, consumption.[548]

As noted above, the Interagency Working Group on Social Cost of Greenhouse Gases has developed a tool to determine the costs of GHG pollution.[549] BLM's decision not to apply this

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[546] DEIS vol. 1 at 3-7.

[547] P. Erickson, *U.S. Again Overlooks Top CO2 Impact of Expanding Oil Supply . . . But That Might Change*, Stockholm Environment Institute (Apr. 30, 2016); P. Erickson & M. Lazarus, *Would constraining US fossil fuel production affect global CO2 emissions? A case study of US leasing policy*, CLIMATIC CHANGE (2018); P. Erickson & M. Lazarus, *How limiting oil production could help California meet its climate goals*, Stockholm Environment Institute (2018).

[548] P. Erickson & M. Lazarus, How would phasing out US federal leases for fossil fuel extraction affect CO_2 emissions and 2°C goals?, Stockholm Environment Institute, Working Paper No. 2016-2 at 23 (2016) (Erickson & Lazarus, How would phasing out US federal leases for fossil fuel extraction affect CO_2 emissions and 2°C goals?).

[549] Environmental Protection Agency (EPA), EPA Fact Sheet, SOCIAL COST OF CARBON (2015). On March 28, 2017, President Trump directed the Office of Information and Regulatory Affairs to revisit the metric, but he did not rule out its use in the future. *See* Exec. Order No.

tool or another tool to assess the costs of Arctic Refuge GHG pollution[550] artificially skews BLM's analysis to make Refuge drilling look less harmful. An accurate estimate of net carbon emissions resulting from the proposed action is a prerequisite for applying a social cost of carbon analysis. A complete and accurate assessment of the costs of Arctic Refuge drilling's impacts on the climate is even more essential to a reasoned decision because BLM takes into account the potential economic benefits of the project. For example, it states that total taxes and royalties from Arctic Refuge drilling would amount to approximately $104.6 million.[551] It is arbitrary for the agency to quantify certain economic benefits of Arctic Refuge drilling (and allude to others) without accurately disclosing the social cost of its likely carbon emissions.[552]

BLM's justification for its failure to utilize the social cost of carbon (or otherwise quantify the cost of carbon emissions) is arbitrary and capricious. In Appendix F, the agency claims that a) current protocols do not require applying the social cost of carbon metric to the DEIS; b) NEPA does not require cost-benefit analysis; c) that the DEIS does, in fact, analyze non-monetary impacts from carbon emissions; d) that this approach is justified because it is easier to understand; and e) that, regardless, the social cost of carbon is flawed.[553] As an initial matter, BLM cannot hide behind the fact that current protocols do not require a particular social cost of carbon metric or that prior guidance on the Interagency Working Group's social cost of carbon metric has been retracted. That metric remains a readily available means of analyzing a potentially significant impact. (Indeed, it is worth noting that BLM used estimates of the social cost of carbon in NEPA reviews prior to release of the Interagency Working Group's protocol in 2010.[554]) Additionally, BLM cannot justify its omission of social cost by simply claiming that they chose a different methodology. The DEIS provides *no* meaningful quantitative analysis of the social cost of GHG pollution, despite quantifying the economic benefits of the program leading to such pollution.

BLM further attempts to dismiss its failure to analyze costs by claiming that "[a]ny increased economic activity that is expected to occur with the proposed action is simply an economic impact, rather than an economic benefit" and that "[s]ome people may perceive increased economic activity as a 'positive' impact . . . whereas another person may view increased economic activity as negative or undesirable."[555] This rhetorical sleight of hand does not dispel the fact that BLM has failed to quantify the economic impacts of carbon emissions as part of its accounting for the economic impacts of the Coastal Plain oil and gas leasing program. BLM is choosing to quantify the benefits of the leasing program but failing to

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13,783, § 5(b), 82 Fed. Reg. at 16,095-96; *see also* H. Hess, *OIRA Works Quietly on Updating Social Cost of Carbon*, GREENWIRE (June 15, 2017).

[550] DEIS vol. 1 at 3-9.

[551] DEIS vol. 1 at 3-236.

[552] *See Mont. Envtl. Info. Ctr.*, 274 F.Supp.3d at 1098; *High Country Conservation Advocates*, 52 F. Supp. 3d at 1190–93.

[553] DEIS vol. 2 Appendix at F-2-F-4.

[554] *See Bristlecone Alliance, et al.*, 179 IBLA 51, 87 2010 WL 2345539 at *31 (Apr. 14, 2010).

[555] DEIS vol. 2 Appendix F at F-3.

accurately quantify the costs from carbon emissions.[556] In other words, the agency has functionally—and impermissibly— chosen to set the costs of those emissions at zero.[557]

Moreover, any claim by BLM that its decision-making does not turn on the purported economic benefits of leasing is contradicted by BLM and Interior's own statements to the public. For example, a recent BLM press release titled "THEY SAID IT COULDN'T BE DONE: TRUMP ADMIN DOMINATES WITH BILLION-DOLLAR OIL AND GAS SALE" expressly touts lease sale revenues as evincing the success of the Trump Administration's "Energy Dominance" policies.[558] Indeed, with regard to Coastal Plain leasing, then Secretary of Interior Ryan Zinke stated in December 2018, "An energy-dominant America starts with an energy-dominant Alaska, and among the scores of accomplishments we have had at Interior under President Donald J. Trump, taking these steps toward opening the 1002 section of Alaska's North Slope stands out among the most impactful toward bolstering America's economic strength and security."[559]

Quantifying the downstream emissions from the proposed leasing here does not in itself provide a sufficient description of the severity and magnitude of the impacts that will result from those emissions. Moreover, it does not provide the public with a meaningful basis for understanding the total "economic impact" of the proposed leasing.

3. Economic Analyses Show that Near-Perfect Substitution Is Not a Reasonable Assumption.

BLM asserts that the No Action Alternative would result in only 3.4 to 3.9 percent less demand for oil, and therefore GHG pollution, than the action alternatives.[560] The assumption is that the other 96 percent of forgone Arctic Refuge oil would be replaced by other production that

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[556] *See High Country Conservation Advocates*, 52 F. Supp. 3d at 1190-93.

[557] *Id.*; *see also Ctr. For Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1200 (9th Cir. 2008).

[558] Press Release, Bureau of Land Mgmt., "They Said It Couldn't Be Done: Trump Admin Dominates with Billion-Dollar Oil and Gas Sale" (Sept. 7, 2018), *available at* https://www.blm.gov/press-release/they-said-it-couldnt-be-done-trump-admin-dominates-billion-dollar-oil-and-gas-sale; DOI Press Release, "Energy Revolution Unleashed: Interior Shatters Previous Records with $1.1 Billion in 2018 Oil and Gas Lease Sales" (Feb. 6, 2019), available at https://www.doi.gov/news/energy-revolution-unleashed-interior-shatters-previous-records-11-billion-2018-oil-and-gas; DOI Press Release, "They Said It Couldn't Be Done:Trump Admin Dominates with Billion-dollar Oil and Gas Sale" (Sept. 6, 2018), available at https://www.doi.gov/pressreleases/they-said-it-couldnt-be-done-trump-admin-dominates-billion-dollar-oil-and-gas-sale.

[559] "BLM Alaska Releases Draft Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program," DOI Press Release (Dec. 20, 2018), *available at* https://www.doi.gov/pressreleases/blm-alaska-releases-draft-environmental-impact-statement-coastal-plain-oil-and-gas.

[560] DEIS vol. 1 at 3-7.

would only happen if Arctic Refuge production does not happen.[561] However, by excluding one of the largest factors in its analysis (non-domestic oil consumption), BLM presents a misleading view of the impacts of its action. Artificially limiting its analysis and not fully reporting the findings of the model it relies on allows BLM to irrationally conclude that increased oil production from the Arctic Refuge would lead to only a negligible increase in emissions over the No Action Alternative.

Numerous analyses show that near-perfect substitution for oil and gas production simply does not occur in the real world and is not a reasonable assumption. Oil and gas production operates in a global market where changes in U.S. production translate into shifts in global prices, global consumption, and associated GHG pollution. All other things being equal, analyses show that increasing U.S. oil and gas production lowers oil prices and increases global consumption, while leaving U.S. oil and gas undeveloped increases oil prices and decreases global consumption. In short, every barrel of oil and unit of gas that is left undeveloped results in a reduction in global oil and gas consumption with associated decreases in GHG pollution, as detailed below.

A comprehensive analysis of the GHG consequences of ending new oil leasing on U.S. federal lands and waters, and avoiding renewal of existing leases for resources that are not yet producing, found that ceasing new oil leasing would result in a large GHG and climate benefit.[562] Like BLM's analysis, this study accounted for the effects of substitution by other fuels for the oil that would be forgone by ending new leasing. The study estimated that for each unit (QBtu) of federal oil production cut, other oil supplies would substitute for about half a unit (0.56 QBtu) and net oil consumption would drop by nearly half a unit (0.44 QBtu). Additionally, about half of that drop in consumption (0.22 Qbtu) would be replaced by a mix of oil substitutes (such as biofuels or electricity, which SEI estimates to have 85 percent the carbon intensity of oil).[563] In short, every barrel of federal oil left undeveloped would result in nearly half a barrel reduction in net oil consumption, with associated reductions in GHG pollution. The analysis estimated that ending new federal oil leasing would reduce 2030 global CO_2 emissions from oil consumption by 54 million metric tons of CO_2, with an increase in CO_2 emissions from other fuels of 23 million metric tons of CO_2, for a net emissions benefit of 31 million metric tons of CO_2.[564] The analysis recommended that "policy-makers should give greater attention to measures that slow the expansion of fossil fuel supplies."[565]

An analysis of the effects of removing subsidies for U.S. oil and gas production found that decreases in the U.S. oil and gas supply would result in substantial decreases in global oil

[561] DEIS vol. 1 at 3-7.

[562] *See generally* Erickson & Lazarus, How would phasing out US federal leases for fossil fuel extraction affect CO_2 emissions and 2°C goals?

[563] *Id.* at 24.

[564] *Id.* at 25.

[565] *Id.* at 1.

and gas consumption.[566] In the case of oil, the model estimated that a decrease of 600,000 barrels per day in U.S. oil supply, resulting from a drop in U.S. oil production due to subsidy removal, would lead to a decrease in global oil consumption of 300,000 to 500,000 barrels per day.[567] In the model, the decreased U.S. oil supply is only partially replaced by other sources of U.S., OPEC, and other rest-of-world supply. In short, each U.S. barrel not developed would result in a net reduction in global oil consumption of 0.5 barrels to 0.8 barrels.[568] Similarly, for natural gas, a 1.06 to 1.32 Tcf per year decrease in U.S. natural gas supply would lead to a net reduction in global gas consumption of 0.94 to 1.06 Tcf per year,[569] which translates into a net reduction in global gas consumption of 0.7 to 1 unit for each unit of U.S. natural gas left undeveloped.

An analysis by experts at Columbia University and the Rhodium Group on the effects of lifting U.S. crude oil export restrictions shows that U.S. oil production affects global crude oil prices,[570] which is only possible if there is not perfect substitution. As illustrated in Figure 23 of the study, when U.S. crude oil exports are permitted, as they were by the lifting of the crude oil export ban in December 2015, all modeling groups agreed that the international oil market will respond to changes in U.S. production.[571] Specifically, all modeling groups projected that global crude prices will decrease as U.S. production increases, resulting in an increase in global crude oil demand: "a 1.2 million b/d increase in U.S. production due to removing current export restrictions could result in anywhere between a 0 and 1 million b/d increase in global crude demand."[572] This study demonstrates that crude oil is sold and consumed in a global market, where increasing U.S. supply increases global consumption and results in more greenhouse gas pollution.

In sum, numerous scientific and economic analyses show that the assumption of near-perfect substitution for U.S. oil and gas production is unfounded and unreasonable, and dramatically misrepresents the significant greenhouse gas and climate impacts from oil and gas leasing.

4. The DEIS Fails to Properly Evaluate the Climate Change Impacts Related to Methane Emissions

The DEIS estimates the direct emissions of methane (CH_4) that will occur due to leakage during oil and gas production from the Coastal Plain for the increment of production associated

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[566] *See generally* G. Metcalf, The Impact of Removing Tax Preferences for U.S. Oil and Gas Production, Council on Foreign Relations (Aug. 2016); *see also* P. Erickson, Rebuttal: Oil Subsidies—More Material for Climate Change Than You Might Think, Council on Foreign Relations (Nov. 2, 2017).

[567] Metcalf at 16, Tbl. 2.

[568] *Id.*

[569] *Id.* at 17, Tbl. 3.

[570] *See generally* J. Bordoff & T. Houser, Navigating the U.S. Oil Export Debate (Jan. 2015).

[571] *Id*. at 42, Fig. 23.

[572] *Id.* at 57.

with only with the increased demand stimulated by the Coastal Plain. The DEIS calculates this estimate by using data from the U.S. EPA Inventory of US Greenhouse Gas Emissions and Sinks 1990-2016 (2018). The DEIS asserts that the EPA inventory data shows that "the EPA estimate of methane's GHG contribution from petroleum production processes represents on the order of 5 percent of the CO_{2e} contribution from the nationwide petroleum and natural gas combustion."[573] In other words, BLM apparently took EPA's estimates for total methane released from petroleum production systems in the U.S., which EPA presents in the inventory in the form of carbon dioxide equivalency, and divided that number by EPA's estimates for total greenhouse gas emissions from U.S. combustion of oil and natural gas — which is almost entirely CO_2 emissions, also expressed by EPA in the form of carbon dioxide equivalency.[574] The DEIS then asserts that, based on this general ratio of emissions from production to emissions from combustion, the methane emissions associated with producing the increment of Coastal Plain oil and gas reflecting increased demand due to the Coastal Plain program will be 5% of the emissions from downstream combustion of that increment.[575] As detailed below, BLM has failed to take a hard look at the methane emissions by ignoring obviously relevant factors, and thereby underestimating the total emissions, and by totally failing to consider the relevant timeframe for assessing the global warming potential of the additional methane that will be added to the atmosphere as a result of the Coastal Plain program. As a result of these errors, BLM has failed to adequately consider the impacts of its proposed actions on climate change.

a. The DEIS Underestimates Methane Emissions

The DEIS underestimates methane emissions by failing to address or account for available scientific information indicating that the EPA inventory emissions estimates on which BLM relies vastly underestimate emissions. As described above, the estimate of methane emissions from the proposed Coastal Plain program in the DEIS is calculated using data from the U.S. EPA Inventory of US Greenhouse Gas Emissions and Sinks 1990-2016 (April 2018). Recent scientific science published in June of 2018 indicates that the magnitude of methane leakage in 2015 from oil and gas supply chain emissions were about 60% higher than the U.S. Environmental Protection Agency inventory estimate for that year.[576] The study suggests that this discrepancy exists because current EPA inventory methods miss emissions that occur during abnormal operating conditions. The study used ground-based, facility-scale measurements and validated them with aircraft observations in areas accounting for ~30% of U.S. gas production. A When scaled up nationally, the facility-based estimate of 2015 supply chain emissions was 13 ±

[573] DEIS at 3-8 to 3-9.

[574] BLM does not provide any explanation of how it calculated the 5%, nor any citation to specific portions of the EPA inventory, so the public must guess how BLM used the data in EPA's 655-page inventory to calculate this 5% estimate.

[575] DEIS vol. 1 at 3-9.

[576] R.A. Alvarez et al., Assessment of methane emissions from the U.S. oil and gas supply chain, *Science*, Vol. 361, Issue 6398 (July 13, 2018), pp. 186-188, DOI: 10.1126/science.aar7204. The EPA inventory estimates for years 2015 and 2016 are similar. *See* U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2016 (2018) at 3-69 to 3-70 and 3-79.

2 teragrams per year, equivalent to 2.3% of gross U.S. gas production. Notably, NOAA scientists co-authored the study. One of the co-authors, Jeff Peischl, a Cooperative Institute for Research in Environmental Sciences (CIRES) scientist working in NOAA's Chemical Sciences Division stated that: "This study provides the best estimate to date on the climate impact of oil and gas activity in the United States…It's the culmination of 10 years of studies by scientists across the country, many of which were spearheaded by CIRES and NOAA."[577] Despite the obvious significance of this credible study to the assumptions in the DEIS, BLM totally fails to consider it. As a result, the DEIS significantly underestimates the methane emissions from the proposed Coastal Plain oil and gas program.

b. The DEIS Fails to Disclose and Consider the Timeframe for Global Warming Potential it Uses to Estimate Methane Emissions

Global Warming Potential ("GWP") is a concept that is critical to understanding any estimate of methane emissions made for the purpose of assessing climate change impacts. Global Warming Potential is the accumulated radiative forcing within a specific time frame caused by emitting 1 kilogram (kg) of the gas in question, relative to 1 kg of CO_2.[578] In simpler terms, it is a ratio of how much atmospheric warming a given greenhouse gas will cause *over a specified number of years* compared to the same mass of carbon dioxide. The Global Warming Potential of methane is very different depending on whether the timeframe considered is 20 years or 100 years because methane is very short-lived compared to carbon dioxide, but is much more powerful in terms of its capacity to trap heat in the atmosphere. The GWP for methane when considering a 100 year timeframe ranges from 28 to 36.[579] In contrast, the GWP for methane when considering a 20 year timeframe to examine the impact of the emissions is 84-87.[580] The GWP for CO_2 for any timeframe is always 1. Notably, the DEIS makes no mention of this concept whatsoever in its discussion of methane.

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[577] University of Colorado at Boulder, New study finds US oil and gas methane emissions 60 percent higher than estimated, (Jun. 21, 2018) https://phys.org/news/2018-06-oil-gas-methane-emissions-percent.html.

[578] *See, e.g.*, U.S. EPA Inventory of US Greenhouse Gas Emissions and Sinks 1990-2016 (2018) at 1-8.

[579] *See* U.S. EPA, Understanding Global Warming Potentials, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why (last accessed January 16, 2019); *see also* U.S. EPA Inventory of US Greenhouse Gas Emissions and Sinks 1990-2016 (2018) at 1-10, Table 1-3, showing range of 100 year GWPs from assessment reports. The 2018 US EPA Inventory uses a 100-year GWP for methane of 25, the number from the IPCC's 2007 Assessment Report, due to reporting requirements associated with the international agreements around climate change, but acknowledges that more recent Assessment Reports have updated that estimate. *See id*. at 1-9 to 1-10.

[580] *See* U.S. EPA, Understanding Global Warming Potentials, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why (last accessed January 16, 2019).

The US EPA Inventory uses the GWPs for the 100-year time frame only. Consequently, the calculations in the DEIS present methane emissions only in terms of the equivalence to CO_2 over a 100-year timeframe. If the DEIS also considered the climate change impacts of its actions over a shorter time frame, and calculated the methane emissions in light of the GWP for a 20 year timeframe, the methane emissions, expressed in CO_2 equivalents, would be approximately 2.7 times greater than the amount presented in the DEIS. Notably, EPA itself makes clear that the use of the 100-year timeframe in its inventory is based on a political agreement between nations to standardize how emissions are reported under the United Nations Framework Convention on Climate Change, and that other time horizons are available.[581] BLM itself has at times considered the 20-yr GWP in addition to the 100-yr GWP.[582]

Although the DEIS provides no explanation, BLM appears to have calculated the 5% figure it provides by taking the U.S. EPA Inventory figures for 2016 methane emissions from U.S. petroleum systems and natural gas systems, reported in MMT CO_2 eq using a 100-year time frame GWP, and divided that number by the 2016 CO_2 emissions from US combustion of oil and gas. Though the main body of the EPA inventory report provides its estimates using a 100-yr GWP for methane of 25 to accord with international framework reporting consistency requirements, it appears that BLM adjusted the methane emissions to reflect a 100-yr GWP of about 31, to be consistent with the methane GWP of 28-34 from the more recent 2014 IPCC assessment.[583] Applying the same rationale the DEIS appears to employ, but with the 20 year GWP for methane, the resulting ratio of US methane emissions from production to US CO_2 emissions from combustion would be about 14% instead of 5%.[584] Furthermore, taking into

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[581] *See W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt*., No. CV 16-21-GF-BMM, 2018 WL 1475470, at *15 (D. Mont. Mar. 26, 2018), appeal dismissed, No. 18-35836, 2019 WL 141346 (9th Cir. Jan. 2, 2019) ("EPA based its use of the 100-year time horizon on a political agreement between nations rather than on science."); U.S. EPA Inventory of US Greenhouse Gas Emissions and Sinks 1990-2016 (2018) at 1-8 ("Parties to the UNFCCC have also agreed to use GWPs based upon a 100-year time horizon, although other time horizon values are available.").

[582] *See, e.g., W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt*., No. CV 16-21-GF-BMM, 2018 WL 1475470, at *15 (D. Mont. Mar. 26, 2018), appeal dismissed, No. 18-35836, 2019 WL 141346 (9th Cir. Jan. 2, 2019) ("The Miles City PRMP and FEIS included estimates based on the 20-year time horizon.)

[583] The US EPA Inventory provides an estimate for 2016 of 38.6 MMT CO_{2eq} (100-yr methane GWP of 25) for methane from US petroleum systems (production), 163.5 MMT CO_{2eq} (100-yr methane GWP of 25) for methane from US natural gas systems (production), and 4966 MMT CO_{2eq} for CO_2 emissions from US combustion of oil and gas. Adjusting the methane figures for a 100 yr GWP of 31 instead of 25, by multiplying them by 31/25, would result in estimates of 47.8 MMT CO_{2eq} (100-yr methane GWP of 31) and 202.7 MMT CO_{2eq} for petroleum and gas systems respectively, for a total of 47.8 + 202.7 = 250.5 MMT CO_{2eq} (100-yr methane GWP of 31). The resulting ratio of US methane emissions from production to US CO_2 emissions from combustion is then 250.5 / 4966 = 0.05 = 5%.

[584] Converting the US EPA Inventory estimates for 2016 of 38.6 MMT CO_{2eq} (100-yr methane GWP of 25) for methane from US petroleum systems (production), 163.5 MMT CO_{2eq} (100-yr methane GWP of 25) for methane from US natural gas systems (production) for a 20 –yr

account the reality evinced by the Alvarez et al. study that actual oil and gas production methane emissions are 60% higher than EPA's methane estimates, the resulting ratio would be 22.4% instead of 5% when consider the 20-yr GWP.

By ignoring the importance of GWP timeframe entirely, the DEIS has failed to take a hard look at the impacts of methane from the Coastal Plain program. The impacts of increased methane emissions over a timeframe of 20 years are highly relevant in particular in light of the most recent report from the IPCC, which concluded that significant emissions reduction are necessary by 2030 to avoid the most devastating impacts of climate change as discussed in detail below. In particular, deep reductions of methane and other short-lived GHG emissions are required to limit global warming to 1.5°C with no or limited overshoot (at least 35% reductions in both methane and black carbon by 2050 relative to 2010).

5. BLM fails to account for black carbon emissions

BLM also fails to estimate black carbon emissions from Arctic Refuge drilling, despite the fact that our groups provided detailed information about black carbon and its impacts in our scoping comments. According to EPA, black carbon "is now recognized as an important climate-forcing agent with particular impact on the arctic region."[585] Black carbon, or more colloquially, "soot," is comprised of "small dark particles that remain after incomplete combustion of fossil fuel or biomass."[586] Black carbon "darkens the surface" of snow and ice, "directly absorbing light [and] reducing the reflectivity ('albedo') of snow and ice," both of which "are widely understood to lead to climate warming."[587] EPA has found that this increased absorption of solar radiation is a significant contributor to local warming, and importantly, to the hastening of snow and ice melt, and that "[s]ensitive regions such as the Arctic . . . are particularly vulnerable to the warming and melting effects of [black carbon]."[588] Indeed, "[s]tudies have shown that [black carbon] has especially strong impacts in the Arctic, contributing to earlier spring melting and sea

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methane GWP of 84-87, by multiplying by 86/25, yields estimates of 132.8 MMT CO_{2eq} (20-yr methane GWP of 86) for methane from US petroleum systems (production), and 562.4 MMT CO_{2eq} (20-yr methane GWP of 86) for methane from US natural gas systems, for a total of 132.8+562.4 = 695.2 MMT CO_{2eq} (20-yr methane GWP of 86). The ratio of US methane emissions from production to US CO_2 emissions from combustion is then 695.2 / 4966 = 0.14 = 14%.

[585] EPA Region 10, Response to Comments for Outer Continental Shelf Permit to Construct and Title V Air Quality Operating Permit, Conical Drilling Unit Kulluk at 121 (Oct. 21, 2011).

[586] Rao, R. and J.H. Somers. Undated. Black Carbon as a Short-Lived Climate Forcer: A Profile of Emission Sources and Co-Emitted Pollutants. Environmental Protection Agency. https://www3.epa.gov/ttnchie1/conference/ei19/session5/rao.pdf.

[587] EPA, REPORT TO CONGRESS ON BLACK CARBON at iii, xxviii, 3, 17 (Mar. 2012).

[588] *Id*. at iii, 18.

ice decline."[589] The acceleration of melting due to black carbon deposition is "believed to contribute significantly to the rapid melting of Arctic and Himalayan glaciers."[590]

"[Black carbon]'s short atmospheric lifetime (days to weeks) and heterogeneous distribution . . . result in regionally concentrated climate impacts," meaning "the location of emissions releases is a critical determinant of [black carbon]'s impacts, which is not the case for long-lived and more homogeneously distributed" greenhouse gas like carbon dioxide.[591] As a result, according to EPA, "[t]here is general scientific consensus that mitigation of [black carbon] will lead to positive regional impacts" and that "[t]he Arctic . . . may benefit more than other regions from reducing emissions of [black carbon]," with mitigation of "sources near to or within the Arctic having particularly significant impacts per unit of emissions."[592]

Several types of fuel sources, including fossil and biomass, emit black carbon, but in differing ratios. Diesel engines are a particularly important source, with up to 80% of its sub-2.5 micrometer particulate matter (PM2.5) composed of black carbon.[593] PM2.5 (and smaller), in addition to being a climate-forcing material through altered albedo, is also associated with human health impacts, particularly cardiovascular and respiratory ailments.[594] The flaring of natural gas is another important source of black carbon, particularly in the Arctic, where it contributes 42% of the annual mean black carbon concentration, and 52% of the concentration in March,[595] when it could have significant effects on early spring ice dynamics.

Given these impacts, the eight-nation Arctic Council in April 2015 adopted a framework agreement to hasten reduction of black carbon and methane emissions, in which those nations (including the U.S.) committed to taking "enhanced, ambitious, national and collective action to accelerate the decline in our overall black carbon emissions." [596] The Framework established an Expert Group on Black Carbon and Methane, which met in 2017 and recommended "that black carbon emissions be further collectively reduced by at least 25-33 percent below 2013 levels by 2025.[597]

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[589] *Id.* at 4.

[590] Rao & Somers, *supra*, at 10.

[591] *Id.* at 12.

[592] *Id.* at 13–14.

[593] *Id.* at 2.

[594] *Id.*

[595] Stohl, et al. 2013. Black carbon in the Arctic: the underestimated role of gas flaring and residential combustion emission. Atmospheric Chemistry & Physics 13:8833-8855.

[596] Enhanced Black Carbon and Methane Emissions Reductions: An Arctic Council Framework for Action. Annex 4. IQALUIT 2015 SAO Report to Ministers, https://oaarchive.arctic-council.org/bitstream/handle/11374/610/ACMMCA09_Iqaluit_2015_SAO_Report_Annex_4_TFBCM_Framework_Document.pdf?sequence=1&isAllowed=y.

[597] Arctic Council Secretariat, 2017. Expert Group on Black Carbon and Methane: Summary of progress and recommendations. 49 pp. https://oaarchive.arctic-council.org/bitstream/handle/11374/1936/EDOCS-4319-v1-

BLM fails to estimate the emissions of black carbon from Arctic Refuge drilling or identify potential mitigation measures when discussing air quality impacts and climate change.

6. The DEIS Fails to Take a Hard Look at the Cumulative Impacts of the Action's Contribution to Climate Change

The DEIS fails to assess the individual and cumulative impacts of the GHG emissions that will result from the program. There is no assessment of the climate change impact associated with the anticipated emissions. Nor does the DEIS adequately analyze the impacts of climate change on the resources of the Refuge. Moreover, there is no assessment of how the proposed action, cumulatively with other similar actions being taken by BLM nationwide, will cause impacts through climate change, or undermine attainment of the carbon budget and emissions reductions that are urgently necessary to address disastrous climate change impacts.

a. The DEIS Provides No Meaningful Analysis of the Cumulative Impacts

Instead of providing *any* analysis whatsoever of the impact of the action's contribution to climate change, when considered cumulatively with other reasonably foreseeable drivers of climate change, the DEIS states:

> The potential cumulative climate impacts of global development and associated GHG emissions have been discussed extensively in the published literature, including several reports by the Intergovernmental Panel on Climate Change and numerous scientific journals, and therefore, are not repeated here (BLM 2018a; IPCC 2014; Melillo et al. 2014; ACIA 2005).

The DEIS does not even provide a summary of the conclusions of the documents that it cites. The total absence of any analysis considering how the contribution of the emissions from the Coastal Plain oil and gas program action alternatives will interact with other sources of emissions to exacerbate the impacts of climate change violates the requirement to take a hard look at the cumulative impacts of the action being studied.

Courts have made clear that agencies cannot incorporate non-NEPA documents by reference as a substitute for providing analysis of an impact in the EIS itself, as BLM has attempted to do here.[598] Further, agencies cannot avoid analysis by purporting to "tier" to other

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[598] *See, e.g., All. for Wild Rockies v. Kimbell*, 310 F. App'x 106, 109–10 (9th Cir. 2009) ("unlawful tiering occurs when a NEPA document refers to a more general non-NEPA document in order to explain and evaluate the environmental impact of the decision in question." (citing *League of Wilderness Defenders v. U.S. Forest Serv.*, 549 F.3d 1211, 1218-20 (9th Cir.2008)); *see also Or. Natural Res. Council v. U.S. BLM*, 470 F.3d 818, 823 (9th Cir. 2006) (holding similarly proposed tiering impermissible because "the Watershed Analysis is not a NEPA

NEPA documents that themselves do not contain analysis that evaluates the specific impact in question.[599] BLM's reference to the SEIS for the GMT2 project ("BLM 2018a") does not provide an analysis of the cumulative effects of Coastal Plain leasing on climate change. Most obviously, the GMT2 SEIS evaluates a project producing *vastly* less oil and gas than BLM projects for the Coastal Plain leasing program.[600]

Moreover, in lieu of an actual cumulative impacts analysis, the GMT2 SEIS merely compares the proportion of oil produced by the GMT2 to the total oil production for Alaska and the US.[601] The DEIS concedes that Coastal Plain production will result in a *net* increase in downstream oil emissions by stimulating demand for oil. For "scale" it presents the net emissions from increased demand as a proportion relative to 2015 total GHG emissions from Alaska, the United States, and the world. Merely presenting emissions or oil volumes relative to totals from other sources, which is what both the GMT2 SEIS and present DEIS do, cannot constitute an adequate analysis of cumulative impacts. In *San Juan Citizens All. v. United States Bureau of Land Mgmt.*, No. 16-CV-376-MCA-JHR, 2018 WL 2994406, at *14 (D.N.M. June 14, 2018), the district court found that BLM had violated NEPA's requirement to consider cumulative impacts of oil and gas leasing on climate change by asserting that the emissions associated with combustion of all of the oil and gas from the parcels in question would not be different from the no leasing alternative because the total amount of emissions was small compared to total national and global emissions. The court explained that BLM's "facile conclusion that this particular impact is minor and therefore 'would not produce climate change impacts that differ from the No Action Alternative,' is insufficient" to comply with requirement to consider cumulative impacts.[602] Here, BLM provides even less analysis than what the court rejected in that case, as it draws no conclusion whatsoever about the climate change exacerbating consequences of increased emissions resulting from the Coastal Plain leasing program.

In sum, the DEIS fails to assess in any manner how driving up annual emissions by the amount identified in the DEIS over a period of 70 years will exacerbate climate change.

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document"); *Kern v. U.S. BLM*, 284 F.3d 1062, 1073 (9th Cir.2002) (holding that "tiering to a document that has not itself been subject to NEPA review is not permitted").

[599] *See, e.g., Muckleshoot Indian Tribe v. US Forest Service*, 177 F.3d 800, 810–11 (9th Cir. 1999) (concluding that the EIS for a land exchange improperly tiered to the EIS for the applicable land and resources management plan because neither the exchange EIS nor the plan EIS fully analyzed the cumulative impacts of the increased logging on parcels that would be transferred).

[600] *See* DEIS at Table 3-3, page 3-7.

[601] *See* BLM 2018a at 312-313 ("The climate change analysis is essentially a cumulative effects analysis, and no additional cumulative effects analysis is included.")

[602] *San Juan Citizens All. v. United States Bureau of Land Mgmt.*, No. 16-CV-376-MCA-JHR, 2018 WL 2994406, at *14 (D.N.M. June 14, 2018).

b. The DEIS Fails to Adequately Assess Climate Change Impacts to Biological Resources, and the Cumulative and Synergistic Effects of Oil and Gas Development and Climate Change in the Refuge

The cursory treatment of cumulative effects described above is not cured by the discussion in the DEIS of climate change impacts on particular resources of the Refuge. Throughout the DEIS, BLM relies on improper attempts to tier, ignores the best available scientific information, and makes unsupported conclusory statements and generalizations instead of actually analyzing the cumulative impacts to the resources of the Coastal Plain.

Our Scoping Comments reminded the BLM that under NEPA, the agency must consider direct, indirect, and cumulative effects;[603] the latter referring to "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." The required "hard look" at these impacts must be structured in the context of a changing environment and the impacts of climate change. The overwhelming weight of scientific evidence allows no other conclusion but that the impacts of climate change are not only "reasonably foreseeable," but indeed already upon us. In accordance with established CEQ Guidance for assessing cumulative impacts,[604] BLM must address the additive, synergistic, and countervailing impacts between the effects of climate change and the effects of the various alternatives.

Our Scoping Comments reminded the BLM of their obligation to utilize recent, credible and comprehensive information, such as the "2017 Climate Science Special Report,"[605] as the information basis for assessment of climate change and its impacts on the north slope of Alaska, which include changes to temperature, permafrost, sea ice and the oceans. Indeed, in the interim since the submission of our comments yet another comprehensive source of climate change information has been published: The U.S. Global Change Research Program released the "Fourth National Climate Assessment" (NCA18) on November 23, 2018. In addition to extensive detail on the observed and projected changes to our climate driven primarily by fossil fuel use,[606] the

[603] 40 C.F.R. § 1508.25(c)

[604] Council on Environmental Quality (CEQ). 1997. Considering Cumulative Effects Under the National Environmental Policy Act. Council of Environmental Quality, Executive Office of the President, Washington, D.C.

[605] USGCRP, 2017: 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, 470 pp., doi: 10.7930/J0J964J6, *available at*: https://science2017.globalchange.gov/

[606] Hayhoe, K., D.J. Wuebbles, D.R. Easterling, D.W. Fahey, S. Doherty, J. Kossin, W. Sweet, R. Vose, and M. Wehner, 2018: Our Changing Climate. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 72–144. doi: 10.7930/NCA4.2018.CH2.

NCA18 describes in detail the consequences for Alaska's terrestrial and marine wildlife and ecosystems; people, communities and infrastructure; and activities, culture and public health.[607]

The EIS captures none of this recent research, and instead relies almost entirely on outdated information. Specifically, instead of conducting the required analysis, the EIS inappropriately attempts a shortcut in the impacts discussion: "Regarding the potential effects of climate change on the region in general, the reader is referred to Section 3.2.4 of the GMT2 [Greater Mooses Tooth 2] Final SEIS for a detailed discussion."[608] The referenced section, Sec. 3.2.4 of the GMT2 SEIS,[609] does not, in fact, contain a detailed discussion or the potential impacts of climate change on the region. Instead, it contains the following text: "Potential climate change impacts in the project study area remain essentially as described in BLM 2014 (Greater Mooses Tooth One SEIS), Section 3.2.4.3, and are summarized as follows. . ." The climate change impacts discussed in Section 3.2.4 in the GMT1 SEIS[610] document, to which the coastal plain EIS is attempting to tier, relies primarily on the 2012 "*The United States National Climate Assessment – Alaska Technical Regional Report.*"[611] That document, which at the time was a recent and credible information source, is thus now nearly seven years out of date. In a region that "is among the fastest warming regions on Earth,"[612] ignoring the past seven years' worth of readily available, credible scientific information in the analysis is a grievous oversight. To cite just one example, sea ice loss, noted in those documents as threat to polar bears, walrus and ice seals, has continued to accelerate, with every year's annual minimum falling below the

[607] Markon, C., S. Gray, M. Berman, L. Eerkes-Medrano, T. Hennessy, H. Huntington, J. Littell, M. McCammon, R. Thoman, and S. Trainor, 2018: Alaska. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 1185–1241. doi: 10.7930/NCA4.2018.CH26

[608] Coastal Plain Oil and Gas Leasing Program DEIS, page 3-5.

[609] Bureau of Land Management. 2018. Alpine Satellite Development Plan for the Proposed Greater Mooses Tooth 2 Development Project Final Supplemental Environmental Impact Statement. Bureau of Land Management, Alaska State Office. September 2018. Anchorage, Alaska. https://eplanning.blm.gov/epl-front-office/projects/nepa/65817/155289/190057/GMT2_Final_SEIS_Volume_1-_Chapters_1-6.pdf

[610] Bureau of Land Management. 2014. Greater Mooses Tooth One Final Supplemental Environmental Impact Statement. Bureau of Land Management, Alaska State Office. October 2014. https://eplanning.blm.gov/epl-front-office/projects/nepa/37035/50832/55575/GMT1_Final_SEIS_Volume_1_Oct_2014_(2)_508.pdf

[611] Markon, C.J., S.F. Trainor, and F.S. Chapin, III, eds. 2012. The United States National Climate Assessment – Alaska Technical Regional Report: U.S. Geological Survey Circular 1379. 148 p. Anchorage, Alaska

[612] Hayhoe et al. 2018 (*op. cit.*)

2001-2010 average.[613] The 2018 National Climate Assessment's Alaska[614] chapter alone cites over 200 references dating from more recently than 2013—information that this EIS fails to convey. The Coastal Plain EIS must capture recent developments such as sea ice trends and other recent warming impacts, in order to provide an accurate analysis of climate change impacts.

In addition to the reliance on outdated information, we question more broadly the appropriateness of tiering the impacts discussion from information in the Mooses Tooth SEIS documents. GMT1 and GMT2 are both individual drilling projects, each comprised of a single drill pad. Therefore, the scope, scale, size and location of these projects differs greatly from the Arctic Refuge Coastal Plain proposal, and it varies dramatically in relation to the size of the Coastal Plain region, which is much larger in the NPRA than it is in the Arctic Refuge. Due to these distinctions, the analysis in those SEIS documents of the effects of the habitat destruction from infrastructure development combined with climate change impacts cannot rationally be tiered to or incorporated by reference without any additional analysis of how the more expansive scale of the proposed Coastal Plain leasing will interact with the impacts of climate change. Furthermore, these two projects were tiered to the to the 2012 Final Environmental Impact Statement[615] for the Integrated Activity Plan for National Petroleum Reserve-Alaska[616] -- a plan whose status is now uncertain, pending a review as required by Secretarial Order 3352 (May 31, 2017),[617] for which BLM announced scoping on November 21, 2018.[618]

Our Scoping Comments outlined in detail the climate change-related issues that the BLM needs to assess with respect to biological resources: To cite just a few examples:

> The EIS must analyze the direct, indirect and cumulative effects of the proposed action against a backdrop of continued climate change which is already causing habitat loss, conflicts with humans, and energetic costs, nutritional stress and strenuous long-distance swimming for polar bears. BLM must also consider how greenhouse gas (GHG) and black carbon pollution generated from an oil and gas program in the Arctic Refuge will affect polar bears and hinder recovery of the

[613] http://nsidc.org/arcticseaicenews/charctic-interactive-sea-ice-graph/. See also Serreze, M. C., & Meier, W. N. (2018). The Arctic's sea ice cover: trends, variability, predictability, and comparisons to the Antarctic. *Annals of the New York Academy of Sciences*.

[614] Markon, et al. 2018 (*op.cit.)*

[615] Bureau of Land Management. 2012. National Petroleum Reserve-Alaska FINAL Integrated Activity Plan/Environmental Impact Statement. Bureau of Land Management, Alaska State Office. November 2012. https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=14702

[616] Bureau of Land Management. 2013. National Petroleum Reserve-Alaska. Integrated Activity Plan, Record of Decision. February 2013. https://eplanning.blm.gov/epl-front-office/projects/nepa/5251/42462/45213/NPR-A_FINAL_ROD_2-21-13.pdf

[617] https://www.doi.gov/sites/doi.gov/files/elips/documents/3352 - National Petroleum Reserve - Alaska.pdf

[618] https://www.federalregister.gov/documents/2018/11/21/2018-25336/notice-of-intent-to-prepare-an-integrated-activity-plan-and-environmental-impact-statement-for-the

species. (Page 46)

As discussed above, polar bears are spending more time onshore due to climate change, so terrestrial spills, lagoon, and nearshore spills are increasingly likely to affect their habitat and prey. (page 54)

It is critical that BLM analyze direct and indirect impacts in context with continued climate change in order to fully understand the effects of potential oil and gas development in the Arctic Refuge on polar bears. (page 58)

The EIS must robustly analyze both the effects of oil and gas development on climate change, and assess cumulative effects by describing the interactions between those activities and the various impacts of climate change on biological resources, wildlife and habitats within the Refuge. (page 150)

Some of the more climate-vulnerable species in the Refuge may need to move to broader expanses of tundra to the east and west that may persist longer into the future. It is thus important to maintain connectivity between the Refuge and these other areas, particularly on the Canadian side, where islands stretch the northern extent of terrestrial habitats.

The EIS does not satisfactorily address any of these issues, and indeed fails utterly to assess the interactions between how drilling activities and climate change might affect wildlife and habitat. The Climate Change discussion in the Marine Mammals section (3.3.5) briefly addresses the challenges to polar bears and other marine mammal species, but it fails utterly to address the interacting and cumulative effects of climate change and oil and gas drilling. The discussion in the Birds section (page 3-91) is brief, general, speculative and lacking in specificity for the many species involved. The discussion of climate change impacts on Terrestrial Mammals (page 3-109) fails to give any more than a passing mention to most of the climate - vulnerable coastal plain species.[619] Furthermore, the discussion of climate change impacts to caribou rightly describes some of the negative effects (vegetation change, increased insect harassment), but the section then concludes, without providing evidence of beneficial effects outweighing negative impacts, that: "Because climate change could involve both adverse and beneficial effects on caribou, it is not possible to predict the impacts on the PCH and CAH."

The EIS further fails to reference important relevant information on wildlife impacts found in the Arctic National Wildlife Refuge Revised Comprehensive Conservation Plan (CCP), which addresses climate change in detail, particularly in the "Affected Environment" chapter.[620]

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[619] Aimee Delach & Noah Matson, Defenders of Wildlife, *No Refuge from Warming, Climate Change Vulnerability of the Mammals of the Arctic National Wildlife Refuge, available at*: https://defenders.org/publications/no_refuge_from_warming_climate_change_vulnerability_of_the_mammals_of_the_arctic_national_wildlife_refuge.pdf.

[620] CCP EIS vol.1 ch.4.

The EIS only cites the CCP as a reference for Alternative A impacts, and ignores its lengthy discussion on climate change impacts to Vegetation (section 4.3.3), Fish (4.3.5.4), Birds (4.3.6.11) and Mammals (4.3.7).

Instead of conducting an actual analysis of direct, indirect and cumulative effects, the EIS simply resorts to repeating the following sentence: "The effects of climate change described under *Affected Environment* above, could influence the rate or degree of the potential direct and indirect impacts" under "Direct and Indirect Impacts" and "The effects of climate change described under *Affected Environment* above, could influence the rate or degree of the potential cumulative impacts" under "Cumulative Impacts" for each of the following topics:

Section 3.2.4 Physiography

Section 3.2.5 Geology and minerals

Section 3.2.7, Paleontological Resources

Section 3.2.8, Soil Resources

Section 3.2.9, Sand and Gravel

Section 3.2.10, Water Resources ("Direct and Indirect Impacts" only)

Section 3.3.1, Wetlands and Vegetation

Section 3.3.2, Fish and Aquatic species

Section 3.3.3, Birds

Section 3.3.4, Terrestrial mammals

Section 3.3.5, Marine mammals

Section 3.4.2, Cultural resources

Section 3.4.3, Subsistence Uses and resources

Section 3.4.6, Recreation

Section 3.4.8, Visual resources

Section 3.4.9, Transportation

Section 3.4.10, Economy

Nowhere does the EIS reckon with the nature of these impacts or how the impacts of climate change will interact with the impacts of oil and gas leasing and exploration. This failure to do an even qualitative assessment violates NEPA's requirement to take a "hard look" at these impacts.

c. The DEIS Fails to Evaluate the Impacts in Light of the Need for Urgent Emission Reductions

The DEIS also entirely fails to examine how the program will undermine attainment of the carbon budgets necessary to stabilize climate change. The DEIS totally fails to consider the cumulative impacts in light of the recent (2018) IPCC reports outlining the urgent need for drastic and sustained GHG reductions by 2030 to avoid the most disastrous consequences of climate change. BLM has totally failed to consider how the impact of the Coastal Plain leasing, cumulatively with reasonably foreseeable emissions from the federally managed mineral estate within BLM's jurisdiction, will influence the severity and timing of climate change impacts. This information is of obvious relevance to BLM's decision-making because BLM retains broad discretion to impose stipulations on the Coastal Plain leasing to defer the timing of production activities. A proper analysis of the cumulative impacts of the proposed action on climate change would provide information needed to evaluate how the timing of production could be delayed or otherwise conditioned to, inter alia, avoid stimulating demand.

Oil and gas leasing in the Arctic Refuge is fundamentally incompatible with staying within the global carbon budget necessary to maintain a livable planet.[621] The United States has committed to climate change targets that require the nation to steadily decrease greenhouse gas emissions. The Paris Climate Agreement recognized the need to hold long-term global average temperature "to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels."[622] Extensive research demonstrates the urgent need to reduce greenhouse gas emissions to meet that target. For example, the 2018 report from the Intergovernmental Panel on Climate Change (IPCC), quantified the devastating harms that would occur at 2°C warming, highlighting the necessity of limiting warming to 1.5°C to avoid catastrophic impacts to people and life on Earth.[623] Consistent with that assessment, in

[621] Oil Change International, Drilling Towards Disaster: Why U.S. Oil and Gas Expansion is Incompatible with Climate Limits (January 2019), http://priceofoil.org/content/uploads/2019/01/Drilling-Towards-Disaster-Web-v2.pdf at 33 ("The opening of the Arctic Refuge to oil and gas exploration constitutes a fundamental denial of the path the United States must take to avoid climate catastrophe. Encouraging production growth in a remote and pristine environment from the mid2030s and beyond stands in direct opposition to how U.S. leaders must respond to the growing climate crisis.").

[622] United Nations Framework Convention on Climate Change, Conference of the Parties, Nov. 30-Dec. 11, 2015, Adoption of the Paris Agreement Art. 2, U.N. Doc. FCCC/CP/2015/L.9 (December 12, 2015), http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf ("Paris Agreement").

[623] IPCC [Intergovernmental Panel on Climate Change], Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), http://www.ipcc.ch/report/sr15/.

November 2018, the U.S. Global Change Research Program released the Fourth National Climate Assessment, an authoritative assessment of the science of climate change that describes the economic costs of climate change.[624] It concludes, among other things, that "the impacts of climate change are intensifying across the country, and that climate-related threats to Americans' physical, social, and economic well-being are rising."[625] These include more frequent and intense extreme weather and climate-related events, increasing temperatures, and rising sea levels, which are expected to disrupt the economy, resulting in "annual losses in some economic sectors . . . [of] hundred of billions of dollars by the end of the century—more than the current gross domestic product (GDP) of many U.S. states."[626]

Immediate action is necessary to reduce emissions sufficiently to limit warming to 1.5°C. The 2018 IPCC special report on *Global Warming of 1.5°C* estimates the cumulative amount of carbon dioxide that can be emitted to maintain a 66 percent probability of limiting warming to 1.5°C at between 420 $GtCO_2$ and 570 $GtCO_2$ from January 2018 onwards.[627] At the current emissions rate of 42 $GtCO_2$ per year, this carbon budget would be expended in just 10 to 14 years, underscoring the urgent need for transformative global action to transition from fossil fuel use to clean energy.[628] In pathways consistent with 1.5°C, global net anthropogenic CO_2 emissions must decline by about 45% from 2010 levels by 2030 and reach net zero around 2045 or 2050.[629]

Reducing fossil fuel extraction is a necessary part of the solution. A recent global analysis found that carbon emissions from burning the oil, gas, and coal in the world's *currently operating* fields and mines would exceed the carbon budget consistent with staying below

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[624] The complete report is available at https://nca2018.globalchange.gov/.

[625] A. Jay *et al*., Overview, in *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (D. R. Reidmiller *et al.,* eds., U.S. Global Change Research Program (2018)) (emphasis omitted).

[626] U.S. Global Change Research Program, Summary, in *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (D. R. Reidmiller *et al.*, eds., U.S. Global Change Research Program (2018)).

[627] IPCC [Intergovernmental Panel on Climate Change], Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), http://www.ipcc.ch/report/sr15/ at Summary for Policymakers, SPM-16.

[628] *Id.*

[629] IPCC [Intergovernmental Panel on Climate Change], Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), http://www.ipcc.ch/report/sr15/,at Summary for Policymakers, SPM-15.

1.5°C.[630] The estimated U.S. carbon budget consistent with limiting temperature rise to 2°C—a level of warming well above what the Paris Agreement requires—ranges from 34 $GtCO_2$ to 123 $GtCO_2$.[631] To stay well below 2°C, the 2019 study recommends that no new fossil fuel extraction or transportation infrastructure should be built, and governments should grant no new permits for new fossil fuel extraction and infrastructure.[632] Moreover, some fields and mines, primarily in rich countries, must be closed before fully exploiting their resources.[633] Importantly, a 2015 scientific and economic study found that "all 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."[634] A U.S. Geological Survey report demonstrates that fossil fuels produced on federal lands account for a significant percentage of U.S. emissions—approximately 24 percent of national carbon dioxide, seven percent of methane, and two percent of nitrogen emissions from 2005-2014.[635] The potential carbon emissions from already leased fossil fuel resources on U.S. federal lands would exhaust the remaining U.S. carbon budget consistent with the 1.5°C target.[636]

A recent study in the journal Climatic Change analyzed the effectiveness of policies to restrict fossil fuel supply and concluded "restrictive supply-side policy instruments (targeting fossil fuels) have numerous characteristic economic and political advantages over otherwise similar restrictive demand-side instruments (targeting greenhouse gases)."[637]

Moreover, in 2016, the United States recognized that Arctic development must be consistent with national and international climate goals. In a joint statement with Canadian Prime Minister Trudeau, President Obama agreed that in the Arctic "commercial activities will occur only when the highest safety and environmental standards are met, including national and global

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[630] Oil Change International at 5.

[631] Robiou du Pont, Yann et al., Equitable mitigation to achieve the Paris Agreement goals, 7 Nature Climate Change 38 (2017); Peters, Glen P. et al., Measuring a fair and ambitious climate agreement using cumulative emissions, 10 Environmental Research Letters 105004 (2015); Gignac, Renaud and H. Damon Matthews, Allocating a 2C cumulative carbon budget to countries, 10 Environmental Research Letters 075004 (2015).

[632] Oil Change International at 11.

[633] *Id*.

[634] C. McGlade & P. Ekins, *The geographical distribution of fossil fuels unused when limiting global warming to 2°C*, 517 NATURE 187, 187, 190 (2015).

[635] M.D. Merrill *et al. Federal Lands Greenhouse Gas Emissions and Sequestration in the United States: Estimates for 2005–14*, U.S. Geological Survey Scientific Investigations Report 2018–5131 (2018), https://doi.org/10.3133/sir20185131.

[636] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015), http://www.ecoshiftconsulting.com/wpcontent/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf.

[637] F. Green & R. Denniss, *Cutting with both arms of the scissors: the economic and political case for restrictive supply-side climate policies*, CLIMATIC CHANGE (2018).

climate and environmental goals, and Indigenous rights and agreements."[638] Additionally, if, as the Joint Statement commits, Canada and the United States develop a "science-based standard for considering the life-cycle impacts of commercial activities in the Arctic,"[639] it will disclose both the potential for expansion of fossil fuel supplies to compete directly for market share with clean alternatives and efficiency technology, and the deleterious investment signals stemming from perpetuation of federal involvement in promoting carbon-intensive energy sources.

In sum, oil and gas development in the Arctic is a critical issue for the current administration to reexamine as it assesses how to bring its supply-side policies in line with international commitments to combat climate change, and how to meet climate targets based on sound science and economics. This analysis must assess how reducing the supply of oil from federal lands can affect global oil markets and lead to a reduction in demand and a resulting reduction in GHG pollution. Oil and gas production requires investments in capital-intensive, high-carbon fuel infrastructure that resists being shut down and locks in long-term fuel supplies, making it more difficult and expensive to later shift to a low-carbon pathway and reach greenhouse gas targets.[640] BLM must acknowledge that drilling in the Arctic Refuge is inconsistent with maintaining a livable planet.

d. The Best Available Science Demonstrates that Urgent GHG Emissions Reductions Must Be Achieved in the Near Term, and Management of US Federal Oil and Gas Leasing Can Impact Stabilization of Climate Change.

The EPA has determined that human emissions of greenhouse gases are causing global warming that is harmful to human health and welfare.[641] The D.C. Circuit has upheld this decision as supported by the vast body of scientific evidence on the subject.[642] Indeed, EPA could not have found otherwise, as virtually every climatologist in the world accepts the legitimacy of global warming and the fact that human activity has resulted in atmospheric warming and planetary climate change.[643] The world's leading minds and most respected institutions—guided by increasingly clear science and statistical evidence—agree that dramatic

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[638] The White House, *U.S.-Canada Joint Statement on Climate, Energy, and Arctic Leadership* (Mar. 10, 2016).

[639] *Id.*

[640] Oil Change International at 13.

[641] *See* 74 Fed. Reg. 66,496 (Dec. 15, 2009), *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act.*

[642] *See Coal. for Responsible Regulation, Inc. v. E.P.A.*, 684 F.3d 102, 120-22 (D.C. Cir. 2012).

[643] *See, e.g., See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *The Science of Climate Change* (1995); U.S. Climate Change Science Program, *Abrupt Climate Change* (Dec. 2008); Hansen, James et al., *Global Surface Temperature Change*, REVIEWS OF GEOPHYSICS, 48, RG4004 (June 2010); *see also,* Muller, Richard A., *Conversion of a Climate Change Skeptic,* NEW YORK TIMES, July 28, 2012 (citing Richard A. Muller, et. al., *A New Estimate of the Average Earth Surface Temperature, Spanning 1753 to 2011*; Richard A. Muller, et. al., *Decadal Variations in the Global Atmospheric Land Temperatures*.

action is necessary to avoid planetary disaster.[644] GHG concentrations have been steadily increasing over the past century,[645] and the insatiable consumption of fossil fuels is pushing the world to a tipping point where, once reached, catastrophic change will be unavoidable.[646] In fact, the impacts from climate change are already being experienced, with drought and extreme weather events becoming increasingly common.[647]

Renowned NASA climatologist Dr. James Hansen provides the analogy of loaded dice—suggesting that there still exists some variability, but that climate change is making these extreme events ever more common.[648] In turn, climatic change and GHG emissions are having dramatic impacts on plant and animal species and habitat, threatening both human and species

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[644] *See, e.g.,* Rob Atkinson, et al., *Climate Pragmatism: Innovation, Resilience, and No Regrets* (July 2011); Ramanathan, Veerabhadran et al., *The Copenhagen Accord for Limiting Global Warming: Criteria, Constraints, and Available Avenues* (Feb. 2010); UNITED NATIONS, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Climate Change 2007: Synthesis Report* (2007); A.P. Sokolov, et al., *Probablistic Forecast for Twenty-First-Century Climate Based on Uncertainties in Emissions (without Policy) and Climate Parameters,* MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT) (Oct. 2009) (abstract); UNITED NATIONS, FRAMEWORK CONVENTION ON CLIMATE CHANGE, *Report of the Conference of the Parties* (Dec. 2011); Bill McKibben, *Global Warming's Terrifying New Math,* ROLLING STONE, July 19, 2012; Elizabeth Muller, *250 Years of Global Warming,* BERKLEY EARTH, July 29, 2012; Marika M. Holland, et. al., *Future abrupt reductions in summer Arctic sea ice,* Geophysical Research Letters, Vol. 33, L23503 (2006).

[645] *See* Randy Strait, et al., *Final Colorado Greenhouse Gas Inventory and Reference Case Projections: 1990-2020,* CENTER FOR CLIMATE STRATEGIES (Oct. 2007); Robin Segall et al., *Upstream Oil and Gas Emissions Measurement Project,* U.S. ENVIRONMENTAL PROTECTION AGENCY; Lee Gribovicz, *Analysis of States' and EPA Oil & Gas Air Emissions Control Requirements for Selected Basins in the Western United States,* WESTERN REGIONAL AIR PARTNERSHIP (Nov. 2011).

[646] *See, e.g.,* James Hansen, *Tipping Point: Perspective of a Climatologist,* STATE OF THE WILD 2008-2009; GLOBAL CARBON PROJECT, *A framework for Internationally Co-ordinated Research on the Global Carbon Cycle,* ESSP Report No. 1; INTERNATIONAL ENERGY AGENCY, *CO_2 Emissions from Fuel Combustion*, Highlights 2011; GLOBAL CARBON PROJECT, *10 Years of Advancing Knowledge on the Global Carbon Cycle and its Management*; Malte Meinshausen, et al., *Greenhouse-gas emission targets for limiting global warming to 2° C,* 458 NATURE, April 30, 2009.

[647] *See, e.g.,* UNITED NATIONS, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (2011); Aiguo Dai, *Increasing drought under global warming in observations and models,* NATURE: CLIMATE CHANGE (Aug. 2012); Stephen Saunders, et. al., *Hotter and Drier: The West's Changed Climate* (March 2008).

[648] *See,* James Hansen, et al., *Climate Variability and Climate Change: The New Climate Dice* (Nov. 2011); James Hansen, et al., *Perception of Climate Change* (March 2012); James Hansen, et al., *Increasing Climate Extremes and the New Climate Dice* (Aug. 2012).

resiliency and the ability to adapt to these changes.[649] According to experts at the Government Accountability Office ("GAO"), federal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring. These effects include, among others, "(1) physical effects, such as droughts, floods, glacial melting, and sea level rise; (2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and (3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses."[650]

Despite the strength of these findings, federal agencies have historically failed to take serious action to address these impacts. This type of dismissive approach fails to satisfy the guidance outlined in Department of Interior Secretarial Order 3226, discussed below, or the requirements of NEPA. "Reasonable forecasting and speculation is … implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labelling any and all discussion of future environmental effects as 'crystal ball inquiry.'"[651]

NEPA imposes "action forcing procedures … requir[ing] that agencies take a *hard look* at environmental consequences."[652] These "environmental consequences" may be direct, indirect, or cumulative.[653] BLM is required to take a hard look at those impacts as they relate to the agency action. "Energy-related activities contribute 70% of global GHG emissions; oil and gas together represent 60% of those energy-related emissions through their extraction, processing and subsequent combustion."[654] Even if science cannot isolate each additional coal mine or oil or gas well's contribution to these overall emissions, this does not obviate BLM's responsibility to consider fossil fuel development in the action area in light of the cumulative impacts of fossil fuel emissions. In other words, the BLM cannot ignore the larger relationship that oil and gas management decisions have to the broader climate crisis that we face. Here, the agency's

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[649] *See* Fitzgerald Booker, et al., *The Ozone Component of Climate Change: Potential Effects on Agriculture and Horticultural Plant Yield, Product Quality and Interactions with Invasive Species*, 51 J. INTEGR. PLANT BIOL. 4, 337-351 (2009); Peter Reich, *Quantifying plant response to ozone: a unifying theory*, TREE PHYSIOLOGY 3, 63-91 (1987).

[650] GAO Report, *Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources* (2007); *see also* Committee on Environment and Natural Resources, National Science and Technology Council, *Scientific Assessment of the Effects of Global Climate Change on the United States* (2008); Melanie Lenart, et al. *Global Warming in the Southwest: Projections, Observations, and Impacts* (2007) (describing impacts from temperature rise, drought, floods and impacts to water supply on the southwest).

[651] *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1246 n.9 (9th Cir. 1984 (quoting *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm.*, 481 F.2d 1079, 1092 (D.C. Cir. 1973)).

[652] *Methow Valley*, 490 U.S. at 350 (citations omitted) (emphasis added).

[653] 40 C.F.R. §§ 1502.16, 1508.7, 1508.8.

[654] International Investors Group on Climate Change, *Global Climate Disclosure Framework for Oil and Gas Companies*.

analysis must include the full scope of GHG emissions.[655] If we are to stem climate disaster—the impacts of which we are already experiencing—the agency's decision making must be reflective of this reality and plan accordingly.

BLM is responsible for the management of 700 million acres of federal onshore subsurface minerals.[656] Indeed, "the ultimate downstream GHG emissions from fossil fuel extraction from federal lands and waters by private leaseholders could have accounted for approximately 23% of total U.S. GHG emissions and 27% of all energy-related GHG emissions."[657] This suggests that "ultimate GHG emissions from fossil fuels extracted from federal lands and waters by private leaseholders in 2010 could be more than 20-times larger than the estimate reported in the CEQ inventory, [which estimates total federal emissions from agencies' operations to be 66.4 million metric tons]. Overall, ultimate downstream GHG emissions resulting from fossil fuel extraction from federal lands and waters by private leaseholders in 2010 are estimated to total 1,551 [million metric tons of CO_2 equivalent ("$MMTCO_2e$")]."[658] In 2010, the GAO estimated that BLM could eliminate up to 40% of methane emissions from federally authorized oil and natural gas development, the equivalent of eliminating 126 Bcf or 46.3 $MMTCO_2e$ of GHG pollution annually and equivalent to roughly 13 coal-fired power plants.[659] More recently, the United States Geological Survey estimated that greenhouse gas emissions from public lands fossil fuel production (excluding exports) from 2005 through 2015 constituted between 22.2% and 25.9% of total U.S. emissions.[660]

Therefore, even though greenhouse gas emissions from the proposed program may look minor when viewed on the scale of the global climate crisis, when considered cumulatively with all of the other GHG emissions from BLM-managed land, they become significant and cannot be ignored. Moreover, this analysis is of obvious relevance to determinations within BLM's

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[655] *See Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1998) ("To 'consider' cumulative effects, some quantified or detailed information is required. Without such information, neither the courts nor the public, in reviewing the [agency's] decisions, can be assured that the [agency] provided the hard look that it is required to provide.").

[656] *See* U.S. DOI-BLM, *Mineral and Surface Acreage Managed By BLM, available at:* http://www.blm.gov/wo/st/en/info/About_BLM/subsurface.html.

[657] Stratus Consulting, prepared for: The Wilderness Society, *Greenhouse Gas Emissions from Fossil Energy Extracted from Federal Lands and Waters*, Feb. 1, 2012.

[658] *Id.*

[659] GAO, *Federal Oil & Gas Leases: Opportunities Exist to Capture Vented and Flared Natural Gas, Which Would Increase Royalty Payments and Reduce Greenhouse Gases*, GAO-11-34 at 12 (Table 1)(October 2010). This GHG equivalence assumes a CH_4 warming potential of 72 (20-year warming period) as per the Intergovernmental Panel on Climate Change's Fourth Assessment Report and using EPA's GHG equivalencies calculator.

[660] U.S. Geological Survey 2018, Federal Lands Greenhouse Gas Emissions and Sequestration in the United States: Estimates for 2005–14, Scientific Investigations Report 2018–5131.

discretion here, such as how to condition lease terms, and qualifying the rights associated with any leases issued to ensure that BLM meets its substantive mandates to, inter alia, prevent undue and unnecessary degradation, ensure that its actions do not jeopardize ESA-listed species, use its resources to recover such species, and preserve the values of the Refuge for its priority purposes, as required by the Improvement Act and ANILCA. In particular, this analysis is relevant to the question of whether the lease terms should defer production until such as time as carbon reduction requirements to address climate change have been met.

In assessing the cumulative impact, BLM must consider recent climate science and carbon budgeting, and must consider how opening additional lands to fossil fuel leasing, in combination with other reasonably foreseeable and occurring BLM leasing, will undermine attainment of the emissions reductions necessary *now* to prevent the worst impacts of climate change from occurring. Since the dawn of the industrial revolution a century ago, the average global temperature has risen some 1.6 degrees Fahrenheit. Most climatologists agree that, while the warming to date is already causing environmental problems, another 0.4 degree Fahrenheit rise in temperature, representing a global average atmospheric concentration of carbon dioxide ("CO_2") of 450 parts per million ("ppm"), could set in motion unprecedented changes in global climate and a significant increase in the severity of natural disasters—and could represent the point of no return.[661] In February 2017, the atmospheric concentration of CO_2 was approximately 406.42 ppm, up from 404.04 ppm the same month a year earlier.[662]

Climate change has been intensively studied and acknowledged at the global, national, and regional scales. Climate change is being fueled by the human-caused release of greenhouse gas emissions, in particular carbon dioxide and methane. The Intergovernmental Panel on Climate Change ("IPCC") is a Nobel Prize-winning scientific body within the United Nations that reviews and assesses the most recent scientific, technical, and socio-economic information relevant to our understanding of climate change. In its report to policymakers in 2014, the IPCC provided a summary of our understanding of human-caused climate change. Among other things, the IPCC summarized:[663]

- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.

- Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.

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[661] *See* David Johnston, *Have We Passed the Point of No Return on Climate Change?*, Scientific American (April 2015), *available at:* http://www.scientificamerican.com/article/have-we-passed-the-point-of-no-return-on-climate-change/.

[662] NOAA, Earth System Research Laboratory, *Trends in Atmospheric Carbon Dioxide*, *available at:* http://www.esrl.noaa.gov/gmd/ccgg/trends/.

[663] IPCC AR5, *Summary for Policymakers* (March 2014) *available at:* http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

- Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane, and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.

- In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate.

- Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive, and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.

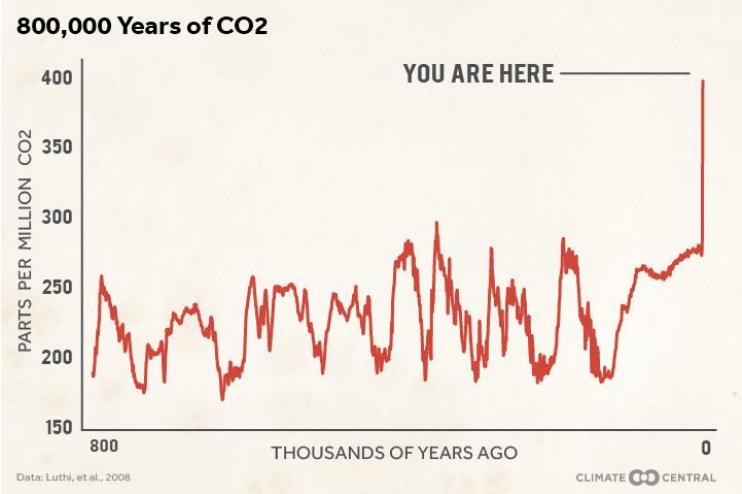
- Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level will continue to rise.

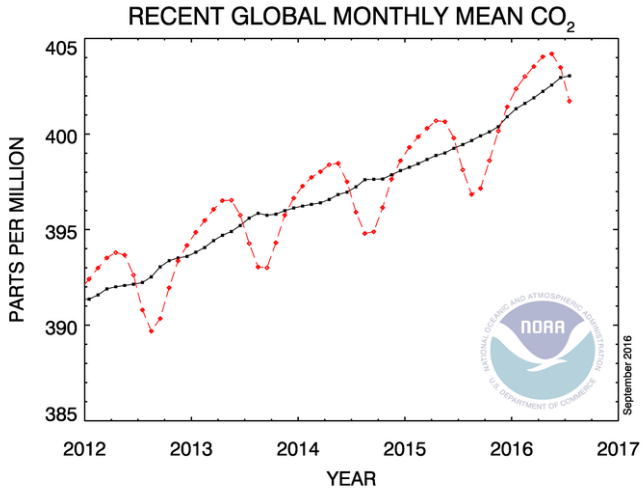
Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are recognized as the key greenhouse gases contributing to climate change. As mentioned above, in 2009, the EPA found that these "six greenhouse gases taken in combination endanger both the public health and the public welfare of current and future generations."[664] The D.C. Circuit has upheld this decision as supported by the vast body of scientific evidence on the subject.[665] According to the National Oceanic and Atmospheric Administration ("NOAA"), "[t]he combined average temperature over global land and ocean surfaces for August 2016 was the highest for August in the 137-year period of record, marking the 16th consecutive month of record warmth for the globe." [666] The global climate crisis is happening and it may well be accelerating quickly.

[664] U.S. Environmental Protection Agency, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act* 74 Fed. Reg. 66,496 (Dec. 15, 2009).

[665] *See Coal. for Responsible Regulation, Inc. v. EPA.*, 684 F.3d 102, 120-22 (D.C. Cir. 2012).

[666] NOAA, Global Analysis – August 2016, *available at:* https://www.ncdc.noaa.gov/sotc/global/201608.





The graphs above show globally averaged historic and monthly mean carbon dioxide.

The IPCC in 2013 affirmed: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased" causing "widespread impacts on human and natural systems."[667] This is consistent with the findings of the United States' 2014 Third National Climate Assessment, stating: "That the planet has warmed is 'unequivocal,' and is corroborated through multiple lines of evidence, as is the conclusion that the causes are very likely human in origin."[668] With particular regard to the Southwest Region—which includes Colorado, New Mexico, Utah, Arizona, Nevada, and California—the National Climate Assessment included in the following overview:[669]

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[667] IPCC AR5 Synthesis Report at 2. See also Overland, J., et al., The urgency of Arctic change, Polar Science (2018), doi: https://doi.org/10.1016/j.polar.2018.11.008.

[668] Jerry M. Melillo, *et al.*, Climate Change Impacts in the United States: The Third National Climate Assessment (2014) at 61, *available at:* http://nca2014.globalchange.gov.

[669] *See id.* at 463–86.

- Snowpack and streamflow amounts are projected to decline in parts of the Southwest, decreasing surface water supply reliability for cities, agriculture, and ecosystems.

- The Southwest produces more than half of the nation's high-value specialty crops, which are irrigation-dependent and particularly vulnerable to extremes of moisture, cold, and heat. Reduced yields from increasing temperatures and increasing competition for scarce water supplies will displace jobs in some rural communities.

- Increased warming, drought, and insect outbreaks, all caused by or linked to climate change, have increased wildfires and impacts to people and ecosystems in the Southwest. Fire models project more wildfire and increased risks to communities across extensive areas.

- Flooding and erosion in coastal areas are already occurring even at existing sea levels and damaging some California coastal areas during storms and extreme high tides. Sea level rise is projected to increase as Earth continues to warm, resulting in major damage as wind-driven waves ride upon higher seas and reach farther inland.

- Projected regional temperature increases, combined with the way cities amplify heat, will pose increased threats and costs to public health in southwestern cities, which are home to more than 90% of the region's population. Disruptions to urban electricity and water supplies will exacerbate these health problems.

The recently-published 2018 Fourth National Climate Assessment confirms and updates these findings, concluding, *inter alia*, that:

- Climate change creates new risks and exacerbates existing vulnerabilities in communities across the United States, presenting growing challenges to human health and safety, quality of life, and the rate of economic growth.

- Climate change affects the natural, built, and social systems we rely on individually and through their connections to one another. These interconnected systems are increasingly vulnerable to cascading impacts that are often difficult to predict, threatening essential services within and beyond the Nation's borders.

- While mitigation and adaptation efforts have expanded substantially in the last four years, they do not yet approach the scale considered necessary to avoid substantial damages to the economy, environment, and human health over the coming decades.

- The quality and quantity of water available for use by people and ecosystems across the country are being affected by climate change, increasing risks and costs to agriculture, energy production, industry, recreation, and the environment.

- Impacts from climate change on extreme weather and climate-related events, air quality, and the transmission of disease through insects and pests, food, and water increasingly

threaten the health and well-being of the American people, particularly populations that are already vulnerable.

- Climate change increasingly threatens Indigenous communities' livelihoods, economies, health, and cultural identities by disrupting interconnected social, physical, and ecological systems.

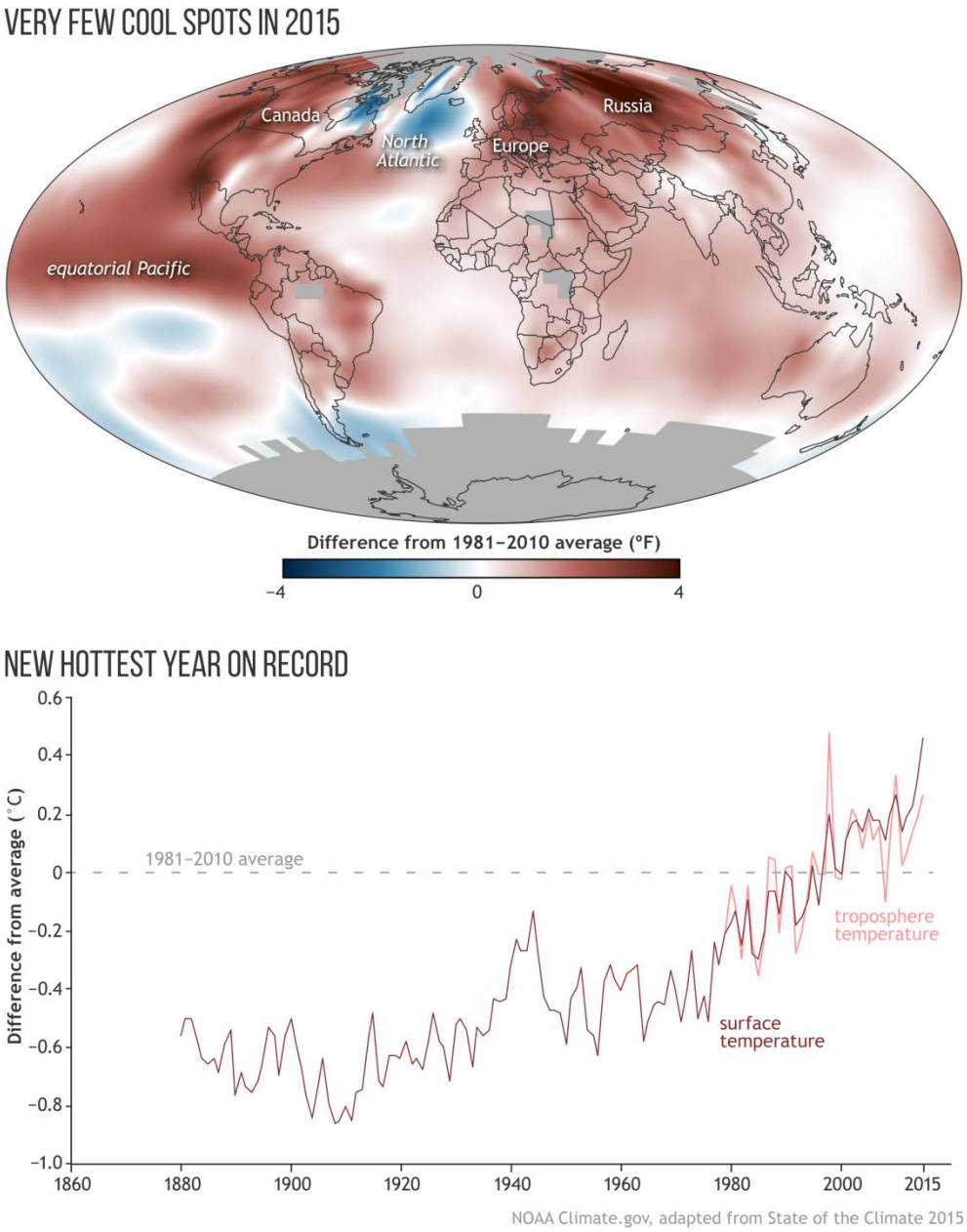
- Ecosystems and the benefits they provide to society are being altered by climate change, and these impacts are projected to continue. Without substantial and sustained reductions in global greenhouse gas emissions, transformative impacts on some ecosystems will occur; some coral reef and sea ice ecosystems are already experiencing such transformational changes.

- Coastal communities and the ecosystems that support them are increasingly threatened by the impacts of climate change. Without significant reductions in global greenhouse gas emissions and regional adaptation measures, many coastal regions will be transformed by the latter part of this century, with impacts affecting other regions and sectors.[670]

Immediate and substantial greenhouse gas reductions are required to avoid catastrophic impacts to people and communities. "Following the warmest year on record in 2014 according to most estimates, 2015 reached record warmth yet again, surpassing the previous record by more than 0.1°C."[671]

[670] U.S. Global Change Research Program, 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II: Report-in-Brief* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)], http://nca2018.globalchange.gov/.

[671] American Meteorological Society, *State of the Climate in 2015*, Vol.97, No.8 (Aug. 2016), at S7.



The Paris Agreement commits all signatories to a target holding long-term global average temperature "to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels."[672] As articulated by a team of international climate scientists, including Dr. James Hansen, in a 2013 report: "The widely accepted target of limiting human-made global warming to 2 degrees Celsius (3.6 degrees Fahrenheit) above preindustrial level is too high and would subject young people, future generations and nature to irreparable harm…. Observational data reveal that some climate

[672] Paris Agreement at Art. 2.

extremes are already increasing in response to warming of several tenths of a degree in recent decades; these extremes would likely be much enhanced with warming of 2°C or more."[673] "Runaway climate change—in which feedback loops drive ever-worsening climate change, regardless of human activities—are now seen as a risk even at 2°C of warming."[674] Indeed, the impacts of 2°C temperature rise have been "revised upwards, sufficiently so that 2°C now more appropriately represents the threshold between 'dangerous' and 'extremely dangerous' climate change."[675]

Although the Paris Agreement underscored that immediate action is needed to avoid 'extremely dangerous' warming, meeting the voluntary commitments adopted in Paris alone will be insufficient to meet goal of limiting temperature change to between 1.5°C and 2.0°C above pre-industrial levels. As noted by a 2015 UNEP technical report: The emissions gap between what the full implementation of the unconditional [intended nationally determined contributions (INDCs)] contribute and the least-cost emission level for a pathway to stay below 2°C, is estimated to be 14 $GtCO_2e$ (range: 12-17) in 2030 and 7 $GtCO_2e$ (range: 5-10) in 2025. When conditional INDCs are included as fully implemented, the emissions gap in 2030 is estimated to be 12 GtCO2e (range: 10-15) and 5 $GtCO_2e$ (range: 4-8) in 2025.[676]

In other words, far greater emissions reductions are necessary to stay below 2.0°C, let alone aspire to no more than 1.5°C of warming. If no further progress were made beyond the Paris Agreement, expected warming by 2100 would be 3.5°C.[677] In the alternative, if no action is taken and the status quo is maintained estimated warming by 2100 is upwards of 4.5°C.[678]

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[673] James Hansen, *et al.*, *Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature,* 8 PLoS ONE 8 e81648 (2013).

[674] Greg Muttitt, *et al.*, *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production*, Oil Change International (Sept. 2016) at 6; *see also* David Spratt, *Climate Reality Check: After Paris, Counting the Cost* (March 2016) at 8 ("there is an unacceptable risk that before 2°C of warming, significant "long-term" feedbacks will be triggered, in which warming produces conditions that generate more warming, so that carbon sinks such as the oceans and forests become less efficient in storing carbon, and polar warming triggers the release of significant permafrost and clathrate carbon stores. Such an outcome could render ineffective human efforts to control the level of future warming to manageable proportions.").

[675] Kevin Anderson and Alice Bows, *Beyond 'Dangerous' Climate Change: Emission Scenarios for a New World*, Phil. Trans. R. Soc. (2011).

[676] United Nations Environment Programme (UNEP), *The Emissions Gap Report 2015: A UNEP Synthesis Report* (Nov. 2015) at xviii.

[677] Spratt, *Climate Reality Check* at 2.

[678] *See* Climate Interactive, Climate Scorecard, available at: https://www.climateinteractive.org/programs/scoreboard/*; see also,* Andrew P. Schurer, *et al.*, *Separating Forced from Chaotic Climate Variability over the Past Millennium*, Journal of Climate, Vol. 26 (March 2013).

With specific regard to United States commitments under the Paris Agreement, the U.S. INDC set specific greenhouse gas emissions reduction target for 2025 of a 26% to 28% reduction below the 2005 emission levels, producing a range in 2005 net GHG emissions from 6,323 to 7,403 $MTCO_2e$.[679] The difference between this target and the estimated 2025 emissions without INDC policies results in an 'emissions gap' ranging from 896 to 2,121 $MTCO_2e$.[680]

Both the IPCC and National Climate Assessment recognize the dominant role of fossil fuels in driving climate change:

> While scientists continue to refine projections of the future, observations unequivocally show that climate is changing and that the warming of the past 50 years is primarily due to human-induced emissions of heat-trapping gases. These emissions come mainly from burning coal, oil, and gas, with additional contributions from forest clearing and some agricultural practices.[681]

CO_2 emissions from fossil fuel combustion and industrial processes contributed about 78% to the total GHG emission increase between 1970 and 2010, with a contribution of similar percentage over the 2000–2010 period (*high confidence*).[682]

As summarized in a recent report:

> The Paris Agreement aims to help the world avoid the worst effects of climate change and respond to its already substantial impacts. The basic climate science involved is simple: cumulative carbon dioxide (CO_2) emissions over time are the key determinant of how much global warming occurs. This gives us a finite *carbon budget* of how much may be emitted in total without surpassing dangerous temperature limits.[683]

Scientific research has established that there is no room in the global carbon budget for new fossil fuel extraction if we are to avoid the worst dangers from climate change. Instead, new fossil fuel production and infrastructure must be halted and most existing production must be phased out to meet the Paris Agreement climate targets and avoid catastrophic climate dangers.

The United States has committed to the climate change target of holding the long-term global average temperature "to well below 2°C above pre-industrial levels and to pursue efforts

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[679] Jeffery Greenblatt & Max Wei, *Assessment of the climate commitments and additional mitigation policies of the Unites States*, Nature Climate Change (Sept. 2016), *available at:* http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate3125.html.

[680] *Id.* at 2; *see also* UNEP, Emissions Gap Report.

[681] Third National Climate Assessment at 2.

[682] IPCC AR5 Synthesis Report at 46.

[683] *The Sky's Limit* at 6.

to limit the temperature increase to 1.5°C above pre-industrial levels"[684] under the Paris Agreement.[685] The United States signed the Paris Agreement on April 22, 2016 as a legally binding instrument through executive agreement,[686] and the treaty entered into force on November 4, 2016. The Paris Agreement codifies the international consensus that climate change is an "urgent threat" of global concern.[687] The Agreement recognized the 1.5°C climate target because 2°C of warming is no longer considered a safe guardrail for avoiding catastrophic climate impacts and runaway climate change.[688]

[684] United Nations Framework Convention on Climate Change, Conference of the Parties, Nov. 30-Dec. 11, 2015, Adoption of the Paris Agreement Art. 2, U.N. Doc. FCCC/CP/2015/L.9 (December 12, 2015), http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf ("Paris Agreement").

[685] On December 12, 2015, 197 nation-state and supra-national organization parties meeting in Paris at the 2015 United Nations Framework Convention on Climate Change Conference of the Parties consented to the Paris Agreement committing its parties to take action so as to avoid dangerous climate change.

[686] United Nations Treaty Collection, Chapter XXVII, 7.d Paris Agreement, List of Signatories; U.S. Department of State, Background Briefing on the Paris Climate Agreement (December 12, 2015). Although not every provision in the Paris Agreement is legally binding or enforceable, the U.S. and all parties are committed to perform the treaty commitments in good faith under the international legal principle of *pacta sunt servanda* ("agreements must be kept"). Vienna Convention on the Law of Treaties, Art. 26.

[687] *See* Paris Agreement, at Annex (*"Recognizing* the need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge").

[688] Hansen, James et al., Target atmospheric CO_2: Where should humanity aim?, 2 The Open Atmospheric Science Journal 217 (2008); Anderson, Kevin & Alice Bows, Beyond 'dangerous' climate change: emission scenarios for a new world, 369 Philosophical Transactions of the Royal Society 20 (2011); Hansen, James et al., Assessing "dangerous climate change": Required reduction of carbon emissions to protect young people, future, generations and nature, 8 PLoS ONE e81648 (2013); IPCC [Intergovernmental Panel on Climate Change], Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, [Core Writing Team, R.K. Pachauri & L.A. Meyer (eds.)], IPCC, Geneva, Switzerland (2014), http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf at 72-73; U.N. Subsidiary Body for Scientific and Technological Advice, Report on the Structured Expert Dialogue on the 2013-2015 review, FCCC/SB/2015/1NF.1 (2015), http://unfccc.int/resource/docs/2015/sb/eng/inf01.pdf.; Hansen, James et al., Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observation that 2°C global warming could be dangerous, 16 Atmospheric Chemistry and Physics 3761(2016); Schleussner, Carl-Friedrich et al., Differential climate impacts for policy-relevant limits to global warming: the case of 1.5C and 2C, 7 Earth Systems Dynamics 327 (2016).

Notably, a 2018 report from the Intergovernmental Panel on Climate Change (IPCC), the authoritative international scientific body for the assessment of climate change, quantified the devastating harms that would occur at 2°C warming, highlighting the necessity of limiting warming to 1.5°C to avoid catastrophic impacts to people and life on Earth.[689] According to the IPCC's analysis, the damages that would occur at 2°C warming compared with 1.5°C include more deadly heatwaves, drought and flooding; 10 centimeters of additional sea level rise within this century, exposing 10 million more people to flooding; a greater risk of triggering the collapse of the Greenland and Antarctic ice sheets with resulting multi-meter sea level rise; dramatically increased species extinction risk, including a doubling of the number of vertebrate and plant species losing more than half their range, and the virtual elimination of coral reefs; 1.5 to 2.5 million more square kilometers of thawing permafrost area with the associated release of methane, a potent greenhouse gas; a tenfold increase in the probability of ice-free Arctic summers; a higher risk of heat-related and ozone-related deaths and the increased spread of mosquito-borne diseases such as malaria and dengue fever; reduced yields and lower nutritional value of staple crops like corn, rice, and wheat; a doubling of the number of people exposed to climate-change induced increases in water stress; and up to several hundred million more people exposed to climate-related risks and susceptible to poverty by 2050.[690]

Scientific research has estimated the global carbon budget – the cumulative amount of carbon dioxide that can be emitted – for maintaining a likely chance of meeting the Paris climate target of 1.5°C or well below 2°C. According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), total cumulative anthropogenic CO_2 emissions must remain below 400 $GtCO_2$ from 2011 onward for a 66 percent probability of limiting warming to 1.5°C, and below 1,000 $GtCO_2$ from 2011 onward for a 66 percent probability of limiting warming to 2°C above pre-industrial levels.[691] The 2018 IPCC special report on *Global Warming of 1.5°C* provided a revised carbon budget for a 66 percent probability of limiting warming to 1.5°C, estimated at 420 $GtCO_2$ and 570 $GtCO_2$ depending on the temperature dataset used, from January 2018 onwards.[692] At the current emissions rate of 42

[689] IPCC [Intergovernmental Panel on Climate Change], Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), http://www.ipcc.ch/report/sr15/.

[690] *Id.* at Summary for Policymakers.

[691] IPCC [Intergovernmental Panel on Climate Change], 2013: Summary for Policymakers. 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 [Stocker, T.F. et al. (eds.)], Cambridge University Press (2013) at 25; IPCC [Intergovernmental Panel on Climate Change], Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)], IPCC, Geneva, Switzerland (2014) at 63–64 & Table 2.2.

[692] IPCC [Intergovernmental Panel on Climate Change], Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and

$GtCO_2$ per year, this carbon budget would be expended in just 10 to 14 years, underscoring the urgent need for transformative global action to transition from fossil fuel use to clean energy.[693]

Importantly, a 2016 global analysis found that the carbon emissions that would be emitted from burning the oil, gas, and coal in the world's *currently operating* fields and mines would fully exhaust and exceed the carbon budgets consistent with staying below 1.5°C or 2°C.[694] Further, the reserves in currently operating oil and gas fields alone, even excluding coal mines, would lead to warming beyond 1.5°C. An important conclusion of the analysis is that *most* of the existing oil and gas fields and coal mines will need to be closed before their reserves are fully extracted in order to limit warming to 1.5 degrees.[695] Some existing fields and mines will need to be closed to limit warming to 2 degrees.[696]

In short, there is no room in the carbon budget for *new* fossil fuel extraction *anywhere*, including in the United States.[697] Additionally, most of the world's existing oil and gas fields and coal mines will need to be closed before their reserves are fully extracted to meet a 1.5°C target. The United States has an urgent responsibility to lead in this transition from fossil fuel production to 100 percent clean energy as a wealthy nation with ample financial resources and technical capabilities, and due to our dominant role in driving climate change and its harms. The U.S. is the world's largest historic emitter of greenhouse gas pollution, responsible for 26 percent of cumulative global CO_2 emissions since 1870, and is currently the world's second highest emitter on an annual and per capita basis.[698]

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related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), http://www.ipcc.ch/report/sr15/.

[693] *Id.*

[694] Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production (September 2016), available at: http://priceofoil.org/2016/09/22/the-skys-limit-report/.

[695] Oil Change International, The Sky's Limit California: Why the Paris Climate Goals Demand That California Lead in a Managed Decline of Oil Extraction, May 2018, available at: http://priceofoil.org/ca-skys-limit at 7, 13.

[696] Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production (September 2016) at 5, 7.

[697] This conclusion was reinforced by the IPCC Fifth Assessment Report which estimated that global fossil fuel reserves exceed the remaining carbon budget (from 2011 onward) for staying below 2°C (a target incompatible with the Paris Agreement) by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2°C by 31 to 50 times. *See* Bruckner, Thomas et al., 2014: Energy Systems. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press (2014), available at: http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf at Table 7.2.

[698] Global Carbon Project, Global Carbon Budget (November 13, 2017) at 10, 18, 32, http://www.globalcarbonproject.org/carbonbudget/17/presentation.htm

Research on the United States' carbon budget and the carbon emissions locked in U.S. fossil fuels similarly establishes that the U.S. must halt new fossil fuel production and rapidly phase out existing production to avoid the worst dangers of climate change. Scientific studies have estimated the U.S. carbon budget consistent with a 1.5°C target at 25 $GtCO_2eq$ to 57 $GtCO_2eq$ on average,[699] depending on the sharing principles used to apportion the global budget across countries.[700] The estimated U.S. carbon budget consistent with limiting temperature rise to 2°C – a level of warming well above what the Paris Agreement requires and which would result in devastating harms – ranges from 34 $GtCO_2$ to 123 $GtCO_2$,[701] depending on the sharing

[699] Robiou du Pont, Yann et al., Equitable mitigation to achieve the Paris Agreement goals, 7 Nature Climate Change 38 (2017), and Supplemental Tables 1 and 2. Quantities measured in $GtCO_2eq$ include the mass emissions from CO_2 as well as the other well-mixed greenhouse gases (CO_2,methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and SF_6) converted into CO_2-equivalent values, while quantities measured in $GtCO_2$ refer to mass emissions of just CO_2 itself.

[700] Robiou du Pont et al. (2017) averaged across IPCC sharing principles to estimate the U.S. carbon budget from 2010 to 2100 for a 50 percent chance of returning global average temperature rise to 1.5°C by 2100, consistent with the Paris Agreement's "well below 2°C" target, and based on a cost-optimal model. The study estimated the U.S. carbon budget consistent with a 1.5°C target at 25 $GtCO_2eq$ by averaging across four equity principles: capability (83 $GtCO_2eq$), equal per capita (118 $GtCO_2eq$), greenhouse development rights (-69 $GtCO_2eq$), and equal cumulative per capita (-32 $GtCO_2eq$). The study estimated the U.S. budget at 57 $GtCO_2eq$ when averaging across five sharing principles, adding the constant emissions ratio (186 $GtCO_2eq$) to the four above-mentioned principles. However, the constant emissions ratio, which maintains current emissions ratios, is not considered to be an equitable sharing principle because it is a grandfathering approach that "privileges today's high-emitting countries when allocating future emission entitlements." For a discussion of sharing principles, see Kartha, S. et al., Cascading biases against poorer countries, 8 Nature Climate Change 348 (2018).

[701] Robiou du Pont et al. (2017) estimated the U.S. carbon budget for a 66 percent probability of keeping warming below 2°C at 60 $GtCO_2eq$ based on four equity principles (capability, equal per capita, greenhouse development rights, equal cumulative per capita), and at 104 $GtCO_2eq$ based on five principles (adding in constant emissions ratio, but see footnote above). For a 66 percent probability of keeping warming below 2°C, Peters et al. (2015) estimated the U.S. carbon budget at 34 $GtCO_2$ based on an "equity" approach for allocating the global carbon budget, and 123 $GtCO_2$ under an "inertia" approach. The "equity" approach bases sharing on population size and provides for equal per-capita emissions across countries, while the "inertia" approach bases sharing on countries' current emissions. Similarly using a 66 percent probability of keeping warming below 2°C, Gignac et al. (2015) estimated the U.S. carbon budget at 78 to 97 $GtCO_2$, based on a contraction and convergence framework, in which all countries adjust their emissions over time to achieve equal per-capita emissions. Although the contraction and convergence framework corrects current emissions inequities among countries over a specified time frame, it does not account for inequities stemming from historical emissions differences. When accounting for historical responsibility, Gignac et al. (2015) estimated that the United States has an additional cumulative carbon debt of 100 $GtCO_2$ as of 2013. *See* Peters, Glen P. et al., Measuring a fair and ambitious climate agreement using

principles used. Under any scenario, the remaining U.S. carbon budget compatible with the Paris climate targets is extremely small.

An analysis of U.S. fossil fuel resources demonstrates that the potential carbon emissions from already leased fossil fuel resources on U.S. federal lands would essentially exhaust the remaining U.S. carbon budget consistent with the 1.5°C target. This analysis estimated that recoverable fossil fuels on U.S. *federal lands* would release up to 349 to 492 $GtCO_2eq$ of carbon emissions, if fully extracted and burned.[702] Of that amount, *already leased* fossil fuels would release 30 to 43 $GtCO_2eq$ of emissions, while as yet unleased fossil fuels would emit 319 to 450 $GtCO_2eq$ of emissions. Thus, carbon emissions from *already leased* fossil fuel resources *on federal lands alone* (30 to 43 $GtCO_2eq$) would essentially exhaust the U.S. carbon budget for a 1.5°C target (25 to 57 $GtCO_2eq$), if these leased fossil fuels are fully extracted and burned. The potential carbon emissions from unleased fossil fuel resources (319 to 450 $GtCO_2eq$) would exceed the U.S. carbon budget for limiting warming to 1.5°C many times over.[703] This does not include the additional carbon emissions that will be emitted from fossil fuels extracted on non-federal lands, estimated up to 500 $GtCO_2eq$ if fully extracted and burned.[704] This research further establishes that the United States must halt new fossil fuel projects and close existing fields and mines before their reserves are fully extracted to achieve the Paris climate targets and avoid the worst damages from climate change.

Furthermore, research that models emissions pathways for limiting warming to 1.5° or 2°C shows that a rapid end to fossil fuel extraction in the United States is critical. Specifically, research indicates that g*lobal* fossil fuel CO_2 emissions must *end entirely* by mid-century and likely as early as 2045 for a reasonable likelihood of limiting warming to 1.5° or 2°C. [705] Due to

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cumulative emissions, 10 Environmental Research Letters 105004 (2015); Gignac, Renaud and H. Damon Matthews, Allocating a 2C cumulative carbon budget to countries, 10 Environmental Research Letters 075004 (2015).

[702] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015), available at: http://www.ecoshiftconsulting.com/wpcontent/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf.

[703] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015), at 4.

[704] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015), at 3 ("the potential GHG emissions of federal fossil fuels (leased and unleased) are 349 to 492 Gt CO2e, representing 46% to 50% of potential emissions from all remaining U.S. fossil fuels").

[705] Rogelj, Joeri et al., Energy system transformations for limiting end-of-century warming to below 1.5°C, 5 Nature Climate Change 519 (2015); IPCC [Intergovernmental Panel on Climate Change], Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), http://www.ipcc.ch/report/sr15/.

the small U.S. carbon budget, the United States must end fossil fuel CO_2 emissions even earlier: between 2025 and 2030 on average for a reasonable chance of staying below 1.5°C, and between 2040 and 2045 on average for a reasonable chance of staying below 2°C.[706] Ending U.S. fossil fuel CO_2 emissions between 2025 and 2030, consistent with the Paris climate targets, would require an immediate halt to new production and closing most existing oil and gas fields and coal mines before their reserves are fully extracted.

Ending the approval of new fossil fuel production and infrastructure is also critical for preventing "carbon lock-in," where approvals and investments made now can lock in decades worth of fossil fuel extraction that we cannot afford. New approvals for wells, mines, and fossil fuel infrastructure -- such as pipelines, marine and rail import and export terminals -- require upfront investments that provide financial incentives for companies to continue production for decades into the future.[707] Given the long-lived nature of fossil fuel projects, ending the approval of new fossil fuel projects avoids the lock-in of decades of fossil fuel production and associated emissions.[708]

In a recent special report, issued October 2018, the IPCC has underscored the need for urgent emissions reductions on an unprecedented scale.[709] To avoid exceeding 1.5°C of warming, global net CO_2 emissions reductions would need to decline by 45% relative to 2010

[706] *See* Climate Action Tracker, USA (last updated 30 April 2018), available at: http://climateactiontracker.org/countries/usa at Country Summary figure showing U.S. emissions versus year.

[707] Davis, Steven J. and Robert H. Socolow, Commitment accounting of CO2 emissions, Environmental Research Letters 9: 084018 (2014); Erickson, Peter et al., Assessing carbon lock-in, 10 Environmental Research Letters 084023 (2015); Erickson, Peter et al., Carbon lock-in from fossil fuel supply infrastructure, Stockholm Environment Institute, Discussion Brief (2015); Seto, Karen C. et al., Carbon Lock-In: Types, Causes, and Policy Implications, 41 Annual Review of Environmental Resources 425 (2016); Green, Fergus and Richard Denniss, Cutting with both arms of the scissors: the economic and political case for restrictive supply-side climate policies, Climatic Change, https://doi.org/10.1007/s10584-018-2162-x (2018).

[708] Erickson et al. (2015): "The essence of carbon lock-in is that, once certain carbon-intensive investments are made, and development pathways are chosen, fossil fuel dependence and associated carbon emissions can become "locked in", making it more difficult to move to lower-carbon pathways and thus reduce climate risks." Green and Denniss (2018): "When production processes require a large, upfront investment in fixed costs, such as the construction of a port, pipeline or coalmine, future production will take place even when the market price of the resultant product is lower than the long-run opportunity cost of production. This is because rational producers will ignore 'sunk costs' and continue to produce as long as the market price is sufficient to cover the marginal cost (but not the average cost) of production. This is known as 'lock-in.'"

[709] *See* IPCC, Global Warming of 1.5 °C (Oct. 2018), *available at* http://www.ipcc.ch/report/sr15/.

levels by 2030, and reach net zero by 2050.[710] To keep warming below 2°C, emissions would have to decline by 20% relative to 2010 levels by 2030, and reach zero by 2075.[711] According to the report, "[b]y the end of 2017, anthropogenic CO_2 emissions since the preindustrial period are estimated to have reduced the total carbon budget for 1.5°C by approximately 2200±320 $GtCO_2$." [712] Further, "[t[he associated remaining budget is being depleted by current emissions of 42± 3 $GTCO_2$ per year."[713] Estimates of the remaining carbon budget to remain under 1.5°C depend on the measure of temperature effects considered and the probability of success.[714] For a 50% chance of successfully staying under 1.5°C, estimates range from 580 to 770 $GTCO_2$.[715] For a 66% chance, estimates range from 420 to 570 $GTCO_2$.[716]

The report explains that limiting "limiting global warming to 1.5°C …would require rapid and far-reaching transitions," including in energy, "unprecedented in terms of scale."[717] With high confidence, the report finds that, "In 1.5°C pathways with no or limited overshoot, renewables are projected to supply 70–85% (interquartile range) of electricity in 2050."[718] It also acknowledges that current Paris Agreement ambitions will fail to limit warming to 1.5°C, even if additional aggressive emissions goals are pursued *after* 2030: "Estimates of the global emissions outcome of current nationally stated mitigation ambitions as submitted under the Paris Agreement would lead to global greenhouse gas emissions in 2030 of 52–58 $GtCO_2eq$ yr^{-1} (*medium confidence).* Pathways reflecting these ambitions would not limit global warming to 1.5°C, even if supplemented by very challenging increases in the scale and ambition of emissions reductions after 2030 (*high confidence*)."[719] With high confidence, the report finds that, "Pathways that limit global warming to 1.5°C with no or limited overshoot show clear emission reductions by 2030 … All but one show a decline in global greenhouse gas emissions to below 35 $GtCO_2eq$ yr^{-1} in 2030, and half of available pathways fall within the 25–30 $GtCO_2eq$ yr^{-1} range (interquartile range), a 40–50% reduction from 2010 levels."[720] Alarmingly,

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[710] IPCC, Global Warming of 1.5 °C: Summary for Policy Makers (Oct. 2018), at SPM-15, *available at* http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

[711] *Id*.

[712] *Id*. at SPM-16.

[713] *Id*.

[714] *Id*. at SPM-16.

[715] *Id*.

[716] *Id*. The report also notes the sources of uncertainty in the budget estimates: "Uncertainties in the climate response to CO_2 and non-CO_2 emissions contribute ±400 $GtCO_2$ and the level of historic warming contributes ±250 $GtCO_2$ (*medium confidence*). Potential additional carbon release from future permafrost thawing and methane release from wetlands would reduce budgets by up to 100 $GtCO_2$ over the course of this century and more thereafter (*medium confidence*). In addition, the level of non-CO_2 mitigation in the future could alter the remaining carbon budget by 250 $GtCO_2$ in either direction (*medium confidence*)." 2018 IPCC Report at SPM-16.

[717] *Id*. at SPM-21.

[718] *Id*.

[719] *Id*. at SPM-24.

[720] *Id*.

the report also finds, "Pathways reflecting current nationally stated mitigation ambition until 2030 are broadly consistent with cost-effective pathways that result in a global warming of about 3°C by 2100, with warming continuing afterwards (*medium confidence*)."[721]

Simply put, the timeframe to avoid catastrophic climate change is short, and the management of our federal minerals is dangerously out of step with this reality.

