ALASKA WILDERNESS LEAGUE, 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 REFUGE ASSOCIATION, NATIVE CONSERVANCY LAND TRUST, NATIVE MOVEMENT, NATURE CANADA, NORTHERN ALASKA ENVIRONMENTAL CENTER, SIERRA CLUB, THE OCEAN FOUNDATION, THE WILDERNESS SOCIETY, TRUSTEES FOR ALASKA, WILDERNESS WATCH, WORLD WILDLIFE FUND

June 19, 2018

Submitted via email

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Attn: Coastal Plain Oil and Gas Leasing Program EIS
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Scoping Comments re: Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program

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 April 20, 2018, Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, Alaska, 83 Fed. Reg. 17562 (Apr. 20, 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 issues that the Bureau of Land Management (BLM) must address in the National Environmental Policy Act (NEPA) review process as it considers holding a lease sale on the Coastal Plain of the Arctic Refuge. As the agency responsible for administering the oil and gas program, the BLM must ensure the planning process complies with NEPA, 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 Federal Land Policy and Management Act, the National Wildlife Refuge System Administration Act, the Endangered Species Act, and the Marine Mammal Protection Act, in addition to other substantive laws, treaties, and regulations as well as the management and permitting requirements of its cooperating agencies. 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.

Department of the Interior (DOI) officials have stated that they will move the environmental review process forward at a very fast pace and have outlined a timeline to complete the NEPA review and hold a lease sale by next summer. 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. Reckless decision-making is not what the Arctic Refuge — the crown jewel of our National Wildlife Refuge System — deserves. 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. Simply put, the Coastal Plain is no place for any oil and gas activities.

Sincerely,

Adam Kolton, Executive Director
Alaska Wilderness League

Aran O'Carroll, Executive Director
Canadian Parks and Wilderness Society-National

Chris Rider, Executive Director
Canadian Parks and Wilderness Society-Yukon

Kristen Monsell, Oceans Legal Director
Center for Biological Diversity

Robert Dreher, Senior Vice President, Conservation Programs
Defenders of Wildlife

Marissa Knodel, Associate Legislative Counsel
Earthjustice

Eric DuMont, Stop Drilling Campaign Director
Environment America

Carol Hoover, Executive Director
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Jessica Girard, Council Member
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David Raskin, President
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Geoffrey Haskett, President
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Native Movement

Graham Saul, Executive Director
Nature Canada

Lisa Baraff, Program Director
Northern Alaska Environmental Center

Lena Moffitt, Senior Director, Our Wild American Campaign
Sierra Club

Richard Charter, Coastal Coordination Program
The Ocean Foundation

Nicole Whittington-Evans, Alaska Director
The Wilderness Society

Victoria Clark, Executive Director
Trustees for Alaska

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World Wildlife Fund

CC:
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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 outlining many of the issues that the Bureau of Land Management (BLM) must address in the National Environmental Policy Act (NEPA) review process as it attempt to evaluate the impacts of an oil and gas program and considers holding a lease sale on the Coastal Plain of the Arctic Refuge.

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, issues that the BLM will need to consider in the development of the leasing environmental impact statement (EIS), the impacts that BLM will need to analyze, and the evaluation that BLM must undertake pursuant to section 810 of the Alaska National Interest Lands Conservation Act (ANILCA). At the outset, we note that there are many information and data gaps; BLM must not proceed in the face of incomplete or out-of-date information. BLM must address the topics discussed herein to ensure compliance with legal mandates. BLM must not shirk its duties or rush this process.

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

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.

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. 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.[1] 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.[2] The Range was protected specifically "for the purpose of preserving unique wildlife, wilderness and recreational values" of the area.[3] 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."[4] 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 ANILCA into law in 1980.[5] 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."[6] Through ANILCA, Congress re-designated the Range as the Arctic Refuge.[7] Congress added acreage south and west of the Range to the newly designated Arctic Refuge.[8] In addition to the purposes previously recognized for the Range, Congress identified additional purposes for this unique and spectacular areas 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 Arctic caribou herd), polar bears, grizzly bears, muskox, Dall sheep, wolves,

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

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

[3] PLO 2214 at 1.

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

[5] 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).

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

[7] ANILCA § 303(2).

[8] *Id.* § 303.

wolverines, snow geese, peregrine falcons and other migratory birds and Arctic char and graying;

(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.[9]

These four purposes, along with the original three purposes set out in PLO 2214, apply to the Coastal Plain.[10]

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.[11] ANILCA did not open the Coastal Plain to oil and gas. 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."[12] 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."[13] 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 esthetics.[14] Despite these findings, the Secretary of the Interior (Secretary) recommended leasing the entire Coastal Plain area.[15] For decades, Congress and the President declined to do so.

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[9] *Id.* § 303(2)(B).

[10] 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 Final EIS].

[11] 16 U.S.C. § 3142.

[12] 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].

[13] LEIS at vii, 123, 187.

[14] LEIS at 166.

[15] LEIS at vii, 188-89, 192.

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

The U.S. Fish and Wildlife Service (FWS) currently manages the entire Arctic Refuge — including the Coastal Plain — under the Comprehensive Conservation Plan (CCP) adopted on April 3, 2015.[16] 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.[17] Currently, the Coastal Plain is managed under the Minimal Management category as set out in the CCP.[18]

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.[19]

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.[20] In adopting Alternative E (which included a Wilderness recommendation for the majority of the Coastal Plain and the lands to the south added by ANILCA), FWS stated that Wilderness for the Coastal Plain:

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[16] 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].

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

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

[19] CCP ROD at 4.

[20] CCP ROD at 3.

> [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.[21]

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.[22]

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."[23]

Throughout the CCP revision process, FWS properly declined to consider oil and gas development on the Coastal Plain.[24] 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.[25]

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

[22] CCP ROD at 11–12.

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

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

[25] CCP Final EIS, Chapter 1 at 1-1; *see also* Arctic National Wildlife Refuge, Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review, Wild

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. The draft EIS must acknowledge this inconsistency.[26]

IV. 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.[27] 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.

In 2013, the State of Alaska (State) submitted an "application" to conduct seismic exploration on the Coastal Plain. DOI and the Secretary rejected the application three times, each time asserting that ANILCA no longer allows exploration. Following a lawsuit by the State, the court upheld the Secretary's decision and interpretation of ANILCA: exploration under ANILCA was no longer permitted. The legislation opening up the Coastal Plain to oil and gas development does not specifically mention exploration when it authorizes an oil and gas program. In addition

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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").

[26] The Notice of Intent (NOI) indicates that "[t]he EIS will appropriately consider the surface management of the Coastal Plain." 83 Fed. Reg. at 17,563. It is unclear if this language is intended to indicate that FWS will update the CCP. If FWS is going to undertake an update to the CCP, it must be clearly stated and FWS must provide adequate notice and undertake a comprehensive NEPA process to do so.

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

to considering the impacts from exploration,[28] BLM must explain whether and how exploration may be allowed and under what statutory and regulatory authority it will be regulated.

V. DEVELOPMENT OF THE LEASING EIS

A. THE EIS PROCESS MUST BE GIVEN AN APPROPRIATE AMOUNT OF TIME AND STUDY.

The BLM needs to fully analyze the impacts of oil and gas activities and should not truncate the topics to be addressed, the analysis performed, or the timeframe necessary to undertake the analysis and public outreach. During the past few weeks, DOI has made statements indicating that it will proceed with an aggressive plan for implementing an oil and gas program on the Coastal Plain of the Arctic National Wildlife Refuge. The timeline for holding a lease sale given by both agency officials and Alaska's congressional delegation is very fast. The stated goal is to hold a lease sale by the summer of 2019.[29] A recent statement by Senator Lisa Murkowski illustrates why the agency is moving so quickly to hold a lease sale: "They are working fairly and aggressively to put in place, to lay the groundwork for what comes next . . . because once you get those leases out into the hands of those who can then move forward, it's tougher to throw the roadblocks in place."[30] Based on statements by the administration and Alaska's Congressional delegation, it is clear that the goal is to hold a lease sale before any potential change in administration.[31] Creating a timeline based on blatant political considerations is patently unreasonable.

Recently issued Executive Order 13807 and DOI Secretarial Order 3355 seek to speed up and slim down the National Environmental Policy Act (NEPA) review and process. Such limits

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[28] *See infra* Part VI.E.1.

[29] *See* Bureau of Land Management, Scoping Meeting Boards, Board 6 (setting out project timeline and showing a Record of Decision being signed in the spring/summer of 2019), *available at*: https://eplanning.blm.gov/epl-front-office/projects/nepa/102555/145749/179458/Coastal_Plain_Scoping_Boards.pdf; *see also* Ben Lefebvre, *ANWR Oil Lease Sale Could Start Early Next Year*, POLITICOPRO, Mar. 14, 2018; Michael Doyle, *Assistant Secretary Says Department Is Open for Business*, E&E NEWS, Mar. 14, 2018 [hereinafter Doyle]; Alan Bailey, *Interior plans to begin environmental review for lease sale in 1002 area*, PETROLEUM NEWS, Mar. 18, 2018 [hereinafter Bailey].

[30] Hobson II, *supra*.

[31] Margaret Kriz Hobson, *Road map for ANWR drilling gets clearer*, E&E News, Mar. 12, 2018 ("There is a strong commitment to work with us to get these leases out before the end of this term.").

are inappropriate for many projects in Alaska, where affected communities are geographically dispersed, there are long subsistence gathering seasons, and projects and their environmental impacts are often complex. It is particularly inappropriate for an oil and gas program for the Coastal Plain.

The Secretarial Order imposes limitations for environmental impact statements (EIS) for all DOI projects, including a page limit of 150 pages, with the exception of a 300-page maximum for "unusually complex projects." Approval from high-level agency officials is required prior to going over these limits.[32] These arbitrary page limits are unrealistic, as the majority of EISs are well over 300 pages in length because of the need to evaluate the project and its impacts as required by law. The purpose of an EIS is to "provide full and fair discussion of significant environmental impacts and [to] inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[33] An oil and gas program for the Coastal Plain is unprecedented and has a huge scope of potential impacts and other issues that BLM needs to take into consideration, as BLM must consider all of the impacts from all phases of oil and gas activities.[34] Adhering to arbitrary limits will lead to less transparency in the analysis, more mistakes, and missing key data and analysis. It is inappropriate for BLM to adhere to these limits when it comes to a project of this scale.