To meet NEPA's requirements for the consideration of cumulative impacts, BLM must consider the emissions anticipated from the Coastal Plain program in light of the urgent need for reductions identified by the IPCC. Moreover, BLM's consideration of alternatives must include alternatives that consider how BLM can use its discretion to mitigate these impacts, for example, by lease terms that defer production.

7. The DEIS Misrepresents the Economic Impacts of the Alternatives by Failing to Provide Adequate Information to Gauge the Negative Economic Impacts of the Proposed Leasing Alternatives

Though calculating the positive economic impacts of the projected oil and gas extraction,[722] the DEIS fails to ascertain the costs associated with the contribution to climate change resulting from its decision, or the economic benefits of avoiding or delaying carbon emissions. Consequently, the economic analysis is slanted and misrepresents the economic consequences of the proposed action. The DEIS fails to provide the information necessary to assess the magnitude of the negative consequences associated with the plan's contribution to climate change, and to assess those impacts in economic terms. The DEIS also fails to provide the information necessary to assess the economic benefits from the avoided emissions that would result from deferring production under the leases. In other words, the DEIS fails to consider whether delaying production is a more economically efficient way of keep carbon sequestered, and therefore remaining within carbon budgets, than other methods of reducing carbon emissions. Without adequate information to make such comparisons, the EIS is skewed, inflating the apparent economic benefits of the oil and gas production while obscuring its economic harms.

B. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON AIR QUALITY IS INADEQUATE.

BLM's air quality impacts analysis is deficient and fails to identify and disclose reasonably foreseeable direct, indirect, and cumulative air quality impacts from all phases of oil and gas development on the Coastal Plain. Attachment A to our comments provides a detailed technical review of the air quality analysis contained in the Draft EIS, prepared by Megan Williams. We fully incorporate that document by reference into our comments, and provide a brief summary below.

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[721] *Id.*

[722] *See, e.g.*, DEIS vol. 1 at 3-236–3-237 (quantifying royalties on the anticipated oil and gas production), 3-235 (quantifying income generated from labor induced by the oil and gas program).

An adequate NEPA analysis and compliance with the Clean Air Act requires BLM to quantitatively analyze the air pollution impacts associated with each alternative considered in the EIS, ensure prevention of significant deterioration of air quality, fully analyze a suite of enforceable mitigation measures, and address impacts from greenhouse gas emissions. In order to adequately analyze these issues, BLM was required to perform a quantitative analysis of criteria pollutants, but entirely failed to do so.[723] Further exacerbating this issue, BLM's qualitative analysis in the draft EIS is deficient.

Baseline levels of air quality must be established prior to allowing development on the Coastal Plain. In the absence of a baseline monitoring data record that is representative of ambient air conditions on the Coastal Plain, BLM should ensure that quality-assured monitoring data are collected within the program area in accordance with EPA and State data quality criteria and that the data are made available to the public, prior to allowing development on the Coastal Plain.[724] Establishment of a comprehensive monitoring network within the program area will help serve as a backstop to track and ensure air quality protection throughout the Coastal Plain and to help identify areas of concern with regard to air impacts. Beyond establishing baseline air quality monitoring data, however, BLM must complete a more comprehensive, quantitative modeling analysis of future development in this DEIS in order to *prevent* significant impacts throughout the Coastal Plain (as opposed to taking corrective action after a significant impact is identified by an air quality monitor).

The DEIS fails to analyze or condition leasing on a comprehensive set of required, measurable, and enforceable mitigations to ensure there will be no significant impacts to air quality associated with leasing and development of the Coastal Plain.[725] BLM's failure to include specific, enforceable mitigation measures makes it unclear how the agency will ensure there will be no significant impacts to air quality – i.e., that development will not adversely impact human health and the natural environment and will not result in significant deterioration of air quality as required by the Clean Air Act. None of the Lease Stipulations address air quality, and the BLM's Required Operating Procedures 5 and 6 do not adequately address air quality and are largely discretionary. Monitoring does not mitigate against impacts to air quality, and BLM should not conflate these requirements. We encourage BLM to closely review the list of potential measures included in Ms. Williams' report that may mitigate impacts to air quality for inclusion in the final EIS.[726] The failure to analyze sufficient mitigation measures also violates NEPA, which requires BLM to consider reasonable alternatives to eliminate or mitigate adverse impacts to air quality. As BLM expressly acknowledges, the potential impacts to air quality under all of the action alternatives would be identical – demonstrating that the range of alternatives is insufficient.[727] BLM must put forth an alternative that ensures no significant air quality impacts and full compliance with the Clean Air Act. This would include one that fully considers whether

[723] *See* Attachment A, secs. II & III.
[724] *See* Attachment A, sec. I.
[725] *See* Attachment A, sec. VI.
[726] Attachment A, sec. VI.
[727] DEIS vol. 1 at 3-16 ("Alternatives B through D would be the same as described under Impacts Common to All Action Alternatives.").

there will be unacceptable health risks associated with criteria and hazardous air pollutant impacts, significant cumulative visibility impacts, or significant deterioration of air quality. BLM should use modeling to determine what specific mitigation measures and pace / location / intensity of development will be needed to ensure BLM's actions will not cause or contribute to violations of the National Ambient Air Quality Standards or adverse impacts to air quality related values, and then BLM must include those measures as enforceable mitigation measures in the DEIS.

Even setting aside the failure to analyze or condition leasing on a comprehensive set of mitigations, the DEIS is deficient because BLM failed to conduct the modeling necessary to adequately analyze air quality impacts, compare alternatives, and support conclusions about compliance with the Clean Air Act. BLM is required to independently estimate the emissions inventory, model air pollution impacts associated with each of the action alternatives, and compare these results to the baseline of Alternative A.[728] The absence of modeling deprives the public and decision makers from understanding the air quality impacts of an oil and gas program and evaluating the potential tradeoffs and differences between alternatives – including between Alternative A and the action alternatives. Air quality modeling is a necessary tool for assessing future air pollutant impacts under NEPA and supporting BLM's conclusion that oil and gas activities would be unlikely to exceed health-based National Ambient Air Quality Standards and thresholds set to protect against adverse impacts to air quality related values. A quantitative modeling assessment of the air quality impacts from the alternative development scenarios, based on modeling of emissions associated with the specific assumptions for the development Alternatives – including the location and density of development – would be needed in order to understand whether or not impacts would be greater under certain alternatives for some pollutants, in some locations. BLM's failure to conduct modeling renders the DEIS deficient.

Moreover, BLM's decision to not include a modeling analysis of potential future oil and gas development impacts on the Coastal Plain in the DEIS because the location, timing, and level of development is not known at this time, is not supported by evidence that the BLM either cannot obtain the needed information without exorbitant cost or cannot present a credible scientific estimation based on methods generally accepted in the scientific community.[729] According to NEPA regulation, if an estimation of reasonably foreseeable significant adverse impacts cannot be obtained because, among other things, the means to obtain it are "not known", BLM has an obligation to include an evaluation "based upon theoretical approaches or research methods generally accepted in the scientific community" provided that "the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason."[730] These methods of dealing with incomplete information are required under NEPA and must be thoroughly exercised before drawing the conclusion that an analysis of oil and gas development impacts cannot be included in the DEIS.[731]

[728] Attachment A, sec. II.
[729] *See* 40 C.F.R. § 1502.22
[730] 40 C.F.R. § 1502.22
[731] *See* 40 C.F.R. § 1502.22

BLM's conclusion that future oil and gas development on the Coastal Plain is unlikely to exceed air quality standards and thresholds is based on other air analyses – performed to assess both onshore and offshore development – that are deficient, predict significant air quality impacts, likely underestimate potential impacts, and are not representative of oil and gas development on the Coastal Plain.[732]

BLM also entirely fails to analyze how hazardous air pollutant emissions may impact public health.[733] The EIS acknowledges that the Clean Air Act regulates hazardous air pollutants which may impact human health, [734] but then never again mentions how oil and gas activities on the Coastal Plan may produce emissions which are potentially hazardous to human health. This omission is unacceptable. BLM needs to carefully consider how increased air pollution may impact exposed populations, including residents of Kaktovik, Refuge visitors, industry workers, and others who are in the vicinity of the program area for subsistence purposes.[735]

Although visibility is integral to the wilderness characteristics, aesthetics, and recreational values of the Coastal Plain and adjacent Mollie Beattie Wilderness, the DEIS fails to analyze haze and other air quality impacts on Class I and sensitive Class II airsheds.[736] BLM cannot merely rely on conclusory statements that future projects on the Coastal Plain would be "unlikely" to violate important air quality standards and visibility. Current operations on the North Slope have proven otherwise.[737]

BLM also fails to adequately address greenhouse gas emissions and climate change impacts from development of oil and gas leases. Though BLM quantifies direct and indirect greenhouse gas (GHG) emissions by reference to the GMT2 Final EIS, it is not clear this comparison accurately captures potential emissions resulting from oil and gas leasing and development on the Coastal Plain.[738] Moreover, BLM's analysis does not draw any conclusions with regard to the significance of GHG or overall emissions, and entirely fails to consider any potential climate change mitigation.[739]

Finally, BLM did not explain its failure to convene a technical workgroup under the terms of the Memorandum Of Understanding Among The U.S. Department Of Agriculture, U.S. Department Of The Interior, And U.S. Environmental Protection Agency, Regarding Air Quality

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[732] *See* Attachment A, sec. IV.

[733] *See also infra* Part III.Z.

[734] DEIS vol. 1 at 3-11. In addition to criteria pollutants, the Clean Air Act regulates toxic air pollutants, or hazardous air pollutants, that are known or suspected to cause cancer or other serious health effects or adverse environmental impacts. The hazardous air pollutant regulatory process identifies specific chemical substances that are potentially hazardous to human health.

[735] *See* Attachment A, sec. III.B.2.

[736] *See* Attachment A secs. III.B.3 & IV.A.3. *See also infra* Part V. S, T, W.

[737] *See* Sabrina Shankman, *Oil boom sets off health fears in Alaskan Arctic*, SAN FRANCISCO CHRONICLE (Aug. 1. 2018).

[738] *See* Attachment A, sec. VII.

[739] *See* Attachment A, sec. VII; *see also supra* Part V.A..

Analyses And Mitigation For Federal Oil And Gas Decisions Through The National Environmental Policy Act Process Understanding (Air Quality MOU), signed June 23, 2011, as requested in our scoping comments. BLM must conduct modeling pursuant to the Air Quality MOU between these agencies for air quality analyses and mitigation in connection with oil and gas development on Federal lands.[740] Indeed, BLM has done this modeling in the past pursuant to the terms of the MOU: in conjunction with the FWS, U.S. Environmental Protection Agency, U.S. Bureau of Ocean Energy Management, National Park Service, U.S. Forest Service, and the State of Alaska, BLM has conducted air quality modeling to address the potential near-field and far field air quality impacts of several other BLM-authorized oil and gas leasing activities on the North Slope, including the NPR-A IAP, Greater Mooses Tooth (GMT1), and Greater Mooses Tooth 2 (GMT2). BLM's failure to utilize the experience and expertise of these agencies to ensure air quality modeling conducted as part of this NEPA analysis thoroughly and accurately discloses the effects of all phases of oil and gas development on Arctic Refuge air quality raises serious questions as to scientific integrity and transparency of this NEPA process.

C. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON SOUNDSCAPES IS DEFICIENT.

Maintaining the natural soundscape of the Arctic Refuge is crucial to its wilderness, recreation, wildlife, and subsistence purposes, as is highlighted in the CCP:

> Natural quiet and natural sounds are intrinsic elements of the Wilderness character of designated Wilderness and the wilderness characteristics of the entire Refuge. As such, their perpetuation is important for meeting the Refuge's purposes, goals, objectives, and special values. Human-caused sounds may mask or obscure natural sounds and disrupt wildlife behavior. They may interfere with locating prey or detecting predators, or with the complex communication systems many species have evolved to assist in mating or other behaviors. As well, human-caused sound interferes with the sense of solitude that is important to many visitors.[741]

In the DEIS, BLM fails to note the importance of the natural soundscape of the Coastal Plain in achieving the purposes of the Refuge. Moreover, the DEIS does not fully analyze the foreseeable acoustic impacts of oil and gas development on the natural soundscape.

Non-natural noise, such as that created as a result of oil and gas development, can affect the physiology, behavior, and spatial distribution of wildlife.[742] It also degrades wilderness characteristics like naturalness and opportunities for solitude. BLM should have taken these

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[740] See generally, Memorandum of Understanding Among the U.S. Dept. of Agriculture, U.S. Dept. of Interior and U.S. EPA Regarding Air Quality Analysis And Mitigation For Federal Oil And Gas Decisions Through The National Environmental Policy Act Process (2011).

[741] CCP EIS vol. 1 at 4-43–4-44; *see also* CCP ROD at 11–12 ("The Refuge exemplifies the idea of wilderness embodying tangible and intangible values including natural conditions, natural quiet, wild character, and exceptional opportunities for solitude, adventure, and immersion in the natural world." (emphasis added)).

[742] *See, e.g.*, Shannon et al. 2016.

values and Refuge purposes into account in its analysis of the acoustic environment. A thorough analysis of the impacts of the proposed development scenarios on the soundscape of the Coastal Plain and the resulting impacts on resources including wildlife, wilderness, and recreation is crucial to the NEPA process. The DEIS section on the acoustic environment fails to articulate an accurate or complete environmental baseline or adequately analyze the foreseeable noise impacts of an oil and gas program.

First, the affected acoustic environment in the DEIS is deficient because it fails to identify an adequate baseline using accurate data on background ambient noise levels in the project area. In our scoping comments, we highlighted the need for BLM to gather sufficient baseline soundscape data for areas within and throughout the Coastal Plain.[743] That baseline data should have then been utilized in a noise impact study, including modeling of all development scenarios. Instead of gathering new data sufficient to establish an accurate and current baseline, BLM utilized data from the 2010 background acoustic monitoring study at Point Thomson.[744] Data collected nearly a decade ago outside the Coastal Plain does not constitute "a comparable description of existing acoustic environment in the program area," as the DEIS claims.[745] The Point Thomson study measured noise levels adjacent to the northwestern border of the Refuge, not the ambient noise levels within and throughout the Coastal Plain.[746] Moreover, Point Thomson is closer to the Prudhoe Bay complex, so ambient noise levels are likely to be different than those in the Refuge. Without first establishing an adequate baseline for *this* program area, BLM cannot effectively evaluate the impacts of oil and gas development on the soundscape of the Coastal Plain.

Second, the DEIS fails to conduct acoustic modeling of all development scenarios to accurately forecast foreseeable noise impacts. This can be accomplished through existing methodologies.[747] As noted in our scoping comments, BLM must then utilize acoustic ecologists and wildlife biologists to fully assess the reasonably foreseeable direct, indirect, and cumulative impacts of increased anthropogenic noise on various wildlife species.

Instead, BLM relies on highly generalized, qualitative statements about potential impacts from ground-based development equipment and increased aircraft traffic on wildlife, wilderness, recreation, and subsistence. The actual impacts analysis includes confusing and conflicting statements. For instance, it states that there would be no potential impacts common to all alternatives, but then goes on to state that the acoustic impacts would be similar under all the action alternatives, but less extensive in NSO areas under Alternatives C and D.[748] The DEIS does not provide support for the assertion that noise impacts would be limited or nonexistent in NSO areas, which would still be affected by aircraft, seismic operations, vehicle use, and potentially intense ground-based development where NSO stipulations are waived.

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[743] Scoping Comment Letter at 122.
[744] DEIS vol. 1 at 3-17.
[745] DEIS vol. 1 at 3-17.
[746] *See* CCP EIS vol. 1 at 4-44.
[747] *E.g.,* Keyel et al. 2017; Keyel et al. 2018.
[748] *See* DEIS vol. at 3-20–3-23.

Nor does the DEIS adequately analyze foreseeable acoustic impacts to wildlife. As noted in our scoping comments, BLM should have carefully evaluated the impacts of noise from fixed-wing aircraft and helicopters on caribou. Instead, BLM oversimplified the impacts to all terrestrial mammals by grouping them in a single chart.[749] The DEIS lacks a careful and specific evaluation of the impacts of increased air traffic noise on caribou, birds, marine mammals, or other species.[750] It also fails to adequately analyze or mitigate foreseeable acoustic impacts to fish associated with seismic and other development activities.[751]

Finally, the proposed lease stipulations and ROPs that BLM claims will prevent or mitigate acoustic impacts are insufficient. For instance, the DEIS relies on ROP 34 to minimize the effects of low-flying aircraft on wildlife, subsistence activities, local communities, and recreationists.[752] As discussed in in the comments below on caribou, this ROP is inadequate and *less* protective than current Federal Aviation Administration guidance recommending a minimum altitude of 2,000 feet about National Wildlife Refuges and other noise-sensitive areas. For similar reasons, Stipulation 10 under Alternative D is not, as BLM claims, adequate to "protect wilderness values."[753] The stipulation simply recites current recommended practice to limit low-flying aircraft in noise-sensitive areas.

D. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON SOILS, PERMAFROST, TUNDRA, AND VEGETATION IS INADEQUATE.

As with numerous other sections of the draft EIS, the discussion of soil-based and vegetation-related impacts is woefully inadequate to perform NEPA's key function: providing decision makers, other agencies, and the public the needed information to understand and help minimize the possible environmental damage from federal choices. In Title II of the 2017 Tax Act, Congress authorized leasing in the Coastal Plain that its chief sponsor described as having a miniscule footprint — 1/10,000th the size of the Refuge — and as protecting the environment.[754] In fact, leasing-related federal authorizations are slated to affect the Coastal Plain profoundly and across a far greater region.

Production facilities with spiderwebs of road-connected drillpads will kill vegetation, impact permafrost, and spread damaging dust far beyond their physical perimeters, as will other permanent roads and sand and gravel quarries. Statutory acreage limits will be exceeded on speculative assumptions about successful rehabilitation. A potentially vast network of ice roads will further damage soils and vegetation, in demonstrably lasting fashion. Like gravel roads, they

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[749] DEIS vol. 1 at 3-111.
[750] *See infra* Part V.H, I, L.
[751] *See infra* Part V.G.
[752] DEIS vol. 1 at 3-22.
[753] DEIS vol. 1 at 3-22–3-23.
[754] Senator Lisa Murkowski, Floor Speech on Reconciliation Legislation (November 30, 2017), www.murkowski.senate.gov/press/speech/floor-speech-reconciliation-legislation-tax-reform.

could introduce invasive species that would spread into this pristine ecosystem. Pipelines will leak, even if not sabotaged. Snow fences will alter insulation of permafrost and cause subsidence and permanent changes to vegetation. Seismic surveys before and after leasing will stamp a physical grid on the entire Coastal Plain, directly affect hundreds of thousands of acres, altering or destroying vegetation, causing subsidence and erosion, and creating ponds and surface water channels whose effects can run far afield from vehicle tracks.

These impacts will affect an Arctic region much more vulnerable to long-term physical impacts than other U.S. arctic areas that have seen intensive oil and gas development thus far. This is a region whose soils and vegetation are concurrently under assault from climate change in ways that not only will accentuate development impacts, but also make past experience an unreliable guide as to future effects. Everything about this scenario demands that all possible measures be instituted to reduce environmental damage. Yet readers of the draft EIS have no idea about the scope and pervasiveness of these potential impacts to vegetation, soils, and permafrost, and no basis to provide informed input about the choices BLM faces. This deeply faulty picture illegally violates NEPA's core mandate. As discussed in more detail below, BLM needs to revise and reissue the EIS with a full assessment of the impacts to soil, permafrost, tundra, vegetation, and wetlands to ensure both BLM and the public have sufficient information about the impacts and how to address them.

1. BLM Failed to Adequately Analyze the Impacts of the Oil and Gas Program on Soils and Permafrost.

BLM's discussion of the impacts to soils and permafrost is so truncated and sparse that it deprives the public of the ability to understand the wide range of impacts likely to occur to these resources from oil- and gas-related activities on the Coastal Plain. It also provides no indication that BLM took a hard look at the potential direct, indirect, and cumulative impacts of the oil and gas program, as required by NEPA. For example, BLM fails to adequately quantify the total number of acres that could be impacted due to the placement of gravel fills and VSMs for roads, pads, airstrips, and structures. BLM estimates that, under all the action alternatives, there will be approximately 2,000 acres of disturbance from gravel fill.[755] BLM's analysis does not quantify the potential indirect impacts to soils and permafrost, which could extend well beyond the actual footprint of the gravel and could persist for decades.[756] Oil development impacts are not limited to the area where drill pad gravel or support beams touch the ground. Gravel roads cause permanent hydrological and surface morphological changes to the landscape, altering permafrost freeze-and-thaw cycles and creating issues related to thermokarst. These effects can include deeper permafrost thaw, earlier snowmelt in close proximity to the road, and alterations to

[755] DEIS vol. 1 at 3-46.

[756] National Research Council of the National Academies, Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope, Committee on Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope 156 (2003) [NRC Report].

hydrology.[757] Gravel roads and related traffic on roads can also lead to issues with dust, salts, and contaminants being deposited into streams and ponds or onto nearby tundra, where it can smoother or alter the mix of vegetation. The road dust can smother vegetation, reducing transpiration, and decreasing albedo, leading to a warming effect that can increase the depth of thaw in the summer.[758] This can lead to changes in geomorphology, where ice wedges melt around flat or high-centered polygons and can become degraded polygons. BLM also fails to consider the potential impacts that could occur from infrastructure, such as pipelines, that may not directly touch the ground, but could still shade areas and potentially lead to changes in vegetation and permafrost. There could also be warming that occurs around the base of the vertical support members (VSMs), which can threaten the integrity of infrastructure over time (e.g. sags in pipelines, which can lead to spills). Changes in soil hydrology may also influence the fire regime within the Coastal Plain. BLM's analysis fails to take into account the full range of significant impacts that will substantially increase the damage to tundra and other resources in a way that extends well beyond 2,000 acres. BLM needs to quantify and analyze the full set of impacts to soil and permafrost resources.

One specific area where BLM has dramatically underestimated impacts is with regard to dust. The draft EIS estimates that fugitive dust, gravel spray, thermokarsting, and impoundments may affect soils and vegetation up to 328 feet from roads and pads.[759] These impacts are likely to occur across a much broader area. One study from the Russian Arctic found that a more appropriate buffer is 3,280 feet, given the potential zone of impacts from windblown dust.[760] A recent study on the Dalton Highway showed that significant disturbance and impacts to vegetation occurred in a 200-meter-wide corridor adjacent to the highway — double the distance BLM relies on in the draft EIS.[761]

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[757] *See, e.g.*, Walker, D. A., M. Kanevskiy, Y. L. Shur, M. K. Raynolds, J. L. Peirce, M. Buchhorn, K. Ermokhina, and L. A. Druckenmiller. 2018. 2016 ArcSEES Data Report: Snow, thaw, temperature, and permafrost borehole data from the Colleen and Airport sites, Prudhoe Bay, and photos of Quintillion fiber optic cable impacts, North Slope, Alaska. Alaska Geobotany Center Data Report AGC18-01, Institute of Arctic Biology, University of Alaska Fairbanks, Fairbanks, Alaska, USA; Raynolds, M.K., Walker, D.A., Kofinas, G.P., & Ambrosius, K.J. (2012). Sixty years of landscape change within an arctic oilfield, Prudhoe Bay, Alaska. In A. Colpaert, T. Kumpula, & L. Mononen (Eds.), *12th International Circumpolar Remote Sensing Symposium* (pp. 73-74). Levi, Finland; BENJAMIN SULLENDER, AUDUBON ALASKA, ECOLOGICAL IMPACTS OF ROAD AND AIRCRAFT-BASED ACCESS TO OIL INFRASTRUCTURE 16–17 (2017), https://ak.audubon.org/sites/g/files/amh551/f/road_aircraft_access_report_final.pdf.

[758] *See, e.g.*, D.A. Walker & K.R. Everett, *Road Dust and Its Environmental Impact on Alaskan Taiga and Tundra*, 19(4) ARCTIC & ALPINE RESEARCH 479 (2018).

[759] DEIS vol. 1 at 3-93.

[760] Kumpula, T., A. Pajunen, E. Kaarlejärvi, B. C. Forbes, and F. Stammler. 2011. Land Use and Land Cover Change in Arctic Russia: Ecological and Social Implications of Industrial Development. Global Environmental Change 21:550-562.

[761] Myers-Smith, I. H., B. K. Arnesen, R. M. Thompson, and F. S. Chapin III. 2006. Cumulative Impacts on Alaskan Arctic Tundra of a Quarter Century of Road Dust. Ecoscience 13:503-510.

BLM repeatedly refers to other documents as a way to truncate and obscure analysis in the draft EIS, contrary to NEPA. For example, BLM refers to the NPRA's Greater Mooses Tooth 2 development's analysis as "fully describing" how climate change is impacting soils and permafrost.[762] The text of the draft EIS, however, contains only wholly uninformative, bland statements like "climate change described under *Affected Environment* above [i.e. the reference to the NPRA document], could influence the rate or degree of the potential cumulative impacts."[763] It contains none of the information in the NPRA document about changes to surface topography, increased water accumulation, changed drainage patterns (including sudden drainage events), and increased potential for soil erosion and sedimentation. In the Refuge's Coastal Plain, many of these phenomena have already been greatly accelerated by climate change in the past 30 years.[764] BLM also repeatedly cites, without informatively explaining or summarizing, the environmental analysis for the Nanushuk project, which is on state lands immediately adjacent to the Reserve; BLM relies on the Nanushuk decision to support its statements about changes to snow conditions that can occur from infrastructure, reclamation impacts, the potential for accelerated permafrost thaw, and for the proposition that placement of fill will cover soils and kill existing vegetation, which in turn alters the thermal active layer.[765]

BLM's incorporation of these unrelated decision documents by reference is deficient on multiple grounds. First, BLM failed to provide adequate citations or explanations about the content and nature of those documents, contrary to binding NEPA regulations and guidance that require summaries of referenced material.[766] It is impossible for the public to determine precisely which sections BLM is referring to and to understand how the analyses in those documents may or may not apply to the Coastal Plain.

Second, BLM generalized its analysis in a way that assumes all permafrost and soil conditions across the entire North Slope are homogenous, and failed to look at the conditions and concerns specific to the Coastal Plain. The terrain, permafrost, hydrology, and snow conditions on the Coastal Plain differ greatly from those found further to the west in areas like the NPRA and the Nanushuk project. The Coastal Plain is primarily dominated by foothills (45%), hilly coastal plain (22%), and river floodplains and deltas (25%), with a small portion that is part of

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[762] DEIS vol. 1 at 3-46.

[763] DEIS vol. 1 at 3-48.

[764] D.A. "SKIP" WALKER ET AL., LIKELY IMPACTS OF PROPOSED 3D-SEIMSIC SURVEYS TO THE TERRAIN, PERMAFROST, HYDROLOGY, AND VEGETATION IN THE 1002 AREA, ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA 27–28 (2019) [hereinafter Seismic White Paper].

[765] DEIS vol. 1 at 3-46 to 3-47; *see also id.* at 3-46 ("Changes in the landforms due to erosion and thermokarst, such as slumping and channelization, affects [sic] the vegetation and water characteristics of the area (USFWS 2015a)."); *cf.* Seismic White Paper, *supra*, at 25 ("[G]round compaction by seismic vehicles, combined with the projected increases in temperatures and precipitation for the region, increase the risks for long-term hydrological impacts and widespread destabilization of ice-rich permafrost terrain.").

[766] *See* 40 C.F.R. § 1502.21; *see also supra.*

the Sadlerochit Mountains (0.03%).[767] Flat thaw-lake plains, which are typical in the northern portion of the NPRA and Prudhoe Bay area, make up only 3% of the Arctic Refuge's Coastal Plain.[768] These differences lead to there being broad floodplains and deltas in some areas and deep ravines and gullies in other areas of the Coastal Plain, which in turn has the potential to impact snow distribution, hydrology, permafrost, and vegetation in the region[769] — all in ways that are different from what occurs further to the west in areas like the NPRA. The Coastal Plain also has relatively low amounts of winter snowfall and strong winter winds that can lead to significant scouring and unpredictable and inconsistent snow cover.[770] This in turn could lead to very different impacts from those that have occurred further to the west, where there is comparatively greater snow cover to mitigate against impacts from activities like seismic exploration.

Similarly, BLM insupportably assumes that information about recovery from past impacts is a reliable guide for the future. In reality, however, "effects of climate fluctuation further complicate the evaluation of the effects of seismic exploration."[771] However true that is today, the confounding effect will likely only grow more pronounced as climate change works ever greater impacts on the Coastal Plain.[772] Thus, even where retrospective study of development impacts and recovery times is done in similar geophysical conditions, it is likely that in the future those impacts and recovery times will increase.

BLM's analysis also fails to account for the unique permafrost conditions on the Coastal Plain and how impacts might substantially differ from those in areas to the west. For example, extremely ice-rich silt deposits called yedoma are abundant in a broad band across the western half of the Coastal Plain.[773] These deposits can be more than 40 meters thick and, if they were to thaw completely, could result in thaw settlement at levels of 10–20 meters of more.[774] The impacts of exploration and development on yedoma and other ice-rich soil features on the Coastal Plain, could lead to thermokarst formation and thermal erosion, followed by subsidence, ponding, and new surface drainage patterns that threaten extensive ecosystem changes and dangers to infrastructure, and could be difficult or impossible to mitigate.[775] Simply referencing analyses of other, importantly different Arctic landscapes does not constitute the legally mandated assessment of potential impacts to, and mitigation measures for, the unique distribution and characteristics of these and other soil structures in the Coastal Plain.

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[767] Seismic White Paper, *supra*, at 15.
[768] *Id.*
[769] *Id.*
[770] *Id.* at 7, 21–22.
[771] Seismic White Paper, *supra*, at 31.
[772] Wang, K., Jafarov, E., Overeem, I., Romanovsky, V., Schaefer, K., Clow, G., Urban, F., Cable, W., Piper, M., Schwalm, C., Zhang, T., Kholodov, A., Sousanes, P., Loso, M., and Hill, K.: A synthesis dataset of permafrost-affected soil thermal conditions for Alaska, USA, Earth Syst. Sci. Data, 10, 2311-2328, https://doi.org/10.5194/essd-10-2311-2018, 2018.
[773] Seismic White Paper, *supra*, at 26.
[774] *Id.*
[775] *Id.* at 23–26.

Despite all of these differences between the Coastal Plain and areas further to the west, BLM's analysis fails to account for the unique ways in which impacts and degradation to soil and permafrost resources might occur on the Coastal Plain. BLM cannot rely on documents related to completely different projects involving wholly different conditions and areas to bypass a meaningful analysis specific to this area and this oil and gas program. BLM must obtain the necessary information to allow it to evaluate the impacts of an oil and gas program on the Coastal Plain. BLM is playing a shell game with its environmental analysis by referring to documents that involve entirely different decisions in a different region of the Arctic with very different permafrost, snow cover, terrain, ground ice content, hydrology, and other conditions. BLM needs to substantially revise this section to fully address the potential impacts to soil and permafrost resources on the Coastal Plain and reissue the draft for public review.

BLM also needs to fully account for the impacts from seismic exploration on the Coastal Plain. BLM's failure to adequately address past, present, and future seismic exploration leaves its analysis of the potential impacts to soil resources and permafrost fatally deficient. It is particularly important that BLM address the undulating terrain of the Coastal Plain. Slope transitions are one of the places where seismic equipment is likely to cause damage to the vegetation and permafrost. BLM needs to account for these terrain and other differences in analyzing the potential impacts.

BLM completely ignores the fact that it is currently preparing to approve an extensive pre-leasing seismic proposal from SAExploration (SAE) throughout the Coastal Plain.[776] That is a reasonably foreseeable—and connected—action that, if it goes forward as proposed, will itself have significant impacts to soil and permafrost and cumulatively combine with and exacerbate other impacts to soils and permafrost.[777] The EIS estimates that there will be around 900 square miles of impacts from seismic activities. But SAE's proposal alone would directly impact 150,000 acres and would involve around 37,800 miles of seismic lines.[778] Given the near certainty of other seismic testing proposals, BLM's conclusion that there will be only 900 square miles of impacts is unsupported by, and contrary to, the record. It does not take into consideration the fact that seismic exploration is not a one-time operation. It is often repeated as companies move to subsequent oil and gas phases, with exploration in some areas occurring on a yearly basis. It also does not take into account the proprietary nature of seismic survey results, which can lead to different companies repeating seismic surveys across the same area to gather their own data. These seismic operations, particularly when considered cumulatively, have the potential to significantly degrade permafrost, destroy vegetation, and dramatically alter hydrologic systems. BLM's analysis in no way accounts for these combined impacts.

BLM's discussion of the impacts to the Coastal Plain that occurred from the seismic program in the 1980s is also inadequate. BLM notes in passing in its cumulative impacts section that previous seismic exploration and an exploratory test well disturbed the surface vegetation

[776] *See supra* (describing the seismic proposal).

[777] Seismic White Paper, *supra*, at 6 ("The [SAE] seismic plan will create a "checkerboard" of trails across the entire 1002 Area").

[778] *Id.* at 6, 10.

and impacted the thaw of permafrost, changed drainage patterns, and changed vegetation growth for over 25 years after disturbance.[779] BLM then goes on to state that, while improvements have been made to avoid impacts on the ground surface, future seismic surveys may have similar impacts.[780] This is not an adequate assessment of the impacts. BLM has not provided any indication that it has fully analyzed the potential cumulative impacts from seismic surveys, as evidenced by the fact that the agency does not even account for the current seismic proposal before the agency. BLM's cursory acknowledgement that there are likely to be similar impacts does nothing to lay out why those impacts previously occurred, whether there are specific ways in which impacts could be avoided now, how those impacts are likely to cumulatively impact the region, or any other information. BLM's note that technologies have improved also ignores the reality of SAE's proposal and is not supported. SAE's proposal involves much of the same equipment that caused significant impacts in the 1980s, but its proposal is substantially more intense than that conducted in the 1980s.[781] That means that it is likely to lead to even more extensive damage on the Coastal Plain.[782] BLM needs to fully discuss and analyze the impacts of the previous seismic program from the 1980s as part of its current assessment.

BLM's discussion of the different impacts that are likely to occur under each alternative provides no meaningful analysis of the differences between the various alternatives. The EIS notes that the potential impacts under each of the alternatives would be the same as its general description of potential impacts (which, as noted above, also does not contain an adequate analysis of the potential impacts).[783] The only differences the alternatives analysis notes are that there are slightly different levels of disturbance from gravel fill and gravel mines, and that lease stipulations would limit surface occupancy to the western area of the Coastal Plain under Alternatives C and D.[784] This is not an adequate analysis. This in no way accounts for the differences in permafrost and soil resources across the Coastal Plain and how impacts across the Coastal Plain might have different impacts than might occur under a scenario that limits development activity to certain areas in the Refuge. It also does not acknowledge or account for the fact that BLM has the ability to waive any limitations on surface occupancy, which could further compound impacts. BLM needs to substantially revise this section to fully describe and account for the potential differences in impacts for each of the alternatives.

BLM also failed to adequately assess the cumulative effects from the oil and gas program. The entire purpose of a cumulative effects analysis is for the agency to take a close look at the ways in which effects could combine and result in environmental degradation that could compound over time.[785] BLM only touches on a handful of points in its cumulative effects

[779] DEIS vol. 1 at 3-48.
[780] DEIS vol. 1 at 3-48.
[781] Seismic White Paper, *supra*, at 29.
[782] *See, e.g.*, Seismic White Paper, *supra*, at 10–11, 28–29.
[783] DEIS vol. 1 at 3-47–3-48.
[784] DEIS vol. 1 at 3-47–3-48.
[785] 40 C.F.R. § 1508.7 (indicating a cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or

section for soils and permafrost: that previous seismic surveys caused long-term damage to soils and permafrost and future surveys may have similar impacts; that there may be greater than 2,000 acres of impacts to soils and permafrost if acreage is regained from reclamation;[786] that there could be changes to soil composition, drainage patterns, erosion, and thermal regimes; and that climate change could influence the rate or degree of cumulative impacts.[787] While BLM recognizes these impact categories, it does nothing to quantify or otherwise analyze them and disclose to the public and decision makers how they are likely to affect the Coastal Plain. The agency also does not discuss how past, present, or future actions could combine to exacerbate and magnify impacts. This is not an adequate analysis of the potential cumulative effects. It does not discuss in any meaningful way what those impacts might be, the scale on which they would occur, the timeframe in which they would occur, how those effects might combine or overlap, or anything else. It also fails to discuss the full range of activities that could cumulatively combine to cause these impacts. The draft EIS mentions seismic surveys and the 2,000 acres directly occupied by surface facilities, but does not account for other impacts, such as those from exploratory drilling and ice roads, other off-road travel that could occur in the program area, or gravel mines. The discussion also does not account for cumulative impacts to soils and vegetation that could occur from contamination issues as well — a serious omission given the long history of oil spills from North Slope oil drilling and transportation operations. In other words, this section provides no indication BLM took a close look at any of the potential cumulative impacts to soils and permafrost, let alone properly informed outsiders about them.

BLM's related analysis of water resources also fails to adequately account for changes to vegetation and soil resources. The draft EIS includes a list of potential future impacts on surface water quality.[788] This list fails to includes changes to surface hydrology and drainage patterns associated with changes in vegetation and soil resources, as well as from water impoundment. Any time water collects, there is greater heat transfer to the adjacent soil. Once water channels or ponding are changed or increased, there is a positive feedback cycle of warming and acceleration of thaw. Changes to surface hydrology drainage patterns can lead to increased thermo-erosion and thermokarsting. Elsewhere in the draft EIS, BLM states that "[p]otential disturbance of the vegetation or water and wide erosion could initiate thawing of the upper ice-rich zones and trigger the development of thaw-lakes."[789] BLM also needs to consider the development of thaw-lakes, thermo-erosion channels, and thermokarst features in that section.

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person undertakes such actions"); *see also* Vargas-Moreno, J.C., B. Fradkin, S. Emperador, O. Lee, (eds). 2016. Project Summary: Prioritizing Science Needs Through Participatory Scenarios for Energy and Resource Development on the North Slope and Adjacent Seas. GeoAdaptive, LLC, Boston, Massachusetts, *available at* http://catalog.northslopescience.org/catalog/entries/8302-nssi-scenarios-final-reports-prioritizing-sc.

[786] As discussed elsewhere throughout these comments, BLM is mistaken that it can authorize more than 2,000 acres of total ground disturbance from development over time.

[787] DEIS vol. 1 at 3-48.

[788] DEIS vol. 1 at 3-55.

[789] DEIS vol. 1 at 3-56.

BLM limits its analysis of cumulative impacts to the program area, contrary to NEPA. BLM is required to consider all past, present, and reasonably foreseeable future actions.[790] That analysis is not limited to the limited geographic area in the program area and should consider broader impacts and degradation of permafrost and soil resources across the North Slope and northwest Canada. This should include an analysis of not only oil and gas impacts, but also other infrastructure that could further degrade oil and permafrost resources. BLM should also consider other nearby seismic activities, such as those conducted by SAE both last winter and this winter on state lands immediately adjacent to the Refuge and any activities on private lands within the boundaries of the Refuge.[791] The potential cumulative effects to soils and permafrost have the potential to extend well beyond the limited footprint of the program area.[792] This is particularly important given the potential for climate change to further accelerate and exacerbate the significant impacts to permafrost across all of the Arctic.

BLM's proposed mitigation measures in the required operating procedures and lease stipulations are also insufficient to address impacts to permafrost and soils. Outside of the very limited provisions that relate to off-road travel, the reader is left with effectively no indication what measures BLM will implement to prevent or mitigate against the full range of potential impacts to soil and permafrost resources. ROP 11 indicates ground operations would be allowed when soil temperatures at 12 inches below the tundra surface reach 23 degrees Fahrenheit and snow depths are an average of 9 inches, or 3 inches of snow water equivalent, whichever is less. The strong winds, varied topography, and variable snow depths on the Coastal Plain are likely to make it difficult for find routes with consistent or adequate snow cover to prevent impacts from activities like seismic exploration. Assuming those parameters are adequate to prevent any possibly significant harm, they cannot do that if only an *average* snow depth is used to determine when ground operations will be allowed. "Generally, low amounts of winter snowfall, strong winter winds, and the hilly terrain in the 1002 Area combine to create substantial areas of very thin and unpredictable snow."[793] Thus, even when snow depth was at its greatest recorded extent, in 2018, "vast areas of [the Coastal Plain] were snow free."[794] Nor does ROP 11 even explain how and where these measurements will be taken, and how often. Snow coverage can change throughout the season, even overnight.

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[790] 40 C.F.R. § 1508.7.

[791] *See, e.g.,* Alaska Dep't of Natural Resources, MLUP NS 18-004 SAExploration, Inc. Staines 3D Geophysical Exploration Permit Approval (2018), http://dog.dnr.alaska.gov/Documents/Permitting/NorthSlope/OperationPlans/2019/2018-12-31_Decision_MLUPNS_18-004_Approved.pdf; Henry Fountain, *See the Scars that Oil Exploration Cut Across Alaska's Wilderness*, N.Y. Times, Aug. 3, 2018, https://www.nytimes.com/2018/08/03/climate/alaska-anwr-seismic-testing-tracks.html (showing impacts from SAE's exploration activities just outside the Refuge last winter).

[792] *See, e.g.*, Raynolds, Martha K. et al., *Cumulative Geoecological Effects of 62 Years of Infrastructure and Climate Change in Ice-Rich Permafrost Landscapes, Prudhoe Bay Oilfield, Alaska*, GLOBAL CHANGE BIOLOGY (2014).

[793] Seismic White Paper, *supra*, at 7.

[794] *Id.* at 20.

ROP 11 also doesn't adequately account for different vegetation types with these default depths. Allowing ground operation at an average of 9 inches of snow depth puts vulnerable tussock tundra habitat at risk of damage.[795] Some tussock vegetation stands 18 inches tall when measured from the adjacent ground surface. If snow depth is insufficient to cover the tops of the tallest tussock vegetation, tussock vegetation may be crushed or sheared off during operations. Tussock vegetation that is crushed or sheared off dies, often replaced by different vegetation. This process can take 5 or more years, leaving the ground surface vulnerable to subsidence caused by a change in surface albedo, hydrology, and evapotranspiration. BLM needs to ensure snow depths cover the tops of the tallest tussock vegetation at sufficient depths. Similarly, shrubby vegetation is vulnerable to damage when not fully covered by snow. Ground operation should not be allowed in areas with shrubby vegetation unless snow depths are sufficient to cover the tops of shrubby vegetation. Ground operation will not be permitted on steep slopes with shrubby vegetation.

ROP 11 also contains additional provisions related to the types of vehicles and the manner in which they operate. These provisions appear to be drawn verbatim from best management practice C-2 in the NPRA.[796] While these provisions may arguably be appropriate in flatter areas with more consistent and deeper snow depths, they do not go far enough to address the unique range of terrain, snow conditions, permafrost, hydrology, vegetation community types, and other concerns that could lead to significant damage to the Coastal Plain. Further, similar measures have been insufficient to protect even these other areas, which are scarred by seismic operations, calling into question their ability to protect the Coastal Plain.[797] BLM cannot take a one-size-fits-all approach and assume that these provisions are sufficient to prevent degradation in areas that involve radically different conditions and concerns. BLM needs to obtain additional information about the unique characteristics of the Coastal Plain so it can outline with greater specificity how it will prevent degradation of soil, vegetation, and permafrost resources.

ROP 11 includes a provisions stating that "[i]ce roads would be designed and located to avoid the most sensitive and easily damaged tundra types as much as practicable." BLM should delete "as much as practicable" from this provision. Sensitive and easily damaged tundra is often located along stream banks where shrubby vegetation is common. Allowing ice road construction across shrubby stream bank vegetation for practicability risks damaging and/or killing vegetation in a location where soils are especially vulnerable to subsidence and erosion. It may not be "practicable" to avoid such vegetation at stream crossings, thus risking irreversible erosion and subsidence that could have long-term impacts on water quality.

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[795] *See, e.g.*, LORENE LYNN, RED MOUNTAIN CONSULTING LLC & MALAMUTE ENERGY, INC., REHABILITATION MONITORING REPORT FOR THE RENAISSANCE SNOW TRAIL, UMIAT, ALASKA: LAS 26566 (Nov. 30, 2018) (included in attached documents)

[796] Bureau of Land Mgmt., NPR-A Integrated Activity Plan Record of Decision app'x A, at 54 (2013).

[797] Henry Fountain, *See the Scars that Oil Exploration Cut Across Alaska's Wilderness*, N.Y. Times, Aug. 3, 2018, https://www.nytimes.com/2018/08/03/climate/alaska-anwr-seismic-testing-tracks.html.

Standard g in ROP 11 indicates snow fences may be used in areas of low snow to increase snow depths within an ice road or snow trail route. Snow fences are an effective means to accumulate snow for the purpose of building snow roads, but snow accumulation may cause significant changes to surface hydrology, permafrost thermal stability, and to vegetation communities. Snow accumulation behind snow fences delays the melt period by 1-3 weeks and sometimes 4_8 weeks,[798] causing changes to soil temperature, soil moisture, nutrient cycling, and vegetation communities. Subsidence has been documented as well.[799] BLM should modify ROP 11 so snow fences must be removed immediately following construction of a snow road. Excess snow accumulated by snow fences must be excavated or pushed to decrease snow depths to that found in surrounding tundra.

BLM is missing and needs to identify and obtain key information to fully understand and attempt to mitigate against the potentially significant impacts of oil and gas activities on soil and permafrost in the Refuge. BLM does not have adequate information about the permafrost conditions specific to the Coastal Plain of the Refuge to complete its analysis. BLM needs to obtain additional information about ground-ice distribution. BLM also needs to do an in-depth analysis of the wind speeds and snow cover to better understand where scour and draft occurs on the Coastal Plain. BLM also needs more information and studies to better understand the range of potential impacts to permafrost and hydrology likely to occur in different snow conditions, terrain types, and vegetation types. All of this necessitates a revised draft EIS.

2. BLM Failed to Adequately Analyze the Impacts of the Oil and Gas Program on Tundra, Vegetation, and Wetlands.

BLM has failed to quantify the total area of tundra, vegetation, and wetlands that is likely to be impacted by the oil and gas program. The vegetation and wetlands section of the draft EIS points to a hypothetical oil field scenario, consisting of a central processing facility, 8-mile roads connected to six satellite drill pads, a seawater treatment plant, and a 30-mile access road, which total an estimated 750 acres.[800] In the draft EIS, BLM states that it was not possible for the agency to quantify the potential impacts on specific wetland and vegetation types using a specific footprint because no on-the-ground actions have been authorized.[801] Instead, BLM calculates the proportions of each vegetation and wetland type occurring in each lease stipulation category and high-carbon potential zone.[802]

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[798] M. Martinelli, Jr., *Snow-Fence Experiments in Alpine Areas*, J. OF GLACIOLOGY vol. 12, no. 65, at 291–303 (1973); Kenneth M. Hinkel & John K. Hurd Jr., *Permafrost Destabilization and Thermokarst Following Snow Fence Installation, Barrow, Alaska, U.S.A.*, ARCTIC, ANTARCTIC, AND ALPINE RESEARCH (2006).

[799] Schimel, Josh P. et al., *Increased Snow Depth Affects Microbial Activity and Nitrogen Mineralization in Two Arctic Tundra Communities*, 36(2) SOIL BIOLOGY & BIOCHEMISTRY (2004).

[800] DEIS vol. 1 at 3-71.

[801] DEIS vol. 1 at 3-71.

[802] DEIS vol. 1 at 3-71.

It is completely unclear from BLM's vague reference to a typical hypothetical development scenario what the total potential impact might be to vegetation and wetland resources, and how the impacts might vary across the region from such a development. Even if BLM does not have an actual development proposal in front of it, BLM needs to do more to quantify and convey how development in different areas is likely to impact the specific tundra, vegetation, and wetland resources in different areas. BLM's quantification of the specific percentages of vegetation and wetlands within each of the areas open to leasing or other activities under the different alternatives is a start,[803] but ultimately just informs the public of the types of vegetation in areas open to development; it does not actually help the public to understand in a meaningful way what the impacts from the full range of oil and gas activities within those specific areas are likely to be and how those might differ. BLM's analysis never takes the required step of actually discussing how the differences in vegetation might play out in terms of impacts — what, for instance, the landscape will look like if intensive seismic surveying is conducted in vegetation types like tussock tundra and riparian shrublands that are particularly prone to vehicular impacts, or in moist sedge tundra, where recovery is especially poor.[804] If snow cover is inadequate and tussock tundra is damaged, it cannot recover in a human-significant timeframe. BLM cannot bypass providing a more in-depth analysis of the potential impacts to specific areas on the ground by stating that it does not have a specific proposal in front of it. BLM still has an obligation under NEPA to examine the full range of reasonably foreseeable impacts, including any impacts that might occur from waivers of any protective provisions.

BLM also needs to better quantify the potential indirect impacts. As noted throughout these comments, the footprint of development extends well beyond the limited 2,000-acre area where BLM allows placement of fill. BLM should include estimates of the total area that will be impacted by any activities, including indirect impacts. These impacts include nearby areas that could be impacted by dust, oil spills, and other contaminants or that could be altered due to other changes, such as impacts to hydrology that lead to changes in vegetation. BLM has not accounted for impacts to vegetation from pipelines, which will shade significant areas and potentially alter or kill vegetation.

BLM assumed there was a 328-foot buffer to account for the area of indirect effects on vegetation and wetlands.[805] BLM's buffer and consideration of indirect effects is far too small. There are significant impacts from fugitive dust, gravel spray, thermokarsting and thermoerosion, and impoundments. Some of these could extend well beyond just this 328-foot buffer. As noted above, the study of the Dalton Highway that BLM cites when setting the 328-foot buffer indicates that there were significant disturbances and impacts to vegetation that occurred across an area roughly twice that size.[806]

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[803] DEIS vol. 1 at 3-73–3-74.

[804] *See, e.g.,* Seismic White Paper, *supra*, at 32–33.

[805] DEIS vol. 1 at 3-71.

[806] DEIS vol. 1 at 3-72; Myers-Smith, I. H., B. K. Arnesen, R. M. Thompson, and F. S. Chapin III. 2006. Cumulative Impacts on Alaskan Arctic Tundra of a Quarter Century of Road

In the draft EIS, BLM limits the scope of its impacts analysis to only post-leasing activities.[807] BLM needs to analyze the full range of direct, indirect, and cumulative impacts that could occur to vegetation, tundra, and wetlands, including impacts from pre-leasing seismic activities, which the agency recognizes as a part of this project.[808] BLM failed to recognize or discuss the serious impacts that are likely to occur from SAExploration's current seismic proposal or other pre-leasing seismic activities, despite the fact that SAE's proposal is directly related to and intended to inform the lease sale program. The EIS estimates that seismic impacts will be limited to only 900 square miles, but that fails to account for SAE's plan, which could proposes approximately 37,800 miles of seismic lines, with direct impacts to 150,000 acres.[809] In a White Paper analysis by prominent scientists with deep expertise and research experience in the Arctic in a range of disciplines, they concluded that SAE's proposal was likely to cause "significant, extensive, and long-lasting direct, indirect, and cumulative impacts . . . to the microtopography, hydrology, permafrost, and vegetation of the 1002 Area."[810] That White Paper discusses a broad range of potential impacts to vegetation and hydrology from SAE's proposal and from seismic activities in general that BLM needs to analyze in relation to all leasing-related seismic surveying. It concludes that 3D-seismic technology has not improved to the point where there would not be significant damage to arctic tundra. Seismic activities cause compression of the tundra vegetation, which in turn causes changes to snow accumulation, hydrology, and thermal regimes, which are visible from the air and can lead to thermokarst and thermoerosion.[811] These impacts would likely have significant consequences to the habitats of many species of plants, insects, small mammals, birds, and potentially large mammals including caribou.[812] The draft EIS illegally fails to analyze these impacts.

The draft EIS notes that long-term studies have shown that the overall impact of seismic vehicle traffic on tundra is low, but impacts can still be measured up to 25 years after exploration.[813] The EIS also states that seismic lines and camp trails on the North Slope were found to be generally visible in summer vegetation for about 5 years after disturbance, and that longer-term impacts involved limited ground disturbance and ground subsidence where the trail became a wetter trough.[814] This high-level and generalized summary does not reflect the full range of long-term impacts likely to occur from a seismic program as intense as that proposed by SAE or that could occur from subsequent 3-D seismic surveys. The EIS does not adequately discuss the results of the studies that were conducted on areas disturbed as part of the 1980s

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Dust. Ecoscience 13:503-510; *see also* Kumpula, T., A. Pajunen, E. Kaarlejärvi, B. C. Forbes, and F. Stammler. 2011. Land Use and Land Cover Change in Arctic Russia: Ecological and Social Implications of Industrial Development. Global Environmental Change 21:550-562.

[807] DEIS vol. 1 at 3-70.

[808] DEIS vol. 2 at B-10 (listing pre-leasing 3D seismic exploration as a "Project Phase").

[809] *See supra* Part III.B.8.; *see also* Seismic White Paper, *supra*, at 6.

[810] Seismic White Paper, *supra*.

[811] Seismic White Paper, *supra*, at 6–7.

[812] Seismic White Paper, *supra*, at 7.

[813] DEIS vol. 1 at 3-71.

[814] DEIS vol. 1 at 3-71.

seismic program, which indicate there are likely to be significant, long-term impacts from future seismic surveys. There are also cumulative effects that will occur from conducting seismic surveys over areas that are still damaged from the 1980s. The seismic work that took place in the 1980s resulted in impacts that persisted for decades, some of which are still visible to this day and are expected to be permanent. There was still measurable disturbance from that program on 5% of the trails in 2009 and 3% in 2018 — 33 years after the initial disturbance.[815] The soil subsidence and vegetation changes that remain indicate that disturbance is likely to be present in those areas for decades to come.[816] Camp-move trails for seismic surveys caused some of the most damaging impacts to vegetation and tundra and took far longer to recover than many of the areas damaged by the seismic trails in the 1980s.[817]

The draft EIS states that impacts from off-road vehicle traffic could be mitigated "somewhat" by using vehicles that involve fewer pounds per square inch and by performing seismic operations later in the winter when there is more snow cover and soils are frozen deeper.[818] This fails to account for the unique terrain, vegetation (e.g., tussocks), and inconsistent snow cover in the Coastal Plain.[819] The Coastal Plain has relatively low amounts of winter snowfall and strong winter winds that can lead to significant scouring and unpredictable and inconsistent snow cover.[820] It also fails to take into consideration the level of intensity of SAE's proposed seismic program and seismic proposals in general. SAE still proposes to use many of the same vehicles and equipment that have been used in past seismic programs and that have led to vegetation and other damage.[821] Although there have been some improvements to vehicles, the number of vehicles SAE proposes to use is more than double that of past surveys and many of the vehicles are even heavier.[822] This also fails to account for the sheer intensity of SAE's proposal, which will involve dramatically more seismic lines and a much more extensive seismic program than conducted in the 1980s. Even if one assumes that only 5% of the area impacted by SAE's seismic proposal will persist for decades, that would still amount to 7,500 acres worth of severe, long-term impacts from just one seismic program.[823] Even that number, which standing alone is significant, does not take into account the potential for other seismic and oil and gas activities to cumulatively combine with the effects of SAE's current proposal. BLM's dismissal of the impacts from seismic in the EIS is contrary to the evidence before the agency and improperly ignores the full range of relevant impacts that should be analyzed in the EIS. BLM needs to revise the EIS to fully account for these impacts.

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[815] Seismic White Paper, *supra*, at 33.
[816] Seismic White Paper, *supra*, at 33.
[817] Seismic White Paper, *supra*, at 34.
[818] DEIS vol. 1 at 3-71.
[819] Seismic White Paper, *supra*, at 6–7, 15–16, 18–22.
[820] Seismic White Paper, *supra*, at 7, 21–22.
[821] Seismic White Paper, *supra*, at 29.
[822] Seismic White Paper, *supra*, at 29.
[823] This is based on the calculation that SAE's proposal will directly impact 150,000 acres. Seismic White Paper, *supra*, at

BLM's analysis of the potential impacts of ice roads and related mitigation measures is insufficient. The draft EIS states that ice roads have minimal effect on vegetation, which would recover to pre-construction conditions after approximately 20 years.[824] Ice roads can have major impacts that persist into other seasons and can severely alter hydrology, natural thermal regimes, and cause a wide variety of ecological impacts.[825] BLM itself recognizes that recovery can take decades, inconsistent with its claim of a minimal impact. The draft EIS emphasizes that more damage from ice roads occurs in well-drained areas, including moist tundra and shrub habitats.[826] The existing ice road study BLM relies on underscores that damage is more likely to occur in well-drained areas. That study has limited applicability to the Coastal Plain because it looked at four ice roads in the western Arctic, and recommended that, "[b]ecause of the greater impacts associated with tussock tundra uplands, future ice roads planning should concentrate on locating roads in wetland areas."[827] The Coastal Plain is made up of 59% moist herbaceous meadow types, including herbaceous and tussock tundra.[828] Tussock tundra is the most common vegetation type in the Coastal Plain of the Arctic Refuge and is particularly susceptible to damage because of the considerable microtopographic relief in the tussocks, which can be up to ten-inches tall.[829] BLM fails to recognize the prevalence of the exact vegetation type that is likely to be most vulnerable to damage from ice roads and pads. A one-size-fits all approach to these vegetation types is likely to result in damage to these vulnerable areas.

BLM's analysis of how the impacts will differ between alternatives focuses heavily on the no surface occupancy provisions to differentiate between the impacts under each alternative.[830] However, there are serious questions about whether the NSO and other timing provisions are likely to be effective. These provisions will only be effective to the extent that BLM actually adopts and holds to those safeguards. As written, the draft EIS allows for waivers, exceptions, and modifications to these and other requirements, opening the door for operators to avoid ever complying with those requirements.[831] BLM should remove these waivers exceptions, and modifications. However, because it has included them, BLM needs acknowledge and fully assess the ways in which waivers, exceptions, and modifications to these so-called protections could lead to far greater impacts and a much larger footprint than analyzed in the draft EIS.

BLM needs to obtain additional information in order to make sound decisions regarding the potential impacts of the oil and gas program on tundra, vegetation, and wetland resources. BLM needs to conduct additional studies related to snow depths, wind patterns, and scour patterns on the Coastal Plain, as well as the impacts of damaging surface vegetation where there are high volumes of massive ground ice. BLM also needs more information and studies to better understand the range of potential impacts likely to occur in different snow conditions, terrain

[824] DEIS vol. 1 at 3-71.
[825] Sullender, *supra*, at 17.
[826] DEIS vol. 1 at 3-94.
[827] SCOTT GUYER & BRUCE KEATING, THE IMPACT OF ICE ROADS AND ICE PADS ON TUNDRA ECOSYSTEMS, NATIONAL PETROLEUM RESERVE-ALASKA at vii (2005).
[828] DEIS vol. 1 at 3-66.
[829] Seismic White Paper, *supra*, at 32.
[830] DEIS vol. 1 at 3-73 to -74.
[831] *See, e.g.*, DEIS vol. 1 at 2-4.

types, and vegetation types. NEPA requires that BLM identify and obtain this missing information as part of the EIS process.

E. BLM'S ANALYSIS OF GRAVEL AND THE IMPACTS OF GRAVEL MINING IS INADEQUATE.

There are a number of problems with BLM's consideration of gravel mining in the draft EIS. BLM did not adequately explain the authority to permit gravel mining on the Coastal Plain, the assumptions underlying its estimates of needed gravel, nor the impacts of gravel mining in general.

There are serious questions about the authority to conduct gravel mining on the Coastal Plain. ANILCA section 304(c) withdrew all national wildlife refuge lands in Alaska "from all forms of appropriation or disposal under the public land laws" except for the mineral leasing laws.[832] The Coastal Plain is further withdrawn from all forms of entry or appropriation under the mining laws and from operation of the mineral leasing laws.[833] The Tax Act did not modify these withdrawals. BLM has failed to identify any authority allowing it to permit gravel mining on the Coastal Plain, despite the fact that the EIS appears to assume gravel mining will be allowed. BLM needs to explain what it believes is the basis for its authority to allow gravel mining in the EIS.

Even assuming for the sake of argument that gravel mining could be allowed, BLM needs to further recognize and clarify FWS's role in any authorizations. FWS is the administrator and manager of the Refuge. In the draft EIS, BLM just states, "The BLM issues material sale permits."[834] This short statement does not adequately explain BLM's authority to issue such permits generally or specifically within the Refuge. BLM's general authority to issue permits for mining of gravel is governed by the Materials Act, which allows BLM to issue permits for mining of gravel and other mineral materials without actually leasing those lands.[835] However, it is not clear that BLM has authority over the disposal of any gravel materials on the Coastal Plain. BLM needs to explain FWS role as the administrator and manager of the Refuge and how any such actions would fit with the legal obligations in other statutes, such as the National Wildlife Refuge System Administration Act.

BLM's analysis of the potential impacts of gravel mines, should they be allowed, violates NEPA and is contrary to other statutes, such as the Tax Act. BLM appears to rely on its characterization of gravel mines as being outside of the 2,000-acre surface disturbance limit in order to avoid fully analyzing the impacts of mining on the surface resources of the Coastal Plain. BLM needs to fully account for the total number of acres that could be directly and

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[832] ANILCA § 304(c).

[833] 16 U.S.C. § 3142(I).

[834] DEIS vol. 2 Appendix D at D-3.

[835] *See* 43 CFR § 3601.3 ("BLM's authority to dispose of sand, gravel, and other mineral and vegetative materials that are not subject to mineral leasing or location under the mining laws is the Act of July 31, 1947, as amended (30 U.S.C. 601et seq.), commonly referred to as the Materials Act. This authority applies to sale and free use of these materials…").

indirectly impacted from gravel mining used to support the oil and gas program as part of the 2,000 acres.[836] The EIS characterizes gravel mines as equivalent to a mill that supplies steel for construction of other materials.[837] This makes no sense. Gravel mines will be used to supply the gravel that is directly used to build the roads and pads for any oil and gas developments, and are therefore integrally related support facilities. BLM should not unlawfully exclude them from the 2,000-acre limit.

BLM also needs to fully evaluate any gravel mines used to support oil and gas infrastructure on the Coastal Plain as a connected action in the EIS. "Connected actions" are defined as actions that: automatically trigger other actions which may require environmental impact statements; cannot or will not proceed unless other actions are taken previously or simultaneously; or are interdependent parts of a larger action and depend on the larger action for their justification.[838] The entire purpose of these gravel mines would be to supply gravel for any oil and gas infrastructure; they would not be developed but for the need to use them as part of the oil and gas program. Thus, BLM must fully analyze the direct, indirect and cumulative impacts of gravel mining for each action alternative. BLM must conduct this analysis, regardless of whether the gravel mines are ultimately projected to be within or outside the boundaries of the Refuge.

BLM's analysis of the impacts of gravel mining is wholly inadequate for purposes of satisfying BLM's NEPA duties. The draft EIS provides little information on gravel mining beyond an estimated number of cubic yards of gravel needed for each action alternative. The draft EIS anticipates that between 12.7 to 12.4 million cubic yards of gravel will be needed for the Coastal Plain exploration, construction, development, and maintenance.[839] It is seemingly impossible to check the veracity of this number, as the Reasonably Foreseeable Development (RFD) scenario does not provide incremental gravel needs for various elements of potential infrastructure projects (e.g., central processing facilities, anchor pads, and airstrips are all combined).[840] Nor does the RFD scenario adequately explain its estimates for the slight differences in road lengths between alternatives, and assumes that all roads to all satellites would be the same length and width for every alternative.[841] It is entirely unclear whether BLM factors in the need for additional gravel (e.g., for roads that expand in width during use) and river and stream crossings, vehicle turnouts, or storage pads into these estimates. BLM needs to provide far more information about the potential gravel resources necessary for each alternative to adequately analyze potential impacts.

Moreover, gravel mining has very serious impacts that BLM failed to consider in the EIS. Gravel extraction is generally done in large, open pit mines typically located away from major streams and lakes. It is not clear how such mines could be located in a way that protects the sensitive wildlife and biological resources of the Coastal Plain and the EIS appears to assume

[836] *See supra* Part III.A.3.
[837] DEIS vol. 1 at 1-6.
[838] 40 C.F.R. § 1508.25(a)(1).
[839] DEIS vol. 1 at 3-50.
[840] DEIS vol. 2, Appendix B at B-22.
[841] DEIS vol. 2, Appendix B at B-23.

and allow gravel mining in rivers. Open pit mines require extensive overburden removal — for example, over 50 feet of vegetation and soil needed to be excavated to reach suitable gravel in the mines created for Kuparuk.[842] The resulting overburden stockpile disturbs tundra, and the gravel pit itself causes permanent changes to the area's thermal regime due to "thaw bulbs" forming in the permafrost around the unfrozen water during flooding.[843] Indirect effects such as these have led some researchers to approximate that a one acre (0.4 ha) gravel pit may impact as much as 25 acres surrounding the site.[844]

Despite recognizing that these impacts exist to areas surrounding gravel mines, BLM makes no attempt to quantify that disturbance. BLM only acknowledges the direct footprint of mining itself as being between approximately 308–315 acres,[845] but does not quantify or even discuss the indirect and far broader range of impacts to the sensitive ecosystems surrounding these mines. Additionally, BLM notes that multiple material sources are expected to be used, but does not analyze impacts from multiple gravel mines, which would have a much greater impact on the Coastal Plain than a single mine. There are also likely to be other significant impacts to the surrounding area, such as noise impacts, that have not been fully accounted for in the draft EIS.[846] The draft EIS notes the presence of impacts from the gravel mine, but fails to analyze the potential direct, indirect, and cumulative effects they might have on people and wildlife in the surrounding area.

Finally, BLM entirely fails to consider any lease stipulations or required operating procedures to mitigate these significant impacts from gravel mining. The draft EIS indicates that gravel mining might occur in streams and notes that it might impact stream structure.[847] This should not be permitted. In addition to the fact that BLM should not allow for sand and gravel mining to occur in streams, BLM has also failed to analyze the impacts from such a destructive activity. BLM must explain how allowing gravel mining in streams would be subject to stipulations. Lease Stipulation 1 contained in the draft EIS, which is meant to protect water quality, purports to restrict "permanent oil and gas facilities" within certain setbacks,[848] but BLM has arbitrarily and improperly defined gravel mines as being outside of the definition of oil and gas facilities, so it does not appear that this stipulation would apply to limit gravel mining in NSO areas and river corridors. Though it would seem gravel mining should be considered a "major construction activity" under Lease Stipulation 7,[849] BLM's failure to discuss this or any other stipulation in its analysis for gravel mining in Chapter 3 raises doubt that it would apply. BLM must clarify which, if any, lease stipulations apply to gravel mining, and formulate new

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[842] BENJAMIN SULLENDER, AUDUBON ALASKA, ECOLOGICAL IMPACTS OF ROAD- AND AIRCRAFT-BASED ACCESS TO OIL INFRASTRUCTURE 3 (2017), *available at* http://ak.audubon.org/sites/g/files/amh551/f/road_aircraft_access_report_final_0.pdf (internal citations omitted).

[843] *Id*. (internal citations omitted).

[844] *Id*. (internal citations omitted).

[845] DEIS vol. 1 at 3-50.

[846] *See supra* Part V.C. (describing impacts to the acoustic environment)

[847] DEIS vol. 2 at F-16.

[848] DEIS vol. 1 at 2-4

[849] *See* DEIS vol. 1 at 2-13.

and additional protections that are expressly applicable to gravel mining activities on the Coastal Plain.

F. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON WATER RESOURCES IS INADEQUATE.

"Water is the lifeblood of the Arctic National Wildlife Refuge."[850] It provides the habitat to support fish and the invertebrate species relied upon by arthropods, and in turn, over 100 species of birds found in the Coastal Plain.[851] The Coastal Plain is characterized by large rivers, related stream systems, and some, but not many, lakes, which are mostly concentrated in a few areas. Free flowing water in the Coastal Plain is limited; despite the area being classified as wetlands, most of the ponds and lakes are shallow and cover less than one square mile.[852] There is even less open water available in the winter.[853] Modifications to surface water flow could affect many fish and wildlife species and their habitat.[854] Climate change is modifying water resources and ecology of rivers, lagoons, nearshore estuaries of the Arctic Refuge and its adjacent waters due to melting of Brooks Range glaciers.[855] In 1987, DOI concluded that obtaining water for oil and gas activities in the Coastal Plain "has the potential for major adverse effects."[856] It also noted that there was limited information known about the water resources of the Coastal Plain.

Subsequently, FWS conducted additional investigations of water resources in rivers, streams, lakes, and springs during the late 1980's and 1990's,[857] which further substantiated limited winter water availability and significance of water resources to fish, wildlife, and their habitats.[858] For example, investigations found that during April, 90% of the water was located in

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[850] U.S. Fish & Wildlife Serv., *Water and Water Rights*, https://www.fws.gov/refuge/arctic/water.html (last updated Jan. 14, 2014).

[851] NRC, Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope, 30 (2003).

[852] LEIS at 13.

[853] LEIS at 33.

[854] LEIS at 119.

[855] Nolan, M., R. Churchwell, J. Adams, J. McClelland, K.D. Tape, S. Kendall, A. Powell, K. Dunton, D. Payer, P. Martin. 2011. Pp. 49 in: Observing, Studying, and Managing for Change: Proceedings of the Fourth Interagency Conference on Research in the Watersheds, 26-30 September, 2011: Fairbanks, AK. Ed. By C.N. Medley, G. Patterson, and M.J. Parker. Scientific Investigations Report 2011-5169, USGS. https://pubs.usgs.gov/sir/2011/5169/

[856] LEIS at 111, 113 ("The dedicated industrial use of the limited natural fresh-water sources of the 1002 area would be a major effect.").

[857] Elliott, G.W. 1990. Quantification and distribution of winter water within lakes of the 1002 area, Arctic National Wildlife Refuge, 1989. US Fish & Wildlife Serv., Alaska Fisheries Technical Report Number 7, Anchorage. https://www.fws.gov/alaska/fisheries/fish/Technical_Reports/t_1990_07.pdf; Trawicki, et al 1991; Lyons and Trawicki, 1994.

[858] U.S. Fish & Wildlife Serv., Aug 29, 1995, A preliminary review of the Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment: Report and

just 9 of the 119 lakes surveyed, and in 237 miles of river channels studied, only 9 million gallons of water were estimated — an amount that would be sufficient for only 7 miles of ice roads under current practices.

The CCP states that threats to water resources of the Coastal Plain include oil and gas development, and gravel mining.[859] Despite this, BLM's draft EIS fails to accurately describe the water resources of the Coastal Plain and fails to adequately analyze the impacts of the oil and gas program on the water resources.

1. Affected Environment and Inadequate Baseline Information

The draft EIS fails to include sufficient information regarding the water resources of the Coastal Plain or address existing information. While the lack of water resources in the Coastal Plain available for oil and gas activities has been well documented, BLM fails to acknowledge how limited its information is and did not obtain any new information to inform its EIS. As the USGS explained, "[u]nderstanding water resources in the [Coastal Plain] informs questions related to multiple ecosystems as well as possible infrastructure development."[860] As demonstrated by Table H-4 and H-5 in the draft EIS, BLM's information on the major rivers and drainages in the Coastal Plain is lacking. For many of the rivers, there is no information since 1992. For a few others, the most recent information is 2012 (Canning River) and 2017 (Hulahula River). For all of the rivers, the flow information is only available for three months of the year.[861] New, complete annual information must be obtained for these rivers to inform BLM's analysis. There is a tremendous amount of scientific literature available from the last 30+ years that explores and documents how to quantify and describe hydrology (surficial and subsurface). BLM must take into account all historical water quality and quantity information[862] and also utilize the

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Recommendation to the Congress of the United States and Final Legislative Environmental Impact Statement. Regional Director, Region 7, 20 pp.

[859] CCP vol. 1 at 4-38.

[860] 2018 USGS Report at 20.

[861] DEIS vol. 2 Appendix H at H-6–H-18.

[862] McCart, P.J., ed. July 1974. Classification of Streams in Beaufort Sea drainages and distribution of fish in arctic and sub-arctic drainages, Arctic Gas Biological Report Series Vol. 17; Ward, D. and P. Craig. Catalogue of streams, lakes and coastal areas in Alaska along routes of the proposed gas pipeline from Prudhoe Bay, Alaska to the Alaskan/Canadian border. Arctic Gas, Biological Report Series Vol. 19; Craig, P.C. & P. J. McCart 1975. Classification of Stream Types in Beaufort Sea Drainages between Prudhoe Bay, Alaska, and the Mackenzie Delta, N. W. T., Canada, Arctic and Alpine Research, 7:2, 183-198, *available at* https://www.tandfonline.com/doi/pdf/10.1080/00040851.1975.12003821; Childers, J.M, C.E. Sloan, J.P. Meckel, and J.W. Nauman. 1977. Hydrologic reconnaissance of the Eastern North Slope, Alaska, 1975. USGS Open-File Report 77-492; Garner and Reynolds 1986 Vol. II. Pp.397-404; U.S. Fish & Wildl. Serv. Feb 1983. Proposed oil and gas exploration in the Coastal Plain of the Arctic National Wildlife Refuge, Final EIS and Preliminary Final Regulations. Fig.III -2, Location of icings and springs in the ANWR Coastal Plain; Arcone, S.A., A.J. Delaney, and D.J. Calkins. April 1989. Water detection in the coastal plains of the Arctic

best spatial data and current scientific literature, cited herein, in its description of the water resources and obtain necessary information to do so. Having updated information is particularly important given the impacts that climate change is having on water resources in the Arctic.

The draft EIS states that most streamflow in rivers ceases in December, when rivers freeze,[863] but it fails to identify and address the presence of unique winter water flows that do exist, including springs and taliks, formation of extensive aufeis, presence of isolated deep pools beneath ice mounds or hummocks in braided stretches of major river drainages, and groundwater connections to surface waters, which differ in the Refuge Coastal Plain due to proximity the Sadlerochit Mountains and Brooks Range with limestone outcrops.[864] Kane et al 2013 report groundwater flow is active to springs and icings in the Arctic Refuge Coastal Plain despite previously mapped continuous permafrost; water flow may result from "short, suprapermafrost pathways, or non-local recharge areas travelling through complex subpermafrost pathways" originating on the south side of the Brooks Range. Extensive aufeis forms in rivers with springs and provides both significant winter water storage and habitat for caribou, fish and other animals.

The Arctic Refuge Coastal Plain contains many springs, each of which should be described with baseline information on water quantity and quality components as well as associated fish and wildlife so that they can be adequately protected.[865] The unique Sadlerochit Springs (including Sadlerochit Spring Creek and Itkilyariak Creek) was designated as a special area, protected by regulation from any exploratory activities, including during the prior seismic surveys,[866] and recognized as important by the LEIS.[867] Sadlerochit Spring was recommended for Natural Landmark status in 1974.[868]

The draft EIS fails to provide sufficient maps and accompanying information for water resources in their full diversity, including watershed boundaries and detail for rivers, streams, lakes, springs, river floodplains, and river aufeis (icings, nalads), and coastal lagoons and barrier

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National Wildlife Refuge using helicopter-borne short pulse radar. CREEL Report 89-7. https://apps.dtic.mil/dtic/tr/fulltext/u2/a208908.pdf.

[863] DEIS vol. 1 at 3-51.

[864] Kane et al 2013.

[865] For example, see Wiswar, DW 1994. Summer distribution of Arctic fishes in the 1002 area of the Arctic National Wildlife Refuge, Alaska, 1991, with special emphasis on selected lakes, tundra streams, and the Sadlerochit River Drainage. Alaska Fisheries Technical Report Number 27. https://www.fws.gov/alaska/fisheries/fish/Technical_Reports/t_1994_27.pdf.

[866] 50 C.F.R. 37, Sec. 37.32 Special areas. (g) No exploratory activities shall be conducted by any permittee at any time within \1/2\ mile of the source of the Sadlerochit Spring or within \1/4\ mile on either side of Sadlerochit Spring Creek for a distance of 5 miles downstream from its source

[867] LEIS 1987, Plate 1, US Fish & Wildl. Serv. Maps of archeological and natural areas, fishery, moose, brown bear, and polar bear resources in the 1002 area, Arctic National Wildlife Refuge, Alaska, A. Potential national natural landmarks and archeological and other special sites.

[868] Detterman, RL 1974. The Arctic lowland regional potential landform and lifeform natural landmarks. USGS Adm. Rept. Prepared for the NPS 411 pp.

island systems, river deltas, bays, and shorelines. Current and historical maps and information on aufeis in the Coastal Plain should be provided to detect changes, including those which may be underway due to climate change.

The draft EIS also recognizes that there are many fewer lakes in the Coastal Plain than in the NPRA, that the lakes are not evenly distributed but are instead clustered around three main rivers, and that most lakes are shallow and freeze to the bottom during the winter.[869] This means that there is very little water available on the Coastal Plain during the winter for activities like building ice roads and pads, camp water, and drilling exploration wells, and that it is not available in many parts of the Coastal Plain where BLM is considering leasing. However, BLM fails to account for the lack of water or the distribution of what limited available water there may be in its impacts analysis, or consider how this may dictate where oil and gas activities occur or are concentrated.

Additionally, the draft EIS notes that much of the water resources on the Coastal Plain, in particular lakes, is recharged each year by snow melt.[870] BLM does not analyze how using snow for oil and gas activities, like snow roads, or ice from lakes for ice chipping for road, will impact the recharge rate of the water resources on the Coastal Plain, changes to the water quality of remaining water, and risks from scraping or mining ice which may cause lakes to freeze to the bottom resulting in mortality of fish and benthic organisms. As the FWS notes, temporal and spatial data on the water resources of the Coastal Plain is limited.[871] Additionally, data on precipitation is not tied to information on water resources.[872] This means that BLM's conclusions tying these two pieces together as they may relate to recharge rates are not supported. It is critically important to understand the impact to recharge rates given the limited fresh water resources on the Coastal Plain overall and the specific Refuge purpose of protecting water quantity. Without correlated data, BLM cannot do this.

Additional problems with BLM's description of the Coastal Plain's water resources and missing information are described in detail below. Given the volume of missing or inaccurate information in the draft EIS regarding the water resources of the Coastal Plain, BLM cannot accurately analyze the impacts an oil and gas program.

a. Hydrography network

Due to the resolution of the current USGS National Hydrography Dataset (NHD), which uses a 20—30 m resolution digital elevation model as the input data source, and limited physiographic relief within sections of the CP, the data used to estimate hydrography channel network is inaccurate. The current NHD delineated hydrography network does not provide an accurate assessment of active channel width and floodplain extent for streams within the CP. It is particularly inaccurate throughout the CP in areas with wide braided floodplains and low gradient streams, which are both very common landscape features. High-resolution IfSAR data

[869] DEIS vol. 1 at 3-52–3-53.
[870] DEIS vol. 1 at 3-52–3-53.
[871] CCP vol. 1 at 4-38, 4-41.
[872] CCP vol. 1 at 4-38.

(resolution 2.5—5 m) is currently available for the entire CP (https://www.usgs.gov/news/alaska-mapping-update) and the current NHD hydrography needs to be compared to and updated with the best available DEM data and verified using high-resolution satellite imagery and field techniques in order to accurately quantify the affected environment and evaluate changes in the existing environment in the context of climate change. An example of an improved Arctic stream channel network that incorporates high resolution IfSAR DEM data can be seen at https://netmap-portal.squarespace.com/#map. Section 3.2.10 of the DEIS relies on inaccurate DEM and hydrography data, resulting in an inaccurate and incomplete discussion of the affected environment.

b. Seasonal hydrological flow processes

Information provided in the DEIS is vague, outdated and inadequate to accurately describe seasonal hydrologic flow processes of Arctic rivers and streams within the CP. Hydrological processes within lentic and lotic ecosystems are complex and vary spatially and temporally across the CP. Information provided within the DEIS is too generalized to accurately and sufficiently describe baseline seasonal streamflow processes. A description of hydrological processes, ideally using current empirical hydrological data from the CP, should be completed based on hydrologic classification groups following best available methods (see Olden et al. 2012 for overview and appropriate methodology). Much of the information within the DEIS is drawn from areas outside the CP, which make the description of the seasonal hydrologic processes (e.g., streamflow, flooding, snowmelt) inaccurate. Major differences in physiography, geology and geomorphology are present for watersheds outside the CP, which inhibit references cited from being applicable. For example, information on spring flood dynamics provided within Bowling et al. 2003, which is collected in the Putuligayuk River watershed, cannot be applied broadly for all rivers and streams within the CP, which are within different ecological landscapes and have different hydrological characteristics.

c. Permafrost hydrology

Information provided in the DEIS does not adequately describe permafrost hydrology within the CP. Arctic hydrology (surface and subsurface flow paths) is significantly influenced by permafrost features and dynamics, which vary heterogeneously across the Arctic (Woo et al. 2008; Walvoord et al 2012). Due to documented change in the Arctic permafrost and associated impacts on hydrology (Liljedahl et al. 2016; Walvoord and Kurylyk 2016), recent permafrost thaw impacts on hydrology need to be adequately described within the DEIS for all CP watersheds. Additional efforts, within the DEIS, should be focused on providing a detailed description of various aquifers (i.e., supra-permafrost aquifer, sub-permafrost aquifer, sub-talik aquifer) and flow pathways (i.e., surface runoff, groundwater, taliks, conductivity) across the CP in order the adequately describe the baseline—information that is essential for describing impacts of projected water extraction outlined within the DEIS (Appendix B, B-17).

d. Streamflow

Information provided in the DEIS does not adequately describe streamflow regimes within the CP. The natural flow regime is a critical element that maintains biodiversity and ecosystem integrity in lotic systems and altering the historical flow regime will have negative impacts to aquatic species in rivers and streams (Poff et al. 1997; Bunn and Arthington 2002). New data on seasonal streamflow regimes that quantifies critical components of flow regimes (i.e., magnitude, frequency, duration, timing, rate of change) needs to be collected and new methods should be used to quantify streamflow metrics (see Olden and Poff 2003; Richter et al. 1996) in order the adequately describe the baseline. Historical information on surface water discharge is sufficient for instream flow water reservations but does not provide enough detailed information to describe critical baseline components of flow regimes, which are essential to understand projected water extraction impacts outlined within the DEIS (Appendix B, B-17).

e. Stream temperature

Information provided in the DEIS does not adequately describe baseline stream temperature regimes within the CP. Thermal regimes are another critical element that regulates metabolism in fish and invertebrates, influencing growth, phenology and survival, which in turn influences foodwebs and aquatic species communities (Caissie 2006; Webb et al. 2008; Steel et al. 2017). No information is provided on stream thermal regimes, which is essential and necessary baseline information needed to quantify impacts of habitat alteration, outlined within the DEIS (Appendix B, B-17). Baseline information on temperatures for Sadlerochit Springs and other springs in or upstream from Coastal Plain rivers is lacking in the draft EIS, yet changes could impact unique plants and habitat use by the American dipper, other birds, and fish. Changes in spring water temperature and volumes could also affect formation and melting of aufeis.[873]

f. Water biogeochemistry

Information provided in the DEIS does not adequately describe water biogeochemistry within the CP. Beyond briefly mentioning that the CP water bodies are pristine and oligotrophic, no information is provided on water biogeochemistry in lentic and lotic habitats, which is essential and necessary baseline information to quantify impacts of habitat alteration on water quality. Biogeochemical processes in aquatic ecosystems influence nutrient availability, biofilms, invertebrate abundance, which in turn influence Arctic food webs (see Huryn et al. 2005).

g. Climate change

Information provided in the DEIS does not adequately describe climate change impacts on water resources within the CP. Current and future high-resolution climate data is currently available for the CP including upstream areas within each watershed (see Cai et al. 2018), but is not provided in the DEIS. Baseline long-term and spatially explicit information on hydrology (e.g., streamflow, water temperature, water quantity, surficial and subsurface permafrost flow dynamics) is not shown in the DEIS and therefore impossible to describe or assess the current and future effects of climate change. Due to major differences in physiography, geology, fluvial

[873] Yoshikawa et al. 2007.

geomorphology and climate it is inaccurate to suggest that the information provided in BLM (2018a), which describes lands west of Nuiqsut, is sufficient to describe climate change in the CP. To understand climate change impacts on lotic ecosystems, a suite of information, models and empirical data needs to be collected to quantify thermal and streamflow regime (see Poff et al. 1997; Olden and Poff 2003; Isaak and Rieman 2013; Steel et al. 2018). In addition a geomorphic classification on lotic and lentic habitats within the DEIS has not been completed (see Montgomery and Buffington 1997), which is required and necessary to quantify and adequately analyze climate change impacts to aquatic ecosystems.

2. BLM's analysis of the direct and indirect impacts to water resources is flawed.

Future development activities that will directly and indirectly impact water resources and hydrology are identified in the DEIS.[874] While some of the impacts are discussed, due to inadequate baseline on critical hydrology attributes within the Coastal Plain (i.e., streamflow, stream temperature, water biogeochemistry, and groundwater), the DEIS does not accurately describe the extent or multitude of impacts likely to be associated with the proposed oil and gas program There is a tremendous amount of scientific literature available from the last 30+ years that explores and documents the impacts of various types of development proposed by the DEIS. BLM must consider the scientific literature, which is cited herein, and its relevance to the impacts of oil and gas on water resources of the Coastal Plain. Specific flaws with BLM's analysis of the proposed oil and gas program on water resources and hydrology are described below.

BLM fails to analyze the full scope of methods for obtaining water in light of the paucity of deep lakes compared with North Slope development areas to the west of the Coastal Plain. It fails to address the impacts of so-called "innovative techniques to minimize use of freshwater sources" or identify any additional potential water sources "including naturally deep lakes and pools along rivers" beyond those lakes FWS studies have documented to have limited available water beyond that needed by fish and wildlife. The draft EIS also fails to specifically analyze potential impacts of "creating water reservoirs by excavating deep pools in lakes or along stream channels in conjunction with gravel removal operations," or "desalinating marine water obtained beyond the barrier islands."[875] In fact, such techniques like dredging deep holes in river floodplains for water reservoirs are the opposite of "innovative," given that excavations in river floodplain gravels resulted in myriad negative impacts in the early days of the Prudhoe Bay and Kuparuk oil fields.[876] Gravel mining and creation of deep water reservoirs in river floodplains could change the pathways for deep groundwater sources to perennial springs, temperatures, flooding regime, and ice formation and breakup in the rivers; change predator prey relationships and natural diversity of fish and invertebrate communities; and prevent full upstream use of

[874] DEIS vol. 1 at 3-55.

[875] Draft EIS vol 2, Appendix B, p. B-13.

[876] Wilson, WJ, EH Buck, GF Player, and LD Dreyer. 1977. Winter water availability and use conflicts as related to fish and wildlife in Arctic Alaska – A synthesis of information. FWS/OBS-77/06.

riverine habitats currently utilized.[877] While the draft EIS states that "[g]roundwater aquifers or local lakes and rivers are typically the preferred water sources, . . . those sources may not be sufficient to meet water needs,"[878] it does not provide any quantitative analysis of water needs and availability of water sources assumed to be used nor the sites that would be impacted from other water procurement. Water withdrawals should not be permitted from any rivers or streams.

In short, BLM fails to analyze the full extent and intensity of impact sources to water resources, as it does not quantify total number of water sources, show locations on the Coastal Plain, nor address the full duration of potential use during seismic, exploration, development and production activities. This is aggravated by the fact that the impacts of gravel mining and excavated water "holes" or reservoirs are not assumed to be covered by the (improper) 2,000-acre accounting and therefore are not analyzed or tabulated (see, e.g. Table B-5, Hypothetical projected facilities and estimated surface disturbance), despite the bulldozing and earthmoving required. Nor does BLM address the impacts to hydrology and water resources from snow roads and trails, ice roads, and ice bridges — structures which remain as thickly packed snow and ice after surrounding snow has turned to sheet flow water and can block it like a dam.

a. Streamflow

The assessment of direct and indirect impacts of water resources in Section 3.2.10 of the DEIS is inadequate to evaluate impacts of proposed development on streamflow. The removal and fill of aquatic habitats will have a variety of direct impacts beyond the footprint of the development infrastructure, which may develop differently over time (i.e., days–years) causing numerous short and long-term impacts to surface waters (See Walker et al. 1987; Raynolds et al. 2014; Liljedahl et al 2016; Walker et al. 2019). Roads, bridges, and culverts have been shown to alter surface hydrology through channelization and redistributing of flow to stream crossings (Wemple et al., 1996), which can destroy or create wetlands, alter natural streamflow regimes and impair surface waters and aquatic habitat (Trombulak et al. 2000; Cocchiglia et al. 2012). The impacts and consequences of altering streamflow because of oil and gas activities are not adequately addressed in the DEIS.

b. Stream temperature

The assessment of direct and indirect impacts of water resources in Section 3.2.10 of the DEIS is inadequate to evaluate impacts of proposed development on stream temperature. Industrial road crossings, and modification of aquatic habitat (removal and fill of land within floodplains) will have a variety of direct impacts beyond the described footprint, which will likely affect the instream thermal habitat of rivers and streams by altering the heat exchange processes (Caissie 2006). Due to upstream constriction effects, culverted streams are associated with altered conditions, such as increased turbidity and higher water temperature (MacPherson et al. 2012; Maitland et al. 2016), and impacts will extend hundreds of meters of each culvert (Lachance et al. 2008). Cumulatively these impacts have the potential to alter the thermal

[877] *See* draft EIS vol. 2, p. F-23 & vol 1, p. 3-59.
[878] Draft EIS vol. 2, Appendix B, p. B-16.

regimes across entire rivers. The impacts and consequences of altering stream temperature because of oil and gas activities are not adequately addressed in the DEIS.

c. Aquatic biogeochemistry

The assessment of direct and indirect impacts of water resources in Section 3.2.10 of the DEIS is inadequate to evaluate impacts of proposed development on lentic and lotic biogeochemistry. Industrial road crossings will affect the instream physicochemical habitat of rivers and streams. Due to upstream constriction effects, culverted streams are associated with higher percent fine sediment, water temperature, water depth and turbidity, as well as lower dissolved oxygen and water velocity (MacPherson et al. 2012; Maitland et al. 2016), and sediment impacts will extend hundreds of meters downstream for each culvert (Lachance et al. 2008). Proposed development will likely affect biogeochemical processes in aquatic ecosystems, which in turn influence nutrient availability, biofilms, invertebrate abundance, which in turn influence Arctic food webs (Huryn et al. 2005). Additionally, research has shown that vehicle traffic has the potential to introduce heavy metals, ozone and nutrients to roadside aquatic environments (Leharne et al. 1992; Schuler and Relyea 2018), which is likely to be transported throughout aquatic systems (Gjessing et al.1984; Schuler and Relyea 2018). The impacts and consequences of altering water biogeochemistry because of oil and gas activities are not adequately addressed in the DEIS.

Furthermore, disposal of drilling wastes (drilling muds, hazardous wastes, and other substances) through injection into the subsurface would risk far different impacts in the Refuge Coastal Plain region due to freshwater groundwater reservoirs with flows into deep groundwater springs with complex connections given the highly faulted subsurface (Kane et al 2013). Contamination from injection of hazardous wastes and fracking (especially in the Northwest corner in the Brookian shale) risk irreversible impacts to water quality and quantity and fisheries in the Refuge Coastal Plain's spring-fed systems. Yet these impacts were not evaluated. In the Refuge Coastal Plain, it should be assumed that Safe Drinking Water standards apply, which has not the case for the Prudhoe Bay oil field complex oil fields or in the NPR-A, where oil field development has tapped into saline reservoirs.

d. Groundwater

The assessment of direct and indirect impacts of water resources in Section 3.2.10 of the DEIS is inadequate to evaluate impacts of proposed development on groundwater. Habitat alteration from proposed development in the CP (roads, culverts, bridges, infrastructure pads etc.) is likely to increase permafrost thaw, thermokarsting, erosion into lentic and lotic environments and alter surficial and subsurface flow paths (Walker et al. 1987; Raynolds et al. 2014; Liljedahl et al. 2016; Walker et al. 2019). Minimal description is provided on subsurface water movement with the CP, which is largely unknown for the CP and likely complex due to permafrost dynamics (see Woo et al. 2008; Walvoord et al 2012; Kane et al. 2013; Walvoord and Kurylk 2016). The impacts and consequences of altering groundwater are not adequately addressed in the DEIS. Groundwater quality should be monitored prior to drilling and impact indicators should address ground water quality.

3. Instream Flow Reservation Applications

There are many instream flow reservation water right applications pending before the Alaska Department of Natural Resources for waterbodies on the Coastal Plain.[879] During the late 1980's and 1990's, the US Fish & Wildlife Service quantified water resources in the 1002 area with stream gauging and lake elevation and bathymetric studies. Based on these investigations, water rights applications were filed for at least140 lakes and 12 river and stream segments to protect the habitat, migration and propagation of fish and wildlife.[880] The purpose of these water-right reservations is for conservation and they identify the specific water flow necessary to achieve that goal. These reservation applications help meet Refuge purposes including protecting water quantity necessary to support fish and wildlife populations and habitat. These water right applications take precedence over other uses of water from these sources.[881]

Despite the fact that these applications are publicly available and BLM is aware of them and that their existence has a major impact on what water may be available for uses related to oil and gas activities, BLM has not analyzed them in any detail. Protecting these instream flows further reduces the already limited available freshwater resources on the Coastal Plain but is not considered by BLM. A number of the applications likely cover the same waters that BLM identifies as unfrozen in the winter and potentially available for water withdrawals to support oil and gas activities. BLM must analyze the applications, clearly identifying the waters that they are for, the fish, wildlife, and habitat resources that they support, and the impact that they have on potential water withdrawals and usage for oil and gas activities. Without this information, BLM cannot know the available water, the true impacts of oil and gas on water resources and the fish and wildlife that depend on them, or craft necessary protections.

4. Impacts from Water Withdrawals

The draft EIS states that freshwater would be used to construct ice road and pads, dust abatement, and to support operations. As outlined in the Reasonable Development Scenario contained in Appendix B, BLM estimates the following regarding water withdrawals:

- One ice pad uses 500,000 gallons of water;
- One mile of ice road uses 1 million gallons of water;
- Drilling and completing one well uses 420,000 to 1.9 millions of gallons of water; and
- Water to maintain daily production of 50,000 barrels of oil a day will require 2 million gallons of water per day.

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[879] DEIS vol. 1 at 3-54 (while the DEIS acknowledges the existence of pending water rights applications generally in Alaska, it fails to address the specific applications for the Coastal Plain); *see also* included Land Administration System summaries from DNR (obtained via search on DNR's website: http://dnr.alaska.gov/projects/las/).

[880] https://www.fws.gov/alaska/water/arctic_water_rights.htm; https://www.fws.gov/alaska/water/arctic/1002m.htm; https://www.fws.gov/alaska/water/arctic/1002rm2.htm (accessed Feb 19, 2019).

[881] AS 46.15.050.

BLM does not include an estimate for the water needed to support seismic exploration, but SAExploration's pending project proposal will use 3,500 gallons per day. It is also not clear if BLM included water supply needs for camps (100 gallons per person per day) and general road and pad maintenance (20% of the initial water used to construct the road and pad for the season), both of which can use significant amounts of water.[882] BLM must be sure that it is including all potential oil and gas program uses of water in order for the agency to be able to evaluate the impacts.

It is hard to discern how much water would be used under each alternative because BLM does not include that clear information. BLM should add a chart to the final EIS that clearly depicts how much water would be used for all phases of oil and gas under each alternative, based on its development scenarios. Regardless, this is an extraordinary amount of water needed. It is unlikely that there is even that quantity of water available for use on the Coastal Plain. For example, BLM estimates that there are only 1.1 billion gallons of water available by the end of the winter season, with 80% of that volume coming from seven lakes in the Canning River Delta.[883] FWS has previously found that there is only enough available water in the winter to construct a few miles of ice roads.[884]

Despite the high volume of water needed to support BLM's proposed oil and gas program, and the limited water available in winter from a very limited geographic area to do so, BLM concludes that there are not expected to be impacts on water quantity from water withdrawals, relying only on its analysis for the NPRA.[885] However, BLM does not explain or support this conclusion, particularly in light of its recognition that the hydrology and water regime is very different in the NPRA from the Coastal Plain.[886] This conclusion is also at odds with DOI's conclusion in 1987 that industrial use of water resources would be a major effect.

BLM also assumes that permitted withdrawal rates would not exceed recharge rates. It is not clear what this assumption is based on given that BLM lacks considerable information about both precipitation and water resources for the Coastal Plain as previously explained and given FWS explanation that existing information on these topics is not correlated. BLM must explain this conclusion and provide the basis for it.

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[882] NPR-A IAP/EIS vol. 1 at 196, vol. 2 at 19, 21, 36.

[883] DEIS vol. 1 at 3-52.

[884] *See* U.S. Fish & Wildlife Serv., *Potential Impacts of Proposed Oil and Gas Development on the Arctic Refuge's Coastal Plain: Historical Overview and Issues of Concern* (Jan. 17, 2001) [hereafter "FWS 2001 Report"] (noting that the amount of water available in the winter in the Coastal Plain is only enough to maintain ten miles of ice roads); NRC Report, *supra*, at 210 (noting that "exploration will be hampered by the reduced availability of water during the winter" and that use of ice roads may not be feasible to access all areas).

[885] DEIS vol. 1 at 3-58.

[886] DEIS vol. 1 at 3-52.

5. BLM Measures Fail to Protect Water Resources

None of the action alternatives appear to prohibit water withdrawals or excavation of gravel mines for any lands in the program area, whether available for leasing or not, nor for areas subject to No Surface Occupancy. Gravel mines and water withdrawal operations in their entirety should be considered prohibited from areas not available for leasing and also in No Surface Occupancy zones during any season because they alter hydrological flows, impair water quality, and alter natural fisheries diversity as well as riparian and stream bank vegetation. Seismic operations would also have impacts on hydrological and water resources, and should not be allowed under any alternative in the areas unavailable for leasing or subject to No Surface Occupancy.

Additionally, the lease stipulations do not protect water resources from over withdrawal. Lease Stipulation 1 protects water quality, not water quantity. Lease Stipulation 2 purports to protect water quantity, but because its requirements are the same as ROP 9, they are insufficient for the reasons described below. Also, both Lease Stipulation 2 and 3 are limited in the geographic area or specific resources that they would apply to. This leaves much of the water resources on the Coastal Plain without protections. Lease Stipulation 9 is aimed at protecting coastal areas. While this will protect some aspects of water resources of the Coastal Plain, it does not ensure protection of water quantity or limit water withdrawals. BLM must consider lease stipulations to protect water quantity.

BLM also states that required operating procedures 3, 4, 9, 10, 12, 13, 17, 20, 24, and 26 would minimize impacts to water resources.[887] These measures are inadequate to protect water quantity from the impacts of water withdrawals for oil and gas activities. ROP 3 is aimed at water quality, not quantity. ROPs 4 and 10 are for polar bears and do not address water resources. ROP 9 allows water withdrawals of a percentage of unfrozen or available water based on fish species, but BLM does not explain or justify how it arrived at the percentages.[888] Without that critical information, it is unclear if the ROP will in fact protect water resources generally and water quantity in particular. It also makes modeling and monitoring completely discretionary, further limiting BLM's ability to understand the impacts of water use and regulate it effectively. ROP 12 protects water drainage patterns by limiting how components are constructed but does not otherwise protect water quantity or ensure there will not be adverse impacts from water withdrawals. ROP 13 addresses fish and aquatic habitat, but not water quantity. ROP 17 prohibits the construction of a gravel road for exploratory drilling. While this should be required, we also note that that means that ice or snow roads will be used, which will lead to impacts on water resources, not lessen them. This ROP, therefore, does not provide protections for water quantity. ROP 20 is geared at maintaining fish passage by prohibiting development in various areas and habitats. This does not ensure that sufficient water quantity will be available in rivers and streams sufficient for fish passage. ROP 24 concerns the location of gravel mines to protect various resources, but again, it does not directly ensure protection of water quantity. ROP 26 concerns birds and is unrelated to water resources.

[887] DEIS vol. 1 at 3-60.
[888] DEIS vol. 1 at 2-19–2-10.

G. BLM'S ANALYSIS OF AN OIL AND GAS PROGRAM ON FISH AND AQUATIC SPECIES IS INADEQUATE.

1. Summary of Arctic Coastal Plain Fish Species, Important Aquatic Habitat and Subsistence Fisheries — Diversity of fish species within the Coastal Plain and habitat use

Freshwater, estuary and nearshore marine waters of the Coastal Plain (CP) of the Arctic National Wildlife Refuge contain numerous Arctic fish species (17–21 estimated species; U.S. Fish and Wildlife Service 2015). The two most abundant anadromous fish species, Dolly Varden (*Salvelinus malma*) and Arctic Cisco (*Coregonus autumnalis*; Craig 1984) extensively utilize areas within the CP. Arctic Cisco has not been documented using estuary and delta habitat within the CP, but mainly use nearshore habitat within the Beaufort Seas as important foraging habitat between their spawning migration to the Mackenzie River and overwintering location in the Colville River Delta (Reist and Bond 1988; Brown 2008). Therefore, impacts to Arctic Cisco in the nearshore environment could impact species presence or abundance as fish migrate between important habitats. Dolly Varden have two major life forms which include freshwater resident (dwarf, lake and spring forms) and anadromous forms that are present in freshwater, nearshore and marine habitats (Ward and Craig 1974; Brown et al. 2014; Brown et al. 2019). Both Chum salmon (*Oncorhynchus keta*) and Pink Salmon (*O. gorbuscha*) have historically been documented within the Canning and Staines rivers as well as CP nearshore marine areas (Craig et al 1984; Craig and Haldorson 1985), but little information exists on populations or on spawning, rearing and foraging habitat used. Other fishes within the CP freshwater habitat include Lake Trout (*Salvelinus namaycush*), Burbot (*Lota lota*), Ninespine Stickleback (*Pungitius pungitus*), and Slimy Sculpin (*Cottus cognatus*; U.S. Fish and Wildlife Service 2015), and while not much is known about the distribution of each species it is likely that they inhabit a variety of habitat types extensively throughout the CP.

2. Summary of Arctic Coastal Plain Fish Species, Important Aquatic Habitat and Subsistence Fisheries — Important fish habitat within the Coastal Plain

Lotic and lentic habitat within the CP contains extensive important fish habitat necessary for reproduction, foraging and survival of Arctic fish. While historical research has only documented a snapshot of habitat use in space and time, it is likely that fish populations use extensive habitat across large areas (100's km) in order to fulfill necessary life history requirements such as spawning, refugia and foraging (Schlosser 1991). Distinct overwintering areas are located at areas that do not freeze solid during the winter (i.e., perennial springs, deep sections of rivers and deep-water lakes; Craig and McCart 1974; Viavant 2009; Brown et al. 2014; Brown et al. 2019) and are necessary for survival. Another type of important fish habitat, spawning areas, are located upstream of the CP and many post-spawned Dolly Varden either migrate downstream and overwinter near perennial springs within the CP or nearby watersheds (Brown et al 2014; Brown 2019). Rearing and foraging areas for both adult and juvenile Dolly Varden likely occur throughout watersheds within the entire CP, in habitats specific for each life stage, though data documenting habitat use across spatial and temporal scales is limited (e.g., Ward and Craig 1974; McCart 1980; Underwood et al. 1996). Limited information also exists on the abundance and distribution of salmon (Pink and Chum salmon) within the CP, due to their

generally low abundance in the Arctic, but species likely use spring-fed rivers for spawning along with delta, tributaries, side channels and nearshore areas for rearing. Arctic Grayling (*Thymallus arcticus*) occur in freshwater habitats within the CP and, based on previous research (West and Smith 1992) and habitat suitability requirements, it is likely that populations extensively use the vast majority of CP streams and connected lakes at some point in their lives, for reproduction, foraging and survival.

3. Summary of Arctic Coastal Plain Fish Species, Important Aquatic Habitat and Subsistence Fisheries — Importance of fish species as a subsistence resource for Arctic Coastal Plain communities

Nonsalmon fish species are important subsistence resources for the Arctic community of Kaktovik. In addition to marine mammals and large land mammals, fish resources are the third most utilized wild food resource for the community of Kaktovik and represent 13% of total wild resources harvested (Kofinas et al. 2016). The annual mass of fish harvest within the subsistence fishery is significant and fishers harvest 12,468 kg of fish annually, of which the vast majority (99 %) are nonsalmon fish (Kofinas et al. 2016). Fish species with the greatest harvest quantities include Dolly Varden (ca. 9,478 kg), Broad Whitefish (ca.1,691 kg) and Arctic Cisco (ca.762 kg), which are harvested in both nearshore marine and freshwater habitats. In addition to being directly consumed by Kaktovik residents, a large proportion of subsistence catch is shared within a food sharing network between Arctic coastal plain communities (Kofinas et al. 2016).

4. Summary of Arctic Coastal Plain Fish Species, Important Aquatic Habitat and Subsistence Fisheries — Ecosystem based management and importance of connected heterogenous habitat

Ecosystem-based management strategies that allow for natural disturbance and portfolio concepts to occur are essential for sustaining Arctic fish populations in the CP and need to be considered in the DEIS. Disturbance processes across space and time create a mosaic of habitat types (Resh et al. 1988), which provides a diversity of habitat for fish species and creates a variety of options available across changing environmental conditions (i.e., a shifting habitat mosaic; Stanford et al. 2005) ― buffering populations from both climate and anthropogenic impacts (Schindler et al. 2015). Due to displaced resources, movement by anadromous and freshwater fish is extensive, and it is likely that a large majority of Arctic fish currently utilize entire watersheds (e.g., Waldman et al. 2016), from headwater streams to estuaries, to meet basic biological life requirements of reproduction, foraging and survival. The variation in environmental conditions and heterogeneity in habitats across the CP has likely, as seen in other systems, created a diversity of life-history strategies, phenotypes and genetic diversity among fish, which helps maintain and sustain current populations (Schindler et al. 2015). As seen in other watersheds and similar to the proposed development contemplated in the DEIS, fragmentation of connected habitat or disruption of natural disturbance processes, from roads, culverts, bridges and development pads will reduce habitat heterogeneity and increase fish populations vulnerability to long-term persistence (Penaluna et al. 2018). The homogenization and fragmentation of habitat will likely lead to loss of local populations and reduction of local genetic and life-history diversity, leading to less resilient Arctic fish populations.

5. *Affected Environment — Summary of fish and aquatic species habitat section and major deficiencies of baseline data related to fish habitat and species occurrence*

Overall the DEIS assessment of baseline aquatic habitat within the CP is generally incomplete and an inaccurate assessment of the affected environment. The baseline assessment does not provide accurate estimates on the location, quantity or type of fish habitat including rivers, streams, lakes and tundra ponds within the CP. The DEIS fails to consider the affected environment for aquatic invertebrates and plants, two important habitat attributes that provide food and physical habitat for various life stages of fish. There is a tremendous amount of scientific literature available from the last 30+ years that explores and documents how to quantify and describe aquatic habitat and species occurrence across large riverscapes — rivers, streams, lakes, wetlands, groundwater flow pathways, within a terrestrial landscape from the headwaters to the ocean (see Fausch et al. 2002; Naiman et al. 2005). BLM must utilize the best spatial data and current scientific literature, cited herein, in its description of the affected aquatic environment. If information is outdated or missing, BLM must address that.

6. *Affected Environment — Major deficiencies of baseline data related to fish habitat and aquatic species occurrence*

a. Accuracy of hydrography network

Due to the resolution of the current USGS National Hydrography Dataset (NHD), which uses a 20–30 m resolution digital elevation model as the input data source, and limited physiographic relief within sections of the CP, the data used to estimate hydrography channel network is inaccurate. The current NHD delineated hydrography network does not provide an accurate assessment of active channel width and floodplain extent for streams within the CP or correctly represent proposed stream buffers. It is particularity inaccurate throughout the CP in areas with wide braided floodplains and low gradient streams, which are very common landscape features. High-resolution IfSAR data (resolution 2.5–5 m) is currently available for the entire CP (https://www.usgs.gov/news/alaska-mapping-update) and the current NHD hydrography needs to be updated with this best available DEM data and verified using high-resolution satellite imagery and field techniques in order to accurately quantify the affected environment. An example of an improved Arctic stream channel network that incorporates high resolution IfSAR DEM data can be seen at https://netmap-portal.squarespace.com/#map. Section 3.3.2 of the DEIS uses inaccurate DEM and hydrography data, resulting in an inaccurate and incomplete discussion of the affected environment.

b. Lake network classification, stream-lake connection inaccurate

The assessment of lakes and stream-lake connections is inaccurate within the DEIS. To understand the distribution of lake types, stream-lake connectivity and lake sensitivity to climate change and water withdrawal across the CP, an extensive lake-based database needs to be created and lakes must be classified based on a suite of attributes following methods outlined in Jones et al. (2017). First, IfSAR digital surface model, high resolution satellite imagery along with field data should be collected for all lakes and tundra ponds within the entire CP. Then additional data layers such as surficial geology, lake surface area change, stream connection and

landcover vegetation should be collected, and then finally a lake classification should be completed. Without a detailed understanding of lakes types across the CP, it is impossible to quantify or accurately describe the baseline of the affected environment. Currently, within the DEIS section 3.3.2 affected environment, information is missing, and the provided data is likely inaccurate to quantify lentic fish habitat.

c. Accuracy of anadromous fish habitat and species occurrence

The information on fish habitat within the CP program area (Table 3-17; DEIS 2018) is inaccurate and needs to be updated. Fish distribution and habitat use information does not provide a reliable estimate of species-specific habitats for freshwater, anadromous and marine species that inhabit waters within the CP. As stated in Johnson and Blossom (2017), information from the anadromous water catalog (AWC) only reflects the extent of fish surveys or known anadromous fish use in a particular water body (e.g., stream, river, lake) and does not represent species occurrence or habitat use. A variety of habitat variables (e.g., water clarity, river size and depth), sampling methods (e.g., weir, gillnet) and other factors (e.g., remoteness) influence the detection of fish species, which the AWC does not take into account. The data from the AWC is not an accurate assessment of freshwater, anadromous or marine species habitat use. A systematic survey should be conducted to estimate species abundance (see Borcher et al. 2002 for methods) and identify important habitat for reproduction, foraging and survival based on empirical relocation data (e.g., radio tracking), eDNA and intrinsic habitat models that use habitat suitability parameters to estimate habitat use across large spatial extents (e.g. Burnett et al. 2007; Bidlack et al. 2014; Matter et al. 2018). Current estimates of fish-bearing and anadromous streams are incorrect and recent modeled data for a subset of the CP suggest that anadromous fish habitat is much greater (*see* https://netmap-portal.squarespace.com/#map). While data and scientific methods exist to develop accurate assessments of fish habitat, Section 3.3.2 of the DEIS uses inaccurate and limited data to poorly quantify the affected environment.

7. Affected Environment — Deficiencies/data gaps by habitat type section

a. Estuaries, lagoons and nearshore marine waters

Estuaries, lagoons and nearshore marine waters are critical habitat features for a variety of aquatic species at various life-stages and seasonal periods (See Craig et al. 1981; Craig et al. 1984; Craig and Haldorson 1985; Craig 1989; West et al. 1992; Underwood et al. 1996; Dutton et al. 2012; Courtney et al. 2018). In addition to serving as important habitat for various fish species, these areas are also designated Essential Fish Habitat (EFH) for Arctic Cod (*Boreogadus saida*), Saffron Cod (*Eleginus gracilis*) and Snow Crabs (*Chionoecetes opilio*). Section 3.3.2 of the DEIS does not provide accurate and detailed information on the landscape features in relation to habitat use to quantify the baseline affected environment.

b. Rivers, streams and springs

River, stream and karst-spring locations are not accurately identified, delineated or described by Section 3.3.2 of the DEIS. The current NHD stream hydrography network provides an inaccurate estimation of channel location, length and extent for CP lotic environments. Data

on karst springs is limited, and new methods, including satellite imagery and empirical data collection, should be used to quantify physical and biological features of habitat (e.g., Pavelsky and Zarnetske 2017). The limited existing information on streamflow regimes is inadequate for quantifying seasonal flow regimes, and new data must be collected and methods used to quantify streamflow metrics to describe streamflow regime characteristics adequately (see Olden and Poff 2003). No information exists for stream thermal regimes, which is essential and necessary baseline information (see Steel et al. 2017). No channel reach morphology attribute information is documented to classify and quantify lotic habitat, which is essential to quantify the baseline habitat information for rivers, streams and springs and understand the response for human and natural disturbance (see Montgomery and Buffington 1997).

c. Lakes and tundra ponds

Information on lakes and tundra ponds attributes within Section 3.3.2 of the DEIS is inadequate to quantify the baseline. Given the potential importance of lakes as overwintering fish habitat and the significant foreseeable impacts from water withdrawal, detailed and unique information needs to be compiled for all lakes within the CP using methods by Jones et al. (2017).

8. Affected Environment — Deficiencies/data gaps in fish species occurrence

Information on fish species habitat use and occurrence within Section 3.3.2 of the DEIS is inadequate to quantify baseline information on fish species. The DEIS significantly underestimates fish species presence, occupancy and habitat use. A rigorous and systematic survey for fish populations abundance, occurrence and seasonal habitat use has not been collected to document how fish species use the CP for reproduction, foraging and survival. Numerous methods that combine eDNA data, intrinsic potential models and radio tracking currently exist which are both feasible and appropriate for the CP (see Falke et al. 2013; Fraley et al. 2018; Matter et al. 2018). Application of such methods to the CP is necessary to adequately describe the affected environment and conduct the required impacts analysis.

9. Affected Environment — Deficiencies/data gaps in aquatic invertebrate species occurrence

Information on aquatic invertebrate habitat use and occurrence within Section 3.3.2 of the DEIS is inadequate to quantify baseline information on aquatic species. No site-specific information is provided to quantify the distribution, occupancy or abundance of invertebrate species in relation to channel morphology of aquatic habitat. Using the river continuum concept (Vanote et al. 1980), the serial discontinuity concept (Ward and Stanford, 1995), and theory on the tributary influences on network patterns (Fisher 1997), an invertebrate community assessment should be completed that incorporates site-specific information across all streams within the CP. Additionally, references cited in the DEIS are not specific to the CP, are over 18 years old, and do not provide an accurate assessment of the baseline for invertebrate communities. Further, there is no mention of other aquatic species beyond fish and aquatic invertebrates (e.g., plants).

10. Affected Environment — Deficiencies/data gaps in climate change impacts

Information on climate change impacts within Section 3.3.2 of the DEIS is inadequate. Current and future high-resolution climate data is currently available for the CP including upstream areas within each watershed (see Cai et al. 2018), but is not provided in the DEIS. Baseline long-term and spatially explicit information on hydrology (e.g., streamflow, water temperature, water quantity, surficial and groundwater permafrost flow dynamics) is not shown in the DEIS and therefore impossible to describe or assess the current and future impacts of climate change. Necessary information is needed to understand the baseline information of Arctic lakes, along with appropriate methodology documented by Arp et al. (2016). While Stuefer et al. (2017) provides a synthesis and analysis of observational data for three watersheds to the west of the CP it does not provide a reliable estimate of climate impacts for watersheds that flow into the CP. To understand climate change impacts on lotic ecosystems, a suite of information, models and empirical data needs to be collected to quantify thermal and streamflow regime (see Poff et al. 1997; Olden and Poff 2003; Isaak and Rieman 2013; Steel et al. 2018). No current geomorphic classification data on lotic and lentic habitats to quantify habitat types and anticipate future change (Montgomery and Buffington 1997) is documented within the DEIS, which is necessary to quantify and adequately analyze climate change impacts to aquatic ecosystems.

11. Direct and Indirect Impacts to Fish and Aquatic Species

a. Summary of Direct and Indirect Impacts

Overall the DEIS assessment of direct and indirect impacts to fish and aquatic species is scant, inaccurate and does not sufficiently analyze the impacts of an oil and gas program. The DEIS fails to incorporate accurate baseline information, current scientific knowledge on habitat use and behavioral impacts to fish species. The associated impacts from development (physical, chemical and biological) outlined in the DEIS have a high potential to cause numerous other impacts not described. There is a tremendous amount of scientific literature available from the last 30+ years that explores and documents the impacts of various types of development proposed by the DEIS on fish and aquatic species. BLM must consider that scientific literature, which is cited herein.

Due to the limited amount of available winter liquid water, extraction of water from rivers and lakes for construction of ice roads, pads, and other infrastructure could lead to significant short and long-term impacts on fish populations. As the U.S. Fish & Wildlife Service recognized in a 2001 report, "since winter exploration requires ice roads and ice pads to be built across the water-poor Coastal Plain, exploration activities may also impact fish habitats in rivers and lakes by removing massive amounts of water from the rare areas where water is available in the winter." (USFWS 2001). Impacts could include direct loss of overwintering habitat, reduced dissolved oxygen concentrations, and increased stress and mortality of Dolly Varden or other Arctic fishes (e.g., Gaboury and Patalas 1984; Evans 2007; Cott et al. 2008). Seismic exploration through noise or instantaneous pressure change has the potential to cause short term, but severe impacts to overwintering fishes and could include negative behavioral changes (e.g., fleeing, herding), hearing loss and direct mortality of fish and embryos (McCauley et al. 2003; Popper et

al. 2005).[889] Construction of gravel and ice roads, pipelines, and other infrastructure associated with river or stream crossings would mobilize sediment (Maitland et al. 2016), causing associated impacts to rearing, spawning, and overwinter habitat (e.g., Robertson et al. 2007; Chapman et al. 2014), as well as the health and behavior of fishes (e.g., Newcombe and Macdonald 1991; Reid et al. 2003; Robertson et al. 2006; Chapman et al. 2014). Within floodplain channels, infilling and various types of stream and river crossing structures (e.g., ice-bridges, culverts, concrete bridges) have the potential to cause long-term changes to the natural flow regime, and restrict channel movement and fish passage, causing negative impacts to fish populations (Wemple et al. 1996; Cocchiglia et al. 2012; Maitland et al. 2016). Additionally, with the construction and maintenance of a gravel road network, numerous other minor to severe impacts may occur such as hydrocarbon and sump contamination (Schein et al. 2009; Kanigan and Kokelj 2010), introduction of non-native species and increased fishing pressure all of which would have both short and long-term impacts to fish populations (Schindler 2001).

If realized, these foreseeable adverse impacts on CP fish will likely have corresponding adverse impacts on subsistence uses. The major deficiencies in BLM's impacts analysis for fish and aquatic species likewise renders BLM's analysis of impacts on subsistence uses and corresponding findings under ANILCA Section 810 inadequate.[890]

b. Major deficiencies in analysis of direct and indirect impacts to fish and aquatic species

Information on direct and indirect impacts to fish and aquatic species within Section 3.3.2 of the DEIS is inadequate to evaluate the foreseeable significant impacts of proposed development. Direct effects of a proposed action are those that are caused by the action and occur at the same time and place, while indirect effects are defined as those that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. For the DEIS to accurately assess the direct and indirect impacts of the proposed development it is necessary for the DEIS to demonstrate, in a quantatively rigorous manner, that enough is known about the habitats to be impacted and the associated direct impacts to aquatic ecosystems and species. In certain instances impacts may take years to develop in order to be fully quantified and realized (e.g. Walker et al. 1987; Raynolds et al. 2014). The current DEIS is lacking accurate information on stream hydrology (surficial and groundwater), climatology, hydrography channel network and floodplain distributions, channel morphology and distribution and abundance of fish and aquatic species, which are all necessary baseline information to evaluate impacts. BLM must correct the following deficiencies in the analysis to ensure the required hard look at reasonably foreseeable impacts required by NEPA.

[889] *See also* January 20, 2019 comment letter submitted by Dennis M. Higgs, PhD (detailing best available science and specific deficiencies in DEIS analysis of acoustic impacts on fish).

[890] *See infra* Part V.O & VI.

c. Direct and indirect impacts from loss or alteration of aquatic habitat

The assessment of the direct and indirect impacts from loss of aquatic habitat (both lotic and lentic) from development within the DEIS is not robust and does not accurately describe the impacts. The removal and fill of aquatic habitats will have a variety of direct impacts beyond the described footprint of the development infrastructure (i.e., gravel roads, gravel pads, airstrips, pipelines, culverts, bridges, docks, barge landing zones, gravel mines), which may develop differentially over time (i.e., days–years) causing numerous short and long-term impacts (e.g., Walker et al. 1987; Raynolds et al. 2014). Classification of aquatic habitat based on climate, physiography, geology, fluvial morphology using accurate spatially explicit data (e.g., Benda et al. 2015) is essential to understand the foreseeable impacts, which is lacking in the DEIS. A complete understanding of the surficial hydrology through long term data and hydrologic models is also necessary to understand direct impacts. Alteration of aquatic habitats, which rest above permafrost, will alter surficial and subsurface flow paths, directly impacting streamflow, stream temperature and water quality (Liljedahl et al 2016; Walker et al. 2019). Changes in water quantity and quality will also have numerous negative direct, indirect and cumulative impacts on the amount of physical habitat in areas, as well as the quality of habitat used for foraging, reproduction and survival, which will cause impacts to aquatic species behavior, physiology, and fitness. Contrary to the DEIS statement (Chapter 3, section 3.3.2, page 3-80), there is not sufficient scientific evidence to support the claim that gravel reservoirs, created through gravel mines, provide biologically beneficial overwintering habitat for fish.

d. Direct and indirect impacts from industrial roads and road crossings

The assessment of the direct and indirect impacts from industrial road crossings within the DEIS is not robust and does not accurately describe impacts. Roads, bridges and culverts have been shown to alter surface hydrology through channelization and redistributing of flow to stream crossings (Wemple et al., 1996), which can destroy or create wetlands, reduce fish movement (Warren and Pardew, 1998; Trombulak et al. 2000) and restrict access to seasonally important habitat (Brown and Hartman, 1988). Additionally, previous research has shown that vehicle traffic has the potential to introduce heavy metals, ozone and nutrients to roadside aquatic environments (Leharne et al. 1992; Schuler and Relyea 2018), which has the potential to be transported throughout aquatic systems (Gjessing et al.1984; Schuler and Relyea 2018) and harm aquatic biota. Industrial road crossings will also affect the instream physicochemical habitat of rivers and streams. Due to upstream constriction effects, culverted streams are associated with higher percent fine sediment, water temperature, water depth and turbidity, as well as lower dissolved oxygen and water velocity (MacPherson et al. 2012; Maitland et al. 2016), and sediment impacts will extend hundreds of meters downstream for each culvert (Lachance et al. 2008). Road culverts also have the potential to block or restrict fish passage at critical periods (see Morris and Winters, 2008 for Alaska specific example), which could add additional stress on populations during periods when resources are limited (Furniss et al., 1991; Warren and Pardew, 1998). Bridge crossings also contribute to increased sediment inputs from erosion at exposed road crossings; while over time stabilization can occur, storm or flood events (common in the CP) can continually reactivate erosional processes (Maitland et al. 2016). Changes in aquatic habitat quality can directly and adversely impact fish and aquatic species and, by increasing instream sediment (suspended and deposited), will likely impact Arctic fish species

in the CP over different time periods (days—years) by reducing embryo survival, altering feeding behavior, and changing species abundance and richness (Chapman et al. 2014) in CP rivers and streams. The indirect impacts of road crossings in the CP will likely include at least some mortality, reduced fitness, and changes in population abundance in impacted areas, and may also impact population genetic and life-history diversity over the long term. This must be accounted for in the DEIS.

e. Direct and indirect impacts from water use and seasonal redistribution of water

The assessment of the direct and indirect impacts from water extraction and redistribution on fish and aquatic species within Section 3.3.2 of the DEIS is inadequate to evaluate direct and indirect impacts of proposed development. In order to quantify the potential impacts of industrial water consumption (e.g., ice roads, drilling, camp facilities) and redistribution on fish and aquatic species, several analyses need to be completed for the CP including: a specific lake network classification following methods in Jones et al. (2017); a physically-based 3D hydrology model to model water movement; a systematic survey of aquatic habitat, in combination with seamless digital layers, to develop hierarchical habitat information (see CHaMP 2015); and finally systematic fish surveys across the CP in combination with fish habitat models to quantify fish habitat at the species level. Industrial water use in winter and summer will extract water and ice from lakes, rivers, springs and groundwater, which is hydrologically connected to a variety of features, and has the potential to reduce habitat and redistribute water in patterns that may negatively impact fish and aquatic species. For example, removing water or ice from lakes and rivers during winter has the potential to impacts fish and aquatic species by reducing dissolved oxygen, decreasing overwintering and littoral habitat, fracturing migration corridors, and freezing sediments in littoral areas, which may kill fish eggs and invertebrates or cause physiological stress, which can affect growth, reproduction or survival (Cott et al. 2008; Cott et al. 2015). The DEIS estimates that a tremendous amount of water (420,000 to 1,900,000 gallons) would be required to complete each well and another 2,000,000 gallons per day would be required to maintain each well during production. Extraction of water in this quantity from industry preferred water sources on the CP (groundwater aquifers, lakes and rivers) is likely to cause major changes in groundwater and surficial flow paths affecting water quantity across all hydrologically connected habitats. Subsurface groundwater movement in the CP is largely unknown and likely complex due to permafrost (see Kane et al. 2013; Walvoord and Kurylk 2016). If current groundwater hydrological connectivity is altered by water extraction, there could be severe impacts to biologically important aquatic landscape features fed by groundwater (i.e., karst springs, lakes or rivers). The biological impacts and consequences of altering streamflow or water quantity for fish (particularity Dolly Varden and Arctic Grayling) and aquatic species are not adequately addressed in the DEIS.

f. Direct and indirect impacts from habitat alteration; change in streamflow, water temperature and water biogeochemistry

The assessment of direct and indirect impacts of habitat alteration within Section 3.3.2 of the DEIS is inadequate to evaluate impacts of proposed development on fish and aquatic species. Limited information exists on streamflow regimes and is inadequate for quantifying direct and

indirect impacts to fish and aquatic species. The natural flow regime is a critical element that maintains biodiversity and ecosystem integrity in lotic systems, and altering the historical flow regime will have negative impacts to aquatic species in rivers and streams (Poff et al. 1997). New data on seasonal streamflow regimes that quantifies critical components of flow regimes (i.e., magnitude, frequency, duration, timing, rate of change) needs to be collected and methods should be used to quantify streamflow metrics (see Olden and Poff 2003). Thermal regimes are another critical element that regulates metabolism in fish and invertebrates, influencing growth, phenology and survival, which in turn influences foodwebs and aquatic species communities (Caissie 2006; Webb et al. 2008; Steel et al. 2017). No information is provided on stream thermal regimes, which is essential and necessary baseline information to quantify impacts of habitat alteration on aquatic species. Development will likely impact thermal regimes by reducing the quantity of water in certain habitats. Those foreseeable impacts have not been considered in the DEIS. Last, biogeochemical processes in aquatic ecosystems influence nutrient availability, biofilms, invertebrate abundance, which in turn influence Arctic food webs (Huryn et al. 2005). Habitat alteration from proposed development in the CP (roads, culverts, bridges, infrastructure pads etc.) is likely to increase permafrost thaw, thermokarsting, erosion into lentic and lotic environments and alter surficial and groundwater flow paths (Walker et al. 1987; Raynolds et al. 2014; Liljedahl et al. 2016; Walker et al. 2019), which, through changes in the habitat is likely to have negative impacts on the behavioral ecology (i.e., foraging, antipredation, reproduction, survival) of Arctic fish as well as the distribution and abundance of aquatic invertebrates (Cocchiglia et al. 2012).

12. Cumulative impacts

Information on cumulative impacts within Section 3.3.2 of the DEIS is scant and inadequate to assess the cumulative impacts. The DEIS section on cumulative impacts should include an extensive review of the peer-reviewed scientific literature on the cumulative impacts to fish and aquatic species within CP watersheds including both short-term (1–10 years) and long-term impacts (i.e., 10–100 years) on the following topics:

- Roads including snow, ice and gravel surfaces
- Development infrastructure (permanent and temporary)
- Stream crossings infrastructure (ice bridges, culverts, bridges)
- Water and ice extraction from groundwater, rivers streams, lakes and tundra ponds
- Seismic surveys
- Exposure to chemicals from development
- Climate change impacts to cryosphere (permafrost, glaciers, snow), hydrology (groundwater, streamflow, stream temperature, biogeochemistry) and aquatic ecosystems (lotic and lentic) Cumulative impacts to subsistence use of CP fish species

13. Failure to assess and consult on impacts to Essential Fish Habitat

Under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.), the North Pacific Fishery Management Council drafts and revises the Fishery Management Plan (FMP) for Fish Resources of the Arctic Management Area, which designates

particular areas as Essential Fish Habitat (EFH).[891] EFH is defined as those waters and substrate necessary to fish designated under a federal fishery management plan for spawning, breeding, feeding, or growth to maturity. The EFH components of FMPs should be reviewed and revised by the Council and the National Marine Fisheries Service (NMFS) as warranted based on available information, but at least once every 5 years.[892] The five-year review ensures that NMFS and the Councils incorporate the most recent and best science available into the management of EFH. The most recent 5-year EFH review for the Arctic Management Area was conducted in 2015 for the preceding five years.[893] There is Pink and Chum Salmon EFH in the lower reaches of the Staines and Canning Rivers within the program area for the Coastal Plain oil and gas leasing EIS, as well as Arctic and Saffron Cod EFH in the coastal lagoon next to the program area, which may also extend into the lower reaches of rivers within the program area during summer months.

Section 305(b) of the Magnuson-Stevens Act provides that federal agencies must consult with NMFS when doing work that may adversely affect EFH.[894] The action agency must draft an EFH Assessment that includes a description of the action, analysis of potential adverse effects of the action on EFH and the managed species, the action agency's conclusion regarding the effects of the action on EFH and a description of proposed mitigation.[895] The consultation requirement can be satisfied through the NEPA process to avoid duplication, with the action agency including and clearly identifying its EFH Assessment in the EIS.[896] If an ongoing NEPA process is used to fulfill the consultation requirement, the comment deadline for that process should apply to the submittal of NMFS's EFH Conservation Recommendations under 305(b)(4)(A) of the Magnuson-Stevens Act, unless a different deadline was separately agreed to by the parties.[897]

There is no indication that the DEIS includes the required EFH Assessment, or that NMFS has had the ability to weigh in during the comment period, given the government shutdown. The DEIS section on EFH merely identifies that EFH of salmon and cod exist in the program area and cites to BLM's 2012 EIS for the Integrated Activity Plan for the National Petroleum Reserve Alaska (NPRA). This is problematic in at least two respects. First, the 2012 NPRA EIS was completed prior to the most recent NMFS 5-year review of the Arctic Management Area. Thus, BLM is relying on an outdated EFH Assessment that is not based on the best and most recent available data. Second, while the NPRA EIS did analyze the impacts to salmon and cod EFH, that assessment covered a different geographic area and addressed

[891] Arctic FMP 4.1.3, available at https://www.npfmc.org/wp-content/PDFdocuments/fmp/Arctic/ArcticFMP.pdf.

[892] 50 C.F.R. § 600.815(a)(10).

[893] The portion of the 5-year review that focuses on the impacts to EFH from non-fishing activities in Alaska was published in May of 2017. Limpinsel, D. E., Eagleton, M. P., and Hanson, J. L,. 2017. Impacts to Essential Fish Habitat from Non-Fishing Activities in Alaska. EFH 5 Year Review: 2010 through 2015. U.S. Dep. Commerce NOAA Tech. Memo. NMFS-F/AKR-14, 229p.

[894] 50 C.F.R. § 600.920(a)(1).

[895] 50 C.F.R. § 600.920(e)(3).

[896] 50 C.F.R. § 600.920(f)(1).

[897] 50 C.F.R. § 600.920(f)(2).

different EFH locations. It thus cannot satisfy the consultation requirement for the Coastal Plain oil and gas leasing EIS. BLM must prepare an EFH Assessment and consult with NFMS.

14. Major deficiencies in lease stipulations and required operating procedures

The articulation of lease stipulations (LS) and required operating procedures (ROPs) in Chapter 2 of the DEIS terminology and operationalization/implementation. Without that detail, BLM cannot assess their efficacy and the LS/ROPs are unlikely to meet their stated objectives of protecting fish and aquatic species. BLM must precisely describe relevant terms and the scientific methodologies for implementing each LS/ROP. The following terms in LS 1, 2, 3, 4 and ROP 8, 12, 16, 19, 20, 22 are not adequately or scientifically defined for each river or stream where LS or ROPs apply:

- Active floodplain
- Floodplain
- River delta
- 50, 100, 200 year flood for CP rivers
- Ordinary high-water mark
- Essential pipeline/road crossings
- Natural flow of rivers
- Disrupt flow from perennial springs
- Free passage for anadromous fish
- Maintain natural runoff processes

a. Lease stipulation and required operating procedures deficiencies

Lease stipulations and ROPs do not meet objectives with allowable exceptions in alternatives B, C, D. If exceptions within the following LS and ROPs are implemented, the action of the exception will negate the overall objective of the ROP because there are no defined limits associated with each exception action.

1. Lease stipulation 1: No defined parameters associated with the allowable exception to building pipelines, roads or facilities in river deltas. Permeant pipelines, roads or industrial facilities within the flood plain will negate the objective of the LS.
2. Lease stipulation 3: The requirement/standard is not possible and will be ineffective since karst spring source water has a long residence time and short-term studies will not ensure drilling would not disrupt perennial springs.
3. Required operating procedure 8: No defined parameters associated with the allowable exception to remove ice from rivers. Due to no limit on river ice extraction, the ROP's exception negates the objective. Without first defining terminology and then conducting long term hydrologic monitoring, is not possible to quantify whether the objective can be met.
4. Required operating procedure 9: Optional water level and quality monitoring does not allow for adequate or scientific assessment of impacts.

5. Required operating procedure 11: No defined limitations on the surfaces on which roads and industrial operations can operate. Terrain with high erosion potential due to slope and surficial geology is necessary to include within the ROP or objective will not be met.
6. Required operating procedure 12: Requirement/standard described will not necessarily meet the ROP objective. The listed procedures only provide some necessary protective measures and do not cover the suite of crossing structure impacts. Need to also require annual at-site monitoring or there will be no way to determine impacts.
7. Required operating procedure 16: No defined parameters associated with the allowable exception of BLM authorized drilling in floodplains of fish-bearing rivers and streams will negate the ROP objective. Drilling will change water quality due to the quantity of water required for drilling and discharged water.
8. Required operating procedure 19: No scientific evidence documented in the DEIS to support adequacy of 500ft buffer to meet its objective.
9. Required operating procedure 20: Appropriate entities not defined (e.g., USWFS, NMFS) and expertise not defined. Lack of clarity on the ROP could negate the ROP from meeting its objective.
10. Required operating procedure 22: No defined parameters associated with the culvert installation potentially void ROP objective. Terms within the DEIS such as "necessary", "smaller streams", "fish", "restricting fish passage", "natural flow" and "adversely affecting natural flow" need to be defined and detailed methodology needs to be described. Stream crossing methods are out of date (20+years old) and new information on impacts of culverts on fish and aquatic species needs to be considered (e.g., Maitland et al. 2016).
11. Required operating procedure 28: Lacustrine and riverine geomorphic and ecological classification need to be included in the ROP in order to identify and protect important habitat for aquatic invertebrates and all fish species.

b. Major data gaps relating to lease stipulations and required operating procedures

The DEIS fails to include any scientifically justified rationale, backed by empirical data, to explain the proposed width of stream buffers. Within the DEIS there are major scientific data gaps revolving around the width of stream buffers, and extensive scientific evidence needs to be provided to described why values where chosen and why certain rivers and streams were not included. To adequately support its stream buffers, BLM must provide peer-reviewed scientific evidence to demonstrate the following:

- How was river buffer width determined and what scientific evidence was used to determine appropriate width to meet lease stipulation objective?
- Why do certain rivers not have buffers and what scientific evidence was used to determine river buffer width necessary to meet lease stipulation objectives?
- Why do all lower order streams not have a buffer and what scientific evidence was used to determine the appropriateness of this decision?

- Does the lack of stream buffers on lower order streams negate protective objectives of higher order streams due to the fact that they are connected hydrologically?
- How was aufeis/karst spring buffer width determined and what scientific evidence was used to determine appropriate width to meet objective?
- What is the state of science around aufeis flow paths, habitat use of fish and invertebrates across seasons?

In short, BLM's proposed lease stipulations and ROPs appear arbitrary, lack scientific support and necessary detail, and will likely be ineffective in preventing or mitigating adverse impacts to fish and aquatic species.[898]

H. BLM'S ANALYSIS OF AN OIL AND GAS PROGRAM ON BIRDS IS INADEQUATE.

More than 150 species of birds have been documented on the Coastal Plain, many of which find vital habitat for foraging, nesting, migratory staging, and overwintering.[899] The Coastal Plain of the Arctic Refuge lies within a designated Important Bird Area that is globally important for American Golden-plover, Buff-breasted Sandpiper, and Pectoral Sandpiper; continentally important for Snow Goose, Red Phalarope, Whimbrel, and Dunlin; and important at a state level for Golden Eagle, Red-necked Phalarope, Red-throated Loon, Ruddy Turnstone, Semipalmated Plover, Semipalmated Sandpiper, and Stilt Sandpiper.[900]

The DEIS fails to address the important data gaps related to the scientific understanding of Arctic Refuge Coastal Plain avifauna and the potential impacts of oil and gas development on birds. The data on bird species densities in the Coastal Plain area are broadly incomplete and existing, completed surveys are restricted in statistical power as a result of limited spatial scope and temporal scale.[901] New, additional surveys should be designed specifically for the project being considered and should be a mandatory component of any robust environmental impact assessment. For breeding waterbirds specifically, there is a need to better understand those species' distributions and abundances within the Coastal Plain in relation to varying habitat

[898] A list of references cited in this section is appended to the letter.

[899] CCP EIS at Appendix F.

[900] Audubon Alaska, 2014. Important Bird Areas of Alaska, v3. Audubon Alaska, Anchorage, AK. Accessed online at http://databasin.org/datasets/f9e442345fb54ae28cf72f249d2c23a9.

[901] See John M. Pearce, et al., U.S. Department of the Interior, U.S. Geological Survey, Summary of Wildlife-Related Research on the Coastal Plain of the Arctic National Wildlife Refuge, Alaska, 2002-17, Open-File Report 2018-1003 [2018 USGS Report] (2018), at 14 ("only about one-third of the 1002 Area is currently surveyed, and what is surveyed falls within the low-density strata. Surveys within the low-density strata have far fewer transects that are farther apart and thus have little power to detect and determine trends of breeding and non-breeding migratory birds.").

types.[902] Relatedly, while populations of Snow Goose and Black Brant appear to be increasing on the North Slope,[903] studies on any new resulting patterns in the distribution of these species during nesting and migratory staging have yet to be completed. Shorebirds are another species guild that requires more study of a variety of limiting factors, particularly the cumulative effects of oil and gas development,[904] and the potential for shifting habitats due to coastal erosion, shifting river deltas, and the loss of lagoons and barrier islands[905]. Coastal change rates along the coast of the Arctic Refuge vary dramatically, between an erosion (loss) rate of 20 meters/year and an accretion (addition) rate of 11 meters/year. These extremes will have spatially heterogeneous effects on marine, lagoon, and coastal ecology and this topic must be studied in the context wildlife habitat in the Coastal Plain, as well as cumulative effects across the North Slope. Finally, the issue of phenology, or migratory mismatch, is an area of needed study, particularly in the project area. While some migratory birds are displaying some plasticity to changing seasonal patterns,[906] it is not known how the shifts in resource availability or migratory timing will reverberate through a species' life history; nor is it known whether the flexibility seen in other parts of Alaska are applicable to the Coastal Plain of the Arctic Refuge. The agency must address these areas of missing information prior to moving ahead with a leasing program.

In addition to failing to address these data gaps, BLM's draft EIS downplays the importance of the Coastal Plain to birds, is missing important information, and conducts a poor analysis of the impacts that oil and gas development will have on birds. Moreover, the DEIS

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[902] See John Pearce, USGS 2018-2019 Activities in the North Slope Borough: Presentation to the North Slope Borough Planning Commission November 29th, 2018, Utqiagvik (powerpoint presentation), at slide 22.

[903] But see James S. Sedinger, Thomas V. Riecke, Alan G. Leach, and David H. Ward, The Black Brant Population is Declining Based on Mark Recapture, The Journal of Wildlife Management, DOI: 10.1002/jwmg.21620 (2018).

[904] See "primary conservation objectives" *in* Alaska Shorebird Group. 2019. Alaska Shorebird Conservation Plan. Version III. Alaska Shorebird Group, Anchorage, AK

[905] Gibbs, A. E. and B. M. Richmond. 2017. National Assessment of Shoreline Change - Summary Statistics for Updated Vector Shorelines and Associated Shorelines Change Data for the North Coast of Alaska, U.S.-Canadian Border to Icy Cape. Reston, VA.

[906] Craig R. Ely, Brian J. McCaffery, and Robert E. Gill Jr., Shorebirds adjust spring arrival schedules with variable environmental conditions: Four decades of assessment on the Yukon–Kuskokwim Delta, Alaska, *in* Trends and traditions: Avifaunal change in western North America (W. D. Shuford, R. E. Gill Jr., and C. M. Handel, eds.), pp. 296–311, Studies of Western Birds 3. Western Field Ornithologists, Camarillo, CA; doi 10.21199/SWB3.16; Weiser, E. L., Brown, S. C., Lanctot, R. B., Gates, H. R., Abraham, K. F., Bentzen, R. L., Bêty, J. , Boldenow, M. L., Brook, R. W., Donnelly, T. F., English, W. B., Flemming, S. A., Franks, S. E., Gilchrist, H. G., Giroux, M. , Johnson, A. , Kendall, S. , Kennedy, L. V., Koloski, L. , Kwon, E. , Lamarre, J. , Lank, D. B., Latty, C. J., Lecomte, N. , Liebezeit, J. R., McKinnon, L. , Nol, E. , Perz, J. , Rausch, J. , Robards, M. , Saalfeld, S. T., Senner, N. R., Smith, P. A., Soloviev, M. , Solovyeva, D. , Ward, D. H., Woodard, P. F. and Sandercock, B. K., Effects of Environmental Conditions on Reproductive Effort and Nest Success of Arctic-Breeding Shorebirds, Ibis 160: 608-623. DOI:10.1111/ibi.12571 (2018).

section on birds is extremely poorly organized, and presents information specific to certain birds directly alongside information on birds in general, forcing the public to try to piece together a narrative of the baseline and impacts.

1. *The descriptions and baseline information of birds are misleading, inaccurate, and incomplete.*

The DEIS does not provide adequate descriptions and baseline information for the birds found within the Coastal Plain. Throughout the DEIS, the document appears to downplay the importance of birds with the status "uncommon." The FWS defines "uncommon" as "[o]ccurs regularly, but not always observed either because of lower abundance or secretive behaviors." Although a bird may be "uncommon" according to FWS, the species is still regular in the project area. For birds and other species that have regular but dispersed populations, there can be major biological significance for a smaller number of individuals, even if the numbers do not constitute high densities. The DEIS should not, therefore, dismiss "uncommon" bird species. Yet the DEIS seems to downplay uncommon birds, saying that "Many of the 156 species recorded are uncommon or rare."[907] Elsewhere, the DEIS makes special note of birds that are "fairly common, common, or abundant," but does not include birds that are "uncommon"[908] despite the fact that this means that they occur regularly. By overlooking the uncommon birds, the overall effect of these different interpretations is to downplay the importance of the project area for birds.

The DEIS also does not always provide accurate names and citations for the bird species it purports to analyze. The DEIS is sloppy in the presentation of bird names, with incorrect names and typos (e.g. "red-neck phalarope;"[909] "*Calidris pugnaC*;"[910] "Gyrfaon," "Peregrine Faon," and indeed every "*Fao*" species in the *Falco* genus[911]). These glaring errors underscore the rushed approach the agency took in developing this DEIS. The DEIS also does not provide sufficient citation for the public to follow its logic or review its analysis. For instance, when describing populations and locations of Snow Geese, the DEIS references "USFWS and BLM 2018,"[912] which appears to be an internal report entitled Rapid-Response Resource Assessments and Select References for the 1002 Area of the Arctic National Wildlife Refuge in Anticipation of an Oil and Gas Exploration, Leasing and Development Program, per the Tax Act of 2017, Title II Sec. 20001.[913] The DEIS appears to be referring to a source that is a compilation of other select references. The DEIS should not cite to internal compilations, but instead should cite to original data and reports that the public may access and ensure that the primary reports are in fact publically accessible through the agency. Using inaccessible references deters the public from understanding how the agency came to its conclusions. Another example is that the DEIS cites to the "USFWS and BLM 2018" source to say "[u]p to 325,000 snow geese of the Western Arctic

[907] DEIS vol. 1 at 3-85.
[908] *See* DEIS vol. 1 at 3-86.
[909] DEIS vol. 1 at 3-88.
[910] DEIS vol. 2 at J-15.
[911] DEIS vol. 2 at J-18.
[912] DEIS vol. 1 at 3-88.
[913] DEIS vol. 1 at References-47.

Population use the ARCP as a staging area for fall migration."[914] But later the DEIS says that "[a]s many as 325,760 snow geese have been documented using the ARCP, including the program area and east to the Canadian border, for several weeks…"[915] These two numbers are similar, but not the same, and it is possible that BLM is underestimating snow geese population. Without identifying the source of the information, the public is not able to check on the agency's analysis to discover which piece of data is correct.

In addition to providing inadequate and incomplete descriptions of birds, the DEIS does not adequately account for changes to bird habitat due to changes in phenology and coastal erosion. For example, the DEIS notes that "[w]aterbirds arrive in late May and June and begin nesting from late May through June,"[916] but does not provide any analysis of changes in phenology and its impacts. Broadly across the bird section, the DEIS lacks sufficient description and information on potential changes in phenology and the potential for resulting impacts.[917] The

[914] DEIS vol. 1 at 3-88.

[915] DEIS vol. 1 at 3-98.

[916] DEIS vol. 1 at 3-87.

[917] *See e.g.* Bjorkman, A. D., S. C. Elmendorf, A. L. Beamish, M. Vellend, and G. H. R. Henry, 2015, *Contrasting effects of warming and increased snowfall on Arctic tundra plant phenology over the past two decades*, Global Change Biology 21:4651-4661; Khorsand Rosa, R., S. F. Oberbauer, G. Starr, I. Parker La Puma, E. Pop, L. Ahlquist, and T. Baldwin, 2015, *Plant phenological responses to a long-term experimental extension of growing season and soil warming in the tussock tundra of Alaska*, Global Change Biology 21:4520-4532; Stone, R. S., E. G. Dutton, J. M. Harris, and D. Longenecker, 2002, *Earlier spring snowmelt in northern Alaska as an indicator of climate change*, Journal of Geophysical Research: Atmospheres 107; Barichivich, J., K. R. Briffa, R. B. Myneni, T. J. Osborn, T. M. Melvin, P. Ciais, S. Piao, and C. Tucker, 2013, *Large-scale variations in the vegetation growing season and annual cycle of atmospheric CO2 at high northern latitudes from 1950 to 2011*, Global Change Biology 19:3167-3183; Doiron, M., G. Gauthier, and E. Lévesque, 2015, *Trophic mismatch and its effects on the growth of young in an Arctic herbivore*, Global Change Biology 21:4364-4376; Dawson, A, 2008, *Control of the annual cycle in birds: endocrine constraints and plasticity in response to ecological variability*, Philosophical Transactions of the Royal Society B: Biological Sciences 363:1621-1633; Kumar, V., J. C. Wingfield, A. Dawson, M. Ramenofsky, S. Rani, and P. Bartell, 2010, *Biological clocks and regulation of seasonal reproduction and migration in birds*, Physiological and Biochemical Zoology 83:827-835; Liebezeit, J. R., K. Gurney, M. Budde, S. Zack, and D. Ward, 2014, *Phenological advancement in arctic bird species: relative importance of snow melt and ecological factors*, Polar Biology 37:1309-1320; Gauthier, G., J. Bêty, M.-C. Cadieux, P. Legagneux, M. Doiron, C. Chevallier, S. Lai, A. Tarroux, and D. Berteaux, 2013, *Long-term monitoring at multiple trophic levels suggests heterogeneity in responses to climate change in the Canadian Arctic tundra*, Philosophical Transactions of The Royal Society B Biological Sciences 368:20120482; *see also* Sullender, B. K., 2018, *Alaska's Beaufort Coastal Corridor: Persistence of Ecological Values in a Changing Landscape*, Audubon Alaska, Anchorage, AK (for analysis and references to other Arctic wildlife that may be experiencing changes in phenology).

DEIS also notes that coastal habitats may change due to erosion and thawing, but cites to older data[918] that is better replaced with updated data from USGS.[919]

The DEIS also fails to accurately describe the extent of impacts to bird habitat. The 2,000-acre "limit" that allows reclamation to exceed the cap will cause more than 2,000-acres of impacts to birds. The DEIS explains that the agency would allow the 2,000-acre "cap" to be exceeded if disturbed acres are "reclaimed."[920] We question whether areas can be effectively reclaimed following oil and gas development. Regardless, shorebirds and passerines do not use reclaimed acres in the same way they use non-disturbed areas.[921] Furthermore, the DEIS itself notes that "[h]abitat alteration caused by fugitive dust, thermokarsting, and water impoundments intensifies with time,"[922] without explaining how remediation will undo these indirect impacts. Therefore, the DEIS must explain that the impacts to birds would go above and beyond the 2,000 acres, and must address how this impact exceeding 2,000 acres conforms with the law.

The DEIS fails to adequately describe and consider migratory birds. Migratory birds in the Arctic can face problems finding migratory and wintering habitat outside of the project area. The impacts from beyond the project area can in some cases be more severe than impacts in the Arctic,[923] and must be considered in the context of impacts within breeding ranges. For example, some species that breed in the Coastal Plain are long distance migrants that are experiencing impacts along their migratory pathway and merit special consideration and analysis.[924] Pacific

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[918] DEIS vol. 1 at 3-92 (current rates of loss along the Beaufort Sea coastline is 6.5 to 59 feet per year (see Martin et al. 2009 for review.).

[919] Gibbs, A.E., and Richmond, B.M., 2017, National assessment of shoreline change—Summary statistics for updated vector shorelines and associated shoreline change data for the north coast of Alaska, U.S.-Canadian border to Icy Cape: U.S. Geological Survey Open-File Report 2017–1107, 21 p., https://doi.org/10.3133/ofr20171107.

[920] DEIS vol. 2 at B-9 ("the reclaimed acreage of Federal land formerly containing production and support facilities would no longer count towards the 2,000-acre limit.").

[921] Rebecca Bentzen, Joe Liebezeit, Martin Robards, Bill Streever, Samantha Strindberg, and Steve Zack, *Bird use of northern Alaska oilfield rehabilitation sites*, 71 Arctic 422 (2018).

[922] DEIS vol. 1 at 3-95.

[923] Weiser, E. L., R. B. Lanctot, S. C. Brown, H. R. Gates, R. L. Bentzen, J. Bêty, M. L. Boldenow, W. B. English, S. E. Franks, L. Koloski, E. Kwon, J.-F. Lamarre, D. B. Lank, J. R. Liebezeit, L. McKinnon, E. Nol, J. Rausch, S. T. Saalfeld, N. R. Senner, D. H. Ward, P. F. Woodard, and B. K. Sandercock, 2018, *Environmental and ecological conditions at Arctic breeding sites have limited effects on true survival rates of adult shorebirds*, The Auk:29-43.

[924] *See* Sarah E. McCloskey, Brian D. Uher-Koch, Joel A. Schmutz, and Thomas F. Fondell, *International migration patterns of Red throated Loons (Gavia stellata) from four breeding populations in Alaska*, PLOS ONE (January 10, 2018), *available at* https://doi.org/10.1371/journal.pone.0189954 (Red-throated Loons breeding on the Arctic Coastal Plain fly to winter in East Asia, where they may encounter toxic contaminants); C.P. Dau, The fall migration of Pacific Flyway Brent Branta bernicla in relation to climatic conditions, 80 Wildfowl 80 (1992) (Pacific Brant migration brings them to areas with environmental impacts); Austin Reed, Robert Stehn, and David Ward, Autumn Use of Izembek

Brant are also experiencing changes to their wintering habitats, which may be changing nesting and survival of Brant on their Arctic breeding grounds.[925] The DEIS must analyze migratory pathway data[926] and consider these transboundary effects in conjunction with impacts from oil and gas activity.

2. The description and baseline for cliff-nesting raptors is inadequate.

The DEIS does not provide an adequate baseline for cliff-nesting raptors found in the project area. Several raptor species found in the project area (including Golden Eagle, Peregrine Falcon, Gyrfalcon, and Rough-legged Hawk) are cliff-nesting raptors.[927] But the DEIS concludes "the overall abundance of nesting raptors generally was found to be low"[928] without citing to adequate data. The DEIS cites to the 2015 CCP, but the CCP only provided a summary of past survey information for the Canning, Hulahula, and Kongakut Rivers.[929] It was reasonable for the CCP to summarize data because the CCP was not analyzing impacts to cliff-nesting raptors from oil and gas activity. BLM's DEIS, however, should provide the public with a citation to the original survey data. The DEIS should also include other sources in its baseline description of cliff-nesting raptors in the project area, including Johnson and Herter (1989),[930] Young et al. 1995,[931] and analogous habitat and natural history information from the western Arctic[932] to extrapolate where cliff-nesting raptors may be present. The DEIS should also acknowledge that surveys for cliff-nesting raptors can be subject to error.[933]

Lagoon, Alaska, by Brant from Different Breeding Areas, 53 The Journal of Wildlife Management 720 (1989).

[925] Ward, D. H., A. Reed, J. S. Sedinger, J. M. Black, D. V. Derksen, and P. M. Castelli, 2005, *North American Brant: effects of changes in habitat and climate on population dynamics*, Global Change Biology 11:869-880; Leach, A. G., D. H. Ward, J. S. Sedinger, M. S. Lindberg, W. S. Boyd, J. W. Hupp, and R. J. Ritchie, 2017, *Declining survival of black brant from subarctic and arctic breeding areas*, The Journal of Wildlife Management 81:1210-1218..

[926] E.g. Robert E. Wilson, Craig R. Ely, and Sandra L. Talbot, Flyway structure in the circumpolar greater white-fronted goose, 8 Ecology and Evolution 8490 (2018) (which uses data on the migratory pathway for this goose species).

[927] DEIS vol. 1 at 3-90.

[928] DEIS vol. 1 at 3-90.

[929] CCP EIS vol. 1 at 4-85.

[930] Johnson, S. R., and D. R. Herter. 1989. The Birds of the Beaufort Sea. Anchorage, Alaska: BP Exploration (Alaska), Inc.

[931] Young, D. D., Jr., C. L. McIntyre, P. J. Bente, T. R. McCabe, and R. E. Ambrose. 1995. "Nesting by golden eagles on the North Slope of the Brooks Range in northeastern Alaska." *Journal of Field Ornithology* 66 (3): 373–379.

[932] Bureau of Land Management, National Petroleum Reserve-Alaska Integrated Activity Plan (2013) vol. 1 at 270-275.

[933] *See* Travis L. Booms, Philip F. Schempf, Brian J. McCaffery, Mark S. Lindberg and Mark R. Fuller "Detection Probability of Cliff-Nesting Raptors During Helicopter and Fixed-Wing Aircraft Surveys in Western Alaska," Journal of Raptor Research 44(3), (1 September 2010). https://doi.org/10.3356/JRR-09-70.1.

3. The description and baseline for shorebirds is inadequate.

The description of shorebirds, their habitat, and their threats is incomplete and inadequate. The DEIS establishes that some shorebird species are more common in the east and near the Canning River,[934] but does not list which species and cites to an internal Conoco report not available to the public. More broadly, the DEIS should have provided maps of where shorebirds and used habitat suitability data to depict where shorebirds are found in the project area during breeding[935] and during postbreeding time periods and migratory staging.[936] It is important to note that studies on migratory staging in shorebirds describe the importance of river deltas *other* than the Canning, that staging densities vary annually, and that it is more appropriate to treat these several deltas as a habitat complex that is collectively important to shorebirds at a critical stage in their life history.[937]

Furthermore, the DEIS fails to describe the threatened status of shorebirds worldwide,[938] and does not address impacts to migratory shorebirds in their stop-over and wintering habitat beyond the project area. For example, shorebirds flying along the East Asian-Australasian Flyway are facing pressure from development in vital stop-over habitat in the Yellow Sea. At a minimum, the DEIS should describe the life-histories (and the accompanying threats) of the shorebirds of special conservation concern, including American Golden-Plover, Whimbrel,

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[934] DEIS vol. 1 at 3-89.

[935] Sarah T. Saalfeld Richard B. Lanctot Stephen C. Brown David T. Saalfeld James A. Johnson Brad A. Andres Jonathan R. Bart, Predicting breeding shorebird distributions on the Arctic Coastal Plain of Alaska, 4 Ecosphere 1 (2013), available at https://doi.org/10.1890/ES12-00292.1.

[936] Audrey R. Taylor, Richard B. Lanctot, Abby N. Powell, Falk Huettmann, Debora A. Nigro, and Steven J. Kendall, Distribution and Community Characteristics of Staging Shorebirds on the Northern Coast of Alaska, 63 Arctic 451 (2010); Audrey R. Taylor, Richard B. Lanctot, Abby N. Powell, Steven J. Kendall, and Debora A. Nigro, Residence time and movements of postbreeding shorebirds on the Northern coast of Alaska, 113 The Condor 779 (2011); Audrey Taylor, Postbreeding Ecology of Shorebirds on the Arctic Coastal Plain of Alaska, Ph.D. dissertation, University of Alaska Fairbanks (2011).

[937] Stephen Brown, Steve Kendall, Roy Churchwell, Audrey Taylor, and Anna-Marie Benson, Relative Shorebird Densities at Coastal Sites in the Arctic National Wildlife Refuge, 35 Waterbirds 546 (2012); Audrey R. Taylor, Richard B. Lanctot, Abby N. Powell, Steven J. Kendall, and Debora A. Nigro, Residence time and movements of postbreeding shorebirds on the Northern coast of Alaska, 113 The Condor 779 (2011); Roy T. Churchwell, Steve Kendall, Stephen C. Brown, Army L. Blanchard, Tuula E. Hollmen, and Abby N. Powell, the First Hop: Use of Beaufort Sea deltas by hatch-year Semipalmated Sandpipers, Estuaries and Coasts (2017), DOI 10.1007/s12237-017-0272-8.

[938] *See e.g.* Scott Weidensaul, *Losing Ground: What's Behind the Worldwide Decline of Shorebirds?*, Living Bird (Autumn 2018), *available at* https://www.allaboutbirds.org/losing-ground-whats-behind-the-worldwide-decline-of-shorebirds/.

Hudsonian Godwit, Bar-tailed Godwit, Red Knot, Sharp-tailed Sandpiper, Dunlin, Buff-breasted Sandpiper, Pectoral Sandpiper, Western Sandpiper, Wandering Tattler, Lesser Yellowlegs.

Instead, the DEIS provides descriptions of shorebird migrations that are vague, confusing, and insufficient. The DEIS mentions perfunctorily that "[i]n late July through September, shorebirds stage on the ARCP river deltas for the fall migration to wintering areas in the Americas and Asia,"[939] but does not explain which species migrate along which flyway nor describe the threats those birds face along those migratory pathways. The DEIS is also confusing and conclusory when it notes that "[t]he data from birds marked with radio transmitters indicate that individuals migrate via the Central Flyway use multiple river deltas as they gradually migrate eastward across the ARCP,"[940] but does not clarify whether this information refers to spring or fall migration, and does not cite to the data it references. These brief and conclusory statements, without reference to data[941] and without a deeper discussion of shorebird migration is wholly inadequate.

4. The descriptions and baselines for waterbirds are inadequate.

The DEIS does not sufficiently describe or provide a baseline for waterbirds. The DEIS should describe the life histories and threats of waterbirds of conservation concern, including Brant, Spectacled Eider, Steller's Eider, Yellow-billed Loon, and Black Scoter. For example, according to new estimates the overall population of Black Brant appears to have declined steadily over the past two decades,[942] making survival in the Arctic Coastal Plain increasingly important for this potentially stressed species.

The description of the fall-staging Snow Goose baseline in the DEIS appears incomplete. The DEIS uses survey data from 2004 to describe the location of fall-staging Snow Geese in the project area.[943] The DEIS also notes that the breeding population of Snow Geese across the North Slope has "increased dramatically" and suggests that "[i]f trends in staging reflect population trends in breeding areas, the number of geese staging in the program area was likely higher in recent years."[944] But the DEIS fails to consider this potential increase in staging birds

[939] DEIS vol. 1 at 3-89.

[940] DEIS vol. 1 at 3-89.

[941] See e.g. Stephen Brown, Cheri Gratto-Trevor, Ron Porter, Emily L. Weiser, David Mizrahi, Rebecca Bentzen, Megan Boldenow, Rob Clay, Scott Freeman, Marie-Andree Giroux, Eunbi Kwon, David B. Lank, Nicolas Lecomte, Joe Liebezeit, Vanessa Loverti, Jennie Rausch, Brett K. Sandercock, Shiloh Schulte, Paul Smith, Audrey Taylor, Brad Winn, Stephen Yezerinac, and Richard B. Lanctot, Migratory connectivity of Semipalmated Sandpipers and implications for conservation, 119 The Condor 207 (2017) (using spatial data showing the migration pathways of Semipalmated Sandpipers).

[942] James S. Sedinger, Thomas V. Riecke, Alan G. Leach, David H. Ward, *The Black Brant Population is Declining Based on Mark Recapture*, Journal of Wildlife Management (December 2018).

[943] DEIS vol. 2 Appendix A at Map 3-20.

[944] DEIS vol. 1 at 3-88.

in relation to the possibility that Snow Geese are staging in areas *beyond* where they were found up to 2004.[945] The DEIS should use a habitat suitability model to predict where the increased population of breeding geese are now staging in the project area, or at least acknowledge this potentiality in its analysis. The DEIS also fails to note that Snow Goose staging may vary over time.[946] In turn, the DEIS would need to update its conclusions that the protective measures for caribou would be directly applicable to Snow Geese.

The DEIS also appears to downplay the importance of the project area to the Spectacled Eider. The DEIS describes the Spectacled Eider as an "uncommon breeder," and refers to unpublished nesting data, which are not available to the public, to create Map 3-14. But the status of "uncommon" means that the species "[o]ccurs regularly, but not always observed either because of lower abundance or secretive behaviors," according to FWS.[947] The DEIS also notes that "Low numbers of spectacled eiders are expected to occur in the program area during the pre-nesting period, where suitable habitat is available."[948] But analysis in the EIS should note that breeding surveys for eiders require careful interpretation.[949] Moreover, although the occurrence of Spectacled Eider breeding in the Coastal Plain is uncommon, the coastal plain as an eco-region is prime breeding habitat for Spectacled Eiders,[950] models project an increase in

[945] *See also* John M. Pearce, et al., U.S. Department of the Interior, U.S. Geological Survey, Summary of Wildlife-Related Research on the Coastal Plain of the Arctic National Wildlife Refuge, Alaska, 2002-17, Open-File Report 2018-1003 [2018 USGS Report] (2018), at 12 ("There is uncertainty regarding current population status of snow geese staging within the 1002 Area.").

[946] Robertson, D. G., A. W. Brackney, M. A. Spindler, and J. W. Hupp. 1997. Distribution of Autumn-Staging Lesser Snow Geese on the Northeast Coastal Plain of Alaska (Distribución De Chen Caerulescens a Través De Su Congregación Otonal). Journal of Field Ornithology:124-134.

[947] See CCP EIS, Appendix F.

[948] DEIS vol. 1 at 3-86; DEIS vol. 2 at Map 3-14.

[949] Between 1986 and 2006, the ACP Waterfowl Breeding Population Survey collected data during late June and early July and may have missed observations of the early-nesting eiders; data from the North Slope Eider Survey beginning in 1992 implemented earlier surveys to more accurately capture eider presence, but used a smaller survey area; data beginning in 2007 to the present now combine the broad survey area and the more appropriate timing. The agency should consider this complex data history which may have hidden population declines in the 1990s. See Larned, W. W., R. S. Stehn, and R. M. Platte, Waterfowl breeding population survey, Arctic Coastal Plain, Alaska 2011, Unpublished report, U.S. Fish and Wildlife Service, Waterfowl Management Branch, Soldotna and Anchorage, AK (2012); Stehn, R. A., W. W. Larned, and R. M. Platte, Analysis of aerial survey indices monitoring waterbird populations of the Arctic Coastal Plain, Alaska, 1986-2012, Unpublished report, U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Anchorage, AK (2013).

[950] Sexson, M. G., J. M. Pearce, and M. R. Petersen, Spatiotemporal distribution and migratory patterns of Spectacled Eiders, BOEM 2014-665, Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region, Anchorage, Alaska (2014).

"fundamental niche" habitat for Spectacled and Steller's Eiders in the 1002 Area,[951] and the DEIS should consider impacts even to potentially currently unoccupied habitat. The agency should use a habitat suitability model to anticipate where in the project area eiders may be nesting or occurring at different stages, or where they could occur in the future upon increasing recovery. The agency should also consider whether climate change and development impacts will reduce habitat availability in the Arctic Refuge for both species of Threatened eiders.[952]

5. The description and baseline for passerines is inadequate.

The DEIS does not adequately describe the passerine bird guild in the project area. The DEIS notes that "passerines are the most abundant guilds of nesting birds on the ACP,"[953] and that "landbirds on the ARCP include a diversity of species that are strongly dominated in abundance by passerines and ptarmigan."[954] But the DEIS does not go further to describe what habitat types the different species of passerines are using, does not describe which passerines are species of concern, and does not provide a life history for those species of concern.

6. The description and baseline for seabirds is inadequate.

The DEIS notes in passing that seabirds and pelagic birds are present in low numbers in the project area, that "seabirds occur along the marine vessel route to Dutch Harbor, Alaska,"[955] and describes the numbers and groups of these birds,[956] but does not expand upon these brief statements to explain any of the life histories of these birds or the threats facing them. For instance, Ivory gulls, a Red list species on Audubon Alaska's 2017 Alaska WatchList,[957] could be devastated by an oil spill from increased industrial activity in the nearshore marine environment The DEIS also fails to provide an adequate baseline for the vessel traffic that seabirds (and other marine species) currently face along the proposed barge route,[958] and therefore cannot accurately analyze the likely increase in vessel traffic along this marine route.

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[951] Fuller, T., D. P. Morton, and S. Sarkar, Incorporating uncertainty about species' potential distributions under climate change into the selection of conservation areas with a case study from the Arctic Coastal Plain of Alaska, Biological Conservation 141: 1547-1559 (2008).

[952] Fuller, T., D. P. Morton, and S. Sarkar. 2008. Incorporating Uncertainty About Species' Potential Distributions under Climate Change into the Selection of Conservation Areas with a Case Study from the Arctic Coastal Plain of Alaska. Biological Conservation 141:1547-1559.

[953] DEIS vol. 1 at 3-85.

[954] DEIS vol. 1 at 3-90.

[955] DEIS vol. 1 at 3-85.

[956] DEIS vol. 1 at 3-91.

[957] Nils Warnock, *The Alaska WatchList 2017*, Audubon Alaska, Anchorage AK (2017).

[958] *See analysis, citations, and data in* B. Sullender, *Vessel Traffic*, pp. 285-293 *In* Smith, M.A., M.S. Goldman, E.J. Knight, and J.J. Warrenchuk, 2017, *Ecological Atlas of the Bering, Chukchi, and Beaufort Seas*, 2nd edition, Audubon Alaska, Anchorage AK; B. Sullender, *A Closer Look: Unimak Pass and Bering Strait Vessel Traffic*, pp. 294-295 *In* Smith, M.A., M.S. Goldman, E.J. Knight, and J.J. Warrenchuk, 2017, *Ecological Atlas of the Bering, Chukchi, and Beaufort Seas*, 2nd edition, Audubon Alaska, Anchorage AK.

In sum, BLM's description and information regarding the baseline for birds is insufficient. The information and description must be updated to ensure that BLM is accurately evaluating the impacts of an oil and gas program on birds. Without this information, BLM's analysis will be inadequate.

7. The DEIS's impacts analysis for birds is inadequate, misleading, and erroneous.

BLM's analysis of the impacts of an oil and gas program on the birds that use the Coastal Plain is inadequate and must be revised. The DEIS contains almost no discussion about which species will be most impacted. For instance, the DEIS provides some minimal analysis on the shorebird guild, but does not note impacts to specific shorebirds that rely on the habitat found in the Arctic Refuge Coastal Plain. Where the DEIS does provide some analysis on the impacts to birds, the review is brief, lacks scientific justification, and is overall inadequate.

a. The impacts analysis on birds from road impacts is inadequate.

The DEIS uses the wrong method and information for estimating the indirect impacts of roads on bird habitat. Gravel roads can cause profound change to bird habitat due to dust, gravel spray, thermokarsting, and the creation of impoundments. Yet the DEIS provides only negligible mention of how dust could invert habitat productivity and thus affect productivity of nesting birds. Further, the DEIS estimates that these indirect impacts on bird habitat will extend out up to 328 feet (about 100 meters) on either side of a gravel road in the project area,[959] and in a different section in the DEIS cites to Myers-Smith et al. (2006) and Walker and Everett (1987) as support for this figure. But Myers-Smith et al. (2006) concluded that "significant disturbance may have occurred in a 200-m-wide [656 feet] corridor adjacent to the roadway."[960] The older study by Walker and Everett (1987) only notes that snowmelt from dust is evident out to 100 meters (328 feet), but that dust was indeed found out to 1000 meters, was heavier in the Prudhoe Bay region, was heavier in winter, and that the methods of the time made it difficult to measure dust effects beyond 30 meters.

These are important caveats not made clear in the DEIS, which simply concludes, without a scientific basis, that the indirect impact will extent out to 328 feet. Indeed, more recently other researchers have found "zones of impact" of windblown dust as far as 3,280 feet from a road.[961] This indicates that the DEIS is not only wrong, but may be off by an order of magnitude in its analysis of indirect impacts on bird habitat. The agency must re-run its calculations, use updated data, explain the assumptions and drawbacks of the studies it is using, and expand upon its analysis of impacts from roads and their indirect effects.

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[959] DEIS vol. 1 at 3-93 (referencing Section 3.3.1)

[960] Myers-Smith, I. H., B. K. Arnesen, R. M. Thompson, and F. S. Chapin, III. 2006. "Cumulative impacts on Alaskan arctic tundra of a quarter century of road dust." *Ecoscience* 13(4): 503–510.

[961] Kumpula, T., A. Pajunen, E. Kaarlejärvi, B. C. Forbes, and F. Stammler. 2011. Land Use and Land Cover Change in Arctic Russia: Ecological and Social Implications of Industrial Development. Global Environmental Change 21:550-562.

The DEIS also lacks analysis on the potential for increased subsistence activity along roads built to support the oil and gas infrastructure. It is not clear whether subsistence users would have access to use roads, but the potential for increased use could increase subsistence harvest of certain species. Harvest of shorebirds, eiders, and loons could be significant and would need consideration and analysis.

b. The impacts analysis on birds from oil spills is inadequate.

The DEIS analysis of oil spill impacts on birds is inadequate, incomplete, and lacks reference to studies or articles. First, the bird impacts section in the DEIS ignores relevant spill data. Within the four paragraphs on spills of oil and other contaminants in the bird section, the DEIS references Section 3.2.11 on Solid and Hazardous Waste.[962] This section references Appendix I, which contains only spill data for "Areas near Kaktovik, Alaska."[963] The area near Kaktovik and within the Arctic Refuge is an inappropriate source for data on oil spills when analyzing the impacts of an oil and gas program on birds. The relevant data are from the entire North Slope, particularly the industrial area to the west, including Prudhoe Bay, state and corporate land, and the National Petroleum Reserve-Alaska. The agency must amend its oil spill table to include oil spill data from these areas. When the DEIS presents these more relevant data, it will become more apparent that the DEIS's supposition that spills of 10,000 gallons are extremely rare,[964] is wrong. There have been more than 16 spills of over 10,000 gallons of various toxic materials in the last 19 years, including a spill of over 200,000 gallons of crude by BP in 2006.[965] Presentation of this data is also necessary to test the DEIS's conclusion that small spills on land will be "short term and of several acres" because these types of spills "are usually contained on gravel pads and roads."[966] Without these or other data, the DEIS does not have an adequate basis to make these conclusions.

Second, the DEIS does not conduct a cumulative impacts analysis of oil spills on birds across the North Slope. Using up-to-date spill data from the North Slope, the agency could estimate the cumulative spills, how industrial activity under the different alternatives could add to spill impacts, and whether any bird species may be particularly impacted. The proposed development only increases the odds that the North Slope and its biological landscape will experience a major spill, with inadequate response capabilities. However, the DEIS fails to conduct this analysis.

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[962] Note that the DEIS section on bird impacts does not reference the DEIS section 3.2.6 on Petroleum Resources; for analysis of the inadequacy of this DEIS section 3.2.6 see content above on "Oil and Gas Releases (Spills, Blowouts, Venting and Flaring)".

[963] DEIS vol. 2 at I-3.

[964] DEIS vol. 1 at 3-99.

[965] Alaska Department of Environmental Conservation, Spill Prevention and Response, PPR Spills Database Search, available at http://dec.alaska.gov/Applications/SPAR/PublicMVC/PERP/SpillSearch (accessed 1/24/2019).

[966] DEIS vol. 1 at 3-99.

Third, the DEIS does not adequately explain or analyze what a spill of oil or other industrial materials could do to birds or their habitat, and contains no reference to scientific articles or studies, or indeed any other sources, despite an unfortunate wealth of such information.[967] The DEIS states that salt-water spills would not be toxic to birds,[968] but does not provide a reference. The DEIS notes that larger spills could "contaminate birds, nests, and eggs or their habitat and forage"[969] but provides no reference to the physiological effects from oil or other toxic materials. The DEIS downplays the volume of marine spills and dismisses the likelihood of large spills in the marine environment,[970] but again provides no reference, data, or modeling of this potentiality.

Fourth, the DEIS does not explain or analyze where oil spills may occur, and therefore which bird species are likely to be most impacted. An oil spill in nearshore waters could be devastating to waterfowl, particularly molting and flightless Long-tailed Ducks, coastal staging shorebirds, and gulls. The DEIS does not analyze the likelihood of oil spills against the reasonably foreseeable development scenario, nor against the different alternatives, nor with any modeled scenarios. Instead, the DEIS analyzes spills generally, without spatial information. The DEIS says that larger spills "could reach streams or lakes"[971] but provides no trajectory, directionality, or estimation of where and how far this impact could occur. The DEIS posits that "containment at strategic points on waterways would likely keep oil from flowing downstream into lagoons"[972] but does not explain where this would occur. The DEIS mentions the potential for spills in docking areas or along shipping lanes, but does not provide more specificity that would allow for further analysis on bird and habitat impacts. The DEIS also notes that the cleanup of large spills "could pose contamination risk to large numbers of molting, feeding, or migrating birds,"[973] but does not explain where the spill or the cleanup could occur.

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[967] *See e.g.* Piatt, J. F., C. J. Lensink, W. Butler, M. Kendziorek, and D. R. Nysewander. 1990. *Immediate impact of the 'Exxon Valdez' oil spill on marine birds*, Auk 107:387–397; NOAA, *Final Restoration Plan and Environmental Assessment for the M/V Kuroshima Oil Spill*, National Oceanic and Atmospheric Administration Damage Assessment Center, Seattle, WA; Munilla, I., J. M. Arcos, D. Oro, D. Álvarez, P. M. Leyenda, and A. Velando. 2011, *Mass mortality of seabirds in the aftermath of the Prestige oil spill*, Ecosphere 2:1–14; among many others; *see also analysis and references in* B. Sullender, *Vessel Traffic*, pp. 285-293 *In* Smith, M.A., M.S. Goldman, E.J. Knight, and J.J. Warrenchuk, 2017, *Ecological Atlas of the Bering, Chukchi, and Beaufort Seas*, 2nd edition, Audubon Alaska, Anchorage AK; see also references in Audrey R. Taylor, Richard B. Lanctot, Abby N. Powell, Steven J. Kendall, and Debora A. Nigro, Residence time and movements of postbreeding shorebirds on the Northern coast of Alaska, 113 The Condor 779 (2011).

[968] DEIS vol. 1 at 3-99.

[969] DEIS vol. 1 at 3-99.

[970] DEIS vol. 1 at 3-99.

[971] DEIS vol. 1 at 3-99.

[972] DEIS vol. 1 at 3-99.

[973] DEIS vol. 1 at 3-99

c. The impacts analysis on birds from acoustic impacts is inadequate.

The DEIS lacks any analysis of acoustic impacts on birds.[974] Noise from all stages of industrial activity can impact birds including causing stress, fright or flight, avoidance, changes in behavioral habits like nesting and foraging, changes in nesting success, modified vocalizations, or interference with the ability to hear conspecifics or predators.[975] The DEIS should catalog the existing noise in the planning area, explain the changes in noise that will occur with the development of an oil and gas program, describe impacts that will occur for birds, and provide a method for addressing and monitoring this issue.

d. The cumulative impacts analysis on birds is inadequate.

The DEIS does not contain an adequate cumulative impacts analysis for birds. The sections below describe inadequate cumulative impacts analysis for specific birds and guilds, but more generally the "Cumulative Impacts" section within the "Birds" section of the DEIS[976] is wholly inadequate. This small section essentially consists of an incomplete list of the individual indirect or direct impacts. The list includes increased predation, terrestrial transportation activities, boat and air traffic disturbance, subsistence harvest of birds, recreation, air-based sightseeing, adventure cruise ships, and community development projects. But the list of impacts misses impacts like seismic activity's effects to hydrology and oil spills; the list also completely misses impacts from beyond the project area including melting sea ice; marine boat traffic impacts to marine birds along the marine traffic route; and impacts to migratory birds in other parts of their life history, at stop-over and wintering habitat. The list is also too vague, and does not expand upon the impacts of barge and boat traffic to mention the effects from screeding.

In addition to missing many of the individual impacts that can accumulate or become exacerbated, the cumulative impacts section simply does not analyze these impacts as accumulating or exacerbating. The section both misses habitat loss from infrastructure as an impact and furthermore entirely lacks any accounting of the accumulating infrastructure on the North Slope, including activity in land owned by private corporations or by the State of Alaska, and activity in the National Petroleum Reserve-Alaska in the western Arctic.

Finally, this cumulative impacts section only mentions climate change in a single sentence: "The effects of climate change described under Affected Environment above, could influence the rate or degree of the potential cumulative impacts."[977] This fails to analyze and explain the many and intertwining cumulative impacts that will stem from climate change, including exacerbated habitat loss, changes in phenology, invasive species, and changes to

[974] While the DEIS provides a section on the acoustic environment, DEIS vol. 1 at 3-17, it does not link that section to analysis on birds.

[975] Catherine P. Ortega, Effects of noise pollution on birds: A brief review of our knowledge, 74 Ornithological Monographs 6 (2012).

[976] DEIS vol. 1 at 3-102–3-103.

[977] DEIS vol. 1 at 3-103.

hydrology, erosion rates, and other physiological aspects of Arctic ecosystems.[978] Earlier parts of the birds section make the same error. For example, following a confusing description of how gravel infrastructure could directly and indirectly reduce habitat for spectacled eiders (and the DEIS appears to expand these impacts to all birds), the DEIS mentions the same sentence found in the later section, that "The effects of climate change described under Affected Environment above, could influence the rate or degree of the potential cumulative impacts."[979] But again, this conclusory sentence does not actually analyze how climate change could modify the assumptions on how gravel infrastructure may impact bird habitat. In sections below, the inadequacies of the cumulative impacts analysis for specific bird species and guilds are described in more detail.

e. The impacts analysis on cliff-nesting raptors from oil spills is inadequate.

The analysis of the impacts to cliff-nesting raptors is inadequate. The DEIS describes development activity that would remove gravel from rivers[980] and explains the action alternatives would remove gravel and sand from "alluvial deposits of larger rivers" and "streams and topographic high points."[981] Within Appendix A, the reasonably foreseeable development scenario includes a section on gravel mines but does not provide more specificity, noting that gravel pits will likely occur near the facilities they are supplying.[982] But the section on birds does not use this information to explain where gravel mining may overlap with cliff-nesting raptor habitat, thus limiting the analysis on the extent of this impact. The DEIS therefore does not specify where removal of gravel from rivers will occur under the reasonably foreseeable development scenario and under the different alternatives, and therefore does not adequately assess the impact to cliff-nesting raptors.

The stipulations for protecting cliff-nesting raptors are arbitrary, insufficiently analyzed, and unlikely to achieve the intended result. The DEIS notes that raptors are more easily disturbed by human activities than other birds, concluding that "falcons, hawks, and eagles . . . reacted at greater distances [than 656 feet]."[983] But the DEIS does not contain a mitigation measure that directly addresses impacts to cliff-nesting raptors from human disturbance. Lease Stipulation 1 comes closest and includes the objective to "[m]inimize the loss of raptor habitat" by limiting infrastructure along rivers within 2, 1, or 0.5 miles of various rivers in the project area.[984] But the DEIS only describes the buffer for raptors as more than 656 feet, without providing more specific information. It is therefore impossible to analyze whether these distances are adequate to

[978] See e.g. KENDALL, S., D. PAYER, S. BROWN, AND R. CHURCHWELL. 2011. Impacts of climate change and development on shorebirds of the Arctic National Wildlife Refuge. Pages 91–100 in R. T. Watson, T. J. Cade, M. Fuller, G. Hunt, and E. Potapov (Eds.). Gyrfalcons and Ptarmigan in a Changing World, Volume I. The Peregrine Fund, Boise, Idaho, USA. http://dx.doi.org/10.4080/gpcw.2011.0109.

[979] DEIS vol. 1 at 3-93.

[980] DEIS vol. 1 at 3-49.

[981] DEIS vol. 1 at 3-50.

[982] DEIS vol. 2 at B-22.

[983] DEIS vol. 1 at 3-97.

[984] DEIS vol. 1 at 2-4.

protect cliff-nesting habitat or to protect raptors from disturbance without a clearer understanding of the buffer distance these raptors need. Furthermore, the exceptions to Lease Stipulation 1 will swallow the rule, as pipelines and roads are allowed on a case-by-case basis.[985]

An ROP intended to protect cliff-nesting raptors from gravel mining is arbitrary and lacks adequate explanation. ROP 30 has the objective to "[p]revent or minimize the loss of nesting habitat for cliff-nesting raptors" by prohibiting the removal of "greater than 100 cubic yards of bedrock outcrops, sand, or gravel from cliffs displaying evidence of raptor nests."[986] This differs slightly from a similar mitigation measure in the 2013 IAP for the NPRA, which holds that "Removal of greater than 100 cubic yards of bedrock outcrops, sand, and/or gravel from cliffs shall be prohibited"[987] without requiring evidence of nesting. The ROP does not explain how operators would determine whether there is evidence of raptors, or whether a trained biologist would be necessary to make such a determination. This ROP also runs afoul of the buffer mentioned elsewhere in the DEIS,[988] given that approaching the cliffs to assess gravel resources could disturb raptors.

ROP 30 further requires a "hydrological study that indicates no potential impact on the integrity of river bluffs" prior to "extraction of sand or gravel from an active river or stream channel,"[989] but does not explain whether this activity would itself disturb nesting raptors. The agency apparently designed ROP 30 to protect cliff-nesting raptors but this ROP will risk causing disturbance and does not provide enough evidence that it will limit the destruction of nesting habitat.

The ROP designed to mitigate aircraft disturbance to raptors similarly does not explain how operators will identify raptor nests. ROP 34 requires aircraft to maintain at least 1,500 feet altitude when within half a mile of identified raptor nesting sites. But neither the ROP nor analysis elsewhere in the DEIS explain how crews or operators will identify raptor nests, nor whether a trained biologist is needed to properly identify sites. None of these mitigation measures are included in the DEIS's analysis of impacts to cliff-nesting raptors. Nor does the DEIS analyze the varying levels of impacts to cliff-nesting raptors under the different alternatives.

f. The impacts analysis on overwintering birds is inadequate.

The DEIS fails to analyze where and how winter activity could impact American Dippers or other winter birds in the program area. The DEIS notes that winter birds remain in the

[985] DEIS vol. 1 at 2-4.

[986] DEIS vol. 1 at 2-29.

[987] Bureau of Land Management, National Petroleum Reserve-Alaska Integrated Activity Plan (2013) vol. 1 at 71 (Required Operating Procedure E-15).

[988] DEIS vol. 1 at 3-97 ("falcons, hawks, and eagles . . . reacted at greater distances [than 656 feet]."

[989] DEIS vol. 1 at 2-30.

program area year-round, including "dippers near open running water."[990] Appendix J indicates that wintering birds are not rare (American Dippers are uncommon, meaning regular but not always observed; Willow Ptarmigan are uncommon; and Rock Ptarmigan are common).[991] Later, the DEIS mentions that "[t]raffic and machinery related to winter construction could cause disturbance, behavior alterations, and displacement to resident wintering birds."[992] But the DEIS does not go on to mention American Dippers or other wintering birds in the short section on "Landbirds."[993] There are no lease stipulations or ROPs related to the issue of winter activity impacts on American Dippers or other overwintering birds.[994] Without a basis for its conclusions, the DEIS simply states that development activity would "affect few species and low numbers of year-round residents,"[995] and that "only small numbers of only a few bird species are resident during winter, and none are breeding. Winter construction therefore would potentially affect small numbers of non-breeding birds during the construction phase of a development project."[996] This constitutes insufficient actual analysis of impacts to wintering birds from industrial winter activity.

g. The impacts analysis on shorebirds is inadequate.

The DEIS mentions impacts to shorebirds generally, but does not look specifically at shorebird species that rely on the habitat within the Arctic Refuge Coastal Plain. American Golden-plover and Pectoral Sandpiper are two species that are declining, are of high concern in the U.S. Shorebird Plan,[997] and high percentages the North American populations for these species breed in the 1002 Area.[998] The *articola* subspecies of Dunlin and the population of Ruddy Turnstones that migrate to Asia are also found within the Coastal Plain and these populations are also declining.[999] Yet the DEIS does not mention these species and populations

[990] DEIS vol. 1 at 3-85.

[991] DEIS vol. 2 at J-18–J-19.

[992] DEIS vol. 1 at 3-96.

[993] DEIS vol. 1 at 3-90.

[994] Lease Stipulation 3 involves springs but not during winter; ROPs 10-15 involve seismic winter activity, but do not address winter birds or their habitat needs.

[995] DEIS vol. 1 at 3-92.

[996] DEIS vol. 1 at 3-96.

[997] U.S. Shorebird Conservation Plan Partnership, U.S. Shorebirds of Conservation Concern ─ 2016 (2016), available at http://www.shorebirdplan.org/science/assessment-conservation-status-shorebirds/; Warnock, N, The Alaska WatchList 2017, Audubon Alaska, Anchorage (2017).

[998] Brown, S., Bart, J., Lanctot, R.B., Johnson, J.A., Kendall, S., Payer, D. and Johnson, J., Shorebird abundance and distribution on the coastal plain of the Arctic National Wildlife Refuge, Condor 109:1-14 (2007); Bart, J., S. Brown, B. A. Andres, R. Platte, and A. Manning, North Slope of Alaska. Pp. 37-96 in J. Bart and V. Johnston (Eds.), Arctic shorebirds in North America: a decade of monitoring, Studies in Avian Biology (no. 44), University of California Press, Berkeley, CA (2012).

[999] U.S. Shorebird Conservation Plan Partnership, U.S. Shorebirds of Conservation Concern ─ 2016 (2016); Clemens, R.S., Rogers, D.I., Hansen, B.D., Gosbell, K., Minton, C.D.,

and provides no analysis on the impacts of oil and gas infrastructure on these particular shorebirds.

The DEIS does not adequately analyze or mitigate the impacts to shorebird habitat from winter work and the subsequent shifts in hydrology. The DEIS briefly notes that winter activities, such as seismic machinery and ice roads, can harm vegetation and change spring runoff, and that more damage occurs in well-drained areas of the tundra, which are areas favored by some shorebirds like Whimbrel and American Golden-plover.[1000] But the DEIS never takes the next step to make the connection to shorebirds or their natural history. Nor does the DEIS connect the dots to explain that most of the high oil potential area in Coastal Plain is comprised of that habitat type. While the Canning River and Sadlerochit River have patchy wetlands, the rest of the high oil potential area is comprised of well-drained tundra, which provides habitat for shorebirds like American Golden-plover. Moreover, Lease Stipulations 1, 4, and 9,[1001] which involve purported protections to shorebirds and their habitat do not apply to winter work,[1002] when seismic activity and ice roads impact vegetation and hydrology.

The mitigation measures to address impacts to shorebirds in river deltas are inadequate and arbitrary. The DEIS notes that shorebirds in river deltas could be impacted from development. For example, when discussing road disturbance, the DEIS says "Fall migration-staging flocks may also be subject to disturbance and displacement, such as shorebirds in river deltas."[1003] The DEIS then appears to rely on the lease stipulations riparian setbacks to address any impacts to shorebirds and other birds.[1004] But these setbacks appear inadequate for protecting shorebirds. Lease Stipulation 1 applies generally to protecting wildlife habitat and prohibits roads and pipelines in riparian areas, but allows exceptions on a case-by-case basis.[1005] Any rehabilitation of gravel infrastructure may be beneficial for waterbirds,[1006] but these efforts are not likely to mitigate impacts to shorebirds.[1007] The broad exception in Lease Stipulation 1 that would apply across the alternatives therefore belies the conclusions that the larger setbacks in

Straw, P., Bamford, M., Woehler, E.J., Milton, D.A., Weston, M.A. and Venables, B, Continental-scale decreases in shorebird populations in Australia, Emu 116:119-135 (2016).

[1000] DEIS vol. 1 at 3-94.

[1001] DEIS vol. 1 at 2-4, 2-7, 2-15.

[1002] DEIS vol. 1 at 3-117, 3-119, 3-120.

[1003] DEIS vol. 1 at 3-97.

[1004] *See e.g.* DEIS vol. 1 at 3-101 ("The coastal and riparian setbacks in Alternative C would protect important bird habitat, although as described above, future roads and pipelines would be allowed, including docking pads and the STP in the coastal setback.").

[1005] DEIS vol. 1 at 2-4.

[1006] DEIS vol. 1 at 3-94–3-95.

[1007] *See* Rebecca Bentzen, Joe Liebezeit, Martin Robards, Bill Streever, Samantha Strindberg, and Steve Zack, *Bird use of northern Alaska oilfield rehabilitation sites*, 71 Arctic 422 (2018).

Alternatives C and D make these options more protective.[1008] The DEIS fails to analyze impacts to shorebirds in river deltas and the mitigation measure will not address these impacts.

Furthermore, the cumulative impacts analysis for shorebirds does not connect climate and oil and gas infrastructure. The DEIS mentions climate-related changes that could affect shorebirds, saying that "[i]ncreases in shrubs and trees have been documented (Sturm et al. 2001b; Tape et al. 2006) and are expected to continue with increasing summer temperatures. . . . tundra nesting birds (. . . shorebirds. . .) may decline."[1009] But the DEIS does not go into the potential for increased storms and vulnerable coastlines to experience inundation, which could lead to displacement of staging shorebirds.[1010] Moreover, the DEIS does not link this change to the potential hydrological changes from winter oil and gas activities. Nor does the DEIS connect the climate-induced change, or the winter-activity hydrological changes to the water drawdown, which "may affect shorelines, degrading habitat for a variety of waterbirds and shorebirds."[1011] The DEIS must not only address individual impacts to shorebirds and other species, but must analyze these impacts collectively as cumulative effects, that could add or exacerbate the individual impacts.

h. The impacts analysis for Snow Geese is inadequate.

The DEIS does not adequately examine the impacts from air traffic to snow geese and other non-nesting birds. Non-nesting birds are sensitive to aircraft overflights, from a distance of 1.2 to 2.5 miles from the aircraft pathway.[1012] But in 2002, the USGS recommended more restrictive buffers, including limiting aircraft east of the Hulahula River.[1013] The DEIS must reconcile these recommendations with its analysis. Moreover due to the narrowness of the coastal plain, the buffer of 2.5 miles could cover a large percentage of the total area. The DEIS should depict this impact spatially. Without an acknowledgement and depiction of how far-reaching air traffic impacts will be on the narrow coastal plain, the DEIS has not fully grappled with the extent to which aircraft could impact non-nesting birds.

The DEIS arbitrarily uses the lease stipulations for caribou to apply supposed mitigation measures to Snow Geese. The DEIS notes that "Air traffic could disturb and displace staging snow geese that visit the eastern coastal plain of the North Slope in large numbers in late August

[1008] *See e.g.* DEIS at 3-102 ("Alternative D includes some larger setbacks than Alternatives B or C for riparian areas and is, therefore, somewhat more protective of avian habitats in riparian areas.").

[1009] DEIS vol. 1 at 3-92.

[1010] See e.g. Stephen Brown, Steve Kendall, Roy Churchwell, Audrey Taylor, and Anna-Marie Benson, Relative Shorebird Densities at Coastal Sites in the Arctic National Wildlife Refuge, 35 Waterbirds 546 (2012).

[1011] DEIS vol. 1 at 3-94.

[1012] DEIS vol. 1 at 3-98.

[1013] USGS, J. W. Hupp, D. G. Robertson, and A. W. Brackney. 2002. Size and Distribution of Snow Goose Populations, In Arctic Refuge Coastal Plain Terrestrail Wildlife Research Summaries. D. C. Douglas, P. E. Reynolds, and E. B. Rhode eds. USGS.

and September of most years."[1014] The DEIS further claims that NSO areas for caribou under Alternative C, and no leasing areas for caribou under Alternative D,[1015] would also result in less air traffic.[1016] But the DEIS does not explain that areas of NSO or no leasing would not prohibit air traffic, but instead that air traffic may be less likely given the prohibitions on development on the terrestrial areas below. Furthermore, the DEIS explains that "potential disturbance and displacement of staging snow geese also would occur during fall in areas north and west of protected calving habitat."[1017] Using stipulations for caribou to apply to snow geese is inappropriate and arbitrary. In comparison, FWS adopted regulations applicable to the Arctic National Wildlife Refuge specifically to protect snow geese.[1018]

i. The analysis on impacts to waterbirds from barging and screeding is inadequate.

First, the DEIS does not explain where and when barging and screeding would occur. The DEIS notes that screeding (scraping the seafloor) could impact waterbirds feeding in lagoons and coastal areas.[1019] The DEIS notes that these activities could occur in Camden Bay,[1020] but does not limit barging and screeding to this one location. The DEIS offers a conclusory statement that "impacts from screeding are expected to be of short duration and would occur in localized areas."[1021]

Second, the DEIS further downplays the impacts of screeding on birds and their food web. The DEIS notes that screeding will cause a "sediment plume that could disrupt feeding by non-breeding, post-breeding, and staging birds."[1022] But the DEIS dismisses this as "short-term" and does not acknowledge that a sediment plume could present long-term impact of disrupting the foot web. Moreover, the analysis completely lacks any mention of climate change and whether habitat impacts from screeding will be exacerbated by climate-change-induced erosion.

[1014] DEIS vol. 1 at 3-98.

[1015] DEIS vol. 1 at 2-13 (Lease Stipulation 7)

[1016] DEIS vol. 1 at 3-101.

[1017] DEIS vol. 1 at 3-102.

[1018] 50 C.F.R. § 37.32(d) ("Snow goose staging special areas. Whenever he deems it necessary or appropriate to ensure that exploratory activities do not significantly adversely affect staging snow geese, the Regional Director shall designate within the general area bordered on the east by the Aichilik River, on the north by the mainland coastline, on the west by the Hulahula River, and on the south by the southern boundary of the coastal plain, specific snow goose staging special areas which shall be closed to all exploratory activities during such periods between August 20 and September 10 of each year as those areas are determined by the Regional Director to be used for snow goose staging. No exploratory activities shall be conducted in such designated areas during such periods.").

[1019] DEIS vol. 1 at 3-95.

[1020] DEIS vol. 1 at 3-97.

[1021] DEIS vol. 1 at 3-95–3-96.

[1022] DEIS vol. 1 at 3-95.

j. The impacts analysis on loons is inadequate.

Loons in the project area may be impacted by a reduction in fish from the loss of deep-water lakes on the Coastal Plain, but the DEIS does not analyze this issue. The area of high-oil potential occurs on a part of the landscape dominated by non-wetland tundra. The DEIS does not explain where and how oil and gas development activities will obtain the water necessary for building ice infrastructure and supporting production phases. One potential area is from deep-water lakes, but this poses a risk to the fish species found in these lakes, which in turn could have "potential population consequences for loons, primarily for Pacific and red-throated loons".[1023] But the DEIS draws this conclusion without any further explanation or analysis of the status of loon populations in the project area, without describing which deep-water lakes may be at risk, and without noting which species of fish may be impacted and whether these fish species are in fact the forage species needed by loons. This analysis is wholly inadequate. The DEIS also neglects to analyze cumulative impacts to loons in areas outside of the project area.[1024]

k. The analysis on impacts to eiders is arbitrary and inadequate.

The DEIS uses an arbitrary buffer zone as a way to protect eiders. The DEIS ascribes a buffer of 656 feet (about 200 meters) in order to "[a]void and reduce temporary impacts on productivity from disturbance near Steller's or spectacled eider nests."[1025] The DEIS also appears to use this same buffer to analyze impacts to *all* bird species.[1026] But the DEIS does not explain why this buffer is appropriate specifically for eiders, nor does the DEIS explain why this buffer is appropriate for all species.

The DEIS does not use complete and appropriate science to determine an appropriate buffer for eiders. The DEIS relies on Livezey et al. (2016) to support the idea that a buffer of 656 feet is appropriate for eiders and for all birds in the program area. But Livezey et al. (2016) is a compilation of data on the disturbance threshold for 49 species of nesting birds and 650 species of nonnesting birds. While this is one place to start the analysis on how disturbance could impact birds in the project area, it is not enough to rely on this compilation to apply specifically to eiders or even to all birds. First, it is not clear whether the data presented in Livezey et al. (2016) is applicable to Arctic birds; the agency should have used the database offered in this publication

[1023] DEIS at 3-94.

[1024] Red-throated Loons that breed on the Arctic Coastal Plain undergo a long-distance migration to winter in East Asia, which makes this population potentially vulnerable to contaminants on their stopover and wintering grounds. McCloskey, S. E., B. D. Uher-Koch, J. A. Schmutz, and T. F. Fondell, *International Migration Patterns of Red-Throated Loons (Gavia Stellata) from Four Breeding Populations in Alaska*, PLoS ONE 13:e0189954 (2018), av*ailable at* https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0189954.

[1025] DEIS vol. 1 at 2-30 (Required Operating Procedure 32).

[1026] *See e.g.* DEIS at 3-96 ("As discussed previously, for assessment of potential effects of disturbance and displacement by future road traffic, the area was calculated within 656 feet of roads, pads, and pipelines as a conservative estimate of the area affected by disturbance and displacement for all species of birds.").

and conducted a new analysis using only Arctic species. Second, the DEIS additionally references disturbance studies on Arctic birds that indicate a zone of disturbance that is larger than 656 feet.[1027] The DEIS cites to Monda et al. (1994)[1028] which documented a buffer of 1640 feet for Tundra Swans; to Johnson et al. (2003) which documents a buffer of 4224 feet (0.8 miles) for unknown Arctic birds;[1029] and to Liebezeit et al. (2009)[1030] which documents a buffer of more than 16,000 feet (3.1 miles) for nesting Arctic passerines. But the DEIS does not explain why it arbitrarily chose 656 feet as the appropriate buffer for eiders and for all birds in the project area.

l. The analysis of impacts to passerines is incomplete and insufficient.

The DEIS briefly notes that climate change could increase shrub- and tree-nesting passerines,[1031] but does not provide any reference.[1032] The DEIS also notes in passing that vegetation damage from winter work is most severe in areas that support higher densities of passerines,[1033] and that passerines experience decreased nest survival within 3.1 miles of oilfield facilities,[1034] but neglects to connect these individual impacts to the cumulative impacts of a changing habitat and climate change. Instead the DEIS only concludes that because Alternative C has larger setbacks, it will be more protective of passerines,[1035] lacking any further analysis of how the development scenario and the different alternatives will impact passerines in different ways and at different levels.

[1027] DEIS vol. 1 at 3-97.

[1028] Monda, M. J., J. T. Ratti, and T. R. McCabe. 1994. "Reproductive ecology of tundra swans on the Arctic National Wildlife Refuge, Alaska." *Journal of Wildlife Management* 58: 757–773.

[1029] Note that Johnson et al. (2003) is an internal industry report that is not readily available to the public. Johnson, C. B., R. M. Burgess, B. E. Lawhead, J. Neville, J. P. Parrett, A. K. Prichard, J. R. Rose, A. A. Stickney, and A. M. Wildman. 2003. Alpine Avian Monitoring Program, 2001. Fourth annual and synthesis report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, Alaska, by ABR, Inc., Fairbanks, Alaska.

[1030] Liebezeit, J. R., S. J. Kendall, S. Brown, C. B. Johnson, P. Martin, T. L. McDonald, D. C. Payer, C. L. Rea, B. Streever, A. M. Wildman, and S. Zack. 2009. "Influence of human development and predators on nest survival of tundra birds, Arctic Coastal Plain, Alaska." *Ecological Applications* 19: 1628–1644.

[1031] DEIS vol. 1 at 3-92

[1032] E.g. Natalie T. Boelman Laura Gough John Wingfield Scott Goetz Ashley Asmus Helen E. Chmura Jesse S. Krause Jonathan H. Perez Shannan K. Sweet Kevin C. Guay, Greater shrub dominance alters breeding habitat and food resources for migratory songbirds in Alaskan arctic tundra, 21 Global Change Biology 1508 (2014), available at https://doi.org/10.1111/gcb.12761.

[1033] DEIS vol. 1 at 3-94.

[1034] DEIS vol. 1 at 3-97.

[1035] DEIS vol. 1 at 3-101.

m. The analysis and mitigation of impacts to seabirds is inadequate and incomplete.

The DEIS contains almost no analysis on impacts to seabirds. The DEIS notes that "low levels of disturbance and displacement of seabirds could occur along the marine vessel route between the ARCP and Dutch Harbor, Alaska."[1036] But the analysis on impacts to seabirds in the coastal areas is focused on Long-tailed Ducks, rather than on seabirds in the coastal areas,[1037] and the DEIS does not contain any additional analysis of the impacts to seabirds from increased vessel traffic.[1038]

The description of the barge "route" referenced in the DEIS[1039] is wholly inadequate for analyzing the impacts of marine vessel traffic on seabirds and other marine animals. Barges are very likely to be a big component of any oil and gas development in the project area, and the DEIS completely fails to analyze this potential for a very large increase of vessel traffic along the route and in the coastal zone of the project area. More vessels along the route will mean more risk of oil spills, more noise introduced into the marine environment, more ship strikes on marine wildlife, and more hazards for marine birds.[1040] The DEIS completely lacks the information necessary for the public to understand impacts to seabirds and other marine wildlife along the vessel traffic route.

Moreover, the mitigation measures for seabirds are missing, inadequate, or arbitrary. Lease Stipulation 9 would purportedly protect coastal zones to varying degrees, but under Alternative B would only require a mitigation plan but would not actually prevent any infrastructure in the coastal area, and Alternatives C and D would allow for barges, docks, spill response areas, and pipelines.[1041] This stipulation would therefore not address impacts that occur on the vessel route from Dutch Harbor.

In sum, BLM's description and analysis of an oil and gas program on birds is insufficient and inadequate. BLM must ensure that has the necessary information regarding the myriad

[1036] DEIS vol. 1 at 3-98.

[1037] *See e.g.* DEIS vol. 1 at 3-97.

[1038] Information, data, and analysis relevant to this topic can be found in the *Birds* and *Mammals* chapters of Smith, M.A., M.S. Goldman, E.J. Knight, and J.J. Warrenchuk, 2017, *Ecological Atlas of the Bering, Chukchi, and Beaufort Seas*, 2nd edition, Audubon Alaska, Anchorage AK.

[1039] *See* DEIS vol. 2 at Appendix A, Figure 3-6.

[1040] *See analysis, citations, and data in* B. Sullender, *Vessel Traffic*, pp. 285-293 *In* Smith, M.A., M.S. Goldman, E.J. Knight, and J.J. Warrenchuk, 2017, *Ecological Atlas of the Bering, Chukchi, and Beaufort Seas*, 2nd edition, Audubon Alaska, Anchorage AK; B. Sullender, *A Closer Look: Unimak Pass and Bering Strait Vessel Traffic*, pp. 294-295 *In* Smith, M.A., M.S. Goldman, E.J. Knight, and J.J. Warrenchuk, 2017, *Ecological Atlas of the Bering, Chukchi, and Beaufort Seas*, 2nd edition, Audubon Alaska, Anchorage AK.

[1041] DEIS vol. 1 at 2-15.

species that use the Coastal Plain to actually evaluate the impacts to birds. Doing do requires substantial revision of the DEIS.

I. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON CARIBOU IS INADEQUATE.