Further, the Secretarial Order adds a target to complete all NEPA reviews within one year. The Deputy Secretary indicated that the agency will follow the arbitrary timeline of one year to meet the directive given in Secretarial Order 3355.[35] To achieve this arbitrarily-imposed timeline, the order mandates that much of the work on developing the EIS be completed prior to the NOI being published. The Council on Environmental Quality (CEQ) recognizes that "universal time limits for the entire NEPA process are too inflexible" and agencies should base timing for NEPA analyses as "appropriate to individual actions."[36] The proposed project must consider input from a variety of federal, state and local agencies as well as tribes and many local

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[32] Office of the Deputy Secretary of the Interior, Memo re: Additional Direction for Implementing Secretary's Oder 3355 (Apr. 27, 2018) (further explaining the one-year timeline and page-limit requirements and outlining how the Deputy Secretary expects agencies to comply, and setting out proposed page limits and a timeline).

[33] 40 C.F.R. § 1502.1.

[34] *See infra* Part VI.E.1.

[35] Secretary of the Interior, Order No. 3355, Streamlining National Environmental Policy Reviews and Implementation of Executive Order 13807 (Aug. 31, 2017).

[36] 40 C.F.R. § 1501.8.

communities. A one-year timeline will not be sufficient time for consultation with affected tribal entities or to solicit input from remote communities that will be affected, or from the nation's public. Further, BLM will not have adequate time to do new studies to fill gaps or even fully consider existing data. This overly strict timeline limits the chance for multiple-year surveys that are needed to understand impacts to wildlife populations and habitat, surface resources, recreational use trends, economic impacts, adverse health impacts on local communities, and subsistence impacts inherent in this proposed project. We are also concerned that, if the agency is doing much of the work on the EIS prior to the public comment and engagement opportunities, BLM will have already selected its course of action and is merely going through the motions of inviting the public to participate on a preordained decision. NEPA cannot be applied in this manner. As explained by the former FWS Regional Director for the Alaska Region, "Procedural integrity, not political expedience, must drive the timeline of this unprecedented effort."[37] BLM should request a waiver for the time and page limits of Secretarial Order 3355.

B. BLM MUST COORDINATE AND CONSULT WITH ALASKA NATIVES AND TRIBES.

FLPMA, federal regulations, and BLM policy all require the agency to coordinate planning with affected Indian tribes. FLPMA requires coordinating BLM planning and resource management with tribes and tribal land resource management programs, where appropriate and consistent with federal law.[38] The Council on Environmental Quality (CEQ), in interpreting NEPA, instructed federal agencies to involve tribes early in planning processes that are likely to affect tribal interests.[39] The BLM's NEPA Manual[40] and Land Use Planning Handbook[41] further describe the agency's duty to tribes. The BLM has also adopted robust and detailed guidance on involving tribes in BLM planning "to help assure (1) that federally recognized tribal governments and Native American individuals, whose traditional uses of public land might be

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[37] Ltr. from Geoffrey Haskett, President, National Wildlife Refuge Association, to Ryan Zinke, Secretary, U.S. Dep't of the Interior (May 23, 2018).

[38] 43 U.S.C. § 1712(b)(9).

[39] 40 C.F.R. § 1501.7(a)(1).

[40] BUREAU OF LAND MANAGEMENT, BLM LAND USE PLANNING MANUAL (1601) (2000).

[41] BUREAU OF LAND MANAGEMENT, BLM LAND USE PLANNING HANDBOOK (H-1601-1) (2005).

affected by a proposed BLM action, will have sufficient opportunity to contribute to the decision, and (2) that the decision maker will give tribal concerns proper consideration."[42]

DOI and BLM must also adhere to the requirements found in Executive Order 13175, Consultation and Coordination with Indian Tribal Governments.[43] It is critically important to honor the government-to-government relationship with all tribal entities that may be affected by leasing on the Coastal Plain, meaning all tribes that rely upon the Coastal Plain's resources for subsistence. There has been a lack of early tribal involvement in the design of a process that would meaningfully involve all tribal interests, including the Gwich'in, who have strong cultural, spiritual, and subsistence ties to the Coastal Plain and the health of the Porcupine Caribou Herd. DOI and BLM need to engage appropriate tribal members in all future steps the agencies plan to take, and ensure effective communication and informed Federal decision making that takes tribal concerns into consideration.

The BLM must adhere to these mandates to coordinate with and consult with tribes. BLM must take a broad and inclusive approach in doing so. Many tribes and Alaska Natives could be affected by an oil and gas program on the Coastal Plain, even if the tribe or tribal members are geographically distant from the Coastal Plain. This is because in Alaska, subsistence use regions span large geographic areas and subsistence resources include many migratory species like caribou and waterfowl.

The Gwich'in people live in fourteen small villages scattered 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.[44] All of these villages should be

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[42] BUREAU OF LAND MANAGEMENT, GENERAL PROCEDURAL GUIDANCE FOR NATIVE AMERICAN CONSULTATION (H-8120-1) (2004) at I-1.

[43] *See* Executive Order EO 13175, Consultation and Coordination with Indian Tribal Governments (Nov. 6, 2000).

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

contacted for government-to-government consultation. Likewise, DOI should contact and hold hearings for scoping and on the Draft EIS in all villages that desire a hearing.[45] Limiting public participation and public comment to only the submission of written comments may unfairly exclude and limit the ability of tribal entities and individuals to fully participate in this process, as some individuals such as elders may be limited in their ability to provide written comments or even verbal comments in the absence of a translator. It is also inappropriate for BLM to limit the length of public comment periods when tribal entities ask for additional time. The reality in Alaska is that subsistence and other activities may make it difficult for individuals to fully participate and engage during short timeframes and during certain times of the year. BLM should accommodate requests for additional time to ensure that tribal entities are able to fully engage in this important process. BLM should also grant any additional requests by affected tribes for cooperating agency status under NEPA.[46] Tribes have significant special expertise that makes them particularly suited to serve as cooperating agencies.

C. BLM MUST PROPERLY DEFINE THE SCOPE OF THE EIS AND ADDRESS AND RESOLVE NUMEROUS LEGAL ISSUES PRIOR TO LEASING.

In its Notice of Intent to Prepare an Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program, Alaska,[47] BLM stated that it was "undertaking a Coastal Plain Oil and Gas Leasing EIS to implement the leasing program pursuant to the Tax Act (Pub. L. 115-97, Dec. 22, 2017)." According to the NOI, 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." BLM specifically identified that the EIS will "consider and analyze" various leasing alternatives (areas to lease, stipulations and best management practices (BMPs) for leases and subsequent activities) and the 2,000-acre restriction in the Tax Act.[48] The NOI identified five criteria for development of the EIS: (1) it will consider all Federal lands, (2) it will address oil and gas leasing, (3) the Tax Act mandates at least two

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

[46] *See* 40 C.F.R. § 1501.6; 43 C.F.R. § 1601.0-5(d)(2).

[47] 83 Fed. Reg. 17562 (Apr. 20, 2018) [hereinafter NOI].

[48] NOI, 83 Fed. Reg. 17562.

lease sales of at least 400,000 acres based on the highest hydrocarbon potential,[49] (4) subsistence use and resources and the requirements under ANILCA section 810 to avoid and minimize any impacts on subsistence, and (5) "surface management of the Coastal Plain."[50] According to the NOI, on-the-ground activities will not be authorized by the record of decision for this EIS; additional analysis and permits and authorizations will be required. As set out, these issues to be addressed are too narrow. As explained below, there are numerous legal questions and considerations that BLM, DOI, and FWS must address in this process that are critical to resolve before a lease sale takes place or any activities are authorized.

The NOI also creates much confusion about what BLM is considering and analyzing, how this evaluation will relate to subsequent activities and how it will evaluate resources on the Coastal Plain. DOI and BLM must be absolutely clear about what the agency is evaluating and what activities could be authorized based on the EIS. As explained below, the proper scope of the EIS is broad, covering all oil and gas activities that follow from the Tax Law's provisions, including those on non-federal lands, and through all phases, and all associated impacts.[51]

1. BLM Must Consider Refuge Law and Policy in Developing an Oil and Gas Program.

The Coastal Plain is part of the Arctic National Wildlife Refuge, the largest and wildest unit of the National Wildlife Refuge System. In developing the EIS, BLM and FWS must pay particular attention to refuge law and polices that govern both the Arctic Refuge specifically and the National Wildlife Refuge System more broadly. This includes addressing the conservation purposes of the Arctic Refuge, Refuge System management laws and policies, and the management role of FWS.

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[49] There is an ongoing dispute between the State of Alaska and BLM concerning the western boundary of the Arctic Refuge. *Appeal of the State of Alaska*, IBLA No. 2016-109, 2017-55.

[50] *Id*.

[51] *See infra* Part VI.E.

a. BLM Must Acknowledge the U.S. Fish and Wildlife Service's Role as the Primary Management Agency of the Coastal Plain

The U.S. Fish and Wildlife Service is the management agency for the entire Arctic Refuge. Under the National Wildlife Refuge System Administration Act (NWRAA), FWS is the agency tasked with managing all refuges in the national wildlife refuge system, including the Arctic Refuge.[52] 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,[53] the legislation did not otherwise alter or supplant the FWS 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. 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.[54] BLM must appropriately acknowledge the FWS's lead role in Coastal Plain and Arctic Refuge management. The EIS must also fully take into account FWS's obligations to manage the resources of the Coastal Plain and the Arctic Refuge under ANILCA, the NWRAA, the Wilderness Act, the Marine Mammal Protection Act, and other applicable laws, policies, and treaties and demonstrate how a leasing program will satisfy these obligations.[55]

b. BLM Must Address the Original Conservation Purposes of the Arctic Refuge.

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.[56] 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

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[52] 16 U.S.C. § 668dd(a)(1); ANILCA § 304(a).

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

[54] *Trustees for Alaska v. Watt*, 524 F. Supp. 1303, 1309–10 (D. Alaska 1981).

[55] *See infra* Part V.C.1.b. In this capacity, FWS should approve all Refuge activities, including oil and gas activities.

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

provide for subsistence, and (7) protecting water quantity and quality needed to meet fish, wildlife, and habitat needs.[57]

The Tax Act added an additional purpose for the Coastal Plain: "to provide for an oil and gas program on the Coastal Plain."[58] Including an oil and gas program as a statutory purpose of a national wildlife refuge is unprecedented and on its face in conflict with the purposes of the Refuge System as a whole. No other national wildlife refuge in our nation has oil and gas as a statutory purpose. It is important to note that the Tax Act did not provide priority for the oil and gas purpose over any of the pre-existing purposes. Accordingly, FWS policy instructs that the oil and gas purpose of the Coastal Plain is subservient to the seven conservation purposes. FWS policy's 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."[59]

Consistent with this policy, the EIS must recognize that the seven conservation purposes are the priority purposes for the Coastal Plain and BLM must address how these existing purposes will continue to be met. In its analysis, the EIS must specifically evaluate whether the existing purposes will be met by each alternative, and must demonstrate based on a factual record, not conjecture, that the conservation purposes can indeed be met. This will require a rigorous analysis of any stipulations, best management practices, or other proposed measures

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[57] 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.

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

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

relied upon to avoid, minimize, mitigate, or compensate for harm. Moreover, as described further below, BLM must engage with the FWS in that analysis. A thorough analysis of the impacts of an oil and gas program based on up-to-date science will likely demonstrate that an oil and gas program is irreconcilable with these conservation purposes.

c. DOI must Address the Refuge Compatibility Mandate and Refuge Management Policies.

Compatibility is a cornerstone of refuge management.[60] Section 304(b) of ANILCA adopted the compatibility standard for refuges in Alaska. The compatibility requirement obliges FWS to determine whether proposed "uses are compatible with the major purposes for which such areas were established."[61] 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."[62] "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."[63]

In the development of the CCP for the Arctic Refuge, FWS developed and issued numerous compatibility determinations for uses.[64] Existing compatibility determinations for the Arctic Refuge cover various activities, including subsistence activities, recreational activities like hunting and fishing, and wildlife observation. DOI and FWS must address how they will apply the compatibility requirements to uses associated with an oil and gas program. In doing so, the agencies must consider and make mandatory any stipulations required to ensure that the use is compatible with Coastal Plain purposes. Relatedly, DOI should address how it will ensure that any oil and gas program is consistent with FWS's Biological Integrity, Diversity, and

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[60] 16 U.S.C. § 668dd(d).
[61] *Id.* § 668dd(d)(1)(A).
[62] 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.
[63] 603 FW 2 2.6.Q.
[64] CCP Final EIS at Appendix G.

Environmental Health Policy.[65] This policy was adopted to ensure that the refuge system mission is met and individual refuge purposes achieved.

2. BLM Must Explain How It Intends to Administer a Lease Sale and Oil and Gas Program Consistent with Existing Legal Obligations.

There are important legal obligations — statutory, regulatory, policy, and treaty based — that DOI must adhere to before it can consider leasing any portion of the Coastal Plain. The Tax Act did not waive any environmental laws. During the short legislative process to adopt the bill, Senator Lisa Murkowski, section 20001 of the Tax Law's sponsor, made multiple statements that no laws would be shortcut or environmental reviews truncated.[66] BLM must ensure that every law is fully complied with.

In defining the scope of the EIS and evaluating the impacts of oil and gas activities as required by NEPA, BLM must describe how it plans to implement a leasing program that complies with all laws and policies meant to ensure protection and conservation of the land and resources of the Coastal Plain and its place in the public lands systems of the United States. These laws include, but are not limited to: ANILCA and its regulations,[67] the Naval Petroleum Reserves Production Act (NPRPA) and its regulations,[68] the Federal Land Policy and

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[65] U.S. Fish and Wildlife Service, Biological Integrity, Diversity, and Environmental Health, 601 FW 3 (Apr. 16, 2001), *available at*: https://www.fws.gov/policy/601fw3.html.

[66] Chairman Lisa Murkowski, Opening Statement, Full Committee Reconciliation Markup, U.S. Senate Committee on Energy and Natural Resources (Nov. 15, 2017) ("I think it's also important to understand that we have not preempted the environmental review process in this legislation. We have not preempted the environmental review, nor have we limited the consultation process with Alaska Natives in any way. All relevant laws, all regulations, and executive orders will apply under this language."), available at: https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=5B08FB7E-B82C-488F-9627-D78DEAF2EBC1, *see also* Cong. Rec. S7697 (daily ed. Dec. 1, 2017) (statement of Sen. Carper stating that Senator Murkowski "assured members of the committee that, if the legislation became law, it would require such development be subject to the full scope of environmental review required by the National Environmental Policy Act, or NPEA, as well as other environmental laws. Indeed, earlier in this floor debate, the Senator from Alaska reiterated an assurance that the environmental and local wildlife will always be a concern and a priority and that this legislation does not waive NEPA or any other environmental law.")).

[67] *See supra* Part V.C.1.b.

[68] 42 U.S.C. § 6501, et seq.

Management Act (FLPMA) and its regulations, the NWRAA and regulations,[69] the Endangered Species Act, the Marine Mammal Protection Act, the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and other applicable statutes and regulations concerning oil and gas programs on federal public lands, and in national wildlife refuges and preservation systems. These laws impose both substantive and procedural requirements on actions and activities for the Coastal Plain and the land, wildlife, water, and other resources, and each must be addressed. Where there is potential conflict, BLM must explain how it is resolving that conflict and ensure that conservation mandates are met.

Described below are four species-specific laws that must be complied with. Additional relevant legal obligations like ANILCA, NWRAA, and the National Historic Preservation Act are describe elsewhere.

a. The Oil and Gas Program Must Comply with the Marine Mammal Protection Act.

Many marine mammals protected by the Marine Mammal Protection Act (MMPA)[70] use coastal and nearshore waters of the Arctic Refuge, including spotted, ringed, and bearded seals; beluga and bowhead whales; and polar bears.[71] Under the MMPA, it is unlawful to "take," or "harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal."[72] An activity that has the potential to incidentally take a small number of marine mammals may be permitted by regulation if it will have no more than a "negligible impact on the species or stock and will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses."[73] Oil and gas activities on the Coastal Plain may result in the taking of protected marine mammals. The National Marine Fisheries Service has not issued incidental take regulations for taking of seals and whales on or near the Refuge by oil and gas

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[69] *See supra* Part V.C.1.

[70] 16 U.S.C. §§ 1361–1407.

[71] U.S. Fish and Wildlife Service, Arctic National Wildlife Refuge, Mammal List, *available at*: https://www.fws.gov/refuge/arctic/mammlist.html.

[72] 16 U.S.C. §§ 1362(13), 1372(a).

[73] 16 U.S.C. § 1371(a)(5).

development.[74] FWS has issued incidental take regulations for the taking of polar bears and walruses by oil and gas activities in the Beaufort Sea and along the coast, but these regulations exclude and do not take into consideration potential oil and gas activities in the Arctic Refuge.[75] Thus, there is currently no MMPA authorization for oil and gas activities in the Arctic Refuge. BLM must address how it will ensure compliance with the MMPA for the oil and gas program.

b. The Oil and Gas Program Must Comply with the Endangered Species Act.

Several species protected under the Endangered Species Act (ESA)[76] inhabit the Arctic Refuge and its nearshore waters, including bowhead whales, ringed and bearded seals, spectacled eider, and polar bears.[77] Threatened polar bears den on the Coastal Plain and are using it with increasing frequency for other activities. The majority of the Coastal Plain (approximately 77 percent) is designated as critical habitat for the species.[78] Under the ESA, BLM has a duty to ensure "that any action authorized, funded, or carried out by [BLM] is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical habitat]."[79] BLM cannot authorize any action that may affect a protected species or its designated critical habitat without first consulting with either FWS (for polar bears and spectacled eider) or the National Marine Fisheries Service (for whales and seals). BLM must address how it will ensure compliance with the ESA for the oil and gas program.

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[74] *See* NOAA Fisheries, Incidental Take Authorization for Oil and Gas, *available at*: https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-oil-and-gas.

[75] 81 Fed. Reg. 52276 (Aug. 5, 2016).

[76] 16 U.S.C. § 1531 *et seq*.

[77] *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 (bearded seal listing); 73 Fed Reg. 28212 (May 15, 2008) (polar bear listing); 58 Fed Reg. 27474 (May 10, 1993) (spectacled eider listing).

[78] 75 Fed. Reg. 76086 (Dec. 7, 2010).

[79] 16 U.S.C. § 1536(a)(2).

c. The Oil and Gas Program 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.[80] More than 200 bird species found on the Arctic Refuge are migratory birds protected under the MBTA.[81] Congress enacted the MBTA in 1918 to implement a 1916 convention with Canada to protect migratory birds.[82] The United States later signed three more bilateral conventions with Mexico, Japan, and Russia to protect migratory birds.[83] 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.[84] Any oil and gas activities that take or kill migratory birds on the Coastal Plain without authorization would violate the MBTA.[85] 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.

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[80] 16 U.S.C. §§ 703–712.

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

[82] 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.

[83] 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).

[84] 16 U.S.C. § 703.

[85] 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).

d. The Oil and Gas Program Must Comply with the Bald and Golden Eagle Protection Act.

Both bald eagles and golden eagles occur in the Refuge, including on the Coastal Plain.[86] Golden eagles are described as a "[c]asual visitor [on the] coastal plain."[87] Both species are protected under the Bald and Golden Eagle Protection Act (BGEPA).[88] Project proponents must apply for a permit for any activities that might take or disturb eagles.[89] BLM lands are important to bald eagle persistence.[90] FWS has developed national guidelines for managing bald eagles.[91] The BLM must assess whether and how leasing and oil and gas development on the Coastal Plain might affect eagles. Although written for renewable energy development, a current BLM instruction memorandum on implementing BGEPA would be useful guidance for the current planning process, including a recommendation that the BLM coordinate with FWS.[92]

D. BLM MUST EXPLAIN HOW IT INTENDS TO ADMINISTER AN OIL AND GAS PROGRAM AND LEASE SALE CONSISTENT WITH DIRECTIVES IN THE TAX ACT.

BLM must also explain how it will interpret and administer an oil and gas program and hold a lease sale in light of specific directives in the Tax Act. These directives include the requirement to manage the oil and gas program similar to BLM's management of the National Petroleum Reserve in Alaska (NPRA) under the Naval Petroleum Reserves Production Act (NPRPA), the "2,000-acre limitation" on surface development, and the right-of-way provision.