1. Resource Summary

Caribou (*Rangifer tarandus*) are the most abundant large terrestrial herbivore in the circumpolar arctic.[1042] Known as reindeer in some countries, caribou populations stretch across North America, Europe, and Asia.[1043] Movement is central to life for barren-ground caribou (*R. t. granti*),[1044] such as those that live on the North Slope of Alaska. Barren-ground caribou are renowned for their long-distance migrations, covering thousands of kilometers each year in some of the longest overland movements in the world.[1045] These migrations allow caribou to take advantage of resources that change over space and time, such as moving to areas with greater winter food availability and shelter and then returning to calving grounds with lower densities of predators.[1046] In addition to long-range migration, barren-ground caribou rely on unimpeded local movements, especially after calves are born, to optimize changing nutrient availability and to avoid predators and harassing insects.[1047] As a Canadian report stated, "[u]nhindered movement is the key to how caribou adapt to annual variations in forage availability and insect harassment."[1048] Integration of both long-range and local movement strategies enable barren-ground caribou to achieve large population levels in arctic regions.

The Arctic National Wildlife Refuge is used, with varying frequency, by three of the four caribou herds that calve on the North Slope of Alaska. Portions of the Central Arctic Herd (CAH) use the Arctic Refuge year-round, and the Coastal Plain primarily during summer[1049] and in small numbers during winter.[1050] The Teshekpuk Caribou Herd (TCH) uses parts of the Arctic Refuge as winter range, including occasional use of the Coastal Plain.[1051] The Porcupine Caribou Herd (PCH) uses the Arctic Refuge throughout the year,[1052] with the Coastal Plain providing essential calving,[1053] post-calving, insect relief, and other summer habitat.[1054] The Coastal Plain

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[1042] Bråthen et al. 2007. (Materials cited in this section are referenced in full at the end of the comment letter.)

[1043] Festa-Bianchet et al. 2011.; Mallory and Boyce. 2018.

[1044] Photo 1 in Appendix B.

[1045] Fancy et al. 1989.; Bergman et al. 2000.; Schaefer and Mahoney. 2013.

[1046] Dau. 2011.; Joly. 2012.; Person et al. 2007

[1047] Griffith et al. 2002.

[1048] Russell and Gunn. 2019 at 91.

[1049] Arthur and Del Vecchio. 2009.; Lenart. 2015.

[1050] Clough et al. 1987 at 26.

[1051] Person et al. 2007.

[1052] *See* Figure 1 in Garner and Reynolds. 1986 at 212.

[1053] Photo 2 in Appendix B.

[1054] Garner and Reynolds. 1986.; Clough et al. 1987.; Caikoski. 2015.

also provides a refuge from predators, with lower predator densities than in the foothills to the south.[1055]

Due in large part to its importance for caribou and corresponding subsistence values, three of the four ANILCA purposes for the Arctic Refuge are related to conserving the PCH.[1056] These purposes, along with the original purpose of the Refuge to preserve unique wildlife, wilderness, and recreational values and the 1987 International Agreement on the Conservation of the Porcupine Caribou Herd, impose substantive duties on the Department of the Interior to preserve and protect caribou and its habitat. Unfortunately, the DEIS fails to demonstrate compliance with those obligations, or with procedural obligations under NEPA, as they relate to caribou.

a. Importance of post-calving habitat

While the post-calving period has traditionally received less attention than the calving period in the scientific literature and in environmental impact analyses, it is also very important for caribou. The International Porcupine Caribou Board ranked both calving and post-calving habitat of equally high importance for the PCH.[1057] The post-calving period is crucial to providing nourishment for growing calves and replenishing depleted body reserves. Caribou rely on stored body fat and energy reserves to get them through the long, difficult winter.[1058] They then use these reserves to fuel their spring migration. This can be costly in terms of energy requirements, with one study showing that pregnant females in the PCH may lose about 4 kg of body fat during spring migration.[1059] Female caribou with new calves continue to rely on their body reserves to fuel lactation.[1060] Calving ground habitats are also important for nursing caribou to meet the energetic demands of lactation and allow calves to gain weight and increase their probability of survival.[1061] After calving, female caribou have to replenish their depleted body stores during the brief summer growing season. This doubles their energy and protein demands during this period.[1062] Failure to do so can have strong consequences, as summer weight gain influences the probability of conceiving in the subsequent fall[1063] and of successfully carrying that calf to birth the next spring.[1064] Unimpeded access to a diversity of high-quality forage is important during this period to enable caribou to regain body condition and provide sufficient milk production for their new calves.[1065] The Coastal Plain is critical for caribou post-calving when the animals are at the low point of their annual energy cycle, with the energy reserves of

[1055] Fancy and Whitten. 1991.
[1056] ANILCA § 303(2)(B); *See also supra*.
[1057] International Porcupine Caribou Board. 1993.
[1058] Gerhart et al. 1996.; Barboza and Parker. 2008.; Taillon et al. 2013.
[1059] Fancy. 1986.
[1060] Taillon et al. 2013.
[1061] Griffith et al. 2002.
[1062] Griffith et al. 2002.
[1063] Cameron et al. 2005.
[1064] Veiberg et al. 2017.
[1065] Klein. 1990.; Russell and Gunn. 2019.

parturient cows especially low.[1066] The Coastal Plain provides greater concentrations and prolonged availability of plant nitrogen compared to the nearby Brooks Range.[1067] This nitrogen is a limiting resource for caribou that allows them to gain weight during the brief summer months, increasing winter survival and subsequent-year reproduction.[1068] Furthermore, key limiting minerals needed by caribou also appear to be more available on the Coastal Plain than in other seasonally-used areas.[1069] The importance of this area is reinforced by records showing that even in years in which the PCH primarily calved in Canada, the herd has travelled to the Arctic Refuge Coastal Plain for food and insect relief during the post-calving period.[1070] The USGS points out that "essentially the entire 1002 Area was eventually used by late June or early July."[1071] This is also evident from location records that show use of the entire Coastal Plain over time, especially during the post-calving period.[1072]

Insect activity, primarily that of mosquitoes and oestrid flies, has a strong influence on caribou space use in July and August, leading caribou to seek areas of relief from insects, such as the windy coastline, gravel bars and elevated areas.[1073] They may also rely upon patches of perennial snow and ice, including aufeis, for insect relief.[1074] During this period, caribou gradually gather together into large aggregated groups.[1075] Some of these have occurred in the western areas of the Coastal Plain,[1076] including over 80,000 caribou in a single group near Camden Bay in 1972,[1077] as well as multiple years with large groups all the way to the Canning River.[1078] Large aggregations continue to form and to use the western parts of the Coastal Plain for insect relief, such as a group estimated at around 121,000 individuals that spent time just south of Camden Bay in 2014 and a slightly smaller group of around 100,000 animals that used a similar area in 2017.[1079] A recent report prepared for the Canadian government notes: "Although in any given year the movement patterns of large aggregations are unpredictable, aggregations, for the four years considered [2014-2017], were most concentrated in the western portion of 1002, south of Camden Bay."[1080]

[1066] Clough et al. 1987 at 25.
[1067] Barboza et al. 2018.
[1068] Barboza et al. 2018.
[1069] Oster et al. 2018.
[1070] Griffith et al. 2002.
[1071] Griffith et al. 2002 at 20.
[1072] Animation 1 in Appendix B.; *See also* Figure 3.11 in Griffith et al. 2002 at 16.
[1073] Pollard et al. 1996.; Photo 3 in Appendix B.
[1074] Rosvold. 2016.; Photos 4–5 in Appendix B.
[1075] Photos 6-7 in Appendix B.
[1076] Photo 8 in Appendix B.
[1077] Garner and Reynolds. 1986 at 230; Map 1 in Appendix B.
[1078] Ken Whitten (ADF&G PCH caribou biologist, retired) pers. comm.
[1079] *See* Figure 19 in Russell and Gunn. 2019 at 40.
[1080] Russell and Gunn. 2019 at 42.

Harassment due to insects can have a negative effect on caribou populations,[1081] leading to lower rates of calves being born in years following high insect activity.[1082] It can also threaten the ability of caribou to replenish depleted body stores, as prolonged exposure to insects can shift lactating female caribou from positive to negative energy balance.[1083] This makes it very important that caribou be able to access insect relief habitat and move between insect relief areas and quality forage habitat as conditions change.

2. Deficiencies in the DEIS Analysis of Caribou

We appreciate the general review and inclusion of content related to caribou. A number of important points have been raised in the DEIS. For example, we appreciate the recognition that the Coastal Plain is used at times by the PCH, CAH, and TCH; that most years the PCH calves within the Coastal Plain; and that both the PCH and CAH use the Coastal Plain for insect relief.[1084] However, we feel that there remain numerous issues that must be more adequately addressed. These are specified in the following sections.

a. Ignoring the larger Rangifer context

The DEIS fails to place the discussion of the PCH and CAH in the context of the global condition of *Rangifer*. Caribou and reindeer (both *Rangifer tarandus*) stretch across North America, Europe, and Asia.[1085] Although widely distributed in the Arctic, most caribou and wild reindeer (*R. t. tarandus*) populations have faced strong declines, likely influenced in part by global changes in climate and anthropogenic landscape change.[1086] The recent Arctic Report Card released by the National Oceanic and Atmospheric Association (NOAA) reported global declines of more than 50% of migratory caribou and reindeer over the past two decades, with some herds declining more than 90%.[1087] While caribou herds naturally fluctuate,[1088] the NOAA report notes that several herds show no sign of recovery after drastic declines and some are at record low levels since reliable recording began.[1089] Canada especially has seen drastic declines in its caribou herds, leading it to recently recognize barren-ground caribou as nationally "Threatened."[1090] Two eastern migratory Canadian herds are now listed as "Endangered."[1091] This comes at a time when the contiguous United States just had the last of its known wild caribou removed.[1092] While the PCH currently is a notable exception to the declining trend seen

[1081] Dau. 1986.
[1082] National Research Council. 2003.
[1083] Fancy. 1986.
[1084] DEIS vol. 1 at 3-104.
[1085] Festa-Bianchet et al. 2011.; Mallory and Boyce. 2018.
[1086] Vors and Boyce. 2009.; Russell et al. 2015.; Mallory and Boyce. 2018.
[1087] Russell et al. 2018.
[1088] Ferguson et al. 1998.; Zalatan et al. 2006.
[1089] Russell et al. 2018.
[1090] COSEWIC. 2016.
[1091] COSEWIC. 2017.
[1092] Moskovitz. 2019.

in many caribou populations, the prevailing observations across much of the globe should lead to caution regarding assumptions that the PCH will remain at high population size, especially in light of additional pressures that would be placed on the herd by industrial development and climate change. This is of special concern in light of recent research suggesting that a caribou herd's population size can strongly influence the effect of development on that herd's future population dynamics.[1093] The BLM should update the Affected Environment description of caribou to better situate the PCH in their species' global context to fully consider potential risks of the proposed action.

b. Factors that hinder adequate review of the DEIS caribou content

There are several factors that hinder the ability of the public to review and determine the adequacy of the discussion of impacts to caribou in the DEIS. First, no justification is given for the caribou use percentages by which the DEIS analyzes development and human activity impacts on caribou. This prevents a clear evaluation of whether the measures reported in the DEIS actually reflect expected impacts. Second, the lack of transparency in the caribou data sources used in the DEIS means that even if the caribou use categories are accepted as being reasonable, it is impossible to evaluate how representative of impacts they really are. Third, the methods used to determine impacts based on the data are not the best-available scientific methods. These are all critical issues that prevent the full analysis of impacts expected under NEPA. In the following sections we elaborate on each of these problems.

i. Lack of justification for caribou use percentages

Repeatedly throughout the DEIS, caribou use is depicted using the percentage of years that caribou are present, broken into four categories: < 20%, 20-30%, 30-40%, > 40%.[1094] As a minor point, it is unclear exactly where the bounds lie. Using < 20% as the first category implies that 20% occurs in the next category, where it is the lower bound, while using > 40% as the final category implies that 40% occurs in the previous category, where it is the upper bound. If both the lower and upper bounds are included in the bins, where does 30% lie, which is listed in both the 20-30% category and the 30-40% category? Either 30% is being double counted, which presents problems, or it occurs in one category or the other, in which case the two categories are of uneven size. This should be clarified by BLM.

A much more important issue is the lack of justification that is given for using these percentages to define caribou use. The DEIS "defines important calving grounds as the high-use PCH calving area (area used in greater than 40 percent of years)"[1095] and apparently uses a similar definition for post-calving.[1096] No justification is given for why only areas used in more than 40% of years are important. A clear biological rationale, grounded in the best-available science, must be stated. As is noted below, such a determination of "important" habitat neglects the value of more occasionally used calving and post-calving areas for the PCH, including those

[1093] Russell and Gunn. 2019.
[1094] E.g., Maps 3-21, 3-23, E-1, Tables J-12 and J-13.
[1095] DEIS vol. 2 at E-8.
[1096] DEIS vol. 1 at 2-14.

where large concentrations have occurred less frequently but in large numbers outside of the areas depicted as "high use" in Map 3-21 and Map E1. BLM must explain why an area used lightly in more than 40% of years is considered more important than an area used heavily in 35% or even 20% of years. Furthermore, explanation of each of the percentage use categories and their biological importance needs to be provided by BLM since these categories are used as the key impact indicators for analyzing road, pipeline, air traffic, noise and human activity impacts on caribou.[1097] They also represent the main quantitative indication of impact to caribou in the DEIS: acres with differing levels of use during calving and post calving that overlap with varying lease restriction categories.[1098] In light of this, it is crucial that BLM be clear on why these are biologically-meaningful and sufficient for demonstrating impact or lack thereof.

ii. Lack of transparency in caribou data sources

Transparency is a hallmark of robust scientific analysis because it enables replication. It is also essential to enable proper public review of NEPA documents. The DEIS suffers greatly from a lack of transparency with regards to its caribou data. Location information is a key component of both the description of the affected environment for caribou and of the environmental and subsistence consequences of the proposed development alternatives. As is pointed out above, the "proportion of years areas are used by PCH per season" is the key impact indicator used in the DEIS for analyzing road, pipeline, air traffic, noise and human activity impacts on caribou.[1099] Similarly, the "proportion of CAH caribou using the program area alternatives by season (based on percent of seasonal use density from kernel density)" is used to evaluate impacts of roads and pipelines to the CAH.[1100] Caribou location data are also used to calculate the acreages and percentages of use by caribou.[1101] Because this information underlies the analyses of impact, it is crucial that the data sources be specified in such a way that any member of the public could evaluate the quality of the data. This includes providing clear citations to publicly available publications/reports that describe and visualize the data sources or, for original telemetry data, providing detailed information on the timeframe of data, sample size (both in terms of number of individuals and frequency and duration of locations), type of technology used to obtain locations, methods used to depict location data, and more. This is not done for caribou in the DEIS.

No source documentation for caribou locations is given in Chapter 3. Some additional information is given regarding data sources in the DEIS appendices, but this is still insufficient to evaluate data quality. Maps 3-21, 3-23, and E-1 — all depicting the seasonal distribution of the PCH in various forms — reference BLM GIS 2018 and Yukon Environmental GIS 2018. Map 3-22, depicting the seasonal distribution of the CAH, references BLM GIS 2018, Prichard et al. 2018, and ABR GIS 2017. The BLM GIS 2018 dataset is the same source that is cited for

[1097] DEIS vol. 2 at F-27 – F-28.
[1098] Tables J-12 and J-13.
[1099] DEIS vol. 2 at F-27 and F-28.
[1100] DEIS vol. 2 at F-27 and F-28.
[1101] DEIS vol. 2, Tables J-12 to J-15.

potential fossil yield classification in program area geological bedrock units,[1102] polar bear denning habitat,[1103] cultural resource site information,[1104] basic acreage calculations,[1105] and more. It is thus apparent that it is an extensive dataset, containing a variety of information. The precise contents of this information, however, are unclear as the reference given for it simply states "GIS data used in the Coastal Plain Oil and Gas Leasing Program EIS alternatives, affected environment, and impact analysis. Alaska Bureau of Land Management."[1106] That conveys no information about the actual sources of data within this massive dataset. Similarly, Yukon Environmental GIS 2018 is referenced as "GIS data provided by Yukon Environmental, Mike Suitor, July 2018."[1107] Again, this gives no clarity as to the actual contents of this dataset. ABR GIS 2017 is referenced as "GIS data of the Central Arctic Herd caribou, data provided by Alaska Biological Research."[1108] Here, at least, the contents of the GIS dataset are specified — CAH data — but this still gives none of the crucial details needed to evaluate the quality of the maps made from those data. Unfortunately, Prichard et al. 2018 is not included in the references of either DEIS volume, so it is impossible for the reader to evaluate what data might have been contributed from this source. BLM has posted some geospatial data on its Arctic Refuge Coastal Plain Oil and Gas Leasing EIS ePlanning page,[1109] but this does not include any caribou data. Instead, there is a statement that "[d]ata from sources external to BLM will not be distributed." The ReadMe file on the ePlanning page lists CAH and PCH among the "Other Affected Environment GIS Data" but simply says to contact ADF&G and Yukon Department of Environment, respectively. This is insufficient. BLM needs to correct these omissions by providing an appendix that clearly specifies all data sources contained within BLM GIS 2018, Yukon Environmental GIS 2018, ABR GIS 2017, Prichard et al. 2018 and any other GIS databases used in the EIS process in such a way that the quality and information above about sample sizes and methods can be ascertained. Without this information, proper review and evaluation of the claims made by BLM are impossible. We note that any information BLM relies on in its decision should be included in the record as well.

Clarity about data sources is important because different types of animal location data may lead to various biases in datasets and resulting depictions. For example, Russell and Gunn point out that satellite collar data can underestimate use of the program area each year.[1110] The DEIS makes no such acknowledgement. VHF collars may show extensive use of the program area for calving even when satellite collars show little use.[1111] It is important that BLM is clear about which types of information are used in the DEIS.

[1102] DEIS vol. 1 at 3-42.
[1103] DEIS vol. 1 at 3-145.
[1104] DEIS vol. 1 at 3-158.
[1105] E.g., DEIS vol. 1 at 3-218.
[1106] DEIS vol. 1 at References-9.
[1107] DEIS vol. 1 at References-51.
[1108] DEIS vol. 1 at References-1.
[1109] https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=152115.
[1110] Russell and Gunn. 2019 at 25.
[1111] *See* Figure 8 in Russell and Gunn. 2019 at 26.

The lack of clear information about data sources for Maps 3-21, 3-22, 3-23 and E-1 combines with a complete lack of description about how the figures were made to make it difficult to evaluate how well they represent seasonal distributions of caribou. The PCH distribution figures in Map 3-21 state the number of years of data going into each depiction, but not what those years are or how many individuals are represented in each. Furthermore, they do not specify whether the years included were consecutive or if some years were omitted. Nor do they make it clear how they account for changing scientific research methods and technology over time. It is also notable that Map 3-23 lists a different number of years depicted for the calving period with cows and calves than that shown in Map 3-21 (37 years in 3-21 versus 34 years in 3-23). No explanation is given for why this is different.

In addition, no statement is made about what depiction of data is used in Map 3-21. For example, if a kernel density estimate is used, that should be stated and the percentage contour used to depict use should be shown. This is not clear from the information as conveyed. Also, if the USGS and USFWS kernel analyses of calving distribution[1112] were used, this should be made clear. These were based on the locations where collared PCH caribou gave birth. Such depictions are useful for displaying variation in birth locations across years, but underestimate use of areas during calving as PCH cows continue to move after calves are born, often moving westward toward and within the program area.[1113] Only using birth sites to represent calving can thus bias the depiction of calving-season use away from the more western portions of the Coastal Plain, resulting in an incomplete evaluation of impacts. It is also possible that the DEIS did not use previously published kernel density estimates but rather created new depictions based on original telemetry records. Whatever data sources were used, these need to be made very clear and the methods of depiction presented in greater detail.

For the CAH seasonal use depictions in Map 3-22, it is stated in the legend that kernel density isopleths are depicted. However, no indication is given of the time period represented by the data going into the kernel density analysis, nor the sample size nor age and sex information of the depicted animals. All of this information can influence the resulting depictions of space use and the way visualizations should be interpreted. It is essential that BLM provide detailed information about the data being represented in the DEIS to enable adequate review and assessment of impacts. Furthermore, BLM needs to explain why different depictions of use are presented for the PCH and the CAH maps and in the analyses of impacts described in Appendix F,[1114] what data gaps may exist, and why these represent reasonable and biologically meaningful depictions of caribou use.

Specifying the years of data used and showing their sources is important for a robust analysis. To our knowledge, the last kernel density depictions made publicly available for the PCH were presented in the Arctic Refuge Revised CCP[1115] and spanned 1983–2010. Coarse

[1112] Griffith et al. 2002; USFWS. 2015.
[1113] Ken Whitten (ADF&G PCH caribou biologist, retired) pers. comm.
[1114] DEIS vol. 2 at F-27 and F-28.
[1115] USFWS. 2015. Map 4-9.

polygon data showing general calving and wintering areas for 2011–2017 were displayed in a newsletter by the Alaska Department of Fish and Game (ADF&G),[1116] but without documentation of methods or use of kernel density estimates or other depictions showing relative use by collared animals. The public thus has no clear way of knowing what the full extent of Coastal Plain or relative use by the PCH has been since 2010. Nor is it clear what data were collected post-2010, or if any of these data were included in the information used in the DEIS maps and Appendix J. The description of background caribou information described the percentage of time PCH females calved in the 1002 Area between 1983–2001.[1117] This, however, is only 19 years of data and Map 3-21 says there are 37 years of calving data depicted. This suggests that 2002–2018 are included (bringing the total to 36 years), but also requires at least one older year of data. Maps of caribou calving stretch back at least until 1961,[1118] and include the period of 1972 through 1986.[1119] Some of this historic information may have been used, but this is not specified. Also, previous depictions of caribou calving habitat have often included both annual calving grounds and annual concentrated calving areas. BLM acknowledges such distinctions in the DEIS but does not specify which representation of calving is being depicted in Map 3-21. The note on Lease Stipulation 7 states that "PCH primary calving habitat area was defined as the area with a higher-than-average density of cows about to give birth during more than 40 percent of the years surveyed."[1120] Mention of "more than 40 percent of the years surveyed" makes this statement seem relevant to the depiction in Map 3-21. Mention of "the area with a higher-than-average density" makes it likely that the statement is referring to concentrated calving areas, rather than annual calving grounds, though notably the definition given in the DEIS for an annual concentrated calving area only calls it "an area of relatively high use,"[1121] not "higher-than-average density," so this is not certain. It is thus possible that Map 3-21 only depicts overlap in concentrated calving, which would not present a full picture of the important areas for PCH calving (see below for more details). It is also possible that annual calving ground overlap is displayed in Map 3-21, and that the "PCH primary calving habitat area" as defined in Stipulation 7 is not depicted. Either way there is a problem. Representations of space use by caribou will look very different depending on whether the extent of calving or extent of concentrated calving are being depicted. The various forms of uncertainty raised above make it impossible to adequately review the information presented. An EIS must present clarity, not require guesswork. BLM needs to clarify its data sources, with all necessary details, and present annual depictions of the input data used in its analyses for any years that are not already publicly available, including all years post-2010.

Greater clarity is needed in the definition used for "calving" as the definition quoted above from Lease Stipulation 7 leaves several ambiguities. For example, what does "about to give birth" mean and how is it determined when female caribou are about to give birth? Calving should cover both the birth site and movements thereafter. While Maps 3-21 and 3-23 list the

[1116] McFarland et al. 2017.
[1117] DEIS vol. 1 at 3-106.
[1118] Skoog et al. 1963.
[1119] Clough et al. 1987.
[1120] DEIS vol. 1 at 2-13.
[1121] DEIS vol. 1 at 3-106.

calving period as May 26–June 10, no biological justification is given for this definition. While peak calving is likely to be over by June 10, calves will continue to be born past this date,[1122] suggesting that the calving period should be extended. Notably, Map 3-22 for the CAH shows an unlabeled map just prior to the map labelled "Post-calving," which stretches from May 30-June 15. BLM needs to explain and scientifically support how it is defining its various seasonal periods.

A final issue with the lack of clarity as to data sources in Map 3-21 regards the differences in what is being compared between the various time periods. The pre-calving, early summer, and mid-summer depictions reflect the distribution of all collared animals, according to the text in Map 3-21 (though with different numbers of years of data for each, ranging from 27-34). The calving period map depicts both cows and calves (for 37 years of data), while the post-calving map represents the distribution of just cows (with only 22 years of data). No explanation is given for why these different depictions are used or how the varying number of years of data were selected. One concern is that habitat use patterns are different for male and female caribou throughout much of the year, so distribution maps based on all animals versus those for just cows (or cows and calves) may be very different. Another concern is that locations of calves are likely biased due to a lack of random selection. Some calves have been collared along with their mothers for use in nutrition studies.[1123] The locations of these calves will not be independent from those of their mothers, thus over-representing the importance of those cows. Other calves were collared in high-density and low-density calving areas to compare survival rates.[1124] These also would lead to over-representing some use areas and under-representing others. It is unclear whether data were derived from one, both, or neither of these sets of studies. Furthermore, it is possible that only parturient cows were depicted in the calving data but all cows, including those that did not have a calf in a given year, were included in the post-calving group. This is not specified. Without sample size information and other details, it is impossible to know how these data choices might affect the results. There are biological reasons to focus on the distribution of cows during the calving and post-calving seasons and to show all animals at other times of the year, as well as logistic reasons such as the greater number of collars that have been deployed on cows compared to bulls. Any such depictions, however, should be presented in two sets of maps: one with just cows each season and the other with all animals in each season. Both sets of maps should specify the sample size broken down by sex, age, and parturition status and should clearly state the specific years of data depicted, with their sources. Doing this will enable adequate evaluation of the contribution of bulls, cows and calves to the seasonal distribution representations and will allow a more robust consideration of use of the Coastal Plain. The BLM should include such maps in a revised EIS.

iii. Failure to Use the Best Available Science in Quantifying Development Impacts to Caribou Habitat

[1122] Ken Whitten (ADF&G PCH caribou biologist, retired) pers. comm.
[1123] Ken Whitten (ADF&G PCH caribou biologist, retired) pers. comm.
[1124] Ken Whitten (ADF&G PCH caribou biologist, retired) pers. comm.

The DEIS states that "BLM has relied on the best available science to inform its consideration of the environmental impacts surrounding an oil and gas leasing program in the Coastal Plain."[1125] This standard has not been met, however, when it comes to quantification of development impacts to caribou and their habitat. The quantitative metrics of development impact on caribou reported in the DEIS consist of simple overlay analyses that report percentages of habitat types overlapping different lease restriction categories[1126] and percentages of seasonal use overlapping lease restriction and oil potential areas.[1127] These percentages are simply reported and no robust analysis of their potential consequences for the PCH or CAH are presented. Such a basic approach to evaluating impact stands in stark contrast to the wide array of available quantitative analytic techniques for considering the impacts of development and climate change on wildlife that exist in the scientific literature and reports. A number of these techniques have specifically been applied to caribou, even in Alaska. For example, Wilson et al.[1128] perform a quantitative analysis of the relative impacts to caribou calving habitat and passerine nest survival under different development alternatives in the NPR-A. This is done in a manner that takes into account the uncertainty inherent in pre-exploration oil and gas development planning, uses scientific understanding of caribou response to development, and looks at use not just of caribou but of other wildlife species to provide a more comprehensive view of development impacts. It is thus very surprising that having relied upon the approach to inform the NPR-A IAP, [1129] BLM does not cite Wilson et al.[1130] anywhere in the DEIS. Appendix E points out that "the precise location of infrastructure, and thus the extent of overlap between surface disturbance and the high-use PCH calving area, is unknown"[1131] and concludes that "[i]t is likely that there would be no or very little surface disturbance within the high-use PCH calving area, given that the hypothetical development scenario suggests that future development would move from west to east, would be concentrated along the coast, and that lessees would attempt to minimize lengthy travel from coastal and existing infrastructure, and between CPFs."[1132] Such a conclusion appears to be more of a hope, rather than any kind of analytical result. It is especially called into question as the description of the hypothetical development scenario in Appendix B points out that "[e]stimating the level of future oil and gas activity in this area is difficult at best"[1133] and that "[t]he petroleum-related activities projected in this hypothetical development scenario is [sic] useful only in a general sense. This is because the timing and location of future commercial-sized discoveries cannot be accurately predicted until exploration drilling begins."[1134] In light of these admissions, as well as the failure of the DEIS to adequately incorporate all available research on oil and gas potential, its geographic extent and intensity

[1125] DEIS vol. 1 at 3-2.

[1126] E.g., DEIS vol. 1 at 3-118 through 3-121.

[1127] E.g., DEIS vol. 2 Tables J-12 and J-13.

[1128] Wilson et al. 2013.

[1129] BLM. 2013. For an example of the use of earlier forms of this model to describe the environmental consequences of proposed alternatives, see BLM 2013 vol. 3 at 44.

[1130] Wilson et al. 2013.

[1131] DEIS vol. 2 at E-9.

[1132] DEIS vol. 2 at E-9.

[1133] DEIS vol. 2 at B-1.

[1134] DEIS vol. 2 at B-2.

with respect to potential prospects and plays, and economic factors,[1135] it is unreasonable for the analysis of impacts to caribou to rely so heavily upon the assumptions of the hypothetical development scenario and to conclude that there would be little impact from development as a result, especially when other options are available.

To meet the standards of the best-available scientific approaches to evaluating impact while accounting for uncertainty, BLM should conduct scientific analyses that quantify impact across various aspects of potential development effects. This includes, but is not limited to, quantifying and mapping caribou habitat selection and the relative value of habitat across different seasons,[1136] using energetics models[1137] to estimate energy consequences of displacement away from prime forage areas, identifying the range of uncertainty in habitat loss under different alternatives,[1138] calculating population-level consequences of displacement,[1139] and considering cumulative effects of climate change on caribou.[1140] Inclusion of a suite of analyses will better represent impacts to caribou from the array of potential threats posed by the proposed alternatives and the cumulative effects of other proposed and ongoing projects compared to the simplistic approach included in the DEIS.

The recent analyses conducted at the request of the Canadian government and submitted as comments on the DEIS[1141] demonstrates that it is feasible for BLM to conduct a more rigorous and quantitative analysis that considers multiple aspects of impact on caribou and compares between the proposed alternatives. The so-called Caribou Cumulative Effects (CCE) model was developed by Don Russell and Anne Gunn, long-time caribou researchers with a wealth of experience and publications relating to caribou in Canada and the United States. The model was created to conduct a science-based risk assessment of PCH vulnerability to proposed Arctic Refuge Coastal Plain Development by using a computer simulation model to quantify expected population-level consequences for the PCH and implications for subsistence hunters under baseline conditions, the DEIS action alternatives, and full Coastal Plain development. Three linked submodels represented caribou movement and environmental (including development) exposure, energy and protein consequences of environmental exposure for individual caribou, and population dynamics based on the previous two models. This allowed quantification of population consequences expected under each development scenario and a range of variable climatic conditions.

The CCE presents an important step forward in analyzing impacts to caribou under the DEIS alternatives and yields key conclusions regarding the effects of Coastal Plain

[1135] *See supra* (hypothetical development section).
[1136] E.g., Wilson et al. 2012.
[1137] E.g., Russell et al. 2004.
[1138] E.g., Wilson et al. 2013.
[1139] E.g., Griffith et al. 2002.
[1140] E.g., Tews et al. 2007.
[1141] Russell and Gunn. 2019.

development.[1142] In addition to adopting the CCE approach or preparing a comparable analysis in a revised DEIS, BLM must also build upon the CCE approach, including the following aspects:

1. Population simulations in the CCE were conducted over a 10-year period, from 2017-2027.[1143] Ultimately, oil and gas impacts are predicted by the DEIS to last up to 130 years.[1144] Thus, population consequences of development should also be modelled across a similarly long time span.
2. More robust modeling of caribou movement is needed. The movement submodel in the CCE does not truly model caribou movement, but rather uses 414 movement paths from satellite collared caribou between 1985-2017 to reflect realistic movement patterns.[1145] These were overlaid on the environment as a way to sample environmental data from movement paths, including whether the individual was within the zone of influence of development on a given day. Use of existing movement paths, however, means that while the energetics of movement and costs to foraging were altered in the presence of development, distribution was not. As is described below, many records indicate alteration in caribou distribution in the presence of development. These are not reflected in the CCE. Options exist for modeling animal movement, with the opportunity to parameterize movement models based on telemetry data.[1146] Movement models have previously been used to examine development impacts including diversion and delay of caribou in northern Alaska.[1147] These should be improved upon by parameterization with caribou telemetry data or other available techniques should be used and integrated into a quantitative approach like that of the CCE.
3. The influence of edge effects that extend across lease restriction categories needs to be included in the model. We describe in detail below the importance of recognizing that development impacts may extend across lease restrictions boundaries into no surface occupancy and no leasing areas. In the rationale given for Map Designation 5 in Table 13, Russell and Gunn note that displacement and disturbance will occur across boundaries from adjacent development,[1148] but do not penalize this in their model. Absent a realistic spatial development buildout, the DEIS should apply an approach that simulates locations of development[1149] to assess where edge effects will intrude across lease restriction boundaries or assume an overly cautious approach and include penalties along all lease restriction edges in light of the potential for adjacent development.
4. The model needs to rigorously address all operations and activities that may occur under each alternative and not be prohibited by mitigation measures.[1150] For example, this may

[1142] See Russell and Gunn. 2019 for details.
[1143] Russell and Gunn. 2019 at 56.
[1144] DEIS vol. 2 at B-11.
[1145] Russell and Gunn. 2019 at 51.
[1146] E.g., Morales et al. 2004.; Patterson et al. 2008.; Bartoń et al. 2009.; Patterson et al. 2009.; Avgar et al. 2015.
[1147] BLM. 2014 at 353 – 354.
[1148] Russell and Gunn. 2019 at 77.
[1149] E.g., Wilson et al. 2013.
[1150] *See* reasonably foreseeable development section above and caribou comments below.

include aircraft takeoffs and landings, water withdrawals, seismic exploration, gravel mining, construction of water reservoirs, exploratory drilling, and more.

5. Climate variability was considered in the CCE in three categories – poor conditions, average conditions, and good conditions – represented by the first quartile, mean, and third quartile of climate indicator records from 1979–2016.[1151] Examining impacts to caribou under varying climate conditions is an important step in a quantitative analysis and an improvement on the approach taken in the DEIS (see below). However, it is also important to include conditions that go beyond the historic range of variability in climate in recognition of the rapid and unprecedented changes happening in the arctic, that are often without analog. Climate projection models that predict future conditions, even when those are novel with respect to the past, should be analyzed along with consideration of the historic range of variability. In particular, such climate projections need to be applied to the evaluation of impacts under the proposed alternatives. While the CCE was run under different climate conditions for the baseline and full-development conditions, the analysis of DEIS action alternatives was run only under average climate conditions.[1152] For a robust analysis of impacts under the proposed alternatives, the influence of climate variability — shown to matter in the baseline and full development scenarios — must be considered.
6. The CCE model was only run for the PCH. BLM must perform its quantitative analyses for both the CAH and the PCH as both herds regularly use the Coastal Plain. This will allow a more accurate consideration of impacts to the CAH, rather than just asserting without support that "potential impacts on CAH caribou are expected to be low" for each alternative.[1153]

In developing quantitative analyses of development impacts on caribou, whether following a framework like that of the CCE or other published approaches, it is important that season-specific impacts be analyzed across the full annual ranges and cycles of the PCH and CAH. It also is important that while such models may at times rely upon the best-available caribou telemetry data, validation of the models be conducted using the full range of historic records of caribou habitat use, including those collected using field observations, telemetry and aerial surveys. This is important to ensure that model results conform with caribou behavior and space use over the longer timeframes considered in the DEIS (e.g., up to 130 years[1154]). To ensure robust analyses, proposed methods should be reviewed and approved by a qualified group of independent scientists prior to conducting the analyses. Similarly, the results of any quantitative analyses should be made available at a draft stage for review and comment by the same independent group and by the public prior to being used to compare between proposed alternatives or to develop new alternatives. Upon completion of the analyses results should be made publicly available. We note that while the discussion above has focused on caribou, the application of a more robust set of quantitative analyses cannot be constrained to any one species and also should be applied to other important species in the Arctic Refuge to understand the comprehensive impacts of oil and gas development on Coastal Plain resources and wildlife. A

[1151] Russell and Gunn. 2019 at 55.
[1152] Russell and Gunn. 2019 at 76.
[1153] DEIS vol. 2 at E-3.
[1154] DEIS vol. 2 at B-11.

comprehensive approach is lacking in the DEIS but is necessary to understand and accurately describe the impacts of oil and gas development.

3. Mapping Historic Use of the Coastal Plain by the PCH

In light of the lack of clarity in the caribou telemetry data used to represent seasonal habitat use by the PCH and CAH in the DEIS, as well the potential for sole reliance on satellite telemetry data to underestimate calving area use, both described above, we sought out historical records of PCH calving and concentrated calving, digitized them to a geospatial format, and mapped them. The resulting records span annually from 1972-2018 (except for 2011) and also include a record from 1961. Maps are depicted individually for each year[1155] as well as in an animation that displays the variability in annual calving as well as the overall area used over time.[1156] Source information is listed in Table B-1 in Appendix B. We have provided these data as an attachment to our comments.[1157] Taken together, these historic records reinforce that over time the entire Arctic Refuge Coastal Plain is important for caribou calving.[1158]

We recognize the difficulties in combining calving depictions created using different survey methods (aerial surveys vs. telemetry records from individually-collared animals), varying sample sizes of collared individuals, multiple precisions of collar-based location information depending on the type of technology used, etc. Detailed analysis of overlap is difficult with such a dataset. Nonetheless, such historic records can be useful to reflect the extent of calving over longer time periods than are represented in the DEIS maps. We use our dataset primarily to communicate the extent of calving over time and the variability in use of calving areas over time. Review of the historic maps reveals extensive use of the entire program area for calving over time. It is notable that there are a number of years where calving occurred in the western part of the Coastal Plain, including outside of the calving areas of focus in the DEIS. We note that such depictions may still underestimate full Coastal Plain use by caribou.[1159] Over time the entire Coastal Plain is important for caribou calving.

As we point out throughout our comments, the calving period is not the only important time for caribou. Pre-calving arrival on the calving grounds, post-calving and summer insect relief are also critical if caribou are to successfully birth and grow their calves as well as replenish their own body condition to be ready for the subsequent winter. Coastal Plain use is thus not just important during the calving period, but across the rest of the year as well. An animation of caribou locations from collared animals created by CARMA,[1160] the CircumArctic Rangifer Monitoring & Assessment Network, illustrates well that the entirety of the Arctic Refuge Coastal Plain is used by caribou over time. The DEIS needs to clearly reflect the full array of historic data that represent use of the Coastal Plain.

[1155] Maps 2-48 in Appendix B.
[1156] Animation 2 in Appendix B.
[1157] These data are included with the documents submitted concurrently for the record.
[1158] Map 49 in Appendix B.
[1159] Russell and Gunn. 2019.
[1160] Animation 1 in Appendix B

4. Use of CAH Responses Insufficient for Inferring Impact to the PCH

The DEIS assumes responses of the PCH to development and resulting impacts to caribou will be similar to those recorded for the CAH.[1161] However, it fails to discuss impacts to the CAH following recent oil field expansions to the Prudhoe Bay oil field complex, particularly from the Point Thompson Project, which began production in April 2016 and is located just west of the Refuge Coastal Plain. While the DEIS acknowledges differences between conditions for the CAH and PCH, it fails to modify its assessment of impact based upon these differences.[1162] As we pointed out in our scoping comments,[1163] development impacts to the CAH have been substantial and USGS stated that impacts are expected to similarly be observed in the PCH, but that there are multiple reasons the PCH is likely to experience stronger effects from development.[1164] This is not reflected in the DEIS. We expand upon several differences between the herds below and describe their consequences for PCH impacts analysis. BLM must revise the DEIS to take these into consideration and use them to move beyond simply stating that differences exist and instead evaluate the greater impacts for the PCH and incorporate them into the descriptions of foreseeable effects.

a. The Narrow Arctic Refuge Coastal Plain Leaves Little Room for Shifts in Distribution

The Arctic Refuge Coastal Plain is constricted in a relatively narrow band between the Beaufort Sea coast on the north and mountainous terrain on the south, [1165] much less expansive than the coastal plain used for calving by the CAH and other herds farther west. In spite of this, the Arctic Refuge Coastal Plain is used for calving by one of the largest herds in North America, with about 8 times as many caribou calving in the Refuge in recent years on about one-fifth the amount of available habitat compared to that used by the CAH further west where current oil development is centered. While the CAH shifted its calving distribution away from industrial areas as they were developed,[1166] there are not the same opportunities to do so for the PCH. Displacement and disruption of calving and post-calving caribou by oil exploration and development in the Refuge, where the densities of caribou are very high, is likely to have far greater consequences than to the west. Although we pointed out the influence of the narrower Coastal Plain in the Arctic Refuge as part of our scoping comments, the DEIS fails to include implications of this feature for caribou and must do so in a revised DEIS.

[1161] E.g., DEIS vol. 1 at 3-114.
[1162] DEIS vol. 1 at 3-114.
[1163] Alaska Wilderness League et al. 2018.
[1164] Griffith et al. 2002.
[1165] Map 50 in Appendix B.
[1166] Wolfe 2000.; Cameron et al. 2002.

b. Different Demographic Drivers of the PCH and CAH

Russell and Gunn review demographic information for the PCH and CAH and relate it to various climate drivers.[1167] They found that early calf survival in the PCH was strongly influenced by spring and early summer forage conditions, while this had little influence on the CAH. In contrast, early calf survival in the CAH responded strongly to snow conditions in the previous fall, which have less effect on the PCH. These differences mean that development is likely to have disparate effects on the two herds. The DEIS notes that "[a]lthough several potential demographic impacts of development on CAH caribou have been reported…, the CAH increased in size between 1978 and 2010 before declining in size between 2010 and 2016."[1168] Reports of a CAH population increase during a period of increasing oil and gas development are likely due to a number of factors, one of which may be that limiting conditions for early calf survival occur at a time when the CAH is generally away from the main development areas.[1169] The PCH, in contrast, shows the strongest effects on early calf survival at the precise time that cows and calves would come into contact with potential Coastal Plain development – spring and early summer. Russell and Gunn conclude that, in light of this, "the documented displacement of calving in the CAH, if experienced with development in the PCH, would have more significant impacts on calf survival (for the PCH) than occurred in the CAH."[1170] BLM needs to account for this in the DEIS.

In addition, comparison of population patterns for the CAH and PCH would be enhanced by inclusion of quantitative population data in the DEIS. This is currently lacking. BLM needs to provide these data for the CAH both for the pre-oil and gas exploration and development period, particularly prior to Prudhoe Bay exploration in 1968 and intense construction of the Trans-Alaska Pipeline between 1969–1977, as well as for the period following exploration and development. Along with data from both periods, any limitations of the data should be discussed. This will allow a more robust assessment of population trends and potential development impacts.

c. Greater Insect Harassment Risk for the PCH

As described above, insect harassment is a major driver of caribou movement and can have important consequences for caribou energy balance and the ability to obtain sufficient forage to support calves and prepare for winter. Russell and Gunn describe how shifts in distribution of the CAH away from infrastructure came with a tradeoff in ability to reach coastal insect relief habitat.[1171] One reason the CAH might have been able to sustain this tradeoff, however, is due to a lower overall insect exposure. A spatial analysis of mosquito activity index based on temperature and wind speed records indicated that 70% of the CAH summer range occurs within the lowest mosquito activity category, while only 20% of PCH summer range

[1167] Russell and Gunn. 2019.
[1168] DEIS vol. 1 at 3-114.
[1169] Nicholson et al. 2016.
[1170] Russell and Gunn. 2019 at 35.
[1171] Russell and Gunn. 2019.

occurs in the same category.[1172] Thus, insect harassment effects may be stronger on the PCH compared to the CAH, accentuating the effect of any hindrance of caribou in reaching insect relief areas. BLM must evaluate this, given the DEIS' acknowledgement of the potential for "deflection and delays in caribou movements across roads and pipelines during the summer insect season."[1173]

d. Assumed Caribou Displacement Buffer Is a Minimum Estimate

The DEIS uses a 2.49-mile buffer to calculate potential displacement of calving caribou,[1174] presumably based on studies of the CAH.[1175] Terminology is inconsistent here: in some places the DEIS states that "maternal caribou with young calves would avoid infrastructure by up to 2.49 miles,"[1176] while in other places the DEIS states that they "may" be displaced.[1177] Nonetheless, the assumption clearly is made that impacts would range from the area of the gravel footprint up to a maximum of 2.49 miles out from that footprint.[1178] While we appreciate the recognition that caribou would be affected by infrastructure and would exhibit displacement, nowhere is it noted that this is a minimum estimate of displacement from infrastructure and that the actual displacement may be larger. There are several reasons to expect that potential impacts could exceed those previously recorded for the CAH. First, study of the CAH has shown that the increasing pattern of cows and calves with distance from roads may continue beyond 4 km (2.49 miles).[1179] As ADF&G summarizes, "[b]y the mid-1980s, major movements of CAH caribou through the Prudhoe Bay oil field in summer had ceased, and caribou distribution and movements within the Kuparuk oil field were altered substantially."[1180] Later studies have shown more broad shifts of CAH caribou with caribou use of areas decreasing as the density of infrastructure increased, as described above.[1181] This suggests much more extensive displacement than just 4 km. While the USGS notes that 4 km is a conservative estimate of calving displacement,[1182] BLM fails to do the same in the DEIS.

Second, the DEIS points out that "PCH caribou have had much less exposure to human development and activities than have CAH caribou…, so they would be expected to have stronger reactions to infrastructure than CAH caribou for some years."[1183] It is unclear why this is not reflected in the expected displacement away from infrastructure. Instead, the DEIS says

[1172] Table 3 in Bali. 2016.
[1173] DEIS vol. 1 at 3-113.
[1174] DEIS vol. 1 at 3-112.
[1175] DEIS vol. 2 at E-8.
[1176] DEIS vol. 2 at E-8 (emphasis added).
[1177] E.g., DEIS vol. 2 at F-28.
[1178] E.g., DEIS vol. 1 at 3-118.
[1179] Dau and Cameron. 1986.
[1180] Lenart. 2015 at 18-2.
[1181] *See* Figure 14 in Russell and McNeil. 2005 and Figure 4.7 in Cameron et al. 2002.
[1182] Griffith et al. 2002.
[1183] DEIS vol. 1 at 3-114.

that the same level of displacement "observed at existing North Slope oil fields would be expected in the program area with similar development and mitigation design."[1184]

Third, assuming the same displacement distance as observed with the CAH ignores the potential influence of hunting. Hunting is not allowed from roads in the Prudhoe Bay complex,[1185] but will be allowed for both subsistence and non-subsistence hunters in the Coastal Plain according to the DEIS.[1186] Previous studies have shown that hunting may increase avoidance responses of ungulates to infrastructure.[1187] Indeed, one study found road effects on caribou extended up to 15 km from roads some years during hunting season.[1188] The presence of hunting in the Coastal Plain will create different conditions for the PCH compared to those experienced by the CAH, potentially increasing the effect of displacement from roads and facilities. The statement in the DEIS that "hunting is allowed along most roads in Alaska"[1189] has little relevance to this discussion, as it nonetheless is not something experienced by the CAH around oil and gas infrastructure, which is the standard being used in the DEIS to extrapolate impacts to the PCH.

For all of the reasons above, BLM should clearly state that the 4 km displacement distance used in its analyses is a minimum representation of what might be observed during calving and post-calving by caribou cows and calves and should acknowledge that development may displace caribou and/or disrupt free movement of caribou from all or most of the Coastal Plain during both calving and post-calving. Furthermore, BLM must provide a robust discussion of the above potential concerns and should revise its analysis to compare effects on caribou during calving and post-calving under a larger displacement buffer. This is important as it will influence the "potential disturbance and displacement" area calculations used by BLM to compare impacts under each alternative,[1190] potentially greatly increasing the affected area.

5. Development impacts on caribou are insufficiently addressed

There are multiple reasons that development impacts on caribou are insufficiently addressed in the DEIS. In addition to the deficiencies in baseline data and information discussed above, there are issues with certain potential impacts not being fully considered, unjustified assumptions being used, and phrasing that downplays potential impacts to caribou. Specific instances of these issues are described in the following sections.

[1184] DEIS vol. 1 at 3-114.
[1185] Lenart. 2015.
[1186] DEIS vol. 1 at 3-122.; DEIS vol. 2 at F-28.
[1187] Paton et al. 2017.; Plante et al. 2018.
[1188] Plante et al. 2018.
[1189] DEIS vol. 1 at 3-122.
[1190] DEIS vol. 1 at 3-112.

a. Seismic exploration

The DEIS downplays the potential impact to caribou and their habitats from seismic exploration, such as the geographic extent of potential operations across the Coastal Plain as well as the likelihood of repeated surveys over the life of the oil and gas program. [1191] The DEIS states that direct impacts on caribou from seismic exploration are expected to be negligible due to the low level of use by caribou during the winter.[1192] There are two problems with this conclusion. First, it ignores that the Coastal Plain has at times been used in the winter by a sizable proportion of the TCH[1193] and regularly by scattered groups of the CAH.[1194] That such events are rare for the TCH and affect relatively small numbers of the CAH does not necessarily mean the impacts are insignificant. What would the consequences be for the CAH, TCH or another caribou herd if, in a year when conditions drove them to use the Coastal Plain, there were inhibited from doing so by seismic exploration or other activities and infrastructure? It is surprising that BLM gives no consideration to this possibility, even if rare, given that the DEIS acknowledges this occasional use of the Coastal Plain by the TCH.[1195] This should be considered and the potential consequences if it were to occur should be clearly stated and supported by scientific justification.

The second problem involves potential impacts to the PCH. The end date permitted for seismic exploration could influence the likelihood of impacts to caribou. When SAExploration applied for a permit to conduct seismic exploration in the Arctic Refuge in the 2018–2019 and 2019–2020 winter seasons, it requested a plan of operations ending on May 31st or the date of tundra closure.[1196] As of the submission of these comments, SAExploration has indicated that it will seek permits for 2019–2020 and 2020–2021, so we do not know if the company would be granted permission to operate at all or if dates would extend through May 31st. Such an end date would almost certainly bring exploration activities into contact with pregnant caribou arriving on the Coastal Plain calving ground. Caribou preparing to calve typically arrive on the Coastal Plain by mid- to late-May, though they have been noted as early as May 5th in light snow years.[1197] The U.S. Geological Survey (USGS) reported median arrival dates on the Coastal Plain of collared pregnant females as ranging from May 17 to June 4.[1198] The first calves are usually born the last week of May,[1199] and peak calving even has been reported in late May.[1200] In light of this, it is possible that calving ground arrival, and even calving itself, could coincide with the end of the seismic exploration season. As calving is a time when caribou mothers and calves are highly sensitive to disturbance,[1201] the unquestionably significant impacts that any overlap of

[1191] *See supra* seismic section.
[1192] DEIS vol. 1 at 3-110, 3-112.
[1193] Person et al. 2007.
[1194] Clough et al. 1987.
[1195] DEIS vol. 1 at 3-104.
[1196] SAExploration. 2018.
[1197] Garner and Reynolds. 1986.
[1198] Griffith et al. 2002.
[1199] Garner and Reynolds. 1986.
[1200] Skoog et al. 1963.
[1201] Dau and Cameron. 1986.

seismic exploration with calving ground arrival and calving would have must be considered in the EIS. BLM needs to explain why, in light of the information presented above, no consideration is given to the impact of end-of-season seismic dates on caribou.

Indirect effects of seismic exploration are also a concern for caribou. While these are mentioned in the DEIS, the full impacts are not adequately considered. The DEIS acknowledges that timing of snowmelt could change due to compaction of snow caused by seismic exploration, and that this could reduce forage availability for caribou.[1202] Furthermore, it is noted that long-term damage to forage plants is likely to occur,[1203] with impacts lasting about 20 years.[1204] This was based on the results of a single 2D seismic program; proposed and future 3D seismic surveys with closely spaced seismic lines used by greater numbers of heavier vehicles over the life of the oil and gas program could result in higher impacts.[1205] This is of great concern for caribou calving and post-calving habitat. As is noted above, the post-calving period is a crucial time for caribou to obtain sufficient high-quality forage to meet their energy needs during lactation and to begin re-building energy stores depleted during the winter. The BLM must fully evaluate, based on the best-available science, the impacts that damage to vegetation may have on caribou. This needs to be done with references to scientific studies. The DEIS alleges that seismic exploration "could also extend the time when highly nutritious, early growth forage is available after snowmelt."[1206] BLM provides no support for this conclusion, leaving the reader unable to evaluate whether or not the statement is justified. Scientific evidence for this statement must be clarified and the relative effects of any potential benefits must be weighed against the foreseeable significant negative effects specified above. Furthermore, scientific information must be evaluated for impacts to caribou and their habitat from all elements of seismic operations, including seismic trails, camp and fuel move trails, and snow trails, as well as any summer "stickpicking" clean up or follow-up ground work conducted in summer associated with seismic exploration.

The concerns above are especially strong because even under Alternative D, where some of the PCH primary calving habitat (using the DEIS definition) is set aside for no leasing, the DEIS acknowledges that "seismic activity could occur over the entire program area."[1207] It is deeply troubling that seismic exploration would be allowed under Alternative D in an area set aside to protect sensitive caribou calving habitat, especially because such exploration would serve no apparent purpose given that the areas are unavailable for leasing. The BLM should not allow this and must give a thorough rationale for why seismic exploration would be allowed in an area with no leasing.

[1202] DEIS vol. 1 at 3-112.
[1203] DEIS vol. 1 at 3-112.
[1204] DEIS vol. 1 at 3-71.
[1205] Walker et al. 2019.
[1206] DEIS vol. 1 at 3-112.
[1207] DEIS vol. 1 at 3-120.

b. Importance of less frequently used calving and post-calving habitat

Much attention is focused in the DEIS on "primary calving habitat" and post-calving habitat, based on repeated use over time.[1208] The DEIS "defines important calving grounds as the high-use PCH calving area (area used in greater than 40 percent of years)."[1209] It is important to note, however, that annual calving areas used less frequently may still be of great importance to the ability of a caribou herd to survive and thrive. Annual calving grounds tend to occur in areas with higher rates of increase for vegetation productivity, as measured by the Normalized Difference Vegetation Index (NDVI).[1210] The importance of caribou accessing nutritious forage during the calving and post-calving periods has been described above. These areas vary spatially over time, and the PCH appears to shift its calving areas in response.[1211] Because of this, the entire Coastal Plain is important to caribou over time.[1212] Indeed, historic records show calving and even concentrated calving, along with large post-calving aggregations, in the western parts of the program area.[1213] While the DEIS acknowledged the 2015 findings of the USFWS, that "due to the annual variability in the calving area, the PCH needs a large region from which to select the best conditions for calving in a given year,"[1214] it also contends that, while "[h]abitat loss would reduce forage availability for terrestrial mammals," "foraging habitat is abundant across the program area."[1215] This assumes that forage habitat is of equal quality everywhere, a contention not borne out by previous studies. In their 2002 report on the PCH, USGS concluded that "unrestricted access to annual calving grounds and concentrated calving areas maximized performance of lactating Porcupine caribou herd females and their calves."[1216] Caribou need to be able to track varying resources. For these reasons, the entire Coastal Plain is important for caribou, not just areas that have shown repeated use in the recent past. As USFWS described, "[c]ertain areas within a caribou herd's range may not be used by caribou for a long period. But as herd movement patterns shift (possibly due to climatic changes), these infrequently used areas may become important."[1217] The potential for climate change-induced shifts in calving areas is acknowledged in the DEIS,[1218] but not taken into consideration when evaluating important habitat. It is the responsibility of BLM to evaluate, using the best available scientific information, the potential costs for caribou population growth of being unable to access nutritious forage for one or a few years in a row due to development, rather than just asserting that an abundance of habitat means there will be no consequences of displacement.

[1208] E.g., DEIS vol. 1 at 2-13 and 2-14.
[1209] DEIS vol. 2 at E-8.
[1210] Griffith et al. 2002.
[1211] Griffith et al. 2002.
[1212] Caikoski. 2015.
[1213] E.g., Garner and Reynolds. 1986.
[1214] DEIS vol. 1 at 3-107, citing USFWS. 2015.
[1215] DEIS vol. 1 at 3-112.
[1216] Griffith et al. 2002 at 32.
[1217] Garner and Reynolds. 1986 at 241.
[1218] DEIS vol. 1 at 3-110.

Furthermore, BLM needs to consider the full range of records of caribou use when delineating important caribou habitat. Caribou have continuously inhabited the range of the PCH for over 400,000 years according to paleontological evidence.[1219] As Joshua Miller relates in his comments on the DEIS, based on paleontological research he has done on the Coastal Plain, antler records show calving and other patterns of use for both male and female caribou across the Coastal Plain stretching back thousands of years.[1220] Written references to caribou on the Coastal Plain date back to 1825,[1221] while artifacts and bones confirm use of caribou by indigenous people 12,000–17,000 years ago or more.[1222] Western scientific information dating back to at least the early 1950s on distribution and habitat use should also be considered.

c. Road effects on caribou habitat

As is noted above, caribou rely on movement to access nutritious forage and avoid predators and insects. Freedom to roam is thus an important element of caribou habitat. There are no roads today in the Arctic National Wildlife Refuge, nor in the adjacent Ivvavik and Vuntut National Parks in Canada. The DEIS fails to fully consider the unique risks to unimpeded access that major transportation networks and oil field roads pose to caribou movements and use of the Coastal Plain. Those risks are exacerbated by the narrowness of the Coastal Plain in the Arctic Refuge.

The hypothetical development scenario states, without scientific analysis:

> In caribou areas, potential roads would be built on north-south and east-west orientations to the extent possible to limit interference with caribou migration. Figure B-2, Conceptual Layout of a Caribou Area Stand-alone Oil Development Facility, shows how the hypothetical layout could be adjusted for caribou mitigation if deemed appropriate by permitting agencies.[1223]

Figure B-2 depicts a slightly different layout of the roads radiating out from the Central Processing Facility to additional "satellite" drill sites, but no explanation is provided for assumptions about why it would be expected to have a differing impact on caribou compared with Figure B-1. Furthermore, no analysis was provided for how a major road and transportation system and infield roads would affect caribou movements. BLM needs to address these issues using strongly supported scientific information.

Nor does the DEIS fully analyze other reasonably-foreseeable infrastructure impacts on caribou. This includes the impacts of temporary exploration roads, gravel extraction,[1224] and water withdrawals and hauling for ice infrastructure and other needs — particularly considering

[1219] Nuttall et al. 2005.
[1220] Miller. 2019.
[1221] Franklin. 1828.
[1222] Nuttall et al. 2005.
[1223] DEIS vol. 2 at B-13.
[1224] *See* gravel section.

the relative lack of Coastal Plain freshwater.[1225] The DEIS lacks specific analysis of where temporary and permanent infrastructure is likely to be located or where water withdrawals, water reservoirs, and gravel extraction are likely to take place. Without that information, BLM cannot analyze reasonably foreseeable disturbance impacts to caribou.

There has been extensive research on negative impacts of roads associated with the Trans-Alaska Pipeline and the Prudhoe Bay oilfield complex to the CAH.[1226] The DEIS fails to provide an adequate synthesis of the impacts to caribou documented in dozens of monitoring and research studies conducted over many decades by biologists of the Alaska Department of Fish and Game, federal agencies, University of Alaska Fairbanks scientists and others, nor of their evaluations of differences in potential effects for the PCH due to the natural landscape, habitat use and migratory patterns.[1227] Such research on effects to caribou and their habitats was addressed in an extensive synthesis of cumulative impacts of oil and gas activities by the National Academy of Sciences.[1228] The DEIS obscures or downplays these documented major and accumulating effects, and evades its responsibility to provide sufficient discussion by stating: "impacts of oil and gas development on caribou have been summarized in various reviews, along with appropriate mitigation measures (Shideler 1986; Cronin et al. 1994; Murphy and Lawhead 2000; Lawhead et al. 2006), which are incorporated here by reference and are summarized below."[1229] That approach — which is repeated throughout the impacts analysis, including for behavioral responses from potential disturbance[1230] — does not satisfy BLM's obligation to take a hard look at reasonably foreseeable impacts to caribou.

The DEIS acknowledges that habitat alteration and snowdrifts along roads would delay and ultimately reduce local forage availability for caribou.[1231] As is stated in the previous section, this raises concerns that should be addressed about the ability of caribou to acquire adequate forage to meet their energetic needs during the calving and post-calving periods. The DEIS also fails to include adequate discussion of the toxicological effects of roads. The DEIS states that dust generation during creation of gravel roads and travel upon those roads "may add toxic metals to roadside vegetation that mammals forage."[1232] This is a significant potential consequence, yet it was not even mentioned in the DEIS description of road effects.[1233] Contaminants in snow have been previously documented at Prudhoe Bay.[1234] Contaminants are

[1225] *See* water resources section.

[1226] E.g., Cameron et al. 1979.; Cameron and Whitten. 1979.; Cameron and Whitten. 1980.; Whitten and Cameron. 1983.; Smith and Cameron. 1985.; Dau and Cameron. 1986.; Cameron et al. 1992.; Smith et al. 1994.; Cameron et al. 1995.; Nellemann and Cameron. 1996.; Nellemann and Cameron. 1998.; Cameron et al. 2005.

[1227] E.g., Griffith et al., 2002.

[1228] National Research Council. 2003.

[1229] DEIS vol. 1 at 3-110; *see also* discussion re: improper tiering.

[1230] E.g., DEIS vol. 1 at 3-113.

[1231] DEIS vol. 1 at 3-113.

[1232] DEIS vol. 1 at 3-117.

[1233] E.g., around DEIS vol. 1 at 3-113.

[1234] Snyder-Conn et al. 1997.

of special concern given that studies in Prudhoe Bay have shown that indirect effects of infrastructure combined with rapid climate change have increased rates of thermokarsting, creating more channels.[1235] This may exacerbate spread of toxic dust, increasing the level of impact. Studies of drilling waste reserve pits documented dispersal of drilling waste components across tundra wetlands and ponds away from the actual drilling sites,[1236] and at nearshore drilling sites.[1237] Additional information is needed about the likelihood of such toxic metal deposition and about the expected impacts it would cause on caribou. Such discussion must be supported by the best-available scientific information and include studies elsewhere in Alaska.[1238] It is especially important that this topic be addressed if fugitive dust leads to early snowmelt and green-up, attracting caribou to areas near roads.[1239] Toxic metals could change such early snowmelt from potentially beneficial, as claimed in Table 3-19, to having a significant adverse effect on caribou. This is especially of concern in calving and post-calving habitat (which occupy the entire Coastal Plain), as young organisms, especially those that are still feeding on milk, experience greater absorption and lower excretion of toxic metals, making early age a critical period for metal toxicity.[1240] BLM needs to address these concerns in a much more robust and science-supported manner, clearly explaining the consequences for caribou.

d. Little evidence for assumption of habituation

The DEIS asserts that "[e]xperience in existing northern Alaska oil fields indicates that caribou and other terrestrial mammals may habituate to low-level constant noise and oilfield activities on roads and pads."[1241] Notably, no citations are given for this statement. Throughout the DEIS, the assumption is made that habituation will play a role in reducing negative impacts on caribou from development.[1242] The effectiveness of habituation is not sufficiently demonstrated in the DEIS. In fact, the evidence in the scientific literature for habituation to infrastructure in caribou is equivocal at best. A search of the scientific database *Web of Science* for studies of caribou habituation revealed only three peer-reviewed studies of caribou habituation to oil and gas activity. Two of these look at habituation within the CAH.[1243] While both claimed to show evidence of habituation, Haskell et al.[1244] base this largely on use of areas closer to infrastructure during the post-calving period, when insect harassment is a dominant driver of caribou space use. Calving caribou only moved closer to infrastructure during the calving period in one of the three years evaluated.[1245] The second study[1246] found no evidence of

[1235] Raynolds et al. 2014.
[1236] West and Synder-Conn. 1987.; Woodward et al. 1988.
[1237] Snyder-Conn et al. 1990.
[1238] E.g. Hasselback et al. 2005.
[1239] DEIS vol. 1 at 3-113.
[1240] Jugo. 1977.; Kostial et al. 1978.
[1241] DEIS vol. 1 at 3-114.
[1242] E.g., DEIS vol. 1 at 3-115, 3-119, 3-121; DEIS vol. 2 at E-7.
[1243] Haskell et al. 2006.; Haskell and Ballard. 2008.
[1244] Haskell et al. 2006.
[1245] Haskell et al. 2006.
[1246] Haskell and Ballard. 2008.

habituation across years. They observed greater percentages of calves and numbers of caribou per kilometer surveyed in years with earlier snowmelt and inferred this as evidence that caribou habituated to infrastructure during each year, but point out that "[t]he available data were few, so our results may benefit from further verification or falsification."[1247] Furthermore, they acknowledge that "caribou will not coexist with hunted oilfields as they have with oilfields as a refuge."[1248] As is noted above, the presence of hunting in the Arctic Refuge will present a key difference from the Prudhoe Bay and Kuparuk areas, enhancing impacts and, in this case, preventing habituation — something not acknowledged in the DEIS. The third study[1249] is cited in the DEIS as a possible indication of habituation to infrastructure by the PCH.[1250] Johnson and Russell used 27 years of location data for the PCH to examine winter distribution responses to various human infrastructure and disturbance in Canada, including both seismic lines and well sites as well as non-energy infrastructure.[1251] They found a decreasing response of caribou to human infrastructure over time, but concurrent decreases in oil and gas activities made it difficult to determine whether this was due to habituation or to regeneration of natural habitats and processes after the cessation of human activities.[1252] They specifically point out that their "measured pattern is neither definitive nor causal."[1253] It is also notable that this study was during winter, not during calving when parturient females are most sensitive, and took place in forested environments, where barren-ground caribou show different behavior than is seen in open tundra areas.[1254] In a report on mitigating oil development effects on caribou that is cited in the DEIS, Cronin et al. acknowledge that "[e]vidence for habituation to anthropogenic stimuli by the CAH in and around the oil fields is fragmentary and anecdotal."[1255] It is thus surprising that the DEIS so often assumes habituation.

Other studies of ungulates also have failed to find strong evidence of habituation to industrial development and activity. Boulanger et al.[1256] examined caribou disturbance responses near a diamond mine in Canada and found variation in avoidance responses over time but no

[1247] Haskell and Ballard. 2008 at 628.
[1248] Haskell and Ballard. 2008 at 634.
[1249] Johnson and Russell. 2014.
[1250] DEIS vol. 1 at 3-114.
[1251] Johnson and Russell. 2014.
[1252] Johnson and Russell. 2014.
[1253] Johnson and Russell. 2014 at 61.
[1254] Bergerud. 1974.
[1255] Cronin et al. 1994 at A-67. We do not endorse or agree with many of the conclusions of Cronin et al. 1994. This report was funded by the Alaska Oil and Gas Association, who selected the participants of a workshop that was closed to the public, other researchers, conservation organizations, and the Gwich'in Steering Committee. Northern Alaska Environmental Center Press Release: Oil industry meetings privately with agencies on Caribou Study Plans (Jan. 24, 2002).Work by this group implying a lack of infrastructure impacts on caribou has been rebutted (Joly et al. 2006). We cite the report here only to reinforce the point that the very studies that BLM cites do not support its reliance on habituation to mitigate impacts.
[1256] Boulanger et al. 2012.

clear evidence of habituation. Another recent Canadian study found avoidance of long-established infrastructure, "suggesting that long-term habituation is unlikely."[1257] Similarly, recent research on mule deer (*Odocoileus hemionus*) in the contiguous United States found that the deer did not habituate to energy development even after a 15-year period and intensive mitigation efforts.[1258] A study in Norway found no evidence of habituation by reindeer to ski resorts, trails, and recreational cabins over a 20-year study.[1259] Furthermore, a group of caribou experts concluded that past experiences suggest that the PCH would show "a low degree of habituation, particularly of maternal cows, to the presence of development."[1260] The EIS must reflect the current state of knowledge and acknowledge that the current scientific literature does not justify an assumption of habituation for caribou.

e. DEIS downplays impacts to caribou in its phrasing

The way many of the impacts to caribou are described in the DEIS, including what is mentioned and what is omitted, serves to downplay the possible magnitude of negative effects. For example, while the DEIS properly acknowledges that major negative impacts to calving caribou and displacement of caribou from infrastructure will be adverse, long-term, and planning area wide,[1261] in multiple instances the phrasing of the DEIS serves to downplay the importance of this impact. This starts in the Affected Environment descriptions of calving on the Coastal Plain. The description of PCH calving switches the units of measures in ways that cover up the importance of the Arctic Refuge Coastal Plain for calving. From 1983–2001 the DEIS states that "the annual percentage of PCH females calving in the ANILCA 1002 Area (essentially the program area) averaged 42.7 percent."[1262] Presumably this refers to the percentage of collared PCH females, not all calving females, but this is not clear because no data source is cited for this claim. The presence of the same statistic in Griffith et al.[1263] leads us to assume that was the source of this information. BLM must clearly cite its sources rather than leaving the reader to infer data sources from their own research. In any event, reporting only the average percentage makes it appear that the Arctic Refuge Coastal Plain is used for calving by less than half of female caribou. Examination of the presumed source, however, reveals that while the average percentage of females calving in the 1002 Area from 1983–2001 was 43%, the percentage use each year "was quite variable" and ranged from 0-92%.[1264] Only reporting the average downplayed the fact that in some years use was quite high. From 2000 to 2011 the DEIS description is of the number of years in which "annual concentrated calving areas occurred in the Yukon or near the Yukon-Alaska border."[1265] The resulting claim of 8 out of 12 years where concentrated calving occurred mostly outside of the program area again suggests the relative

[1257] Plante et al. 2018 at 138.
[1258] Sawyer et al. 2017.
[1259] Nellemann et al. 2010.
[1260] Elison et al. 1986 at 21.
[1261] Table 3-19 in DEIS vol. 1 at 3-111.
[1262] DEIS vol. 1 at 3-106.
[1263] Griffith et al. 2002.
[1264] Griffith et al. 2002 at 17.
[1265] DEIS vol. 1 at 3-106.

unimportance of the Coastal Plain for calving. This time a source is given. Review of that source reveals that in addition to reporting the trend of concentrated calving primarily occurring outside of the program area from 2000–2011, USFWS also reports that "[f]rom 1983-1999, concentrated calving areas were in Arctic Refuge in all years and also occurred in the Yukon in 3 of 17 years."[1266] Had the same unit of measure been used for both the 1983–1999 period and 2000–2011, it would have presented a very different picture. As is noted above, historic records point to use of the Arctic Refuge Coastal Plain for caribou calving for thousands of years. Furthermore, as we discuss above, even in years in which the PCH primarily calved in Canada, the herd has travelled to the Arctic Refuge Coastal Plain for food and insect relief during the post-calving period.[1267] It is important that BLM reflect the importance of the Arctic Refuge Coastal Plain in the EIS and not downplay it by selectively choosing which statistics to report.

Impacts to caribou are also minimized in the DEIS by including them outside of the main caribou section. While the DEIS acknowledges that "future oil and gas infrastructure in the program area, particularly in the PCH calving grounds, could cause a shift in calving distribution during some years, which would likely reduce calf survival and halt herd growth," potentially resulting in reductions in calf survival and herd numbers,[1268] this comes in the Subsistence Uses and Resources section, rather than in the Terrestrial Mammals section. Impacts to caribou must be clearly stated in the sections on caribou so that the public is able to determine the full weight of potential impacts.

f. Inconsistent impact metrics hinder effective analysis

Much of the analysis of potential development impacts on caribou in the DEIS relies on the hypothetical development scenario and descriptions of expected impact. Different descriptions of the amount of the environment affected, however, prevent clear evaluation of what the true impacts may be. For example, in Chapter 3, the DEIS states that the hypothetical schematic of an anchor-field footprint totals 750 acres, resulting in 633,000 acres of potential disturbance and displacement for caribou.[1269] Presumably the 750 acres is representative of Figures B-1 and B-2, as the description "(one CPF and 6 radiating 8-mile access roads to 6 drill pads, including an STP pad and a 30-mile access road, totaling 750 acres)"[1270] precisely matches what is shown in those figures.[1271] In Appendix E, however, BLM states:

> Surface disturbance associated with one CPF in the high-use PCH calving area could total up to 488 acres based on Figure B.2., Conceptual Layout of a Caribou Area Stand-along Oil Development Facility, in Appendix B. Depending on the configuration of the oil field, displacement of maternal caribou around 488

[1266] USFWS. 2015 at 4-101.
[1267] Griffith et al. 2002.
[1268] DEIS vol. 1 at 3-173.
[1269] DEIS vol. 1 at 3-112.
[1270] DEIS vol. 1 at 3-112.
[1271] DEIS vol. 2 at B-14 and B-15.

> acres of surface disturbance could total up to 118,500 acres (4 percent) of the high-use calving area.[1272]

This reference to the hypothetical development figure states that the facility acreage is only about 65% of that listed in Chapter 3, resulting in an estimated displacement area that is less than 20% of the size reported in the Chapter 3. Simple addition of the acreages shown in Figure B-2 yields 732 acres total,[1273] suggesting the Appendix E estimate may be incorrect. This difference is very disturbing, especially as it seems that BLM is drastically underestimating effects in its ANILCA 810 subsistence analysis that are clearly acknowledged elsewhere.[1274] This raises grave concerns about the impacts estimated for caribou and the conclusions drawn in Appendix E. BLM needs to fix this discrepancy and clearly explain what the level of impact is expected to be and how it was derived from the diagram.

g. Lack of analysis of gravel mining effects

BLM acknowledges that gravel mining would result in habitat loss and alteration,[1275] yet gravel mines are not included in the 2,000-acre limit.[1276] The justification given for not including gravel mines, that they "supply raw materials for construction of oil and gas facilities but are not themselves oil and gas facilities any more than are mills that supply steel for construction of pipelines and other facilities,"[1277] completely ignores the difference between facilities located far outside the Arctic Refuge and those located within its boundaries. If steel mills were proposed to be created within the program area it would be essential that they and their impacts be considered. So too should the direct, indirect, and cumulative impacts of gravel mines be considered. Unfortunately, the impacts of gravel mining largely were not considered when analyzing potential impacts of development on caribou.

Caribou have been shown to respond negatively to mining, exhibiting displacement from the area around mines[1278] and alteration of movement behavior in response to mining roads and traffic.[1279] The DEIS acknowledges that studies have shown larger areas of displacement for caribou than reported around roads in the Prudhoe Bay area,[1280] but nevertheless bases its

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[1272] DEIS vol. 2 at E-9.

[1273] Calculation based acreages listed in Figure B-2 in DEIS vol. 2 at B-15: 1 CPF x 50 acres + 6 satellite wells x 12 acres each + 1 seawater treatment plant x 15 acres + 1 barge landing location x 10 acres + (1 road from the seawater treatment plant to the development area x 30 miles + 6 access roads to satellite wells x 8 miles each) x 7.5 acres per mile of road (as stated in DEIS vol. 2 at B-16) = 147 acres from buildings + 585 acres from roads = 732 acres total. Note that acreages, road miles, and facility numbers are identical in Figure B-1 also.

[1274] *See also* discussion re: subsistence and ANILCA 810.

[1275] DEIS vol. 1 at 3-112.

[1276] DEIS vol. 1 at 1-6.

[1277] DEIS vol. 1 at 1-6.

[1278] Boulanger et al. 2012.; Plante et al. 2018.

[1279] Wilson et al. 2016.

[1280] DEIS vol. 1 at 3-114, citing Boulanger et al. 2012.

displacement analyses on a 4 km road displacement distance and ignores any compounding effects of mining removing additional caribou habitat. Displacement due to mining may be 3–5 times larger than the 4 km area that BLM assumes for roads.[1281] Furthermore, Required Operating Procedure (ROP) 24 has a goal of minimizing the impact of mining on air, land, water, fish and wildlife[1282] but no mention is made of caribou, nor do any provisions prohibit mine placement within caribou habitat, NSO or no leasing areas. BLM needs to clearly specify where gravel mining will be allowed within or near the program area to allow evaluation of its impacts. It must then use that information in conjunction with the scientific evidence cited above to quantitatively evaluate the direct, indirect and cumulative impacts to caribou from gravel mining in or near the program area.

h. Numerous points are asserted with insufficient justification

There are a number of points in the DEIS where statements are asserted with no or insufficient support or citation. This is problematic for the document's ability to be adequately reviewed by the public. While several such instances are described elsewhere in these comments, additional examples are provided here. For example, the DEIS asserts that mitigation measures under Alternative B "would be adequate to maintain caribou passage to coastal areas."[1283] No citation or support is given for this statement. Indeed, it is not even clear to which specific measures BLM is referring. Moreover, the statement seems in sharp contrast to recognition by ADF&G that "[b]y the mid-1980s, major movements of CAH caribou through the Prudhoe Bay oil field in summer had ceased, and caribou distribution and movements within the Kuparuk oil field were altered substantially."[1284] BLM needs to demonstrate based on the scientific literature, not simply assert, why and how specific proposed measures will adequately allow caribou passage. [1285]

Another example comes from the DEIS assessment of road mortality risk to caribou. The DEIS states that traffic management and vehicle use plans and prohibitions on chasing caribou with vehicles "sufficiently mitigate mortality risk to caribou on the North Slope."[1286] The citation given for this statement is a personal communication by Alex Prichard, one of the consultants who helped prepare the Terrestrial Mammals section of the DEIS.[1287] Serving both as an author of the DEIS and as the source of a personal communication about the sufficiency of the DEIS presents a conflict of interest and offers insufficient justification for the recorded claim. BLM needs to provide a robust scientific analysis of the proposed road mortality mitigation measures that demonstrates how and why they will "sufficiently mitigate mortality risk to caribou."

[1281] Boulanger et al. 2012.; Plante et al. 2018.
[1282] DEIS vol. 1 at 2-27.
[1283] DEIS vol. 2 at E-7.
[1284] Lenart. 2015 at 18-2 and citations therein.
[1285] *See also* mitigation measures discussion.
[1286] DEIS vol. 2 at E-7.
[1287] DEIS vol. 2 at C-2.

A third example regards the DEIS' statements about caribou displacement. It is asserted that, "[c]aribou would be displaced from areas that no longer have suitable forage, but displacement is not expected to be widespread. Caribou could still forage within the total footprint of a CPF and its associated satellite well pads, for example."[1288] Again, no citations are provided. The claim that "displacement is not expected to be widespread" is surprising in light of the DEIS's recognition of displacement of caribou with calves due to development[1289] and the estimated acreages of potential calving displacement that are larger than the entire area available for leasing under some alternatives.[1290] As is described above, these estimates are minimums. The assertion that caribou could forage within the development footprint ignores the history of CAH animals gradually abandoning concentrated use of much of the development complex to the west of the Arctic Refuge. As a recent Canadian report points out:

> [T]he CAH, especially cows and calves, altered their behavior and distribution as risk aversive responses to the oilfields and those responses have persisted for over 40 years. Current monitoring describes cows and newborn calves continuing to avoid roads and shifted calving distribution based on aerial surveys and location of collared caribou which does raise questions about the effectiveness of mitigation.[1291]

We agree with their concern. Results from the CAH suggest that even "state of the art" mitigation measures have not been effective and raises great concerns about the impacts to caribou foraging that would arise from concentrated development in the Arctic Refuge. The DEIS assertions also raise concerns about the resulting impacts to subsistence hunting of caribou displacement away from development, which the DEIS minimizes.[1292]

Yet another example involves statements about the effectiveness of timing limitations to protect caribou. Appendix E in the DEIS states that "[r]esearch has demonstrated that TLs [timing limitations] effectively mitigate the majority of impacts to caribou," though it acknowledges that they are not effective for mitigating displacement of maternal caribou during calving.[1293] No citation is given to explain what "research" is being referred to here. It is notable that nowhere in Chapter 3 of the DEIS is justification for the effectiveness of timing limitations given. Instead, Chapter 3 states, "the potential impacts of the alternative on caribou would depend, in large part, on how well these TLs avoid displacement of calving caribou and impediments to caribou movements during other times of year when caribou are present."[1294] This seems much more tentative than the bold, but unsupported, claim in Appendix E. The DEIS needs to be consistent in its representation of the impacts of development on caribou and to clearly cite its sources when making claims, especially if those claims are used to indicate a lack

[1288] DEIS vol. 2 at E-6.
[1289] DEIS vol. 2 at E-8.
[1290] DEIS vol. 1 at 3-121.
[1291] Russell and Gunn. 2019 at 89.
[1292] DEIS vol. 2 at E-6; *see also* subsistence and ANILCA 810 discussion.
[1293] DEIS vol. 2 at E-8 – E-9.
[1294] DEIS vol. 1 at 3-118.

of impact on caribou and subsistence users. This is especially the case given that a report by well-published caribou experts recently stated, "We simply do not know whether… continuing drilling while shutting down construction (Time Limited stipulation) is effective mitigation."[1295] BLM needs to update its statements to conform with the best-available science.

i. Cumulative effects are insufficiently addressed

The cumulative effects analysis for caribou is very brief and primarily provides background, describing what has happened in the program area in the past, but not drawing implications from it for the future[1296] — which, of course, is the entire point of a cumulative effects analysis. There is no discussion of the effects of other development outside of the project area. This is surprising as cumulative effects are to be analyzed across the annual range of both the PCH and CAH.[1297] Analyses of the effects of existing infrastructure on the PCH and CAH are needed to enable quantification of cumulative (i.e., added) effects of proposed development within the program area.[1298] Furthermore, impacts of foreseeable future development within the PCH and CAH herd ranges also need to be analyzed for how they may compound potential Coastal Plain development. This is a serious omission for the CAH, as the DEIS states that "[i]nfrastructure to support development in the program area may facilitate additional development west of the program area, potentially altering the behavior and movements of CAH caribou."[1299] The potential for this facilitated development and how it may affect the CAH, along with other development on State lands west of the Arctic Refuge, should be specified by BLM in the cumulative effects section. Furthermore, the DEIS fails to address the cumulative effects of the proposed action and expanding oil field infrastructure and activities to the west of the Refuge on the PCH during times when large aggregations move west of the Refuge boundary during post-calving/insect relief season.[1300]

In addition, it is surprising that no mention or analysis is made of the Arctic Strategic Transportation and Resources (ASTAR) project in the cumulative effects section. Appendix F states that "ASTAR is in its preliminary stages"[1301] but does not otherwise justify ignoring the project in analyses of cumulative effects. The DEIS defines reasonably foreseeable future actions as those that are likely, or reasonably certain, to occur based on plans, permit applications, and fiscal appropriations.[1302] While the ASTAR project has not yet secured funding to build infrastructure, it has acquired funding from the Alaska State Legislature to conduct a planning process. The November 2, 2018 letter from the Alaska Department of Natural Resources and

[1295] Russell and Gunn. 2019 at 92.
[1296] DEIS vol. 1 at 3-122.
[1297] DEIS vol. 2 at F-28.
[1298] Russell and Gunn. 2019.
[1299] DEIS vol. 1 at 3-110.
[1300] Thayer. 1967, 1968.
[1301] DEIS vol. 2 at F-11.
[1302] DEIS vol. 2 at F-6.

North Slope Borough to the DOI Assistant Secretary for Land and Minerals Management[1303] requesting BLM revise the Integrated Activity Plan (IAP) for the National Petroleum Reserve – Alaska (NPR-A), in part because of the ASTAR process, seems to clearly indicate intention to proceed. Furthermore, since the ASTAR project first started posting maps displaying potential futures for the project, the maps have included potential roads that stretch up to the western edge of the Arctic Refuge Coastal Plain. These maps have changed multiple times since they were initially posted in 2017, but the most recent map[1304] still shows roads passing along the edge of the program area, which falls within the range of both the CAH and PCH. This warrants inclusion in the cumulative effects analysis.

BLM also neglects to address any potential impacts to caribou habitat on private lands within the Refuge, even though concentrated PCH calving habitat exists there,[1305] along with significant coastal insect relief habitat used by large numbers of caribou during the post-calving season. Furthermore, BLM's Hypothetical Development Scenario assumes that a CPF may occur on private land.[1306] This has also been assumed in assessments by USGS.[1307] Impacts associated with such development must be assessed. Cumulative impacts must address potential infrastructure and activities on lands within the external boundary of the Arctic Refuge Coastal Plain, and within the full range of the CAH and PCH.

j. Climate change threats are inadequately weighted

The DEIS is correct in pointing out that climate change is likely to have multiple, possibly counteracting, effects on caribou.[1308] However, the conclusion drawn as a result – that "[b]ecause climate change could involve both adverse and beneficial effects on caribou, it is not possible to predict the impacts on the PCH and CAH"[1309] – is unduly equivocal and misleading. The DEIS lists one positive potential effect of climate change[1310] and ten potential negative effects.[1311] Not listed were potential negative consequences such as sudden pathogen outbreaks that can lead to sudden and large-scale die offs of herbivores, such as was seen in 2016 in Russia

[1303] Available from https://eplanning.blm.gov/epl-front-office/projects/nepa/117408/162755/198560/11.2.18_Ltr_to_AsstSecDOI_Balash_NPRA_IAP_Coop_Agency_Request.pdf.

[1304] Arctic Strategic Transportation and Resources website. https://www.arcgis.com/apps/Cascade/index.html?appid=ab8be9349a08477ebfb66d017e0aec8d.

[1305] Map 49 in Appendix B.

[1306] DEIS vol. 2 at B-19.

[1307] Attanasi. 2005.

[1308] DEIS vol. 1 at 3-109.

[1309] DEIS vol. 1 at 3-109.

[1310] Increased access to forage. DEIS vol. 1 at 3-109.

[1311] Increased shrub abundance, decreased forage quality, increased insect harassment, increased parasite incidence, more rapid annual decline in forage quality, increased predator densities and altered distributions, increased rain-on-snow events, phenological mismatch, earlier mosquito emergence, altered migration conditions due to earlier melting of ice and snow and earlier river breakup. DEIS vol. 1 at 3-109.

when over 2000 reindeer were killed by anthrax that was apparently exposed by melting permafrost.[1312] In 2015, an outbreak of *Pasteurella* similarly killed off over 200,000 saiga antelope (*Saiga tatarica tatarica*), which calve in large aggregations somewhat similarly to caribou, reducing the global population by over 60%.[1313] Even warming temperatures, noted in the DEIS but not described as a potential negative effect, may threaten caribou. Warmer temperatures in summer have been correlated with higher adult female mortality rates in a Canadian caribou herd.[1314] With such a strong preponderance of potential negative effects arrayed against relatively few expected positive effects for cold-adapted caribou, BLM must clearly articulate reasonably foreseeable negative impacts and support any assertion that positive effects may balance or outweigh negative effects with scientific literature.

It is also important for BLM to acknowledge that the presence of both positive and negative potential effects of climate change on caribou does not necessarily make it impossible to predict impacts. An analysis from Canada used a spatially-explicit simulation model to examine net effects of both positive and negative climate-induced factors on a caribou herd.[1315] Similarly, a recent Canadian report evaluating Coastal Plain development effects on the PCH incorporated climate variability and found that it strongly influenced population consequences of development for caribou and resulting impacts on subsistence users.[1316] BLM has multiple options for how climate change effects on caribou can be evaluated quantitatively and must incorporate such an analysis of the likely net effects of climate change on the PCH and CAH to robustly reflect impacts under the proposed alternatives. A revised DEIS should incorporate cumulative analyses of potential stresses from climate change, existing development, and reasonably foreseeable future development.

k. NSO is not the equivalent of Alternative A

The DEIS repeatedly affirms the idea that "the areas of NSO would have no additional impact relative to Alternative A."[1317] Such a statement neither aligns with scientific understanding, nor with other statements in the DEIS. The DEIS clearly states that "[t]here would be no direct or indirect impacts on terrestrial mammals from post-lease oil and gas activities under Alternative A."[1318] No impacts is then the standard against which NSO areas should be compared. A first issue with the assertion of no impacts in NSO areas is that it assumes effects of development will end at the boundary of NSO areas. The idea of "edge effects" — that conditions around the edge of a habitat patch will often be different than those in the interior of the patch – has long been recognized in landscape ecology.[1319] In the context of the Coastal Plain the concern is that effects occurring in the non-NSO areas will "spill over" into

[1312] Golovnev. 2017.
[1313] Kock et al. 2018.
[1314] Russell et al. 2018.
[1315] Tews et al. 2007.
[1316] Russell and Gunn. 2019.
[1317] DEIS vol. 1 at 3-120. See also DEIS vol. 1 at 3-119, 3-122.
[1318] DEIS vol. 1 at 3-110.
[1319] Forman and Godron. 1981.

the NSO areas. This phenomenon is affirmed in the DEIS in the Recreation section where it states that under Alternative D, "some impacts associated with an anticipated 21 well pads and associated infrastructure would occur inside of the NSO areas. These would include changes to the recreation setting from artificial lighting and alteration of the recreation setting and visitor experiences from the visual presence of infrastructure and vehicles."[1320] The analysis of viewshed effects of Coastal Plain development submitted by Stuart Smith confirms that the visual effects of development would extend far across the Coastal Plain.[1321] Many of these impacts could also affect caribou, which are highly visual creatures and rely heavily on sight for predator avoidance.[1322] Indeed, DEIS statements support the idea of caribou impacts in NSO areas, though the DEIS does not explicitly acknowledge this. Under each of the action alternatives, acreage of the potential PCH calving displacement area estimated by BLM is mentioned to "likely fall into the locations with NSO."[1323] This is especially evident under Alternative D, where the potential PCH calving displacement area is larger (by almost double) than the program area remaining open to surface occupancy.[1324] By necessity much of this displacement area would have to overlap NSO areas since "[t]he amount of future construction activity is expected to be similar across action alternatives."[1325]

Another reason impacts in NSO areas are expected to exceed those under Alternative A is because seismic activity will be allowed across the entire program area.[1326] The DEIS clearly notes potential impacts from seismic exploration and, as is noted above, there is reason to conclude impacts may be greater than indicated in the DEIS. Nevertheless, there clearly will be impacts of some sort in the NSO and no leasing areas if seismic activity is allowed there that will differ from the current conditions, which would be maintained under Alternative A.

Finally, NSO stipulations are subject to waivers, exceptions, and modifications across all action alternatives. Indeed, the DEIS expressly acknowledges how particular stipulations may be waived. For example, under Lease Stipulation 2 in Alternative D surface occupancy is prohibited within 0.5 miles of certain waterbodies, except that "[o]n a case-by-case basis, essential pipelines, road crossings, and other permanent facilities may be considered through the permitting process in these areas where the lessee/operator/contractor can demonstrate on a site-specific basis that impacts would be minimal."[1327] Similar possibilities for NSO waivers are mentioned in Lease Stipulations 1, 4, 5, and 9.[1328] In these instances it is clear that impacts would be different than under Alternative A and must be analyzed. BLM may not claim that no impacts will occur in NSO areas.

[1320] DEIS vol. 1 at 3-208.
[1321] Smith. 2019.
[1322] de Vos. 1960.; Bergerud. 1974.
[1323] DEIS vol. 1 at 3-117; *see also* DEIS vol. 1 at 3-119.
[1324] DEIS vol. 1 at 3-121.
[1325] DEIS vol. 1 at 3-112.
[1326] DEIS vol. 1 at 3-120; *see also* Part III.B.8.
[1327] DEIS vol. 1 at 2-5 – 2-6.
[1328] Table 2-2 in DEIS vol. 1 at 2-4 – 2-16.

The evaluation of impacts under each alternative specifies the amount of acreage of calving and post-calving habitat that would be closed to surface occupancy based on the assumption that "[t]his could limit potential impacts on caribou in potentially important calving areas."[1329] The discussion above, however, makes clear that these acreages are not accurate representations of the unimpacted acreages across the program area. BLM needs to re-calculate unaffected acreages of calving and post-calving habitat under an assumption of development right along the NSO boundary (as would be likely to maximize the potential for directional drilling to accesses subsurface resources in NSO areas) and using a minimum 4 km displacement buffer into NSO areas. As is noted above, the 4 km buffer is a conservative estimate and BLM should also run a similar comparison using a wider displacement buffer, to show the range of possible effects on calving and post-calving caribou.

We note that development effects extending beyond the development footprint may also alter caribou calving adjacent to the program area. Data from caribou telemetry collars reveals that females that do not calve within the program area may still use areas just south of the program area boundary during the calving and post-calving seasons.[1330] Displacement of caribou from these areas as a result of activity and development within the program area is not analyzed in the DEIS. BLM needs to consider the full area of impacts on caribou when calculating acreages affected.

6. BLM's Stipulations and Required Operating Procedures pertaining to caribou are insufficient

We appreciate that many of BLM's proposed stipulations and required operating procedures (ROPs) attempt to mitigate impacts to caribou. However, as described above, the DEIS does not include adequate information to assess the effectiveness and enforceability of the measures, which are subject to exceptions, waivers, and modifications across all alternatives. Moreover, many of the stipulations and ROPs related to caribou must be strengthened to ensure they will meet the stated objective and effectively mitigate reasonably foreseeable impacts. To that end, we offer the following comments on specific measures.

a. Lease stipulation 3 – Springs/Aufeis

This stipulation acknowledges that aufeis "provides insect relief for caribou."[1331] Although the objective for Alternatives B and C states "[b]ecause the subsurface flow paths to perennial springs are unknown and could be disturbed by drilling or fracking, use buffer areas around the major perennial springs that support fish populations in which no leasing is permitted,"[1332] neither alternative considers no leasing in those areas. This only occurs under Alternative D. BLM should operate according to its own recommendation and likewise make

[1329] DEIS vol. 1 at 3-119. See also, DEIS vol. 1 at 3-117 through 3-121.
[1330] *See* Figure 6 in Russell and Gunn. 2019 at 24.
[1331] DEIS vol. 1 at 2-6.
[1332] DEIS vol.1 at 2-6.

spring/aufeis habitat for fish, caribou and other organisms associated with perennial springs unavailable for leasing under Alternatives B and C.

b. Lease stipulation 4 – Nearshore marine, lagoon, and barrier island habitats

The objective for this stipulation includes protection of caribou insect relief areas among its purposes.[1333] The stipulation prohibits certain types of infrastructure in coastal waters, lagoons and barrier islands, but provides a caveat that infrastructure "necessary for oil and gas activities" may be approved.[1334] No guidance is given for what conditions would be deemed "necessary," nor if there would be any limits placed on the amount or density of structures that could be approved by this process. This lack of certainty makes it unclear to what degree, if any, caribou coastal insect relief habitat will be protected over the long term. Restrictions need to be clearly specified and justified with the best-available scientific information.

Alternative D adds additional restrictions, including that — in coordination with prospective Refuge users or user groups — lessees, operators and contractors would "[d]esign and construct facilities to minimize impacts on subsistence uses, travel corridors, and seasonally concentrated fish and wildlife resources" and conduct daily operations in a way to "minimize impacts on…wildlife resources."[1335] It is unclear (and not justified) why these provisions only apply to Alternative D. These are common-sense requirements that BLM should apply across all alternatives to reduce impacts to caribou, other wildlife, and subsistence and other users. Moreover, to ensure efficacy, the stipulation should include measurable standards to achieve the broad objective of minimizing impacts, supported by the best-available scientific information.

c. Lease stipulation 6 – Caribou Summer Habitat

We agree with the acknowledgement in this stipulation that "[a]ll lands in the Arctic Refuge Coastal Plain are recognized as habitat of the PCH and CAH and would be managed to ensure unhindered movement of caribou through the area."[1336] Management to ensure unhindered movement is indeed an important goal to avoid negative consequences for caribou. Unfortunately, the stated objective of *minimizing* disturbance, hindrance and alteration of movement[1337] is inconsistent with that important goal. We urge BLM to follow its own rationale stated in the note on this stipulation and to define the objective as ensuring unhindered movement of caribou through the Coastal Plain.

It is important to note that due to the sensitivity to development of cows with young calves, as acknowledged in the DEIS,[1338] it is likely impossible to ensure unhindered movement through developed areas. This reinforces the need for large areas sufficiently far away from infrastructure and activity where cows and calves are unlikely to be affected. BLM should

[1333] DEIS vol. 1 at 2-7.
[1334] DEIS vol. 1 at 2-7.
[1335] DEIS vol. 1 at 2-8.
[1336] DEIS vol.1 at 2-11.
[1337] DEIS vol. 1 at 2-11.
[1338] E.g., DEIS vol. 1 at 3-114.

demonstrate spatially and based on the best-available science where such areas will occur, taking into account that displacement effects from development will not stop at the boundary of an NSO or no leasing area.

Addition of timing limitations under Alternative D2 is important to improve protections to caribou and should be applied to the other alternatives. This addition states that timing limitations are intended "to restrict activities that would disturb caribou during calving and insect-relief periods."[1339] Since the entire Coastal Plain may be used by caribou during calving and post-calving,[1340] we urge that the description on page 2-12 be changed from: "If caribou arrive on the calving grounds before May 20…," to "If caribou arrive on the *Coastal Plain* before May 20…." This is necessary to ensure that the definition of "calving grounds" is not subject to interpretations that might reduce protections under the stipulation. Furthermore, as others have pointed out,[1341] minimum requirements for the 'stop work plan' developed by the lessee should be specified in the DEIS to ensure plans will achieve their intended goal.

Finally, the caveat in the timing limitation description that states, "unless approved by the BLM Authorized Officer,"[1342] is highly problematic. As written, no guidelines are given for when approval might be allowed, beyond "in consultation with the appropriate federal, state, and NSB regulatory and resource agencies."[1343] Absent measurable standards and specific guidelines for when approval might be granted (e.g., no caribou detected within 20 km of facilities by both telemetry data and aerial surveys and telemetry records from collared caribou do not show caribou heading in the general direction of the project area), this caveat should be removed. Whatever guidelines are presented must be clearly supported by the best-available scientific information.

d. Lease stipulation 7 – PCH Primary Calving Habitat Area

The note on Stipulation 7 defines the "PCH primary calving habitat area" as that "with a higher-than-average density of cows about to give birth during more than 40 percent of the years surveyed."[1344] This is a problematic definition and is not supported in the DEIS with robust scientific justification, as discussed in detail above. Moreover, areas outside of the most commonly used concentrated calving areas can still be very important for caribou in some years, as described above. Protecting only the "primary calving area" as defined here will provide little protection in some years, potentially increasing calf mortality and threatening the caribou population. This is especially a concern if warming conditions under climate change leads to "a western shift in concentrated calving areas," as the DEIS indicates.[1345] This possibility would render the strict definition of primary calving habitat given in Stipulation 7 ineffective. Instead,

[1339] DEIS vol. 1 at 2-11.
[1340] Map 49 in Appendix B.
[1341] Russell and Gunn. 2019.
[1342] DEIS vol. 1 at 2-11.
[1343] DEIS vol. 1 at 2-11.
[1344] DEIS vol. 1 at 2-13.
[1345] DEIS vol. 1 at 3-110.

BLM should recognize the clear array of historic records showing that the entire Coastal Plain is important for calving over longer timeframes and seek to avoid disturbance and hindrance of movement across the entire Coastal Plain.

Some of the timing limitation restrictions in this stipulation are similar to those in Stipulation 6 and we have the same concerns and recommendations listed above.

The added traffic restrictions in Stipulation 7 include speed limits when caribou are within half a mile of the road.[1346] Caribou can travel very quickly, covering half a mile in a matter of minutes.[1347] It is thus important to extend this boundary and to use multiple monitoring methods to manage vehicle activities. These should include: 1) daily review of location data from collared caribou to examine general movement patterns long before caribou contact roads, 2) daily or alternate day aerial reconnaissance flights in buffer areas near roads to provide more detailed location information, including of non-collared individuals, 3) road-based surveys to detect caribou proximity to roads. Traffic alteration must be started early and increasingly restricted as caribou near roads. Also, although BLM acknowledges that "15 vehicles per hour or more has been shown to deflect caribou movements and delay road crossings,"[1348] no limits on traffic volume are included her or in other stipulations and ROPs. BLM should conform to its own acknowledgement of impacts and restrict traffic below 15 vehicles per hour. Even these mitigation measures are unlikely to be ultimately effective, however, as the DEIS notes that "[s]ome level of displacement of calving caribou has been shown to occur even with low levels of traffic."[1349] The high sensitivity of calving caribou to human disturbance and sustained shifts in CAH distribution away from development areas in spite of mitigation measures[1350] indicate that the requirements specified in this stipulation are unlikely to remove disturbance and displacement of female caribou with young calves during calving.

Finally, while the stipulation states that "[t]he following ground and air traffic restrictions would apply,"[1351] no air traffic restrictions are listed. These must be specified so that their utility can be evaluated.

e. Lease stipulation 8 – PCH Post-Calving Habitat Area

The note on Stipulation 8 defines the "PCH post-calving area" using the same guidelines used for the primary calving area in Stipulation 7.[1352] This is again problematic and not supported in the DEIS with robust scientific justification. As is described above, the post-calving period is a crucial time for caribou when movement is critical to ensure access to sufficient forage while reducing the negative effects of insect harassment. Once again, areas outside of the

[1346] DEIS vol. 1 at 2-14.
[1347] Jim Dau (ADF&G caribou biologist, retired) pers. comm.
[1348] DEIS vol. 1 at 3-113 – 3-114.
[1349] DEIS vol. 1 at 3-117.
[1350] Cameron et al. 2005.; Russell and Gunn. 2019.
[1351] DEIS vol. 1 at 2-13.
[1352] DEIS vol. 1 at 2-14.

most commonly used post-calving areas will still be important for caribou in some years. Thus, protections laid out in Stipulation 7 should be applied across the entire post-calving area – the full Coastal Plain – incorporating the recommendations we provided above.