1. BLM Must Address Multiple Elements of Administering an Oil and Gas Program and Lease Sales "Similar to" Those Under 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)."[93] This

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[86] CCP Final EIS, Append. F, at F-4–F-5.
[87] *Id.* at F-5.
[88] 16 U.S.C. §§ 668–668c.
[89] 50 C.F.R. §§ 22.1–22.32.
[90] 72 Fed. Reg. 37361.
[91] U.S. Fish and Wildlife Service (2007) National Bald Eagle Management Guidelines.
[92] Bureau of Land Management, California State Director. Bald and Golden Eagle Protection Act – Take Permit Guidance for Renewable Energy. Instruction Memorandum, IM-CA-2013-030. (Jul. 25, 2013).
[93] Pub. L. 115-97, Title II, sec. 20001(b)(3).

direction guides both the manner in which BLM can proceed to leasing as well as the approach the agency must take in structuring an oil and gas program. Additionally, BLM should explain in the EIS its interpretation as to what regulatory framework(s) will govern the various phases of an oil and gas program and how BLM will apply those frameworks to the Coastal Plain. BLM should also explain what additional regulatory authorities it believes are necessary for an oil and gas program on the Coastal Plain and outline what steps it may take to adopt any necessary regulations, such as engaging in formal rulemaking.

a. BLM must not conflate the NEPA process with the NPRPA-specific lease sale process, and must provide opportunities for public input at each stage.

Under the Tax Act, BLM has to manage the oil and gas leasing program similar to how it manages leasing in the NPRA under the NPRPA. BLM has 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.[94] This process is inconsistent with how BLM interprets and applies the NPRPA and its regulations in the NPRA, where the agency approaches the development of the programmatic plan and individual lease sales as two distinct steps. It is also inconsistent with how Senator Lisa Murkowski, the sponsor for Title II of the Tax Act, explained the leasing process contained in the bill, where she outlined that these would occur as distinct steps.[95]

For the NPRA, BLM develops a programmatic EIS called an Integrated Activity Plan (IAP), finalizing that document and completing the NEPA process prior to beginning the lease-

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[94] U.S. Department of the Interior, Bureau of Land Management, Frequently Asked Questions, *available at*: https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=152117 (last visited April 19, 2018).

[95] *See Business Meeting to Consider Reconciliation Legislation*, 115th Cong. at 1:04:44-1:05:37, remarks of Sen. Murkowski, Chairmen, U.S. Senator Committee on Energy & Natural Resources (Nov. 15, 2017) (explaining that first an IAP is developed, than there's a leasing process, followed by later phases of oil and gas, and there is environmental review and public participation at each step), *available at*: https://www.energy.senate.gov/public/index.cfm/hearings-and-business-meetings?ID=5AB53058-9594-4A00-8F0F-AF559530A32E.

sale specific process and holding a lease sale.[96] At a minimum, the agency should engage in a programmatic planning process for leasing in the Coastal Plain together with any necessary draft regulations, and only once that process is complete, conduct a lease-sale-specific process for determining when, where, and whether to hold lease sales. These processes ask different questions and make different decisions. Both require NEPA review and full public participation. We note that the development of the programmatic IAP and the lease-sale specific process for the first lease sale after the IAP was adopted took approximately three years and three months, well within the four-year timeframe allotted in the tax act for holding the first lease sale in the Coastal Plain.[97] Further, BLM will need to survey the boundaries for the tracts contemplated for lease before it can issue a Call for Nominations, and must account for this in its timelines for leasing, as well as analyze potential impacts from survey crews in the EIS. In sum, incorporating the lease-sale specific process into the programmatic leasing EIS is inadequate and inconsistent with how BLM has and currently conducts the leasing program in the NPRA.

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[96] 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, 2013); *see* also National Petroleum Reserve-Alaska, Final Integrated Activity Plan/Environmental Impact Statement at iv, 9–10 9 (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).

[97] *See* 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-Alaska, 75 Fed. Reg. 44277 (July 28, 2010); Bureau of Land Management, NPR-A Sale 2013 Bid Recap (Nov. 6, 2013), *available at*: https://www.blm.gov/sites/blm.gov/files/uploads/Oil_Gas_Alaska_2013_NPR-A_Bid_Recap_v2.pdf.

b. BLM must consider the protection of other values in determining where and how to lease in the Coastal Plain.

BLM's programmatic planning document must consider a broader range of oil and gas management considerations not limited to evaluating leasing. For example, in the NPRA, BLM describes the IAP's function and approach for protecting its values:

> Taken together, the provisions of the plan provide important protections for areas critical to numerous subsistence species - calving and insect relief areas of both caribou herds; riverine, lake, and coastal fish habitat; nesting and breeding areas for tens of thousands of birds; and bays, inlets, and coastlines important for marine mammals - as well as the coastal waters and river routes critical for North Slope residents to access hunting, fishing, berry picking, and trapping grounds.[98]
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> To provide protections in the NPRA pursuant to the NPRPA, BLM:
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> - manages some areas to protect surface resources as a priority;
> - designates some areas as "unavailable for leasing or exploratory drilling";
> - designates some areas as "unavailable for leasing and no new non-subsistence infrastructure or exploratory drilling";
> - commits to "protecting critical areas for sensitive bird populations from all seven continents and for the roughly 400,000 caribou";
> - commits to "manage twelve rivers or river segments to protect their free flow, water quality, and outstandingly remarkable values"; and
> - provides Best Management Practices to avoid and minimize impacts to subsistence.

BLM should consider these and other management approaches and surface protection provisions as part of a larger oil and gas planning process for the Coastal Plain. Additionally, NEPA and the NPRPA require BLM to evaluate mitigation as part of this EIS and any leasing program. Protective measures must include the full range of mitigation options, including required and unwaivable best management practices (BMPs), stipulations, and required operating procedures (ROPs), as well as other avoidance, minimization, and compensatory mitigation measures. These measures must account for the exceptional surface biological values and resources of the Coastal Plain, ensure their protection, and be based on updated information and scientific data.

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[98] BLM IAP ROD at iv.

c. BLM Must Address How It Will Administer Lease Sales and an Oil and Gas Program Taking Into Account the 2,000-Acre Limitation and Right-of-Way Directives in the Tax Act.

In setting out the legal framework and obligations that BLM must satisfy, the agency must explain how it interprets the 2,000-acre limitation on surface development in the Tax Act and how it will address and apply this limitation on surface activities.[99] In the proceedings leading up to bill passage, this provision was described as providing a cap on all surface development on the Coastal Plain.[100] BLM must also 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 must also clearly list all of the structures and facilities that will fall under this limit and those that will not. The agency must explain, in detail, what mechanism it will adopt (including regulations and lease provisions) to ensure that the agency has the ability to regulate surface development to keep any development below this cap, as well as the enforcement authority available to the agency to ensure compliance if development begins.

Fully addressing this mandate and accounting for all phases of oil and gas activities and development in doing so is important given that oil and gas resources, to the extent that there are any, are likely to be unevenly distributed throughout the Coastal Plain, potentially leading to a high number and dispersed distribution of fields.[101] Addressing this limitation requires BLM to consider a broad spectrum of possible restrictions on facilities and ground-disturbing activities that it could impose under the limitation and ensure that it is issuing leases that provide the agency the authority to impose any necessary restrictions to comply with the 2,000-acre limitation whenever specific activities are proposed and approved. BLM should also consider whether it must adopt regulations to implement this provision.

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

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

[100] 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.

[101] CCP Final EIS at Chapter 4, 4-35–4-36; *see also infra* Part VI.E.1–2.

to carry out this section."[102] The BLM must explain how it will address and apply the rights-of-way provision in the Tax Act**,** particularly in light of other statutory obligations for rights-of-way under ANILCA Title XI, and FLPMA.

E. BLM MUST CONSIDER A NO-ACTION ALTERNATIVE AND PROTECTIVE ALTERNATIVES.

The EIS must "[r]igorously explore and objectively evaluate all reasonable alternatives[.]"[103] The alternatives requirement is "the heart" of the EIS.[104] It is vital to an agency's informed decision making, a core goal of NEPA.[105] Every alternative must be given "substantial treatment . . . in detail . . . so that reviewers may evaluate their comparative merits."[106] BLM must consider both a no-action alternative (and do so thoroughly) and a range of protective alternatives to meet its NEPA duties. To be clear, commenters do not support any action alternative.

1. BLM Must Thoroughly and Accurately Consider a No-Action Alternative.

As part of the requirement that the agency consider alternatives, NEPA and CEQ regulations mandate that the agency consider a no-action alternative in all environmental reviews.[107] The NOI states that BLM will consider various leasing alternatives.[108] To comply with NEPA, the BLM must consider a no-action alternative, i.e., a no-leasing alternative. This alternative must be based on accurate and robust baseline data and describe the exceptional values of the Coastal Plain and the importance of the area to the national wildlife refuge system and our public lands national heritage. Absent an accurate and thorough presentation of a no action alternative that reflects 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."[109] To meet BLM's NEPA obligations, consideration of the no-action alternative must be vigorous and far-reaching.

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[102] Pub. L. 115-97, Title II, section 20001(c)(2).
[103] 40 C.F.R. § 1502.14.
[104] *Id*.
[105] *Id.* § 1500.1.
[106] *Id.* § 1502.14(b).
[107] 42 U.S.C. § 4332(2); 40 C.F.R. § 1502.14(d).
[108] 83 Fed. Reg. 17,562.
[109] *Half Moon Bay Fisherman's Marketing Ass'n v. Carlucci v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988).

2. BLM Must Consider A Range of Alternatives That Are Protective of Coastal Plain Resources, Even if Development May Be Precluded.

In addition to the no-action alternative, NEPA requires BLM to develop alternatives that avoid or minimize harm to the environment or enhance the quality of the environment.[110] BLM must therefore develop and fully analyze a robust range of alternatives that would ensure adequate protection of Coastal Plain resources and compliance with all applicable laws and policies. This includes alternatives that would potentially preclude development at later stages.