The concept of evacuating roads when attempted caribou crossings appear imminent is appropriate but details must be more clearly defined. For example, what qualifies as "appears to be imminent"?[1353] Science-based guidance should be clearly stated. Also, what needs to be done for "evacuation"? Is this simply removing people and stopping vehicle movement or actually removing vehicles from the area? If the latter, how will vehicle removal be accomplished without further disturbing caribou? Furthermore, what is the rationale for choosing "approximately 100 or more" caribou as the trigger for road evacuation? In the NPR-A IAP traffic is stopped "to allow a crossing by 10 or more caribou."[1354] Nor does BLM provide a rationale for why the date range for evacuating roads begins June 15. This does not align within the post-calving period as displayed in Map 3-21, which starts earlier. This stipulation should have language similar to that in Stipulation 6 that allows the applicable dates to be adjusted in response to the presence of caribou within the program area. It is unclear who will make the evacuation decision, what the consequences will be of not following the protocol, and who will enforce consequences. These things need to be clarified to increase confidence in the ability of this stipulation to reduce impacts on caribou. Finally, it is not specified why road evacuation standards are only specified for the timing limitation areas. Inclusion of road evacuation standards is common-sense and in line with past BLM action in the NPR-A. BLM should apply this standard across all action alternatives and across the entire program area. However, we note that this still is not likely to prevent all impacts in light of major documented effects of roads to calving caribou and summer movements recorded for the CAH.

f. Lease stipulation 9 – Coastal Area

The objective for this stipulation includes minimizing "the hindrance or alteration of caribou movement in caribou coastal insect-relief areas."[1355] The requirement to implement a conflict avoidance and monitoring plan is appropriate; however additional details are needed about standards and requirements for such a plan to ensure effective adaptive management. The DEIS needs to state standards for monitoring plans, including use of measurable, science-based indicators, clear and scientifically-supported requirements for the frequency of data collection, and clear triggers for defining necessary conflict avoidance measures. Conflict avoidance measures should also be specified and include BLM authority to disapprove of or delay permitting decisions. Responsibility for developing and implementing the monitoring plan for effects of infrastructure and activities on the coastal habitats and subsistence should be assigned to USFWS, as the surface managing agency, rather than to the lessee. BLM should specify that prior to implementation, this plan must be reviewed and approved by the relevant state, federal, and North Slope Borough wildlife and subsistence officials. It should also be specified that the

[1353] DEIS vol. 1 at 2-14.
[1354] BLM. 2013 at 83 and 89.
[1355] DEIS vol. 1 at 2-15.

results and data from the report must be made publicly available, as described below under ROP 23.

It is notable that the stipulation requires an impact and conflict avoidance and monitoring plan to be implemented "[b]efore beginning exploration or development."[1356] As BLM is currently considering a pending permit application for 3D seismic exploration, BLM should require and make available a pre-exploration conflict avoidance plan as a condition on any permit approval.

g. ROP 18

This ROP states that "[a]ll roads must be designed, constructed, maintained, and operated to create minimal environmental impacts."[1357] The BLM should note that achieving this standard with respect to caribou will often mean not building roads at all. Additional details need to be given and scientifically-justified to clarify what standards would meet the ROP objective.

h. ROP 21

Requirement h in this ROP calls for "[l]ocating facilities and other infrastructure outside areas identified as important for wildlife habitat."[1358] BLM needs to clearly identify in the EIS which areas are importance for each species across each season to ensure this otherwise generalized ROP can be meaningfully implemented and to ensure the public has adequate information to assess its efficacy. As pointed out above, the definition given in the DEIS for important caribou calving habitat is insufficient and must be updated to conform with prevailing scientific knowledge. The entire Coastal Plain is important for caribou calving and post-calving habitat.

i. ROP 23

The requirements in ROP 23 may help reduce impacts from infrastructure on caribou, but are insufficient. As described above, documented displacement and continued avoidance of areas near roads by CAH cows and calves indicate that the measures in ROP 23 are unlikely to provide sufficient protection during the calving and post-calving periods. This is compounded by the lack of information about how very large groups of caribou, larger than the peak herd size of the CAH, will respond to infrastructure when aggregated.[1359] Deflection and displacement of caribou are likely.

Tentative language in the ROP must be clarified. For example, it states that ramps or buried pipelines "may be required by the BLM Authorized Officer."[1360] Under what conditions

[1356] DEIS vol.1 at 2-15.
[1357] DEIS vol. 1 at 2-25.
[1358] DEIS vol.1 at 2-26.
[1359] Russell and Gunn. 2019.
[1360] DEIS vol. 1 at 2-27.

would this decision be made? What circumstances would trigger use of buried pipelines or ramps? This needs to be made clear and scientifically justified. Furthermore, BLM needs to explain how such features will be accounted for within the 2000 acre limit on surface disturbance.

We agree with the requirement to perform a study of caribou movement specific to the PCH and CAH prior to authorization of construction.[1361] However, it is important that such studies, as well as creation of an overarching plan for research and monitoring, be carried out by USFWS instead of industry. USFWS is responsible for establishing a long-term integrated baseline and monitoring program for fish and wildlife for the Arctic Refuges, which would include ensuring there is adequate baseline data and research on caribou populations and their habitats and movements to evaluate future impacts of the oil and gas program activities and infrastructure to caribou.[1362] Similarly, agency scientists should conduct the required studies of caribou movement prior to authorization of construction to ensure that results are robust and made publicly available. If a previous study conducted within the last 10 years is to be used instead of completing new research, it is important that the previous study and associated data be made available to the public prior to authorization by the BLM Authorized Officer (AO) to enable thorough review of the sufficiency of the study. A mechanism should be established for the public to provide input to the AO, with sufficient time included for review of the previous report and commenting. If a new study is to be conducted, study design must be approved by the relevant state, federal and North Slope Borough wildlife management authorities and the resulting data and reports from such studies should be made publicly available.

Requirement g states that "traffic may be stopped throughout a defined area for up to 4 weeks, to prevent displacement of calving caribou,"[1363] but it does not give more specific instances of less than a full closure, such as those seen in Stipulation 8. No justification is given for why a four-week maximum is listed for closure. This should be changed to read: "…throughout a defined area whenever necessary to prevent displacement of caribou." This recommended language not only removes the arbitrary 4-week deadline but also broadens the focus from just calving caribou, to reflect the importance of the post-calving and insect relief periods.

j. ROP 28

In order "to conserve important habitat types," this ROP requires "[u]se [of] ecological mapping as a tool to assess wildlife habitat before developing permanent facilities."[1364] Creation of habitat maps is an important step toward "detailed analysis of development alternatives,"[1365] however, BLM does not specify how the resulting map would be used or what guidelines or

[1361] Requirement f in DEIS vol. 1 at 2-27.
[1362] *See, e.g.*, 16 U.S.C. § 3142(c).
[1363] DEIS vol. 1 at 2-27.
[1364] DEIS vol. 1 at 2-29.
[1365] DEIS vol. 1 at 2-29.

thresholds would be used to ascertain whether the goal of conserving important habitat types is met under future development proposals. This should be made clear.

While, map preparation prior to approval of facility location and construction and ground-based wildlife surveys are commendable, the DEIS fails to include any guidelines to inform when and how BLM will determine if such surveys are "deemed necessary."[1366] These must be clarified.

k. ROP 33

This ROP requires geospatial representations of new infrastructure be provided to BLM and the State of Alaska "to be used in monitoring and assessing wildlife movements during and after construction."[1367] This is a very important ROP and we appreciate BLM including it in the DEIS, along with inclusion of construction beginning and end dates as ancillary data. As much as possible, these dates should be provided for different components of the project to allow the finest scale analyses of construction impacts on wildlife movement. To fully achieve the objective of this ROP, we request that BLM specifically state in this ROP that provided geospatial data will be made publicly available. Furthermore, BLM should specify how it will integrate the resulting data into the USFWS monitoring plan described above. This must include how monitoring will inform management decisions, such as through establishing impact thresholds beyond which permitting will be stopped or increasing mitigation requirements.

l. ROP 34

This ROP seeks to "[m]inimize the effects of low-flying aircraft on wildlife" and people.[1368] This is an important goal. However, the ROP must be strengthened and improved to meet its objective. First, requirement c specifies a minimum altitude of 1500 feet above ground level (agl) for flights over caribou calving range and near raptor nesting sites. Federal Aviation Administration guidance recommends a minimum altitude of 2000 feet agl over all National Wildlife Refuges and other noise-sensitive areas.[1369] ROP 34 should be amended to align with this guidance and increase the minimum altitude to 2000 feet over the entire program area at all times. This will help meet the DEIS requirement to maintain the Refuge's original purposes under ANILCA while also complying with the 2017 Tax Act.[1370] It will also be consistent with the importance of the entire Coastal Plain for calving and post-calving habitat over time. It should be noted, however, that even incorporating this minimum requirement is unlikely to prevent impacts to caribou. Flight ceilings often are lower than 1500 feet agl, particularly during calving,[1371] so there is concern that weather exceptions will increase the impact of aircraft on caribou despite the guidance of this ROP.

[1366] DEIS vol. 1 at 2-29.
[1367] DEIS vol. 1 at 2-30.
[1368] DEIS vol. 1 at 2-31.
[1369] FAA. 1984.
[1370] DEIS vol. 1 at ES-1.
[1371] Ken Whitten (ADF&G PCH caribou biologist, retired) pers. comm.

Second, requirement d seeks to "[m]inimize the number of helicopter landings in caribou calving ranges from May 20 through June 20."[1372] Given the extreme importance of the calving period for population well-being and the sensitivity of cows with newborn calves to disturbance, this should be amended to prohibit all helicopter landings in calving grounds during this period.

Third, the requirements under Alternative D expand the altitude and landing restrictions to include the post-calving period. This is necessary given the extreme importance of the post-calving period to caribou and their need to access high quality forage unhindered (see above). In light of this, these provisions should apply consistently across all action alternatives. Provisions should also be expanded to include the period where cows arrive on the calving ground. If animals are deflected and unable to reach the calving ground, the consequences will be as severe as if they were displaced from the calving ground. The start date should be extended to May 1st to accommodate this and language should be included, as is done with traffic effects above, to provide flexibility if migration timing alters with a changing climate.

Fourth, this EIS provides an opportunity to better study the effects of aircraft on people and wildlife. Concerns about the impact of aircraft on wildlife and subsistence hunting have long been voiced by Alaska Native hunters.[1373] The DEIS reviews aircraft effects on caribou.[1374] Many of the studies discussed either dealt with responses to military jets or were conducted prior to 2000. Older studies have an important role to play in understanding the effects of aircraft on caribou; however, the advent of GPS technology for tracking mobile animals like caribou creates great potential to build upon past studies of caribou response to aircraft activity with a finer-scale investigation. Currently, however, the ability to do this is hindered by a lack of adequate aircraft data. In the NPR-A, BLM collects records of the number of aircraft takeoffs and landings, but not flight paths. As it is currently written, ROP 34 is likely to be similar. Requirement a mentions a plan with strategies that include aircraft types, flight altitudes and routes.[1375] To enable more detailed and spatially-explicit studies of aircraft impacts in the Arctic Refuge, we request that BLM add a requirement to ROP 34 that specifies collection of geospatial aircraft data reporting the location, time, altitude, and aircraft type of each permitted flight within the program area. These data should be housed by the USFWS or another designated federal repository and made available to researchers to enable more complete analysis of aircraft use within the Coastal Plain and its effects on wildlife, subsistence hunters, and surface resources.

m. ROP 42

This ROP necessarily prohibits chasing wildlife, especially caribou, with ground vehicles.[1376] The qualifier "with ground vehicles" should be deleted from the requirement language; chasing of wildlife with any type of vehicle should be prohibited.

[1372] DEIS vol. 1 at 2-31.
[1373] Georgette and Loon. 1988.; Halas. 2015.
[1374] DEIS vol. 1 at 3-115 and 3-116.
[1375] DEIS vol. 1 at 2-31.
[1376] DEIS vol. 1 at 2-36.

7. Conclusions Regarding the DEIS Proposed Alternatives

For all the reasons described in detail above, it is clear that none of the action alternatives presented in the DEIS will sufficiently protect caribou. We offer more specific critiques of the action alternatives below.

Under Alternative B, the DEIS acknowledges that "[m]inimal protection measures for development in caribou summer, calving, and post-calving habitat areas could lead to displacement and possible decline in caribou populations, which would decrease hunting and viewing opportunities."[1377] Complete leasing of the program area, combined with a lack of limits to coastal infrastructure — which are acknowledged to possibly hinder coastal movements of CAH and PCH during insect harassment[1378] — make displacement and population decline highly likely. The CCE modeling analysis affirms this, showing significant population decline for the PCH under Alternative B.[1379] Furthermore, the DEIS acknowledges that potential impacts to caribou "would be long term, lasting at least for the period of development."[1380] These acknowledged effects are unacceptable.

BLM claims that under Alternative C the protective measures limiting activity in "caribou summer, calving, and post-calving habitat would minimize the potential for species dispersion, or decline, which would indirectly maintain the quality of hunting and wildlife viewing experiences."[1381] Throughout the above comments we have raised numerous reasons why this assertion is unsubstantiated, insufficiently supported, and based upon analyses that fail to constitute best-available science. The entire program area would once again be open for leasing under Alternative C. Over half of the stipulations and all of the ROPs are identical under Alternatives B and C, reinforcing the notion that Alternative C will not ultimately provide additional protections.

While Alternative D provides the most protection to caribou of the proposed action alternatives, it nonetheless does an insufficient job of adequately protecting caribou in a way that satisfies the caribou and subsistence protection purposes of the Arctic Refuge. For instance, the DEIS admits that neither Alternatives D1 nor D2 will provide additional protection to maternal caribou: "[s]ince these assumptions [under Alternative D1] are identical to Alternative C, impacts to maternal caribou would likewise by the same,"[1382] and "[d]isplacement of maternal caribou associated with future oil and gas development in the Coastal Plain would be similar [under Alternative D2] to that expected under Alternative D1."[1383] Additional reasons why Alternative D provides inadequate protection for caribou are detailed above.

[1377] DEIS vol. 1 at 3-207.
[1378] DEIS vol. 1 at 3-117.
[1379] Russell and Gunn. 2019.
[1380] DEIS vol. 1 at 3-118.
[1381] DEIS vol. 1 at 3-208.
[1382] DEIS vol. 2 at E-13.
[1383] DEIS vol. 2 at E-15.

BLM has not provided an adequate range of alternatives that adequately protect caribou. It is necessary that BLM prepare a revised DEIS that addresses all of the issues described in these comments. Proceeding with any of the current action alternatives and based on the incomplete and inaccurate impacts analysis included in the DEIS risks grave danger to the caribou herds that utilize the Arctic Refuge Coastal Plain and the people who rely upon them for subsistence and recreation.

J. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON OTHER TERRESTRIAL MAMMALS IS INADEQUATE.

1. BLM's Analysis of the Impacts to Muskoxen Is Inadequate.

a. Importance of Muskoxen to the Coastal Plain

Among the U.S. states, the muskox (*Ovibos moschatus*) occurs only in Alaska. Muskox are known for their amazing come-back after being hunted to extirpation by the late 1800s in the state.[1384] In 1930, with a $40,000 allocation from Congress, thirty-four of the animals made a perilous journey from Greenland to Alaska (via New Jersey for quarantine).[1385] Though meant to be domesticated, their care became expensive and difficult and Nunivak Island became their wild home. The Nunivak herd thrived and served as a source population for reintroduction back into the Coastal Plain and Arctic National Wildlife Refuge with translocations in 1969 and 1970.[1386] Muskoxen are important subsistence species for meat, clothing shelter made from hide, and tools and crafts made from bone and horn.

A purpose of the Arctic Refuge identified by ANILCA is to conserve muskox.[1387] The BLM has not sufficiently evaluated the impacts of the oil and gas program in light of this management purpose.

b. Assessment of the Affected Environment

The DEIS states:

> The population in northeastern Alaska and northwestern Canada was estimated at 700–800 animals in the mid-1990s, but it subsequently declined to approximately 300 animals from 2007 to 2014; about 200 were located west of the Arctic Refuge and 100 were located east of it in northern Yukon (Lenart 2015b; Arthur and Del Vecchio 2017). The decline was especially steep in the

[1384] Lent, P.C. 1999. Muskoxen and their hunters: a history. University of Oklahoma Press, Norman, Oklahoma.

[1385] Rozell, N. 2018. By 1900, no musk oxen were left in Alaska. Their journey back was from Greenland to Nunivak Island, via New Jersey. Anchorage Daily News. September 9.

[1386] Jingfors, K.T. and Klein, D.R. 1982. Productivity in recently established muskox populations in Alaska. Journal of Wildlife Manage. 46:1092-1096.

[1387] ANILCA § 303(2)(B)(i).

> Arctic Refuge, where only one muskox was observed in 2006. A group of fewer than 20 animals, which moved back and forth across the Canning River, was the only group using any part of the Arctic Refuge from 2009 to 2015 (Lenart 2015b). Predation by grizzly bears accounted for 58 percent of calf mortality and 62 percent of adult mortality from 2007 to 2011 (Arthur and Del Vecchio 2017).[1388]

Despite acknowledging this alarming population decline, the DEIS does not fully describe the affected environment relating to the muskox in a way that conveys baseline conditions essential to understanding how oil and gas leasing and activities will impact the species and its habitats.

Indeed, the muskox population on the Coastal Plain is small, isolated, and declining. After being reintroduced to the Refuge, the population grew to a high of over 400 animals in the mid-1990s.[1389] The larger population in northeast Alaska and northwest Canada dropped precipitously between 1998 and 2006,[1390] largely due to losses from the Refuge. The dramatic decline is associated primarily with increased predation by grizzly bears,[1391] but also disease,[1392] winter weather,[1393] distributional changes in the populations of other ungulates such as moose and caribou, and other factors.[1394] Muskoxen continue to occur on the Arctic Refuge, though the Refuge may not currently have a permanent resident herd.

Predation, nutritional conditions, dispersal (which can all be affected by oil and gas development), and also weather are the primary influencers on the species' population dynamics.[1395] Unlike other ungulates that inhabit the region, muskoxen do not migrate but

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[1388] DEIS at vol. 1 at 3-111–3-112.

[1389] Reynolds, P.E. 1998a. Dynamics and range expansion of a reestablished muskox population. Journal of Wildlife Management 62: 734-744; Reynolds, P.E., Reynolds HV, Shideler RT. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13: 79–84.

[1390] Reynolds P.E., Reynolds, H.V., Shideler, R.T. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13: 79–84; Lenart, E.A. 2011. Units 26B and 26C muskoxen management report. In: Harper P., editor. Muskox management report of survey-inventory activities 1 July 2008–30 June 2010. Alaska Department of Fish and Game, Juneau, Alaska, pp. 63–84.

[1391] Reynolds, P.E., Reynolds, H.V., Shideler, R.T. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13:79–84.

[1392] Afema, J.A., Beckmen, K.B., Arthur, S.M., Huntington, K.B., and Mazet, J.A.K. 2017. Disease complexity in a declining Alaskan muskox (*Ovibos moschatus*) population. Journal of Wildlife Diseases 53(2): 311-329.

[1393] Berger, J., Hartway, C., Gruzdev, A., and M. Johnson. 2018. Climate Degradation and Extreme Icing Events Constrain Life in Cold-Adapted Mammals. Scientific Reports 8(1): 1156.

[1394] Barboza, P.S., Reynolds, P.E. 2004. Monitoring nutrition of a large grazer: Muskoxen on the Arctic Refuge. Int Congr Ser 1275: 327–333.

[1395] Reynolds, P.E. 1998b. Ecology of a reestablished population of muskoxen in northeastern Alaska. PhD Thesis, University of Alaska, Fairbanks, Alaska, 106 pp. Reynolds PE,

instead persist in the Arctic year-round.[1396] They build fat stores in summer, and conserve energy in winter by trying to avoid movement.[1397] Winter forage availability is typically of limited quantity and of low nutritional quality. Muskox winter habitat is restricted to shallow snows, often along windswept ridges because they do not move well in deep snow.[1398] Muskox survive the winter by using stored body fat and reducing movement to compensate for low forage intake (Dau 2001). Because of this strategy, muskox may be even more susceptible to disturbances during the winter. It is possible that repeated disturbances of the same animals during winter could result in increased energetic costs that could increase mortality rates.[1399] Additionally, the species reproduces slowly — not breeding until age four or five, only breeding every other year and sometimes less frequently, and only birthing one calf per cycle. These characteristics make the muskox vulnerable to oil and gas development activities, particularly in winter.

c. The EIS Fails to Take a Hard Look at Impacts to Muskox.

In the DEIS, the BLM fails to take a hard look at the myriad impacts of the proposed lease sales and resulting oil and gas development activities on muskoxen and their habitats. Muskox are threatened by disturbance and displacement and habitat degradation from seismic activities and increased air and ground traffic; direct loss of habitat from gravel mining; barriers to movement from facilities, roads, and other infrastructure; increased hunting and poaching associated with increased human presence; increased predation due to increased numbers of predators attracted to human trash and food; and the additive and synergistic effects of climate change. According to the FWS,[1400] oil and gas exploration and extraction activities, particularly along river corridors, can cause:

- displacement from preferred winter habitat
- increased energy needs related to disturbance and displacement
- decreased body condition of females

Reynolds HV, Shideler, R.T. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13: 79–84.

[1396] Jingfors, K.T. 1982. Seasonal Activity Budgets and Movements of a Reintroduced Alaskan Muskox Herd. Journal Wildlife Management 46(2): 344-350.

[1397] Dau, J. 2001. Muskox Survey-Inventory Management Report, Unit 23. In Muskox. Federal Aid in Wildlife Restoration - Inventory Management Report, Grants W-24-5 and W27-1, Study 16.0, M.V. Hicks (ed.). Alaska Department of Fish and Game, Juneau, Alaska.

[1398] U.S. Department of the Interior, Fish & Wildlife Service. 1999. Guide to Management of Alaska's Land Mammals. U.S. Department of Interior, U.S. Fish and Wildlife Service, Office of Subsistence Management. Anchorage, Alaska.

[1399] Department of Interior, Bureau of Land Management. National Petroleum Reserve – Alaska, Final Integrated Activity Plan/EIS. Vol. 2, Ch. 4 (November 2012) at 189.

[1400] U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, Potential Impacts of Proposed Oil and Gas Development on the Arctic Refuge's Coastal Plain: Historical Overview and Issues of Concern (Jan 17, 2001), *available at*: https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_1/Arctic/PDF/arctic_oilandgas_impact.pdf.

- increased incidents of predation
- decreased calf production and animal survival

i. BLM Fails to Adequately Consider Impacts to Muskox from Seismic and Other Activities in Winter.

The DEIS states of all alternatives:

> Future seismic exploration is expected to occur in all portions of the program area that are open to lease sales. It has the potential to affect terrestrial mammals by eliminating below snow habitat for small mammals, reducing forage availability during winter through compaction of snow and underlying vegetation, and disturbing denning grizzly bears and muskoxen. … Potential localized disturbance of the small number of muskoxen along the western boundary of the program area could result from seismic exploration activities in areas of High HCP.[1401]

> Potential indirect effects of seismic exploration would include short-term compaction of snow cover in foraging habitats for herbivores. The timing of snowmelt during the spring following seismic exploration would change as a result of snow compaction and changes in snow drifting. Delayed snowmelt in the spring could decrease forage available to caribou and other herbivores, but could also extend the time when highly nutritious, early growth forage is available after snowmelt. Some potential habitat alterations and long-term damage to forage plants for herbivores, such as riparian willow shrub is also likely to occur, as described in the Section 3.3.1.[1402]

This description ignores some of the most significant impacts of seismic exploration to muskox. Seismic exploration and other winter oil and gas development activities, such as air and ground traffic, can disturb muskox and have detrimental impacts to the animals' energy balance.[1403] Reactions to seismic activities can be variable, but animals have responded with alert behavior, assorting in defensive formations, and running from the disturbance from distances up to 2.5 miles away from operations.[1404] This can result in the deaths of young calves that are left

[1401] DEIS vol. 1 at 3-110–3-112.

[1402] DEIS vol. 1 at 3-112.

[1403] Department of Interior, Bureau of Land Management. National Petroleum Reserve – Alaska, Final Integrated Activity Plan/EIS. Vol. 2, Ch. 4 (November 2012) at 189 and 191.

[1404] Reynolds, P.E. and LaPlant, D.J. 1985. Effects of Winter Seismic Exploration Activities on Muskoxen in the Arctic National Wildlife Refuge. In Arctic National Wildlife Refuge Coastal Plain Resource Assessment. 1984 Update Report Baseline Study of the Fish, Wildlife, and Their Habitats, G.W. Garner and P.E. Reynolds (eds.). ANWR Progress Report No, FY85-2, Volume I. U.S. Department of Interior, U.S. Fish and Wildlife Service, Anchorage, Alaska; J.F. Winters and R.T. Shidler 1990. An Annotated Bibliography of Selected References

behind.[1405] According to the BLM, "Where 3-D seismic exploration survey lines were located only 500 to 2,000 feet apart, localized displacement of terrestrial mammals could last for several days or *lead to complete abandonment of localized habitat*"[1406] (emphasis added). Calving season — just before snowmelt from mid-April to mid-May — is a sensitive time, and anthropogenic disturbance can be particularly taxing.[1407] If the same animals experience repeated disturbance, energetic deficits could lead to increased mortality rates.[1408]

This information suggests that seismic exploration on the coastal plain would risk disturbing and displacing muskox, causing additional stress in the winter and early spring that could lead to abandonment of preferred habitat areas and increased mortality. The EIS must address the significant potential impacts of seismic exploration on muskox in the coastal plain, particularly the 20 or so animals currently using the program area, and explain how inflicting those impacts on this small population will be consistent with the Refuge purpose of conserving muskox.

ii. BLM Fails to Consider Impacts to Muskox from Oil Spills and Resulting Release of Contaminants and Other Effects.

Oil spills can harm muskoxen by contaminating habitat and forage, causing air pollution, and causing disturbance with clean-up activities. Damage to tundra vegetation, including killing off macroflora, could persist for years, even decades.[1409] Spills affecting waterways could have very detrimental effects to muskoxen because they congregate in riparian areas during summer months.

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of Muskoxen Relevant to the National Petroleum Reserve. Alaska Department of Fish and Game. Fairbanks, Alaska.

[1405] U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, Potential Impacts of Proposed Oil and Gas Development on the Arctic Refuge's Coastal Plain: Historical Overview and Issues of Concern (Jan 17, 2001), at p.9, *available at*: https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_1/Arctic/PDF/arctic_oilandgas_impact.pdf.

[1406] Department of Interior, Bureau of Land Management. Northeast National Petroleum Reserve – Alaska, Final Supplemental Integrated Activity Plan/EIS. Vol. 2, Ch. 4 (May 2008) at 4-158.

[1407] Department of Interior, U.S. Fish and Wildlife Service. Proposed Oil and Gas Exploration within the Coastal Plain of the Arctic National Wildlife Refuge, DEIS and Draft Regulations. (September 1982) at IV-34.

[1408] *Id.*

[1409] McKendrick, J.E. and Mitchell, W. 1978. Fertilizing and Seeding Oil-Damaged Arctic Tundra to Effect Vegetation Recovery, Prudhoe Bay, Alaska. Arctic 31(3): 296-304; McKendrick, J.E. 2000. Vegetative Responses to Disturbance. In The Natural History of an Arctic Oil Field: Development and the Biota, J.C. Truett and S.R. Johnson (eds.). Academic Press, New York, New York.

Muskox are difficult to study, given the harsh conditions of where they live. BLM must identify it is missing information on muskox and discuss why it is not obtaining that information and moving forward or the agency must obtain the information. BLM appears to rely on studies from cattle, citing the IAP. The 2012 DEIS for the NPRA IAP stated:

> Toxicity studies of crude-oil ingestion in cattle indicate that substantial weight loss and aspiration pneumonia leading to death are possible effects (Rowe et al. 1973). Exposure of livestock (horses and cattle) utilizing grazing lands with oil development has resulted in mortality and morbidity (Edwards 1985). Exposure could involve heavy metals, salt water, caustic chemicals, crude oil, and condensates. In cattle, this exposure has been shown to result in a wide variety of symptoms including effects on the central nervous system, cardio-pulmonary abnormalities, gastrointestinal disorders, inhalation pneumonia, and sudden death. Caribou, moose, and muskox that become oiled by contact with a spill in contaminated lakes, ponds, rivers, or coastal waters could die from toxic hydrocarbon inhalation and absorption through the skin. In addition to acute toxicity, mortality from chronic effects could occur well after a spill.[1410]

If BLM believes that it can rely on information about the impact of oil spills on cattle to inform its analysis of the impacts of toxicity on muskox, the agency must explain why.

iii. BLM Fails to Consider Impacts to Muskox from Facilities Construction, Roads and Other Related Infrastructure Associated with Oil and Gas Development.

Roads, pipelines, and other infrastructure can cause movement barriers and habitat fragmentation as well as habitat loss.[1411] Gravel mining associated with oil and gas facility and road construction can cause harm from habitat loss, water loss, and disturbance and displacement.[1412] Mining often occurs in river floodplains, where muskox congregate in the

[1410] U.S. Department of Interior, Bureau of Land Management, Draft Environmental Impact Statement for the National Petroleum Reserve – Alaska, Integrated Activity Plan, Vol. 2, Chapter 4 (sections 4.1 to 4.6) (March 2012) at 195; Edwards, W.C. 1985. Toxicology Problems Related to Energy Production. Veterinary and Human Toxicology 21: 328-337; Rowe, L., J. Dollahite, and B. Camp. 1973. Toxicity of Two Crude Oils and of Kerosene to Cattle. Journal of American Veterinary Medicine Association 16: 60-66.

[1411] Garner, G.W., and P.E. Reynolds (eds.). 1986. Impacts of Further Exploration, Development and Production of Oil and Gas Resources. In Arctic National Wildlife Refuge Coastal Plain Resource Assessment, Final Report. Baseline study of Fish, Wildlife, and Their Habitats, Volume II. U.S. Department of the Interior, Fish and Wildlife Service, Anchorage, Alaska. Clough, J.G., A.C. Christensen, and P.C. Patton (eds.). 1987. Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. U.S. Department of the Interior, Washington D.C.

[1412] *Id*.

summer. Vegetation disturbance could lead to encroachment of non-native vegetation, affecting forage availability. The DEIS fails to assess the impacts of each of these activities on muskox.

iv. BLM Fails to Consider Impacts to Muskox from Increased Human Presence and Activity.

Grizzly bears are the primary predator on muskoxen, and they have contributed to significant declines in the northeastern Alaska population, as discussed above. Increased human presence around oil and gas facilities is likely to attract predators to oil and gas facilities due to trash and food accumulation. Predation not only causes mortality but also increases animal vigilance, stress, and energy use. Muskox typically respond to predation threats by circling into defensive groups. They may also respond by running and abandoning a resting site, and leaving calves vulnerable to predation. Recently, declines in the Central Arctic Caribou Herd and moose populations in the region — the historic prey base for grizzlies — has led to increased predation of muskox.[1413]

Increased human presence and access to the region due to an increase of roads will likely lead to increased hunting and poaching of muskox. Hunting pressure has increased in other areas inhabited by muskox and have had potentially significant impacts on abundance. Not only does hunting cause direct mortality, but the targeting of males for trophies can decrease the resiliency of whole herds.[1414] Males play a significant role in defensive behavior versus predators. The loss of males can lead to increased calf losses. The presence of humans cause general disturbance, and energy-depleting responses as described above. Oil and gas development will increase helicopter and plane traffic, road traffic, and off-highway vehicle use.[1415] The DEIS fails to assess the impacts of each of these activities on muskoxen.

v. BLM Fails to Consider the Cumulative, Additive, and Synergistic Impacts of Other Threats in Combination with Climate Change Effects on Muskox.

Climate change is already affecting muskoxen habitat and is likely affecting the health of individuals. Warm, wet years can be detrimental to muskoxen populations, as shown by past research conducted in Greenland and Canada.[1416] More erratic weather conditions in the Arctic is likely also contributing to mortality and morbidity. For example, rain-on-snow (ROS) events can

[1413] Arthur, S.M., and Del Vecchio, P.A. 2017. Effects of grizzly bear predation on muskoxen in northeastern Alaska. Ursus 28(1): 81-91.

[1414] Schmidt, J.H., and Gorn, T.S.. 2013. Possible secondary population- level effects of selective harvest of adult male muskoxen. PLoS ONE 8(6):e67493; Berger, J. 2017. The Science and Challenges of Conserving Large Wild Mammals in 21st-Century American Protected Areas." Science, Conservation, and National Parks: 189.

[1415] Murphy, S.M. and Lawhead, B.E. 2000. Caribou. In The Natural History of an Arctic Oil Field: Development and the Biota, J.C. Truett and S.R. Johnson (eds.). Academic Press, San Diego, California.

[1416] Berger, J. 2017. The Science and Challenges of Conserving Large Wild Mammals in 21st-Century American Protected Areas. Science, Conservation, and National Parks: 189.

cause direct mortality by freezing animals in the path of an extreme occurrence. Such an occurrence caused the sudden death of over 50 muskox in northwestern Alaska, and another killed an estimated 20,000 animals on Banks Island in the northwestern Canadian Arctic[1417]. These events can also create icing conditions that prevents access to forage, and this may have an adverse impact on the long-term health of individuals, especially if they experience food deprivations as juveniles.[1418] ROS events are likely to increase as climate warming increases. New diseases appearing in the northeastern population of muskox may be correlated with warming temperatures.[1419] Illness causes mortality and can make animals more vulnerable to predation. The DEIS fails to assess the impacts of climate change on muskox but must do so.

2. BLM's DEIS entirely fails to consider the impacts of an oil and gas program on Dall Sheep

A purpose of the Arctic Refuge identified by ANILCA is to conserve Dall sheep (*Ovis dalli dalli*).[1420] The BLM has entirely failed to evaluated the impacts of the oil and gas program on the species in light of this management purpose. In the United States, Dall sheep occur only in the state of Alaska. They are an important prey species and used for human subsistence. They are also in decline in the Refuge, likely due to weather changes, though other factors have not been well-researched.[1421]

Dall sheep are identified as an important subsistence resource in the program area.[1422] Although the northern reach of the population appears to be at the southern edge of the program area, oil and gas activities will likely have direct, indirect, and cumulative impacts on the regional population. The animals are sensitive to air traffic, roads, artificial noise, off-road

[1417] Berger, J., Hartway, C., Gruzdev, A., and Johnson, M. 2018. Climate Degradation and Extreme Icing Events Constrain Life in Cold-Adapted Mammals. Scientific Reports 8(1): 1156; Putkonen, J. et al., Rain on Snow: Little Understood Killer in the North. Eos 90, 221-222 (2009).

[1418] Berger, J., Hartway, C., Gruzdev, A., and Johnson, M. 2018. Climate Degradation and Extreme Icing Events Constrain Life in Cold-Adapted Mammals. Scientific Reports 8(1): 1156.

[1419] Kutz S.J., Jenkins, E.J., Veitch, A.M., Ducrocq, J., Polley, L., Elkin, B., Lair, S. 2009. The Arctic as a model for anticipating, preventing, and mitigating climate change impacts on host-parasite interactions. Vet Parasitol 163: 217–228; Kutz SJ, Bollinger T, Branigan M, Checkley S, Davison T, Dumond M, Elkin B, Forde T, Hutchins W, Niptanatiak A, et al. 2015. Erysipelothrix rhusiopathiae associated with recent widespread muskox mortalities in the Canadian Arctic. Can. Vet. J. 56: 560–563; Afema, J.A., Beckmen, K.B., Arthur, S.M., Huntington, K.B., and Mazet, J.A.K. 2017. Disease complexity in a declining Alaskan muskox (Ovibos moschatus) population. Journal of Wildlife Diseases 53(2): 311-329.

[1420] ANILCA § 303(2)(B)(i).

[1421] U.S. Fish and Wildlife Service. 2018. Dall Sheep in Alaska Refuges.

[1422] DEIS vol. 1 at 3-161–3-162.

vehicles, and other anthropogenic disturbance.[1423] Overflights by helicopter and airplanes can cause sheep to flee and use valuable energetic resources.[1424] Increased hunting may result from an increase in workers near the area.[1425]

The DEIS made no attempt to analyze the effects on climate change on the regional population. Dall sheep are sensitive to extreme weather events and changes in snow conditions.[1426] Dall sheep are susceptible to parasites and bacterial and viral diseases[1427] that may be a growing threat with climate change.[1428] BLM must include an analysis of an oil and gas program on Dall sheep; the failure to do so is a glaring omission in the draft EIS.

3. Seismic and Other Industrial Activities and Noise Impacts on Carnivores

Brown bears den during the winter and can be disturbed by noise. ROP 10 requires a 0.5 mile buffer around occupied brown bear dens identified by the Alaska Department of Fish and Game (ADFG). But the DEIS sets forth no basis for this buffer to ensure that it is sufficiently protective, and no information to indicate what distance from an occupied brown bear den is safe for seismic activity to operate without disturbing the denning bear.[1429] There is no further discussion of the impacts of seismic exploration on carnivores. This must be remedied.

Discussion of the impacts of other industrial activities like construction, blasting, gravel mining, helicopter or airplane overflights, etc., is insufficient to support any conclusion regarding the significance of those impacts. For example, "[d]uring winter, future construction activities

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[1423] AXYS Environmental Consulting Ltd. 2005. Problem Analysis of the Stone's Sheep Situation in Northeastern British Columbia. Draft Report.

[1424] Frid, A. 2003. Dall's sheep responses to overflights by helicopter and fixed-wing aircraft. Biological Conservation 110:387-399.

[1425] Draft Legislative Environmental Impact Statement. 1986. Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment.

[1426] AXYS Environmental Consulting Ltd. 2005. Problem Analysis of the Stone's Sheep Situation in Northeastern British Columbia. Draft Report; Sivy, K.J., Nolin, A.W., Cosgrove, C., and Prugh, L. 2018. Critical snow density threshold for Dall sheep (Ovis dalli dalli). Canadian Journal of Zoology (ja); van de Kerk, M., Verbyla, D., Nolin, A.W., Sivy, K.J. and Prugh, L.R., 2018. Range-wide variation in the effect of spring snow phenology on Dall sheep population dynamics. Environmental Research Letters.

[1427] AXYS Environmental Consulting Ltd. 2005. Problem Analysis of the Stone's Sheep Situation in Northeastern British Columbia. Draft Report.

[1428] Jenkins, E.J., Veitch, A.M., Kutz, S.J., Hoberg, E.P. and Polley, L., 2006. Climate change and the epidemiology of protostrongylid nematodes in northern ecosystems: Parelaphostrongylus odocoilei and Protostrongylus stilesi in Dall's sheep (Ovis d. dalli). Parasitology 132(3):387-401; Aleuy, O.A., Ruckstuhl, K., Hoberg, E.P., Veitch, A., Simmons, N. and Kutz, S.J., 2018. Diversity of gastrointestinal helminths in Dall's sheep and the negative association of the abomasal nematode, Marshallagia marshalli, with fitness indicators. PloS one 13(3):p.e0192825.

[1429] DEIS vol. 1 at 3-110.

would affect mammals that are active all year or are denning in the area. Future summer construction activities could potentially disturb all mammal species using the area in that season. Increased disturbance could result in increased energetic costs, decreased time spent foraging, or displacement from preferred habitat."

The DEIS simply fails to meaningfully assess, and all but ignores, the impacts of industrial development on carnivores, and all terrestrial mammals except caribou (problems and issues with BLM's analysis of caribou are discussed above).

a. Human Interactions and Attractants

The DEIS also appears to largely ignore our scoping comments regarding the impacts of oilfield development and associated potential anthropogenic food sources on predators such as brown bears and wolves and on natural predator-prey relationships. We highlighted significant impacts to those relationships such as increased brown bear density and prey mortality near oilfields; increased hunting pressure and "defense of life or property" killings of brown bears; increased fox populations that require human intervention, including removal.[1430]

The DEIS states:

> All species of terrestrial carnivores can be attracted to areas of human activity if food or rotting waste are improperly handled or disposed of. This can lead to habituation and food-conditioning, thus increasing the risk of injury or mortality to humans or the carnivores themselves (Burgess 2000; Shideler and Hechtel 2000). Increasing predator populations, with the associated higher predation rates on prey populations (especially migrant birds), has been a perennial concern around the North Slope oilfields (Day 1998).[1431]

Some species, particularly bears and foxes, may be attracted to areas of human activity in the program area due to the availability of food or shelter. An increase in red foxes due to human food sources could result in a decline in arctic fox densities.[1432]

ROPs 1 and 2 require that areas be kept clean of debris and that food, garbage and rotting waste be handled in some way that avoids attracting wildlife.[1433] Bear-resistant storage containers are required for garbage. There are not any other specific requirements to avoid attracting wildlife. These are standard ROPs that have not prevented the significant wildlife attraction issues already widely reported from North Slope oil and gas operations, so while well-intentioned, they do not provide any assurance that those issues will not arise on the coastal plain.

Also, ROP 4 says that the lessee:

[1430] Alaska Wilderness League et al., Scoping comments, June 19, 2018 at
[1431] DEIS vol. 1 at 3-108.
[1432] DEIS vol. 1 at 3-113.
[1433] DEIS vol. 1 at 2-16.

> would prepare and implement bear-interaction plans to minimize conflicts between bears and humans. These bear interaction plans would be developed in consultation with and approved by the USFWS and the Alaska Department of Fish and Game (ADFG). The plans would include specific measures identified in the current USFWS Polar Bear Mitigation Plan and would be adapted as needed for grizzly bears.

This language is vague even for polar bears, and even worse for brown bears in terms of providing any assurance that mitigation measures would be effective, or that human-bear interactions related to oilfield development on the coastal plain would not cause significant adverse impacts to predators and prey.

In sum, the DEIS fails to disclose the extent to which the industrialization of the coastal plain will disrupt and disturb carnivores. It relies on ROPs to mitigate these undisclosed impacts, with no underlying rationale or explanation providing any indication of their effectiveness in doing so.

K. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON POLAR BEARS IS INADEQUATE.

As described above, BLM's analysis of the ESA and MMPA protections for polar bears is inadequate.[1434] Polar bears (*Ursus maritimus*) were listed as threatened under the Endangered Species Act (ESA) in 2008 and are also federally protected under the MMPA.[1435] Of the two polar bear populations (or stocks) found in the United States, the Southern Beaufort Sea (SBS) population is the most likely to occur on the Coastal Plain.[1436] The SBS population is among the most imperiled stocks in the world, having declined dramatically since the 1990s.[1437]

Threatened polar bears den on the Coastal Plain and are using the area with increasing frequency for other activities. The majority of the Coastal Plain (approximately 77 percent) is designated as critical habitat for the species.[1438] Despite the importance of the Coastal Plain to SBS polar bears, the EIS fails to properly describe the environmental baseline for the species, and does not adequately analyze potential direct, indirect and cumulative impacts of oil and gas oil and gas leasing on polar bears using the Coastal Plain. The DEIS further fails to adequately analyze meaningful and effective mitigation measures to avoid injurious or lethal impacts to threatened polar bears.

[1434] *See supra*, Section III.D (describing BLM's ESA and MMPA obligations).

[1435] 73 Fed. Reg. 28,212 (May 15, 2008); 75 Fed. Reg. 76,086 (Dec. 7, 2010).

[1436] 75 Fed. Reg. at 76,090.

[1437] FWS Polar Bear Southern Beaufort Sea Stock Assessment 2017 (draft) at 7 (estimating 900 SBS bears, compared to earlier estimates ranging from 1480-2272 bears in the 1990s and 2000s).

[1438] 75 Fed. Reg. at 76,086.

1. Affected Environment

a. The DEIS omits important information on polar bears

BLM fails to include adequate baseline information on the SBS population of polar bears. Modeling predicts "significant declines in polar bear populations within three generations"[1439] The DEIS fails to mention that there is more than a 70% chance of a global polar bear population decline of 30% or more within three generations.[1440] This study refers to significant declines in the *global* population, not just the SBS stock, which has already declined by approximately half since the 1980s.[1441] BLM should clarify that the SBS population has already experienced an alarming decline and is in a more precarious condition than most other polar bear populations.

The DEIS states that "Regehr documented decreases in vital rates of the SBS stock, including survival and breeding rates, corresponding to increases in the number of ice-free days per year in waters over the Beaufort Sea continental shelf."[1442] While that statement is true, BLM ignores the additional finding that those annual ice-free days are projected to continue to increase, which will mean further decreases in vital rates, including survival and breeding rates.[1443] BLM fails to apply existing information and trends regarding increased ice-free days over the Beaufort Sea continental shelf to generate a relevant projection for SBS bears' survival and breeding rates. The FEIS must acknowledge that ice-free days are increasing and will continue to increase, and must disclose the likely impacts to the SBS population from the increased ice-free days and growing distances that bears must traverse from sea ice to land (see below).

BLM also fails to adequately support an assumption about the number of denning female polar bears expected on the coastal plain. BLM states that based on the estimated population of the SBS stock, the proportion of adult females in the population, the breeding probability of adult females, the proportion of dens on land, and the proportion of historical dens in the program area, approximately 19 female bears may den in the program area annually.[1444] BLM offers no calculation to arrive at this estimate, and it may be understated. Using conclusions presented in the DEIS in addition to other information, Dr. Steven Amstrup estimates up to 29 maternal dens may be found annually within the bounds of the Arctic Refuge Coastal Plain.[1445] The DEIS does not even present its estimates for each of the listed factors upon which BLM says it based its

[1439] DEIS vol. 1 at 3-124.

[1440] Regehr 2016 at 1.

[1441] March 2019 Amstrup Letter at 8 (citing Bromaghin et al. 2016).

[1442] DEIS vol. 1 at 3-125.

[1443] E.g., Bromaghin et al. "Polar bear population dynamics in the southern Beaufort Sea during a period of sea-ice decline." *Ecological Applications* 25: 634–651 (2015) ("Reduced spatial and temporal availability of sea ice is expected to increasingly force population dynamics of polar bears as the climate continues to warm.")

[1444] DEIS vol. 1 at 3-128 (citing personal communication with Ryan Wilson, FWS, October 18, 2018).

[1445] March 2019 Amstrup Letter at 11–12.

calculation of the number of dens. This makes it impossible for the general public to understand how BLM arrived at its conclusion.

The proportion of females denning on land has increased significantly, from 34% to 55% between 1985 and 2013, and is expected to continue to increase.[1446] BLM must show some defensible calculation to support its estimate of the number of denning bears annually in the program area over the course of the program. Moreover, BLM must provide the public with an opportunity to comment on the assumptions that it has made in the course of that calculation, rather than obscuring it, as it has done in this DEIS.

Further, the DEIS fails to meaningfully characterize the extent to which climate change will reduce the stability of dens during the future time periods when oil and gas activities will also be disturbing denning bears. The DEIS discusses the key characteristics of denning habitat, but glosses over relevant projected changes in one critical characteristic – snow cover – stating only that:

> The warming temperatures and increased precipitation year-round and longer growing seasons that are predicted to occur in the future may have negative implications for the stable conditions required for maternal denning by polar bears, especially if warm temperatures prevent snow cover of sufficient depth from accumulating early in the denning season.[1447]

Yet that lack of snow cover early in the denning season is just what is projected for the Alaskan Arctic.[1448] BLM must present the best available science indicating the likely timing and amount of snow cover arriving on the coastal plain throughout the life of the proposed oil and gas program and disclose the implications of that snow cover for SBS bears' breeding success.

Due to the lack of this information, BLM's assessment of the impacts that oil and gas activities will have on denning is measured against an inaccurate baseline. The DEIS thus fails to take into account how disturbances to denning caused by oil and gas activities will be even more severe in the future than they would be at present.

b. BLM failed to consider existing or projected levels of intentional or incidental take of polar bears in its environmental baseline

The DEIS is missing essential information on the annual number of human-caused mortalities for SBS polar bears and fails to connect this existing baseline level of lethal take to its

[1446] DEIS vol. 1 at 3-128.

[1447] DEIS vol. 1 at 3-132.

[1448] *See* NOAA, Final Rule, Threatened Status for Arctic ringed seal (and other subspecies), 77 Fed. Reg. 76706 (December 28, 2012); *see also* Rettig, "Need a Weather Forecast for 2030? Alaska climatologist can help" (May 31, 2016) available at https://www.adn.com/science/article/need-weather-forecast-2030-cutting-edge-alaska-climatologist-may-be-able-helo/2013/05/11/.

analysis of oil and gas impacts on the SBS population. Regarding polar bear harvest under the Inupiat-Inuvialuit Agreement, the DEIS states that from 2006-2015, "an average of 19 bears per year were removed from the U.S. portion of the SBS stock, averaging 50 percent males, 27 percent females, and 22 percent unreported sex."[1449] However, it omits the more relevant total number of bears removed annually from the SBS stock, which includes bears taken in Canada. According to the draft FWS 2017 SBS Polar Bear Stock Assessment Report, during the same ten-year time period referenced in the DEIS, an average of 14.2 bears were removed from the Canadian portion of the SBS stock, with a sex ratio of 56 males to 44 females.[1450] This latest government information states that the combined average number of polar bears removed annually from the SBS stock is 33.2 bears taken for subsistence purposes.[1451] Notably, the FWS Polar Bear Five Year Review states that the average number of human-caused mortalities was even higher between 2010–2014 at 36 SBS bears taken per year.[1452] Indeed, apparently referring to the SBS population, the 2017 FWS 5-year status review states that harvest rates in some subpopulations "appear excessive in relation to the best-available estimates of subpopulation size."[1453]

The DEIS fails to examine how this current level of lethal take will adversely affect SBS polar bears or the species as a whole, including the cumulative effects on annual rates of recruitment or survival combined with the additional impacts of oil and gas activities on the Coastal Plain. It completely ignores the Potential Biological Removal (PBR) level established for the SBS stock under the MMPA. PBR is defined as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its Optimum Sustainable Population (OSP).[1454] PBR for the SBS stock has most recently been calculated at 14, far below the average number of bears removed via annual harvest alone.[1455] According to a recent FWS memorandum, with at least 33.2 bears removed from the SBS population annually compared to a PBR of 14, it is clear that "the ability

[1449] DEIS vol. 1 at 3-125.

[1450] FWS (draft) Polar Bear: Southern Beaufort Sea Stock Assessment (2017) at 12-13 available at https://www.fws.gov/alaska/fisheries/mmm/polarbear/pdf/Southern%20Beaufort%20Sea%20Draft%20SAR%20%20for%20public%20comment.pdf.

[1451]FWS (draft) Polar Bear: Southern Beaufort Sea Stock Assessment (2017) at 12-13

[1452] FWS Polar Bear Five Year Review 2017 at 27; that combined annual harvest from 1988-2007 averaged 56.9, and from 2006-2010 averaged 53.6. FWS SBS Polar Bear Stock Assessment 2010 at 3, 5.

[1453] *Id.*; see also p. 27 (identifying SBS bears as the only stock with both a historically reduced and still-declining current population, with "harvest mortality additive to negative growth rate.").

[1454] 16 U.S.C. § 1362(20).

[1455] FWS (draft) Polar Bear: Southern Beaufort Sea Stock Assessment (2017) at 11. Even using the 2010 minimum population estimate of 1397 SBS bears, PBR was calculated at 22 – also well below the mortality from harvest alone. FWS Polar Bear Stock Assessment 2010 at 3.

of the population to reach OSP is [already] being compromised."[1456] The DEIS neglects to consider this baseline information in its cursory evaluation of the status of the SBS stock or incorporate it into its cumulative effects analysis. As noted in the FWS memorandum, it is reasonable to assume that any additional lethal take from proposed seismic testing would additionally impact the SBS stock causing further adverse effects on annual rates of recruitment or survival.[1457] Likewise, over the lifetime of an industrial oil field, from post-lease exploration, to infrastructure construction, oil and gas development and production, it is reasonable to assume that some additional level of lethal take will occur.

Notably, while comparison to the PBR calculated by FWS demonstrates that oil and gas activities under the program are likely to cause impacts that the DEIS has failed to acknowledge, the PBR itself cannot rationally be used to show an acceptable take level in the context of a stock like the SBS population that is already experiencing such catastrophic decline.[1458]

The DEIS also fails to consider that sustainable removal rates rely on assumptions about the sex-ratio of polar bears taken by harvest, as well as other conditions. Historically, removing 4.5% of a polar bear population annually was considered sustainable take, a level at which the population can still produce maximum sustainable yield (Taylor et al. 1987).[1459] But that conclusion turns on qualifiers related to sex-ratio and the absence of other stressors that are not consistent with the realities affecting the SBS population. Taylor estimated the sustainable yield of the female component of the population at < 1.6% per annum **under optimal conditions**.[1460] Such "optimal conditions" clearly do not exist at present for the SBS population. Recent research by Regehr et al. (2015) found that while the 4.5% removal rate would be generally reasonable in the absence of climate change related stressors, a lower rate may be necessary to avoid accelerating population declines caused by habitat loss due to climate change.[1461] In addition, the Regehr study includes an important qualifier that is not considered in the DEIS: a 4.5-percent harvest rate for polar bears is reasonable under many biological and management conditions **at a 2:1 male-to-female ratio**, although a lower or higher rate may be appropriate in some cases.[1462] SBS bears are not being harvested at a 2:1 male-to-female ratio in Canada; for the period 2003-

[1456] U.S. Fish and Wildlife Service, Memo re: 1002 Coastal Plain Incidental Take Regulation Application, September 2018 at 3 *available at* https://assets.documentcloud.org/documents/5647572/Alaska-Memo.pdf

[1457] *See Id.*

[1458] *See* March 2019 Amstrup Letter at 33.

[1459] FWS Polar Bear Five Year Review: Summary and Evaluation 2017 at 25.

[1460] *Id.* (omitting the phrase "under optimal conditions" from the study). *See* Taylor et al., Modeling the Sustainable Harvest of Female Polar Bears, J. Wildl.Manage.51(4) at 811 (1987). The Taylor study is not included in the DEIS References. The FEIS must provide the best available science regarding sustainable removal from the SBS population and explain how additional polar bear take and harassment from industrializing the coastal plain is consistent with recovering the population.

[1461] *Id.*.

[1462] Regehr et al., Resilience and Risk—A Demographic Model to Inform Conservation Planning for Polar Bears (2015) at 1. This study also does not appear in the DEIS References.

2007, for example, the sex ratio in the Canadian harvest was 45% male to 55% female,[1463] and during the 2006-2015 time period it was 56% males to 44% females.[1464]

In sum, the DEIS dramatically understates the removal of SBS bears actually occurring. It also fails to explain the relevance of the number of bears removed from the population annually and ignores the best available science estimating a removal number and sex-ratio considered to be consistent with the recovery of the SBS population. All available science indicates that current levels of removal by harvest alone exceed acceptable levels of polar bear mortality. BLM can therefore arrive at no supportable conclusion that additional oil and gas - related harassment and mortality on top of existing harassment and mortality will be consistent with the recovery of the SBS population.

2. Environmental Consequences

The DEIS presents a narrow range of action alternatives that fail to protect polar bears. BLM also does not accurately describe the reasonably foreseeable impacts of oil and gas activities on polar bears, including significant habitat loss and displacement, noise, seismic operations, and increased human-bear interactions. BLM also fails to assess the cumulative impacts of this proposal together with existing and foreseeable developments in the Arctic against a backdrop of climate change. Further, BLM makes no attempt to quantify the number of polar bears that would potentially be harmed by oil and gas activities, nor explain how the program could affect the SBS population as a whole.

a. BLM failed to consider a reasonable range of alternatives to protect polar bears.

BLM's range of alternatives is inadequate.[1465] The three action alternatives do not present a reasonable range sufficient to analyze differences in impacts to polar bears. The EIS plainly states that "[a]ll the action alternatives would affect large areas of the designated terrestrial-denning unit of critical habitat for polar bears; any facilities constructed within 20 miles of the coast would be located in that critical habitat unit."[1466] Additionally, all of the action alternatives assume the entire Coastal Plain will be open to seismic exploration, which by itself may have lethal impacts on polar bears.

The minor variations between the action alternatives do not offer a meaningful difference in impacts to polar bears and their critical habitat. For instance, under Lease Stipulation 5 in Alternative D, BLM would prohibit permanent oil and gas structures from being within 1 mile of the small portion of potential denning habitat located from the coastline to 5 miles inland on the Niguanak River, Katakturuk River, Marsh Creek, Carter Creek, and Sadlerochit River, and all

[1463] FWS Polar Bear Stock Assessment 2010 at 3.
[1464] FWS (draft) Polar Bear: Southern Beaufort Sea Stock Assessment (2017) at 13.
[1465] *See supra* Part III.B.2.
[1466] DEIS vol. 1 at 3-133.

associated tributaries.[1467] Similarly, under Alternative D, BLM would prohibit oil and gas "activities" within that same small portion of the denning habitat from October 30 through April 15.

The only rationale provided by BLM for protecting that portion of the denning habitat is that 37% of known historic dens in the Coastal Plain have been observed there, even though that area represents only 8.8% of the terrestrial denning critical habitat within the Coastal Plain.[1468] BLM provides no scientific basis to rely on the historical den occurrences to conclude that this portion of the suitable denning habitat is the only portion of the suitable denning habitat in the Coastal Plain that requires the protection conferred by Lease Stipulation 5. BLM does not explain whether the agency followed any scientifically sound approach to identifying areas within the suitable denning habitat that have a higher likelihood of den occurrence than other portions. For example, BLM does not explain or evaluate whether it has considered the effect of potential telemetry or survey biases, which may mean that density of denning in other areas is underestimated due to those areas being less accessible to researchers. Moreover, BLM has failed to explain whether or how it has taken climate change impacts into account, and how such impacts may shift preferred denning locations in the future compared to historically observed preferences.

BLM should have evaluated impacts from oil and gas activities on all terrestrial denning critical habitat on the Coastal Plain, and considered measures to mitigate impacts to that broader geographic area. It also should have considered the impacts of alternative seismic exploration methods and sought to mitigate those impacts specifically.

b. BLM failed to analyze impacts to critical habitat

In Appendix B, the DEIS describes the extensive industrialization of the Coastal Plain as a Reasonably Foreseeable Development scenario. It assumes there will be three or four central processing facilities (CPF), each with six satellite well pads connected by roads averaging eight miles in length. Each CPF area would include oil pipeline connections to the Trans-Alaska Pipeline, and water and electricity pipelines to supply the CPF; these would total hundreds of miles.[1469]

There would be barge landings, staging pads and a seawater treatment plant located along the coastline, connected to the CPF by thirty miles of road and pipeline.[1470] In addition to

[1467] *See* DEIS vol. 1 at 2-10.

[1468] *See* DEIS vol. 1 at 3-147.

[1469] Draft EIS vol. 2 at B-13.

[1470] Draft EIS vol. 2 at B-15- B-16 ("A barge landing and an associated staging pad to store equipment and modules until ice roads can be constructed would typically disturb approximately 10 acres, including the barge landing and a gravel staging pad…. A road and seawater transport pipeline would be constructed from the seawater treatment plant to the [Central Processing Facility]. Typical gravel roads in the Arctic require 7.5 acres of surface disturbance per mile.").

each potential CPF, it is expected that a generator, airstrip, storage tanks, a communications center, waste treatment units, and a maintenance shop would be constructed on the anchor pad, as well as living quarters and offices on or off the pad.[1471] Hundreds of miles of gravel roads, and undisclosed miles of ice roads, would be constructed, and gravel mines unearth hundreds of additional acres.[1472]

This extensive system of coastal infrastructure would significantly alter and permanently fragment critical habitat for polar bears, rendering thousands of acres on the coastal plain either undesirable or completely unavailable. Although bears prefer sea ice habitat to hunt, roam and rest, both males and females are known to use land habitat in late summer and early fall, with females remaining an average of 56 days and increasing.[1473] The coastal plain has already become the denning habitat used by a large proportion of SBS bears, and will likely become progressively more important for bears to hunt, roam and rest, as well. As discussed further below, SBS polar bears are facing deteriorating health and the avoidance behavior and energetic losses posed by this project will worsen their existing conditions.

The DEIS fails to take a hard look at this enormous imposition of industrial infrastructure and associated activities on polar bear critical habitat, simply stating the following:

> Most polar bears moving through areas near industrial facilities would likely be disturbed by activities on, or be hazed away from, drill-site pads. Disturbance from traffic on access roads would likely alter the use of habitats by bears nearby, although those effects would diminish for facilities located farther inland because they would be less likely to be used by bears than other areas near the coastline. Overall, the effects of reduced use of habitats near oil and gas facilities likely would be minimal, although they would be long-term in duration.[1474]

The DEIS fails to further explain the impact of these direct losses of polar bear habitat, and there is no support for the conclusion that effects would be minimal. BLM must assess the impact of the habitat fragmentation caused by the development of oil and gas facilities spanning hundreds of miles in designated critical habitat on the movements, behaviors, health and distribution of SBS polar bears.

Additionally, if bears spend more time on land during the open water period, there is potential for increased disease transmission, particularly where bears form aggregations at sites where the remains of subsistence harvested whales are deposited (e.g., Barter Island and Cross Island, Alaska). Such aggregations are also more susceptible to the impacts from potential oil spills.[1475] The DEIS ignores any increased potential for disease transmission or increased

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[1471] *Id.*
[1472] *Id.* at B-22-23.
[1473] DEIS vol. 1 at 3-127
[1474] DEIS vol 1 at 3-135.
[1475] FWS Polar Bear Five-Year Review 2017 at18.

susceptibility to oil spills faced by SBS bears using increasingly important land habitat in new ways.

BLM's comparison of alternatives focuses on the overlap of leasing areas with mapped suitable denning habitat, rather than impacts within the boundaries of the critical habitat designation of terrestrial denning habitat.[1476] The majority of the Coastal Plain (approximately 77 percent) is designated as critical habitat for the species.[1477] However, BLM focuses much of its discussion on what it calls "suitable denning habitat," referring to the potential denning locations themselves, which it states covers only 4,700 acres.[1478] But maternal denning habitat includes, inter alia, corridors between the dens and the coast, and BLM's designation obscures the reality that BLM is only talking about a small portion of the actual critical habitat designated for terrestrial denning. BLM then limits its analysis of infrastructure to only quantify the extent of the industrial footprint within the 4700 acres.

This approach likely understates the impacts on denning habitat because disturbance and structures in designated critical habitat may have negative impacts on the mapped denning habitat as well. Moreover, analyzing impacts to *only* mapped suitable denning habitat overlooks the fact that polar bears must move between these riverine corridors to travel to the coast, reach their dens, and seek out food sources. BLM's failure to consider impacts beyond suitable denning habitat artificially limits the scope of its analysis by omitting impacts to critical habitat on the majority of the Coastal Plain. In sum, the EIS fails to evaluate the direct, indirect and incremental cumulative effects that could occur to polar bears due to this proposal. These include the exclusion or avoidance from feeding, resting, or denning areas; increased energetic costs; and disruption of associated biological behaviors and processes as a result of disturbance and displacement of their critical habitat caused by an oil and gas program. Ultimately, BLM provides no reasonable basis to support its surprising conclusion that the effects on polar bears of developing a large oilfield in the middle of designated polar bear critical habitat will be minimal.

c. BLM failed to analyze impacts from noise and human disturbance and interactions

Industry activities may disturb polar bears at maternal den sites, with polar bears reacting in a variety of ways depending on factors such as the level of exposure and distance from the den site from the industrial activity.[1479] The DEIS states that in a report for ExxonMobil Co., MacGillivray et al. (2003) found that noises associated with various industry activities were detectable above background levels at ranges from 0.3 miles to 1.24 miles from artificial den sites depending on the stimulus, with low-frequency vibrations and noises detected at the greatest

[1476] *See* DEIS vol. 1 at 3-145 (BLM presents two tables that attempt to differentiate impacts between alternatives. BLM GIS 2018 is cited as a source for mapping potential maternal denning habitat in Table 3-24.) BLM should fully describe how these maps and acreage numbers were developed.

[1477] 75 Fed. Reg. 76,086.

[1478] DEIS vol. 1 at 3-134.

[1479] 81 Fed Reg. at 52,292 (Aug. 5, 2016).

distances.[1480] Helicopter noise was detectable up to .6 miles. BLM acknowledges that "[b]lasting at gravel mines and pile-driving of bridge abutments during future winter construction would be sources of noise in polar bear denning habitat… Possible impacts on polar bears exposed to noise potentially include disruption of normal activities, displacement from foraging and denning habitats, and displacement of maternal females and young cubs from dens."[1481]

BLM does not state the distance at which blasting and pile-driving noise would likely be detected by denning or non-denning bears, leaving unexamined the likelihood of the identified potential impacts occurring. As discussed elsewhere, it also fails to evaluate the impacts of seismic testing, including noise impacts on denning bears. The FEIS must evaluate whether winter construction activities such as blasting and pile driving could result in displacement, injury or death to polar bears. If a 2003 report prepared for Exxon measuring noise at artificial dens represents the best available science on the sensitivity of actual denning polar bears to noise, then BLM cannot support a conclusion that all the noise associated with oil and gas activity on the coastal plain, including seismic exploration and winter construction, won't significantly affect polar bears.

Other industrial activities and noise will disturb non-denning bears as well. Routine snowmachine noise has been shown to prompt significant avoidance responses in polar bears at distances up to 3,272 meters – over two miles.[1482] Except for male adults, bears studied "typically had a pronounced response and frequently fled snowmobiles and continued to flee the area at lengthy distances." The DEIS notes this study but fails to mention the two-mile response threshold noted for some bears and understates the intensity of the observed fleeing response.[1483] The FEIS must disclose the known snowmachine impacts more transparently and discuss the likely impacts of the many other mobile sources of foreseeable industrial noise on polar bears, including trucks, bulldozers, airplanes, helicopters, etc.

BLM relies heavily on Incidental Take Regulations that do not yet exist for the Coastal Plain to conclude that noise from industrial activities will have no significant impact on bears.[1484] This reliance is misplaced for at least two reasons.

[1480] DEIS vol. 1 at 3-136; References-31.

[1481] DEIS vol. 1 at 3-137.

[1482] Andersen, M., and J. Aars. 2008. "Short-term behavioral response of polar bears (*Ursus maritimus*) to snowmobile disturbance." *Polar Biology* 31: 501–507.

[1483] DEIS vol. 1 at 3-137.

[1484] *See* DEIS vol. 1 at 3-144 (stating that the current ITR process has been effective at addressing and mitigating the risks from human encounters with polar bears); DEIS vol. 1 at 3-141 ("The precautions against den disturbance in the interaction plan, required under ITRs, and the denning surveys conducted before seismic exploration and construction of roads and pads would minimize the likelihood of this potential risk"); DEIS vol. 1 at 3-138: ("Behavioral disturbance on the productivity of polar bears in the program area is likely to be low. This assumes that all mitigative measures are implemented, as required under ITRs and specified in typical wildlife interaction plans for industrial activity in Arctic Alaska, and that preconstruction den surveys detect most maternal dens in the affected areas.")

First, the track record pursuant to the Beaufort Sea ITR for disturbances to polar bears is mixed at best, with examples of industry activity disturbing and displacing denning bears along with examples of bears largely unaffected despite fairly close proximity to industrial activity.[1485] The monitoring done pursuant to the ITR provides some useful information but is not designed to measure overall bear responses to various stimuli at different distances in any scientific way. The monitoring information doesn't indicate that behavioral disturbances to polar bears in the Beaufort Sea have been minimal, and certainly doesn't support the conclusion that noise impacts from industrializing the coastal plain – with its unique site characteristics and different and changing usage by polar bears – would be minimal.

Second, as FWS notes in the Beaufort Sea ITR, "the distribution and habitat use patterns of polar bears indicates that relatively few animals will occur in the areas of Industry activity at any particular time, and, therefore, few animals are likely to be affected. SBS polar bears are widely distributed, are most often closely associated with pack-ice, and are unlikely to interact with open-water industrial activities . . ."[1486]

These findings are critical to the FWS's "negligible impacts" determination in the Beaufort Sea ITR,[1487] but the same findings cannot be made with regard to the coastal plain. As noted herein and in the DEIS, the coastal plain has become a critically important denning area and will likely be of increasing importance for roaming and foraging as well, as sea ice continues to diminish. It cannot be said that relatively few animals will occur in the areas of industry activity on the coastal plain, or that bear interactions with that activity are unlikely. In short, the coastal plain is completely different than the Beaufort Sea ITR area in terms of the likely impacts on polar bears, and the Beaufort Sea experience to date offers little assurance that those impacts will be insignificant.

In sum, there is evidence of industrial noise detectability in dens up to 1.24 miles depending on the source, and the DEIS fails to disclose the specific noise sources and associated detectability distances expected. The potential impacts are significant, including abandonment of dens which can equate to death for cubs, and curtailed nursing time in the den, which also can impair cub survival. There have also been observed strong avoidance reactions of non-denning bears to snowmachines at distances up to two miles, and no countervailing evidence to suggest that impacts from snowmachines and other mobile sources of noise on the coastal plain would not trigger similar intense reactions from bears. Despite this evidence, the DEIS concludes that establishing a one-mile buffer around known dens and complying with future, unspecified ITRs will suffice to protect bears from noise. This conclusion is inconsistent with the evidence.

[1485] 81 Fed. Reg. 52,292 (August 5, 2016).
[1486] 81 Fed. Reg. 52,304.
[1487] *Id.*

d. BLM must address methods for reducing human food, hazardous substances, and other attractants associated with Arctic Refuge Coastal Plain oil and gas development

The DEIS appears to ignore scoping comments regarding the impacts of oilfield development in the Arctic on polar bears, in terms of reducing attractants and addressing the increasing likelihood of human-polar bear interactions on the coastal plain if oil and gas development were to proceed there.[1488] The DEIS states that:

> ITRs also include measures to avoid and minimize bear conflict with humans. Upon issuance of a LOA by the USFWS, trained personnel are allowed to haze or otherwise take polar bears under specific circumstances involving the protection of human life. The USFWS has voluntary deterrence guidelines (75 FR 61631) to deter polar bears without causing injury or death, focusing on passive measures intended to prevent bears from gaining access to property or people, such as fencing, gates, skirting, exclusion cages, and bear-proof garbage containers, as well as on preventive measures to discourage bears from interacting with property or people, such as acoustic devices for auditory disturbance and vehicle or boat deterrence.[1489]

This fails to address the extent to which industrial development on the coastal plain is likely to attract polar bears and increase human-polar bear interactions. It ignores the evidence already provided that those interactions are already increasing, with bears spending more time on land and doing more foraging and traveling, and that one company reported tripling the number of bears it has had to haze.[1490] Hazing can help prevent the need to kill bears in defense of self or property but increases metabolic costs, and for females can result in decreased reproductive rates – ultimately affecting population growth.[1491]

While the DEIS acknowledges that oil and gas activities lead to more human-bear encounters, it relies on extremely dated information to downplay the effects of those activities. The DEIS cites polar bear sighting and hazing statistics from 2005 to 2008, ignoring the last 10 years of oil and gas activities.[1492] It also relies on a 2003 source to say that oil and gas activities have not affected polar bears and ringed seals,[1493] despite the fact that the cumulative effects of climate change and oil and gas activities were significantly lower fifteen years ago.

BLM must disclose these foreseeable impacts to polar bears and describe how the increased human-bear interactions, increased incidences of hazing and other efforts to deter bears

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[1488] Scoping Comment Letter at 51–53.

[1489] DEIS vol. 1 at 3-125.

[1490] T. C. Atwood et al., Rapid environmental change drives increased land use by an arctic marine predator, 11 PLoS ONE e0155932 at 12 (2016); Scoping Comment Letter at 52-53.

[1491] *Id.*.

[1492] DEIS vol. 1 at 3-148.

[1493] *Id.*

from seeking food sources in developed areas, and increased energetic costs for polar bears will translate into adverse impacts for the SBS population.

BLM also failed to assess and disclose the potential threats to polar bears from oil spills. The EIS states that accidental spills, leaks, and other sources of contamination are a potential source of injury or mortality, but brushes aside the potential impacts by relying on assumptions that any spill would be small, on-land, and cleaned up quickly. [1494] The assumptions underlying BLM's discussion of oil spills are faulty, and BLM underestimates the potential environmental damage from spills on the Coastal Plain.[1495] Further, BLM states that "[s]pills associated with development projects on the mainland are of much less concern for polar bears than are marine spills."[1496] This finding seemingly ignores the fact that polar bears are spending more time onshore due to climate change, so terrestrial spills are increasingly likely to affect their habitat and prey. BLM also failed to explore alternatives or mitigation measures to reduce spills and protect areas of particular importance to bears, like feeding and resting areas, summer refugia and winter denning areas. Thus, BLM's analysis of impacts to polar bears from oil spills is deficient.

e. BLM failed to analyze potentially significant impacts to polar bears from seismic exploration.

The EIS underestimates the potential impacts to polar bears as a result of seismic exploration. BLM's analysis of pre-leasing seismic exploration is confusing and inadequate throughout the EIS, but this is particularly concerning in the case of polar bears. Seismic exploration presents a risk of lethal take to polar bears due to shortened denning time, den abandonment and the ensuing indirect mortality, or direct mortality caused by trucks running over bears and cubs in maternal dens.

As the FWS recognized, "it is thought that successful denning, birthing, and rearing activities require a relatively undisturbed environment."[1497] Polar bears are particularly vulnerable to anthropogenic disturbance during denning as compared to other times in their life cycle.[1498] The best available science indicates that sows entering dens or denning with cubs are more sensitive to noise disturbance than other demographic groups.[1499] Seismic exploration on the Coastal Plain will likely have particularly harmful impacts as it would occur during the

[1494] DEIS vol. 1 at 3-41.

[1495] *See supra*, at Part IV.B (describing the shortcomings in BLM's oil spill analysis).

[1496] DEIS vol. 1 at 3-41.

[1497] 81 Fed. Reg. at 36,673 (June 7, 2016).

[1498] S. C. Amstrup, *Polar bear, Ursus maritimus, in* WILD MAMMALS OF NORTH AMERICA: BIOLOGY, MANAGEMENT, AND CONSERVATION 587, 606 (G. A. Feldhamer, B. C. Thomson & J. A. Chapman (eds.), John Hopkins Press 2003).

[1499] 81 Fed. Reg. at 52,291 (Aug. 5, 2016).

winter months, overlapping with the denning season and the period when bears emerge with their young cubs to hunt prey on sea ice.[1500]

Bears that are forced to den onshore are increasingly vulnerable to human encroachment, and denning females disturbed by human activities, including oil and gas activities, may abandon their dens, causing a loss of cubs.[1501] Disturbance can also cause the mother and cubs to leave the den together sooner than they otherwise would, which reduces the likelihood that the cubs will survive their first year of life. The FWS has expressly acknowledged the potentially lethal effects of winter oil and gas exploration on denning polar bears in the Arctic Refuge, finding that "[m]aternal polar bears with newborn cubs can be prematurely displaced from their winter dens by the noise, vibrations, and human disturbance associated with oil exploration activities. This displacement may result in potentially fatal human-bear conflicts, and may expose the cubs to increased mortality due to harsh winter conditions for which they are not yet prepared."[1502] Cubs, which are born in mid-winter, are generally unable to survive conditions outside the den until March or April.[1503]Female polar bears have an average of 1.8 cubs per litter, [1504] and adequate time in a den is necessary to optimize cub development for withstanding harsh Arctic spring conditions and to synchronize den emergence with peak prey availability.[1505] If den site abandonment occurs before the cubs are able to survive outside the den, or if the female abandons the cubs, the cubs will die.[1506]

A rational, scientifically legitimate analysis of the impacts of seismic exploration requires consideration of the areal extent of the survey during a given denning season and the number of den locations distributed in the proposed survey area, and must consider the high failure rate for the den detection methods that will be employed. BLM has provided no such analysis in the DEIS. For example, taking into account the realities of heavy vehicle movement during recent seismic surveys in Alaska, a seismic survey covering the entire Coastal Plain within a denning season would pose a 79% to 90% chance that at least one undetected polar bear den would be directly run over by a vehicle and crushed, with potential immediately lethal consequences for

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[1500] F. Messier *et al.*, *Denning ecology of polar bears in the Canadian Arctic Archipelago*, 75 Journal of Mammalogy 2 (1994).

[1501] *See, e.g.*, S. C. Amstrup, *Human disturbances of denning polar bears in Alaska*, 46 Arctic 246 (1993).

[1502] U.S. Fish and Wildlife Service, *Potential Impacts of Proposed Oil and Gas Development on the Arctic Refuge's Coastal Plain: Historical Overview and Issues of Concern*, at 10 (2001), *available at*: https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_1/Arctic/PDF/arctic_oilandgas_impact.pdf.

[1503] 81 Fed. Reg. at 52,292.

[1504] Rode et al. *Variation in the response of an Arctic top predator experiencing habitat loss: feeding and reproductive ecology of two polar bear populations,* Global Change Biology, v. 20, 82 (2014).

[1505] Rode et al. *Den phenology and reproductive success of polar bears in a changing climate,* Journal of Mammology, 99(1): 16 (2018).

[1506] 75 Fed. Reg. at 76,090.

the mother and cubs.[1507] Moreover, due to the density of 3D seismic survey grids, any undetected den would have a very high probability of being disturbed by the very close passage of heavy vehicles.[1508] Given that den detection methods have failed to detect dens about half the time, this means that nearly half of the bears denning within the seismic survey area will be exposed to disturbance at proximities that in the past caused mothers to open their dens. [1509] Those disturbances will bring energetic costs and may also lead to lethal results.[1510]

Despite the foregoing, BLM largely ignores the effects of noise, vibration, human presence and other disturbance to polar bears produced by seismic exploration activities. BLM only mentions such impacts when describing mitigation measures it assumes will be implemented via ITRs that do not currently exist. For instance, the EIS states that "[d]en surveys using FLIR sensors or trained dogs would be conducted annually before seismic exploration and construction of roads and pads commenced in the program area…"[1511]

BLM cannot assume that such measures are wholly effective given recent research demonstrating the shortcomings of these surveys. FLIR surveys, while more effective at detecting polar bear dens than visual observations, cannot identify all of them. As described by Dr. Steven Amstrup, research suggests that a 50% detection rate is probably close to the highest that could reasonably be expected from FLIR surveys. Additionally, locating dens on the Arctic Refuge Coastal Plain is even more complex than in other parts of Alaska's Arctic slope. This is because "den concentration areas" are typical in some other Arctic regions and can be protected with restrictions on industrial and other human activities. However, snow accumulation sufficient for denning in the Coastal Plain occurs mainly in narrow linear features following drainage courses, lake shores and coastal banks. These features and their associated denning habitat are so abundant that they can be considered essentially uniform on the Coastal Plain.[1512] This means that FLIR surveys are likely to be even less than 50% effective when applied in the Coastal Plain.[1513]

While BLM does later acknowledge that FLIR surveys and dog detection "do not provide perfect detection and occupied maternal dens are sometimes missed in preconstruction surveys,"[1514] nowhere does BLM attempt to quantify the likelihood of missing dens. The EIS

[1507] *See* March 2019 Amstrup Letter at Table 2, columns 1 and 2 (showing 79% probability of running over at least one den if there are 10 undetected dens in survey area, and 90% if there are 15 undetected dens).

[1508] *See* March 2019 Amstrup Letter at 13–16.

[1509] *Id*. at 13 (anticipating at least 50% failure rate for den detection); *id.* (explaining that vehicles passing 65 meters from den caused premature opening in past); *id*. at 14 (calculating that if there were 15 undetected dens, on average at least 13 of them would be within 65 meters of vehicle passage).

[1510] *Id*. at 14–15 (describing latent lethal consequences for cubs due to disturbance).

[1511] DEIS vol. 1 at 3-137.

[1512] *See* March 2019 Amstrup Letter at 14.

[1513] *See* March 2019 Amstrup Letter at 23.

[1514] DEIS vol. 1 at 3-134.

merely states that "complete detection of occupied bear dens is unlikely to be achieved, so an unknown (though probably small) number of denning bears could be exposed to disturbance until discovered by such operations every winter during exploration, construction, and development drilling phases."[1515]

Exposing half of the maternal dens located within a proposed seismic survey area to disturbance and potential crushing cannot be considered a small number. This is particularly true when a seismic survey will cover an extensive area within the Coastal Plain within a given denning season. And the disturbance is not necessarily temporary – i.e. lasting only "until discovered by such operations." If a den is abandoned or left earlier than it otherwise would have been, the "discovery" is too late and the significant harm, possibly lethal harm, is done.

Finally, BLM fails to consider the efficacy of the use of dogs for den detection. For practical purposes, the use of the dogs is limited to confirming whether a suspected den already identified by the FLIR survey is actually occupied by a polar bear. Dogs cannot find dens that were not detected by the FLIR survey, because researchers would have to tread over nearly every square foot of an enormous area with the dogs. Further, the dogs must be transported via vehicles that can cause disturbance to undetected dens. The dogs themselves can also cause den disturbance when they alert to a den by starting to dig. [1516] For purposes of a seismic survey of a large area within the complex habitat of the Coastal Plain, dog detection will be of limited utility to mitigate adverse impacts to polar bears. [1517]

BLM failed to take a hard look, or any look at all, at impacts from seismic activities, which could have population-level impacts on threatened polar bears and are under active permitting consideration by the very same agency. [1518] BLM must thoroughly evaluate these impacts before leasing any areas or authorizing any seismic activity.

f. BLM's cumulative impacts analysis is deficient

The DEIS's discussion of cumulative impacts to polar bears is inadequate. The DEIS does not mention, let alone analyze, the majority of current and reasonably foreseeable circumstances and activities that are affecting and will affect polar bears cumulatively and synergistically with Arctic Refuge development. The DEIS fails to analyze the direct, indirect and cumulative effects of the proposed action against a backdrop of continued climate change, which is already causing habitat loss, conflicts with humans, energetic costs, nutritional stress, and strenuous long-distance swimming for polar bears.

[1515] *Id.* at 3-146.

[1516] *See* March 2019 Amstrup Letter at 24 (discussing limitations and adverse side effects of using dogs for den detection).

[1517] *Id.*

[1518] *See supra* at Part III.B. (BLM has improperly segmented and omitted any review of SAExploration's seismic proposal from its analysis of the oil and gas program).

The most significant impact that will act cumulatively with Arctic Refuge drilling is loss of sea ice habitat from climate change. Amstrup et al. (2010) evaluated the future range-wide population status of polar bears under five GHG emissions scenarios and combined them with management scenarios.[1519] Under the A1B, B1, and "mitigation" emissions scenarios (where the "mitigation scenario" was characterized by 450 ppm CO_2, radiative forcing of ~3.5 watts/m^2, and mean global temperature rise limited to ~1.75ºC above preindustrial temperatures by 2100), extinction was the dominant outcome in the Divergent ecoregion (where sea ice recedes from the coast in summer, and polar bears must remain on land or move with the ice as it recedes north) encompassing the SBS population.[1520] When the mitigation scenario was combined with the best-possible on-the-ground management to reduce threats from harvest, bear-human interactions, and oil and gas activities, reduced population was still the dominant outcome for the Divergent ecoregion, although the probability of extinction was still substantial at 24 percent by 2100.[1521]

The DEIS recognizes that climate change is causing, and will continue to cause, an increase in polar bears denning on land and spending time on land, which will lead to more bear-human conflict.[1522] The DEIS does not, however, assess the myriad other ways climate change will act cumulatively with Refuge activities to increase threats to polar bears. For example, polar bears' decreased body condition will mean that any disturbance from oil and gas activities will take a greater energetic toll than it would on healthy bears. Any disturbance that causes a bear to flee has a high metabolic cost.[1523] Moving at even relatively slow speeds results in bears' expending 13 times more energy than they otherwise would.[1524] Female polar bears that are energetically stressed may forgo reproduction, rather than risk incurring the energetic costs of an unsuccessful reproductive process, and the persistent deferral of reproduction could contribute to a declining population trend, further threatening a species with an intrinsically low rate of growth.[1525]

In a warming Arctic, polar bears have less energy to spare. A recent study found that radio-tracked adult female polar bears in the SBS population increased their activity time and/or their travel speed to compensate for rapid westward ice drift in recent years, as ice drift rates increased due to reduced ice thickness and extent.[1526] This additional activity increased their estimated annual energy expenditure, and "likely exacerbate[s] the physiological stress

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[1519] S. C. Amstrup *et al., Greenhouse gas mitigation can reduce sea-ice loss and increase polar bear persistence*, 468 Nature 955 (2010).

[1520] *Id.* at 3.

[1521] *Id.*

[1522] DEIS vol. 1 at 3-138.

[1523] *Id.* at 192.

[1524] Schliebe (2006) at 75.

[1525] *Id.* at 20.

[1526] G.M. Durner *et al., Increased Arctic sea ice drift alters adult female polar bear movements and energetics*, 23 Global Change Biology 3460 (2017).

experienced by polar bears in a warming Arctic."[1527] Polar bears are also increasing their energy expenditure by swimming more due to the decline in sea ice. For example, one study documented an adult female making a 687-km continuous swim over nine days to reach the distant sea-ice edge, followed by an 1800-km walk and swim, during which time she lost 22 percent of her body mass and her yearling cub.[1528] The study "indicates that long distance swimming in Arctic waters, and travel over deep water pack ice, may result in high energetic costs and compromise reproductive fitness" and that "[a]ssociated declines in body mass and losses of dependent young may ultimately become an important mechanism for influencing population trends."[1529]

Satellite telemetry records from 76 bears in the Beaufort Sea during 2007–2012, coupled with earlier results, indicated that the frequency of long-distance swims increased with (a) increases in the distance of the pack ice edge from land, (b) the rate at which the pack ice edge retreated, and (c) the mean daily rate of open water gain between June and August.[1530] These results indicate that "long-distance swimming by polar bears is likely to occur more frequently as sea ice conditions change due to climate warming."[1531] Again, this means that the bears that encounter Arctic Refuge drilling activities are likely to already be in an energy-deficit state, so disturbance from industrial activities will likely have a greater impact than it would have in the past.

BLM acknowledges dramatic sea ice loss, increases in the number of ice-free days in the Beaufort Sea, and the stress brought to polar bears by those factors. It notes that distances traveled by pregnant females from sea ice to denning habitat increased by 3.7 miles per year from 1979-2006, a total of over 103 miles.[1532] The DEIS ignores the next sentence in the cited study, however, which projects that that distance will continue to increase by 10 miles per year from 2001-2060 – close to another **600 miles**.[1533] It is undisputed that increased travel distances could negatively affect denning success and ultimately the population size of polar bears.

[1527] *Id.*; *see also* J.V. Ware *et al.*, *Habitat degradation affects the summer activity of polar bears*, 184 Oecologia 87 (2017) (finding that SBS bears were substantially more active than Chukchi Sea bears in lower quality habitat types and that onshore, SBS bears exhibited relatively high activity associated with the use of subsistence-harvested bowhead whale carcasses).

[1528] G. M. Durner *et al.*, *Consequences of long-distance swimming and travel over deep-water pack ice for a female polar bear during a year of extreme sea ice retreat*, 34 Polar Biology 975 (2011).

[1529] *Id.*

[1530] N. W. Pilfold, *et al.*, *Migratory response of polar bears to sea ice loss: to swim or not to swim*, 40 Ecography 189 (2017).

[1531] *Id.* at 189.

[1532] DEIS vol. 1 at 3-125.

[1533] Bergen et al. 2007. Predicting Movements of Female Polar Bears Between Summer Sea-Ice Foraging Habitats and Terrestrial Denning Habitats of Alaska in the 21st Century: Proposed Methodology and Pilot Assessment.

Since it ignores the additive distance that SBS bears will need to travel from sea ice to denning habitat, the DEIS does not estimate the energetic loss or nutritional stress that polar bears will have to overcome nor assign any expected additive mortality due to this dynamic. The DEIS thus understates the likely consequences for SBS bears.

Another recent study found that SBS polar bears cannot use a hibernation-like metabolism to prolong their summer fasting period meaningfully and that bears are susceptible to deleterious declines in body condition, and ultimately survival, during the lengthening period of ice melt and food deprivation.[1534] Scientists at DOI interpret these observations as a prelude to mass polar bear mortality events in the future: "[a]s changes in habitat become more severe and seasonal rates of change more rapid, catastrophic mortality events that have yet to be realized on a large scale are expected to occur."[1535]

Climate change and oil and gas development will also act cumulatively on polar bears' primary prey, ringed seals, likely reducing their abundance and availability for polar bears. Cumulative impacts and synergistic effects from potential Arctic Refuge Coastal Plain, Beaufort Sea OCS, and state offshore lease sales, exploration, and oil drilling programs could affect seal feeding, pup survival, and vulnerability to a suite of predators. For example, icebreakers used to move drilling vessels and related equipment to leased areas may fragment sea ice that ice-dependent seals need to build lairs and raise and feed their pups. Seismic noise and related vessel activities may also disturb seals, thereby reducing seal availability to polar bears during critical feeding periods. Increased human activity associated with exploration and drilling may also increase the occurrence of other Arctic predators like Arctic foxes and non-native red foxes (*Vulpes Vulpes)* and their predation on seal pups,[1536] thereby increasing predator competition and loss of meat to scavenging, and further reducing polar bear access to prey.[1537]

In addition to cumulative impacts from climate change, polar bears in the SBS population face cumulative impacts from a wide range of industrial activities, including onshore and offshore oil and gas development and increased shipping. BLM has failed to identify and assess the many ongoing and reasonably foreseeable oil and gas activities that will affect polar bears, including increased onshore oil development in the NPR-A, including CD-5, GMT-1, GMT-2, and Willow. The impacts and disturbance to polar bears due to oil and gas activities in the NPR-A may be further exacerbated if DOI moves ahead with its attempt to reopen and revise BLM's Integrated Activity Plan. As envisioned by DOI, this plan would open more areas in the Reserve to leasing and oil and gas activities, including in sensitive environmental areas near the coast. BLM also failed to fully consider impacts from increasing development on state lands adjacent to

[1534] J.P. Whiteman *et al.*, *Summer declines in activity and body temperature offer polar bears limited energy savings*, 349 Science 295 (2015).

[1535] Convention on Int'l Trade in Endangered Species, CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II, Sixteenth meeting of the Conference of the Parties, Bangkok (Thailand), 3-14 March 2013, Prop. 3 at 5.1.

[1536] L. E. Eberhardt, *et al.*, *Arctic fox home range characteristics in an oil-development area*, 46 Journal of Wildlife Management 1 (1982).

[1537] I. Stirling and W. R. Archibald, *Aspects of predation of seals by polar bears*, 34 Journal of the Fisheries Research Board of Canada 8 (1977).

the Reserve; the Liberty offshore island in the Beaufort Sea; and a new Five-Year Plan for Offshore Oil Development that includes lease sales in the Beaufort Sea.

Polar bears in the SBS population face extinction during this century if we do not take aggressive steps to decrease greenhouse gas emissions and limit other impacts to polar bears from industrial development. The DEIS does not acknowledge or analyze how Arctic Refuge oil activities will act cumulatively with climate change and other development to seal polar bears' fate.

3. Mitigation Measures

BLM is obligated under NEPA to analyze appropriate mitigation measures to reduce impacts to polar bears. It fails to do so. Throughout its analysis, BLM improperly relies on conclusory statements about Incidental Take Regulations (ITRs) mitigating impacts to polar bears.[1538] The agency fails to state that such ITRs would be required for this leasing program, nor does the EIS explain its assumptions for what specific mitigation measures it believes will be in place at which phase of oil and gas activities.

The use of FLIR surveys and dogs to detect polar bear dens would not be required by the lease or by BLM; the DEIS says that they would be conducted "as stipulated by the LOAs and polar bear interaction plans that would be required."[1539] But LOAs are not necessarily required, depending on circumstances, nor are polar bear interaction plans mandated to require the use of FLIR surveys or dogs. BLM must require the mitigation measures it is relying on to make any conclusions about impacts to polar bears. At present, the DEIS speculatively discusses mitigation measures that *might* be required or suggested by another agency, rather than mitigation measures it intends to impose. The DEIS fails to consider whether the measures actually will occur. It also fails to consider their efficacy, or lack thereof, as discussed above.

The EIS also relies on a buffer zone around known dens to mitigate noise disturbance.[1540] However, such a buffer is ineffective if den-detection surveys are not mandated in the first place.[1541] Notably, Alternatives B and C do not mandate pre-activity den-detection surveys for winter overland moves and seismic work.[1542] Since polar bears do not return to the same exact den location each year, it is unclear how a current active den location would ever be "known" absent a pre-activity den-detection survey; and since dens are not visible to the naked eye, it is unclear how a den would be "observed" prior to disturbing it absent a den-detection survey using

[1538] See e.g., DEIS vol. 1 at 3-134, 3-135, 3-137, 3-138, 3-146

[1539] DEIS vol. 1 at 3-137.

[1540] See ROP 10, DEIS vol. 1 at 2-20.

[1541] See March 2019 Amstrup Letter at 22 (explaining that dens are not visible due to overlying snow and must be located using forward looking infrared camera surveys (FLIR) to detect heat); *id*. at 26 (explaining that polar bears do not return to the same exact den location from year to year).

[1542] DEIS vol. 1 at 2-20.

FLIR.[1543] Further, even when pre-activity den-detection surveys are conducted, such a buffer will fail to protect dens that remain undetected due to the high failure rate of the den-detection method employed. Alternative D, while stating that den-detection surveys for winter overland moves and seismic work "would" be conducted by parties subject to the ROP, does not specify the methods to be employed, instead stating that the pre-activity den-detection survey would be conducted "in consultation" with FWS and/or NMFS.[1544] It is not clear whether the term "consultation" is intended to mean the interagency consultation process required by ESA section 7, or merely that the party seek guidance from the other agencies. The DEIS thus leaves it to a future, possibly voluntary, process by another agency to decide what survey methods will be required while misleadingly indicating that FLIR-detection and the use of dogs will mitigate impacts.

And as discussed above, BLM fails to provide any science to indicate that a one-mile buffer will protect denning bears from foreseeable noise impacts, especially seismic testing and pile-driving. Also, BLM provides no buffer for non-denning bears, despite evidence indicating strong aversion reactions of non-denning bears, especially females and cubs, to industrial noise. BLM must support its denning buffer with science and establish ROPs for non-denning bears designed to reduce the extreme energetic stress that industrial sources of noise are known to cause polar bears.

Also, ROP 4 says the lessee/operator/contractor "would prepare and implement bear-interaction plans to minimize conflicts between bears and humans. These bear interaction plans would be developed in consultation with and approved by the USFWS and the Alaska Department of Fish and Game (ADFG). The plans would include specific measures identified in the current USFWS Polar Bear Mitigation Plan . . ." The DEIS does not cite to this Mitigation Plan or identify the specific measures, leaving them unexamined for efficacy. ROP 4 doesn't require that all such measures be included. The FEIS should include the Mitigation Plan, identify the specific measures, and require that they all be included. Even that, though, would not constitute an actual evaluation of the impacts to polar bears from these interactions.

The DEIS misleadingly implies that NSO stipulations will "protect" between "29 percent of the potential maternal denning habitat mapped in the program area" (under Alternative B) and 54 percent (under Alternative D), and that a total of 82 percent of the maternal denning habitat will be protected under Alternative D when combining the NSO with the areas not offered for lease.[1545] The DEIS fails to acknowledge or evaluate how oil and gas development on areas adjacent to the NSO and unleased locations will affect access to and viability of the maternal denning habitat itself. There is no analysis of the reach of impacts from areas where surface oil and gas activities will be allowed. A proper analysis minimally would require mapping the areas where surface oil and gas activities will be allowed and then evaluating how much habitat falls within a buffer distance from those locations, where the buffer distance reflects some scientifically determined estimate of the distance required to ensure the habitat will be safe from various forms of harm resulting from those activities. Moreover, the approach in the DEIS is

[1543] See March 2019 Amstrup Letter at 22, 26.
[1544] DEIS vol. 1 at 2-21 to 2-22.
[1545] DEIS vol. 1 at 3-144, 3-145, and 3-147.

misleading because it refers only to the mapped potential denning habitat rather than to the terrestrial denning critical habitat. The DEIS thereby improperly ignores the important role that the surrounding critical habitat plays in supporting the maternal denning locations, and misleadingly inflates the benefit of the NSO stipulations.

The proposed Lease Stipulations and Required Operating Procedures include Lease Notice 1, which states that BLM would not approve any activity that may affect any listed species or critical habitat until it completes its obligations under applicable requirements of the ESA, including completion of any required procedure for conference or consultation.[1546] This provision cannot be properly categorized as a mitigation measure, as BLM is merely characterizing the legal requirements of ESA section 7 consultation. The ESA imposes a substantive obligation on federal agencies, but BLM does not explain how it will comply with those requirements at the lease sale stage.[1547] For instance, BLM should explicitly state whether the agency will consult with FWS before issuing leases on the Coastal Plain. BLM's attempts to frame its existing ESA obligations as a mitigation measure in its impacts analysis does not obviate BLM's responsibility to provide for measures that minimize and avoid impacts to polar bears.

Furthermore, with regard to the effectiveness of Lease Notice 1, BLM has totally ignored the question that the scope of discretion retained under the terms of the lease may affect the scope of any post-leasing consultation. This is critical to define because the government has attempted to undermine ESA consultations by asserting that it has limited or no discretion over a decision.[1548] It is plain that if an agency has *any* discretionary authority to prevent or reduce an effect to a listed species resulting directly or indirectly from its action, then the scope of the consultation must extend to the full reach of such effects.[1549] But if there are effects that cannot be reached due to limits on the agency's discretion once the lease has been issued, the agency will claim that those effects need not be considered during the post-leasing ESA consultation, and therefore would not come within the ambit of notice provided by Lease Notice 1. Thus it is vitally important for the DEIS to consider, and for any future leases to clearly establish through their terms, whether BLM is retaining the authority to permanently and completely preclude

[1546] DEIS vol. 1 at 2-35.

[1547] *See supra* Part III.D. (explaining BLM's procedural and substantive obligations under the ESA).

[1548] *See e.g., Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv*., 524 F.3d 917, 928 (9th Cir. 2008) (rejecting agency attempt to exclude consideration of effects of allegedly nondiscretionary components of action during consultation on ground that agency did have authority). *See also supra* Part III.D.1 (describing BLM's failure to explain how it will comply with its ESA mandates).

[1549] *See NRDC v. Jewell*, 749 F.3d 776, 784 (9th Cir. 2014) (en banc) (agency required to consult on water contract renewal even if obligated to renew, where agency could still attempt to negotiate contract terms not directly related to the water allocation or quantity); *Karuk Tribe of California v. U.S. Forest Serv*., 681 F.3d 1006, 1024 (9th Cir. 2012) (consultation required on any affirmative agency action where the agency has "some discretion" and that discretion has "the capacity to inure to the benefit of a protected species").

surface disturbing activities, if necessary to protect a listed species, or whether BLM is merely retaining the authority to condition the access to oil and gas resources so as to reduce impacts to the listed species. Unless the lease terms do the former, BLM ostensibly would be giving away a critical component of its discretion – and the ability to protect polar bears from injury and disturbance - at the leasing stage.[1550] The DEIS, and the ESA consultation that the DEIS claims is occurring now at the leasing stage, must consider the impact of BLM forsaking that discretion. If BLM is purporting to retain that full discretion, then it should do so unequivocally in the terms of the lease. If not, the DEIS and ESA consultation must evaluate the impacts accordingly. Moreover, BLM cannot lawfully give away its discretion to control impacts that it purports are not concrete enough to analyze fully at the leasing stage with regard to its ESA obligations. Thus, to comply with the ESA, BLM must ensure that the lease terms clearly retain full discretion to entirely and permanently preclude impacts at later stages.

Even for leases that BLM describes in this DEIS as being "NSO," it is not clear from the DEIS whether BLM would retain the authority post-leasing to permanently preclude activities on areas immediately adjacent to the NSO areas that would be required to access the oil and gas associated with the NSO leases. In short, it is not clear what BLM means by "NSO" in this DEIS, and the agency should carefully explain whether it is retaining the authority to deny all development on the NSO lease permanently, or whether the "NSO" lease entails a right of access via adjacent areas, and therefore potential spill-over effects on the NSO areas themselves that BLM will not be able to entirely and permanently preclude after the leasing stage.

L. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON MARINE MAMMALS IS INADEQUATE.

The DEIS fails to fairly assess the impacts of oil and gas leasing, exploration and development in the coastal plain on Arctic ringed seals. Arctic ringed seals are listed as threatened under the Endangered Species Act and also as depleted under the Marine Mammal Protection Act, as described above. Projections based on the best available science indicate that ringed seal habitat is vanishing and will shrink to a tiny fraction of its historical reach in the coming decades. Despite this, the DEIS makes misleadingly optimistic statements about the current and potential future conditions for this species and omits or fails to account for many of the documented impacts on seals from oil and gas operations. The one Required Operating Procedure, applicable in just one of the alternatives presented in the DEIS, does not appear sufficient to protect seals from noise and other impacts based on the best available science. We note that the concerns outlined below also apply to the threatened bearded seal Beringia distinct population segment, which are subject to the same ESA and MMPA protections as Arctic ringed seals.[1551]

[1550] *See supra* Part III.B.7 (explaining BLM's failure to maintain authority to preclude development on leases).

[1551] NOAA, Final Rule, Endangered and Threatened Species; Threatened Status for the Beringia and Okhotsk Distinct Population Segments of the Erignathus barbatus nauticus Subspecies of the Bearded Seal, 77 Fed. Reg. 76740 (December 28, 2012).

1. The DEIS Fails to Accurately Describe the Affected Environment for Seals.

Arctic ringed seals were listed as threatened under the ESA in 2012.[1552] The principal threats to ringed seals are habitat alterations stemming from climate change – specifically the reduced presence and extent of sea ice and decreasing spring snow cover.[1553] Ringed seals are vulnerable to habitat loss from changes in the extent or concentration of sea ice because they depend on this habitat for critical life stages including pupping, nursing, molting, and resting.[1554] In the Beaufort Sea, a moderate decline in sea ice is predicted during June within this century, while substantial declines in sea ice are projected in July and November after mid-century.[1555] Changes in the seasonality of snow cover on sea ice are already negatively impacting juvenile survival of ringed seals.[1556] Ringed seals, especially the newborn, depend on snow cover for protection from cold temperatures and predators.[1557] Earlier snow melts have resulted in high rates of pup mortality due to hypothermia and predation. In Alaska, researchers have documented the increasingly early emergence of seals from lairs.[1558]

Polar bear predation on ringed seal pups increased 4-fold in a year when average snow depths decreased from 23 to 10 cm. So, although a high proportion of pups born each year are lost to predation, that mortality would be much higher without the protection provided by the subnivean lair.[1559] Low ringed seal recruitment in western Hudson Bay was also attributed to decreased snow depth in April and May. Reduced snowfall results in less snow drift accumulation next to pressure ridges, and pups in lairs with thin snow cover are more vulnerable to predation than pups in lairs with thick snow cover. When snow cover is insufficient, pups can also freeze in their lairs or outside when lairs prematurely collapse.[1560]

[1552] NOAA, Final Rule, Threatened Status for Arctic ringed seal (and other subspecies), 77 Fed. Reg. 76706 (December 28, 2012).

[1553] 77 Fed. Reg. at 76708 (also noting changes in prey availability due to ocean acidification as a conservation concern).

[1554] *Id*. at 76,709.

[1555] *Id*.

[1556] Kelly, Climate Change and Ice Breeding Pinnipeds 2001 Pages 43-55 *in* G.-R. Walther, C. A. Burga, P. J. Edwards (eds.) "Fingerprints" of climate change: adapted behaviour and shifting species' ranges. Kluwer Academic/Plenum Publishers, New York and London; Stirling, I., and T. G. Smith. 2004. Implications of warm temperatures and an unusual rain event for the survival of ringed seals on the coast of Southeastern Baffin Island. Arctic 57:59-67.; Stirling and Smith 2004.

[1557] 77 Fed. Reg. at 76,711.

[1558] Kelly et al., Timing and Re-interpretation of Ringed Seal Surveys (2006) p.48, Table 15.

[1559] 77 Fed. Reg. at 76,711.

[1560] 77 Fed. Reg. at 76,709.