BLM should analyze a range of alternatives that would encompass both conditional and deferred leasing options. BLM must evaluate a series of heavily stipulated leasing alternatives that include a range of mandatory, non-waivable stipulations, BMPs, and ROPs. Stipulations that should be evaluated, for example, include those developed for the NPRA and other sensitive areas throughout the National Wildlife Refuge System, as well as the broader system of federal public lands that have been leased or developed, in addition to creating Coastal Plain specific prescriptions based on the unique biology and resources of the area. As part of this, BLM must consider stipulations that would ensure the agency retains full authority to deny permits for development based on site-specific considerations and analyses and clearly place the burden on the lessee to affirmatively demonstrate that values and purposes of the Refuge will not be impaired or degraded. BLM must also evaluate alternatives where development is contingent on FWS determining, among other things, that development can occur without compromising the original purposes of the Arctic Refuge. Further, BLM must analyze lease stipulation alternatives that would allow the agency to completely preclude development at later stages or confine development to very limited areas (e.g., a contiguous 2,000-acre footprint) based on concerns about impacts to resources. BLM should also consider alternatives that would forestall development of leases until such time as development would not compromise the conservation purposes of the Refuge (e.g., when leases can be developed in a manner that fully avoids adverse direct and indirect impacts to the Refuge), when economic conditions ensure that development will be cost-effective, or when critical information gaps are addressed. Commenters believe that oil and gas development in the Coastal Plain will necessarily compromise the original purposes of the Refuge and cannot rationally be reconciled with those values.

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[110] 40 C.F.R. § 1502.1; *see also Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 965 (9th Cir. 2005).

The Tax Act leaves BLM with ample discretion to make development contingent on circumstances that may ultimately delay or preclude it. The obligations imposed by numerous other statutes require that BLM exercise its discretion in a manner consistent with all applicable legal mandates. In addition, BLM has the authority to place leases into suspension in the interest of conservation of natural resources, which can include both preventing harm to the environment and preventing loss of mineral resources and can be structured to suspend expiration of lease terms and obligations to pay rent. BLM must therefore analyze alternatives for the leasing stage that preserve and reflect its authority to preclude development. In addition to a wide range of alternatives that would condition leasing in a way that may preclude development, BLM should analyze alternatives that would defer leasing to the end of the 4-year window provided in the Tax Act to allow additional time for necessary actions to ensure compliance with all relevant legal obligations. The development of alternatives must be guided by the analysis of the cumulative impacts analysis.[111]

F. DOI MUST 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.[112] This requirement helps "insure the professional integrity, including scientific integrity, of the discussions and analyses" in an EIS.[113] 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."[114] "[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

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[111] *See infra* Part VI.F.

[112] 40 C.F.R. § 1502.22(a); *see also* 43 C.F.R. § 46.125.

[113] 40 C.F.R. § 1502.24.

[114] *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)).

proposed action."[115] Accordingly, NEPA's missing information regulation "clearly contemplates original research if necessary."[116]

There is a substantial amount of baseline data missing or out of date that must be gathered and reviewed before BLM can 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.[117] 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;[118]
- Air quality, including modeling and monitoring;[119]
- Bird usage, including breeding, staging, feeding, habitat use, population and abundance, and distribution, for raptors, resident species, migratory birds, and waterfowl;[120]
- Fish inventories and distribution;[121]
- Water resources, including water chemistry/quality information, and water quantity availability;[122]
- Snow cover and variation across terrain;[123]

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

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

[117] *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) (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).

[118] *See, infra* Part VI.A.2.

[119] *See infra* Part VI.B.2.

[120] *See infra* Part VI.A.4.

[121] *See infra* Part VI.A.7.

[122] *See infra* Part VI.B.1.

[123] *See infra* Part VI.B.7.

- Predator distribution within the Coastal Plain and adjacent areas, including for wolves, wolverines, brown bears, and golden eagles;[124]
- 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;[125]
- Cultural resources and an inventory;[126]
- Wetlands distribution and coverage, including updated mapping;[127]
- Vegetation distribution and coverage, permafrost, and soils, including updated mapping;[128]
- Human health and food security;[129]
- Acoustic and soundscape data;[130]
- Subsistence use patterns;[131] and
- The impacts on Coastal Plain resources from climate change.[132]

BLM must obtain missing and/or updated information about these issues and other issues before proceeding with the EIS. BLM needs to obtain this information to ensure it has adequate baseline information for evaluating the existing conditions and future changes to the region. Additionally, 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. As such, even existing information may be of limited utility. Absent updated and new information, including additional missing information BLM or the public identifies, BLM cannot meaningfully evaluate the impacts of oil and gas activities, formulate or evaluate alternatives, or take necessary measures to protect important biological resources on the Coastal Plain. BLM's artificially imposed one-year timeline for EIS completion is not a sufficient basis to fail to obtain necessary missing information.

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[124] *See infra* Part VI.A.5.
[125] *See infra* Part VI.A.1.
[126] *See infra* Part VI.C.6.
[127] *See infra* Part VI.B.4, VI.B.7.
[128] *See infra* Part VI.B.4, VI.B 7.
[129] *See infra* Part VI.C.4.
[130] *See infra* Part VI.B.5.
[131] *See infra* Part VI.C.1, VII.
[132] *See infra* Part VI.D.

G. BLM Must Consider and Satisfy International Treaty Obligations

Numerous treaties govern the management of the wildlife that use and rely on the Coastal Plain, including treaties related to caribou, polar bears, and migratory birds. Fulfilling international treaty obligations is a purpose of the Arctic Refuge.[133] BLM must ensure that it complies with all treaty duties and obligations in the development of the EIS and management of an oil and gas leasing program on the Coastal Plain. It is critically important for BLM to cooperate and coordinate closely on all treaty issues with relevant government officials, agencies, and indigenous peoples — including with the FWS, the U.S. State Department, other federal and state agencies, the Canadian government, and Gwich'in representatives from both the U.S. and Canada and other affected Alaska Natives, and First Nations peoples.

1. International Porcupine Caribou Herd Agreement

The International Porcupine Caribou Herd Agreement (the Agreement) was signed in 1987 by the United States and Canada to conserve the Porcupine Caribou herd and its habitat.[134] The Agreement recognizes that "the Porcupine Caribou Herd regularly migrates across the international boundary between Canada and the United States of America and that caribou in their large free-roaming herds comprise a unique and irreplaceable natural resource of great value which each generation should maintain and make use of so as to conserve them for future generations."[135] The Agreement also recognizes that the Porcupine Caribou Herd is important for the "nutritional, cultural, and other essential needs" and for "customary and traditional uses" by Canadian First Nations and Alaska Natives.[136] The Agreement recognizes the importance of conserving habitat on an ecosystem level to the conservation of the herd, "including such areas as calving, post-calving, migration, wintering and insect relief habitat."[137] The Agreement specifically defines the herd's habitat as "the whole or any part of the ecosystem, including

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[133] ANILCA, Sec. 303(2)(B)(ii).

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

[135] *Id.*

[136] *Id.*

[137] *Id.*

summer, winter and migration range, used by the Porcupine Caribou Herd during the course of its long-term movement patterns."[138]

The Agreement imposes multiple mandates on the two nations, including "tak[ing] appropriate action to conserve the Porcupine Caribou Herd and its habitat," a consultation opportunity if one country is going to take an action that "is determined to be likely to cause significant long-term adverse impact" on the herd or habitat, which can require mitigation, and avoidance of activities that disrupt migration or other "important behavior patterns" like calving and insect relief.[139] To meet the obligations in the Agreement, the Agreement establishes a Board that is able to make recommendations on any activities that "could significantly affect the conservation of the Porcupine Caribou Herd or its habitat."[140] The Party undertaking the action is then required to consider the Board's recommendations and respond in writing to any that it rejects.[141]

BLM must ensure that it adheres to all substantive and procedural requirements of the Agreement during the development of the leasing EIS. The EIS should explain the treaty obligations and discuss how BLM will ensure that they are met. BLM should also convene the Board on a timeline and in a manner that allows the Board to make recommendations that would inform the BLM's draft EIS.

2. Agreements on the Conservation of Polar Bears

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.[142] Specifically, this multilateral agreement commits each associated country to sound conservation practices by protecting the ecosystem of polar bears, with special attention to denning areas, feeding sites, and migration corridors based on best available science through coordinated research. The agreement was signed by the United States

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

on November 15, 1973, in Oslo, Norway; ratified on September 30, 1976; and entered into force in this country on November 1, 1976.[143] 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.[144] 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. Accordingly, the BLM must consider our country's international obligations under the 1973 Agreement in the EIS.

We note that the Coastal Plain of the Arctic Refuge provides very important habitat for polar bears, in particular the Southern Beaufort Sea population (SBS). 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 on-shore habitat as sea ice diminishes due to climate change. The EIS should address how BLM will ensure adequate coordination with Canada, Denmark, Norway, and Russia to protect polar bears that could be affected by oil and gas leasing in the Arctic Refuge Coastal Plain. Additionally, BLM should address how the proposed oil and gas leasing program and alternatives affect polar bear denning areas, feeding sites, and migration corridors, including corridors between Alaska and Canada.

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.[145] 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 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

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[143] *Id.*

[144] 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)).

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

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.[146] BLM must 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.

3. Migratory Bird Treaties

All bird species that utilize the Arctic Refuge, with the exception of grouse and ptarmigan, are covered by the Migratory Bird Treaty Act of 1918 (MBTA) and its amendments.[147] Key amendments to the act include the Migratory Bird Treaty with the Soviet Union of 1978 (USSR Treaty). Migratory bird management must also comply with the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere of 1940 (Convention).

The Convention and the MBTA provide a variety of management provisions relevant to the Coastal Plain that the EIS must consider, including:

- A prohibition on the disturbance of nesting colonies (USSR Treaty, Article II).
- Direction for each nation to undertake, to the maximum extent possible, measures necessary to protect and enhance migratory bird environments and to prevent and abate pollution or detrimental alteration of their habitats (USSR Treaty, Article IV).
- A requirement that each nation provide immediate notification to the other when pollution or destruction of habitats occurs or is expected (USSR Treaty, Article IV).
- A stipulation that each nation shall, to the extent possible, establish preserves, refuges, protected areas, and facilities for migratory birds and their habitats and manage them to preserve and restore natural ecosystems (Convention).
- An allowance that protective measures under the treaty may be applied to species and subspecies not listed in the specific convention but that belong to one of the families containing listed species (USSR Treaty, Article VIII).

4. UNESCO 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 with "outstanding universal value"[148] that are nominated by a country

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[146] *Id.*

[147] 16 U.S.C. §§ 703–712.

[148] U.N. Educational, Scientific and Cultural Org. (UNESCO), The Criteria for Selection, https://whc.unesco.org/en/criteria/ (last visited June 5, 2018).

or by multiple countries. The United States and other State Parties which are part of the convention provide UNESCO with a Tentative List of sites from which they nominate sites for the World Heritage List. As of June 4, 2018, there are 1073 World Heritage List sites, with 23 in the United States including one transboundary natural site in Alaska shared with Canada: Kluane/Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek.

The United States was the first country to sign onto the World Heritage Convention in 1973. The U.S. stopped paying its UNESCO and World Heritage dues in 2011 when Palestine was admitted as a member state.[149] Even while not paying dues, the U.S. remains a party to the World Heritage Convention and can nominate sites to the World Heritage List.[150] The U.S. has continued to submit nominations to the World Heritage List and two U.S. sites have been added since 2011.[151]

The Arctic National Wildlife Refuge was included on the U.S.'s 1982 Indicative Inventory, a precursor to, and generally similar to, the Tentative List.[152] On January 22, 2008, Secretary of the Interior Dirk Kempthorne announced a new Tentative List for the U.S. of 14 sites that were meant to serve as the basis of US World Heritage List nominations for the next 10 years.[153] This new Tentative List did not include the Arctic National Wildlife Refuge.

On the Canadian side of the border, Canada included Ivvavik National Park and Vuntut National Park (adjacent to the Arctic Refuge in Canada) on its Tentative List in 2004 as a natural and cultural heritage, or mixed, World Heritage Site.[154] The UNESCO link for this site states that this is "a land rich in wildlife, in variety of landscape and in vegetation,"[155] and mentions the

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[149] Nat'l Park Serv., Q & As on US Withdrawal from UNESCO and US involvement with the World Heritage program (Mar. 20, 2018), *available at:* https://www.nps.gov/subjects/internationalcooperation/unesco-q-a.htm.

[150] *Id.*

[151] *Id.*

[152] George Wright Soc'y, Revision of the U.S. World Heritage Tentative List Completed, http://www.georgewright.org/tentativelist.html (last visited June 5, 2018).

[153] *Id.*

[154] Herschel Island (Qikiqtaruk) Territorial Park, an Arctic island in the Beaufort Sea, is also included in this nomination. *See* U.N. Educational, Scientific, and Cultural Org., Ivvavik / Vuntut / Hershel Island (Qikiqtaruk), *available at*: http://whc.unesco.org/en/tentativelists/1939 (last visited June 5, 2018).

[155] *Id.*

Porcupine [Caribou] Herd. The site description also states that "[t]his is the land of the Inuvialuit and Vuntut Gwitchin, who have hunted, fished and traded in the region for thousands of years. The cultural landscape's rich and complex human history is expressed through archaeological evidence and oral history."[156] On December 17, 2017, the Government of Canada announced its updated Tentative List adding eight new sites but retaining six sites from when the Tentative List was updated in 2004 including the Ivvavik/Vuntut/Herschel Island (Qikiqtaruk) site.[157] On December 17, 2017, the Government of Canada announced its updated Tentative List adding eight new sites but retaining six sites from when the Tentative List was updated in 2004 including the Ivvavik/Vuntut/Herschel Island (Qikiqtaruk) site.[158]

Like the Canadian nomination of the adjacent Ivvavik/Vuntut/Herschel Island (Qikiqtaruk) site, the Arctic National Wildlife Refuge would meet at least half of the ten Criteria for qualification on the World Heritage List: potentially Criteria iv-v and vii-x.[159] As one example of these likely impact of designation, Royal Dutch/Shell in 2003 stated it would "avoid exploring or drilling on sites that carry the United Nation's World Heritage designation."[160] If oil development occurred on the Coastal Plain, however, the potential for the Arctic National Wildlife Refuge to be recognized as a World Heritage Site for its "outstanding universal value" and for its ability to meet multiple qualifying criteria for a mixed site may be affected. In the EIS, BLM should consider whether the Arctic Refuge and its Coastal Plain should be included on the United States' Tentative List.

VI. BLM MUST CONSIDER A BROAD RANGE OF IMPACTS IN THE EIS.

An EIS must take a hard look at the direct, indirect, and cumulative effects of the proposed project on the human environment, as well as means to mitigate adverse environmental

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[156] *Id.*

[157] Parks Canada, Canada's Tentative List, *available at*: https://www.pc.gc.ca/en/culture/spm-whs/indicative-tentative (last visited June 5, 2018).

[158] Parks Canada, Canada's Tentative List, *available at*: https://www.pc.gc.ca/en/culture/spm-whs/indicative-tentative (last visited June 5, 2018).

[159] UNESCO, The Criteria for Selection, https://whc.unesco.org/en/criteria/ (last visited June 5, 2018).

[160] Heather Timmons, *Shell to Avoid Oil Drilling at Sites Listed By UNESCO*, NEW YORK TIMES (Aug. 31, 2003), available at: https://www.nytimes.com/2003/08/31/world/shell-to-avoid-oil-drilling-at-sites-listed-by-unesco.html.

impacts.[161] The effects and impacts to be analyzed include ecological, aesthetic, historical, cultural, economic, social, and health impacts.[162] Direct effects are those that are caused by the project and that occur in the same time and place.[163] Indirect effects are those that are somewhat removed in time or distance from the project, but nonetheless reasonably foreseeable.[164] As the lead agency responsible for developing the EIS, BLM is obligated to obtain necessary baseline data for the project area[165] and do a thorough analysis of potential impacts from the proposed project. The impacts that BLM must consider and evaluate in the EIS include: wildlife impacts, surface resource impacts, social systems and use impacts, climate change impacts, impacts from all phases of oil and gas activities on both Federal and private lands, cumulative impacts, cross border and transboundary impacts, and economic impacts. Each category is addressed below.

Additionally, Federal agencies are required under the National Environmental Policy Act to use "high quality" information in planning.[166] The BLM's Land Use Planning Handbook commits the agency to "mak[ing] decisions using the best information available."[167] The agency's NEPA handbook further specifies that the agency "[u]se the best available science to support NEPA analyses, and give greater consideration to peer reviewed science and methodology over that which is not peer-reviewed."[168]

BLM has adopted additional guidance for planning and management of special status species. The agency's manual on special status species stipulates that "[w]hen administering the Bureau sensitive species program, all information shall conform to the standards and guidelines established under the Information Quality Act" (IQA).[169] DOI's guidelines for implementing the IQA state that "[t]he Department will: (a) Use the best available science and supporting studies

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[161] *Id*. §§ 1502.16, 1508.25(c).
[162] *Id*. § 1508.8.
[163] *Id*. § 1508.8(a).
[164] *Id*. § 1508.8(b).
[165] *See infra* Part V.F.
[166] 40 C.F.R. § 1500.1(b).
[167] BUREAU OF LAND MANAGEMENT, BLM LAND USE PLANNING HANDBOOK (H-1601-1) (2005) at 2.
[168] BUREAU OF LAND MANAGEMENT, BLM NATIONAL ENVIRONMENTAL POLICY ACT HANDBOOK (H-1790-1) (2008) at 6.8.1.2.
[169] BUREAU OF LAND MANAGEMENT, SPECIAL STATUS SPECIES MANAGEMENT MANUAL (6840) (2008) at 6840.06.2 (SPECIAL STATUS SPECIES MANAGEMENT MANUAL).

conducted in accordance with sound and objective scientific practices, including peer-reviewed studies where available."[170] The BLM has also adopted guidelines for complying with the IQA, which incorporates the Department's guidelines and describes processes for ensuring the quality of information contained in agency documents.[171] These IQA guidelines apply to the current planning process, as it will include "information disseminated to the public for conducting BLM business."[172] BLM must adhere to these directives when evaluating the impacts of oil and gas program on Coastal Plain resources.

A. BLM MUST ANALYZE AND FULLY DISCLOSE THE IMPACTS OF AN OIL AND GAS PROGRAM ON NUMEROUS WILDLIFE SPECIES.

1. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Caribou

Caribou (*Rangifer tarandus*) are the most abundant large terrestrial herbivore in the circumpolar arctic[173] Known as reindeer in some countries, caribou populations stretch across North America, Europe, and Asia.[174] Although widely distributed, caribou and wild reindeer populations worldwide have faced strong declines, likely due to global changes in climate and anthropogenic landscape change.[175] Four caribou herds occupy arctic Alaska, having their calves on the coastal plain and foothills of Alaska's North Slope. These caribou are renowned for their long-distance migrations, covering hundreds to thousands of kilometers each year in some of the longest overland movements in the world.[176] These migrations allow caribou to take advantage of spatiotemporally varying resources, such as moving to areas with greater winter food availability and shelter and then returning to their calving ground habitats with lower densities of predators and rich food sources.[177] As plant browsers and prey species for golden eagles,[178]

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[170] U.S. DEPARTMENT OF THE INTERIOR, INFORMATION QUALITY GUIDELINES PURSUANT TO SECTION 515 OF THE TREASURY AND GENERAL GOVERNMENT APPROPRIATIONS ACT FOR FISCAL YEAR 2001 (undated) at 2; available at https://forms.doioig.gov/docs/InformationQualityGuidelines.pdf.

[171] BUREAU OF LAND MANAGEMENT, INFORMATION QUALITY GUIDELINES (2018).

[172] *Id.* at 3.

[173] Brathen et al. 2007. (Materials cited in this section are cited in full in Appendix 3.)

[174] Vors and Boyce 2009.

[175] Vors and Boyce 2009; Russell et al. 2015.

[176] Fancy et al. 1989, Bergman et al. 2000, Schaefer and Mahoney 2013.

[177] Person et al. 2007, Dau 2011, Joly 2012, Fancy and Whitten 1991.

[178] Whitten et al. 1992.

brown bears[179] and wolves,[180] caribou also strongly influence the ecology of the coastal plain, an ecological function that must be evaluated within the leasing EIS.