Seals need snow drift accumulations on stable pack ice a minimum 54 cm deep to build effective birth lairs.[1561] Those accumulations require accumulations of at least 20 cm on flat ice; therefore, areas forecasted to have less than 20 cm average snow depth in April are considered inadequate for the formation of ringed seal birth lairs.[1562] Snow cover in the first decade of the 21st century averaged 25-35cm over much of the range of Arctic ringed seals.[1563] The snowpack in the Beaufort Sea has thinned from 32.8cm historically to 14.5 cm as measured from 2009-2013.[1564] Before the end of this century, snow cover adequate for the formation and occupation of birth lairs is forecasted to occur in only parts of the Canadian Arctic Archipelago, a portion of the central Arctic, and a few small isolated areas in other regions.[1565] Areas with 25–30 cm of snow are projected to be limited to a few small isolated pockets in the Canadian Arctic by 2090–2099.[1566]

In sum, decreasing sea ice habitat and snow cover already threaten the continued existence of Arctic ringed seals, and there is projected to be very little habitat sufficient to support critical life-cycle functions of ringed seals within the coming 80 years.

Despite the very grim outlook that forms the basis for listing Arctic ringed seals, the DEIS understates their predicament and the ways in which oil and gas activity will exacerbate the stressors on this threatened population. BLM distorts the best available science by understating impacts and overstating the likelihood that behavioral responses or improved environmental conditions will benefit seals in the future.

For example, the DEIS says only "a small number of seals could use the program area."[1567] The map provided, however, indicates numerous seal sightings well within a five-mile buffer seaward of the coastal plain, plainly showing that seals in fact do use the program area, in unknown but potentially significant numbers.[1568] The surveys used to produce the map also likely overlooked a significant percentage of seals actually present in the program area.[1569]

[1561] NOAA, Proposed Designation of Critical Habitat for Arctic Ringed Seals 79 Fed. Reg. 73010, 73014 (December 9, 2014).

[1562] *Id*.

[1563] 77 Fed. Reg. at 76,708.

[1564] Webster et al., Interdecadal changes in snow depth on Arctic sea ice, Journal of Geophysical Research: Oceans Volume 199, Issue 8 (2014)

[1565] 77 Fed. Reg. at 76,708.

[1566] *Id*. at 76,711; see also Hezel et al., Projected decline in spring snow depth on Arctic sea ice caused by progressively later autumn open ocean freeze-up this century, Geophysical Research Letters Volume 39 (2012) (projecting declines in mean April snow depth north of 70 degrees latitude from about 28 cm to 16 cm, and a 70% decline in areas with snow depths above 20cm).

[1567] DEIS vol. 1 at 3-130.

[1568] DEIS vol. 2, App. B at Map 3-26.

[1569] Kelly et al., Timing and Reinterpretation of Ringed Seal Surveys (2006) at 6 (Modeling of the probability that seals were visible during past aerial surveys indicated that the fraction of seals visible varied from less than 0.40 to more than 0.75 between survey years).

The DEIS also states that "[t]he population trends and status of this stock are currently unknown but there are indications that ocean conditions have been favorable for ringed seals recently: ringed seals near Kaktovik are growing and maturing faster and at a younger age now than 30 years ago."[1570] BLM cannot reasonably base a broad conclusion that ocean conditions have been favorable for ringed seals, however, on the observed maturation rates of a small sample of seals in one area comprising a tiny fraction of their range.

More importantly, the climate change-driven existential threats to ringed seals described above negate the impact of any real or perceived recent improved ocean conditions. Ringed seals are just as threatened with extinction in the coming decades whether or not current ocean conditions appear "favorable," and the implication that there are meaningful countervailing improving conditions for ringed seals is misplaced. Particularly given the highly unfavorable condition of ocean acidification, a key conservation concern behind the Arctic ringed seal listing that the DEIS does not mention,[1571] the implication regarding favorable ocean conditions is even more misleading.

Finally, the DEIS claims that the "broad distribution, diverse diet, and *ability to haul out on land or ice* suggest that ringed seals may be resilient to changes in sea ice availability (NMFS 2013)."[1572] This quotation is inaccurate; the cited document actually states that ringed seals' "broad distribution, ability to undertake long movements, diverse diet, and association with widely varying ice conditions suggest resilience in the face of environmental variability."[1573]

The report does not state that ringed seals haul out on land, or that they could adapt to the disappearance of sea ice by hauling out on land instead, which appears to be the intent of the mis-quoted language. Further, the very next sentence in the report, not noted in the DEIS, states that "[h]owever, ringed seals' long generation time and ability to produce only a single pup each year may limit its ability to respond to environmental challenges such as the diminishing ice and snow cover."[1574] In all, the report suggests no notable "resilience" that seals may have that would meaningfully modify the science and findings behind the threatened listing under the ESA: critical habitat to support the continued existence of ringed seals is vanishing and is expected to persist in just a very small area on the planet within about 80 years.

In sum, BLM must modify the discussion in the DEIS to reflect the best available science and provide an accurate sense of the environmental baseline relevant for Arctic ringed seals.

[1570] DEIS at 3-130.

[1571] 77 Fed. Reg. 76,708.

[1572] DEIS at 3-131 (emphasis added).

[1573] NMFS Biological Opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska (2013) at 153.

[1574] *Id.*

2. The DEIS Understates Impacts from Oil and Gas Activities to Seals

The DEIS underestimates potentially significant adverse impacts to seals from exploration, and impacts from industrial noise. Regarding seismic exploration impacts, the DEIS states that:

> A small number of ringed seals could over-winter and produce pups in the nearshore program area. One potential impact on ringed seals from the action alternatives could result from threats to lair integrity, such as lair collapse caused by tracked vehicles transiting sea ice during seismic activity. This impact could result in injury or mortality of pups and females. Noise from seismic activities could also disturb and displace individual seals. Overall, potential impacts of on-ice seismic activity could be lethal to a small number of seals, although the probability of this occurring is low. Most impacts would be temporary behavioral changes on the ringed seal population.[1575]

It is unclear why BLM believes the probability of lethal impacts to seals is low given the known presence of seals in the area and the difficulty in detecting and avoiding lairs; BLM should clarify that lethal impacts are quite possible and explain how they will be prevented. We also note that any lethal take of ringed seals would require an incidental take permit pursuant to the Marine Mammal Protection Act, which BLM entirely fails to acknowledge in the DEIS.

Further, the DEIS adds that industrial noise, e.g., from vessel operations, coastal facilities, seismic exploration, mobilization of modular units and other sources may impact seals at a distance of 2.5-3.7 miles.[1576] There is no lease stipulation or ROP, however, that would protect seals from noise impacts at this distance. There is also no citation offered for this distance estimate, nor any differentiation between the type of noise and distance needed to avoid impacts, nor discussion of what those impacts would be – i.e., no discussion regarding seal noise disturbance thresholds and responses.

The DEIS omits the best available science on the specific topic of noise impacts to ringed seals. For example, seals have been found to abandon lairs three times more often when located within 150 meters of seismic lines, and seismic Vibreosis caused lair abandonment from 644 meters away.[1577] Radio-tagged seals departed their lairs in response to snow machines within 2.8 km, human footfalls as far away as 600 m, a skier as far away as 400 m, and in response to a helicopter flying 5 km from the lair at an altitude of 152 m, and during helicopter landings or takeoffs as far away as 3 km.[1578] Seals also departed lairs by diving into the water in greater than 50% of instances when helicopters flew over at or below an altitude of 305 m.[1579]

[1575] DEIS at 3-135.

[1576] DEIS vol. 1 at 3-139.

[1577] Kelly et al., *Ringed Seal Winter Ecology and Effects of Noise Disturbance* at ii. (1986).

[1578] Kelly et al., *Responses of Ringed Seals to Noise Disturbance* (1988).

[1579] Kelly et al., *Ringed Seal Winter Ecology and Effects of Noise Disturbance* at ii.

Also, the brief mention of vessel operations concerns only noise and overlooks other factors. Vessels associated with oil and gas exploration activities represent a suite of stressors that pose several potential hazards to ice seals in the Beaufort and Chukchi Seas. For example, the size and speed of transiting vessels pose some probability of collisions between ice seals.[1580] Ringed seals may be at the greatest risk from shipping threats in areas of the Arctic where geographic constriction concentrates seals and vessel activity into confined areas, such as the Bering Strait and other areas.[1581]

Aggregations of ringed seals have been seen in Kotzebue Sound, near Nome, and along the central Beaufort Sea coast from Kaktovik west to Brownlow Point along Camden Bay.[1582] Vessels transiting to the Beaufort Sea from Dutch Harbor at the start or finish of the open water season, or transiting between sites or for resupply during the season, may pose the most risk to ringed seals because that is when the vessels are traveling at high speeds and covering areas where ringed seals are known to aggregate.[1583] Some seals are thought to have been struck and killed by ship propellers, and some have been killed by icebreakers moving through fast-ice breeding areas.[1584] The DEIS fails to disclose this risk or provide measures to mitigate against it.

BLM must add the best available science to its discussion of reasonably foreseeable impacts to ringed seals from seismic exploration and other industrial activities, particularly their noise impacts. It must then develop associated lease stipulations and ROPs based thereon, and draw a rational connection between the two.

3. The DEIS Fails to Analyze Adequate Mitigation To Protect Seals.

Required Operation Procedure (ROP 10), which is included in Alternative D only, requires lessees working in polar bear denning and seal birthing habitat in winter to conduct a survey for polar bear dens and seal birthing lairs, in consultation with the USFWS, or NMFS, or both, as appropriate, throughout the planned area of activities and before initiating activities.[1585] The provision is silent as to how seal lairs would be detected. As is the case with polar bear dens, detecting lairs is a difficult task and it is critical that BLM explain the methods by which dens will be detected, the best available methods and track record of success in doing so, and what percentage of lairs can reasonably be expected to be detected in the program area during pre-seismic surveys.

ROP 10 also requires a sound source verification test in advance of seismic survey work to measure the distance of vibroseis3 sound levels through grounded ice to the 120 decibels (dB)

[1580] NMFS, Biological Opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska (2013) at 211.

[1581] *Id.* at 212.

[1582] *Id.*

[1583] *Id.*

[1584] *Id.*

[1585] DEIS vol. 1 at 2-21.

re 1 μPa threshold in open water. The distance will be used to buffer all on-ice seismic survey activity operations from any open water or ungrounded ice throughout the project area.[1586]

BLM fails to explain the basis for the 120 dB threshold. Its apparent premise – that staying below this threshold will avoid impacts to seals – does not appear to be supported by the best available science. Instead, contextual factors such as subject behavioral state, spatial orientation of source and receiver, subject motivation or familiarity with a sound source, and similarity of noise to potential predators strongly influence response probability across a range of noise levels.[1587] BLM must consider the contextual factors relevant for ringed seals near the coastal plain, including the likely unfamiliarity with industrial noise sources, and must explain the basis for establishing a 120 dB threshold.

The DEIS states that "[u]nder ROP 10, the pre-activity surveys required to locate dens, plus the 0.5-mile and 1-mile buffers for seismic and heavy equipment operation around occupied dens of grizzly and polar bears, respectively, would help to reduce the impacts of behavioral disturbance on denning bears (as well as birth lairs of ringed seals on landfast ice along the coast) throughout the entire program area."[1588]

But as noted above, the DEIS mentioned a 2.5-3.7 mile zone where noise impacts to seals can be expected, and the referenced buffers apply only to bear dens, not seal lairs. The DEIS thus overstates the protection provided to seals under ROP 10. 0.5-mile and 1-mile buffers are simply insufficient.

Finally, operations after May 1 would employ a full-time trained protected species observer (PSO) on vibroseis vehicles to ensure all basking seals are avoided by vehicles by at least 500 feet and would ensure that all equipment with airborne noise levels above 100 dB re 20 μPa were operating at distances from observed seals that allowed for the attenuation of noise to levels below 100 dB. The rationale behind these metrics is again not provided in the DEIS, and they do not appear to reflect the best available information.

Seals are departing lairs earlier in the season, so basking seals can be expected before May 1 and this standard should be modified accordingly.[1589] As detailed above, many sources of noise cause behavioral responses in seals from distances greater than 500 feet, so keeping that distance will not be effective in avoiding those responses. And while it may be a worthy goal, the effort to keep attenuated noise levels below 100 dB for observed seals would seem difficult to achieve as a practical matter. BLM should explain how this can be achieved, and/or include this in the required sound source verification test, so that distances that specified equipment must be kept from basking seals can be understood prior to undertaking the activity.

[1586] *Id.*

[1587] Encyclopedia of Marine Mammals (2018) at 701.

[1588] DEIS vol. 1 at 3-146.

[1589] Kelly 2006 (p. 48, Table 15); s*ee also* Von Duyke et al., Ringed seal spatial use, dives, and haul-out behavior in the Beaufort, Chukchi and Bering Seas (2011-2016) (using satellite transmitters to demonstrate haul-out behavior well in advance of May 1).

4. The DEIS to Fails Adequately Consider Impacts to Whales

The DEIS has also failed to describe adequately the range of potential impacts to cetacean species, particularly large whales, from vessel traffic, both in marine waters within 5 nautical miles (nm) of the program area as well as along the 1,600 nm marine barge route (Fig. 3-6, Marine Barge Route—Dutch Harbor to Program Area, Appendix A). The DEIS acknowledges that two whales, the bowhead (*Balaena mysticetus*) and the beluga (*Delphinapterus leucas*) are commonly found within 5 nm of the coastline of the Arctic Refuge.[1590] The bowhead is listed as an endangered species under the ESA and as a depleted species under the MMPA, while the beluga is listed as a depleted species under the MMPA.[1591] Along the marine barge route, the DEIS also states that vessels may encounter eight additional large whale species: blue, fin, humpback, minke, North Pacific right, sperm, and killer whales.[1592] All eight species are protected by the MMPA; in addition, the blue, fin, sperm, North Pacific right, and Western North Pacific distinct population segment (DPS) of humpback whales are listed under the ESA as endangered, while the Mexico DPS of humpback whales is listed as threatened.[1593] Puzzlingly, the DEIS later discounts any impacts from vessel collision to the western North Pacific DPS of gray whales, also listed as endangered under the ESA, although the DEIS never identifies this species as occurring along the marine barge route and fails to include any further discussion regarding the species.[1594]

As detailed below in Section V.W,, Shipping, the DEIS improperly limits the geographic scope of the "affected environment" and inappropriately focuses on the "program area" rather than providing the necessary baseline descriptions of marine areas, and the species that occur in those areas, along the marine barge route. [1595] The DEIS also fails adequately to discuss the environmental impacts that could occur along the marine barge route to large whales, specifically: oil and hazardous substance spills,[1596] noise,[1597] and ship strikes.[1598] We reiterate those concerns by reference here, and urge BLM not only to rectify the DEIS' errors in this regard but also to clarify and improve its proposed mitigation measures,[1599] and add the National Marine Fisheries Service as a cooperating agency,[1600] to ensure that the DEIS, lease stipulations, and required operating procedures are grounded in the best available scientific information on large whales and that lease stipulations and required operating procedures scrupulously adhere to the requirements of the ESA and MMPA.

[1590] Table 3-20, DEIS at 3-123; *see also* Map 3-25, Appendix A

[1591] DEIS at 3-123.

[1592] DEIS at 3-130.

[1593] https://www.fisheries.noaa.gov/alaska/endangered-species-conservation/endangered-threatened-and-candidate-species-alaska

[1594] DEIS at 3-142.

[1595] *Id.* at Section V.W.

[1596] *See infra* Part W.B.1.

[1597] *See infra* Part W.B.2.

[1598] *See infra* Part W.B.3.

[1599] *See infra* Part W.C.

[1600] *See infra* Part W.D.

M. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON ARCTIC REFUGE LANDOWNERSHIP AND USE IS INADEQUATE.

The Coastal Plain of the Arctic National Wildlife Refuge are federal public lands owned by all Americans for our common use and benefit. There are some private lands within the boundaries of the Coastal Plain, including native allotments and corporation land. Additionally, all Alaska Native Claims Settlement Act (ANCSA)-conveyed lands contain a limitation on use and disposition, imposed by section 22(g) of that act. Groups raised the need for BLM to analyze the impacts of an oil and gas program on private lands, including the need to consider activities on these private lands in its cumulative impacts analysis.[1601] BLM's analysis of this issue in the draft EIS is deficient.

BLM fails to specifically analyze the impacts of an oil and gas program on the Native allotments. There are over 900 acres of allotments spread across the Coastal Plain, but concentrated primarily along rivers and the coast.[1602] Many of these allotments support subsistence activities and uses. Some of the allotments have not been conveyed yet. BLM has not analyzed the impacts of oil and gas development on the use of allotments or the potential to impact selections. It is reasonable that a person may no longer be interested in using a specific area and allotment if that area is highly impacted by oil and gas activities. BLM has also not proposed any measures to protect these allotments, like a buffer or seasonal restrictions that are specific to the allotments. Relatedly, BLM's characterization of the NSO provision as providing protections for private lands is also questionable, as the NSO provision only prohibits permanent oil and gas infrastructure, but not significant other activities like exploration, it does not appear to apply to all areas where there are allotments, and BLM can grant waivers to allow pipelines and roads to cross rivers.

It also appears from BLM's discussion that BLM is making the various stipulations and required operating procedures it will adopt for the Federal lands applicable to the private lands.[1603] Section 22(g) of ANCSA makes Refuge laws generally applicable to private lands within the Refuge. To ensure clarity, BLM should more clearly state that its stipulations and limitations developed to protect Refuge values and resources on Federal lands are applicable to all private lands in the Refuge through section 22(g).

BLM notes that there may be interest in conveying lands out of federal ownership "to accommodate new community development" and "to support . . . a demand for land uses associated with energy or mineral development."[1604] It is unclear what BLM means by this or what authority DOI has to convey lands in the Coastal Plain out of federal ownership. Past legislation has very clearly and specifically provided for land selections by Alaska Native Corporations, and those selections have been made. And in 1988, Congress passed legislation

[1601] Group Scoping Letter at 160–62.
[1602] DEIS vol. 1 at 3-149; CCP EIS Map 4-1
[1603] DEIS vol. 1 at 3-150.
[1604] DEIS vol. 1 at 3-151.

that prohibits land exchanges within the Coastal Plain absent Congressional approval.[1605] BLM must explain this and related statements and specifically identify the legal authority it believes it could use to transfer additional federal lands in the Coastal Plain. BLM should also identify what additional lands it thinks may be sought for exchange based on its conclusions and assumptions. Additionally, BLM notes multiple times that an oil and gas program may lead to an expansion of infrastructure and facilities in the City of Kaktovik,[1606] but BLM does not analyze what those impacts would be on Coastal Plain resources. BLM must analyze all reasonably foreseeable impacts.

1. ASRC Lands

BLM has not adequately explained or analyzed the legal status and impacts of oil and gas on ASRC lands. Under ANCSA, Kaktovik Inupiat Corporation (KIC) — an Alaska Native village corporation — could select 92,160 acres of surface land. Originally, only 69,120 of those acres could be within the Arctic Refuge.[1607] That changed in 1980 with the passage of the Alaska National Interest Lands Conservation Act (ANILCA). In ANILCA, Congress authorized KIC to select an additional 23,040 surface acres within the Arctic Refuge. In general, regional corporations like ASRC were entitled to acquire the subsurface rights to lands selected by village corporations like KIC.[1608] But Congress prohibited regional corporations — like ASRC — from acquiring the subsurface rights to surface lands selected by a village corporation if those surface lands were within a pre-ANCSA refuge like the Arctic Refuge.[1609]

Despite these legal prohibitions barring ASRC from gaining the subsurface estate in the Arctic Refuge, in 1983 DOI Secretary Watt entered into a legally questionable land exchange with ASRC called the Chandler Lake Agreement that also addressed oil and gas development on private lands within the Arctic Refuge. As a result of this exchange, ASRC obtained an interest in 92,160 acres of subsurface estate below the KIC surface lands and most allotments within the Arctic Refuge. Congress amended ANILCA in 1988 to specifically prohibit the Secretary from conveying or exchanging any additional lands within the Arctic Refuge without congressional approval (other than lands selected prior to 1987).[1610] The General Accounting Office later found that the land exchange was not in the public interest for multiple reasons.[1611]

[1605] 16 U.S.C. § 1302(h)(2).
[1606] DEIS vol. 1 at 3-150–3-151.
[1607] *See* 43 U.S.C. §§ 1611(a)(1), 1613(a).
[1608] 43 U.S.C. § 1613(f).
[1609] 43 U.S.C. §§ 1611(a)(1), 1613(f).
[1610] 16 U.S.C. § 3192(h)(2) & Public Law 100-395 (Aug. 16, 1988).
[1611] *See* U.S. General Accounting Office, Federal Land Management, Chandler Lake Land Exchange Not in the Government's Best interest, Report to the Chairman, Subcommittee on Water and Power Resources, Committee on Interior and Insular Affairs, House of Representatives, GAO/RCED-90-5 (Oct. 1989) [GAO Report], *available at*: https://www.gao.gov/products/RCED-90-5.

The Chandler Lake Agreement extensively addresses possible oil and gas development on the lands in the Arctic Refuge that ASRC obtained under that Agreement. Provisions of the Chandler Lake Agreement clearly and definitively state that no exploratory drilling, production, leasing, or other development leading to production of oil and gas is allowed on ASRC lands until Congress authorizes such activities on Refuge lands, the Coastal Plain or on ASRC lands, or both. The Chandler Lake Agreement also acknowledged that the land was always subject to section 22(g) of ANCSA.[1612] The Chandler Lake Agreement also sets out extensive details on how oil and gas could be developed on the ASRC lands, including some stipulations and practices that may no longer be considered desirable or advisable. Importantly, the Agreement specifies that its provisions can be superseded by Congress or regulations.

During scoping, Groups asked BLM to explain the legal status of these lands and, if DOI believes that these lands are now open to oil and gas, explain the legal basis for that conclusion as well as account for the impacts to the Coastal Plain from any activities that may take place on the corporation lands. BLM has failed to do so in the draft EIS.[1613] It appears from the draft EIS discussion that BLM believes that all of these lands are now open to oil and gas activities, but BLM also states that land ownership and use is similar to how it was in 2015 as described in the CCP.[1614] ASRC lands are clearly and definitively described as being closed to oil and gas activities in the CCP.[1615] ASRC lands potentially being open to oil and gas is a major change in private land use that must be clearly addressed in the EIS. BLM must be clear on this point. This means that BLM must also explain how it interprets the application of the stipulations and conditions in the 1983 Agreement and other environmentally protective measures adopted pursuant to this process to apply to these lands in light of the 1983 Agreement. BLM must explain what is open or not, and also explain what activities may proceed or not, and under what restrictions on these lands. BLM should also clearly state that Title XI of ANILCA applies to activities proposed for ASRC lands. To date, BLM has not clearly set these points out. It must do so, as it is a critical piece to understand the full extent of oil and gas activities and potential impacts on the Coastal Plain and its resources.

N. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON SUBSISTENCE USE AND RESOURCES IS INADEQUATE.

The Arctic National Wildlife Refuge's Coastal Plain has irreplaceable subsistence importance for the Gwich'in people, and every community connected to this landscape through ecological and social systems. BLM grossly discounts how an oil and gas program will significantly impact human connections to the lands, waters, and resources of the region through subsistence activities. BLM failed to meaningfully analyze the complexity of subsistence resources and practices, and analyze how a leasing program will impact the cultural and

[1612] 43 U.S.C. § 1621(g).

[1613] *See supra* Part III.B.5 (explaining why BLM cannot exclude consideration of development of these lands).

[1614] DEIS vol. 1 at 3-149, vol. 2 Appendix F at F-11.

[1615] CCP EIS vol. 1 at 4-4–4-5.

traditional values,[1616] and economic,[1617] social,[1618] public health,[1619] and environmental systems that make subsistence the central aspect of rural life for people of the region.[1620] NEPA requires BLM to take a hard look at subsistence resources and practices and the proposed oil and gas leasing program's impacts on subsistence, a standard the DEIS fails to meet.

1. The DEIS does not Adequately Describe the Affected Environment

The DEIS fails to consider the significant subsistence impacts in affected communities. BLM ignores many potentially affected communities in its analysis, does not incorporate traditional knowledge throughout the DEIS, arbitrarily limits the scope to post leasing activities, fails to be transparent about its consultation with Porcupine Caribou Management Board, does not consider effects on numerous, important subsistence species, and does not adequately consider a baseline on migratory species such as caribou and bowhead whales. BLM's analysis lacks rigor without consideration of these subsistence aspects.

The Gwich'in people live in fourteen villages extending across northeast Alaska, northern Yukon, and Northwest Territories. Though the Inupiat community of Kaktovik is the only community located on the Coastal Plain, other villages such as Arctic Village, Fort Yukon, Venetie, Chalkyitsik, Beaver, and Canadian villages such as Old Crow and Fort McPherson, are located within the range for the Porcupine Caribou Herd and will be impacted by any oil and gas activities on the Coastal Plain.[1621] The draft EIS recognizes that many other communities, such Wiseman, Birch Creek, and Stevens Village, have reported geographic, historic/prehistoric, or cultural ties to the Arctic Refuge as a whole.[1622] BLM further acknowledges that subsistence harvesting and sharing patterns for "22 Alaskan communities and seven Canadian user groups are relevant if post-lease oil and gas activities changes caribou resource availability or abundance for those users."[1623] Despite this, BLM arbitrarily limits its analysis of subsistence impacts to four communities: Kaktovik, Nuiqsut, Arctic Village, and Venetie.[1624] This is egregious, particularly in light of the fact that Canadian users account for the vast majority — in the past up to 85 percent — of the harvest of the Porcupine Caribou Herd.[1625] BLM did not adequately

[1616] *See supra* Parts V.P, VQ.
[1617] *See supra* Part V.Y.
[1618] *See supra* Part V.P.
[1619] *See supra* Part V.Z.
[1620] DEIS vol. 1 at 3-160.
[1621] Gwich'in Steering Committee, Primary Habitat of the Porcupine Caribou Herd Map.
[1622] DEIS vol. 1 at 3-160.
[1623] DEIS vol. 1 at 3-167.
[1624] DEIS vol. 2 Appendix E at E-3.
[1625] DEIS vol. 1 at 3-168; DEIS vol. 2 at M-27 to M-32; Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd, E100687 - CTS 1987 No. 31 (July 17, 1987), *available at* http://www.treaty-accord.gc.ca/text-texte.aspx?id=100687. Additionally, this analysis does not comply with international treaty obligations, which requires consultation and input from the

assess whether oil and gas leasing on the Coastal Plain would significantly restrict subsistence uses in the remaining potentially affected communities.

BLM errs by not incorporating and utilizing traditional knowledge when developing the DEIS. The Gwich'in people's understanding of the Coastal Plain and its relationship with the health of the land goes far beyond the passing mention in the DEIS, which recognizes that "any development in the program area would have devastating effects on the population of the PCH and other resources, such as migratory birds, that have key habitat in the coastal plain."[1626] The Porcupine Caribou Herd uses the Arctic Refuge throughout the year, with the Coastal Plain providing essential calving, post-calving, insect relief, and other summer habitat.[1627] The Gwich'in of Alaska and Canada are culturally and spiritually connected to the Porcupine Caribou Herd, and their knowledge of the Coastal Plain as calving and post-calving habitat should be incorporated in caribou studies. Similarly, BLM mentions Iñupiat traditional knowledge, but does not utilize this knowledge as a resource.[1628] Merely recognizing, but not addressing and incorporating available insights from the people who have lived in and relied on the area for a millennia is unacceptable. BLM must obtain traditional knowledge through government-to-government consultation, ANILCA section 810 hearings, and other outreach efforts, and incorporate findings throughout not only subsistence section of the DEIS, but all other relevant sections of the DEIS.

Additionally, BLM relies on outdated subsistence use data in its baseline analysis, calling its findings into question. BLM relies on data from Steven R. Braund and Associates covering 1996-2006. This data is 13 years out of date as of the time of the DEIS comment period and cannot reasonably be relied upon for purposes of BLM's analysis.

BLM also arbitrarily and improperly limits the scope of its subsistence analysis in the same way it improperly limited the scope of its NEPA and ANILCA 810 analysis: BLM only looks at post-lease activities that include seismic and drilling exploration, development, and transportation.[1629] BLM should not limit its analysis of the impacts to only post-leasing activities and needs to include the full range of direct, indirect, and cumulative impacts to subsistence use that could occur from the program. This includes from any proposals to conduct pre-leasing seismic exploration on the Coastal Plain. Seismic damage can significantly harm wildlife through the degradation of their habitat. BLM also improperly excluded other forms of infrastructure and activities from what it considered as part of its 2,000 acres of impacts. This includes pipelines, which could cross large areas of the Coastal Plain and have the potential to divert caribou away from key areas. BLM also failed to account for other activities like gravel mining, which have severe sound and other environmental impacts that could deter caribou and other species from important habitat areas. BLM's deficient analysis of the full range of resource impacts from the broad scope of activities likely to occur on the Coastal Plain and to nearby

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Porcupine Caribou Board to consider the interests of both Alaskan and Canadian Porcupine Caribou subsistence users. *See supra* Part III.E (re: international treaty obligations).

[1626] DEIS vol. 1 at 3-173.

[1627] *See supra* Part V.I (re: impacts to caribou); Caikoski. 2015.

[1628] DEIS vol. 1 at 3-173.

[1629] DEIS vol. 2 Appendix E at E-2.

areas means BLM has dramatically underestimated the potential impacts from the oil and gas program and related activities. BLM needs to revise and reissue its EIS to ensure it actually takes into consideration the full range of potential impacts for purposes of its subsistence analysis.

Furthermore, the BLM fails to be transparent about its consultation with the Porcupine Caribou Management Board, as required by international treaty. The Porcupine Caribou Management Board consists of members who use the herd from Alaska, the Yukon Territory, and Northwest Territories. The Canadian Gwich'in, in northern Yukon and Northwest Territories, rely heavily on the Porcupine Caribou Herd, and have previously accounted for up to 85 percent of the harvest.[1630] Incorporating information and suggestions obtained through consultation is essential to inform BLM's subsistence analysis of caribou, and not doing so results in significant risk to the subsistence users.[1631] By failing to be transparent about the consultation process, BLM falls short of international treaty obligations, and does not explain how concerns of the people, science, and traditional knowledge from indigenous residents of the Yukon Territory and Northwest Territories were incorporated. As a result, BLM fails meaningfully to consider the input of affected communities in Canada, who represent over half of the Herd's use will experience impacts related to their subsistence use.

BLM's overall analysis of specific subsistence resources is also insufficient. The DEIS fails to consider the extensive resources used for subsistence by communities reliant upon Arctic Refuge resources. Appendix M provides known levels of subsistence harvest for Kaktovik, Nuiqsut, Venetie, and Arctic Village.[1632] But analysis of impacts on these resources is substantially lacking, and BLM does not look beyond these four communities. The DEIS provides very little consideration of any resource besides caribou and marine mammals, even though Bering cisco, Dolly Varden, Arctic Char, Dall sheep, ptarmigan, and wood are all considered "major resources" for Kaktovik residents.[1633] Moderate resources for Kaktovik also include Arctic cisco, Arctic fox, Arctic grayling, beluga whale, blueberry, broad whitefish, Canada geese, common eider, cranberry, King eider, lake trout, least cisco, long-tailed duck, moose, muskox, polar bear, saffron cod, salmonberry/cloudberry, snow geese, squirrel, walrus, whitefronted geese, wolf, and wolverine.[1634] Minor resources for Kaktovik include bird eggs, brown bear, halibut, humpback whitefish, red fox, and spotted seal.[1635] All these resources are biologically diverse and impacts to them from oil and gas will be unique. The DEIS generally lists which resources are most important, but does not tie those assertions to any analysis. All resources listed in Appendix M Subsistence Uses and Resources, including all major, moderate, and minor resources for not only Kaktovik, but the communities of Nuiqsut, Venetie, and Arctic Village must be given meaningful consideration for impacts to subsistence.

[1630] DEIS vol. 1 at 3-168; DEIS vol. 2 at M-27–M-32;
[1631] *See infra* Part III.E (describing BLM's international treaty obligations).
[1632] DEIS vol. 2 at Appendix M.
[1633] DEIS vol. 2 at Appendix M, M-10.
[1634] DEIS vol. 2 at Appendix M, M-10–M-11.
[1635] DEIS vol. 2 at Appendix M, M-11

In addition, the DEIS must provide substantive consideration of marine mammals and caribou, and the effects they will have on communities beyond those on and directly adjacent to the project area. Marine mammals used for subsistence include bowhead whale, beluga whale, seal, walrus, and polar bear.[1636] All marine mammals listed in the DEIS are either major or moderate subsistence resources for the community of Nuiqsut and Kaktovik.[1637] Yet the DEIS provides inadequate consideration of subsistence impacts to these resources beyond mentioning reliance in passing, failing to consider levels of consumption and the importance of harvesting marine mammals to Iñupiaq communities. The DEIS should consider all specific marine mammals, as they present the largest percentage of harvest for subsistence for Kaktovik and Nuiqsut.[1638] BLM should incorporate the best available science related to harvest practices for each marine mammal to obtain an accurate baseline from which to consider potential subsistence impacts. Similarly, the baseline information for communities' reliance on caribou as a subsistence resource requires further explanation. For example, the DEIS merely states that data is not available for subsistence caribou harvest in Arctic Village, however, the DEIS estimates that 90% of the community's subsistence harvest is caribou and moose and "the assumption is that caribou are source of primary subsistence."[1639] BLM must explain how its treatment of this missing or unavailable information comports with the requirements of 40 CFR § 1502.22.

2. BLM's Environmental Consequences Analysis Inaccurately Describes Subsistence Impacts

a. BLM Fails to Adequately Address Impacts to Subsistence Resources.

BLM must provide meaningful analysis of impacts to Gwich'in subsistence use of the Porcupine Caribou Herd by incorporating the best available science and considering hunter avoidance from infrastructure. In addition, BLM must consider impacts to fish and other aquatic subsistence resources, marine mammals, aircraft disturbance, sharing systems, compounded loss of subsistence areas, the subsistence cycle, and respect the differences in communities.

BLM's analysis on impacts to caribou and associated subsistence use are lacking. Despite acknowledging that oil and gas can have impacts on the Porcupine Caribou Herd, BLM concludes that there will not be an impact on the subsistence resources for the Gwich'in. This ignores best available science, traditional knowledge, and the human rights of the Gwich'in people. Caribou are a major resource for all the listed study communities, and use is high — over 50% of the food source for nine of the 22 caribou study communities.[1640] Despite this importance, BLM's overall analysis is general and does not adequately account for the impacts.

[1636] DEIS vol. 1 at 3-161.

[1637] DEIS vol. 2 at Appendix M, M-10–M-11, M-18–M-19.

[1638] DEIS vol. 1 at 3-162, 164 (Marine mammals are 62.7% of total harvest for the community of Kaktovik, with 72% of households attempting to harvest. Marine mammals are the highest harvested species for Nuiqsut as well at 33.8% and 54% of households attempting to harvest.)

[1639] DEIS vol. 1 at 3-165.

[1640] *See* DEIS vol. 2 at Appendix M, M-5; DEIS vol. 1 at 3-167.

The DEIS recognizes that calf survival and herd growth are impacted by oil and gas disturbances resulting in reduced numbers to the Porcupine Caribou Herd leading to reduced harvest success among the Iñupiaq, Gwich'in, and Inuvialuit caribou hunters.[1641] While the agency makes this finding, BLM fails to quantify, or further analyze these effects. The DEIS should include this analysis.

BLM's findings for the Porcupine Caribou Herd are particularly concerning due to the fact that the DEIS's caribou studies do not use the best available science and improperly minimize impacts to caribou. For example, the DEIS does not place the Porcupine Caribou Herd in the context of the global condition of caribou populations, ignoring the risks posed by global declines of caribou.[1642] In addition, the DEIS omits important baseline studies, does not explain its assumptions in analyzing road, pipeline, air traffic, noise and human activity impacts on caribou, and the sources of data used to understand distribution of the herd are not transparent.[1643] Further, impacts are insufficiently considered, including development like seismic exploration and road effects, which would greatly alter the current condition of the Porcupine Caribou Herd that lacks any major transportation networks. Understanding how the Porcupine Caribou Herd will be affected is essential to analyzing subsistence impacts for availability and distribution, which are essential to understanding harvest opportunities. The caribou studies need to incorporate the best-available science in order to accurately discern impacts to subsistence.

Further, the BLM must account for the fact that the Porcupine Caribou Herd's range is currently without any major transportation networks and the PCH have not had any previous exposure to oil and gas infrastructure in their calving and post-calving areas. The fact that impacts "are expected to be more intense" for this herd is acknowledged, [1644] but not considered throughout the impacts analysis, including its omission from analysis in the subsistence discussion. There is little evidence that caribou actually habituate to infrastructure, as BLM assumes in the DEIS. Rather, infrastructure could displace caribou availability farther from the project area, and generally alter migratory paths.[1645] BLM's lackluster caribou analysis does not sufficiently examine the impacts from and oil and gas program to caribou and, therefore, to subsistence, in a meaningful way.

Subsistence hunters will travel away from industry in order to avoid pipelines and other signs of oil and gas activity while participating in subsistence activities. While the DEIS acknowledges this phenomenon, it provides no meaningful analysis of the extent of avoidance and fails to incorporate it into the subsistence findings. The visual impacts from the production facilities and pipelines would be significant.[1646] BLM needs to discern how avoidance of visual impacts will impact subsistence. In addition, subsistence hunters often cite to issues and harm

[1641] DEIS vol. 1 at 3-173.
[1642] *See supra.*
[1643] *See supra.*
[1644] DEIS vol. 1 at 3-169.
[1645] *See supra* Part V.I.
[1646] *See infra* Part V.W (re: visual impacts).

from aircraft disturbance to subsistence hunting. BLM must ascertain whether hunters alter their subsistence activities due to flight schedules and what impacts will result from future, increased traffic.[1647] When considering physical barriers to subsistence imposed by infrastructure to subsistence, BLM underestimates these impacts as a result of improper exclusion of infrastructure and activities from its definition of "2,000 acres," thereby limiting consideration of pipelines and gravel mines. BLM must consider pipelines as physical barriers for caribou that will alter their migration patterns and cause avoidance during certain points in their lifecycles. BLM fails to adequately explain how oil and gas infrastructure may alter availability, not just as a result of deflection for animals, but also as deterrence for subsistence hunters.

Moreover, the assumption of potential impacts of noise on fish is incorrect and based on a faulty premise that because seismic activity and pile driving will likely occur in winter that there will be no impact. Many fish of subsistence importance, including Dolly Varden and grayling, overwinter in large congregations. If these overwintering locations are not known, these subsistence resources could be significantly impacted by winter exploration and development activities. Overwintering locations for fish of subsistence importance must be identified within BLM's analysis. Moreover, how pile driving, seismic activities, and other winter activities may impact the success of winter fishing should be described in detail.[1648] Without this information, BLM's analysis not only of fish, but also of subsistence, is inadequate.

Additionally, BLM fails to adequately consider impacts to marine mammals, another important subsistence resource. The DEIS considers all marine mammals, including bowhead whales, seals, and polar bears in the analysis together, making general assertions about how potential air or vessel traffic and seismic exploration might impact subsistence use. As separate species with significantly different biological needs, migration patterns, and impacts, each of these should be considered individually. In addition, development from other projects in the area, such as Liberty and Point Thompson must be considered. BLM needs to provide each marine mammal with an independent consideration using the best available science, as each will have unique impacts due to disturbance from oil and gas activity and subsistence impacts will look different for each species.

b. BLM Fails to Adequately Consider Impacts to Subsistence Users.

The DEIS does not fully account for the impacts of increased aircraft traffic to subsistence harvesting of caribou and other resources. Aircraft traffic, including plane and helicopter traffic, reduce subsistence harvest opportunities by diverting caribou. Air traffic patterns are difficult to foresee and can cause "acute stress and disruption" to subsistence hunters.[1649] When participating in subsistence activities, hunters' success is linked to their food security and cultural wellbeing. In Nuiqsut, aircraft traffic is considered by many to be the most

[1647] *See infra* Parts V.H, I, L (describing changes from air traffic noise on caribou, birds, and marine mammals, these disruptions may influence species availability for subsistence hunting).

[1648] *See infra* Parts V.G (re: fish inventories and distribution), V.C (re: acoustic impacts).

[1649] GMT-1 Final SEIS vol. 1 at 437.

common impact to caribou, and may divert or delay their movements.[1650] Here, the DEIS does not currently identify airport locations, which does not allow for meaningful consideration the alternatives. It is impossible to compare and substantively analyze traffic patterns when it is unknown what the flight patterns will look like. Additionally, the DEIS errs by saying aircraft disturbance will not significantly impact caribou when BLM has not identified airport locations, therefore it is uncertain exactly where disturbances will occur. In addition, the DEIS must consider potential air traffic impacts on subsistence activities for birds as well, including the endangered spectacled eider — previously found to be impacted in Nuiqsut.[1651] The DEIS must fully analyze the impacts of increased air traffic to subsistence hunters by considering hunter avoidance and using the best available science to consider the impacts on caribou and other species.

Further, BLM has failed to adequately analyze how the fluidity (sharing, trading, bartering, etc.) of resources between communities will be impacted by the leasing program. As sharing and participating in sharing networks is considered a substance activity, BLM must consider how reductions in the ability to share are in fact a reduction to subsistence. The complete loss or reduction of resources in one community may impact the exchange of resources with other communities within the region. Existing sharing networks distribute food widely, where communities are able to receive resources they are otherwise unable to obtain. When availability of subsistence foods decreases, sharing also decreases as households experience reduced harvests and availability. The DEIS merely mentions that reduced harvests could disrupt sharing networks, there is no substantive consideration of effects, merely that changes would occur and "disruptions of social connections could thus increase vulnerability in communities."[1652] The DEIS should look at specific communities sharing practices and the relative wealth of households to accurately determine impacts from reductions in fluidity of resources. The potential impacts to these social networks should be explained in much greater detail; simply acknowledging it is insufficient to serve as the required NEPA analysis.

The DEIS does not sufficiently consider the compounded impacts to subsistence hunters. When subsistence users are unable to engage in subsistence activities or their opportunities are limited, their ability to pass on traditional knowledge about subsistence activities also becomes limited. As discussed above, opportunities or subsistence areas may become limited because of infrastructure, avoidance by subsistence hunters, and reduced subsistence resources. The initial reduction of traditional use areas will limit the ability to pass on traditional knowledge to younger generations and traditional use and knowledge of the use areas will be lost. The DEIS should measure this impact as long-term or permanent, and consider the loss of knowledge as a significant subsistence impact.

Additionally, in several instances, including within Appendix M, BLM identifies the annual cycle of subsistence resource harvesting.[1653] BLM does not, however, identify how these

[1650] DEIS vol. 1 at 3-170.
[1651] GMT-1 Final SEIS vol. 1 at 367, 374.
[1652] DEIS vol. 1 at 3-175.
[1653] DEIS vol. 2 at Appendix M.

resources may be impacted by oil and gas activities associated with this leasing program during these particular times of year. BLM should articulate in detail how the leasing program will impact resources and practices during each month. Subsistence users generally rely on healthy subsistence resources being present in traditional use areas at specific times, and some harvesters are often limited in their ability to access resources beyond traditional use areas at the expected time of year.[1654] Even if the potential impact to wildlife resources may be slight, changes in resource access and availability, including perceived changes in fish and wildlife health due to development, may affect subsistence.[1655] Further, harvest cycle analysis must include and account for climate change impacts to the subsistence harvest and resulting limits to subsistence resources availability. For example, BLM must consider how surveying for ice road season damage by helicopter in June may impact caribou hunting.

Finally, BLM relies heavily on the experiences of Nuiqsut to describe likely circumstances for communities reliant upon the Arctic Refuge. In doing so, however, BLM fails to articulate the major differences temporally and physically between these two contexts. First, Nuiqsut is being significantly affected as a result of being surrounded by oil development.[1656] BLM cannot rely on other EISs, which incorrectly minimize subsistence impacts to Nuiqsut, as a way of shirking its NEPA obligations to fully and accurately consider the potential impacts to subsistence uses on the Coastal Plain.[1657] Second, development around Nuiqsut is ongoing and the full scope of impacts have yet to be realized. Even so, the impacts from the handful of projects that are starting to surround the community are already having significant impacts to subsistence users' ability to continue their way of life. BLM should not assume hunters have or will successfully adapt to resource development, especially since there are a number of large projects around Nuiqsut that are anticipated but have not yet been constructed. These include, among others, Greater Mooses Tooth Two, Willow, and Nanushuk. Drawing conclusions from such a dynamic set of circumstances presents limitations to knowing what will happen in the context of oil and gas leasing on the Coastal Plain. BLM does not acknowledge or otherwise account for these limitations in its efforts to correlate Nuiqsut's experiences to that which may occur to other communities. Finally, the geography and resources relevant to the NPR-A and Coastal Plain are very different, and affected communities are located in different landscapes with very different resource patterns. An analysis specific to communities relying upon the resources of the Arctic National Wildlife Refuge is necessary. BLM must evaluate the potential long-term or permanent impacts to the Porcupine Caribou Herd and other subsistence uses on the Coastal Plain by relying on the best science available, not by relying on unfounded analogies and unsupported conclusions.

[1654] Point Thompson FEIS vol. 3 at 5-602.

[1655] *Id.*

[1656] *See* GMT-1 Final SEIS at 456–58.

[1657] *See*, GMT-1 Final SEIS at 435. The Kuukpik Corporation comments (on behalf of shareholders and other community institutions) to the BLM on the NPR-A Draft IAP/EIS in 2012 noted that BLM's analysis: "…often dramatically understates the actual impacts of oil and gas development on Nuiqsut" and that "the conclusion is usually a by the dismissal of its implications, in spite of its undisputed scope." (I. Nukapigak 2012).

c. BLM Failed to Adequately Analyze Cumulative Impacts.

The DEIS analysis of cumulative impacts on subsistence is deficient. BLM's analysis fails to consider cumulative impacts to communities that rely on Refuge resources from development, climate change, and the potential for contamination.

In addition, the DEIS does not include cumulative effects from the Point Thompson and Liberty developments. The proposed action must be considered in the context of current development. Both Point Thompson and Liberty will have impacts on bowhead whales, seals, and polar bears.[1658] The DEIS should consider the cumulative impacts on bowhead whale hunts, whale availability, changes in migratory patterns and deflection of bowhead whales from development and increased traffic. BLM must also consider the potential for Liberty construction to interfere with Kaktovik subsistence harvest of caribou during construction as projected by the project's EIS.[1659] Any disruption of the Porcupine Caribou Herd from these development projects would likewise disrupt harvest patterns for Gwich'in communities, as well. Liberty found that the additive effects on polar bears may result in moderate to major effects on the species.[1660] Point Thompson also found a loss in critical habitat for polar bears.[1661] As a moderate subsistence source for both Kaktovik and Nuiqsut, polar bear must be considered in the cumulative for subsistence. The proposed action must be considered the context of current development including the Point Thompson and Liberty projects and their impacts on marine mammal subsistence availability.

Additionally, in describing impacts of oil and gas development, BLM focuses on impacts resulting from oil and gas development activities just on the Coastal Plain. There is no discussion of the reasonably foreseeable future actions of a road and pipeline between Kaktovik and the Dalton Highway/Trans-Alaska Pipeline and oil and gas development in the Colville-Canning area and Alpine area. BLM completed failed to analyze or even discuss impacts from development activities in the Colville-Canning Area, Alpine, a road and pipeline between Kaktovik and the Dalton Highway/Trans-Alaska Pipeline. This does not adequately account for the potential cumulative impacts to subsistence users or reasonably foreseeable projects, such as ConocoPhillips' Willow project near Nuiqsut. BLM needs to explicitly lay out these foreseeable projects and impacts.

BLM also assumes that hunters would "adapt, to varying extents, to the changes occurring around them."[1662] How BLM foresees hunters adapting should be described. It is also necessary to consider that all hunters may not be able to adapt because of factors like increased cost of travel to more distant subsistence use areas. The DEIS also recognizes that some subsistence hunters choose not to use roads. Not using roads is a subsistence hunter's prerogative, and BLM must not only mention these hunters, but consider the effects on hunters

[1658] Liberty Development and Production Plan Final EIS at 4-214, 4-226–4-228; Point Thompson ROD at 108-109.

[1659] Liberty Development and Production Plan Final EIS at 4-231, 4-233.

[1660] Liberty Development and Production Plan Final EIS at 5-36.

[1661] Point Thompson ROD at 92, 111.

[1662] DEIS vol. 1 at 177.

who choose to not utilize roads for subsistence practices. BLM should analyze and describe the limitations of adaptation to changed subsistence practices, resources, and conditions on the landscape.

BLM also fails to accurately describe how subsistence uses and resources will be impacted by a changing climate. BLM should include an analysis of how subsistence resource abundance and habitat quality have been impacted by a changing Arctic. Relatedly, BLM must discuss how a changed climate is expected to impact subsistence practices in the future. These changes should be coupled with the cumulative industrial impacts of oil development on the North Slope and Arctic Ocean. Currently, BLM's cumulative analysis consists of the broad statement that climate change "could influence the rate or degree of potential impacts."[1663] In addition, the baseline analysis only finds that "climate change could contribute to resource availability caused by development in and around the program area, further reducing their availability to subsistence users."[1664] These statements are too broad and general to capture the real impacts that are already happening across the North Slope of Alaska. As discussed elsewhere in these comments, the best available science demonstrates that climate change is already impacting important subsistence resources like caribou, fish, and marine mammals. Instead of conducting an analysis specific to how subsistence use in this area could be impacted by climate change, BLM instead relies on ambiguous statements to merely acknowledge potential impacts. BLM's analysis should incorporate the best available climate science, include site specific analysis for all communities. BLM must analyze impacts to communities along the migratory path of the Porcupine Caribou Herd who will experience reduced subsistence harvest opportunities if the migratory path of the herd is altered or shifts. BLM's current climate change cumulative impacts analysis lacks rigor and fails to meaningfully account for climate change.

BLM does not address the potential risk of contamination from potential oil spills on subsistence activities. Mentioned as a potential risk in all scenarios,[1665] the impact of a large spill would be widespread is not included in the cumulative impacts analysis. The size of proposed spills and can have effects on marine wildlife and both smaller and larger spills need to be considered in the DEIS, especially during whaling season and bowhead migration times. Onshore spills may contaminate hydrological systems, tundra and vegetation, and in turn the wildlife and people that rely upon these ecological systems. Spill trajectories and risk must be weighed in the cumulative sense.

In sum, the Coastal Plain of the Arctic Refuge is a vital subsistence area. BLM's analysis failed to take a hard look at all impacted subsistence resources, as well as the human factors of subsistence, including deterrence from development, and use the best available science to consider impacts to subsistence resources. The DEIS is deficient and must be revised.

[1663] DEIS vol. 1 at 3-178.
[1664] DEIS vol. 1 at 3-168.
[1665] DEIS vol. 1 at 3-174.

3. BLM Failed to Consider Effective Mitigation Measures.

Although BLM claims some impacts to subsistence resources, such as caribou, can be mitigated with timing and surface limitations, BLM acknowledges that mitigation measures can merely minimize, and cannot eliminate impacts to subsistence. BLM does not attempt to explain what the shortcomings of these mitigations measures may be in terms of restrictions on subsistence availability. BLM also does not adequately account for the fact that the mitigation measures are potentially subject to waivers, exceptions, and modifications. The effectiveness of any mitigation measures is in part directly tied to whether or not they are enforceable or could be waived. BLM needs to account for the potential waiver of these provisions as part of its analysis, as that could negate any of the purported protections and benefits of such provisions.

For instance, Stipulation 6 seeks to protect habitat of both the Porcupine and Central Arctic Herds by minimizing disturbance and hindrance of movements.[1666] However, for its requirements and standards, it simply points to ROP 23 for Alternatives B and C, with only the addition of suspension of major construction activities using heavy equipment for a short period under Alternative D. This means that this stipulation does not provide any independent protection for caribou movements across the Coastal Plain. (It is unclear what is meant by "major construction activity" and also noteworthy that even that protection is subject to waiver.) Stipulation 7 seeks to protect the "PCH primary calving habitat area." However, BLM has not supported the delineation of that area in the DEIS with any level of robust scientific justification.[1667] Additionally, areas outside of the most commonly used concentrated calving areas are still very important for caribou for post-calving needs as well as calving during particular years. BLM needs to protect both key calving and post-calving habitat, as well as protect migration corridors and movements. Protecting only the "primary calving area" as defined here will provide little protection in some years, potentially increasing calf mortality and threatening the caribou population. This is especially a concern if warming conditions under climate change leads to "a western shift in concentrated calving areas," as the DEIS indicates.[1668]

Moreover, BLM's mitigation measures which are specifically targeted to address impacts to subsistence users fall far short of avoiding and minimizing impacts to affected communities. ROP 36, "Subsistence Consultation for Permitted Activities" completely ignores the need to provide opportunities for Gwich'in communities to participate in planning and decision-making to prevent unreasonable conflicts between subsistence uses and other activities. Similarly, ROP 39 requires that "Before starting exploration or development, lessees/operators/contractors are required to develop a subsistence access plan, in coordination with the Native Village of Kaktovik and the City of Kaktovik…" It is unacceptable for BLM to arbitrarily limit these coordination and consultation opportunities to Kaktovik and the North Slope Borough, in light of the abundant evidence that Gwich'in subsistence users will be significantly impacted from oil and gas leasing on the Coastal Plain.

[1666] DEIS vol. 1 at 2-11.
[1667] *See supra*.
[1668] DEIS vol. 1 at 3-110.

We further note that ROP 36 contains no clear mechanism for actually reducing impacts to subsistence activities. There is no provision that allows a local community to prevent any oil and gas activity from moving forward if there would be significant impacts on subsistence use – rather, the community would merely be informed ahead of time. Without providing for any type of "veto" power to local communities, such measures are essentially meaningless. Moreover, subsection (c) requires that applicants prepare a plan to describe how they will avoid subsistence impacts, and submit that plan to the BLM Authorized Officer. For such a plan to have any value whatsoever, it must be shared will all potentially affected communities to determine whether the plan would effectively avoid unreasonable conflicts with subsistence. The BLM Authorized Officer should not be given carte blanche to make such determinations. Finally, we note that several of the "requirements" of this ROP merely parrot existing legal mandates and should not be considered mitigation measures for purposes of this section. This includes the requirement for BLM to do government-to-government consultation in subsection (b) and the requirement for barge operators to avoid unmitigable adverse impacts, as determined by NMFS, on the availability of marine mammals to subsistence hunters in subsection (c)(vi).[1669]

O. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON SOCIOCULTURAL SYSTEMS IS INADEQUATE.

Assessment of sociocultural systems is essential for understanding the effects of a proposed action on affected communities. The Gwich'in and Iñupiat people have strong cultural ties to the Coastal Plain of the Arctic Refuge, the program area considered by BLM. Alaska Native people have lived on and used the Coastal Plain since time immemorial. The Gwich'in people live in fourteen communities across northern Alaska and Canada along the migratory path of the Porcupine Caribou Herd. The Gwich'in identify as the Caribou people, and consider any disturbance to the calving grounds of the Porcupine Caribou Herd an affront to their human rights — the Coastal Plain is so sacred to the Gwich'in that they do not set foot in this area. Oil and gas development on the Coastal Plain will cause disruptions to land and subsistence activities and uses, which will have severe social, cultural, and health impacts that BLM must analyze.

BLM must engage in a robust and meaningful analysis of all cultural impacts from an oil and gas program on the Coastal Plain. BLM has failed to make positive ANILCA 810 findings for any communities besides Kaktovik, in spite of countervailing evidence of broader impacts. The DEIS does not fully address comments made by the Gwich'in Steering Committee during scoping. In addition the DEIS does not sufficiently consider transboundary effects, local and regional changes to the economies of effected communities, traditional lands and resources, effects to social, health, and cultural environments, and cumulative impacts. BLM must substantially revise the DEIS after consulting with affected communities and reissue the revised DEIS.

[1669] See Part III.G.2 (describing the requirements of the Marine Mammal Protection Act). It should also be noted that FWS should be included alongside NMFS as having regulatory authority over marine mammal take.

1. BLM Fails Incorporate Input from Affected Communities and Stakeholders for the Affected Environment

Overall, the DEIS is deficient for failing to address input required to make a robust sociocultural analysis. BLM's analysis is inadequate for finding no significant restrictions under ANILCA 810, declining to address comments raised by the Gwich'in Steering Committee during scoping, and failing to comply with the requirements of the International Porcupine Caribou Herd Treaty.

First, BLM's finding of no significant restrictions on subsistence for Gwich'in communities under ANILCA section 810 is in error. The ANILCA 810 analysis improperly finds that impacts to the Porcupine Caribou Herd do not impose significant restrictions on the Gwich'in's subsistence hunting activities.[1670] It is critically important that BLM release preliminary findings and recommendations in a revised 810 analysis so that the agency can receive input on them before the agency finalizes them. These findings and recommendations will allow BLM to appropriately consider of sociocultural impacts to subsistence hunting and reduced opportunities to participate in other subsistence activities. The deficiency from not completing an adequate 810 analysis is reflected in BLM's incomplete analysis of impacts to the Gwich'in people's sociocultural systems.

Additionally, BLM did not fully address the Gwich'in Steering Committee previous scoping comments. The Gwich'in Steering Committee was established to protect the sacred calving and post calving grounds of the Porcupine Caribou Herd — the Coastal Plain of the Arctic Refuge. The Gwich'in Steering Committee represents the communities of Arctic Village, Venetie, Fort Yukon, Beaver, Chalkyitsik, Birch Creek, Stevens Village, Circle, and Eagle Village in Alaska, and Old Crow, Fort McPherson, Tsiigehtchic, Aklavik, and Inuvik in Canada. The Gwich'in Steering Committee presented extensive comments during scoping, which were not sufficiently addressed.[1671] BLM must address all issues raised by the Gwich'in Steering Committee during scoping.

Finally, BLM's failure to comply with International Porcupine Caribou Herd Treaty requirements renders its sociocultural background discussion and analysis deficient. As explained above, BLM fails to comply with international treaty obligations by not being transparent about its consultation with the Porcupine Caribou Board. This deficiency results in significant risk to the Canadian subsistence users' nutritional, cultural, and other essential needs. The Canadian Gwich'in, in northern Yukon and Northwest Territories, rely heavily on the Porcupine Caribou Herd, and have previously accounted for up to 85 percent of the harvest.[1672] The DEIS recognizes "seven Canadian user groups of the [Porcupine Caribou Herd]: Inuvialuit (Aklavik, Inuvik, and Tuktoyaktuk), Northwest Territory (NWT) Gwich'in people (Aklavik,

[1670] *See infra*, at Part VI.

[1671] Gwich'in Steering Committee, Scoping Comments re: Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program (June 19, 2018).

[1672] DEIS vol. 1 at 3-168; DEIS vol. 2 at M-27–M-32;

Inuvik, Fort McPherson [*Tetlit Zheh*], and Tsiigehtchic), Vuntut Gwich'in people (Old Crow), Tr'ondek Hwech'in (Dawson City), Nacho Nyak Dun (Mayo), and other residents living in the Yukon Territory and the NWT."[1673] By not being transparent about the consultation process, BLM fails to not only comply with international treaty obligations, but fails to acknowledge or consider the cultural values Gwich'in in the Yukon and Northwest Territories in the DEIS. As a result, BLM fails meaningfully to consider the impacts on affected communities in Canada, who represent over half of the Herd's use will experience impacts related to their food security, nutrition, spiritual, and other essential needs.

2. The DEIS's analysis of impacts to sociocultural systems is insufficient.

BLM does not sufficiently analyze sociocultural impacts of the proposed action on affected communities. The DEIS must consider impacts to all communities that will feel the effects of oil and gas leasing and development on the Coastal Plain. The DEIS is deficient for not incorporating sociocultural concerns throughout the analysis, failing to provide meaningful alternatives, limiting the analysis to post-leasing impacts, and providing insufficient consideration of transboundary impacts, changes in local and regional economies, changes to traditional subsistence lands and resources, and changes to the social, health, and cultural environment.

a. Sociocultural systems analysis is lacking throughout the DEIS

Broadly, the DEIS does not adequately incorporate the values of the affected communities into the analysis. When considering important values in the abstract, the DEIS states that BLM's proposed oil and gas program opens 66%–100% of the Coastal Plain to leasing, "while balancing biological and ecological concerns."[1674] BLM specifically fails to mention impacts to human-based resources, including subsistence, cultural resources, sociocultural values, and spiritual beliefs. These impacts must be considered as well. In order to resolve this omission, BLM must not only highlight the importance of human resources generally, but must also revise its analysis to include these components. For example, the DEIS should incorporate traditional knowledge into all scientific analysis for any relevant resources. Overall, BLM downplays impacts to sociocultural systems and fails to account for many communities which would be most affected by development.

b. Lack of meaningful analysis of the impacts of alternatives on sociocultural systems

The sociocultural systems section's alternatives analysis is not rigorous as it does not provide enough detail to compare the alternatives on their merits. The DEIS is required to "[d]evote substantial treatment to each alternative considered in detail . . . so that reviewers may evaluate their comparative merits."[1675] The sociocultural alternatives section lists some

[1673] DEIS vol. 1 at 3-167.
[1674] DEIS vol. 1 at 5.
[1675] 40 C.F.R. § 1502.14(b)

"potential" impacts under Alternative B.[1676] A general list of "potential" impacts does not constitute a meaningful analysis.

The DEIS's analysis of Alternative C is similarly substantially lacking. The entirety of analysis for Alternative C states:

> The types of potential impacts under Alternative C would be the same as those described under Alternative B. Because fewer acres of calving grounds would be available for leasing, the intensity of potential sociocultural impacts related to caribou under Alternative C would be less than Alternative B.[1677]

This analysis is problematic for a myriad of reasons. First, it is incorrect that under Alternative C less calving acreage is offered — alternatives B and C offer the same acreage in the same areas for lease. The DEIS acknowledges in Alternative B that any disruption, perceived harm, contamination, or degradation to the Porcupine Caribou Herd's calving grounds will have a sociocultural impacts to the Gwich'in people.[1678] But BLM does not explain why it believes that the "intensity of potential sociocultural impacts related to caribou" would be less under Alternative C given the importance of the entire Coastal Plain to caribou and the Gwich'in.[1679] Additionally, BLM cannot claim reduced impacts to the Gwich'in people's identity, as any harm to the Coastal Plain will constitute an impact to the Gwich'in based on their traditional knowledge.

Second, this analysis does not distinguish which caribou herd may have reduced "potential sociocultural impacts."[1680] Both the Porcupine Caribou Herd and the Central Arctic Herd are affected by oil and gas leasing and the availability of both herds is tied to subsistence and sociocultural activities. Impacts on the community of Nuiqsut, which relies on the Central Arctic Herd is not mentioned in this comparison.

Third, the analysis to caribou must not only clarify and examine the impacts to both the Porcupine Caribou Herd and the Central Arctic Herd, but the analysis must be robust, and consider how the diminished availability of caribou for subsistence purposes alters sociocultural impacts on the Gwich'in, who rely heavily on the Porcupine Caribou Herd.

The analysis for Alternatives D1 and D2 are similarly deficient. BLM merely states the "intensity of potential sociocultural impacts" will be different under the alternatives, but provides no analysis that would allow the differences in the alternatives to be meaningfully considered.[1681] For this reason, BLM must respond to the issues raised in the preceding paragraph in order to allow reviewers to analyze the alternatives on their comparative merits for Alternatives D1 and

[1676] DEIS vol. 1 at 3-191.
[1677] DEIS vol. 1 at 3-192.
[1678] DEIS vol. 1 at 3-191.
[1679] DEIS vol. 1 at 3-192.
[1680] DEIS vol. 1 at 3-192.
[1681] DEIS vol. 1 at 3-192.

D2. Merely stating that the intensity of impacts will change does not constitute a rigorous evaluation.[1682] The sociocultural systems cursory alternatives analysis does not allow reviewers to assess their comparative merits and impacts.[1683]

c. Analysis improperly limited to post-leasing

BLM also arbitrarily and improperly limits the scope of its sociocultural systems analysis in the same way it improperly limited the scope of its NEPA analysis: BLM only looks at post-lease activities that include seismic and drilling exploration, development, and transportation.[1684] BLM should not limit its analysis of the impacts to only post-leasing activities and needs to include the full range of direct, indirect, and cumulative impacts to subsistence use and resources that could occur from the entire oil and gas program. This includes from any proposals to conduct pre-leasing seismic exploration on the Coastal Plain. As discussed elsewhere, BLM is currently in the process of reviewing an extensive seismic proposal from SAExploration that could cause lasting damage to tundra, vegetation, soils, permafrost, and other resources. That damage can in turn significantly harm wildlife through the degradation of their habitat. BLM also improperly excluded other forms of infrastructure and activities from what it considered as part of its 2,000 acres of impacts. This includes pipelines, which could cross large areas of the Coastal Plain and have the potential to divert caribou away from key areas. BLM also failed to account for other activities like gravel mining, which have severe sound and other environmental impacts that could deter caribou and other species from important habitat areas. BLM's deficient analysis of the full range of resource impacts from the broad scope of activities likely to occur on the Coastal Plain and to nearby areas means BLM has dramatically underestimated the potential impacts from the oil and gas program and related activities. These impacts and activities will all have sociocultural impacts. As BLM acknowledges "any disruption to that herd or perceived contamination or degradation of calving grounds in the program area would have sociocultural impacts on the Gwich'in people, in terms of their belief systems, cultural identity, and the impact of development in the sacred calving grounds of the [Porcupine Caribou Herd]."[1685] BLM must do more than just acknowledge that there will be impacts; BLM must actually analyze the impacts, including those from preleasing seismic activity that will create potential impacts to subsistence activities by deterring caribou and other species and will cause direct harm to the Gwich'in people by damaging the Coastal Plain. BLM needs to revise and reissue its EIS to ensure it takes into consideration the full range of potential impacts to subsistence and sociocultural systems are considered.

d. The DEIS fails to consider the transboundary effects

BLM's analysis falls short by not considering transboundary effects, and therefore the sociocultural repercussions on Gwich'in people who live in the fourteen villages across northern Alaska and Canada. As explained above, BLM is required to take a hard look at all impacts to

[1682] 40 C.F.R. § 1502.14(a).
[1683] 40 C.F.R. § 1502.14(a), (b).
[1684] DEIS vol. 1 at 3-188–3-193.
[1685] DEIS vol. 1 at 3-191.

the affected environment and cutting off this analysis at the Canadian border is improper as the intensity of the impacts are not fully considered. The DEIS does not mention transboundary impacts nor does it consider any sociocultural impacts to Canadian communities such as Old Crow, Aklavik, or Fort McPherson.[1686] Caribou do not recognize borders. The Porcupine Caribou Herd is relied upon heavily by all Gwich'in people, Canadian and American, for subsistence.

To take a hard look at sociocultural impacts, the DEIS must consider transboundary effects, as Gwich'in span Alaska, northern Yukon, and the Northwest Territories and all communities along the migratory route of the Porcupine Caribou Herd will feel affects.

e. Changes in local and regional economies

The DEIS fails to consider financial impacts for all Gwich'in communities

The DEIS does not meaningfully analyze sociocultural impacts for Gwich'in villages given the lack of economic activity that it likely to occur while the villages experience shifts in subsistence resource availability. The DEIS must take a hard look at the effects on all Gwich'in communities that rely on the Porcupine Caribou Herd to sustain their way of life. The section analyzing the changes in income and employment levels focuses on the community of Kaktovik's likely shift of community roles, changing social ties and altering income and employment disparities. It fails to look at the financial impacts to all affected communities, including Gwich'in villages, given the likely impacts to subsistence resource availability and use. The DEIS notes that:

> The comparative lack of economic activity for the Gwich'in people, especially the communities of Arctic Village and Venetie, could make those communities more vulnerable to social impacts, particularly those associated with disruption of subsistence activities. Without the increased economic activity associated with development, communities are more vulnerable to its impacts and less able to adapt to environmental and social changes resulting from the development.[1687]

This is not a substantive analysis for the fourteen Gwich'in communities who rely on the Porcupine Caribou Herd and will experience impacts. Even though the Gwich'in are not directly adjacent to proposed development, their communities are located along the migratory path of the Porcupine Caribou Herd and the Gwich'in rely on the herd for subsistence. It is therefore improper for the DEIS to suggest that only two of the Gwich'in communities, Arctic Village and Venetie, will be made more vulnerable by receiving none of the "benefits" from financial gain, while incurring impacts to their subsistence lifestyle and cultural identity. As stated above, Canadian Gwich'in communities account for the majority of Porcupine Caribou Herd harvest, and will feel such impacts well and other Gwich'in villages in Alaska hunt and share Porcupine

[1686] *See supra*.
[1687] DEIS vol. 1 at 3-189.

Caribou.[1688] Importantly, the DEIS does acknowledges that the economic impacts will be amplified by the current financial situation of the Gwich'in villages, as the communities experience limited economic development and rely heavily on subsistence activities to sustain their way of life.[1689] However, BLM's analysis of the financial impacts to Gwich'in communities is not meaningful, and this analysis does not account for the magnitude of impacts the Gwich'in will experience from any reductions in caribou harvest. The DEIS must analyze the changes in community subsistence harvest and economic impacts upon all fourteen Gwich'in communities.

Changes to economy mischaracterized as short term

The changes in Income and Employment Levels analysis contains a direct contradiction that must be resolved. The DEIS finds that the adjustment away from the current distribution of hunters in "could cause short-term social stresses in a community."[1690] This analysis incorrectly downplays the impacts, considering them told be "short term" when in actuality, all alternatives will be impose significant restrictions on subsistence resources and will forever change community dynamics. In fact, when comparing alternatives the DEIS provides that "the duration of impacts would be long term for all types of impacts."[1691] BLM must resolve this inconsistency in terms of the gravity and lasting nature of impacts to communities on a timeline consistent with that described above regarding BLM's impacts analysis.

In addition, BLM must explain exactly how increases in employment opportunities are expected to result in a shift away from subsistence activities. The DEIS recognizes that historically very few residents of effected communities hold oil and gas jobs.[1692] BLM must reconcile this with the sociocultural analysis which considers changes in social structures will be altered as certain individuals shift to "nonsubsistence roles."[1693] BLM needs to further consider the intensity of this impact in order to analyze changes in employment.

Further, BLM describes a "tipping point" where the impacts to "residents would no longer be able to adjust to such changes [and t]he potential sociocultural impacts of such an occurrence would likely be negative and long term."[1694] BLM must identify such points using the best available science to determine the scale and scope of impacts to sociocultural systems. What

[1688] *See supra*, at Part III.E.1.

[1689] DEIS vol. 1 at 3-185 ("[T]here is little economic development in the Gwich'in area and few opportunities for local employment. In most cases, seasonal employment rather than full-time or permanent employment directly supports the subsistence activities of individuals. . . . The relative lack of cash to support subsistence activities would make these communities more vulnerable to changes in the availability of resources, such as caribou. This is because residents have less capacity to travel great distances in search of subsistence resources or to purchase alternative foods that are less desirable.").

[1690] DEIS vol. 1 at 3-188.

[1691] DEIS vol. 1 at 3-191.

[1692] DEIS vol. 1 at 3-229.

[1693] DEIS vol. 1 at 3-190.

[1694] DEIS vol. 1 at 3-188.

level of impact results in a tipping point is not further discussed; it needs to be identified to better understand the proposed alternatives and mitigate impacts.

f. Changes to traditional subsistence lands and resources

i. Disruptions to Subsistence Activities and Uses must specifically consider individual communities

The DEIS analysis errs by grouping all affected communities together when considering how subsistence uses will be disrupted. By considering all communities together, BLM does not provide a robust analysis for subsistence impacts, as user access and availability will look very different in many communities. For example, Kaktovik will have to directly avoid infrastructure during subsistence activities while Gwich'in communities will likely experience subsistence impacts from altered migratory caribou behavior, lower herd population, and reduced overall animal health. Infrastructure in Kaktovik may force subsistence hunters to change their hunting areas, strategies, and potentially hunting methods.[1695] BLM's analysis does not take a hard look at impacts, instead making broad statements about potential impacts on subsistence resource availability. The DEIS must take a detailed look at the sociocultural impacts, which requires so level of differentiation between affected communities.

ii. Subsistence patterns and roads

BLM must account for changing subsistence patterns due to roads.[1696] Roads will fragment caribou habitat and the DEIS fails to fully consider the risks roads pose to the Porcupine and Central Arctic Caribou Herds. BLM's current caribou analysis is deficient for failing to account for the reasonably foreseeable impacts to the herds and by neglecting to address issues such as snowdrifts along roads which delay and reduce the availability of local forage for caribou.[1697] BLM needs to address these concerns with the best available science. After BLM updates this analysis and clearly explains the consequences for caribou, the DEIS must be further updated to reflect the subsequent sociocultural implications to caribou.

iii. Implications from reduced availability of marine mammals

BLM must fully address the implications of impacts to bowhead whales and other marine mammals for subsistence access and the subsequent sociocultural implications that stem from reduced sharing practices and passing of traditional knowledge. The DEIS's environmental justice section acknowledges that there are impacts to subsistence use of bowhead whales and other marine mammals from oil and gas activities.[1698] Hunters are required to travel further as a result of noise and traffic.[1699] Reduced harvest of whales would interrupt and alter sharing and

[1695] DEIS vol. 1 at 3-190.
[1696] DEIS vol. 1 at 3-190.
[1697] *See supra*.
[1698] DEIS vol. 1 at 3-202.
[1699] DEIS vol. 1 at 3-130.

trading networks with different communities and regions in Alaska and Canada.[1700] The DEIS fails to account for any of these impacts and merely concludes that large vessel traffic could temporarily disturb or displace whales or bearded/ringed seals. Generally, the DEIS notes that negative social consequences will result if harvest of key resources, such as bowhead whales are reduced, but does not analyze the likelihood and severity of these impacts.[1701] BLM's analysis fails to adequately consider how harvest interruptions would restrict the availability of marine mammals for subsistence use.

iv. Changes in harvester dynamics from increased competition

BLM makes brief mention, but fails to provide actual analysis about how reduced availability of subsistence resources may cause tensions between user groups who harvest the Porcupine Caribou Herd.[1702] There is no description for how BLM foresees these conflicts developing, how they will play out, and what larger implications they may have on social cohesion. The Porcupine Caribou Herd and Central Arctic Herd are harvested by twenty-two communities in total. BLM should analyze and describe how the reduction of resources will change social dynamics amongst communities.

e. Changes to the social, health, and cultural environment

i. Analysis must consider impacts to the Iñupiat and Gwich'in cultures

As separate peoples with unique beliefs, histories, and traditions, BLM should provide robust independent analysis of cultural impacts to the Iñupiat and Gwich'in people. The DEIS considers how Disruptions to Subsistence Activities and Uses will degrade social ties and cohesion universally for both the Iñupiat and Gwich'in. While disruption is inevitable in both cultures, it is improper to consider the impacts in such broad strokes. For example, the Iñupiat of Kaktovik will experience changes from structural development around their community and reductions in availability of terrestrial and marine species. Alternatively, Gwich'in communities will see impacts to the Porcupine Caribou Herd and may have to travel farther, and utilize different locations for subsistence harvest. As currently written, the DEIS errs by failing to consider the distinctive impacts to Iñupiat and to Gwich'in people from disruptions to their subsistence activities.

ii. Disruptions to sharing networks and cultural activities

The DEIS does not sufficiently consider decreased ability to participate in the cultural practices of sharing and processing of subsistence resources. The DEIS notes that for Kaktovik Iñupiat residents "[s]haring the harvest is an important objective in subsistence lifestyles; 42 percent of households shared half or more of their harvests with others in the community."[1703]

[1700] DEIS vol. 1 at 3-171.
[1701] DEIS vol. 1 at 3-190.
[1702] DEIS vol. 1 at 3-192.
[1703] DEIS vol. 1 at 3-420.

Similarly, "Nuiqsut residents consider sharing to be central to their identity; the bowhead whale hunt, in particular, centers on sharing, as evidenced by the 97 percent of households who receive bowhead whale meat annually."[1704] Gwich'in culture utilizes sharing networks which are important to for resiliency and community — sharing not only with other Gwich'in, but Iñupiat communities as well.[1705] Even though the DEIS recognizes the existence and importance of sharing networks, there is no actual analysis that considers how these networks might be altered from oil and gas development on the Coastal Plain. BLM must provide a robust analysis of how oil and gas development will alter sharing networks.

f. The DEIS does not sufficiently consider the Gwich'in's cultural identity and their spiritual connection with the Porcupine Caribou Herd

The Gwich'in people are spiritually connected and inexorably tied to the Porcupine Caribou Herd, and thus the Coastal Plain as the calving and post-calving habitat of the Herd.[1706] The DEIS recognizes the Gwich'in and Porcupine Caribou Herd relationship,[1707] but does not interweave the serious and detrimental effects from development on the Coastal Plain to the Gwich'in people's spirituality into the sociocultural analysis. The Gwich'in's continued spiritual connection with the Porcupine Caribou Herd needs to be analyzed as a substantial impact in BLM's Disruptions to Subsistence Activities and Uses section and in its section 810 analysis. By

[1704] DEIS vol. 1 at 3-164.

[1705] DEIS vol. 1 at 3-167 ("Venetie sharing networks extending throughout the state, but with a focus on nearby interior communities, such as Arctic Village, Fort Yukon, Eagle, Chalkyitsik, Stevens Village, Beaver, and Birch Creek. Venetie residents also have sharing networks with multiple North Slope communities, including Utqiaġvik, Nuiqsut, and Anaktuvuk Pass. The study notes the importance of the close kinship ties between Venetie and Arctic Village as a source of resiliency, as caribou harvested in Arctic Village are often shared with Venetie, sometimes in exchange for resources, such as salmon, which are less available in Arctic Village. The importance of caribou in Venetie sharing networks is evidenced by the 22,445 pounds of caribou that flowed between households (nearly half of all subsistence food flows).").

[1706] *See* Gwich'in Steering Committee, Scoping Comments re: Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program (June 19, 2018).

[1707] DEIS vol. 1 at 3-156 ("Any potential impacts on the [Porcupine Caribou Herd] would constitute a cultural effect."); *id*. at 3-183 (internal citations omitted) ("Despite the various changes to social and political organization over time, much of the traditional Gwich'in people's social and political structure remains intact. Subsistence remains central to their identity. The people of Arctic Village and Venetie are primarily descendants of the Neets'aii band of the Gwich'in and, along with other Gwich'in, identify as the "caribou people" in reference to their main source of food and cultural and spiritual identity. They view their primary cultural tradition as living with the caribou, with an emphasis on the reciprocal nature of their relationship with this important resource."); *id*. at 3-187 ("The importance of reciprocity in human and animal relationships is evident . . . the strong belief in the sacredness of places like the Coastal Plain, due to its integral connection to caribou calving and migratory bird nesting grounds.").

not analyzing the significant impacts to Gwich'in spirituality, BLM does not acknowledge the full scope of negative social consequences for the Gwich'in people.

g. BLM's consideration of cumulative impacts to sociocultural systems is deficient

The DEIS cumulative analysis errs by not adequately considering past, present, and foreseeable future impacts on sociocultural systems. The section purporting to assess cumulative impacts on sociocultural systems acknowledges that in the cumulative instance, the potential for sociocultural impacts would increase yet contains no quantified or detailed information.[1708] BLM identifies the following issues that "would increase the potential for sociocultural impacts" in the cumulative case:

- changes in income and employment levels
- changes in available technologies
- disruptions to subsistence activities and uses
- and increased interactions with outsiders
- abundance of subsistence resources
- safety of subsistence hunters[1709]

Merely listing broad issues that may be "potentially" implicated or "could contribute to changes" does not constitute a hard look. The DEIS does not explain or analyze whether these potential impacts have had negative or positive effects or their expected duration. NEPA requires analysis with greater specificity in order to sufficiently analyze cumulative impacts.

Similarly, BLM finds that "[p]ast and present actions that have affected sociocultural systems among the Iñupiat and Gwich'in people include:

- oil and gas development
- onshore and offshore transportation and infrastructure projects
- scientific research
- increased recreation and tourism
- demographic changes
- changes in land status
- modernization"[1710]

The DEIS does not tie these actions to the cumulative effects analysis — there is no mention of a current project or explanation of how these broad categories impact future activities. The inclusion of this list in the cumulative impacts section implies they are part of the cumulative analysis, but they are not incorporated in any meaningful way. BLM not only needs to provide a baseline for each action listed above, but needs to meaningfully analyze how these actions play a role in the cumulative impacts to sociocultural systems. For example, BLM should clarify what scientific research is used, where increased recreation and tourism are taking place,

[1708] DEIS vol. 1 at 3-192.
[1709] DEIS vol. 1 at 3-192.
[1710] DEIS vol. 1 at 3-192.

how much of an increase in recreation and tourism will occur, what types of demographic changes are projected, exactly how land status would change, and what types and how much modernization would occur. In addition, BLM must clarify what onshore and offshore projects they are considering, and include the possibilities of Alpine, Greater Mooses Tooth One, Greater Mooses Tooth Two, Liberty, the proposed Willow project, and the revision of NPR-A Integrated Activity Plan/EIS. BLM must then actually analyze the cumulative impacts of these projects. Broadly suggesting that impacts exist does not constitute the detailed analysis required by NEPA.

BLM seems to characterize future development on the Coastal Plain as a cumulative impact rather than and direct and indirect impact of its proposed lease sales. BLM simply states "[t]he proposed oil and gas leasing program, *in addition to future activities*, could lead to additional oil and gas development and other development and infrastructure projects."[1711] Besides being illogical, this assumption leads to BLM focusing primarily on direct and indirect impacts to subsistence uses, rather than taking a hard look at the cumulative impacts of other reasonably foreseeable future actions. BLM also does not identify what future activities it is referring to. Other cumulative impact sections of the DEIS, such as the ANILCA 810 section, point to specific development such as a road and pipeline between Kaktovik and the Dalton Highway/Trans-Alaska Pipeline, oil and gas development in the Colville-Canning Area, and oil and gas activity in the vicinity of Alpine.[1712] The DEIS also does not discuss how future development beyond the Coastal Plain would cumulatively impact communities. For instance, it is highly likely that offshore oil and gas development will exacerbate impacts from any oil and gas activities on the Coastal Plain by negatively impacting subsistence whaling. Additionally, other cultural implications that are not specifically tied to subsistence activities must be considered as well. For example, the cumulative analysis impacts section must address the harm to Gwich'in identity form oil and gas development on the Coastal Plain. The effects of increased development in the region from a variety of resource development and infrastructure projects will by additive and synergistic impacts to subsistence use, the economy, and social cohesion. BLM's failure to adequately analyze cumulative impacts from reasonably foreseeable future projects renders its analysis deficient.

<u>The DEIS downplays the cumulative impacts to certain communities</u>

BLM uses Arctic Village and Venetie as examples of communities that will experience none of the economic benefit from oil and gas, but will see decreased subsistence harvest.[1713] BLM fails to clarify whether the decreases in subsistence harvest stem from reductions to the Porcupine Caribou Herd or other subsistence resources that are likely to be impacted by oil and gas on the Coastal Plain, such as waterfowl and migratory birds. If this reference does pertain to the Porcupine Caribou Herd, the analysis fails to account for all of the communities that will be harmed by impacts to the Porcupine Caribou Herd and a reduction in subsistence resources. BLM fails to account for not only reductions in individuals' ability to obtain caribou, but also

[1711] DEIS vol. 1 at 3-192 (emphasis added).
[1712] DEIS vol. 2 Appendix E at E-16.
[1713] DEIS vol. 1 at 3-192–3-193.

reductions and impacts to community sharing practices within and between communities. For the Gwich'in people, "sharing is central to maintaining social and kinship ties."[1714] All Gwich'in communities, Alaskan and Canadian, will experience these impacts and must be accounted for in this analysis. Further, it is improper for BLM to assume for purposes of its sociocultural impacts analysis that communities who have relied on subsistence practices for countless generations will simply "adapt to such changes, while maintaining cultural traditions and values, such as subsistence, humility, respect for elders, family and kinship, and avoidance of conflict." [1715] BLM cannot shirk its obligations to take a hard look at these impacts by irrationally assuming that entire sociocultural systems will adapt.

Climate Change

The DEIS is flawed by not mentioning climate change in the cumulative impacts analysis, or the entirety of the sociocultural systems analysis. Climate change impacts are currently altering the Arctic at a rapid pace and will continue to shape the future of subsistence hunting and other cultural practices in the Arctic. Through omission, the DEIS ignores the very real impacts which are already happening across the North Slope and Interior Alaska. As discussed elsewhere in these comments, the best available science demonstrates that climate change is already impacting important subsistence resources like caribou, fish, and marine mammals. In other sections of the DEIS, BLM relies on the decision document for the Greater Mooses Tooth Two development to bypass providing any meaningful analysis of the impacts of climate change instead of conducting an analysis specific to how subsistence use in this area could be impacted by climate change.[1716] The Greater Mooses Tooth Two analysis relates to a landscape hundreds of miles away with different resources and use patterns and does not contain an analysis of the potential impacts of climate change specific to the Coastal Plain and its resources. BLM cannot rely on that analysis to analyze the impacts to sociocultural systems from climate change. It is inappropriate to wholly omit climate change effects, as they will exacerbate the impacts to sociocultural systems from oil and gas activities and must be analyzed. The best available science for climate change must be considered in the cumulative impacts and throughout the sociocultural systems analysis.

Requirement to analyze all alternatives

BLM provides no meaningful analysis of all alternatives in the context of cumulative impacts. The alternatives analysis indicates that some impacts will be more severe than others, but the analysis is so vague it is unclear how BLM is actually analyzing impacts and does not account for the complexity of sociocultural issues.[1717] The analysis fails to mention Alternative C or D1, only stating that Alternative B and Alternative D2 respectively have the largest and smallest impacts. Merely noting that one option would likely have the most impact and another would have the least is not a meaningful analysis Further, without actual analysis, it is not clear that BLM's conclusion is correct or what it is based on. This renders BLM's cumulative impacts

[1714] DEIS vol. 1 at 3-183.
[1715] DEIS vol. 1 at 3-192–3-193.
[1716] DEIS vol. 2 Appendix E at E-19.
[1717] DEIS vol. 1 at 3-193.

analysis deficient. BLM must compare the alternatives in a robust way, where specific features of the alternatives are considered.

In sum, BLM fails to adequately discuss the impacts from the oil and gas leasing program on sociocultural systems, including restrictions and impacts to key resources such as caribou that are vital to subsistence. Oil and gas leasing on the Coastal Plain will forever alter subsistence practices for the Gwich'in. BLM's cumulative analysis of Sociocultural Systems impacts falls far short of adequately considering the impacts of other past, present, and reasonably foreseeable future actions in conjunction with oil and gas leasing on the Coastal Plain. BLM needs to revise its analysis of the direct, indirect, and cumulative impacts and reissue the EIS it to ensure that it fully accounts for these impacts.

P. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON ARCHEOLOGICAL AND CULTURAL RESOURCES IS INADEQUATE.

There is significant information missing for BLM to be able to accurate describe cultural and archeological resources and for the agency to be able to accurately analyze the impacts of an oil and gas program on these resources. BLM needs to do extensive studies in order to make informed decisions protecting cultural resources and comply with National Historic Preservation Act (NHPA) Section 106.[1718] NHPA Section 106 requires the BLM to [i]dentify historic properties and assess the effects of the undertaking on such properties.[1719] Completing an accurate review and analysis of cultural and archeological resources will required a revised EIS.

There has been only one attempt to systematically survey the Coastal Plain and ascertain cultural resources, and that study was conducted in 1982.[1720] Otherwise, research on cultural resources is minimal, and concentrated around the village of Kaktovik.[1721] As BLM recognizes, this is limited, and does not encompass large areas of the Coastal Plain: "vast inland areas of the program area have received little to no systematic investigation for cultural resources."[1722] The coastal region presents a unique challenge, where the area has been "subject of a greater number of survey efforts, [but] dynamic coastal erosion processes are affecting those resources."[1723] Additionally, research on heritage sites is scant, as the Alaska Heritage Resources Survey includes only "10 literature reviews, 12 reconnaissance surveys, and one intensive survey."[1724] The EIS acknowledges only 89 Alaska Heritage Resource Sites, three RS 2477 trails (#1649, #1043, and #914), and two NOAA shipwrecks, one located off Barter Island and the other in Camden Bay.[1725] Of the 89 identified sites, only one third are prehistoric or historic sites

[1718] 36 C.F.R. § 800.8.
[1719] 36 C.F.R. § 800.8(c)(1)(ii).
[1720] DEIS vol. 1 at 3-152.
[1721] DEIS vol. 1 at 3-152.
[1722] DEIS vol. 1 at 3-152.
[1723] DEIS vol. 1 at 3-153.
[1724] DEIS vol. 1 at 3-152.
[1725] DEIS vol. 1 at 3-157.

(including sod houses lithic scatters, tent rings and artifact scatters).[1726] The rest of the sites are historic, including military sites and historic Iñupiaq structures.[1727] All identified archaeological resources must be protected consistent with Archaeological Resources Protection Act (ARPA) to ensure there is no "[u]nauthorized excavation, removal, damage, alteration, or defacement of archaeological resources."[1728] The DEIS currently makes no reference to the ARPA and how BLM will comply with its mandates — this is an unacceptable omission and must be remedied.

BLM cannot engage in cultural resource protection without surveys and a baseline understanding of the resources. The EIS is deficient as it presents and incomplete picture of the Coastal Plain's prehistoric and historic sites, and cannot sufficiently protect the unknown. Information currently available is outdated, insufficient, and incomplete. A full, comprehensive study of the Coastal Plain's cultural resources, including specific consideration archeological resources and historic resources is required, not only to make informed decisions, but it is required by NHPA.[1729]

BLM must document the broader cultural ties to the coastal plain for the Iñupiat and Gwich'in. Ethnographic resources also require protections, including ethnographic landscapes, traditional cultural properties, Native American sacred sites, and intangible cultural resources (e.g. oral traditions, indigenous knowledge, and traditional skills).[1730] Currently BLM recognizes:

> Both the Iñupiat and the Gwich'in people have cultural and ethnographic ties to the program area, as evidenced by cultural sites, traditional and contemporary uses, oral histories, and current beliefs and values. When these are viewed as a whole, these ties to land and place are often documented and identified in the cultural resource regulatory framework as TCPs or cultural landscapes. These types of cultural resources have not been documented to date in the program area under the existing regulatory frameworks.[1731]

Additionally the EIS states that [a]ny potential impacts on [*Iizhik Gwats'an Gwandaii Goodlit*, "The Sacred Place Where Life Begins"] would constitute a cultural effect" on the Gwich'in people.[1732] Deference should be given to traditional knowledge, which "is built on millennia of residence in the region."[1733] The lack of research must be remedied before BLM undergoes any disruption or oil and gas activities that could potentially harm the Coastal Plain, a significant ethnographic cultural resource. BLM identifies that the Gwich'in people in Arctic

[1726] DEIS vol. 1 at 3-153; DEIS vol. 2, Appendix L at L1–L2.
[1727] DEIS vol. 1 at 3-153; DEIS vol. 2, Appendix L at L1–L2.
[1728] 16 U.S.C. § 470ee(a).
[1729] 36 C.F.R. § 800.8.
[1730] DEIS vol. 1 at 3-154.
[1731] DEIS vol. 1 at 3-156–3-157.
[1732] DEIS vol. 1 at 3-156.
[1733] DEIS vol. 1 at 3-156.

Village and Venetie requested consultation, specifically on ethnographic knowledge.[1734] The NHPA requires BLM to meaningfully comply, not only with regard to the communities of Arctic Village and Venetie's requests, but it must pursue consultation for all Gwich'in communities along the historic migration path of the Porcupine Caribou Herd and for Iñupiat communities as well.[1735]

The BLM's Current Lease Stipulations are insufficient to protect for cultural resources. The DEIS states that there is "[n]o potential for adverse effects" as BLM is able to protect cultural resources with "[l]ease stipulations already proposed include[ing] conducting cultural surveys prior to ground-disturbing activities, a plan for unanticipated discovery stoppage, and cultural awareness training and orientation."[1736] All Lease Stipulations that purport to protect cultural resources, namely, Lease Stipulation 2, 3, and 4, contain carve outs for development in sensitive areas on a case-by-case basis.[1737] These limits the ability of these measures to achieve the goal of protecting cultural resources. These provisions are also insufficient to protect unsurveyed cultural resources and meaningfully determine the effects of the alternatives because it is currently unknown what is in each program area.

Significant amounts of additional research must be done to identify resources, evaluate alternatives, and develop adequate protections for cultural resources. Currently, in its rush to hurry forward this EIS, BLM has not completed "surveys and research to identify and document potential sacred sites, TCPs, ethnographic landscapes, or intangible resources have not been completed to date in the program area."[1738] Any archeological resources discovered through the required studies are also protected by the ARPA as an "irreplaceable part of the Nation's heritage."[1739] BLM must perform obtain the necessary information and conduct the required surveys to accurately analyze the impacts of an oil and gas program on cultural resources. By not completing these surveys, BLM fails to comply with NEPA and Section 106 NHPA, and cannot adequately consider the impacts of the proposed alternatives it has set forth in the EIS.[1740]

Q. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM FAILS TO ADEQUATELY CONSIDER THE IMPACTS ON ENVIRONMENTAL JUSTICE COMMUNITIES.

BLM's environmental justice analysis fails to sufficiently evaluate whether the leasing program will have "disproportionately high and adverse human health or environmental effects … on minority populations and low-income populations."[1741] BLM's analysis is deeply flawed and fails to account for the full scope of potential impacts to minority and low-income

[1734] DEIS vol. 1 at 3-155.
[1735] 36 C.F.R. § 800.8(c)(3).
[1736] DEIS vol. 1 at 3-157.
[1737] DEIS vol. 1 at 2-5–2-7.
[1738] DEIS vol. 1 at 3-155.
[1739] 16 U.S.C. § 470aa *et seq*.
[1740] 36 C.F.R. § 800.8(c)(1)(ii).
[1741] EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

populations from all phases of oil and gas activities and fails to consider impacts to all potentially affected populations.

Executive Order No. 12898, issued in 1994, requires that all federal agencies "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." BLM has failed to do so.

Communities associated with the Arctic Refuge are rural, contain many low-income households, and retain subsistence lifestyles in a mixed, subsistence cash-income economy with high levels of unemployment.[1742] Continued traditional and cultural uses of their lands and waters contribute to the physical and spiritual well-being of people and communities helping to maintain their close relationship to the land and sustain their "sense of place."[1743] Oil and gas development activities would result in the gradual loss, decline, or change in subsistence resources upon which local low-income and minority residents depend.[1744] This would place a disproportionate weight of any adverse effects on low-income and/or minority populations.

The Gwich'in people live in fourteen small villages across a vast area extending from northeast Alaska to the northern Yukon and Northwest Territories in Canada. Though the Inupiat community of Kaktovik is the only community located on the Coastal Plain, other villages such as Arctic Village, Fort Yukon, Venetie, Chalkyitsik, Beaver, and Canadian villages such as Old Crow and Fort McPherson, are located within the range for the Porcupine Caribou Herd and will be impacted by any oil and gas activities on the Coastal Plain.[1745] The draft EIS recognizes that many other communities, such Wiseman, Birch Creek, and Stevens Village, have reported geographic, historic/prehistoric, or cultural ties to the Arctic Refuge as a whole.[1746] BLM further acknowledges that subsistence harvesting and sharing patterns for "22 Alaskan communities and seven Canadian user groups are relevant if post-lease oil and gas activities changes caribou resource availability or abundance for those users."[1747] All of these communities — in Alaska and Canada — meet the criteria as for being minority or low-income populations, as these are primarily communities of indigenous people with a subsistence-cash economy. As such, all of these communities should have been properly considered in BLM's environmental justice analysis.

BLM recognizes that "environmental justice impacts related to potential adverse impacts on subsistence resources extend well beyond the immediate program area, and they encompass the social and cultural value of subsistence resources (and their uses), as described in ANILCA,

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[1742] CCP EIS vol. 1 at 5-121.

[1743] *Id.*

[1744] *See supra* Part V.N, O.

[1745] Gwich'in Steering Committee, Primary Habitat of the Porcupine Caribou Herd Map, *available at*: http://ourarcticrefuge.org/wp-content/uploads/2012/10/mappch.pdf.

[1746] DEIS vol. 1 at 3-160.

[1747] DEIS vol. 1 at 3-193.

as well as the value of direct reliance on these resources for physical sustenance."[1748] Despite this, BLM arbitrarily limits its environmental justice analysis to four communities: Kaktovik, Nuiqsut, Arctic Village, and Venetie.[1749] BLM did not adequately assess whether oil and gas leasing on the Coastal Plain would significantly impact minority populations and low-income populations, as required by relevant executive orders and BLM's own guidance.

Regarding BLM's analysis of the environmental consequences, BLM arbitrarily and improperly limits the scope of its environmental justice analysis in the same way it improperly limited the scope of its NEPA and ANILCA 810 analysis. BLM only looks at post-lease activities that include seismic and drilling exploration, development, and transportation.[1750] BLM should not limit its analysis of the impacts to only post-leasing activities and needs to include the full range of direct, indirect, and cumulative impacts to minority and low-income populations that could occur from the program. This includes from any proposals to conduct pre-leasing seismic exploration on the Coastal Plain. As discussed elsewhere, BLM is currently in the process of reviewing an extensive seismic proposal from SAExploration that could cause lasting damage to tundra, vegetation, soils, permafrost, and other resources. That damage can in turn significantly harm wildlife through the degradation of their habitat. BLM also improperly excluded other forms of infrastructure and activities from what it considered as part of its 2,000 acres of impacts. This includes pipelines, which could cross large areas of the Coastal Plain and have the potential to divert caribou away from key areas. BLM also failed to account for other activities like gravel mining, which have severe sound and air quality impacts that could deter fish and wildlife from important habitat areas and directly impact nearby communities. BLM's deficient analysis of the full range of resource impacts from the broad scope of activities likely to occur on the Coastal Plain and to nearby areas means BLM has dramatically underestimated the potential impacts from the oil and gas program and related activities. BLM needs to revise and reissue its EIS to ensure it actually takes into consideration the full range of potential impacts to minority and low-income populations for purposes of its environmental justice analysis.

BLM further downplays the potential environmental justice impacts from oil and gas leasing by relying on its own flawed analysis throughout the EIS to justify its findings. BLM correctly notes that CEQ guidance directs the agency to consider any multiple or cumulative effects on human health and the environment, even if certain effects are not in the control or subject to the discretion of the agency. [1751] BLM further notes that impacts to economy, subsistence, sociocultural, and public health and safety are largely, if not exclusively, also of importance to environmental justice.[1752] BLM then briefly summarizes its conclusions from these sections of its DEIS. As described in detail above, BLM failed to adequately analyze impacts to

[1748] DEIS vol. 1 at 3-195.

[1749] DEIS vol. 2 Appendix E at E-3.

[1750] DEIS vol. 2 Appendix E at E-2.

[1751] CEQ, Environmental Justice Guidance Under the National Environmental Policy Act, 1997.

[1752] DEIS vol. 1 at 3-196.

subsistence,[1753] sociocultural systems,[1754] the economy,[1755] and public health.[1756] These flawed analyses result in BLM's inadequate discussion of environmental justice impacts.

Critically, we note that BLM should have also considered impacts to cultural resources, visual resources, acoustics and soundscapes, air quality, fish, and caribou in terms of importance to environmental justice. These additional resources and issues have the potential to significantly impact minority and low-income populations dependent upon the Arctic Refuge. Thus, BLM failed to consider many of the factors that determine environmental justice impacts.

In the cumulative effects portion of its environmental justice discussion, BLM recognizes that on the North Slope "decades of oil exploration and development conducted by the federal government and industry…[have] directly affected habitat use and behavior of subsistence species and resulted in additive impacts on subsistence resources, harvest patterns, and users. These effects have altered livelihoods and ways of life and account for some of the social disruptions seen in villages today."[1757] BLM does not, however, fully analyze how such similar direct and indirect impacts may affect communities on the Coastal Plain or that rely on Coastal Plain resources, which has been historically protected from oil and gas development. BLM fails to take a hard look at the ways in which specific minority and low-income communities would be similarly impacted by oil and gas leasing development in the Arctic Refuge, merely relying on conclusory statements which cite to other findings in its EIS.

We note that, where BLM does correctly find a potential negative effect, the agency still falls far short of providing a meaningful analysis under NEPA and of meeting its environmental justice obligations. BLM acknowledges "[c]ommunities that are most likely to experience negative sociocultural impacts would be those that experience impacts on subsistence, while not having increased income or employment opportunities, such as Arctic Village and Venetie; therefore, the action alternatives would constitute a disproportionate, adverse impact on the environmental justice communities of Arctic Village and Venetie."[1758] It is unclear whether this statement is tied only to cumulative impacts or to the direct and indirect impacts of oil and gas leasing and development on the Coastal Plain. BLM should clarify this. BLM must also explain why this finding does not include all communities whose subsistence way of life is closely tied to the resources of the Coastal Plain, and why no similar finding was made cumulatively for Nuiqsut, where environmental justice impacts are already occurring.[1759] Additionally, BLM must explain how this conclusion is consistent with its ANILCA 810 findings, which do not find a

[1753] *See supra*.
[1754] *See supra*.
[1755] *See supra.*
[1756] *See supra.*
[1757] DEIS vol. 1 at 3-201.
[1758] *Id*.
[1759] GMT1 SEIS, *supra*, Vol. 1 at 472.

significant restriction on subsistence uses for Arctic Village or Venetie.[1760] (As we explain below, the agency's section 810 finding is flawed).

Despite this finding, BLM discusses no mitigation measures whatsoever to address such a disproportionate, adverse impacts. This is contrary to CEQ guidance, which states that "agencies should elicit the views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian tribe and should carefully consider community views in developing and implementing mitigation strategies." The environmental justice analysis contains absolutely no discussion of how BLM intends to mitigate this finding, contrary to CEQ guidance. The only stipulations and ROPs mentioned are those relevant to other resource categories such as subsistence and public health. BLM wholly failed to consider specific mitigation measures to address disproportionate, adverse impacts to environmental justice communities.

Finally, BLM has failed to meaningfully engage communities in this EIS process, worsening the environmental justice implications of its proposed leasing program. Despite recognizing that "Federal agencies also are required to give affected communities opportunities to provide input into the environmental review process, including the identification of mitigation measures,"[1761] BLM has repeatedly failed to engage affected communities.[1762] BLM's timeframes for review of the draft EIS are insufficient to allow for meaningful public involvement. Ensuring that the public has sufficient time to receive and review all of the documents and understand their relationship to what is being proposed is essential to the public's ability to analyze and provide meaningful comments to the agency on the project. BLM has stated that it intends to hold a lease sale this year and is rushing toward that goal at the expense of the public participation and environmental justice. Rushing the analysis and public review is not consistent with BLM's obligations when considering an issue which will gravely impact minority and low-income populations. In addition to its hasty timeframes, BLM has not coordinated with all affected communities in Alaska to hold public meetings or government-to-government consultation. Further, there is no indication that BLM contacted any communities in Canada for purposes of consultation or public meetings.