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 use the Arctic Refuge year round, and the Coastal Plain primarily during summer.[181] The Teshekpuk Caribou Herd occasionally uses parts of the Arctic Refuge as winter range.[182] 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.[183] While Porcupine Caribou Herd calving grounds have shifted in concentration between the Arctic Refuge and Canadian Yukon over time in response to year-to-year variation in plant quality and quantity[184] and weather conditions, the majority of the herd has calved on the Arctic Refuge Coastal Plain in most years since the 1970s, including recently.[185] Even in years in which calving was concentrated in Canada, the herd has used the Arctic Refuge Coastal Plain for food and insect relief while raising their young after calving.[186]

The Coastal Plain also is critical for caribou post-calving as it provides greater concentrations and prolonged availability of plant nitrogen, a limiting resource for caribou that allows them to gain weight during the brief summer months, increasing winter survival and subsequent-year reproduction.[187] These factors make the Porcupine caribou herd's calving and post-calving habitats, which are most sensitive to disturbance, also the most important to herd growth and sustainability.[188] The EIS must study and fully disclose any negative effects, including on calving success and population growth, of caribou being potentially displaced into the Brooks Range, where predator densities are higher, plant nitrogen is lower and available for a

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[179] Reynolds et al. 1987, Mowat and Heard 2006.
[180] Dale et al. 1994, Ballard et al. 1997.
[181] Arthur and Del Vecchio 2009, Lenart 2015.
[182] Person et al. 2007.
[183] Caikoski 2015.
[184] Griffith et al. 2002.
[185] Clough et al. 1987, International Porcupine Caribou Board 1993, Douglas et al. 2002, McFarland et al. 2017.
[186] Griffith et al. 2002.
[187] Barboza et al. 2018.
[188] International Porcupine Caribou Board, 1993, Russell and McNeil 2002.

shorter amount of time. Furthermore, key limiting minerals needed by caribou appear to be more available on the Coastal Plain than in other seasonally-used areas.[189]

Due to its ecological, cultural, and subsistence importance, conservation of the Porcupine Caribou Herd and its habitat in its natural diversity is a primary purpose of the Arctic National Wildlife Refuge.[190] Under the current management in the CCP, the Refuge has positive effects on caribou habitat and persistence, and the EIS must evaluate changes to caribou conservation and management against this no-action baseline. Furthermore, the Porcupine Caribou Herd is one of the largest herds in North America and ranges over a vast area of northeast Alaska and northwest Canada. The EIS must also address the potential ecological impacts over this large area resulting from development on the coastal plain. ANILCA also makes fulfillment of international obligations — including the 1987 Porcupine Caribou Herd Conservation Agreement between the United States and Canada — and providing the opportunity for continued subsistence uses of the caribou and other Refuge resources purposes of the Refuge.[191] This must be considered.

a. Development impacts on caribou

The EIS must analyze and disclose the direct, indirect, and cumulative impacts of the lease sales and resulting activities (including exploration) on caribou, including the effects of facilities such as gravel pads, roads, airstrips and low flying aircraft, and pipelines on caribou movement, migration, and calving. Risks of spills must also be assessed. Caribou movement corridors and calving areas must be identified for analysis. The EIS must evaluate the functional loss of habitat associated with caribou avoidance of development, not simply the immediate footprint. The EIS must also disclose the additive and synergistic effects of climate change and leasing activities on caribou habitat and population trends, as well as related impacts to the abundance of predators such as wolves, bears and wolverines. BLM must fully analyze these and other reasonably foreseeable direct, indirect, and cumulative impacts of all phases of oil and gas development on the Porcupine Caribou Herd, utilizing the best available scientific information. These and other impacts are described in more detail below.

i. Calving

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[189] Oster et al. 2018.
[190] ANILCA § 303(2)(B)(i).
[191] *Id.* § 303(2)(B)(ii)-(iii); *see supra* Part V.G.1, *infra* Part VI.C.1, VII.

Studies of the Central Arctic Herd in relation to development of the Prudhoe Bay development area and expansions to the west provide a cautionary tale about possible effects of energy development on caribou within the Coastal Plain and Arctic Refuge and should be applied to the effects analysis within the EIS.

The Central Arctic Herd historically used two calving grounds, one in the west between the Colville and Kuparuk rivers and one in the east between the Sagavanirktok and Canning rivers.[192] As development expanded out from Prudhoe Bay, caribou using the western calving grounds where new development occurred shifted south,[193] while those in the east outside of main development areas did not shift.[194] This shift away from new development likely had consequences for caribou as food availability was lower for development-exposed caribou that shifted calving areas[195] and these caribou showed lower calf body mass[196] and birth rate[197] though the herd still grew through this period.[198] A review by the United States Geological Survey (USGS) concluded there was no clear biological explanation for the shift in concentrated calving in the west, implicating petroleum development as its likely cause.[199] The observation that only the development-exposed portion of the herd showed this shift in calving location casts doubt upon alternative explanations, such as the timing of snowmelt.

The sensitivity to development of female caribou about to give birth and those with young calves has been well documented and must be addressed within the EIS. Studies of the Central Arctic Herd following expansion of the Kuparuk Development Area, west of Prudhoe Bay, found that use of areas near development declined after infrastructure was established[200] and was lower than expected within 4 km of roads.[201] While one study reported increasing density of caribou calves within 1 km of roads in the Kuparuk Development Area,[202] this study

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[192] Lenart 2015.
[193] Wolfe 2000, Noel et al. 2004, Cameron et al. 2005, Joly et al. 2006, Lenart 2015.
[194] Wolfe 2000, Russell and McNeil 2005.
[195] Wolfe 2000; Griffith et al. 2002.
[196] Arthur and Del Vecchio 2009.
[197] National Research Council 2003; Cameron et al. 2005.
[198] Lenart 2015.
[199] Griffith et al. 2002.
[200] Cameron et al. 1992, Dau and Cameron 1986.
[201] Cameron et al. 2005.
[202] Noel et al. 2004.

was criticized for not taking into account the overall decrease in caribou numbers within the development area when interpreting their findings.[203] This decrease in numbers occurred despite a rapid increase in herd size during this period and has been suggested to reflect a shift of caribou away from the area of concentrated development.[204] Caribou with calves also tend to occur farther from development than those without calves and tend to occur less in areas and at times of higher human activity.[205] Furthermore, females about to give birth or with very young calves tend to avoid, or are less likely to cross, roads and pipelines during the calving season.[206] The EIS must disclose the effects of leasing and development on caribou calving and calving habitat, including the effects of roads and other infrastructure. Population-level effects and trends must be assessed, as well as the functional loss of habitat resulting from caribou cows and calves avoiding development activities.

ii. Insect relief

Insect activity, primarily that of mosquitoes and oestrid flies, has a strong influence on caribou space use, leading caribou to seek areas of relief from insects, such as the coast, gravel bars, Aufies fields, and elevated areas.[207] Harassment due to insects can have a negative effect on caribou populations, leading to lower rates of calves being born in years following high insect activity.[208] Caribou may also use areas around infrastructure during periods of moderate to high insect activity.[209] Nevertheless, observations of lower reproduction rates following years of high insect activity for caribou occupying relatively developed areas compared to those occupying less developed areas led the National Research Council to conclude that by altering caribou movements development "probably exacerbates the adverse effects of insect harassment."[210] This is of grave concern as warming conditions in the Arctic are leading to earlier growth and increased survival of mosquitoes.[211] The EIS should discuss the disturbance, hindrance, and alteration effects of leasing and development on the movement of caribou associated with insect-

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[203] Joly et al. 2006.
[204] Joly et al. 2006.
[205] Haskell et al. 2006.
[206] Wolfe et al. 2000, Griffith et al. 2002.
[207] Pollard et al. 1996.
[208] National Research Council 2003.
[209] Pollard et al. 1996.
[210] National Research Council 2003 at 115.
[211] Culler et al. 2015.

relief, as well as impacts to insect-relief habitat. Areas essential for movement and insect-relief should be defined and identified.

iii. Limited evidence of habituation

Some have argued that caribou habituate to human activity, learning not to fear it over time.[212] The evidence for this is equivocal at best. This is a topic that requires further scientific investigation to allow adequate determination of the possible effects of oil and gas development. The EIS should reflect the state of knowledge and acknowledge that the current scientific literature does not justify an assumption of habituation for caribou.

iv. Likelihood of increased development impacts for the Porcupine Caribou Herd

It is likely that the responses to development observed in the Central Arctic Herd will similarly apply to the Porcupine Caribou Herd. In fact, the USGS pointed out a number of reasons why responses may be greater in the Porcupine Caribou Herd compared to the Central Arctic Herd.[213] One major factor, and one that the effects analysis within the EIS must consider, is that the coastal plain is narrower within the Arctic Refuge compared to the main Central Arctic Herd range, leaving less room for shifts in space use.[214] Another is that the expansion of development and the shift in Central Arctic Herd calving occurred during a period of relatively favorable environmental conditions. The EIS should acknowledge that future environmental changes, due to natural fluctuations or climate change (see below), may reduce the ability of caribou to accommodate range shifts. As the National Research Council pointed out in their 2003 report, "although the accumulated effects of industrial development to date have not resulted in large or long-term declines in the overall size of the Central Arctic Herd, the spread of industrial activity into other areas that caribou use during calving and in summer, especially to the east where the coastal plain is narrower than elsewhere, would likely result in reductions in reproductive success, unless the degree to which it disturbs caribou could be reduced."[215].

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[212] *See, e.g.*, Bureau of Land Management, Alpine Satellite Development Plan for the Proposed Greater Mooses Tooth 2 Development Project: Draft Supplemental Environmental Impact Statement (2018).

[213] Griffith et al. 2002.

[214] See Attached Map At Appendix 1.

[215] National Research Council 2003 at 6.

Success of mitigation measures to reduce disturbance to movement due to physical barriers has not been adequately verified.[216] However, the shift in Central Arctic Herd calving distribution to the south in the Milne Point and Kuparuk areas occurred in spite of use of structures intended to mitigate impacts like elevated pipelines and reduced road density,[217] suggesting that such mitigation was ineffective.