Overall, BLM's environmental justice analysis is deeply flawed and contrary to the evidence. BLM needs to substantially revise its entire EIS to fully account for the broad range of direct, indirect, and cumulative impacts to all potentially affected minority and low-income communities, which warrants a finding for significant impacts to environmental justice for all of these communities.

[1760] *See* DEIS vol. 2 Appendix E at E-10, E-19 (finding that the action alternatives will not result in a significant restriction to subsistence uses, and finding that the cumulative case may significantly restrict subsistence uses and needs *solely* for the community of Kaktovik).

[1761] DEIS vol. 1 at 3-196.

[1762] *See supra* Part III.B.9 (explaining that BLM and DOI's process is insufficient to meet legal requirements for public participation and consultation).

R. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON RECREATIONAL USES OF THE COASTAL PLAIN IS INADEQUATE.

Preservation of wilderness and recreation values are among the original purposes of the Arctic Refuge.[1763] As the DEIS recognizes, the Coastal Plain "offers recreationists primitive recreation experiences, such as expedition-length float hunts and polar bear viewing, that are unique on a global scale and that depend largely on the physical setting."[1764] These world-class recreational opportunities are dependent on maintaining the area's primitive recreation settings. A 2009 report based on surveys of Arctic Refuge visitors found that the primary reason people visit the Refuge are to experience its wilderness character, see wildlife, and experience solitude.[1765] As the CCP recognizes:

> Arctic Refuge provides a superlative setting for a variety of compatible recreational activities, and, consistent with maintaining the wilderness resource values upon which their special character depends, the Service will continue to provide opportunities for visitor access.[1766]

Thus, the CCP requires minimal management to "emphasize natural, unaltered landscapes and natural processes."[1767] The DEIS fails to include a thorough analysis of the reasonably foreseeable direct, indirect, and cumulative impacts of all phases of an oil and gas program on recreational uses.

First, the description of the affected environment is incomplete and inaccurate. Our scoping comments requested that BLM compile accurate and up-to-date visitor use and recreation data, along with associated economic benefits. While the DEIS includes some basic information on visitor use and recreation data, it fails to include information about the direct and indirect economic benefits associated with wilderness-dependent recreation.[1768] The affected environment section also includes errors, such as describing most recreation in the program area being in the Kongakut, Canning, and Hulahula River corridors.[1769] In fact, the Kongakut River does not cross the Coastal Plain at all and instead flows entirely through the Mollie Beattie Wilderness from its origin in the Brooks Range to the Beaufort Sea.

[1763] PLO 2214 at 1.

[1764] DEIS vol. 1 at 3-205.

[1765] Neal Christensen & Lynette Christensen, Arctic National Wildlife Refuge Visitor Study, p. 16 (2009), available at https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_1/Arctic/PDF/visitorstudy.pdf.

[1766] CCP EIS at 2-16.

[1767] CCP ROD at 4 (explaining that minimal management and wilderness recommendation of the Coastal Plain "strives for a more permanent commitment to perpetuating the Refuge's natural conditions and processes and wilderness-associated recreational opportunities").

[1768] *See also infra* Part V.Y.

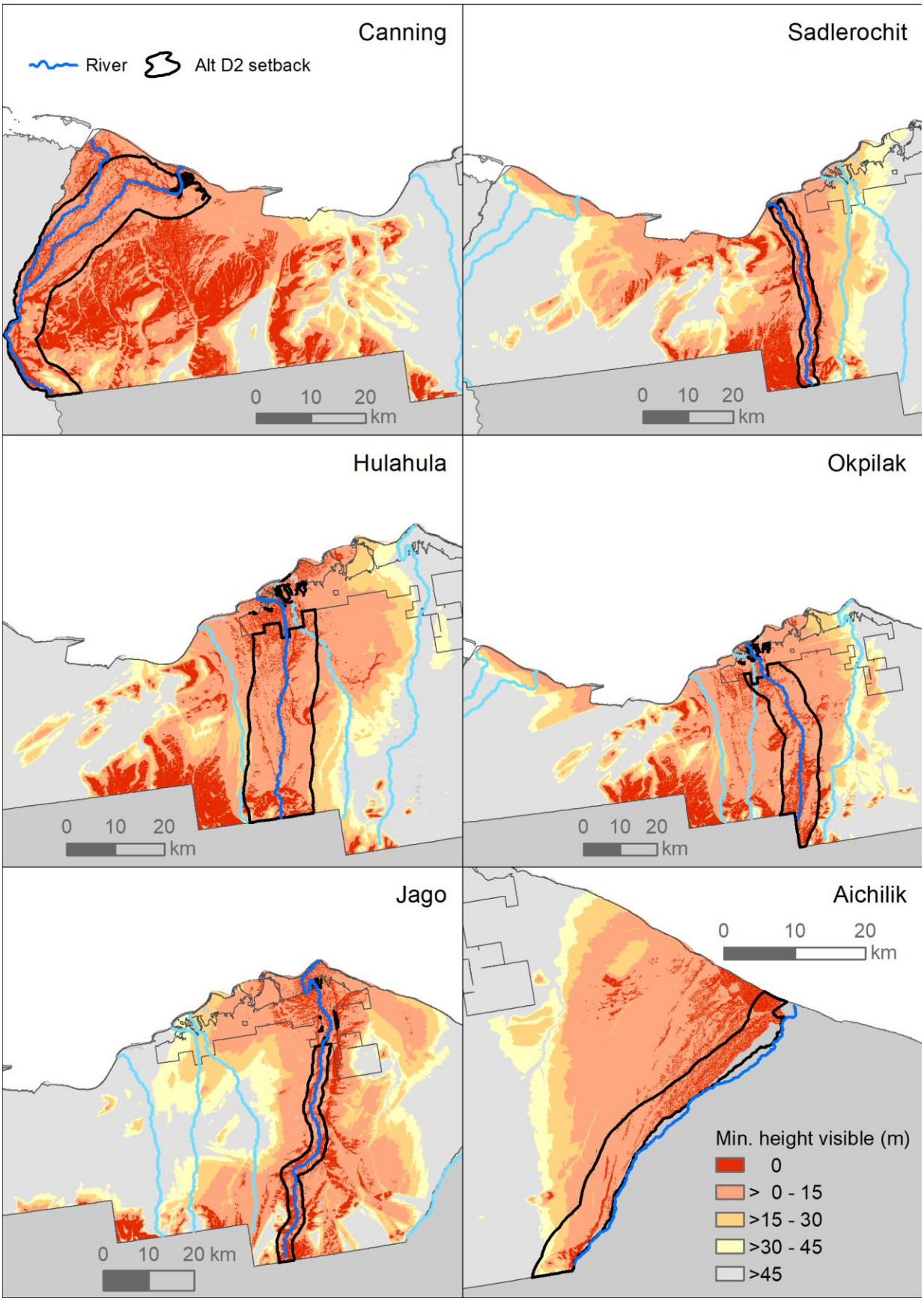
[1769] DEIS at 3-203.

Second, the DEIS impacts analysis fails to include sufficient information about the scope and extent of recreational impacts and incorrectly suggests that protective measures will minimize impacts. The impacts analysis does properly recognize that adverse impacts will be unavoidable:

> Because visitors to the program area generally expect a physical setting consisting of little to no human disturbance and a social setting with little to no interaction with other visitors or human activity, small changes to the physical and social setting can have disproportionately large impacts on user experience. . . .
>
> Even with the protective measures to minimize potential visual impacts, surface disturbance and infrastructure development would modify the existing character of the landscape, diminish visual quality, and directly affect the quality of the recreation setting and associated experiences.[1770]

As described below, BLM cannot, however, analyze the scope and extent of the impacts to recreational settings and opportunities absent a more robust analysis on visual impacts, including the type of visibility analysis described in that section and included in Appendix D (Stuart Smith, Ph.D, Comments on Draft EIS for Coastal Plain Oil and Gas Leasing Program (Jan. 11, 2019). Such an analysis demonstrates, for instance, that even the larger NSO buffers around certain rivers under Alternatives C and D are completely ineffective at preventing or significantly mitigating visual impacts:

[1770] DEIS at 3-204–3-205.


Canning
River
Alt D2 setback
0 10 20 km
Sadlerochit
0 10 20 km
Hulahula
0 10 20 km
Okpilak
0 10 20 km
Jago
0 10 20 km
Aichilik
0 10 20 km
Min. height visible (m)
0
> 0 - 15
>15 - 30
>30 - 45
>45

Map Explanation: Visibility surfaces for six major rivers along the Coastal Plain of the Arctic National Wildlife Refuge and corresponding no surface occupancy setback buffers under Alternative D2 (Alt D2). Visibility surfaces were obtained from Stuart Smith at True North GIS and indicate how tall a structure could be in a given location before becoming visible to a person traveling along the indicated river. The setback buffers from Alternative D2 were used as these present the largest setbacks in the DEIS. The resulting maps show that even these largest buffers are inadequate to mitigate visual impacts to recreationalists as even small structures (≤ 15 m) beyond these setbacks would be visible to people floating the indicated rivers.

Accordingly, conclusions like that on page 3-207 of the DEIS that, under Alternative C, "[f]our-mile NSO setbacks from rivers, such as the Canning and Hulahula Rivers, would maintain recreational opportunities and avoid the displacement of visitors in those popular recreation corridors" are unsupported. Moreover, that statement in the recreational impacts analysis is inconsistent with the articulation of Stipulation 1 in Chapter 2, Table 2-2, which lists the setback as two, not four, miles from either the edge of the active floodplain (for the Canning and Hulahula) or the bank's ordinary high-water mark (for the Okpilak) under Alternative C. Even setting aside the inconsistencies between the impacts analysis and Table 2-2, BLM may not rely on the most protective setback (4 miles) for a single river (the Hulahula) under one alternative (Alternative D) to claim there will be no or minimal impacts to recreation. As the map above depicts, even that setback is inadequate.

Other components of the analysis of visual impacts as they pertain to recreation are also incomplete. For instance, the DEIS acknowledges the importance of night sky conditions to recreation settings and user experiences and the adverse impacts associated with artificial light, but then attempts to discount those impacts by stating that they will primarily occur during winter and spring and so will affect fewer visitors and that unspecified protective measures may reduce light pollution.[1771] As with other visual impacts, the DEIS includes no information about the reasonably foreseeable scope or extent of light pollution.

Beyond aesthetic impacts to recreational uses, the DEIS recognizes that noise impacts, physical displacement and prevention of access, and impacts on physical resources and biological conditions will also affect recreational settings and opportunities.[1772] But the analysis of those reasonably foreseeable significant impacts is so generalized and cursory as to be meaningless. Nor does the impacts analysis address the economic impacts associated with the permanent degradation of the area's primitive recreation setting. In a few places, the DEIS acknowledges that the ability of operators to provide clients with desired recreation experiences would affect commercial operators.[1773] But it fails to even address — much less quantify — the

[1771] DEIS vol. 1 at 3-205 (concluding that "measures that prevent the placement of aboveground infrastructure or that specify the use of downcast lighting or other trespass mitigation measures would minimize impacts on the quality of nighttime recreation" without specifying the measures and if and how they would apply).

[1772] DEIS vol. 1 at 3-206.

[1773] DEIS vol. 1 at 3-206.

associated economic impacts.[1774] Nor does the DEIS include any information about how it will monitor and respond to changes in recreation and visitor experiences to ensure that Refuge purposes are met, as we requested in our scoping comments.

Finally, BLM's cumulative impacts analysis includes confusing and unsupported statements. For instance, it claims that "[u]nder all alternatives, there would be an increased demand for recreation use in the program area."[1775] It is unclear what support, if any, BLM has for this statement, especially where significant degradation of recreational settings can be expected under the action alternatives, which in turn would be expected to lead to decreases in wilderness recreation use and associated economic benefits. The cumulative impacts analysis also states that "[v]isitors displaced from certain areas because of oil and gas activity could choose alternate locations in the program area to recreate."[1776] This statement is also unsupported and contrary to the record, which demonstrates that the visual impacts of oil and gas development will likely extend across most of the Coastal Plain, regardless of where infrastructure is located.[1777] Moreover, the narrow geography of the Coastal Plain and established locations of the river corridors on which most recreation depends means that visitors cannot simply relocate. To the extent that BLM is assuming visitors would tend to not visit or recreate on the Coastal Plain as a result of oil and gas development, but would instead concentrate in other areas, the agency must analyze the impacts that could occur. The concentration of visitors in an area can be highly impactful both to the ecosystem and to the users. The Kongakut River is already experiencing some of these visitor pressures and it has posed management challenges for FWS.[1778]

BLM must prepare a more robust analysis of recreational impacts to comply with NEPA and demonstrate how the oil and gas program it is proposing would be consistent with the Refuge purpose of protecting the area's wilderness-dependent recreational values. This will necessarily require the development and analysis of alternatives designed to better protect the Coastal Plain's world-class recreational values — which are dependent on the area's natural, untouched landscape. Such alternatives might include, for instance: concentrating and strictly limiting leasing and development to certain lower-impact areas identified through a visibility analysis and careful examination of recreational use data; or including non-waivable stipulations for extensive NSO setbacks around river corridors, height restrictions on infrastructure, mandatory photo simulations of proposed facilities to inform future visual resource assessments, timing limitations during popular recreational months, mandatory development of monitoring and conflict avoidance plans in coordination with recreational groups, guides, and pilots, and other measures designed mitigate aesthetic and other impacts to recreation settings and opportunities. While such alternatives are a necessary component of an adequate NEPA analysis,

[1774] As discussed in below, in Part V.Y, this is in stark contrast to the DEIS's attempts to quantify economic *benefits* associated with development. NEPA does not permit such disparate treatment of the costs and benefits of a proposed action.

[1775] DEIS vol. 1 at 3-208.

[1776] DEIS vol. 1 at 3-209.

[1777] *See* Appendix D (Smith viewshed analysis).

[1778] CCP EIS Executive Summary at S-28, vol. 1 at 3-5.

we do not believe they would be adequate to protect the Coastal Plain's recreational values, with which oil and gas development is strictly incompatible.

S. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON ARCTIC REFUGE WILDERNESS RESOURCES AND DESIGNATED WILDERNESS IS INADEQUATE.

The Arctic Refuge is distinctive among refuges — it was established specifically to preserve wilderness values. The Coastal Plain has exceptional wilderness values.[1779] The Coastal Plain is a key part of the broader ecosystem and is adjacent and connected to existing Wilderness by means of watersheds, rivers, and migration corridors. The Coastal Plain also provides key habitat for migratory birds and the Porcupine and Central Arctic Caribou Herds, and is the most important land denning habitat in the U.S. Arctic for the threatened polar bear — all species which benefit from the undeveloped and undisturbed wilderness character of the area. The Coastal Plain also supports world-class primitive recreational opportunities, which are inextricably intertwined with and dependent on its wilderness character. Wilderness is defined as untrammeled, undeveloped, natural, having outstanding opportunities for solitude or a primitive and unconfined recreation, over 5,000 acres or sufficient in size to preserve wilderness characters, and containing ecological, geological, or other features of scientific, educational, scenic, or historical value.[1780] In the CCP, FWS explained that wilderness is marked by four main qualities: undeveloped, untrammeled, natural, and providing opportunities for solitude or primitive and unconfined recreation.[1781] The Coastal Plain possesses each of these characteristics in spades. It is our nation's premier wilderness Refuge.

The Coastal Plain contains outstanding wilderness, wildlife, and recreational values and fits the definition of Wilderness as defined in the Wilderness Act: "an area of undeveloped federal land retaining its primeval character and influence. . . , which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable."[1782]

FWS stated that Wilderness designation for the Coastal Plain:

> [B]est meets the Service's purpose and need to manage the Arctic Refuge to achieve the mission of the National Wildlife Refuge System and to meet the purposes for which the Refuge was established. This alternative conserves the fish, wildlife and habitats of the Arctic Refuge and facilitates subsistence and recreation in settings that emphasize natural, unaltered landscapes and natural processes.[1783]

The agency also stated that:

[1779] *See supra* Part II.A.
[1780] 16 U.S.C. § 1131(c).
[1781] CCP EIS vol. 1 at 4-14–4-15.
[1782] 16 U.C.S. § 1131(c).
[1783] CCP ROD at 3–4, *see also id.* at 12.

> [The] Arctic Refuge is nationally recognized for its unique and wide range of arctic and subarctic ecosystems that retain a high degree of biological integrity and natural diversity. The Refuge exemplifies the idea of wilderness embodying tangible and intangible values including natural conditions, natural quiet, wild character, and exceptional opportunities for solitude, adventure, and immersion in the natural world. The Refuge represents deep-rooted American cultural values about frontiers, open spaces, and wilderness. It is one of the finest representations of the wilderness that helped shape our national character and identity.[1784]

To guide its management of the Arctic Refuge, the FWS adopted a goal of "preserv[ing] its wilderness values and characteristics, [and] maintain[ing] its natural state in unaltered condition."[1785] FWS than adopted various objectives to achieve this goal for both the designated Wilderness and wilderness characteristics more broadly.[1786] These goals and objectives are relevant to the BLM's oil and gas program and should be considered.

In selecting Alternative E in the CCP ROD, FWS stated that "[s]election of this Alternative recognizes that [the] Arctic Refuge exemplifies the characteristics of wilderness. Embodying tangible and intangible values, the Refuge's wilderness characteristics include natural conditions, natural quiet, wild character, and exception opportunities for solitude, adventure, and immersion."[1787] In advancing the Wilderness recommendation to Congress, the President stated that the Arctic Refuge "is one of the most beautiful, undisturbed places in the world. It is a national treasure and should be permanently protected through legislation for future generations."[1788]

1. BLM Fails to Accurately Describe the Exceptional Wilderness Characteristics of the Coastal Plain.

Despite the wealth of information on the wilderness characteristics of the Coastal Plain, BLM fails to fully acknowledge or describe them. As recognized by the FWS, the Coastal Plain has exceptional wilderness characteristics and values.[1789] To begin, BLM fails to account for the wilderness purpose of the Coastal Plain when the agency is identifying the area's purposes in the EIS.[1790] As explained above, the three purposes from PLO 2214 apply equally to the Coastal Plain, and PLO 2214 specifically includes preserving the wilderness values as a purpose. BLM must acknowledge this purpose, and also acknowledge that it is a priority purpose for the Coastal Plain. Without doing so, the agency cannot accurately describe the impacts and magnitude of

[1784] CCP ROD at 11–12.
[1785] CCP EIS vol. at 1 at 2-6.
[1786] CCP EIS vol. 1 at 2-6–2-9.
[1787] CCP ROD at 4.
[1788] Ltr. From the President to the Speaker of the House of Representatives and the President of the Senate (Apr. 3, 2015).
[1789] CCP EIS, Appendix H at H-12.
[1790] DEIS vol. 1 at 3-209.

impacts of an oil and gas program on the wilderness characteristics of the Arctic Refuge and Coastal Plain.

Additionally, the draft EIS wholly fails to discuss the wilderness characteristics of the Coastal Plain and Arctic Refuge.[1791] The draft EIS states only that the four primary qualities of wilderness are found throughout the Coastal Plain except in certain tracts near Kaktovik.[1792] It is unclear what BLM means by "tracts" because no specific lease tracts have been identified. Additionally, BLM has not provided a map of areas with or without wilderness characteristics to support this assertion. The lack of discussion of the wilderness characteristics of the Coastal Plain in the draft EIS biases BLM's analysis and means that the reader (i.e., the public) will not be informed of the exceptional wilderness values of the Coastal Plain. BLM must fully and accurately describe the wilderness characteristics in the EIS itself. While it is true that the draft EIS cites to the CCP for its description of wilderness characteristics, there is no summary or discussion of that document, and no independent description of the wilderness characteristics of the Coastal Plain and Arctic Refuge. This must be revised.

Relatedly, BLM appears to cite only to the Wilderness Review Appendix in the CCP, but fails to identify the extensive discussions in other parts of the CCP regarding the exceptional wilderness characteristics of the Coastal Plain. For example, the CCP identified the Refuge's wilderness characteristics as among its "most prominent" special values and described them in-depth:

> Arctic Refuge exemplifies the idea of wilderness—to leave some remnants of this nation's natural heritage intact, wild, and free of the human intent to control, alter, or manipulate the natural order. Embodying tangible and intangible values, the Refuge's wilderness characteristics include natural conditions, natural quiet, wild character, and exceptional opportunities for solitude, adventure, and emersion in the natural world.[1793]

In the CCP ROD adopting Alternative E for the Arctic Refuge, FWS stated that the Arctic Refuge is "one of the finest representations of the wilderness that helped shape our national character and identity."[1794] BLM must acknowledge and include all relevant discussion on wilderness characteristics from CCP documents. The BLM also does not appear to cite to the prior studies that were done on the wilderness values of the Coastal Plain, including the 1002 baseline studies in the early 1980. This information must be included, as it provides support for the enduring wilderness values of the Coastal Plain.

[1791] DEIS vol. 1 at 3-211. BLM also only cites to the appendix of the CCP, not the discussion in volume 1 or the findings in the CCP ROD.

[1792] DEIS vol. 1 at 3-212.

[1793] CCP EIS vol. 1 at 1-23.

[1794] CCP ROD at 12.

Additionally, the area of the Arctic Refuge to the immediate east and south of the Coastal Plain is designated Wilderness: the Mollie Beattie Wilderness Area.[1795] The Mollie Beattie Wilderness is "the largest, wildest, and most diverse Wilderness in the National Wildlife Refuge System."[1796] It supports a number of uses, such as recreation, subsistence hunting and fishing, and scientific research.[1797] BLM fails to describe this area and its values. With respect to the Mollie Beattie Wilderness Area, BLM must ensure that no activities will harm its wilderness characteristics or otherwise run afoul of its management as Wilderness.

2. BLM Fails to Analyze the Impacts of Oil and Gas on the Wilderness Characteristics of the Coastal Plain and the Mollie Beattie Wilderness.

Despite the widespread and exceptional wilderness values of the Coastal Plain, BLM devotes a scant page in the draft EIS to its analysis of the impacts.[1798] BLM claims that "[i]n general, discussions of potential impacts on wilderness characteristics, qualities, and values tend to be more qualitative in nature, measured by the overall visual quality, naturalness, and wildness of an area that may be affected by changes to the types and levels of recreation, management actions, and surrounding land use."[1799] No support is given for this statement and it ignores the rich history of quantifying and depicting wildland characteristics. Wilderness is, in many ways, abstract, but this has not stopped people from finding ways to conceptualize and describe its values.[1800] As early as 2000 researchers were developing ways to quantify the components of wildness and to represent them spatially through GIS.[1801] Others have found similar ways since that time to spatially and quantitatively represent the degree of human modification[1802] or human footprint.[1803] While human modification of the natural world represents only one aspect of

[1795] ANILCA § 702(3).

[1796] CCP EIS vol. 1 at 4-15.

[1797] CCP EIS vol. 1 at 4-16.

[1798] DEIS vol. 1 at 3-216–3-217.

[1799] DEIS vol. 1 at 3-216.

[1800] E.g., Aplet, G.H. 1999. On the nature of wildness: exploring what wilderness really protects. Denver University Law Review 76(2), 347-367.

[1801] Aplet, G., Thompson, J., Wilbert, M. 2000. Indicators of wildness: using attributes of the land to assess the context of wilderness. p.89-98 in: McCool, S.F., Cole, D.N., Borrie, W.T., O'Loughlin, J. (eds.). Wilderness science in a time of change conference – Volume 2: Wilderness within the context of larger systems; May 23-27, 1999. Missoula, MT. Proceedings RMRS-P-15-VOL-2. Ogden, UT, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

[1802] Theobald, D.M. 2013. A general model to quantify ecological integrity for landscape assessments and US application. Landscape Ecology 28, 1859-1874.

[1803] Sanderson, E.W., Jaiteh, M., Levy, M.A., Redford, K.H., Wannebo, A.V., Woolmer, G. 2002. The human footprint and the last of the wild. BioScience 52(10), 891-904.; Venter, O., Sanderson, E.W., Magrach, A., Allan, J.R., Beher, J., Jones, K.R., Possingham, H.P., Laurance, W.F., Wood, P., Fekete, B.M., Levy, M.A., Watson, J.E.M. 2016. Sixteen years of change in the global terrestrial human footprint and implications for biodiversity conservation. Nature Communications 7:12558.

describing wildness, such approaches have been combined with other aspects of wilderness character to quantify and represent wildlands[1804] and to compare their values.[1805] While these analyses may not represent every aspect of wilderness character, it is clear that approaches exist for quantifying and representing wilderness values. BLM should apply such techniques and use them in concert with a visual resources analysis to fully analyze the impacts of proposed development on wilderness character.

BLM states that under all alternatives, oil and gas and related activities "could potentially affect an area's naturalness and opportunities for solitude in the program area"[1806] or "could be affected." These are profound understatements. Development of the Coastal Plain under all alternatives will have significant impacts on wilderness characteristics and values; BLM cannot downplay these impacts. The 1987 Report found that full or even limited leasing would have major impacts on recreation, wilderness, and esthetics.[1807] The agency must thoroughly analyze the impacts of all activities associated with an oil and gas program on the wilderness values, characteristics, and resources of the Coastal Plain, as well as the Mollie Beattie Wilderness. Brief statements of possible impacts are not sufficient.

BLM also incorrectly states that the impacts to wilderness would be site-specific, and it appears to focus only on roads and access routes as impacting wilderness characteristics. This is unreasonable and unsupported. It is also inconsistent with other findings by the agency that oil and gas facilities would have impacts in NSO areas.[1808] As the National Research Council (NRC) explained, "[t]he effects of industrial activities are not limited to the footprint of a structure or to its immediate vicinity; a variety of influences can extend some distance from the actual footprint."[1809] Relatedly, the NRC stated

> [t]he common practice of describing the effects of particular projects in terms of the area directly disturbed by roads, pads, pipelines, and other facilities ignores the spreading character of oil development on the North Slope and the consequences

[1804] Belote, R.T., Dietz, M.S., Jenkins, C.N., McKinley, P.S., Irwin, G.H., Fullman, T.J., Leppi, J.C., Aplet, G.H. 2017. Wild, connected, and diverse: building a more resilient system of protected areas. Ecological Applications 27(4), 1050-1056.

[1805] Belote, R.T., Irwin, G.H. 2017. Quantifying the national significance of local areas for regional conservation planning: North Carolina's Mountain Treasures. Land 6, 35.

[1806] DEIS vol. 1 at 3-216–3-217.

[1807] LEIS at 166.

[1808] DEIS vol. 1 at 3-208.

[1809] NAT'L RESEARCH COUNCIL, CUMULATIVE ENVIRONMENTAL EFFECTS OF OIL AND GAS ACTIVITIES ON ALASKA'S NORTH SLOPE 9–11 (2003) ("The effects of North Slope industrial development on the physical and biotic environments and on the human societies that live there have accumulated, despite considerable efforts by the petroleum industry and regulatory agencies to minimize them… Continued expansion is certain to exacerbate some existing effects and to generate new ones.").

of this to wildland values. All of these effects result in the erosion of wildland values over an area far exceeding the area directly affected.[1810]

BLM cannot confine its analysis of impacts to wilderness to just the direct areas developed. The agency must describe how all oil and gas activities have the ability to directly and indirectly impact the undeveloped, untrammeled, and natural characteristics and opportunities for solitude or primitive and unconfined recreation of a much broader area and account for that in the EIS.[1811] It is also not clear how narrowly or broadly BLM is considering the impacts to wilderness characteristics, as BLM has not provided a map or other graphic depicting wilderness characteristics would be impacted under its development scenarios (the maps and graphics accompanying Stuart Smith's comments, which are attached to these comments as an appendix and discussed in detail in Section V below, could be replicated for wilderness characteristics). BLM should do this in the revised EIS.

BLM's analysis of the impacts by alternative is woefully inadequate and inaccurate. Inexplicitly, BLM states that there could be fewer impacts to wilderness characteristics under Alternative C because fewer acres will be offered for lease than Alternative B.[1812] Alternatives B and C offer the exact same acres for lease.[1813] BLM's obvious statement that there will be greater impacts to wilderness characteristics under Alternative C than Alternative A is not a substitute for required analysis of impacts. Alternative A does not allow oil and gas; therefore there will be no impacts to wilderness characteristics.[1814] As a result, all three action alternatives will have greater impacts to wilderness characteristics than the no-action alternative. BLM's basic recognition that there will be greater impacts from oil and gas from its action alternatives than the no-action alternative is not an analysis.

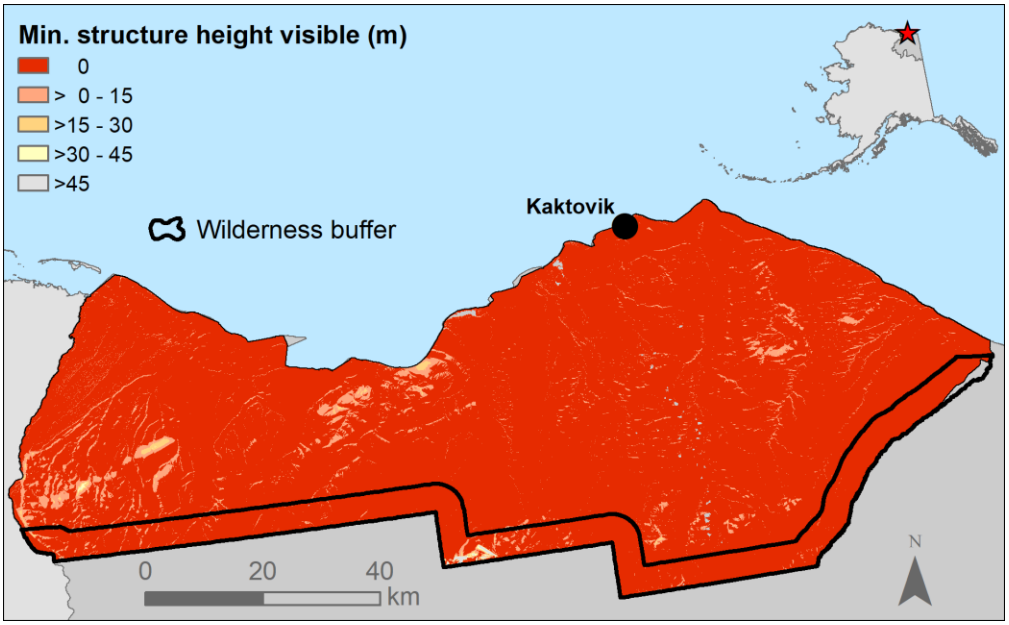
Absent from BLM's analysis of any alternative is an analysis of the impacts on the adjacent designated Wilderness. Oil and gas activities will have impacts on the Mollie Beattie Wilderness, including sound, light, visual, and natural systems (including but not limited to hydrology, migration, and permafrost). Indeed, the viewshed analysis prepared by Mr. Smith demonstrates that infrastructure of any height located in virtually any location on the Coastal Plain will be visible from high points within the Wilderness, marring the visitor's experience and greatly diminishing his or her sense of being immersed in a natural, undeveloped landscape.[1815] BLM must analyze the impacts of its proposed oil and gas program on the designated Wilderness and be sure that any program that it proposes does not degrade the qualities of the Wilderness and its management under ANILCA and the Wilderness Act.

[1810] *Id*. at 148.
[1811] CCP EIS vol. 1 at 4-14–4-15.
[1812] DEIS vol. 1 at 3-217.
[1813] DEIS vol. 1 at 2-1, Table 2-1.
[1814] DEIS vol. 1 at 3-216.
[1815] *See* Appendix D (Smith viewshed analysis at Figure 12).

3. *BLM's Measures Are Insufficient to Protect Wilderness and Wilderness Values of the Arctic Refuge*

BLM's statement that impacts to wilderness characteristics will be reduced in the areas that will be managed under NSO stipulation or areas with TLs is specious.[1816] First, these provisions can be waived, exempted, or modified.[1817] Specifically regarding the NSO provision, it still allows for infrastructure on a case-by-case basis, including for river crossings.[1818] Second, neither NSO nor TLs prohibit seismic exploration or drilling, which can have impacts to the untrammeled nature of the area, recreation, and wildness. Third, the TL is not a limitation on development, but on use during a specific time of the year. The same areas can still be developed, with the same impacts on wilderness characteristics as areas not subject to TLs.[1819] BLM's conclusion that TLs will lessen or reduce impacts to wilderness characteristics is, therefore, baseless.

BLM also proposes only one protective measure for the Mollie Beattie Wilderness that would apply under only Alternative D: a three-mile NSO buffer and suggestion that aircraft operations be planned to minimize flights below 2,000 feet within that buffer.[1820] Had BLM prepared a visibility analysis, it would have been apparent that the three-mile NSO buffer is wholly insufficient to protect wilderness values in the Mollie Beattie Wilderness under any alternatives and regardless of where development is located – since infrastructure of any height located virtually anywhere on the Coastal Plain will be visible from high points in the adjacent Wilderness:



[1816] DEIS vol. 1 at 3-216–3-217.
[1817] DEIS vol. 1 at 2-3.
[1818] DEIS vol. 1 at 2-4.
[1819] DEIS vol. 1 at 2-13.
[1820] DEIS vol. 1 at 3-217 & Lease Stipulation 10.

Map Explanation: Visibility surface for 15 points in the Mollie Beattie Wilderness south of the program area and no surface occupancy Wilderness buffer under Alternative D. Visibility surfaces were obtained from Stuart Smith at True North GIS and indicate how tall a structure could be in a given location before becoming visible to a person standing at the 15 points. This map indicates that the Wilderness buffer proposed in the DEIS is vastly inadequate to mitigate visual impacts to recreationalists in the Wilderness. Nearly the entire Coastal Plain is visible at ground level from the 15 Wilderness points, meaning that any oil and gas infrastructure would also be visible, negatively impacting the Wilderness experience.

Additionally, BLM should consider other measures as part of its alternatives to protect wilderness values, such as mandating consolidated development with very limited footprints allowed and limiting development to specific areas of the Coastal Plain.

T. BLM FAILED TO COMPLY WITH WILD AND SCENIC RIVERS ACT REQUIREMENTS AND PROTECT COASTAL PLAIN RIVERS' OUTSTANDINGLY REMARKABLE VALUES.

BLM's draft EIS fails to adequately consider the impacts of oil and gas activities on rivers and protect the rivers available for addition to the National Wild and Scenic Rivers System. Congress passed the Wild and Scenic Rivers Act of 1968 to "protect[] for the benefit and enjoyment of present and future generations" selected Wild rivers that "possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values."[1821] To qualify for inclusion in the Wild and Scenic Rivers system, a river must first be a "free-flowing stream" and the adjacent land must possess at least one outstandingly remarkable value (ORV).[1822] The BLM was required to consider for recommendation all suitable rivers located within the Arctic Refuge in the Wild and Scenic Rivers System in the leasing EIS and to ensure that the proposed project would protect their values. BLM's efforts fall short of Wild and Scenic Rivers Act requirements, do not follow required procedures, and fail to adequately protect the Coastal Plain rivers' ORVs.

The draft EIS fails to protect the Coastal Plain's eligible rivers ORVs. The Wild and Scenic Rivers Act Requires management of eligible rivers to protect and maintain their current values.[1823] BLM's cursory analysis provides different suggested buffer zones around high water marks of each river, but does not explain how those buffers protect the specific ORVs for the relevant rivers.[1824] Had BLM prepared a visual resources analysis, it would have been apparent that the proposed buffers are wholly insufficient to protect scenery- and recreation-dependent ORVs.[1825] Specifically, the Canning River has cultural, wildlife, fish, and recreational ORVs. The Canning's cultural ORV is based on both contemporary and historical use, many indigenous peoples used the river for thousands of years for harvest and trade, the river hosts an abundance of archaeological sites,[1826] and the Canning is used by modern Iñupiat intensively for subsistence

[1821] 16 U.S.C. § 1271.
[1822] 16 U.S.C. §§ 1273(b), 1271.
[1823] 16 U.S.C. §§ 1273(b); CCP EIS Appendix I at 1.
[1824] DEIS vol. 1 at 3-211, 3-214–3-216.
[1825] *See* embedded map in Part V.S.
[1826] CCP EIS Appendix I at 49.

purposes.[1827] The Canning River's wildlife values stem for the river's support of migratory birds (shorebirds, tundra swans, and the Arctic Refuge's only nesting sites of Sabrine's gulls), over fifty miles of critical polar bear denning habitat, muskoxen, grizzly bears, wolves, wolverines, and provides calving grounds for the Central Arctic Caribou Herd and use for the Porcupine Caribou Herd.[1828] Similarly, the river's fish ORV is based on the river's fish diversity, and high "densities and overwintering, spawning, and rearing populations of Arctic grayling, Arctic char, round whitefish, burbot, and a population of anadromous Dolly Varden that is genetically distinct compared to populations from other nearby drainages."[1829] In addition, the Canning's round whitefish and burbot are of particular importance to Kaktovik subsistence users.[1830] For recreation, the Canning is the longest north flowing river in the Arctic Refuge, and "offers a safe experience for less experienced boaters and opportunities for wildlife viewing, fishing, hunting, trapping, hiking, and photography."[1831]

The Hulahula has recreational and cultural ORVs. Culturally, the Hulahula was used for trade and travel, and is "identified as having important cultural values by both the Iñupiat and Gwich'in" and "the entire river corridor is intensively used by the Iñupiat people for a variety of subsistence purposes."[1832] Recreationally, the Hulahula "offers an unparalleled northern arctic recreational experience. The river is fast and challenging . . . [r]afters, kayakers, hunters, and hikers from around the world pursue adventure trips on the Hulahula. The average group size is 4.6, and the average trip length is 8.6 days. . . . Some guide companies also offer winter trips that include winter camping and cross-country skiing."[1833] The CCP found the Hulahula suitable as one of the top Coastal Plain rivers threatened by oil and gas development,[1834] and as the second most visited river.[1835]

The Jago River has outstandingly remarkable wildlife values, with "many string bogs and seepage areas laced with fens and floodplains . . . support[ing] heavy seasonal use by wildlife, including the Porcupine and Central Arctic caribou herds, wolves, muskoxen, and bears."[1836] The Jago River was "a high density calving area (50 percent of calving) in almost all (13) of the 17 years of a long-term research project . . . boasts the longest segment (61.8 miles) of polar bear denning habitat on the Refuge"[1837] and is also important to snow geese, who

> rely on thermokarst pits with healthy stands of tall cottongrass for feeding and building fat reserves for migration. These important feeding sites, known as staging

[1827] *Id*.
[1828] *Id*. at 49–50.
[1829] *Id*. at 50.
[1830] *Id*. at 51, 53.
[1831] *Id*. at 53.
[1832] *Id*. at 74.
[1833] *Id*. at 74, 77.
[1834] *Id*. at 78.
[1835] *Id*. at 81.
[1836] *Id*.
[1837] *Id*.

> areas, make up only three percent of the Refuge's coastal plain, and they primarily occur near the Jago River. After a flock of snow geese feed on a stand of cottongrass, it takes at least four years for the stand to recover.[1838]

The Okpilak River has scenic and geologic values, and is on the Arctic Refuge's most active glacial area "fed by hanging glaciers that appear precariously attached to stark, steep, rocky mountain sides . . . the river's headwaters are found in two different glaciers in two different valleys."[1839] The geologic values include a 4.4 mile, forty foot deep postglacial canyon, massive lateral moraines, and colluvial cones reaching 490 feet.[1840] The scenic ORV is based on the river's high mountain views, including snow-capped Mt. Michelson, lateral moraines, expansive views of the Coastal Plain, and the Coastal Plain's only true "hot springs allow soakers to watch Dall's sheep and caribou while looking over the floodplain."[1841]

The draft EIS merely lists the above ORV categories, providing no substantive or individual consideration for how to properly sustain the Canning, Hulahula, Jago, and Okpilak River's important ORVs.[1842] BLM merely asserts compliance with state water quality and "[m]anagement actions that prohibit surface-disturbing activities, including NSO, CSU, and TLs near the eligible and suitable WSRs would provide varying protections for ORVs."[1843] The EIS acknowledges that "developing infrastructure that is installed within 0.5 mile of any eligible or suitable river, such as bridges, have the potential to downgrade a river's eligibility and suitability of a wild river to that of a recreational river."[1844] Degrading a river's classification, as BLM does here is not consistent with maintaining ORVs.[1845] All four rivers on the Coastal Plain are eligible for "Wild" river classification, denoting minimal access and development and "represent[ing] vestiges of primitive America."[1846] Contrary to maintaining the Wild classification, the draft EIS acknowledges infrastructure could degrade values."[1847] While each alternative contains setbacks, there is no further analysis to the level of protections provided by each. The draft EIS completely disregards the preservation standard mandated by the Wild and Scenic Rivers Act.

The CCP points to oil and gas development on the Jago, Hulahula, and Okpilak rivers as having negative impacts on their recreational ORVs, listing impacts such as "noise and sight pollution, increased air traffic, and visible human influence would negatively affect the remoteness, solitude, and wildlife-viewing opportunities."[1848] As a result, FWS found the Hulahula eligible and the Jago and Okpilak protected through other mechanism, primarily

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[1838] *Id*. at 82, 85 (internal citations omitted).
[1839] *Id*. at 96.
[1840] *Id*.
[1841] *Id*.
[1842] DEIS vol. 1 at 3-211.
[1843] DEIS vol. 1 at 3-214 (internal citation omitted).
[1844] *Id*.
[1845] 16 U.S.C. §§ 1273(b).
[1846] 16 U.S.C. § 1273(b)(1); CCP EIS Appendix I at 2.
[1847] DEIS vol. 1 at 3-214.
[1848] CCP EIS Appendix I at 85, 79, 100.

through current Arctic Refuge protections and FWS regulations.[1849] The substance of BLM's analysis is encapsulated in these two sentences:

> General impacts resulting from oil and gas development in the program area could include potential soil erosion and habitat fragmentation, which could affect cultural, fish, geologic, recreation, and wildlife ORVs. The degree of impacts on WSRs would depend on the proximity of development to the WSR.[1850]

The EIS makes no specific findings to protect ORVs, merely acknowledging impact. BLM does not explain or confront the CCP's findings of negative impacts to ORVs. When forwarding oil and gas development on the Coastal Plain, BLM must consider impacts to ORVs in light of FWS's management of these rivers and values as set out in the CCP.

Particularly egregious, in Lease Stipulation I, under all alternatives, allows for "[o]n a case-by case basis, essential pipeline and road crossings to the main channel would be permitted through setback areas. The setbacks may not be practical in river deltas. In these situations, permanent facilities would be designed to withstand a 200-year flood" for the Hulahula, Canning, Okpilak and Jago Rivers.[1851] Allowing development of pipelines and roads across any of these rivers is inconsistent with protecting any ORV and are exactly the type of inappropriate development for a "Wild" river, which should be maintained "free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted."[1852]

Required Operating Procedure 35, is meant to "[e]nsure ongoing and long-term reclamation of land to its previous condition and use" and describes leaseholder requirements for abandonment of "[o]il and gas infrastructure, including gravel pads, roads, airstrips, wells and production facilities."[1853] Alternative D would require the leaseholder to "develop and implement a BLM-approved abandonment and reclamation plan . . . describ[ing] . . . wild and scenic river . . . eligibility and suitability" before final abandonment.[1854] Merely describing for the eligibility and suitability for inclusion in the Wild and Scenic River system is not substantive enough to ensure protections as required by the act. BLM's] EIS currently fails to require maintenance of Wild and Scenic rivers free flowing state and ORVs. For Alternatives B and C, leaseholders would only have to "develop and implement a BLM-approved abandonment and reclamation plan describ[ing] short-term stability, visual, hydrological, and productivity objectives and steps to be taken to ensure eventual ecosystem restoration to the land's previous hydrological, vegetation, and habitat condition."[1855] In addition, under Alternatives B and C, the reclamation must only "ensure eventual restoration," where "eventual" is not defined, so it is unclear exactly

[1849] DEIS vol. 1 at 3-214.
[1850] *Id*.
[1851] DEIS vol. 1 at 3-214, vol. 2 at 2-4.
[1852] 16 U.S.C. § 1273(b)(1).
[1853] DEIS vol. 1 at 2-32.
[1854] *Id*.
[1855] *Id*.

how extended a time this could be. Finally, in addition to Alternatives B and C already vague and pliable parameters these alternatives allow "[t]he BLM Authorized Officer [to] grant exceptions to satisfy stated environmental or public purposes."[1856] By completely failing to account for wild and scenic river values in alternatives B and C, Required Operating Procedure 35 does not protect for any ORVs or the free flowing state of rivers. For only requiring "short-term stability," "eventual restoration," and the availability of discretionary exceptions, extended or inadequate reclamation will negatively impact rivers' classification and potential eligibility for the Wild and Scenic Rivers system.

BLM's draft EIS does not comply with Wild and Scenic Rivers Act requirements as it fails to protect the Coastal Plain's river's ORVs.

U. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON THE MARINE PROTECTED AREA IS DEFICIENT.

The coastal zone and waters within the Arctic Refuge constitute a Marine Protected Area (MPA) that is managed under the guidance of Executive Order 13830, which states:

> Each Federal agency whose actions affect the natural or cultural resources that are protected by an MPA shall identify such actions. To the extent permitted by law and to the maximum extent practicable, each Federal agency, in taking such actions, shall avoid harm to the natural and cultural resources that are protected by an MPA.[1857]

The DEIS does not adequately analyze impacts to the MPA's natural resources. The DEIS merely lists the impacts that could occur from oil and gas development in the project area,[1858] without providing references, and without connecting the list of impacts to specific activities or phases of development. Nor does the DEIS provide the specific location or duration of these impacts, making it difficult to assess the likely level and type of impact. Instead, the DEIS leaves specific analysis to the future.[1859] This is improper. The lack of explanation on where, when, and how these impacts would arise makes it impossible for the agency and for the public to accurately anticipate impacts to the MPA.

The DEIS does not acknowledge impacts to the MPA's cultural resources. One of the main purposes of an MPA is "the ecologically and economically sustainable use of the marine

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[1856] *Id.*

[1857] President William Clinton, Executive Order 13158 of May 26, 2000, Marine Protected Areas, Sec. 5, available at https://www.govinfo.gov/content/pkg/FR-2000-05-31/pdf/00-13830.pdf.

[1858] *See* DEIS vol. 1 at 3-212.

[1859] *See e.g.* DEIS vol. 1 at 3-212 ("A more site-specific analysis would occur during the Application for Permit to Drill (APD) phase of development.").

environment for future generations,"[1860] including the sustainable harvest and consumption of fish and other marine resources. But the DEIS lacks any reference to the importance of protecting the MPA for cultural reasons. The agency must explain that the MPA is a protected area that is intended to conserve marine resources for both natural and cultural reasons, and explain how fossil fuel development in the Coastal Plain will impact the cultural resources contained within the MPA.

The DEIS offers only a short and inadequate cumulative impacts analysis for the MPA.[1861] The DEIS does not mention coastal erosion, or other climate change effects, that are slated to occur in the coastal zone, and how this could interact with the impacts from oil and gas development activities to impact the MPA. Instead, the cumulative impacts paragraph is a list of individual direct impacts that lack specificity on duration, location, and extent. BLM must consider these other impacts as part of the cumulative impacts to the MPA.

The mitigation measures identified in the DEIS do not appear to address the likely impacts to the MPA. As articulated in paragraphs above, it is difficult to ascertain the location, duration, and level of impacts that could occur in the MPA. But the lease stipulation involving coastal areas would only require a plan under Alternative B; and would allow for barges, storage areas, and pipelines in coastal zones under Alternatives C and D.[1862] These are insufficient protections for the MPA.

V. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON VISUAL AND AESTHETIC RESOURCES IS INADEQUATE.

Many of the socio-economic benefits of the Coastal Plain — including those stemming from its unique, wilderness-dependent recreational values — are integrally connected to its primitive and undisturbed visual resources. Indeed, two of the three original purposes for which what is now the Arctic Refuge was designated in 1960 were to preserve its unique wilderness and recreational values,[1863] which are discussed in more detail in the previous sections. People visit and value the Arctic Refuge and its Coastal Plain in large part because of its untouched character and aesthetics; oil and gas development is simply incompatible with maintaining those visual resources — and the associated wilderness and recreational values of the Coastal Plain. A thorough analysis of the reasonably foreseeable direct, indirect, and cumulative impacts of all phases of development on visual resources — including their extent and severity — is a critical component of the NEPA process and the ability of BLM and the public to assess compliance with other laws governing management of the Coastal Plain. The DEIS fails to include such an analysis.

[1860] President William Clinton, Executive Order 13158 of May 26, 2000, Marine Protected Areas, Sec. 1, available at https://www.govinfo.gov/content/pkg/FR-2000-05-31/pdf/00-13830.pdf.

[1861] DEIS vol. 1 at 3-214.

[1862] DEIS vol. 1 at 2-15, 3-212, 3-213.

[1863] PLO 2214 at 1.

BLM acknowledges the potentially high visual sensitivity of numerous areas, including river corridors where recreational use is concentrated, and that visual resource impacts from surface disturbance will be long-term due to the slow rate of recovery of tundra vegetation and related surface conditions.[1864] As an alarming example, the DEIS describes the remaining visual impacts from limited 2-dimensional seismic exploration conducted thirty-five years ago.[1865] Yet the impacts analysis included in Section 3.4.8 of the DEIS provides only a generalized discussion of anticipated types of impacts to visual resources associated with surface disturbance, infrastructure, dust, and artificial light; it does not include a meaningful analysis of the extent, location, or severity of those aesthetic impacts.[1866] For instance, the DEIS states that visual resources inventory and contrast ratings will be deferred to post-leasing NEPA analyses.[1867] Given BLM's intent to have this EIS satisfy NEPA for purposes of the irretrievable commitment of issuing leases, the agency may not defer analysis of reasonably foreseeable aesthetic impacts associated with leasing and development activities. Nor may it segment its analysis of the significant and highly foreseeable visual impacts associated with SAExploration's application to conduct pre-leasing 3-dimensional seismic operations. Those along with all other reasonably foreseeable direct, indirect, and cumulative visual resource impacts associated with all phases of development must be fully analyzed in the leasing EIS.

A critical component of a thorough NEPA analysis of visual resource impacts associated with oil and gas development is a visibility or viewshed analysis that would forecast the extent and severity of impacts on visual resources based on the topography of the program area, locations of visitor use, and general characteristics of anticipated infrastructure. Such an analysis can readily be prepared using established and scientifically sound methodologies, even with limited information about the precise location of future infrastructure. Indeed, GIS specialist Stuart Smith of True North GIS, LLC prepared such an analysis for the Coastal Plain and submitted it to BLM as comments on the DEIS. We incorporate that analysis by reference into these comments.[1868] As Mr. Smith's comments conclude: "BLM should fully consider the visibility analysis [he] prepared and ensure that the public and decision-makers are aware of the extensive and significant viewshed impacts associated with development." Without such analysis, BLM cannot adequately analyze the extent and severity of anticipated visual impacts. The agency must incorporate Mr. Smith's analysis or prepare its own comparable visibility analysis.

Contrary to statements in the DEIS that visual resource impacts and associated degradation of recreational settings and opportunities and wilderness characteristics may be limited due to NSO stipulations, Mr. Smith's analysis shows that those impacts are likely to be extensive, regardless of where infrastructure is ultimately located. This is due to the area's topography and narrow geography between the Brooks Range and the Beaufort Sea, bisected by several major river corridors on which most recreational visitors depend. The DEIS recognizes

[1864] DEIS at 3-219–3-220 & Appx. F at F-38.
[1865] DEIS at 3-219.
[1866] *See* DEIS at 3-220–3-224.
[1867] DEIS at 3-220.
[1868] *See* Appendix D (Smith viewshed analysis).

these realities, along with the significant and abrupt departure from the area's current aesthetics that any development would represent:

> Visitors . . . depend predominantly on use of river corridors during all or a portion of their visits. . . .
>
> Because visitors to the program area generally expect a physical setting consisting of little to no human disturbance and a social setting with little to no interaction with other visitors or human activity, small changes to the physical and social setting can have disproportionately large impacts on user experience. . . .
>
> [T]he relatively flat topographic characteristics of the program area would result in new mineral development infrastructure being visible from far distances. Also, because there is no development currently, any new development that would be visible to recreation users would modify the recreation setting and visitor experiences.[1869]

Nevertheless, the DEIS goes on to make a number of unsupported conclusions that NSO and other proposed measures would limit visual resource impacts, safeguard recreational settings and opportunities, and preserve wilderness character.[1870] Had BLM conducted the necessary visibility analysis, it would have demonstrated the inadequacy of the proposed stipulations. For instance, it would be virtually impossible to locate derricks and towers over 30 meters tall anywhere on the Coastal Plain without having them be visible from six major recreational river corridors.[1871] And to avoid viewshed impacts from those six river corridors, infrastructure of 15 meters or less in height would need to be located within a small 12% of the Coastal Plain.[1872] Notably, those limited locations that might shield infrastructure of less than 15 meters in height from the major river corridors include virtually no overlap with the high potential area and little overlap with whatever might reasonably be defined as the "medium potential area south of Kaktovik," which according to BLM's Reasonably Foreseeable Development Scenario would be the likely location of 3 of the 4 central processing facilities (CPFs) under Alternatives B, 2 of the 3 CPFs under Alternative C, and both CPFs under Alternative D:[1873]

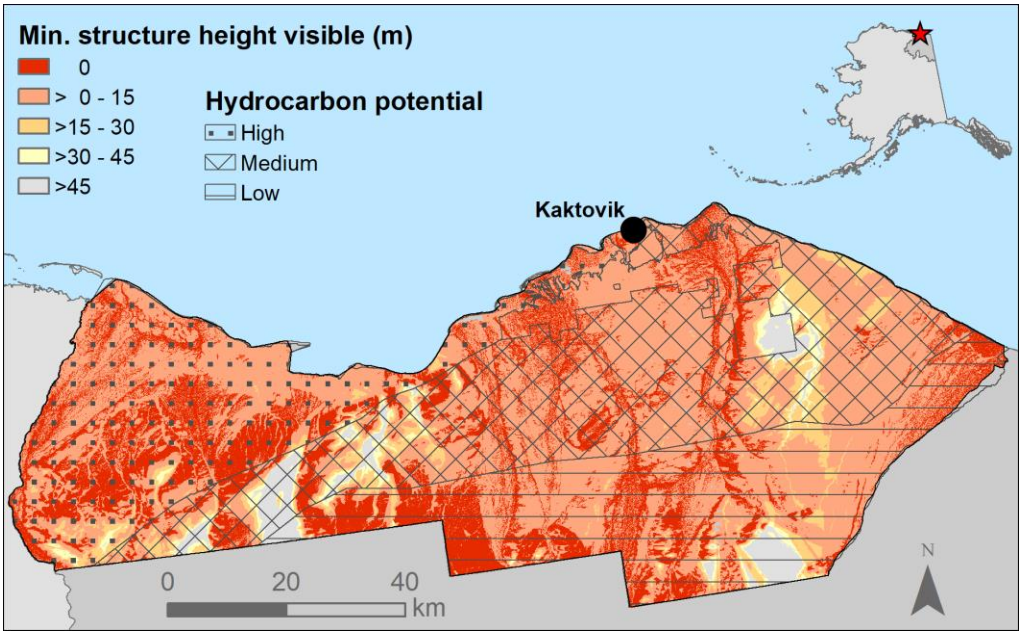
[1869] DEIS vol. 1 at 3-203–3-205.

[1870] *See, e.g.*, DEIS vol. 1 at 3-205 ("Protective measures intended to limit ground disturbance and associated impacts on resources would improve recreation by limiting or prohibiting surface-disturbing activities . . . ."); *id.* at 3-207 (suggesting that NSO setbacks from rivers under Alternative C "would maintain recreation opportunities and avoid displacement of visitors"); *id.* at 3-216 (suggesting that "the area would likely retain its overall wilderness character"); *id.* at 3-217 (relying on 3-mile-NSO-buffer under Alternative D to protect wilderness character of the Coastal Plain and adjacent Mollie Beattie Wilderness).

[1871] *See* Appendix D (Smith viewshed analysis at Figure 11).

[1872] *See id*. at Figure 11.

[1873] DEIS vol. 2 Appx. B at B-19–B-20.



Map Explanation: Combined visibility surface for six major rivers along the Coastal Plain of the Arctic National Wildlife Refuge overlaid with the three hydrocarbon potential zones described in the DEIS. Visibility surfaces were obtained from Stuart Smith at True North GIS and indicate how tall a structure could be in a given location before becoming visible to a person traveling along the six rivers. This map demonstrates that there are very few places in the high hydrocarbon potential area where derricks and towers over 30 m tall could be placed without impacts to river recreationalists. Similarly, there is limited area in the medium-potential zone south of Kaktovik where such infrastructure could be located without visual impact.

In short, major infrastructure will be visible from the major river corridors under each of the action alternatives, impacting visual resources and recreation. This must be accurately analyzed in the EIS.

When it comes to infrastructure visible from highpoints located within the Mollie Beattie Wilderness to the South, infrastructure of any height would generally be visible no matter where it is located.[1874] The visibility analysis also shows that infrastructure of any height located across nearly 1/3 of the Coastal Plain would be visible from Kaktovik, thereby impacting the aesthetics and experience of residents and subsistence users, the growing number of tourists who visit Kaktovik to view polar bears, and others entering or exiting the Coastal Plain via that community and its airport.[1875] Other applications of Mr. Smith's visibility analysis are included in the previous sections on recreational uses and wilderness values, further illustrating the inadequacy of BLM's NSO stipulations to safeguard those values and the necessity of such an analysis to the agency's ability to adequately and accurately evaluate reasonably foreseeable aesthetic impacts under each alternative.

Compounding its failure to conduct a visibility analysis showing the extent of anticipated viewshed impacts, the DEIS also fails to include sufficient information to allow decision makers or the public to conceptualize the visual impacts that can be expected. The two photographs the

[1874] *See* Appendix D (Smith viewshed analysis at Figure 12).
[1875] *See* Appendix D (Smith viewshed analysis at Figure 13).

DEIS includes as examples of what infrastructure might look like (one of a typical layout for a central processing facility with airstrip and pipeline from the Alpine CPF on State lands and one of a typical layout for an exploration well with ice pad and ice road from the Stoneyhill site in NPR-A)[1876] are insufficient to depict how the unique aesthetics of the Coastal Plain are likely to be impacted by the development program being contemplated. For instance, the 2012 Point Thomson Development Project EIS conducted a visual resources analysis that superimposed visual simulations of the proposed action on photographs of key observation points at varying distances from the proposed infrastructure, at night, and from the air.[1877]

Under each of the action alternatives, infrastructure and associated aesthetic impacts can be expected across significant portions of the Coastal Plain, including in NSO areas.[1878] The DEIS fails to sufficiently analyze those impacts, which in turn renders the analysis of impacts on recreational uses, wilderness, and wild & scenic rivers inadequate, as discussed above.

W. BLM'S DESCRIPTION OF SHIPPING AND ANALYSIS OF ITS ADVERSE IMPACTS ARE INADEQUATE.

An EIS must "[d]evote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits."[1879] The DEIS does not adequately describe shipping activities associated with the proposed action, including the various alternatives. There is no clear discussion of what kinds of vessels will be used, how many vessel transits are expected, what cargo and materials they will carry, or how fast they are expected to travel. The limited information provided is scattered throughout the DEIS, and it is misleading in suggesting that shipping traffic will be limited to two barge convoys per year carrying project modules.[1880] In the absence of any road, or proposal for a road, connecting Kaktovik and Deadhorse, however, it is clear that the vast majority of project supplies and materials, including bulk fuel and hazardous materials, will need to be shipped to the site. Yet there is virtually no discussion in the DEIS describing the nature and extent of shipping activity or properly analyzing associated risks and environmental impacts based on this anticipated scope. It is not appropriate to postpone meaningful discussion of shipping activities and related impacts until future site-specific NEPA reviews because those will not capture the big picture of cumulative shipping impacts over the 50-year timeframe for the proposed action.

Moreover, the absence of information regarding shipping and shipping-related impacts in the DEIS is especially problematic because the number of vessels transiting the Arctic is

[1876] DEIS vol. 1 at 2-223 & vol. 2 Appx. A Figures 3-8 & 3-9.

[1877] U.S. Army Corps of Engineers, Point Thomson Development Project Final Environmental Impact Statement, Section 5.19.1.1 Visual Impact Assessment (2012).

[1878] *See, e.g.*, DEIS vol. 1 at 3-208 (acknowledging that "some impacts . . . would occur inside of the NSO areas," including "changes to the recreation setting from artificial lighting and alteration of the recreation setting and visitor experience from the visual presence of infrastructure and vehicles.").

[1879] 40 C.F.R. § 1502.14(b).

[1880] *See, e.g.*, DEIS, vol. 1, at 3-93, 3-95, 3-97, 3-99, 3-141, 3-148, and 3-238.

increasing over time, including vessels serving oil and gas exploration areas in the Beaufort and Chukchi Seas, as well as vessels serving the military, research, tourism, mining, and other industries.[1881] The DEIS must describe and analyze oil and gas-related shipping associated with the proposed action in conjunction with a meaningful discussion of this larger picture of dramatically increasing shipping activities in the Arctic over the next 50 years.

1. Affected Environment

An EIS must "describe the environment of the area(s) to be affected" by the proposed action.[1882] Moreover, "[i]n analyzing the affected environment, NEPA requires the agency to set forth the baseline conditions" because, otherwise, there would be "no way to determine what effect the proposed action will have on the environment."[1883] The baseline information must, therefore, be sufficient in scope to serve as a point of comparison for the direct, indirect, and cumulative impacts of the proposed action.[1884]

The geographic scope of the various "affected environment" discussions in the DEIS is too narrow.[1885] These discussions focus heavily on the "program area," which is much smaller than the area that will experience effects from the proposed action.[1886] While the program area encompasses the "[f]ederal lands and waters ... of the Coastal Plain within the ... Arctic Refuge"[1887] and includes approximately 125 miles of coastline from the Staines River to the Beaufort Lagoon,[1888] shipping activities connected with the proposed action will take place, and

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[1881] *See* McWhinnie, L., *et al, Vessel traffic in the Canadian Arctic: Management solutions for minimizing impacts on whales in a changing northern region*, 160 Ocean & Coast. Mgmt. 1-17 (2018), *available at* https://pdfs.semanticscholar.org/53e3/ef8bf4ff65d8705d47bfd80a45e2df33d929.pdf; Huntington, H., *et al, Vessels, risks, and rules: Planning for safe shipping in the Bering Strait*, 51 Marine Policy 119 (2015), *available at* https://www.sciencedirect.com/science/article/pii/S0308597X14002012?via%3Dihub.

[1882] 40 C.F.R. § 1502.15.

[1883] *Western Watersheds Project v. U.S. Bureau Land Mgmt*., 552 F. Supp. 2d 1113, 1126-27 (D. Nev. 2008) (citing *Half Moon Bay Fishermans' Marketing Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988)).

[1884] *See* 40 C.F.R. §§ 1508.7, 1508.8 (defining "direct" and "indirect" effects and "cumulative impact").

[1885] In an unusual approach, the "affected environment" is not addressed in a stand-alone discussion in the DEIS. Instead, it is discussed throughout Chapter 3 in conjunction with the "environmental consequences" of particular topics. *See* DEIS, vol. 1, at 3-1.

[1886] *See generally id.*, ch. 3. One exception is the seabird section, which discusses species found along the shipping route. *See id.* at 3-84 to 3-92. The marine mammal section briefly lists species found along the shipping route and includes a few brief references to the broader region in the narrative, but overall the affected environment and impact discussions focus heavily on the program area. *See id.* at 3-122 to 3-149.

[1887] *Id*. at 1-1. *See id.*, vol. 2, appx. A, map 1-1.

[1888] *See id.*, vol. 2, appx. A, map 1-1.

their impacts will be felt, along the entire 1,600-nautical mile (nm) marine barge route from Dutch Harbor to Kaktovik, Alaska.[1889]

Due to the narrow scope of the affected environment discussions, there is very little baseline information in the DEIS regarding the important marine areas along the marine shipping corridor to the west and south of the program area that could be adversely affected by shipping activities associated with the proposed action. Some important marine areas left out of the DEIS are in the Beaufort Sea and Chukchi Sea regions, including the Chukchi Corridor, Hanna Shoal, Herald Shoal, Barrow Canyon East, Smith Bay, Harrison Bay-Colville Delta, Beaufort Shelf Break, and Oliktok Point to Demarcation Bay, which are described in the attached reports.[1890] Other important marine areas not addressed in the DEIS are in the Bering Sea region, such as the Bering Strait and the waters surrounding King Island, St. Lawrence Island, and Nunivak Island, as described in the attached report prepared by the U.S. Coast Guard.[1891] Including baseline descriptions of these important marine areas in a revised DEIS will facilitate appropriate discussions regarding the direct, indirect, and cumulative impacts arising from the shipping activities associated with proposed Coastal Plain oil and gas operations.

The DEIS has also failed to provide adequate baseline information regarding cetacean species, particularly large whales, and their vulnerability to impacts from vessel traffic, either in marine waters within 5 nm of the program area or along the 1,600 nm marine barge route. The DEIS acknowledges that two whales—the bowhead (*Balaena mysticetus*) and the beluga (*Delphinapterus leucas*)—are commonly found within 5 nm of the coastline of the Arctic Refuge.[1892] The bowhead is listed as an endangered species under the Endangered Species Act (ESA) and as a depleted species under the Marine Mammal Protection Act (MMPA), while the beluga is listed as a depleted species under the MMPA.[1893] The DEIS also acknowledges that vessels may encounter seven additional large whale species along the marine barge route, including blue, fin, humpback, minke, North Pacific right, sperm, and killer whales.[1894] All of

[1889] *See id.*, fig. 3-6.

[1890] *See, e.g.*, Pew Charitable Trusts, *et al, A Synthesis of Important Areas in the U.S. Chukchi and Beaufort Seas: Best Available Data to Inform Management Decisions* (April 2016), *available at* https://www.pewtrusts.org/-/media/assets/2016/05/synthesis_of_important_areas_us_chukchi_beaufort_seas.pdf; Natural Resources Defense Council, *et al, Environmental Risks with Proposed Offshore Oil and Gas Development off Alaska's North Slope* (Aug. 2012), *available at* https://www.nrdc.org/sites/default/files/drilling-off-north-slope-IP.pdf.

[1891] *See, e.g.*, U.S. Coast Guard, *Port Access Route Study: In the Chukchi Sea, Bering Strait, and Bering Sea*, Docket Nos. USCG-2014-0941 and USCG-2010-0833 (Dec. 23, 2016), *available at* https://www.regulations.gov/contentStreamer?documentId=USCG-2014-0941-0040&attachmentNumber=1&contentType=pdf.

[1892] *See* DEIS, vol. 1, at 3-123, tbl. 3-20; *see also* DEIS, vol. 2, appx. A, map 3-25.

[1893] *See* DEIS, vol. 1, at 3-123, tbl. 3-20.

[1894] *See* DEIS, vol. 1, at 3-130.

these species are protected by the MMPA.[1895] In addition, the blue, fin, sperm, North Pacific right, and Western North Pacific distinct population segment (DPS) of humpback whales are listed under the ESA as endangered, while the Mexico DPS of humpback whales is listed as threatened.[1896] Puzzlingly, the DEIS later discounts any impacts from vessel collision to the western North Pacific DPS of gray whales, also listed as endangered under the ESA, even though the DEIS never identifies this species as occurring along the marine barge route and fails to include any further discussion regarding the species.[1897]

2. Environmental Consequences

The discussion below explains that vessel traffic poses three primary risks to marine mammals and other wildlife in the Arctic—oil and hazardous substance spills, noise, and ship strikes.[1898] These risks and associated impacts are not adequately analyzed in the DEIS and should be given substantially greater attention in a revised DEIS.

a. Oil & Hazardous Substance Spills

Shipping-related oil and hazardous substance spills and resulting impacts are not discussed in any substantive way in the DEIS. While the potential for oil and hazardous substance spills is evaluated in the solid/hazardous waste section of the DEIS, this section focuses on terrestrial and freshwater impacts resulting from spills associated with onshore operations.[1899] There are also a few sentences referring to the potential for marine impacts from oil spills in the water resources section, but this language refers to spills from onshore barge docking sites, not from shipping.[1900]

The apparent rationale for the general exclusion of shipping-related spills from the DEIS analysis is buried in the marine mammal section. The narrative strongly downplays the potential likelihood, extent, and harm of any oil or hazardous substance spill by suggesting that (1) there is a "low risk" of spilled fuel if a vessel carrying fuel were to run aground during barging, (2) a large oil spill in the Arctic marine environment is unlikely because "[t]o date," such as a spill has "not occurred," (3) spill risks will be reduced through "safeguards" specified in the required oil spill prevention and contingency plans, (4) the quantities of oil or hazardous substances likely to be released would be "relatively small," and (5) potential spills during refueling at sea would be

[1895] *See generally* MMPA, 16 U.S.C. § 1361 *et seq*; FWS Webpage, International Affairs, https://www.fws.gov/international/laws-treaties-agreements/us-conservation-laws/marine-mammal-protection-act.html (accessed Feb. 26, 2019).

[1896] *See* NMFS Webpage, Endangered, Threatened, and Candidate Species in Alaska, https://www.fisheries.noaa.gov/alaska/endangered-species-conservation/endangered-threatened-and-candidate-species-alaska (accessed Feb. 26, 2019).

[1897] *See* DEIS, vol. 1, at 3-142.

[1898] *See generally* McWhinnie, *Vessel traffic in the Canadian Arctic;* Huntington, *Vessels, risks, and rules*.

[1899] *See id.* at 3-61 to 3-65.

[1900] *See id.* at 3-59.

only "small, accidental" spills.[1901]

This rationale is deeply flawed. While bulk fuel has historically been delivered to the North Slope by tanker truck along the haul road, bulk fuel deliveries by barge have commenced and are likely to become the preferred option in the future. The first large-scale fuel delivery by barge took place in September 2018, and it carried 2 million gallons of fuel from Valdez to Deadhorse.[1902] A collision, grounding, or other accident resulting in the discharge of even half the cargo of a fuel barge of this size (i.e., 1 million gallons) would be 10 times greater than BLM's own threshold for a "very large" spill,[1903] and it would constitute a major spill by any other estimation as well. Moreover, as the ice-free, open water season lengthens due to warming temperatures in the Arctic, transporting fuel by barge is likely to be viewed as a more convenient and/or cost-effective method of transporting fuel compared to the much smaller and more frequent 10,000-gallon increments that can be transported via tanker truck.[1904] Barge deliveries may even be the only feasible way of transporting fuel in support of Coastal Plain oil and gas operations because of the lack of a road between Deadhorse and Kaktovik.[1905]

Notably, the shipping industry appears to be gearing up for more large-scale fuel deliveries to polar waters. Crowley Fuels, for instance, just announced a contract to build a new articulated tug-barge with a 100,000-barrel (4.2 million-gallon) capacity that will be specifically designed for icy waters and dedicated for fuel deliveries throughout Alaska, and the contract includes an option to build a second barge of this type.[1906]

Furthermore, since the practice of bulk fuel barging to the Arctic is relatively new to this region, the lack of historic spills is not a viable metric or indicator of future risk, and the existence of oil spill prevention and contingency planning requirements does not eliminate the risk of a spill and does not excuse BLM from its duty to analyze and explain such risks in an EIS. In 2016, for instance, despite being subject to U.S. and Alaska contingency planning requirements, a tug hauling an empty fuel barge from Ketchikan, Alaska back to British Columbia was grounded and spilled 26,000 gallons of diesel fuel and other fluids, contaminating subsistence clam beds and preventing them from being harvested thereafter.[1907] The spill could have been far worse if the attached fuel barge had still been carrying its 10,000-ton (approx. 3

[1901] *See id.* at 3-141 to 3-142, 3-143.

[1902] *See* KTUU, *Barge delivers historic fuel shipment to Alaska's North Slope* (Sept. 6, 2018), *available at* https://www.ktuu.com/content/news/Barge-delivers-historic-fuel-shipment-to-North-Slope-492658221.html.

[1903] *See* DEIS, vol. 1, at 3-64 (identifying spills over 100,000 gallons as "very large").

[1904] *See* KTUU, *Barge delivers historic fuel shipment*.

[1905] *See* DEIS, vol. 1, at 3-224.

[1906] *See* Tug Tech. & Bus., *Crowley orders new Alaskan ATB*, (Jan. 16, 2018), *available at* https://www.tugtechnologyandbusiness.com/news/view,crowley-orders-new-alaskan-atb_50461.htm.

[1907] *See* Alaska Public Media, *B.C. tribe sues U.S. barge company over 2016 spill* (Oct. 11, 2018), *available at* https://www.alaskapublic.org/2018/10/11/b-c-tribe-sues-u-s-barge-company-over-2016-spill/.

million-gallon) fuel cargo.[1908] Indeed, it is worth noting the upcoming 30th anniversary of the *Exxon Valdez* oil spill on March 24, 2019. The *Exxon Valdez* released 11 million gallons of oil into the pristine waters of Prince William Sound and left a ruinous legacy from which the region has never fully recovered. A spill of this magnitude in the Arctic would have similarly devastating consequences on marine and coastal ecosystems and subsistence resources. Accordingly, the spill analysis in section 3.2.11 of the DEIS must be expanded to encompass large-scale spills into the marine environment from bulk fuel barges, both near the program area and along the marine barge route from Dutch Harbor to Kaktovik.

Additionally, as the DEIS acknowledges, toxic chemicals and other hazardous materials are used in oil and gas operations and have been known to kill polar bears through accidental ingestion.[1909] In fact, on the North Slope of Alaska, substantial quantities of acidic, explosive, poisonous, flammable, and corrosive materials are transported into the area each year, including several substances designated "extremely hazardous," such as sulfuric acid, hydrochloric acid, hydrogen peroxide, and chlorine.[1910] The same types of chemicals can be expected to be used at new oil and gas facilities on the Coastal Plain. While trucks have been used to transport chemicals to the North Slope historically,[1911] marine transportation is likely to be used for Coastal Plain operations given the lack of a road between Kaktovik and Deadhorse.[1912] The spill analysis in section 3.2.11 of the DEIS must therefore be expanded to encompass toxic chemical spills into the marine environment from shipping activities both near the program area and along the marine barge route from Dutch Harbor to Kaktovik.

Finally, the DEIS must consider the marine impacts of potential oil spills on keystone Arctic species, such as the Arctic cod. Arctic cod (*Boreogadus saida*) are an energy-rich Arctic keystone forage fish that serve as primary prey species for marine mammals, seabirds, and fish. A recent study by scientists at Oregon State University and NOAA found that exposure of Arctic cod eggs to low dosages of Alaskan North Slope crude oil resulted in sublethal cardiac abnormalities and deficits in energetics that lasted into the juvenile stage.[1913] The scientists found that developing Arctic cod exposed to oil as embryos entered the overwintering period with less energy reserves, contributing to high mortality rates during a period critical to their survival.

[1908] *See* Hakai Magazine, *The Lingering Legacy of the Nathan E. Stewart* (April 10, 2017), *available at* https://www.hakaimagazine.com/news/lingering-legacy-nathan-e-stewart/.

[1909] *See, e.g.*, DEIS, vol. 1, at 3-64 and 3-141.

[1910] *See* U.S. Coast Guard, *et al*, *Arctic & Western Alaska Area Contingency Plan*, at 282-83 (version 1.0, Aug. 2018), *available at* http://dec.alaska.gov/media/10703/arctic-western-plan.pdf.

[1911] *See id.*

[1912] *See* DEIS, vol. 1, at 3-224.

[1913] Laurel, B., *et al*, *Acute and latent bioenergetic impacts of oil on a keystone Arctic forage fish (Boreogadus saida)*, PNAS 22 (forthcoming) (research presented at Soc'y Envtl. Tech. & Chem. N. Amer., 39th Ann. Mtg. (Sacramento, CA, Nov. 2018); Alaska Mar. Sci. Symp. (Anchorage, AK, Jan. 2019); and 20th Int'l Symp. Poll. Resp. Mar. Orgs. (scheduled Charleston, SC, May 2019)), *more information available at* http://ceoas.oregonstate.edu/profile/copeman/.

Reduced survival and fat content are irreversible impacts that make Arctic cod, and in turn, the maritime Arctic ecosystem that depends on them, highly vulnerable to an oil spill.

Furthermore, Arctic cod eggs are buoyant,[1914] as is oil, making them additionally sensitive to potential oil spills. Although scientific understanding of Arctic cod's early stages remains limited, recent modeling suggests that eggs likely move with ice front, floating just underneath the ice, from the Bering Strait into the Chukchi Sea where there are high populations of developing Arctic cod.[1915] If the Coastal Plain were to be developed, and Arctic cod embryos came into contact with oil from a future spill, the eggs would be in contact with the oil for an extended period of time. Thus the eggs are highly vulnerable to exposure. The spill analysis in section 3.2.11 of the DEIS must also therefore be expanded to encompass the impacts of oil spills on the survival of keystone species at critical life stages and the marine ecosystems whose life they support.

b. Noise

Underwater noise is recognized by the International Whaling Commission (IWC) as one of six priority threats to cetaceans globally.[1916] In 2018, the IWC agreed by consensus a Resolution recognizing the increasing concern over ocean noise.[1917] Underwater noise has also been a topic of dedicated attention under the United Nations Convention on Biological Diversity[1918] and as part of the United Nations Consultative Process on Oceans and the Law of the Sea.[1919] Specific to the shipping sector, the International Maritime Organization (IMO) has

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[1914] *See* Sundby, S., *Factors affecting the vertical distribution of eggs*, 192 ICES Mar. Sci. Symp. 33 (1991), *available at* http://www.ices.dk/sites/pub/Publication%20Reports/Marine%20Science%20Symposia/ICES%20Marine%20Science%20Symposia%20-%20Volume%20192%20-%201991%20-%20Part%2007%20of%2041.pdf.

[1915] Vestfals, C., *et al.*, *Modeling Growth and Transport of Arctic Cod and Saffron Cod Early Life Stages in the Pacific Arctic Under Variable Climate Forcing*, Alaska Mar. Sci. Symp. (presentation) (Anchorage, AK, Jan. 2019, *abstract available at* https://static1.squarespace.com/static/596e8ac529687ff6231cda81/t/5c48f20288251b738e022a00/1548284448641/2019_AMSS_abstractbook.pdf.

[1916] *See* IWC Cons'n Committee, Strategic Plan 2016-2026 (Oct. 2016), *available at* https://iwc.int/document_3644.download.

[1917] *See* IWC, Resolution on Anthropogenic Underwater Noise (Brazil, Sept. 2018), *available at* https://iwc.int/document_3685.download.

[1918] *See generally, e.g.*, Secretariat Conv. Biol. Diversity, CBD Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity, Meeting Documents (UK, Feb. 25-27, 2014), https://www.cbd.int/meetings/MCBEM-2014-01.

[1919] *See, e.g.*, U.N. General Assembly, *Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its nineteenth meeting*, 73d sess., item 78(a) (distrib. July 9, 2018), *available at* https://documents-dds-ny.un.org/doc/UNDOC/GEN/N18/216/69/DOC/N1821669.DOC.

made underwater noise a key subject of its agendas and work programs since 1992.[1920] In 2014, for example, the IMO adopted guidelines to help protect marine life from the harmful impacts of noise from commercial shipping.[1921] The IMO guidelines state that the "international community recognizes that underwater-radiated noise from commercial ships may have both short and long-term negative consequences on marine life, especially marine mammals."[1922]

The DEIS contains several important gaps in discussion and evaluation of the scope and impacts of underwater noise generated by shipping activities associated with the proposed action, including the following:

Geographic Scope. The discussions in the DEIS regarding the impacts of noise in general and on fish, birds, marine mammals, and subsistence focus heavily on noise-generating activities within or near the program area, especially in the vicinity of Kaktovik.[1923] As a result, they largely fail to address shipping noise along the marine barge route and its resulting impacts on wildlife, habitat, and subsistence activities in the many important marine areas along that route. The DEIS should be revised to address noise impacts from shipping along the marine barge route.

Icebreaking. The DEIS identifies propeller cavitation as the "primary" source of noise associated with vessel operations.[1924] This is generally consistent with the IMO guidelines, which identify propeller cavitation as the main source of noise from commercial ships and recognize onboard machinery and operation as relevant sources as well.[1925] Noise from shipping in the Arctic, however, is also generated from icebreaking operations, both as underwater and airborne noise. Moreover, vessel traffic is expected to continue increasing in the region and, even with the longer ice-free season, vessel traffic is still expected to require significant ice-breaker capacity.[1926] The July 1 seasonal restriction helps avoid ice during spring break-up, but since there is no seasonal restriction limiting vessel operation during or after fall freeze-up, there is a very real likelihood of vessel operations when ice is present and icebreaking is needed. Yet

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[1920] *See* IMO Webpage, Ship Noise, http://www.imo.org/en/MediaCentre/HotTopics/Pages/Noise.aspx (accessed Jan. 2019); E. Kleverlaan, IMO-MED, Presentation, *IMO and its role in protecting the marine environment in the Mediterranean Sea*, at 53 (Dec. 2016), *available at* http://www.medmpaforum.org/sites/default/files/pres.fsob3a_kleverlaan_0.pdf.

[1921] IMO Marine Envt. Prot. Comm., *Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life*, MEPC.1/Circ.833, Gothenburg-Sweden (July 30, 2014), *available at* http://www.ascobans.org/sites/default/files/document/AC21_Inf_3.2.1_IMO_NoiseGuidelines.pdf.

[1922] *Id.*, annex § 1.1.

[1923] *See* DEIS vol. 1, at 3-19 to 3-23 (general), 3-82 (fish), 3-96 to 3-98 (birds), 3-135 to 3-139 (marine mammals), and 3-170 to 3-172 (subsistence).

[1924] *Id.* at 3-139.

[1925] *See* IMO Guidelines, annex § 3.2.

[1926] *See* McWhinnie, *Vessel traffic in the Canadian Arctic*.

there is no discussion in the DEIS of potential impacts of noise resulting from icebreaking. Furthermore, there is no recognition of icebreaking noise as causing sea ice habitat loss or alteration. Studies document impacts of icebreaking by ships on Arctic cetaceans, for instance, beluga whales have been deflected by icebreaker noise and have left the area with active icebreaking for as long as two days thereafter.[1927] Ringed and bearded seals hauled out on ice showed avoidance behavior when an icebreaking vessel was more than 1 kilometer away,[1928] and icebreakers can also adversely affect ice-breeding seals during pupping and lactation periods through direct collision or separation of mothers and pups.[1929] Icebreaking noise and disturbance are not addressed anywhere in the DEIS, and this represents a major substantive gap. The DEIS should be revised to include a substantial discussion of icebreaking noise impacts near the program area and along the marine shipping route, and an analysis of the impact of icebreaking on sea ice habitat loss and alteration should be added in section 3.3.5 of the DEIS.[1930]

Acoustic Environment. The general section on noise in the DEIS addresses impacts resulting from ground-based operations and aircraft, but it fails to address shipping and icebreaking noise impacts at all.[1931] While there is some discussion of shipping-related noise later in the DEIS, its exclusion from this section inappropriately suggests it is not an important consideration. The general section should be revised to include at least an overview of shipping noise impacts, including those associated with icebreaking.

Fish. Much like the general acoustic impacts section, the fish section of the DEIS fails to address shipping-related noise impacts at all.[1932] This is a significant omission because fish have exhibited avoidance behaviors when confronted with noisy vessels, and noise levels from icebreaking can reach levels of up to 190 decibels (dB), which is above the threshold for fish to initiate avoidance behavior.[1933] An analysis of the potential shipping and icebreaking noise

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[1927] Finley, K. J., *et al, Reactions of belugas, Delphinapterus leucas, and narwhals, Monodon monoceros, to ice-breaking ships in the Canadian high arctic*, 224 Can. B. Fish. Aquat. Sci. 97 (1990); Erbe, C., *et al, Zones of Impact Around Icebreakers Affecting Beluga Whales in the Beaufort Sea*, 108 J. Acoust. Soc. Am. 1332 (Sept. 2000), *available at* https://icefloe.net/aicc/icebreaker_beluga_whales.pdf.

[1928] *See id.*

[1929] Univ. Washington, *et al, Vulnerability of Arctic marine mammals to vessel traffic in the increasingly ice-free Northwest Passage and Northern Sea Route*, 115 PNAS 7619 (June 4, 2018), *available at* https://www.pnas.org/content/pnas/115/29/7617.full.pdf; S. Wilson, et al, *Assessment of impacts and potential mitigation for icebreaking vessels transiting pupping areas of an ice-breeding seal*, 214 Biol. Cons. 213 (Oct. 2017), *available at* https://www.sciencedirect.com/science/article/pii/S0006320717301672/pdfft?md5=253cb391e3fc3856397e8f90a8c4440a&pid=1-s2.0-S0006320717301672-main.pdf.

[1930] *See* DEIS, vol. 1, at 3-133–3-135.

[1931] *See id*. at 3-19 to 3-23.

[1932] *See id.* at 3-82.

[1933] *See* NMFS, Alaska Region, *Impacts to Essential Fish Habitat from Non-Fishing Activities in Alaska, EFH 5 Year Review: 2010 through 2015*, at 149-50 (May 2017), *available at*

impacts on fish and essential fish habitat (EFH) near the program area and along the marine shipping route should thus be included in a revised draft EIS.

Birds. The DEIS devotes a few sentences to the shipping-related disturbance and displacement of birds and their habitat, but these statements are very cursory and general.[1934] Additional analysis of shipping and icebreaking noise impacts on birds near the program area and along the marine shipping route should be included in a revised draft EIS.

Marine Mammals. The most extensive discussion of noise impacts is in the marine mammal section of the DEIS.[1935] The discussion is flawed, however, because it relies too heavily on the presumed effectiveness of the proposed ROPs. As a result, it understates the potential impacts and inappropriately concludes that they will be minimal. Conclusions that there will be no population-level impacts resulting from disturbance (e.g., seals[1936]) also lack justification and evidence. Additionally, as discussed in Section V(K) above with respect to polar bears, the DEIS fails to analyze the impacts of underwater noise arising from the construction of shipping-related facilities offshore, such as pile-driving, which can harm cetaceans and other marine mammals.[1937] The discussion should be revised to provide a more realistic analysis of shipping, icebreaking, and construction noise impacts on marine mammals near the program area and along the marine shipping route.

Subsistence. The discussion of noise impacts in the subsistence section of the DEIS similarly assumes that the ROPs will be highly effective in mitigating impacts,[1938] and thus the DEIS understates the potential adverse effects. Where subsistence activities involving marine mammals are expected to be disturbed, the discussion focuses on whales and mentions other marine mammals only in passing.[1939] This is inadequate. For example, BLM predicts the effects of noise disturbance on seals will be temporary (less than 5 years), with no lasting demographic effects.[1940] Presumably, however, displacement of the majority of seals from the project area in response to noise would have a notable impact on subsistence activities. The discussion should be revised to provide a more accurate analysis of shipping and icebreaking noise impacts on subsistence near the program area and along the marine shipping route.

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ftp://ftp.library.noaa.gov/noaa_documents.lib/NMFS/TM_NMFS_AFKR/TM_NMFS_FAKR_14.pdf.

[1934] *See* DEIS, vol. 1, at 3-97 to 3-98.

[1935] *See id.* at 3-135 to 3-139.

[1936] *See id*. at 3-139.

[1937] *See* Bailey, H., et al, *Assessing underwater noise levels during pile-driving at an offshore windfarm and its potential effects on marine mammals,* 60 Mar. Poll. B. 888 (2010).

[1938] *See id.* at 3-170 to 3-172.

[1939] *See id.* at 3-170 to 3-171.

[1940] *See id.* at 3-139.

c. Ship Strikes

The DEIS's conclusion that ship strikes of whales and seals would be "unlikely"[1941] is based in large part on BLM's assumption that vessel traffic would be traveling slowly, i.e., at less than around 10 knots.[1942] There is presently nothing in the leasing stipulations or ROPs, however, generally requiring ships to adhere to a 10-knot speed limit. This section of the DEIS should be completely revised. The revised version needs to present a more realistic, scientifically-based analysis of the risk and impacts, including at individual and population levels, of vessel strikes based on overlap of whale habitat with shipping routes and the actual speeds at which vessels are expected to travel, both within or near the program area and along the marine barge route. Even if a speed limit is added in certain areas as a required and enforceable mitigation measure (as discussed below), revision of the analysis would still be needed. This is especially important given that worldwide records of ship strikes on whales show that all large whales are at risk, particularly right whales and bowhead whales, and ship strikes can significantly affect small populations of whales.[1943] Both bowhead and right whales occur along the proposed shipping route, including an extremely at-risk population of North Pacific right whales. Whales do not necessarily avoid transiting ships because they may be distracted by their engagement in other behaviors and because they may have difficulty determining a ship's approach angle under certain circumstances.[1944]

The DEIS's reliance on the paucity or absence of records or evidence of ship strikes to conclude that strikes are unlikely is not satisfactory.[1945] As noted by the IWC, ship strikes often go unnoticed, unreported, or undiscovered,[1946] so relying on recorded strikes alone is likely to substantially underestimate actual incidences of ship strikes. Indeed, documenting ship strikes is especially challenging in Alaska, and such collisions are vastly under-reported.[1947] Nevertheless, a recent study summarizes 108 reported whale-vessel collisions that occurred in Alaska from 1978 to 2011, 25 of which are known to have been fatal.[1948] The most commonly struck species were humpback whales.[1949] While most vessel strikes were by small vessels, medium vessels

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[1941] *See id.* at 3-143.

[1942] *See id.* at 3-142.

[1943] Laist, D. W., *et al, Collisions between ships and whales,* 17 Mar. Mamm. Sci. 35 (Jan. 2001), *available at* https://www.greateratlantic.fisheries.noaa.gov/shipstrike/whatsnew/laist%20et%20al_2001.pdf.

[1944] *See* Williams, S., *et al, Factors affecting whale detection from large ships in Alaska with implications for whale avoidance*, 30 End. Species Res. 209, 210 (June 15, 2016), *available at* https://www.int-res.com/articles/esr2016/30/n030p209.pdf.

[1945] *See* DEIS, vol. 1, at 3-142.

[1946] *See* IWC Webpage, Conservation and Management: Ship Strikes, https://iwc.int/ship-strikes (accessed Feb. 26, 2019).

[1947] *See* Neilson, J., *et al*, *Summary of Reported Whale-Vessel Collisions in Alaskan Waters,* 2012 J. Marine Biol., Article ID 106282 (2012), *available at* https://www.hindawi.com/journals/jmb/2012/106282/.

[1948] *See id.*

[1949] *See id.*

(50- to 260-foot) and large vessels (greater than 260-foot) also struck whales.[1950]

3. BLM's mitigation measures are inadequate.

The mitigation measures most relevant for shipping are set forth in lease stipulations 4 and 9 and ROPs 10, 36, and 46. To strengthen these provisions, we urge BLM to adopt the modifications described below.

Advance Consultation. Lease stipulations 4 (Alt. D) and 9 (Alts. C and D) require that, before engaging in open water activities, the lessee/operator/contractor must consult with the Alaska Eskimo Whaling Commission, the North Slope Borough, and local whaling captains' associations to minimize adverse impacts on subsistence activities.[1951] Similarly, ROP 36 requires permittees who propose transporting materials to the Coastal Plain in support of oil and gas activities to engage in advance consultation with the entities listed above in order to minimize subsistence impacts.[1952] We believe advance consultation as a means to prevent conflicts and adverse impacts is a beneficial approach.[1953] We urge BLM to expand these requirements to all action alternatives and to clarify that bulk fuel and hazardous substances are among the materials for which marine transport requires advance consultation. We further urge BLM to require the lessee/operator/contractor to engage in prior consultation with the U.S. Coast Guard before engaging in shipping activities. The Coast Guard has the expertise and resources to help prevent collisions, groundings, and other incidents that could lead to oil and hazardous substance spills, marine mammal strikes, or other adverse impacts. Additionally, we urge BLM to require advance consultation with the Bering Sea Elders Group, Kawerak, Inc., and Maniilaq Association before transporting materials through the Bering Sea region to the program area. These entities have access to extensive information concerning local marine mammals, sea ice conditions, and vessel traffic that would be invaluable in ensuring safe transit and preventing spills, collisions, and other adverse impacts. Prior consultation would help minimize such impacts by facilitating communication and information-sharing regarding topics such as: planned ship routing, scheduling, weather and ice conditions, visibility, topographic hazards, vessel equipment functionality, adequacy of vessel staffing, proximity of nearest emergency response facilities, presence of other nearby vessels, and recent sightings of marine mammals or other wildlife.

Polar Bear Den Avoidance. ROP 10 prohibits oil and gas activity within one mile of known or observed polar bear dens, subject to limited exceptions.[1954] We note that this ROP is only effective to the extent polar bear dens are accurately detected, and detection techniques have many shortcomings that BLM failed to consider. We further note that this ROP appears

[1950] *See id.*

[1951] *See* DEIS, vol. 1 at 2-8 and 2-15.

[1952] *See id.* at 2-33.

[1953] *See generally* Huntington, *Vessels, risks, and rules* (discussing impacts to indigenous communities not just from availability of whales for subsistence uses but also from vessel conflicts, increased swamping/collision risks between small and large vessels, and other issues).

[1954] *See id.* at 2-20.

limited in scope to onshore oil and gas operations. We urge BLM to expand its applicability to encompass shipping activities as well and to include language clarifying that it prohibits icebreaking and other shipping activities within a one-mile radius of any polar bear den, including those on land and on sea ice.

Seasonal Restriction. ROP 46 includes a seasonal restriction designed to minimize impacts on marine mammals from vessel traffic. Vessel traffic associated with Coastal Plain oil and gas operations is generally prohibited before July 1.[1955] We support the idea of a seasonal restriction not only because it helps minimize conflicts with marine mammals, but also because it reduces the risks of oil and hazardous substance spills occurring due to poor weather, visibility, and ice conditions and because such spills would be extraordinarily difficult to clean up in such conditions.[1956] Moreover, avoiding seasonal periods when ice is present reduces or eliminates the need to utilize noisy and disruptive icebreaking measures that are harmful to wildlife. We urge BLM to strengthen this measure by adding an October 1 fall termination date for vessel traffic.[1957] The same rationale supporting the early-season restriction would counsel in favor of this change. Precluding late-season shipping would likewise help minimize wildlife conflicts and ensure that shipping is not taking place during poor weather, visibility, and ice conditions that increase the need for icebreaking, increase the likelihood of oil and hazardous substance spills, and increase the difficulty of cleaning up any such spill. We also urge BLM to strengthen ROP 46 by requiring consultation with the U.S. Coast Guard before any waiver of the July 1 or October 1 seasonal restrictions is granted, in addition to consultation with NMFS and/or USFWS. While the resource agencies have expertise concerning marine mammals, the Coast Guard is the expert agency with respect to navigation safety and the avoidance of collisions, groundings, and oil and hazardous substance spills, all of which can harm marine mammals and other wildlife.

Speed Limits. The analysis in the DEIS concludes that shipping impacts on marine mammals will be minimal because barges will generally be traveling slowly, such as at speeds of 10 knots or less.[1958] The 10-knot speed restriction in ROP 46, however, only applies in North Pacific right whale critical habitat.[1959] Additionally, recommended 5- and 9-knot speed limits

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[1955] *See id.* at 2-37.

[1956] *See, e.g.*, E&E News, *The U.S. Is Not Ready to Clean Up an Arctic Oil Spill* (July 19, 2017), *available at* https://www.scientificamerican.com/article/the-u-s-is-not-ready-to-clean-up-an-arctic-oil-spill/; J. Wilkinson, et al, *Oil spill response capabilities for ice-covered Arctic marine waters: A review of recent developments and established practices*, 46 Ambio 423 (Oct. 28, 2017), *available at* https://link.springer.com/content/pdf/10.1007%2Fs13280-017-0958-y.pdf.

[1957] *See* Rolph, R., *et al, Impacts of a lengthening open water season on Alaskan coastal communities: deriving locally relevant indices from large-scale datasets and community observations*, 12 Cryosphere 1779, 1780 (May 2018) (describing fall freeze-up in the Arctic as typically occurring in October or early November each year), *available at* https://www.the-cryosphere.net/12/1779/2018/tc-12-1779-2018.pdf.

[1958] *See* DEIS, vol. 1 at 3-142.

[1959] *See id.* at 2-37.

are among the "reasonable precautions" that could be taken "as appropriate" when whales are observed nearby.[1960] These geographically limited and non-binding speed limits are inadequate. As BLM has observed, the "speed of ships is related directly to the severity of collisions between vessels and whales."[1961] Moreover, ship speed is a key factor affecting the risk of collisions, groundings, and oil and hazardous substance spills.[1962]

In many Arctic areas, it may be difficult to establish complete avoidance areas to protect marine mammals due to geographical limitations and navigational hazards, but speed restrictions on vessels are feasible, and they have been widely acknowledged as effective in reducing the risks posed by vessels to whales and other marine mammals.[1963] Restricting vessel speed can mitigate ship strikes, reduce noise impacts, prevent oil and hazardous substance spills, reduce air emissions, and minimize other types of harm.[1964] Studies have shown, for instance, that ships traveling at lower speeds have higher rates of detecting whales and more opportunities to undertake avoidance maneuvers, especially when ability of ship personnel to detect a whale is compromised by poor visibility or other adverse conditions.[1965] Slower-moving ships also give

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[1960] *Id.*

[1961] *Id*. at 3-142.

[1962] *See generally* McWhinnie, *Vessel traffic in the Canadian Arctic;* Huntington, *Vessels, risks, and rules*. *See, e.g.*, 33 C.F.R. § 162.240(b) (imposing a 7-knot speed limit for vessels over 23 feet in length as a safety measure in Tongass Narrows).

[1963] *See* McWhinnie, *Vessel traffic in the Canadian Arctic*; Huntington, *Vessels, risks, and rules;* Wiley, D., *et al, Modeling speed restrictions to mitigate lethal collisions between ships and whales in the Stellwagen Bank National Marine Sanctuary, USA*, 144 Biol. Cons'n 2377 (Sept. 2011), *available at* http://www.pelagicos.net/MARS6910_spring2012/readings/Wiley_et_al_2011.pdf; Conn, P.B. and Silber, G.K., *Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales*, 4 Ecosphere 1 (April 2013), *available at* https://esajournals.onlinelibrary.wiley.com/doi/full/10.1890/ES13-00004.1; Laist, D., *et al, Effectiveness of mandatory vessel speed limits for protecting North Atlantic right whales*, 23 End. Species Res. 133 (Feb. 28, 2014), *available at* https://www.int-res.com/abstracts/esr/v23/n2/p133-147/; van der Hoop, J. *et al, Vessel Strikes to Large Whales Before and After the 2008 Ship Strike Rule*, 8 Cons'n Letters 24 (Jan.-Feb. 2015), *available at* https://onlinelibrary.wiley.com/doi/epdf/10.1111/conl.12105.

[1964] *See* McWhinnie, *Vessel traffic in the Canadian Arctic;* Huntington, *Vessels, risks, and rules*; Faber, J. et al, Regulated slow steaming in maritime transport - an assessment of options, costs and benefits, CE-Delft, Netherland (2012), attached as Exhibit __ and *available at* https://www.cedelft.eu/publicatie/regulated_slow_steaming_in_maritime_transport/1224 (describing speed restrictions as the "most cost-effective way to reduce ship emissions").

[1965] *See* Williams, *Factors affecting whale detection from large ships in Alaska*; Gende, S., *et al, A Bayesian approach for understanding the role of ship speed in whale-ship encounters*. 21 Ecol. Applic. 1887 (Sept. 2011), *available at* https://esajournals.onlinelibrary.wiley.com/doi/10.1890/10-1965.1; Currie, J. et al, *Modelling whale-vessel encounters: the role of speed in mitigating collisions with humpback whales (Megaptera novaangliae)*, 17 J. Cetacean Res. Mgmt. 57 (2017), *available at* https://fh-

whales a greater opportunity to avoid ships, in addition to helping ships avoid whales.[1966] Additionally, reduced vessel speeds reduce the mortality to whales when collisions do occur.[1967]

We urge BLM to expand the applicability of the 10-knot speed limit in ROP 46 to all barges, tankers, and other operational and support vessels associated with Coastal Plain oil and gas operations transiting the 5 nm buffer zone offshore of the program area and its vicinity.[1968] Doing so would be consistent with the U.S. Bureau of Ocean Energy Management's (BOEM's) recent decision concerning the Liberty offshore drilling and production facility, which provided that "[v]essels traveling between West Dock/Endicott and Foggy Island Bay will not exceed speeds of 10 knots in order to reduce the potential for whale strikes."[1969] In adopting this mitigation measure, BOEM explained that "vessel speed restrictions reduce the potential for whale collisions" and that "[s]tudies referenced in the Liberty FEIS show that almost 90% of collisions where whales were killed or severely injured occurred with vessel speeds in excess of 14 knots, and no collisions occurred at speeds at or below 10 knots."[1970] In the DEIS, BLM similarly states that "[c]ollisions with whales are rare for slow-moving vessels traveling at less than 10 knots."[1971]

We note that, while a 10-knot speed limit substantially reduces the number of whale strikes and their severity, it does not entirely eliminate the risk of collision. Slower speeds are appropriate under certain circumstances, including when ships approach within 300 yards of observed whales and when visibility is limited. ROP 46 reflects this by recommending 5- and 9-knot speed limits, respectively, in such situations. We urge BLM to make these 5- and 9-knot speed limits mandatory rather than merely listing them among the "reasonable precautions" that an operator "would take" to avoid whale interactions.

Also, in a revised DEIS, BLM should carefully analyze whether a 10-knot speed limit would reduce harmful impacts to marine mammals at the individual and population level in other sensitive areas along the marine barge route, such as the Chukchi Corridor, Hanna Shoal, Herald Shoal, Barrow Canyon East, Smith Bay, Harrison Bay-Colville Delta, Beaufort Shelf Break, Oliktok Point to Demarcation Bay, Bering Strait, and waters surrounding King Island, St. Lawrence Island, and Nunivak Island. If so, these areas should be delineated and the 10-knot speed limit should be applied to them as part of ROP 46 as well.

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sites.imgix.net/sites/759/2018/02/13174624/Currie-et-al-2017-Modelling-whale-vessel-encounters-the-role-of-speed-in-mitigating-collisions-with-humpback-whales-Megaptera-novaeangliae.pdf.

[1966] *See* Williams, *Factors affecting whale detection from large ships in Alaska*.

[1967] *See* Wiley, *Modeling speed restrictions to mitigate lethal collisions*; Conn, *Vessel speed restrictions reduce risk of collision-related mortality*.

[1968] *See* DEIS, vol. 2, appx. A, map 3-25.

[1969] BOEM, Alaska OCS Region, Beaufort Sea Outer Continental Shelf Liberty Development and Production Plan, Record of Decision, at 11 (Oct. 2018), *at* https://www.boem.gov/Liberty-Record-of-Decision/.

[1970] *Id*. at 12.

[1971] DEIS, vol. 1 at 3-142.

Consistent with existing NMFS speed restrictions protecting whales, vessels may be allowed to deviate from the 10-knot speed limit when necessary for navigational safety, as long as (1) the deviation is justified because oceanographic, hydrographic and/or meteorological conditions severely restrict the maneuverability of the vessel and the need to operate at such speed is confirmed by the pilot on board or, when a vessel is not carrying a pilot, the master of the vessel, (2) the reasons for the deviation along with the vessel speed, area, time, and duration of the deviation are entered into the vessel logbook, and (3) the master of the vessel attests to the accuracy of the logbook entry by signing and dating it.[1972]

Additionally, ROP 46 calls upon vessel operators to undertake a variety of measures when approaching within 1 mile of observed whales, including reducing the vessel speed to less than 5 knots when the vessel is within 300 yards of a whale. We urge BLM to strengthen this provision by requiring vessel speed to be reduced to 10 knots as soon as the vessel approaches within 1 mile of observed whales, and then vessels would further reduce speed to 5 knots when coming within 300 yards of a whale pursuant to the existing provision. With respect to this provision and all other provisions in ROP 46, the language must be revised to clarify that the procedures impose mandatory obligations. For instance, "would" and "should" must be replaced with "must" or "shall."

Geographic Scope. At present, lease stipulations 4 and 9 are limited to nearshore and coastal activities, and ROP 10 is only applicable to onshore oil and gas operations. The geographic scope of ROPs 36 and 46 is less clear but, given the DEIS's general emphasis on program area impacts, they could be construed as limited to oil and gas operations within or in the immediate vicinity of the program area. Shipping-related adverse impacts, however, have the potential to occur anywhere along the marine barge route as well. Accordingly, we urge BLM to revise lease stipulations 4 and 9 and ROPs 10, 36, and 46 to make it clear that these provisions are applicable to all shipping activities associated with Coastal Plain oil and gas operations wherever they may occur.

4. BLM failed to involve relevant cooperating agencies.

In preparing an EIS, the lead agency is expected to "emphasize agency cooperation early in the NEPA process" and to include as a cooperating agency any other federal agency which has "jurisdiction by law" and/or "special expertise with respect to any environmental issue."[1973] Moreover, under U.S. Department of the Interior regulations, BLM must "whenever possible consult, coordinate, and cooperate with ... other bureaus and Federal agencies concerning the environmental effects of any Federal action within the jurisdictions or related to the interests of these entities."[1974]

The U.S. Coast Guard has both jurisdiction and special expertise regarding the risks and

[1972] *See* 40 C.F.R. § 224.105(c).
[1973] 40 C.F.R. § 1501.6; *see id.* § 1508.5.
[1974] 43 C.F.R. § 46.155.

impacts of the shipping activities associated with the proposed action.[1975] For example, the Coast Guard has broad legal authorities relating to discharges of oil and hazardous substances.[1976] It is, in fact, the lead agency for such issues in the "coastal zone" (as opposed to the "inland zone" where EPA authority takes precedence).[1977] The Coast Guard also inspects, certifies, and regulates vessels with respect to a wide range of pollution and environmental standards,[1978] and it has extensive authority over and expertise relating to navigation safety, ship routing, and vessel traffic management.[1979] Further, the Coast Guard plays an important role in protecting fisheries and marine life through its enforcement authorities under several wildlife and marine conservation laws,[1980] as well as its capabilities and resources for responding to wildlife strandings, entanglements, and other similar situations.[1981] For all these reasons, we urge BLM to add the U.S. Coast Guard as a cooperating agency in the preparation of the Coastal Plain Oil and Gas Leasing Program EIS and to give it sufficient time and opportunity to participate meaningfully in the development of a revised EIS.

Additionally, NMFS has both jurisdiction and special expertise concerning the risks and impacts of shipping activities on marine mammals.[1982] As such, NMFS should be added as a cooperating agency for this NEPA process just as it served as a cooperating agency in connection with the Liberty oil and gas project discussed above.[1983] BLM appears to be consulting with NMFS with respect to ESA issues,[1984] but that is not a substitute for full cooperating agency status to ensure that NMFS's expertise is utilized and incorporated into the EIS with respect to the wide range of risks and impacts arising from shipping activities near the program area and

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[1975] It is not clear whether or not BLM reached out to the Coast Guard to request its participation as a cooperating agency or, if so, whether BLM adequately described the potential for shipping-related impacts in nearshore waters along the Coastal Plain and along the 1,600-mile marine barge route. *See* BLM, Coastal Plain Oil and Gas Leasing Program EIS Final Scoping Report (July 2018) (indicating that "BLM asked agencies if they would like to be involved" without specifying which agencies).

[1976] *See* 33 U.S.C. § 1321; 33 C.F.R. pts. 133-138.

[1977] *See* 40 C.F.R. §§ 300.100, 300.175(b)(1); 33 C.F.R. §§ 1.01-80, 153.105; Exec. Order 12580 (Jan. 23, 1987), as amended; Exec. Order 12777 (Oct. 18, 1991), as amended.

[1978] *See* 46 U.S.C. chs. 31-47; 33 C.F.R. pts. 151-159.

[1979] *See* 33 U.S.C. ch. 25; 33 C.F.R. pts. 160-169.

[1980] *See, e.g.*, 16 U.S.C. §§ 1431-1445 (National Marine Sanctuaries Act), 1531-1544 (Endangered Species Act), 1801 (Magnuson-Stevens Fisheries Conservation and Management Act), and 3371-3378 (Lacey Act).

[1981] *See* U.S. Coast Guard Webpage, *Authorities*, *available at* https://www.uscg.mil/readings/Article/1548177/authorities/ (accessed Jan. 2019).

[1982] *See generally* NMFS Webpage, *Marine Mammal Protection*, *available at* https://www.fisheries.noaa.gov/topic/marine-mammal-protection; NMFS Webpage, *Protecting Marine Life in Alaska*, https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/protecting-marine-life-alaska (accessed Feb. 26, 2019).

[1983] *See* BOEM, Final EIS for Liberty Development and Production Plan (Aug. 2018), *available at* https://www.boem.gov/Vol-1-Liberty-FEIS/.

[1984] *See* DEIS, vol. 1 at 1-4 to 1-5.

along the 1,600 mile marine barge route.[1985]

X. BLM'S ANALYSIS OF THE ECONOMIC IMPACTS OF AN OIL AND GAS PROGRAM IS INADEQUATE.

BLM's economic impacts analysis is deficient in numerous respects and fails to identify and analyze the reasonably foreseeable economic costs and benefits of an oil and gas program on the Coastal Plain. Appendix C to these comments provides a detailed technical review of the economics analysis contained in the draft EIS, prepared by Dr. Carolyn Alkire and Anna Perry of Key-Log Economics. We fully incorporate that document by reference into our comments and provide a brief summary below.

The promise of cheaper, more abundant energy — and associated federal revenues — was a primary driver behind opening the Coastal Plain to oil and gas development, including its inclusion in the 2017 Tax Act. Prior to passage of the Tax Act, the Congressional Budget Office estimated that federal revenue from Coastal Plain development during 2018–2027 would be $1.1 billion,[1986] with the same amount going to the State of Alaska. The draft EIS does not even include estimates of anticipated revenue from lease sales,[1987] and several recent Arctic lease sales have not brought in revenues to match the projections in the Tax Act.[1988]

Where BLM does attempt to forecast economic benefits, it does so based on questionable or sometimes plainly faulty assumptions. For instance, despite tremendous uncertainty, BLM considers only one development scenario that relies on unjustified production assumptions, including aggressive leasing and exploration, oil and gas prices high enough to support development,[1989] and the likelihood that oil will be discovered in and recoverable from a small

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[1985] It is not clear whether BLM specifically asked NMFS to participate as a cooperating agency or, if so, whether BLM adequately described the potential for shipping-related impacts on marine mammals near the program area and along the 1,600-mile marine barge route. *See* BLM, Coastal Plain Oil and Gas Leasing Program EIS Final Scoping Report (July 2018) (indicating that "BLM asked agencies if they would like to be involved" without specifying which agencies).

[1986] Congressional Budget Office Cost Estimate (Nov. 2017), available at https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=3454269F-6DC5-4E6C-9F23-99D1E3E64698.

[1987] *See* Draft EIS vol. 1 at 3-231 (BLM not estimating or quantifying bonus bids or rental payments from leasing).

[1988] *See* BLM lease sale data for the National Petroleum Reserve-Alaska, 1999–2018, available at: https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/regional-lease-sales/alaska; Key-Log Economics, *Arctic National Wildlife Refuge: Economics of Potential Oil Development* (Nov. 2017).

[1989] U.S. Energy Information Administration, *Annual Energy Outlook 2019*, p. 56, available at https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf ("Exploration and development of fields in ANWR is not economical in the Low Oil Price case.").

number of large fields.[1990] BLM's hypothetical timeline for development — a critical assumption underlying a complete and accurate economic impacts analysis — is also problematic, unrealistically short, does not consider potential delays (e.g., due to weather or litigation), inconsistently reported throughout the draft EIS,[1991] and inconsistent with the timeline developed by the Energy Information Administration,[1992] whose modelling of likely production undergirds the development scenario. Moreover, BLM's estimates of technically and economically recoverable oil are suspect in many respects,[1993] and underestimate of the development costs necessary to support production given the region's remoteness and the climate. Because they are based on faulty and unsupported assumptions, the federal revenue projections included in the draft EIS are likewise inaccurate.

Nor are the federal royalty and tax projections included in the draft EIS complete.[1994] For instance, they do not include any estimate for revenue generation in the next 10 years — providing no basis for comparison with the wildly optimistic estimates from the Congressional Budget Office ($1.1 billion) and the White House Office of Management and Budget ($1.8 billion) of federal revenue that would be generated between 2018 and 2027.[1995]

The draft EIS also includes incomplete and inaccurate information on the impact of Coastal Plain production on the oil market.[1996] Contrary to BLM's assertions that Coastal Plain development will increase U.S. demand due to minimally lower prices, the best available information from EIA consistently forecasts declining demand and increasing U.S. exports of liquid fuels, with the U.S. becoming a net petroleum liquids exporter by 2020.[1997] Furthermore, economic principles state that oil demand is a function of oil price, not supply; development cannot, in and of itself, increase demand.

Additionally, the EIS should discuss how recent major oil discoveries in the Arctic's Nanushuk formation which underlies the NPR-A and state lands will result in increased flow in the Trans-Alaska Pipeline System (TAPS) regardless of production from the Coastal Plain.

[1990] The DEIS assumes "*economically feasible* oil accumulations would be discovered in *all* potential areas and that *multiple* anchor fields (each containing at least 400 million barrels of proven producible reserves) would be discovered (p. B-13; emphasis added; "proven producible reserves" is not defined in the DEIS) (Appendix C: Key-Log, 2019, p. 4).

[1991] Appendix C: Key-Log, 2019, p. 5.

[1992] U.S. Energy Information Administration, *Analysis of Projected Crude Oil Production in the Arctic National Wildlife Refuge* (2018), available at https://www.eia.gov/outlooks/aeo/anwr.php.

[1993] *See also supra* Part IV.A.

[1994] Appendix C: Key-Log, 2019, pp. 6–7.

[1995] *See* CBO Cost Estimate (Nov. 2017), available at https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=3454269F-6DC5-4E6C-9F23-99D1E3E64698; OMB Fiscal Year 2018 Budget, available at https://www.whitehouse.gov/wp-content/uploads/2017/11/budget.pdf.

[1996] Appendix C: Key-Log, 2019, pp. 7-=–8.

[1997] U.S. Energy Information Administration 2019.

These discoveries include ConocoPhillips' Willow project[1998] and Oil Search's Nanushuk project.[1999] For the next several decades, TAPS will not face risks from low flow.

The draft EIS estimates jobs and wage income, but fails to include sufficient information about inputs it relies upon (timeline, production, and related annual costs) to support the analysis or the estimates.[2000] The estimates also include unsupported assumptions related to the creation of new jobs and associated wage income contributing to economic growth. New jobs would only be created if the workers who obtain them would otherwise be unemployed. These realities are not addressed in the draft EIS, rendering its job and wage income estimates uninformative.

The draft EIS recognizes that the significant ecosystem service values and other socio-economic benefits (including wilderness, recreation, and subsistence) of the Coastal Plain would be harmed by oil and gas development, but makes no attempt to quantify or specifically identify those impacts.[2001] Under NEPA, BLM is not permitted to quantify purported economic benefits associated with an oil and gas development program without also quantifying the economic costs of that development to nonmarket values.[2002] The draft EIS fails to explain why it did not quantify the numerous and significant nonmarket values of the Coastal Plain, and the market effects that ecological damages would have on the local economy, especially recreation and tourism. Performing such a quantitative analysis is entirely feasible and necessary to inform the analysis in the EIS. Indeed, a team from Hendrix College has a study in peer review that quantifies ecosystem services values associated with the Coastal Plain.[2003]

Finally — and compounding the failure to identify, quantify, or analyze the economic costs of an oil and gas development program on the wilderness, wildlife, subsistence, recreation, water, and other values of the Coastal Plain — the draft EIS's description of the regional economy is incomplete and misleading.[2004] Although the draft EIS acknowledges that less than 0.5% of oil and gas jobs are held by residents of the North Slope Borough,[2005] it focuses only on the oil and gas industry rather than describing the regional economy. Absent complete and quantitative information on all elements of regional asserts — including subsistence uses, tourism dollars from Coastal Plain recreation, the value of ecosystem services, etc. — BLM's baseline for analysis remains fundamentally flawed and inaccurate.

[1998] https://www.blm.gov/programs/planning-and-nepa/plans-development/alaska/willow-eis

[1999] http://www.nanushukeis.com/

[2000] Appendix C: Key-Log, 2019, p. 6.

[2001] Appendix C: Key-Log, 2019, pp. 10–11.

[2002] *See, e.g.*, *Cal. v. Block*, 690 F.2d 753, 764 (9th Cir. 1982) (EIS may not identify economic benefits of development without weighing them against environmental costs).

[2003] *See* January 30, 2019 Comments on Leasing DEIS submitted by Moran, McClung, and Young.

[2004] Key-Log, 2019, p. 10.

[2005] DEIS vol. 1 at 3-197.

Y. BLM'S ANALYSIS OF THE IMPACTS OF AN OIL AND GAS PROGRAM ON PUBLIC HEALTH IS INADEQUATE.

BLM's public health analysis lacks significant rigor and should be dramatically improved to provide the public with a more thorough understanding of the health dangers of oil development in mixed subsistence-cash economies. We encourage BLM to pay particular attention to the determinants and associated feedbacks that contribute to public health and wellness in rural Alaska.[2006]

1. Scoping Comments Requested an HIA Be Completed at the Lease Sale Stage.

The BLM reasoned that it need not conduct an HIA in part because no one wanted it at the lease sale stage. Specifically, BLM stated that "scoping comments corroborated the wider scope of analysis approach."[2007] However, the final scoping report notes the "many" comments submitted during the period called for a project-specific, systemic HIA to be conducted at the leasing stage, for baseline conditions to be measured at the leasing stage, and for the BLM to work with public health experts on the health assessment at the leasing stage.[2008] The BLM arbitrarily ignored these comments in developing the DEIS.

2. Affected Environment

a. BLM's Lease DEIS Public Health Analysis is Lacking.

Early within the Public Health section, BLM states that under NEPA regulations, projects that require an EIS must include an analysis of health impacts associated with federal actions.[2009] BLM's public health analysis is based upon a "broad description"[2010] of the general health conditions of the Affected Environment. The Affected Environment analyzed by BLM consists solely of Kaktovik due to its proximity to the proposed program area. For baseline data, BLM relies on information incorporated by reference to the "North Slope Borough (NSB) Baseline Community Health Analysis Report," which was prepared as part of a separate NEPA process for the BLM NPR-A IAP/EIS in 2012.[2011] The NPR-A is a different geographic region,

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[2006] Loring, P.A. and Gerlach, S.C. (2009). Food, culture, and human health in Alaska: an integrative health approach to food security. Environmental Science and Policy, 12: 466-478.

[2007] DEIS vol. 1 at 3-239.

[2008] Coastal Plain Oil and Gas Leasing Program EIS/Final Scoping Report at 3-30 (July 2018), https://eplanning.blm.gov/epl-front-office/projects/nepa/102555/152084/186300/Coastal_Plain_Leasing_EIS_Final_Scoping_Report_508.pdf (accessed Jan. 21, 2019).

[2009] DEIS vol. 1 at 3-239.

[2010] DEIS vol. 1 at 3-239.

[2011] Baseline community health analysis report. North Slope Borough. Department of Health and Social Services. July, 2012, at 2: http://www.north-slope.org/assets/images/uploads/BaselineCommunityHealthAnalysisReport.pdf (accessed Jan. 23, 2019).

with different community concerns. BLM should not rely on data which does not accurately represent the baseline for communities reliant upon the Coastal Plain's resources. Further, much of the data relied upon by BLM is more than 10 years old, which likely does not accurately represent current public health conditions.

BLM determined that a Health Impact Assessment (HIA) was not required for the Coastal Plain at the lease sale stage.[2012] BLM explicitly concluded that lease sales do not affect public health and therefore an HIA at the lease sale stage was not required.[2013] It provided several reasons why a "broad description" of public health status for the Affected Environment was sufficient, stating that: the Lease DEIS "did not analyze specific developments in the program area;"[2014] its decision was "consistent with recent NEPA analyses on the North Slope;"[2015] its decision was based on "changing expectations for what constitutes a sufficient examination of human health in the regulatory process;"[2016] and that scoping comments corroborated the wider scope of analysis approach.[2017] This is incorrect and BLM should conduct an HIA for the leasing program now.

b. Health Impact Assessments

HIA's offer a systemic methodological framework for factoring public health concerns into decision making.[2018] Widely used internationally, the use of HIA's is growing in the U.S. and in Alaska, increasingly as part of the NEPA process.[2019] The NSB has been a leader in integrating HIA into the Environmental Impact Assessment (EIA) process for natural resource development in Alaska.[2020]

The National Academy of Sciences (NAS) defines an HIA as a:

[2012] DEIS vol. 1 at 3-239.

[2013] "This EIS does not analyze specific developments in the program area; therefore, a health impact assessment was not completed for this analysis. Health impact assessments are expected to be developed for future development projects that would require additional NEPA analysis." DEIS vol. 1 at 3-239.

[2014] DEIS vol. 1 at 3-239.

[2015] DEIS vol. 1 at 3-239.

[2016] DEIS vol. 1 at 3-239.

[2017] DEIS vol. 1 at 3-239.

[2018] National Research Council 2011. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: The National Academies Press. Appendix A at 150–161. https://doi.org/10.17226/13229.

[2019] *See* Wernham, A. EcoHealth (2007) 4: 500, at https://doi.org/10.1007/s10393-007-0132-2.

[2020] Baseline community health analysis report. North Slope Borough. Department of Health and Social Services. July, 2012, at 65: http://www.north-slope.org/assets/images/uploads/BaselineCommunityHealthAnalysisReport.pdf (accessed Jan. 23, 2019).

> systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects.[2021]

The NAS Committee on Health Impact Assessment has analyzed the integration of HIA's into the NEPA process. The Committee recommends that the use of HIA's "should be focused on applications in which there is the greatest opportunity to protect or promote health and to raise awareness of the health consequences of proposed decisions."[2022] The NAS concluded that "improving the integration of health into EIA practice under NEPA and related state laws is needed and would advance the goal of improving public health."[2023] To be consistent with the "changing expectations for what constitutes a sufficient examination of human health in the regulatory process" and with precedent established in Alaska, the BLM should conduct an HIA for the Coastal Plain at the Lease DEIS stage. The lease stage presents the greatest opportunity to promote health.

c. NEPA Requires an HIA at the Lease Sale Stage

BLM must conduct an HIA at the lease sale stage in order to meet NEPA requirements. As described in 40 C.F.R. § 1502.15, data and analyses in an EIS shall be commensurate with the importance of the impact. The public health impacts of the proposed Coastal Plain leasing program are one of the most important impacts that the government must analyze. NEPA analysis, after all, is largely premised on taking a hard look at the "*human* environment" (emphasis added).[2024]

Under 40 C.F.R. § 1502.24, agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements. As described in our scoping comments, completing an HIA is a necessary step to insure the professional and scientific integrity of this process.[2025]

[2021] National Research Council 2011. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: The National Academies Press. At 5. https://doi.org/10.17226/13229.

[2022] National Research Council 2011. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: The National Academies Press. At 12. https://doi.org/10.17226/13229.

[2023] National Research Council 2011. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: The National Academies Press. At 12. https://doi.org/10.17226/13229.

[2024] Congressional Record, Senate, P. 40416, December 20, 1969.

[2025] Alaska Wilderness League *et al.*, Scoping Comments re: Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, at 128.

NEPA standards require an *ex ante* analysis of "reasonably foreseeable, significant impacts on the human environment."[2026] Implementing regulations are explicit that public health is among these impacts.[2027] NEPA thus requires that federal agencies analyze the environmental effects, including health effects, in an EIS as soon as it is "reasonably possible" to do so.[2028]

The Technical Guidelines published by the State of Alaska's HIA Program specifies that the HIA should be completed as early as possible in the process to enable baseline data to be gathered, and to enable sufficient agency and expert coordination as required by NEPA. Specifically, the guidelines endorse early coordination on HIA's because it "promotes cooperative planning of field studies and data gathering with other environmental baseline studies, which reduces survey fatigue in communities and the overall cost of field work, decreases the risk of delays, and provides an opportunity for health input into the creation of project 'alternatives.'"[2029]

Deferring the HIA to future specific projects developed under additional and separate NEPA analyses, as the BLM has stated it will do, is an inadequate substitute for estimating the total health impacts from the lease sales and oil and gas program as a whole. For "[i]t is only at the lease sale stage that the agency can take into account the effects of oil production in deciding which parcels to offer for lease."[2030]

While BLM states that "health impact assessments are expected to be developed for future development projects," there is no meaningful mechanism to ensure that this analysis is completed at a project-level EIS. Moreover, as is occurring in the NPR-A, once a lease is issued, the BLM cannot select the no action alternative when a project is being considered unless it specifically retains this right and authority. Such circumstances all but insure that a meaningful analysis of a leasing program's risk to human health and wellness will not be completed prior to BLM making an irretrievable commitment of resources. As such, a meaningful HIA should be completed at the leasing stage so that the public fully understands the risks of a Coastal Plain leasing program.

d. The Tax Act Requires an HIA at the Lease Sale Stage

Section 20001 of the Tax Act that opened the Coastal Plain to lease sales states that the Secretary of Interior "*shall* manage the oil and gas program on the Coastal Plain *in a manner similar to* the administration of lease sales under the Naval Petroleum Reserves Production Act

[2026] 42 U.S.C. §§ 4321, 4331(b).
[2027] 40 CFR § 1500–1508.
[2028] 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1502.22.
[2029] Technical Guidance for Health Impact Assessment in Alaska, State of Alaska Department of Health and Human Services, http://dhss.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf, at 4 (accessed Jan. 21, 2019).
[2030] *Native Village of Point Hope v. Jewell*, 740 F.3d 489, 504 (9th Cir. 2014).

of 1976 (42 U.S.C. 6501 et seq.) (including regulations)[emphases added]."[2031] The implementing regulations of the NPRP-A include establishing the National Petroleum Reserve-Alaska (NPR-A), for which an HIA was conducted in 2012.[2032] In directly analogous circumstances, BLM and its sister agency BOEM have used the HIA to integrate public health concerns into the EIS decision-making framework at the planning or lease stages.[2033]

In at least six instances in Alaska, HIA's were conducted during the leasing stage of proposed oil and gas development projects.[2034] BLM, for example, integrated an HIA as part of the Northeast National Petroleum Reserve Supplemental Environmental Impact Statement to address public health impacts of proposed oil leasing in the Northeast NPR-A.[2035] The Northeast

[2031] PL 115-97, Section 20001, Jan 3, 2017.

[2032] *See* Bureau of Land Management, NPR-A, Final IAP/EIS vol. 6 at 37 (Nov. 2012), https://eplanning.blm.gov/epl-front-office/projects/lup/67091/82377/97728/Volume_5.pdf (accessed Jan. 28, 2019) (the NSB Mayor, in a letter to the BLM notes, "We note, in particular, the agency's development of more flexible blended performance-based and prescriptive measures, and your willingness to undertake meaningful comprehensive human health impact assessments (HIAs) as components of recent planning efforts. Critically, the BLM showed its commitment to addressing the health issues through inclusion of HIAs as more than academic exercises, but as the bases upon which to design appropriate measures to manage potential impacts identified by the assessments.").

[2033] Bureau of Land Management (BLM). 2008. Northeast National Petroleum Reserve-Alaska supplemental integrated activity plan record of decision (July 2008). Prepared by U.S. Department of the Interior, Bureau of Land Management., Anchorage, Alaska, https://eplanning.blm.gov/epl-front-office/projects/nepa/117408/164323/200443/Northeast_NPR-A_Supplemental_2008_Record_of_Decision.pdf (accessed Jan. 28, 2019); BOEM 2012. Outer Continental Shelf Oil and Gas Leasing Program: 2012-2017. Final Programmatic Environmental Impact Statement, Vol. 1. OCS EIS/EA BOEM 2012-030. U.S. Department of the Interior, Minerals Management Service, Herndon, VA. (July 2012); MMS 2007. Chukchi Sea Planning Area Oil and Gas Sale 193 and Seismic Surveying Activities in the Chukchi Sea. Final Environmental Impact Statement. OCS EIS/EA MMS2007-026. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region.

[2034] *See* Esi W. Nkyekyer & Andrew L. Dannenberg (2018): Use and effectiveness of health impact assessment in the energy and natural resources sector in the United States, 2007 – 2016, Impact Assessment and Project Appraisal. https://doi.org/10.1080/14615517.2018.1519221. See Table 1 at 4; *see also* Dannenberg et al, Use of Health Impact Assessment in the U.S. 27 Case Studies, 1999–2007, Am J Prev Med 2008; 34(3)*see also* Map of "Health Impact Assessments in the United States" by State, Pew Charitable Trusts, https://www.pewtrusts.org/en/research-and-analysis/data-visualizations/2015/hia-map.

[2035] Bureau of Land Management (BLM). 2008. Northeast National Petroleum Reserve-Alaska supplemental integrated activity plan record of decision (July 2008). Prepared by U.S. Department of the Interior, Bureau of Land Management., Anchorage, Alaska, https://eplanning.blm.gov/epl-front-

area of the Reserve was significantly important to the traditions and food supply of neighboring Alaska Native communities, where the degree of public health impact was proportional to the impacts to subsistence.[2036] The HIA made a number of recommendations which BLM adopted, including: additional protections for key hunting and fishing areas; measures to minimize disruption of local game; cultural orientation for workers; and a requirement for a more in-depth and site-specific consideration of health impacts for any major oil development on leased lands in the future.

In order to manage the Coastal Plain lease sales similar to the NPR-A, the BLM should similarly integrate an HIA into the Coastal Plain Lease DEIS. An HIA analysis conducted for the Coastal Plain Lease DEIS should focus on how oil leasing, and post-lease exploration, construction, operation, seismic activities, and the cumulative effects of development will expose residents to potential health risks, as well as how direct and indirect determinants that positively contribute to health may be compromised by development-related activities.[2037] A Coastal Plain HIA should also similarly explore mitigation strategies.[2038]

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office/projects/nepa/117408/164323/200443/Northeast_NPR-A_Supplemental_2008_Record_of_Decision.pdf (accessed Jan. 28, 2019). *See also* Wernham, A., "Inupiat Health and Proposed Alaskan Oil Development: Results of the First Integrated Health Impact Assessment/ Environmental Impact Statement for Proposed Oil Development on Alaska's North Slope," EcoHealth (2007) 4: 500, at https://doi.org/10.1007/s10393-007-0132-2.

[2036] Wernham, A. EcoHealth (2007) 4: at 507. https://doi.org/10.1007/s10393-007-0132-2,

[2037] *See* DEIS vol. 1 at ES-1 ("The Leasing EIS will serve to inform BLM's implementation of PL 115-97, Section 20001(c)(1), which is the requirement to hold multiple lease sales. It may also inform *post-lease* activities, including seismic and drilling exploration, development, and transportation of oil and gas in and from the Coastal Plain (emphasis added). Specifically, the Leasing EIS considers and analyzes the environmental impact of various leasing alternatives, including the areas to offer for sale, and the indirect impacts that could result in consideration of the hypothetical development scenario. The alternatives analyze various terms and conditions (i.e., lease stipulations and required operating procedures [ROPs]) to be applied to leases and associated oil and gas activities, to properly balance oil and gas development with protection of surface resources. Future on-the-ground actions requiring BLM approval, including potential exploration and development proposals, would require further NEPA analysis based on the site-specific proposal. Potential applicants would be subject to the terms of the lease.").

[2038] Technical Guidance for Health Impact Assessment in Alaska, State of Alaska Department of Health and Human Services, http://dhss.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf, at 3 (accessed Jan. 21, 2019). Some past examples of HIA recommended mitigation measures include the establishment of a health advisory board, public health monitoring, contaminant monitoring and mitigation measures for reducing exposure, subsistence intake studies, public safety plan, employee education, and an independent oil spill review board. *See* Wernham, A. EcoHealth (2007) 4: 510. https://doi.org/10.1007/s10393-007-0132-2.

e. HIAs Are a Best Practices Approach to Meeting Robust and Rigorous Environmental Review Standards Required by Congress.

Congress amended language in the original Tax Act to clarify that the Act did not in any way limit, waive, or conflict with NEPA, and that any proposed oil and gas operations in the Coastal Plain would be subject to the full scope of NEPA review.[2039] Senator Murkowski assured members of the Energy and Natural Resources Committee that if the tax legislation became law, it would not waive NEPA and that any proposed development, including lease sales, would be subject to the full scope of environmental review required by NEPA:

> When we say that there are no environmental laws being waived, whether it's NEPA, ESA, Clean Water, Clean Air, everything applies, there is a multi-step process that goes on here. We have an integrated activity plan that is developed that is a very open process. You adopt the IAP through a record of decision, then you move to lease sale then you move to exploration then you move to discovery then pre-development, then that development is approved, and there is a process throughout each one, where again you have a level of regulatory and environmental review, of consultation, and of public engagement.[2040]

According to the Lease DEIS Purpose and Needs Statement, the EIS "will inform BLM's implementation of the Tax Act" and "may also inform post-lease activities, including seismic and drilling exploration, development, and transportation."[2041] To achieve Senator Murkowski's commitments and comply with NEPA, BLM should conduct an HIA for the oil and gas leasing program now.

HIA's are considered by the State Department of Health and Human Services as a "best practices approach for responsible development".[2042] In 2010, the State of Alaska institutionalized an HIA Program at the State Department of Health and Human Services. The Alaska HIA Program "evaluates potential health effects of new policies, programs, or projects using existing public health surveillance data, medical literature reviews, and field studies."[2043] The Program published a toolkit "to guide HIA practitioners in implementing an Alaska-specific best practices approach to performing field studies and stakeholder engagement activities, rating

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[2039] *See* Senate Congressional Record, Sen. Carper (DE) Statements re: HR-1, Dec. 1, 2017, at S7697.

[2040] Business Meeting to Consider Reconciliation Legislation, Nov. 15, 2017, at 1:04:42, https://www.energy.senate.gov/public/index.cfm/hearings-and-business-meetings?ID=5AB53058-9594-4A00-8F0F-AF559530A32E.

[2041] DEIS vol. 1 at ES-1.

[2042] Anderson, Paul, "Alaska's Health Impact Assessment Program," State of Alaska Epidemiology Bulletin 19 (July 15, 2011), http://dhss.alaska.gov/dph/Epi/hia/Documents/bulletins/docs/b2011_19.pdf (accessed Jan. 28, 2018).

[2043] *See* http://dhss.alaska.gov/dph/Epi/hia/Pages/pubs.aspx.

potential impacts, and making final recommendations".[2044] One best practice approach the HIA identified is early consultation with public health expert agencies in the coordination of health assessments to avoid duplicative efforts.[2045] This best practice approach is also consistent with NEPA requirements of cross-disciplinary collaboration between natural, physical, and social sciences to further its objectives.[2046]

Notably, BLM did not consult the HIA Program or any other entity with public health expertise when conducting the public health analysis for the Coastal Plain Lease DEIS. It also did not engage in gathering pre-development baseline data to determine conditions prior to potential disruption. BLM's proposed approach of deferring any potential HIA's to future stages of development fails Alaska's "best practices approach" of HIA completion at the earliest possible opportunity.[2047] BLM's public health DEIS analysis thus fails to meet Alaska's best practices approach or comply with legal directives.

3. Criteria for BLM to Prepare an Adequate HIA

In order to complete an adequate HIA, BLM would need to include a "description of the baseline health status of the population; an analysis of the direct, indirect, and cumulative health consequences of the proposed action and alternatives; and a consideration of potential mitigation measures to address the health concerns identified by the analysis."[2048] An adequate completion of these steps "might be considered equivalent to" conducting an HIA.[2049]

[2044] Technical Guidance for Health Impact Assessment in Alaska, State of Alaska Department of Health and Human Services, http://dhss.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf, at 5 (accessed Jan. 21, 2019).

[2045] Technical Guidance for Health Impact Assessment in Alaska, State of Alaska Department of Health and Human Services, http://dhss.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf, at 6 (accessed Jan. 21, 2019).

[2046] 42 USC § 4332.

[2047] Technical Guidance for Health Impact Assessment in Alaska, State of Alaska Department of Health and Human Services, http://dhss.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf, at 4 (accessed Jan. 21, 2019).

[2048] National Research Council 2011. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: The National Academies Press. Appendix A at 110. https://doi.org/10.17226/13229 (accessed Jan. 23, 2019).

[2049] National Research Council 2011. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: The National Academies Press. Appendix A at 110. https://doi.org/10.17226/13229 (accessed Jan. 23, 2019). The Baseline community health analysis report completed for the North Slope Borough for the NPR-A IAP/EIS in July, 2012, may be one example, wherein the baseline report essentially constituted an HIA. http://www.north-

Baseline studies to determine pre-development conditions should include air and water quality, rates and factors of, among other conditions, asthma, obesity (and overweightness), diabetes, cancer, chronic obstructive pulmonary disease, cardiovascular diseases, cerebrovascular diseases, unintentional injury, substance abuse, depression, and suicide. Comprehensive baseline information pertaining to subsistence resources and practices must also be captured. The direct, indirect, and cumulative impacts of proposed development on subsistence and human health, mental health, risk of harm and injury, and climate change should also be addressed. The HIA can integrate all of the data, public comments, impacts and recommendations to systematically address health outcomes and determinants prior to inclusion in final NEPA documents.

Adequate completion of these steps would also require BLM to consider an array of health-focused mitigation measures. An example can be found within the HIA for Red Dog mine, which includes mitigation and monitoring requirements.[2050] One such measure should engage independent scientists, academics, and local experts to perform an environmental and health assessment of oil and gas leasing. This assessment would also include a mechanism through which public input could be integrated into leasing decisions, or, at the very least, in the design and review of monitoring programs, the issuing of leases, and the evaluation of any future proposed exploration or development.

While a specific Arctic National Wildlife Refuge Coastal Plain HIA should be completed as part of the EIS process at the leasing stage, the Point Thomson HIA[2051] serves as a constructive starting place of how this type of analysis can be helpful to the public and complementary to larger environmental impact statements. It states:

> The Alaska Collaborative HIA Working Group, composed of federal, state, and tribal medical and public health professionals and organized by the Department of Health and Social Services HIA Program, developed an Alaska-specific list of Health Effect Categories (HECs) which allows HIA practitioners to combine their human health knowledge in a specific area (e.g. injury prevention) with their knowledge of project design features (e.g. road traffic patterns, road design) in order to identify likely health impacts. HECs analyzed for the Point Thomson Project include:
>
> • Social Determinants of Health (SDH) including psychosocial, domestic violence and gender issues
> • Accidents and Injuries
> • Exposure to potentially hazardous materials

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slope.org/assets/images/uploads/BaselineCommunityHealthAnalysisReport.pdf (accessed Jan. 23, 2019).

[2050] U.S. EPA, Red Dog Mine Expansion Final Supplement Environmental Impact Statement (Oct. 2009), Vol. 1 at 2-43, 3-239 – 3-2263, Vol. 2 at Appendix E.

[2051] Point Thomson Human Health Impact Assessment, http://dhss.alaska.gov/dph/Epi/hia/Documents/PointThomsonCompletedHIA.pdf (accessed Jan. 23, 2019).

• Food, Nutrition, and Subsistence Activity
• Infectious Disease
• Water and Sanitation
• Non-communicable and Chronic Diseases
• Health Services Infrastructure and Capacity

> To gather a variety of perspectives, the HIA Team hosted a panel on October 29, 2010, to consider the Point Thomson Project, its implications for human health, and to rank and rate those human health impacts. This panel was conducted in a focus group format in order to discuss a collection of impacts already identified by the HIA team. The focus group consisted of members of the HIA team, state public health professionals, state officials with excellent knowledge of the project, and international HIA experts.[2052]

Although a helpful guide, the Point Thomson Oil and Gas leasing EIS/HIA is not a sufficient substitute for a project-specific HIA. An HIA must be conducted specifically for the Arctic National Wildlife Refuge Coastal Plain which should cover a broader geographic area than just Nuiqsut, Kaktovik, and the North Slope Borough generally, as was done for Point Thomson.

In conclusion, BLM's decision not to complete an HIA fails to meet NEPA standards and Tax Act requirements for rigorous environmental review at every stage. Its decision was not "consistent with recent NEPA analyses on the North Slope," given the established practice of HIA's conducted at the lease sale stage for proposed oil and gas development on the North Slope. This decision is not consistent with the use of HIA's at the lease sale stage by Department of Interior agencies as part of the NEPA process. BLM's approach ignores scoping comments that clearly raised this issue for analysis now. BLM must conduct a systematic and project-specific HIA for the proposed lease sales on the Coastal Plain as part of a revised draft EIS.

4. Environmental Consequences

Over and above the absence of an HIA, BLM's analysis of public health in the DEIS has significant shortcomings and must be substantially revised. As an initial matter, BLM fails to address all of the factors which may impact public health.

HIA's expressly recognize eight different Health Effects Categories (HECs) that agencies must consider in assessing impacts to public health. HECs supply the fundamental framework for these analyses and allow the HIA practitioner to systematically review each human health area in the light of a project design, to look at all possible health effects. The HECs required for evaluated are: Social Determinants of Health (SDH); Accidents and Injuries; Exposure to potentially hazardous materials; Food, Nutrition, and Subsistence Activity; Infectious Disease;

[2052] Point Thomson Human Health Impact Assessment, http://dhss.alaska.gov/dph/Epi/hia/Documents/PointThomsonCompletedHIA.pdf, at ES-2 (accessed Jan. 23, 2019).

Water and Sanitation; Non-communicable and Chronic Diseases; Health Services Infrastructure and Capacity.[2053] The DEIS does not recognize the HECs.

Alternatively, the NSB has identified health impact determinants in their 2014 Health Indicators Report. This Report provides a comprehensive list of Indicators of Health Outcomes and Health Determinants that an agency needs to evaluate for purposes of health impacts from oil and gas on the North Slope. These 15 indicators are: Overall Health; chronic conditions; communicable diseases, mental health, maternal and child health; injuries; personal income and employment; living conditions; food environment; community well-being; cultural well-being and traditional economy; municipal infrastructure; health care services; data sources and representative indicators; and exposure to environmental contaminants.[2054]

At a minimum, the DEIS needed to acknowledge and fully address one or the other of these important sources of health indicators. The DEIS fails to do so, and as discussed below, where it addresses some of these indicators, its analysis is insufficient. A revised draft EIS is necessary to address the shortcomings of BLM's analysis.

a. Outdated and Incomplete Data

The demographic and health information cited within the DEIS is outdated and incomplete. The BLM references a 2012 document and states that the analysis is based on information "through 2010."[2055] This data is too old and more recent health data should be utilized for the purposes of this EIS.

Moreover, the BLM's reliance on data from the North Slope Borough (NSB) has limitations. It fails to capture the entire impacted population and account for communities on the southside of the Brooks Range, in both the United States and Canada. The community of Utqiagvik, with its considerable size and heath care infrastructure, also has the potential to skew borough-wide data and is not representative of the smaller communities, like Kaktovik, that are more likely to be impacted by the leasing program. At a minimum, BLM must acknowledge that such community-specific data is incomplete or unavailable pursuant to 40 C.F.R. § 1502.22. Similarly, the NSB has different healthcare delivery systems than communities outside of the borough. Additional data, from communities on the southside of the Brooks Range should be compiled, analyzed, and incorporated into this document. Sources of this data could be the Tanana Chiefs Council (TCC), the Council of Athabascan Tribal Governments (CATG), and or the Alaska Native Tribal Health Consortium (ANTHC). Finally, we note that where BLM cites findings and data for Nuiqsut, the agency is citing findings from previous EIS's. BLM makes comparisons between communities but does not cite any data or peer-reviewed studies for Nuiqsut to support its claims. This is not a scientifically sound approach to BLM's public health analysis.

[2053] State of Alaska Health Impact Assessment Program, Department of Health and Social Services, Technical Guidance for Health Impact Assessment in Alaska (2015) at 20-22.

[2054] *See* North Slope Borough, Health Indicators in the North Slope Borough (June 2014) [hereinafter NSB Health Report].

[2055] DEIS vol. 1 at 3-239.

As we discussed in our scoping comments, baseline data is essential to allowing public health experts to understand pre-development conditions and potential future trends associated with how actions on the landscape and/or within communities may change health outcomes for certain populations. BLM's failure to comprehensively establish a baseline could irreversibly compromise how oil developments health impacts are studied and understood.

b. Scope of Analysis

BLM's analysis of public health impacts is too limited in geographic scope and inconsistent with other, related elements of the DEIS. In our scoping comments we discussed how impacts to health should include all communities that are connected to the Coastal Plain through ecological and social systems. We specifically named Arctic Village, Fort Yukon, Venetie, Chalkyitsik, Beaver, and the Canadian communities of Old Crow and Fort McPherson. Without a regional approach, BLM's analysis is flawed and incomplete.

BLM's sole focus on one North Slope community and the use of NSB data is incorrect and should be expanded to include all communities that have a (social and ecological) connection to the Coastal Plain. BLM acknowledges the connections between human health and subsistence, and BLM acknowledges how 22 Alaskan communities and seven Canadian user groups are relevant if post-lease oil and gas activities change caribou resource availability or abundance for those users.[2056] BLM goes on to write that "an overall reduction in the PCH could also affect harvest success among Inupiaq, the Gwich'in people, and Inuvialuit caribou hunters."[2057] BLM's focus on only one North Slope community fundamentally fails to meaningfully analyze how other communities could have their health impacted by the leasing program. Because of the leasing program's connections to resources and these resources connections to health, BLM must comprehensively analyze how potential changes to subsistence resource availability and harvest will impact regional residents' health in both Alaska and Canada.

BLM's geographic scope also fails to consider impacts from transportation. For instance, BLM does discuss impacts spanning to Dutch Harbor, despite the EIS asserting impacts would be considered for such shipping routes. BLM entirely fails to discuss impacts to subsistence whaling which may affect communities along the coast as a result of increased shipping. Additional health impacts should be considered for increased air pollution along shipping routes which could negatively affect coastal communities. BLM should also fully consider health impacts to the community of Dutch Harbor as a result of increased shipping activity taking place there. BLM also fails to consider the health impacts of increased traffic on the Dalton Highway, including impacts to the community of Bettles, which would likely result from oil and gas leasing and development on the Coastal Plain. Increased air pollution, as well as increased likelihood of accidents and injuries along the highway are important health considerations which are completely unaddressed in the DEIS.

[2056] DEIS vol. 1 at 3-160.
[2057] DEIS vol. 1 at 3-173.

BLM also arbitrarily and improperly limits the scope of its NEPA analysis by failing to consider impacts from all phases of oil and gas activities. BLM only looks at post-lease activities that include seismic and drilling exploration, development, and transportation.[2058] BLM should not limit its analysis of the impacts to only post-leasing activities and needs to include the full range of direct, indirect, and cumulative impacts to public health that could occur from the program. This includes from any proposals to conduct pre-leasing seismic exploration on the Coastal Plain. As discussed elsewhere, BLM is currently in the process of reviewing an extensive seismic proposal from SAExploration that could cause lasting damage to tundra, vegetation, water quality, fish, wildlife, and other resources. That damage can in turn significantly harm human health. BLM also failed to account for other activities like gravel mining, which have severe sound and other environmental impacts that could deter caribou and other species from important habitat areas. BLM's deficient analysis of the full range of resource impacts from the broad scope of activities likely to occur on the Coastal Plain and to nearby areas means BLM has dramatically underestimated the potential impacts from the oil and gas program and related activities. BLM needs to revise and reissue its EIS to ensure it actually takes into consideration the full range of potential impacts to public health.

c. "Mixed Impacts"

Ambiguity of how positive and negative impacts are quantified presents challenges in understanding BLM's analysis of public health. The DEIS makes the assumption that oil development will lead to a better delivery of health services but there is nothing to support this premise described within the document. Relatedly, health services do not necessarily mean a healthier population and better health outcomes. Increased funding for health and social programs could potentially be enabled by oil revenue, but BLM fails to consider how these increases in funding would compare to potential increases in negative health outcomes and health care costs caused by an oil and gas leasing program.[2059]

Moreover, BLM also fails to consider that not all communities that could be impacted by the Coastal Plain oil and gas leasing program will benefit from revenue derived from development activities. Communities south of the Brooks Range, who are outside of the NSB, will receive no revenue from royalties or the taxation of infrastructure. These communities' ecological, social, economic, and cultural systems may be impacted while receiving none of the monetary benefits of development. These inequities and disparities must be considered by BLM in their analysis.

d. Exposure to Hazardous Materials

BLM's discussion on air quality issues in rural Alaska villages mentions "indoor air quality" alongside sources of pollution like diesel emissions. What BLM specifically means by

[2058] DEIS vol. 2 Appendix E at E-2.

[2059] In the DEIS, BLM says that all action alternatives should not affect demand for health care services. DEIS vol. 1 at 3-246. This statement is unsubstantiated.

"indoor air quality" should be articulated in greater detail as this phrase does not articulate a clear harm.

BLM's scope of analysis for exposure to hazardous materials is too narrow and solely considers residents of the NSB. Risks from exposure to hazardous materials in other communities should also be considered within this analysis.

e. Mental Health

Mental health impacts are not discussed at all in the DEIS, despite the fact they are already occurring due to stress related to this leasing process (fear of environmental contamination, food security, cultural change, acculturative stress). BLM's analysis entirely fails to capture how this leasing program will impact regional resident's mental health. Within the subsistence uses and resources section, BLM cites the FWS and writes that the program area is considered sacred ground to the Gwich'in.[2060] BLM goes on to say within this section that "caribou are a resource of primary subsistence, economic, cultural, and spiritual importance for the community of Arctic Village."[2061] The stress and mental anguish associated with the potential loss of irreplaceable and culturally important lands must be analyzed when considering the mental health impacts of a Coastal Plain leasing program for Gwich'in communities and all regional residents who have a spiritual connection these lands.

BLM briefly acknowledges that "food security can be a source of stress in NSB households, particularly Inupiat households."[2062] The connection between the leasing program and mental health challenges associated with food insecurity should be considered. This analysis should extend beyond the NSB and include all communities connected to the Coastal Plain's subsistence resources. As the Executive Director of the Gwich'in Steering Committee has repeatedly explained, protecting the Porcupine Caribou Herd is an issue of food security for the Gwich'in.[2063] Relatedly, BLM should analyze how concerns (perceived and/or real) around the safety of subsistence resources could impact mental health.

Finally, BLM fails to mention how this planning process and all subsequent planning and permitting processes on the Coastal Plain will impact the mental health of Inupiaq, Gwich'in, and Inuvialuit peoples. The direct mental health impacts of this DEIS should be considered and described in detail.

[2060] DEIS vol. 1 at 3-164.

[2061] DEIS vol. 1 at 3-165.

[2062] DEIS vol. 1 at 3-240.

[2063] *See* Bernadette Demientieff, "Tax move to open ANWR blatent disregard for human rights," Daily News Miner, Dec. 7, 2017, http://www.newsminer.com/opinion/tax-move-to-open-anwr-blatant-disregard-for-human-rights/article_0daecb24-db35-11e7-ad38-0368a6b96476.html (accessed Feb. 20, 2019). *See also* Bernadette Demientieff, "The Gwich'in people will not back down when our sacred Arctic National Wildlife Refuge lands are at risk," Anchorage Daily News Opinion, Feb. 12, 2019, https://www.adn.com/opinions/2019/02/13/the-gwichin-people-will-not-back-down-when-our-sacred-arctic-national-wildlife-refuge-lands-are-at-risk/ (accessed Feb. 20, 2019).

f. Water Quality

BLM's analysis of water quality fails to consider how oil and gas development could affect the safety of subsistence resources. The contamination of subsistence resources because of poor water quality and the risk it poses to the consumers of subsistence resources should be analyzed within the document.

g. Social Networks

While BLM acknowledges how subsistence resources and practices create social cohesion and networks of sharing and cooperation across the region, BLM fails to consider how these elements of connection contribute positively to the health and wellness of regional residents. A significant body of science exists around the public health benefits of social networks, and these benefits should be described within the document.[2064] Specifically, the health benefits of social networks created and enabled by subsistence resources and practices should be quantified and included within BLM's analysis.

The health impacts of compromised social networks because of changed or reduced subsistence resources or practices should also be considered. BLM states that "reductions in the success of subsistence harvests for Kaktovik residents would accelerate the transition from subsistence resources to store-bought foods, worsening nutritional outcomes and food security."[2065] Disruptions from oil development to ecological and social systems, relating specifically to cooperation and sharing, may similarly cause a transition from subsistence resources to store-bought foods for people throughout the region. This type of secondary outcome should be considered by BLM.

h. Food Security

As we discussed in our scoping comments, BLM must analyze how a Coastal Plain leasing program will impact all three pillars of food security: food availability, food access, and food use.[2066] Potential impacts on food security should be quantified and described in greater detail. Within the subsistence uses and resources section, BLM states that a total loss of caribou harvest for Venetie would represent a 31 percent decline in subsistence foods for the community.[2067] Potential impacts with food security include fear of contamination of subsistence food, decreased ability to access adequate subsistence resources, and a lack of recognition of the limitations of a subsistence-cash economies in many of these communities. BLM should analyze

[2064] See, among others: Smith, K.P. and Christakis, N.A. (2003). Social Networks and Health. *The Annual Review of Sociology*, 34: 405-429.

[2065] DEIS vol. 3 at 243.

[2066] See: World Health Organization. (2014). Trade, Foreign Policy, Diplomacy, and Health: Food Security. Available at: http://www.who.int/trade/glossary/story028/en/.

[2067] DEIS vol. 3 at

how impacts to subsistence resources will comprehensively impact communities' health and wellness.[2068]

i. Safety

BLM fails to consider how oil development in the program area will affect subsistence resource movements, alter hunting patterns, and present safety risks for all regional residents, north and south of the Brooks Range.[2069] Again, and as mentioned before, the scope of this analysis is too narrow. A Coastal Plain leasing program has the potential to alter how and when communities from across the region access the PCH and other subsistence resources, and this will likely create new dangers on the landscape and increase the risk of injury. This is particularly true for the community of Kaktovik, which is most likely to be located in an area of close proximity to gravel roads, pipelines, and other infrastructure.

Relatedly, BLM writes that there could be "slight increase in accidents due to changes in subsistence hunting patterns."[2070] BLM should cite the source that formally estimates that changed subsistence hunting patterns will lead to increases in public health services and describe how it was calculated.

j. Contamination of Food Sources

BLM assumes that a Coastal Plain leasing program will result in a low likelihood of subsistence food contamination because there have been low measurable contamination impacts to food sources to date, despite high levels of oil and gas activities on the North Slope.[2071] This statement does not account for where oil development has historically occurred or the fact that only one community, Nuiqsut, has been directly impacted by oil and gas activities in their core subsistence use areas and that the true impacts of existing and future oil development have not yet been fully felt or understood. The absence of a particular outcome in the past, particularly when not analogous in context, is not a sound rationale to justify the potential for no future impacts.

BLM writes that "except for a major spill, there are likely to be only negligible health effects from contamination of food sources as a result of the action alternatives."[2072] BLM should articulate what these presumed "negligible health effects" may be and describe their sources and any potential mitigation measures.

[2068] See: Smith, J., Saylor, B., Easton, P., & Wiedman, D. (2009). Measurable benefits of traditional food customs in the lives of rural and urban Alaska Inupiaq elders. Alaska J Anthropol, 7(1), 89-99.

[2069] DEIS vol. 3 at 243.

[2070] DEIS vol. 3 at 245.

[2071] DEIS vol. 3 at 244.

[2072] DEIS vol. 3 at 244.

k. Climate Change and Health

BLM fails to meaningfully describe the anticipated public health impacts of climate change. The Fourth National Climate Assessment contains an entire chapter on Alaska and a major section on human health. The document reads: "The impacts of climate change are likely to affect all aspects of Alaska Native societies, from nutrition, infrastructure, economics, and health consequences to language, education, and the communities themselves."[2073] Relatedly, the State of Alaska recently published a public health bulletin on climate change in Alaska.[2074] The BLM should incorporate the comprehensive findings of these reports into its public health analysis for the region. Finally, BLM fails to describe how climate change impacts will potentially be compounded by the impacts of an oil and gas leasing program. These cumulative impacts must be quantified to fully consider potential health conditions within the region.

l. Communicable Disease

BLM does not consider health impacts from infectious or communicable disease or as a result of an influx of non-local workers associated with oil and gas activities. This important health determinant is unacknowledged in the DEIS despite extensive research and studies on the topic,[2075] and its recognition as an important issue by the North Slope Borough. In its Health Indicators Report, the NSB described chlamydia and gonorrhea as the two most common sexually transmitted diseases in relation to North American resource development, and also discussed the importance of considering the spread of communicable diseases like infectious diarrheal illnesses and tuberculosis.[2076] BLM failed to discuss these important health indictors and potential impacts from oil and gas activities.

5. Mitigation Measures

BLM failed to conduct a meaningful analysis of mitigation measures to avoid and minimize impacts to public health. Had BLM developed an HIA for the Lease DEIS, such mitigation would have been considered in a meaningful and transparent process. The standard in Alaska is for HIA's to include potential prevention and mitigation measures that address public health impacts for ultimate agency consideration.[2077] The HIA for the 2007–2012 Outer

[2073] See: Fourth National Climate Assessment, Chapter 4, at: https://nca2018.globalchange.gov/chapter/26/

[2074] See: Assessment of the Potential Health Impacts of Climate Change in Alaska at: http://www.epi.alaska.gov/bulletins/docs/rr2018_01.pdf

[2075] *See, e.g.*, Deziel, et al, Shale gas activity and increased rates of sexually transmitted infections in Ohio, 2000– 2016 (2018) (analyzing how sexually transmitted infections can increase through sexual mixing patterns associated with labor migration).

[2076] NSB Health Report at 12-14.

[2077] Technical Guidance for Health Impact Assessment in Alaska, State of Alaska Department of Health and Human Services,

Continental Shelf Oil and Gas Leasing Program, for example, presented nine alternative plans to the proposed action that were included in the EIS report, and as a result the U.S. Minerals Management Service committed to develop new health-related mitigation measures at the lease sale stage.[2078] Past examples of HIA recommended mitigation measures include the establishment of a health advisory board, public health monitoring, contaminant monitoring and mitigation measures for reducing exposure, subsistence intake studies, public safety plan, employee education, and an independent oil spill review board. BLM must conduct an HIA for leasing on the Coastal Plain to inform the health-related mitigation measures it eventually considers. An HIA is a necessary prerequisite.

BLM should also consider a health-focused mitigation measure. BLM should adopt a measure that provides for health-focused coordination with communities, similar to what was done in ROP 36 for subsistence.[2079] Because Kaktovik data are limited and not publicly available, it is critical that such a mitigation measure requires the establishment of appropriate baseline data.

Z. BLM FAILS TO ADEQUATELY ANALYZE NATIONAL SECURITY ISSUES.

The draft EIS asserts, mistakenly and without support, that "Development in the Coastal Plain is anticipated to contribute to the nation's economy through . . . increase in energy security (or reduced reliance on imported petroleum products)."[2080] First, there is no reason to expect that all or even most of the oil produced from the Coastal Plain — if any eventually is produced — will stay in the United States. In late 2015, after intensive lobbying from oil companies, restrictions on export of crude oil was made illegal in the Consolidated Appropriations Act of 2016.[2081] Since then, export of domestically produced crude oil has exploded, reaching more than a million barrels a day in 2017[2082] and three million barrels a day late last year.[2083] Assuming this trend continues, by the time any oil could reasonably be produced from the Coastal Plain, it would be in excess of U.S. demand and likely simply exported into the global market for foreign consumption. The revised draft EIS must recognize and analyze this.

Equally damning is the inherent vulnerability of Refuge oil to sabotage or other disruption. As former Central Intelligence Director James Woolsey testified to Congress, in 2001

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http://dhss.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf, at 3 (accessed Jan. 21, 2019).

[2078] Dannenberg et al, Use of Health Impact Assessment in the U.S. 27 Case Studies, 1999–2007, Am J Prev Med 2008; 34(3) at 251.

[2079] DEIS vol. 1 at 2-32.

[2080] DEIS vol. 1 at 3-230.

[2081] *See, e.g.*, Rapier, R., 2017, *Why the U.S. Exports Oil*, Forbes (Sept. 30, 2107).

[2082] Energy Information Agency, 2018, *U.S. crude oil exports increased and reached more destinations in 2017* (March 15, 2017).

[2083] Gaffen, D., 2018, *In major shift, U.S. now exports more oil than it ships in*, Reuters Business News (Dec. 6, 2018).

when the United States was genuinely dependent on imported oil, "I have always been . . . tolerant of having oil wells around. [T]he problem with ANWR . . . is the Trans-Alaska Pipeline, which is . . . easily interfered with and easily disrupted."[2084] A year later, he wrote that the pipeline "is frightening insecure" and that drilling in the Refuge would make it "the fattest energy-terrorist target in the country."[2085] A more recent analysis of pipeline security points out that even under normal operating conditions "pipelines more than forty years old are much more likely to rupture or leak" (the Trans-Alaska Pipeline is 42) and "[w]hile there have been no major incidents involving a domestic cyberattack on the pipeline infrastructure, the risks are increasing exponentially."[2086] The revised EIS must candidly acknowledge this intrinsic insecurity of oil produced from the Refuge and contrast it with the energy security achievable through safer and cleaner energy, non-fossil fuel alternatives.[2087]

VI. BLM'S ANILCA SECTION 810 ANALYSIS IS FLAWED.

BLM's Alaska National Interest Lands Conservation Act (ANILCA) Section 810 analysis fails to sufficiently evaluate the impacts on subsistence resources. BLM's analysis is deeply flawed and fails to account for the full scope of potential impacts to subsistence users from all phases of oil and gas activities and fails to consider restrictions to protect all potentially affected communities.

Title VIII of ANILCA recognizes that subsistence uses are a public interest and provides a framework to consider and protect subsistence uses in agency decision-making processes.[2088] Section 810 sets forth a procedure through which effects to subsistence resources must be considered and provides that "actions which would significantly restrict subsistence uses can only be undertaken if they are necessary and if the adverse effects are minimized."[2089]

ANILCA section 810 consists of a two-tiered process evaluating impacts. The federal agency first makes an initial finding, referred to as the "tier-1" determination, in determining whether to withdraw, reserve, lease, or otherwise allow the use, occupancy, or disposition of land.[2090] The agency is required to "evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of

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[2084] Woolsey, R.J., 2001, *Testimony before the Subcommittee on Energy of the Committee on Science of the U.S. House of Representative, Hearing on U.S. Energy Security: Options to Decrease Petroleum Use in the Transportation Sector*, Nov. 1, 2001.

[2085] Woolsey, R.J., A.D. Lovins, and L.H. Lovins, 2002, *Energy security: It takes more than drilling*, Christian Science Monitor (March 29, 2002.

[2086] Dancy, J.R and V.A. Dancy, 2017, *Terrorism and Oil and Gas Pipeline Infrastructure: Vulnerability and Potential Liability for Cybersecurity Attacks*, One J: Oil and Gas, Natural Resources, and Energy Journal 6(2):579-619.

[2087] *See, e.g.*, Wong, J. and L. Johnson, 2010, *A Clean Energy Bargain: More Jobs, Less Global Warming Pollution, and Greater Security*, Natural Resources Defense Council.

[2088] 16 U.S.C. §§ 3111–3126.

[2089] *Amoco Production Co. v. Village of Gambell, Alaska*, 480 U.S. 531, 544 (1987).

[2090] ANILCA § 810(a), 16 U.S.C. § 3120(a).

public lands needed for subsistence purposes."[2091] As part of this determination, BLM must consider the cumulative impacts[2092] and analyze:

> 1) Reductions in the abundance of subsistence resources caused by a decline in the population or amount of harvestable resources;
> 2) Reductions in the availability of resources used for subsistence purposes caused by alteration of their normal locations, migration, or distribution patterns; and;
> 3) Limitations on access to subsistence resources, including from increased competition for the resources.[2093]

If the agency, after conducting the tier-1 analysis, determines that the activity will not "significantly restrict subsistence uses,"[2094] then the agency issues a Finding of No Significant Restriction and the requirements of ANILCA Section 810 are satisfied. However, if the agency makes the initial determination that the action would "significantly restrict subsistence uses," the agency must then conduct a "tier-2" analysis.[2095]

Under tier-2, if a proposed action would significantly restrict subsistence uses, BLM can only adopt that action if it finds that the restriction on subsistence is necessary and consistent with sound public lands management principals; involves the minimal amount of public lands necessary to accomplish the purpose of the use, occupancy or disposition of public lands; and takes reasonable steps to minimize the adverse impacts to subsistence uses and resources from any use.[2096] Thus, ANILCA Section 810 imposes procedural requirements as well as substantive restrictions on the agency's decisions.[2097] The agency must provide notice to local and regional councils and hold hearings in potentially affected communities.[2098] Under BLM's guidance, if the action "may" restrict subsistence uses, BLM is required to take a precautionary approach and comply with the notice and hearing procedures in Section 810.[2099]

As discussed in the following sections, BLM's Section 810 findings are arbitrary and contrary to science, traditional knowledge, and BLM's own discussion about impacts to subsistence elsewhere in the draft EIS. It is particularly egregious that BLM has failed to

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[2091] ANILCA § 810(a), 16 U.S.C. § 3120(a); *Hanlon v. Barton*, 470 F. Supp. 1446, 1448 (D. Alaska 1988).

[2092] *Sierra Club v. Penfold*, 664 F. Supp 1299, 1310 (D. Alaska 1897), *aff'd*, *Sierra Club v. Penfold*, 857 F.2d 1307 (9th Cir. 1988).

[2093] State Director, Bureau of Land Mgmt., Instruction Memorandum No. AK-2011-008: Instructions and Policy for Compliance with Section 810 the Alaska National Interest Lands Conservation Act (ANILCA) (Jan. 14, 2010) [hereinafter Instruction Memorandum].

[2094] 16 U.S.C. § 3120(a).

[2095] *Kunaknana v. Clark*, 742 F.2d 1145, 1151 (9th Cit. 1984); *Hanlon*, 470 F. Supp. at 1448.

[2096] 16 U.S.C. § 3120(a)(1)–(3).

[2097] *Sierra Club v. Marsh*, 872 F.2d 497, 502–03 (9th Cir. 1989).

[2098] 16 U.S.C. § 3120(a).

[2099] BLM Instructional Memorandum at 6-2.

recognize the significant impacts likely to occur to the Gwich'in people, who are culturally and spiritually connected to the Porcupine Caribou Herd and depend on the herd for their survival. BLM needs to substantially revise its Section 810 analysis to consider the full range of impacts to subsistence, to apply the correct legal standards when conducting its 810 analysis, and to hold 810 hearings in all communities that may experience impacts to subsistence.

A. BLM FAILS TO ADEQUATELY ANALYZE THE OVERALL IMPACTS TO SUBSISTENCE USERS AND IMPROPERLY LIMITED THE SCOPE OF ITS ANALYSIS.

Overall, BLM's 810 findings are arbitrary and contrary to the information before the agency. BLM's ANILCA 810 evaluation finds that the cumulative case may significantly restrict subsistence uses and needs *solely* for the community of Kaktovik. BLM does not find significant restrictions for any Gwich'in communities, nor even consider Canadian villages. This is egregious, particularly in light of the fact that Canadian users account for the vast majority — in the past up to 85 percent — of the harvest of the Porcupine Caribou Herd.[2100] Moreover, it is inappropriate for BLM to limit its findings of restrictions on Kaktovik to only the cumulative case. As outlined below, it is clear that the direct and indirect impacts from leasing will significantly restrict subsistence resources in even that community. Based on these arbitrary findings, the agency only intends to hold a public subsistence hearing in Kaktovik during the draft EIS comment period. BLM will not hold ANILCA 810 hearings in any other affected communities.

The Gwich'in people live in fourteen small villages across a vast area extending from northeast Alaska to the northern Yukon and Northwest Territories in Canada. Though the Inupiat community of Kaktovik is the only community located on the Coastal Plain, other villages such as Arctic Village, Fort Yukon, Venetie, Chalkyitsik, Beaver, and Canadian villages such as Old Crow and Fort McPherson, are located within the range for the Porcupine Caribou Herd and will be impacted by any oil and gas activities on the Coastal Plain.[2101] The draft EIS recognizes that many other communities, such Wiseman, Birch Creek, and Stevens Village, have reported geographic, historic/prehistoric, or cultural ties to the Arctic Refuge as a whole.[2102] BLM further acknowledges that subsistence harvesting and sharing patterns for "22 Alaskan communities and seven Canadian user groups are relevant if post-lease oil and gas activities changes caribou

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[2100] DEIS vol. 1 at 3-168; DEIS vol. 2 at M-27 to M-32; Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd, E100687 - CTS 1987 No. 31 (July 17, 1987), available at http://www.treaty-accord.gc.ca/text-texte.aspx?id=100687. Additionally, this analysis does not comply with international treaty obligations, which requires consultation and input from the Porcupine Caribou Board to consider the interests of both Alaskan and Canadian Porcupine Caribou subsistence users. *See supra* Part III.E (re: international treaty obligations).

[2101] Gwich'in Steering Committee, Primary Habitat of the Porcupine Caribou Herd Map, *available at* http://ourarcticrefuge.org/wp-content/uploads/2012/10/mappch.pdf.

[2102] DEIS vol. 1 at 3-160.

resource availability or abundance for those users."[2103] Despite this, BLM arbitrarily limits its ANILCA 810 analysis of subsistence impacts to four communities: Kaktovik, Nuiqsut, Arctic Village, and Venetie.[2104] BLM did not adequately assess whether oil and gas leasing on the Coastal Plain would significantly restrict subsistence uses in the remaining potentially affected communities, as required by ANILCA 810.

BLM also arbitrarily and improperly limits the scope of its ANILCA 810 analysis in the same way it improperly limited the scope of its NEPA analysis: BLM only looks at post-lease activities that include seismic and drilling exploration, development, and transportation.[2105] BLM should not limit its analysis of the impacts to only post-leasing activities and needs to include the full range of direct, indirect, and cumulative impacts to subsistence use that could occur from the program. This includes from any proposals to conduct pre-leasing seismic exploration on the Coastal Plain. As discussed elsewhere, BLM is currently in the process of reviewing an extensive seismic proposal from SAExploration that could cause lasting damage to tundra, vegetation, soils, permafrost, and other resources. That damage can in turn significantly harm wildlife through the degradation of their habitat. BLM also improperly excluded other forms of infrastructure and activities from what it considered as part of its 2,000 acres of impacts. This includes pipelines, which could cross large areas of the Coastal Plain and have the potential to divert caribou away from key areas. BLM also failed to account for other activities like gravel mining, which have severe sound and other environmental impacts that could deter caribou and other species from important habitat areas. BLM's deficient analysis of the full range of resource impacts from the broad scope of activities likely to occur on the Coastal Plain and to nearby areas means BLM has dramatically underestimated the potential impacts from the oil and gas program and related activities. BLM needs to revise and reissue its EIS to ensure it actually takes into consideration the full range of potential impacts to subsistence for purposes of its 810 analysis.

BLM also claims that, at each decision stage, BLM retains the authority to approve, deny, or reasonably condition any proposed on-the-ground activities based on compliance with applicable laws and policies. This is not consistent with the interpretation BLM has taken with regard to its leases elsewhere (i.e., the NPR-A), which in turn has led to serious and unmitigated impacts to the community of Nuiqsut. For example, in the context of the GMT-2 decision near the community of Nuiqsut in the NPRA, BLM refused to adopt the no action alternative, instead claiming that the lease waived the agency's right to later say no to development projects — regardless of how serious the impacts were to subsistence and other resources. If BLM's assertion in the draft EIS is that it retains the authority to later say no to projects, BLM needs to clarify in the draft EIS and any proposed lease terms so it is absolutely clear that a lease does not grant the right to conduct any future activities and that BLM retains the authority to fully prohibit any later proposals. Without clearly retaining this authority, BLM cannot ensure compliance with Section 810.

[2103] DEIS vol. 1 at 3-167.
[2104] DEIS vol. 2 Appendix E at E-3.
[2105] DEIS vol. 2 Appendix E at E-2.

BLM also appears to bypass conducting a meaningful analysis of impacts on the basis that, until BLM receives and evaluates a request for an "exploration permit, permit to drill, or other authorization that includes site-specific information about a particular project, impacts of actual exploration and development that might follow lease issuance are speculative, as so much is unknown as to location, scope, scale, and timing of that exploration and development."[2106] BLM also states in analyzing the cumulative case that potential impacts to caribou abundance would be "minor due to the speculative locations of future proposed infrastructure."[2107] Speculative does not equal minor; the uncertainty about the exact location of infrastructure does not mean that the impacts to subsistence would be minor, particularly if that infrastructure is ultimately located in sensitive areas or disrupts migration patterns or obstructs migration corridors. BLM cannot circumvent doing a robust analysis of the potential impacts merely because the impacts are potentially speculative at this stage. BLM needs to analyze the full range of potential impacts to determine if it might cause impacts to subsistence, and needs to follow a precautionary approach in making those determinations.

BLM's analysis of impacts to subsistence access is wholly inadequate. The agency talks about impacts to subsistence use areas in such a cursory and vague way that there is no indication the agency actually took a meaningful look at the ways in which access could be impacted. The 810 analysis concludes "[l]egal and physical access to subsistence resources may be altered, depending on the locations of CPFs and industry-established safety areas; however it is likely that large-scale access to subsistence resources would be maintained."[2108] BLM appears to dismiss what it acknowledges will be impacts to subsistence by writing them off as unclear at this point since it does not know the exact infrastructure location. That is contrary to Section 810 and its purpose. BLM cannot write off impacts by concluding it does not know the exact location well enough to analyze them; it needs to actually take the time to analyze all potential impacts to subsistence, including cumulative impacts. BLM's conclusion that it is "likely" on a large scale that access will be maintained is also not sufficient. When the agency is evaluating the potential impacts to subsistence, if the action "may" restrict subsistence uses, BLM is required to take a precautionary approach and comply with the notice and hearing procedures in Section 810.[2109] BLM's conclusion that it is "likely" on a wholly undefined "large-scale" that there will not be impacts is unsupported and meaningless. BLM cannot ignore the significance of these impacts by viewing them on such a large scale that effectively hides those impacts; it needs to look at what those impacts could look like at both local and broader scales. BLM failed to follow that precautionary approach with these findings, contrary to Section 810 and BLM's guidance.

BLM's overall analysis of specific subsistence resources is also insufficient. As discussed in more detail in the next section, oil and gas leasing on the Coastal Plain is likely to have significant impacts on the Porcupine Caribou Herd, which will in turn restrict the abundance and availability of the herd for subsistence use. In the draft EIS, BLM states that "[d]evelopment would not significantly affect the availability of caribou for subsistence use."[2110] This

[2106] DEIS vol. 2 Appendix E at E-2.
[2107] DEIS vol. 2 Appendix E at E-18.
[2108] DEIS vol. 2 Appendix E at E-9.
[2109] BLM Instructional Memorandum at 6-2.
[2110] DEIS vol. 2 Appendix E at 7.

assumption erroneously assumes that caribou and other subsistence resources will still be present in the area despite the high likelihood of disturbance from noise and human activity. There are also potentially significant impacts to access to subsistence resources if subsistence users are physically blocked from accessing key subsistence resources, as has been the case in Nuiqsut. BLM fails to explain how the fully waivable lease stipulations, ROPs, and mitigation measures will ensure that caribou will not be deterred from this area and that hunters will still be able to access these resources.

BLM further assumes that hunters will be able to adapt to the changes occurring around them.[2111] BLM cannot rely on the potential for adaptation to bypass a positive subsistence finding under Section 810. How BLM foresees hunters adapting should be described. It is also necessary to consider that all hunters may not be able to adapt because of factors like increased cost of travel to more distant subsistence use areas and the need for better machinery to do so, which is not necessarily available to everyone that may be impacted. BLM should analyze and describe the limitations of adaptation to changed subsistence practices, resources, and conditions on the landscape.

BLM relies heavily on the experiences of Nuiqsut to describe likely circumstances for communities reliant upon the Arctic Refuge. In doing so, however, BLM fails to articulate the major differences temporally and physically between these two contexts. First, Nuiqsut is being significantly affected as a result of being surrounded by oil development. BLM cannot rely on other EISs, which incorrectly minimize subsistence impacts to Nuiqsut, as a way of shirking its ANILCA 810 obligations to fully and accurately consider the potential impacts to subsistence uses on the Coastal Plain. Second, development around Nuiqsut is ongoing and the full scope of impacts have yet to be realized. Even so, the impacts from the handful of projects that are starting to surround the community are already having significant impacts to subsistence users' ability to continue their way of life. BLM should not assume hunters have or will successfully adapt to resource development, especially since there are a number of large projects around Nuiqsut that are anticipated but have not yet been constructed. These include, among others, Greater Mooses Tooth Two, Willow, and Nanushuk. Drawing conclusions from such a dynamic set of circumstances presents limitations to knowing what will happen in the context of oil and gas leasing on the Coastal Plain. BLM does not acknowledge or otherwise account for these limitations in its efforts to correlate Nuiqsut's experiences to that which may occur to other communities. Finally, the geography and resources relevant to the NPR-A and Coastal Plain are very different, and affected communities are located in different landscapes with very different resource patterns. Under section 810, an analysis specific to communities relying upon the resources of the Arctic National Wildlife Refuge is necessary. BLM must evaluate the potential long-term or permanent impacts to the Porcupine Caribou Herd and other subsistence uses on the Coastal Plain by relying on the best science available, not by relying on unfounded analogies and unsupported conclusions.

There are also numerous impacts to fish that are not adequately considered in the draft EIS. The draft EIS acknowledges that non-salmon fish, including Dolly Varden and Bering

[2111] *See, e.g.*, DEIS vol. 1 at 3-177.

cisco, are important subsistence resources and that there could be impacts to both abundance and availability under Alternatives B and C.[2112] This alone is sufficient to trigger a positive finding under ANILCA 810 as subsistence use "may be affected."

BLM failed to adequately consider how oil and gas leasing could significant restrict the availability and abundance of fish as an important subsistence resource. The DEIS brushes aside these potential effects by stating that impacts will be mitigated by Lease Stipulations and ROPs.[2113] BLM provides no analysis to support why the Lease Stipulations and ROPs will effectively protect fish habitat. Further, many of the provisions contain discretionary carve outs. For example, Lease Stipulation 1 provides that "[o]n a case-by case basis, essential pipeline and road crossings would be permitted through setback areas,"[2114] Lease Stipulation 4 states, "[t]he BLM Authorized Officer may approve infrastructure necessary for oil and gas activities in these critical and sensitive coastal habitats, such as barge landing, docks, spill response staging and storage areas, and pipelines . . . on a case-by-case basis."[2115] Lease Stipulation 9 only requires "the lessee/operator/contractor [to] develop and implement an impact and conflict avoidance and monitoring plan to assess, minimize, and mitigate the effects of the infrastructure and its use on these coastal habitats and their use by wildlife and people" — all without any standards for approval.[2116] The discretionary nature of these protections will create inconsistent environmental protections and decisions across the Coastal Plain, and the exceptions could ultimately swallow the rule. More robust provisions, tied to meaningful standards must be implemented in order to adequately protect fisheries and other important subsistence resources.

The DEIS further disregards the potential impacts of noise on fish, based on a faulty premise that because seismic activity and pile driving will likely occur in winter that there will be no impact. Many fish that are important to subsistence, including Dolly Varden and grayling, overwinter in large congregations. If these overwintering locations are not known, these subsistence resources could be significantly impacted by winter exploration and development activities. Overwintering locations for fish of subsistence importance should be identified within BLM's analysis. If this information is not known, it should be researched prior to the competition of this document. Moreover, how pile driving, seismic activities, and other winter activities may impact the success of winter fishing should be described in detail.[2117]

Additionally, BLM's discussion of potential restrictions to use of marine mammals is deficient. The DEIS's environmental justice section acknowledges that there are impacts to subsistence use of bowhead whales and other marine mammals from oil and gas activities.[2118] Hunters are required to travel further as a result of noise and traffic.[2119] Reduced harvest of

[2112] DEIS, vol. 2 Appendix E at E-5.
[2113] DEIS, vol. 2 Appendix E at E-5.
[2114] DEIS, vol. 1 at 2-4.
[2115] DEIS, vol. 1 at 2-7.
[2116] DEIS, vol. 1 at 2-15.
[2117] *See supra* (discussion re: fish and aquatic species and acoustic impacts).
[2118] DEIS, vol. 1 at 3-202.
[2119] DEIS, vol. 1 at 3-130.

whales would interrupt and alter sharing and trading networks with different communities and regions in Alaska and Canada.[2120] The DEIS fails to account for any of these impacts and merely concludes that large vessel traffic could temporarily disturb or displace whales or bearded/ringed seals. These animals demonstrate habituation to noise and activity associated with vessel traffic and onshore infrastructure when disturbance does not result in physical injury, discomfort, or social stress."[2121] This fails to adequately consider how harvest interruptions would restrict the availability of marine mammals for subsistence use.

BLM's analysis of impacts to marine mammals also completely fails to address impacts to polar bears and subsistence take of polar bears. The 810 analysis' marine mammals section does not even mention polar bears.[2122] BLM appears to have dismissed the analysis of any impacts to subsistence take of polar bears on the grounds that they do not comprise the majority of the wild foods subsistence users in the region consume.[2123] BLM's failure to account for impacts to polar bears is a serious omission from the 810 analysis. Impacts from seismic exploration alone, which BLM has not adequately analyzed elsewhere in the EIS, are significant and could lead to injury and lethal take of polar bears, particularly given the significant limitations and flaws with technologies used to detect denning polar bears. Any additional take of polar bears could have potentially serious impacts to this already imperiled species and its population, which could in turn impact subsistence take of polar bears. BLM needs to fully analyze this in its 810 analysis and elsewhere in the EIS.

BLM's failure to make a positive finding for Gwich'in communities should not absolve the agency of its obligation under tier-2 of ANILCA 810. Under tier-2, if a proposed action would significantly restrict subsistence uses, BLM can only adopt that action if it finds that the restriction on subsistence is necessary and consistent with sound public lands management principals; involves the minimal amount of public lands necessary to accomplish the purpose of the use, occupancy or disposition of public lands; and takes reasonable steps to minimize the adverse impacts to subsistence uses and resources from any use.[2124] BLM's evaluation of the availability of other lands for the purposes sought to be achieved and analysis of other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence are also wholly inadequate. BLM's analysis of the availability of other lands provides only a cursory summary of the Tax Act and concludes that the alternatives would fulfill the purpose of the statute.[2125] BLM's evaluation of alternatives that would reduce or eliminate the use of lands needed for subsistence similarly states that the action alternatives would meet the purpose of the Tax Act and notes that some of the alternatives would result in less land being available for leasing.[2126] This is not a meaningful evaluation of the ways in which BLM can reduce impacts to subsistence. The 810 analysis fails to recognize that BLM is

[2120] DEIS, vol. 1 at 3-171.
[2121] DEIS, vol. 2 Appendix E at E-6.
[2122] DEIS, vol. 2 Appendix E at E-5 to E-6.
[2123] DEIS, vol. 2 Appendix E at E-3.
[2124] 16 U.S.C. § 3120(a)(1)–(3).
[2125] See, e.g., DEIS, vol. 2 Appendix E at E-10.
[2126] See, e.g., DEIS, vol. 2 Appendix E at E-10.

in no way obligated to open the entire Coastal Plain to leasing. BLM has not only the ability to further limit the areas it offers for lease, but an obligation under Section 810 to only allow an action if it is involves the minimal amount of public lands necessary to accomplish the purpose.[2127] BLM's cursory evaluation and apparent assumption that there is no difference between the different alternatives and how they relate to subsistence impacts goes against the requirements of Section 810 and fails to provide a meaningful evaluation of how BLM can minimize the impacts to subsistence users. Additionally, while BLM says that it will conduct the required analysis under subsections (a)(3)(A), (B), and (C) of Section 810 in the final analysis is insufficient because it does not provide affected communities the opportunity to review and comment on BLM's analysis and proposed measures before they are adopted. It is critically important that BLM release preliminary findings and recommendations in a revised 810 analysis so that the agency can receive input on them before the agency finalizes them.

Overall, BLM's analysis of the potential impacts to subsistence use is arbitrary, fails to consider the full range of potential impacts, and fails to comply with the requirements of Section 810 and BLM's guidance. The direct and indirect impacts to any of these subsistence resources necessitates a positive finding for purposes of Section 810. BLM's preliminary evaluation is so faulty that it inhibits participation by the communities that could be affected. BLM should issue a revised preliminary evaluation correcting these deficiencies and re-release it when the agency issues the revised draft EIS that is also necessary.

B. BLM FAILS TO ADEQUATELY ANALYZE IMPACTS TO THE PORCUPINE CARIBOU HERD AND GWICH'IN SUBSISTENCE USERS.

BLM's failure to make a positive ANILCA 810 determination for Arctic Village, Venetie, and all other communities who rely on the Porcupine Caribou Herd is in error.[2128] The Porcupine Caribou Herd (PCH) uses the Arctic Refuge throughout the year, with the Coastal Plain providing essential calving, post-calving, insect relief, and other summer habitat.[2129] The Gwich'in of Alaska and Canada are culturally and spiritually connected to the Porcupine Caribou Herd, which in turn relies on the Coastal Plain for calving, post-calving and other summer habitat. Despite acknowledging that oil and gas can have impacts on the Porcupine Caribou Herd, BLM concludes that there will not be an impact on the subsistence resources for the Gwich'in. This ignores best available science, traditional knowledge, and the human rights of the Gwich'in — a problem which is exacerbated by the fact that BLM will not hold ANILCA 810 hearings in any Gwich'in communities. BLM should hold 810 hearings in all communities where there may be impacts to subsistence.

For all development alternatives, BLM acknowledges some portion of the herd's high-use calving area will be subject to leasing and surface occupancy, and the likely result is displacement and a decline in calf survival.[2130] Although the restrictions on surface occupancy

[2127] 16 U.S.C. § 3120(a)(1)–(3).
[2128] 16 U.S.C. § 3120(a).
[2129] *See supra* Part V.I (impacts to caribou); Caikoski. 2015.
[2130] DEIS vol. 2 Appendix E at E-6–E-9.

and leasing are slightly more stringent for Alternative C and Alternatives D1 and D2, all of BLM's proposed action alternatives would result in some level of displacement impacts on calving caribou,[2131] especially as impacts will extend across no surface occupancy and no leasing boundaries.[2132] Alternative B is particularly concerning, as it contemplates two central processing facilities, one of which could be located in area BLM identifies as a high-use calving area for the Porcupine Caribou Herd.[2133] BLM concludes that there would be similar impacts under each of the alternatives because there would be only 2,000 acres of disturbance in the program area.[2134] This ignores the fact that there are likely to be very different impacts depending on where and when BLM allows infrastructure and industrial activity. BLM needs to analyze these differences and how they will impact subsistence, and cannot rely solely on the direct footprint of development. As explained above, the impacts of oil and gas development are felt far beyond the direct footprint of oil and gas projects.

BLM's assertions that these impact will be minimal is in error. Any impacts to the Porcupine Caribou Herd on the Coastal Plain will be felt throughout their range in Alaska, the Yukon, and Northwest Territories and will result in a significant restriction to subsistence resources. BLM acknowledges the importance of caribou to 22 communities,[2135] yet states that "Kaktovik, Arctic Village, and Venetie are the only communities that may be *appreciably affected* by changes in the abundance or availability of PCH caribou."[2136] This conclusion is unsupported. There is again no explanation for BLM's wholesale failure to consider subsistence impacts to other Gwich'in communities.

BLM's own guidance states that the agency should err on the side of protection.[2137] This is particularly important because "the intent of Title VIII of ANILCA is to protect subsistence use, and . . . the Section 810 process has the ultimate goal of identifying ways in which impacts to subsistence can be minimized through the Notice and Hearings process."[2138] Indeed, the threshold to hold hearings is that there "may" be impacts. BLM has not erred on the side of protection in its 810 analysis. Instead, BLM has chosen to ignore the significant direct and indirect impacts to the Gwich'in, including the ways in which impacts to some communities will ripple out to other communities in light of community sharing practices. As discussed next, contrary to BLM's Section 810 findings, there are likely to be significant impacts to both the abundance and availability of resources available for subsistence purposes.

[2131] DEIS, vol. 2 Appendix E at E-11–E-14.
[2132] DEIS, vol. 2 Appendix E at E-11–E-14.
[2133] DEIS, vol. 2 Appendix E at E-8.
[2134] *See, e.g.*, DEIS, vol. 2 Appendix E at E-13.
[2135] DEIS, vol. 2 Appendix E at E-3.
[2136] *Id.*
[2137] *Id.* at 6-3.
[2138] *Id.* at 6-3.

1. The Oil and Gas Program Will Have Significant Impacts to the Abundance of Subsistence Resources for the Gwich'in.

For the two Gwich'in communities considered under ANILCA 810, Arctic Village and Venetie, BLM incorrectly finds there will not be significant restrictions to the abundance of resources available for subsistence use. Factors that can contribute to a reduction in abundance include adverse impacts on habitat, direct impacts on the resource, increased harvest, and increased competition from non-subsistence harvesters.[2139] As discussed in detail in Part V.I of these comments, there are likely to be significant adverse impacts to the Porcupine Caribou Herd from the oil and gas program. Activities associated with the oil and gas program will potentially cause a reduction in the Porcupine Caribou Herd's population, leading to a decline in the amount of harvestable resources. The draft EIS acknowledges that there will be adverse impacts on the Porcupine Caribou Herd and its habitat in multiple places, and yet still somehow finds there will not be significant impacts to subsistence.[2140] It is unclear how BLM avoids finding a reduction in abundance of the Porcupine Caribou Herd, based on even the limited information in its own DEIS. This must be more clearly explained.

BLM also ignores substantial evidence from studies and traditional knowledge that disturbance to caribou in the calving and nursing grounds will have serious impacts to the herd, such as reductions in calf survival.[2141] Caribou rely on stored body fat and energy reserves to get them through the long, difficult winter.[2142] The post-calving period is crucial to providing nourishment for growing calves and replenishing depleted body reserves. The Coastal Plain is critical for caribou post-calving as it provides greater concentrations and prolonged availability of plant nitrogen compared to the nearby Brooks Range.[2143] This nitrogen is a limiting resource for caribou that allows them to gain weight during the brief summer months, increasing winter survival and subsequent-year reproduction.[2144] Furthermore, key limiting minerals needed by caribou also appear to be more available on the Coastal Plain than in other seasonally-used areas.[2145] BLM finds that "[c]aribou would be displaced from areas that no longer have suitable

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[2139] Instruction Memorandum, *supra*, at 4.

[2140] DEIS vol. 2 at E-8 (indicating that, by placing infrastructure in the high-use calving area, BLM finds that "calving would most likely shift to the east or southeast," to areas with suboptimal forage); *id.* ("More surface development within this area could result in greater displacement of maternal caribou during calving, and thus could contribute to lower pregnancy rates and lower calf survival rates."); DEIS vol. 1 at 3-117 (indicating in the DEIS that dust generation during creation of gravel roads and travel upon those roads "may add toxic metals to roadside vegetation that mammals forage"); *cf.* DEIS vol. 2 at E-7 (indicating in the draft EIS that caribou responses to aircraft can affect subsistence hunters, recognizing that "[r]esidents of Nuiqsut consistently highlight aircraft disturbance of caribou as a concern and state that aircraft activity makes animals more wary and harvest more difficult").

[2141] *See supra* Part V.I (caribou).

[2142] *See supra* Part V.I.

[2143] Barboza et al. 2018.

[2144] Barboza et al. 2018.

[2145] Oster et al. 2018.

forage, but displacement is not expected to be widespread."[2146] This statement ignores the important science behind why the Porcupine Herd calves on the Coastal Plain and how displacement could lead to great calf mortality. It also ignores past observations of sustained shifts in distribution of calving Central Arctic Herd caribou in response to westward expansion of development from Prudhoe Bay.[2147] Disturbance to caribou calving and post-calving areas and important food sources would likely cause a decline in their populations and amount of harvestable resources. The DEIS also fails to explain why displacement will not alter migration paths.

Furthermore, all alternatives recognize there could be vehicle collision mortality, altered movement patterns from linear infrastructure, and air traffic impacts to the Porcupine Caribou Herd.[2148] These impacts are not adequately considered in BLM's ANILCA 810 analysis. For example, BLM appears to focus on only what it considers to be part of the 2,000 acre limitation. BLM does not address or account for impacts from infrastructure, such as pipelines, or other activities, such as gravel mining and seismic exploration. Seismic exploration on the Coastal Plain will have significant additional effects on subsistence. SAExploration's proposal seeks to pursue exploration across the entire Coastal Plain, all of which is used as calving grounds by the Porcupine Caribou Herd and Central Arctic Herd. SAE's proposal and other seismic exploration on the coastal plain have the potential to destroy or alter large swaths of vegetation and habitat that are vital to the Porcupine Caribou Herd and other species. This disturbance will amplify subsistence impacts from leasing, exacerbating the potential decline in the population resulting from impacts to calving habitat.

BLM's reliance on the DEIS's mitigation measures is misplaced. For instance, Stipulation 6 seeks to protect habitat of both the Porcupine and Central Arctic Herds by minimizing disturbance and hindrance of movements.[2149] However, for its requirements and standards, it simply points to ROP 23 for Alternatives B and C, with only the addition of suspension of major construction activities using heavy equipment for a short period under Alternative D. This means that this stipulation does not provide any independent protection for caribou movements across the Coastal Plain. (It is unclear what is meant by "major construction activity" and also noteworthy that even that protection is subject to waiver.) Stipulation 7 seeks to protect the "PCH primary calving habitat area." However, BLM has not supported the delineation of that area in the DEIS with any level of robust scientific justification.[2150] Additionally, areas outside of the most commonly used concentrated calving areas are still very important for caribou for post-calving needs as well as calving during particular years. BLM needs to protect both key calving and post-calving habitat, as well as protect migration corridors and movements. Protecting only the "primary calving area" as defined here will provide little protection in some years, potentially increasing calf mortality and threatening the caribou

[2146] DEIS vol. 2 Appendix E at E-8.
[2147] *See supra* Part V.I (caribou section).
[2148] DEIS vol. 2 Appendix E at E-8.
[2149] DEIS vol. 1 at 2-11.
[2150] *See supra* Part V.I.

population. This is especially a concern if warming conditions under climate change leads to "a western shift in concentrated calving areas," as the DEIS indicates.[2151]

Because of the importance of the Porcupine Caribou Herd to all Gwich'in communities, in both Canada and the U.S., any impacts with the potential to decrease the population and harvestable resources will have a significant effect to all Gwich'in communities. BLM failed to account for the potential impacts to abundance, as well as how that will have an even broader impact to these communities in light of sharing practices. BLM's finding of no significant restriction to the abundance of subsistence resources for all Gwich'in communities that rely on the Porcupine Caribou Herd is arbitrary and contrary to science and the record before the agency.

2. The Oil and Gas Program Will Have Significant Impacts to the Availability of Subsistence Resources for the Gwich'in.

Oil and gas leasing on the Coastal Plain would cause reductions in the availability of resources used for subsistence purposes. Under BLM's 810 guidance, reductions in availability are caused by factors such as alterations to resources' locations, migration, or distribution patterns.[2152] Any disturbance to the Porcupine Caribou herd in its calving and post-calving grounds and insect relief areas would very likely result in alteration of their movements. Any such change in the migration patterns of the Porcupine Caribou Herd is particularly problematic for subsistence activities for the Gwich'in people. The Gwich'in of Alaska and Canada are heavily dependent on the Porcupine Caribou Herd, so much so that their communities trace the historic migratory route of the herd through the Gwich'in traditional homelands.

Movement is central to life for barren-ground caribou, such as those that live on the North Slope of Alaska. Barren-ground caribou are renowned for their long-distance migrations, covering thousands of kilometers each year in some of the longest overland movements in the world.[2153] These migrations allow caribou to take advantage of resources that change over space and time, such as moving to areas with greater winter food availability and shelter and then returning to calving grounds with lower densities of predators.[2154] Changes to migratory patterns for the Porcupine herd could have serious impacts on the herd's availability to Gwich'in subsistence hunters.

The hypothetical development scenario description states, without scientific analysis, "[i]n caribou areas, potential roads would be built on north-south and east-west orientations to the extent possible to limit interference with caribou migration. Figure B-2, Conceptual Layout of a Caribou Area Stand-alone Oil Development Facility, shows how the hypothetical layout could be adjusted for caribou mitigation if deemed appropriate by permitting agencies."[2155] Figure B-2 depicts a slightly different layout of the roads radiating out from the Central

[2151] DEIS vol. 1 at 3-110.
[2152] Instruction Memorandum, *supra*, at 5.
[2153] Fancy et al. 1989; Bergman et al. 2000.; Schaefer and Mahoney. 2013.
[2154] Dau. 2011.; Joly. 2012.; Person et al. 2007
[2155] DEIS vol. 2 Appendix B at B-13.

Processing Facility to additional "satellite" drill sites, but no explanation is provided for assumptions about why it would be expected have a differing impact on caribou compared with Figure B-1. Furthermore, no analysis was provided for how a major road and transportation system and infield roads would affect caribou movements. BLM instead relies on the erroneous conclusion that caribou would simply "forage within the total footprint of a [central processing facility and its associated well pads" to dismiss the idea that infrastructure would impact the availability of the Porcupine Caribou Herd.[2156] There has been extensive research on negative impacts of roads associated with the Trans-Alaska Pipeline and the Prudhoe Bay oilfield complex to the Central Arctic Herd.[2157] BLM needs to address these issues using strongly supported scientific information, and fully consider impacts to caribou movement, which would directly impact availability for subsistence use.

Furthermore, all alternatives recognize vehicle collision mortality, altered movement patterns from linear infrastructure, and air traffic impacts to the Porcupine Caribou Herd.[2158] Although BLM claims some of these impacts can be mitigated with timing and surface limitations, BLM acknowledges that mitigation measures merely minimize, and do not eliminate impacts to subsistence.[2159] BLM does not attempt to explain what the shortcomings of these mitigations measures may be in terms of restrictions on subsistence availability. BLM also does not adequately account for the fact that the mitigation measures are potentially subject to waivers, exceptions, and modifications. The effectiveness of any mitigation measures is in part directly tied to whether or not it is enforceable or could be waived. BLM needs to account for the potential waiver of these provisions as part of its analysis, as that could negate any of the purported protections and benefits of such provisions.

Changes to the Porcupine Caribou Herd's migration route will have significant repercussions for Gwich'in communities, who are already having to travel farther to hunt caribou as their migration shifts because of climate change. BLM's 810 analysis lacks robust science and falls far short of its duties to discern, address, and mitigate against any impacts to the availability of subsistence resources.

C. BLM FAILS TO ADEQUATELY ACCOUNT FOR CUMULATIVE IMPACTS IN THE ANILCA SECTION 810 ANALYSIS.

BLM's cumulative analysis falls far short of adequately considering the impacts of other past, present, and reasonably foreseeable future actions in conjunction with oil and gas leasing on the Coastal Plain. Under ANILCA 810, "the purpose of the cumulative effects analysis is to determine the effects of the proposed action and alternatives together with other past, present,

[2156] DEIS vol. 2 Appendix E at E-6.

[2157] E.g., Cameron et al. 1979.; Cameron and Whitten. 1980.; Dau and Cameron. 1986.; Cameron et al. 1992.; Nelleman and Cameron. 1996.; Nelleman and Cameron. 1998.; Cameron et al. 2005.

[2158] DEIS, vol. 2 Appendix E at E-8.

[2159] DEIS, vol. 2 Appendix E at E6–E8.

and reasonably foreseeable future actions."[2160] A positive finding in the cumulative case triggers the notice, hearing, and determination requirements of ANILCA Section 810(a)."[2161]

As pointed above, BLM arbitrarily limits the scope of its 810 analysis to four communities, thus ignoring the impacts of its proposed action along with cumulative impacts that will occur for many other Gwich'in communities in Alaska and Canada.

As an initial matter, BLM seems to characterize future development on the Coastal Plain as a cumulative impact rather than and direct and indirect impact of its proposed lease sales. Besides being illogical, this assumption leads to BLM focusing primarily on direct and indirect impacts to subsistence uses, rather than taking a hard look at the cumulative impacts of other reasonably foreseeable future actions.

Past and present actions included in the cumulative case that have affected subsistence uses and resources are as recognized by BLM as the following:

- Oil and gas exploration, development, and production on the North Slope
- Transportation
- Subsistence activities
- Recreation and tourism
- Scientific research
- Community development
- Climate change[2162]

BLM lists the following as reasonably foreseeable future actions:

- Road and pipeline between Kaktovik and the Dalton Highway/Trans-Alaska Pipeline
- Oil and gas development in the Colville-Canning Area
- Oil and gas activity in the vicinity of Alpine[2163]

Noting these items in passing does not constitute a meaningful cumulative impacts analysis. As discussed throughout these comments, BLM has repeatedly failed to fully discuss the potential impacts from both the leasing program and other activities in the region to a broad range of potential resources and uses, including to subsistence and key resources such as caribou that are vital to subsistence. BLM needs to substantially revise its overall analysis of the potential cumulative impacts in the preliminary evaluation and reissue it to ensure that it fully accounts for these impacts for purposes of both NEPA and its Section 810 analysis.

In describing impacts of oil and gas development, BLM focuses on impacts resulting from oil and gas development activities on the Coastal Plain. There is absolutely no discussion of

[2160] Instruction Memorandum at 7.
[2161] Instruction Memorandum at 7.
[2162] DEIS vol. 2 Appendix E at E-16.
[2163] DEIS vol. 2 Appendix E at E-16.

the 3 reasonably foreseeable future actions discussed in the bullets above. BLM completed failed to analyze or even discuss impacts from development activities in the Colville-Canning Area, Alpine, a road and pipeline between Kaktovik and the Dalton Highway/Trans-Alaska Pipeline. BLM limits its discussion on development in Alpine to *existing* oil and gas development activities. This does not adequately account for the potential cumulative impacts to subsistence users or reasonably foreseeable projects, such as ConocoPhillips' Willow project near Nuiqsut.

BLM states that "[f]uture development associated with the Leasing EIS would not surround Kaktovik, but residents may still feel surrounded if there is development to the west, south, and east of their traditional hunting areas."[2164] It is unclear how BLM reached this unsupported conclusion, given the potential under various alternatives for areas across the Coastal Plain to be open to leasing and future development. BLM then goes on to purportedly analyze the cumulative impacts of development by stating that "cumulative impacts associated with Point Thomson, Liberty, and other projects could result in more than no effect or slight inconvenience on the ability of harvesters to reach and use active subsistence harvest sites."[2165] The analysis contains no description of these projects, how they may or may not impact subsistence access, or how BLM reached this conclusion. This conclusory statement gives no indication that BLM actually analyzed the potential impacts to subsistence.

Besides oil and gas development across the North Slope, BLM must also consider all reasonably foreseeable future actions that may impact the Porcupine Caribou Herd throughout its migratory range. BLM should not arbitrarily limit the scope of its analysis to the geographic area on or immediately adjacent to the Coastal Plain. BLM must consider any impacts to the herd from activities south of Brooks Range and within Canada.

BLM's ANILCA 810 analysis also fails to meaningfully account for climate change, which will exacerbate the cumulative impacts for all subsistence activities. Climate change is reshaping the Arctic landscape, and needs to be considered in light of changing migration patterns and intensify of current effects to subsistence. Currently, the only consideration in the 810 analysis provides:

> Climate change is an ongoing factor considered in cumulative effects analyses on the North Slope. Climate change could affect the habitat, behavior, distribution, and populations of fish and wildlife within the program area. It could also impact access to these resources. The trends in climate change that were described in BLM 2018a are expected to continue.[2166]

BLM's climate change analysis lacks rigor and is incomplete. It completely ignores the very real impacts which are already happening across the North Slope of Alaska. As discussed elsewhere in these comments, the best available science demonstrates that climate change is already impacting important subsistence resources like caribou, fish, and marine mammals.

[2164] DEIS vol. 2 Appendix E at E-17.
[2165] DEIS vol. 2 Appendix E at E-17.
[2166] DEIS vol. 2 Appendix E at E-19.

Instead of conducting an analysis specific to how subsistence use in this area could be impacted by climate change, BLM instead relies on the decision document for the Greater Mooses Tooth Two development to bypass providing any meaningful analysis of the impacts of climate change.[2167] The GMT-2 analysis relates to a landscape hundreds of miles away with different resources and use patterns and does not contain an analysis of the potential impacts of climate change specific to the Coastal Plain and its resources. BLM's ANILCA Section 810 analysis must be focused on the landscape and resources under consideration.

Overall, BLM's conclusion that Kaktovik is the only community that will experience impacts to subsistence, and even then only in the cumulative case, is arbitrary and contrary to the evidence. BLM needs to substantially revise its 810 analysis to fully account for the broad range of direct, indirect, and cumulative impacts, which warrant a positive finding for impacts to subsistence for all of these communities.

[2167] DEIS vol. 2 Appendix E at E-19.

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