There is still much that we do not know about caribou and the things that influence their population dynamics, and the EIS must reflect this uncertainty and account for risk accordingly. It is important to note that while caribou populations naturally fluctuate, the USGS points out that "reduced calf survival may slow the rate of increase during positive phases of the growth curve of the herd and increase the rate of decline during the negative phases of the herd's growth curve."[218] Three expert groups evaluated potential consequences of energy development on the Arctic Refuge coastal plain for the Porcupine Caribou Herd.[219] These evaluations analyzed development scenarios, population simulation models, food availability, predator density, and more. All three indicated likely declines in calf survival, with effects on herd distribution and/or population growth, in response to coastal plain development.[220]

BLM must fully analyze these and other reasonably foreseeable direct, indirect, and cumulative impacts of all phases of oil and gas development on the Porcupine Caribou Herd, utilizing the best available scientific information and taking a precautionary approach to appropriately address uncertainty and the importance of the resource.

b. Data gaps

Understanding space use by species, caribou in particular, is fundamentally important. Protecting fish and wildlife species and their habitats in their natural diversity is among the primary purposes of the Arctic Refuge.[221] In other planning processes, BLM has undertaken a relevant analysis of resource selection by species using appropriate methodologies for the landscape and management scheme and the best available science. BLM must undertake a resource selection analysis in the EIS to understand the potential impacts to caribou.

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[216] Lenart 2015.
[217] Griffith et al. 2002.
[218] Griffith et al. 2002 at 32.
[219] Elison et al. 1986, Griffith et al. 2002, Russell and McNeil 2005.
[220] Elison et al. 1986, Griffith et al. 2002, Russell and McNeil 2005.
[221] ANILCA § 303(2)(B)(1).

Analysis of the historic information in combination with more recent use patterns is necessary to demonstrate the patterns of Coastal Plain use by caribou over time. For the Arctic Refuge, annual documentation of calving and post-calving use began during studies associated with the proposed Arctic Gas Pipeline in 1971 and continued by FWS and other agencies in the 1980's when extensive baseline studies involving field work and analyses were done for caribou, vegetation, and other wildlife as required under ANILCA section 1002(c) for the Arctic National Wildlife Refuge Coastal Plain Resource Assessment.[222] These studies, and others produced since, provide historical polygon-based depictions as well as fixed kernel distributions of habitat use and important areas and are necessary for evaluating long-term habitat use in the Coastal Plain, including for calving, post-calving, and movement routes.[223] This important baseline information needs to be included in documentation of the existing environment and for the impact analysis. However, updates are needed to this information, as most only depict habitat use prior to 2005.[224]

In addition to analysis of historic information, BLM must collect additional data and review recent studies to conduct a resource selection function analysis. In doing so, BLM must identify relative habitat value for Porcupine caribou in a spatially continuous manner based on environmental factors using the longest temporal range of data available. Such studies should be conducted so that they utilize, build upon, and complement historical studies, as well as other knowledge systems like that provided by traditional knowledge.

c. Climate change and caribou

The EIS must discuss the additive and synergistic effects of climate change and leasing activities on caribou habitat and population trends. Climate change is disproportionately affecting the arctic, with warming occurring more strongly than the global average.[225] Caribou population dynamics have been shown to be influenced by broad-scale climate patterns, [226]

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[222] Garner and Reynolds 1986.

[223] *E.g.*, Hemming 1971, Elison et al. 1986, Garner and Reynolds 1986, Clough et al. 1987, Griffith et al. 2002, Russell and McNeil 2005, McFarland et al. 2017.

[224] *But* see McFarland et al. 2017 (depicting calving polygons from 2012-2017 and winter polygons from 2008-2017).

[225] IPCC 2013.

[226] Joly et al. 2011, Mallory et al. 2018.

though in many cases local factors may exert population pressures as strong as, or stronger, than climate.[227] Climate change has the potential to both negatively and positively influence caribou populations. Warming winter conditions in the arctic have led to an increase in rain-on-snow events.[228] Such events lead to thick ice cover when temperatures subsequently decrease, blocking access to food for caribou and other species.[229] The potential of such icing events to decrease body condition of overwintering caribou is of great concern, as late winter body mass of female caribou is strongly linked to calf production and survival, influencing population growth rates.[230] These icing events are expected to continue to increase as the arctic keeps warming and sea ice retreats.[231]

Shifts in climate also are influencing the timing of snowmelt and plant green-up and growing season length across the globe. In northern Alaska, earlier plant greening and longer growing seasons have been observed.[232] While this could increase food availability, warming may also reduce forage quality for caribou, as has been seen in other systems.[233] Thus far, however, forage quality does not seem to have declined during the calving period.[234] Warming conditions also have been associated with expansion of shrubs in the arctic.[235] Some have suggested that decreased edibility of shrubs for caribou may explain why patterns of arctic greening are accompanied by population declines in caribou.[236] Potentially contradictory effects of longer, warmer growing seasons and increased rain on snow events make cumulative effects of climate change on caribou difficult to determine. The variability in potential responses of caribou to changing climate in the arctic calls for increased studies to understand how caribou are likely to respond to warming conditions and for monitoring to determine whether predicted patterns are met. Analyses have been done in Canada to evaluate net effects that consider both positive and negative influences under different climate scenarios.[237] Adapting such studies to

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[227] *See, e.g.*, Mahoney et al. 2016, Uboni et al. 2016.
[228] Hansen et al. 2011, Hansen et al. 2014, Forbes et al. 2016.
[229] Hansen et al. 2011, Hansen et al. 2013.
[230] Hansen et al. 2011, Albon et al. 2017, Veiberg et al. 2017.
[231] Hansen et al. 2014, Forbes et al. 2016.
[232] Gustine et al. 2017.
[233] Barboza et al. 2018.
[234] Gustine et al. 2017.
[235] Tape et al. 2016, Fauchald et al. 2017.
[236] Fauchald et al. 2017.
[237] *See, e.g*, Tews et al. 2007.

the Alaskan arctic may help provide increased understanding of climate effects and allow cumulative analyses of potential stresses from climate change and resource development. BLM must fully analyze existing and reasonably foreseeable impacts of climate change on caribou, including in the environmental baseline and affected environment, and across alternatives.

2. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Polar Bears.

BLM must take a hard look at the impacts of lease sales and resulting oil and gas development activities on imperiled polar bears on the Coastal Plain and adjacent habitats and waters. Polar bear (*Ursus maritimus*) was listed as threatened under the ESA in 2008 and is also federally protected under the MMPA.[238] 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 species. Absent significant reductions in GHG pollution, the small Southern Beaufort Sea (SBS) polar bear population faces a high probability of extirpation within this century, even without the added impacts of fossil fuel development in essential Coastal Plain habitat.

Polar bears are dependent upon Arctic sea ice for survival, as well as sufficient snow accumulation for dens for sows and cubs.[239] The species needs sea ice as a platform from which to hunt, to make seasonal migrations between the sea ice where they feed and their onshore denning areas, and to find mates.[240] Female polar bears give birth in snow dens excavated either on land or in the snow on top of the drifting sea ice.[241] The Coastal Plain of the Arctic Refuge provides the most important onshore denning habitat for polar bears in the United States, leading the FWS to designate the majority of the area as critical habitat for the species in 2010.[242] Polar

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[238] 73 Fed. Reg. 28212 (May 15, 2008); 75 Fed. Reg. 76086 (Dec. 7, 2010).
[239] 73 Fed. Reg. 28212.
[240] *Id.* at 28214.
[241] *Id.* at 28215.
[242] 75 Fed. Reg. 76086.

bears can be found on the Coastal Plain year-round.[243] Of the two polar bear populations (or stocks) found in the United States, the SBS population is the most likely to occur here.[244]

Polar bear populations have already been reduced to a precarious state due to impacts from climate change, which will only increase as warming in the Arctic region continues. Polar bears are particularly vulnerable to sea ice melt given their life history and specialized habitat needs. The USGS concluded that reduced sea ice could result in the loss of approximately two-thirds of the world's polar bears within 50 years, and Alaska's polar bears will likely be extirpated under current emission scenarios.[245] These predictions are already coming to pass. In fact, the SBS population has suffered dramatic losses in sea ice and is in decline.[246] The most recent estimate for the SBS population was 900 bears in 2010, representing a roughly 40 percent decline since the 1980s.[247] As sea ice is reduced, these bears are increasingly coming ashore to den on the Coastal Plain.[248]

Oil and gas lease sales and development on the Coastal Plain will not only impact polar bears and their critical habitat, but will also increase GHG pollution, further contributing to the reduction of essential snow cover and sea ice. It is vital that BLM analyze the impacts of lease sales and resulting activities on polar bears, and the SBS population in particular, in light of their precarious status due to climate change. The BLM is also obligated to consult with FWS to ensure an oil and gas program does not jeopardize the continued existence of polar bears in the United States or adversely modify or destroy their critical habitat in the Arctic Refuge.

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[243] J. W. Olson et al., *Collar temperature sensor data reveal long-term patterns in southern Beaufort Sea polar bear den distribution on pack ice and land*, 564 Marine Ecology Progress Series 211 (2017); T. C. Atwood *et al.*, *Rapid environmental change drives increased land use by an arctic marine predator*, 11 PLoS ONE e0155932 at 9 (2016).

[244] 75 Fed. Reg. at 76090.

[245] S.C. Amstrup, *et al.*, Forecasting the Range-wide Status of Polar Bears at Selected Times in the 21st Century, U.S. Geological Survey Administrative Report (2007).

[246] J. F. Bromaghin *et al.*, *Polar bear population dynamics in the southern Beaufort Sea during a period of sea ice decline*, 25 Ecological Applications 634 (2015).

[247] *Id.*; E. V. Regehr *et al.*, *Polar bear population status in the southern Beaufort Sea*, Open-File Report 2006-1337 at 1 (2006).

[248] J. W. Olson *et al.* 2017; 75 Fed. Reg. 76086.

a. BLM Must Consider the Impacts to Polar Bears from Habitat Loss, Degradation and Fragmentation Caused by Oil and Gas Development.

The BLM must analyze how leasing and subsequent oil and gas exploration, drilling and production in the Arctic Refuge will directly, indirectly and cumulatively affect polar bears due to habitat loss, degradation and fragmentation. The SBS population in particular is increasingly dependent on the Coastal Plain as refugia in an industrializing and warming Arctic. The Coastal Plain has more potential terrestrial denning habitat for pregnant sows than other areas of the Arctic, and 38 percent more denning habitat available than the region immediately west of the Refuge.[249] For decades, female SBS polar bears have used the Coastal Plain in late fall to seek dens and "other groups of polar bears seasonably frequent the coastal periphery of the area."[250] In one study, 50 percent of bears tracked along the northern mainland coast of Alaska were found to den within the Arctic Refuge, and 42 percent were within the Coastal Plain.[251] Based on known den locations from 2000-2010, 22 percent of dens for the entire SBS population were on the Coastal Plain.[252]

Declining sea ice conditions in the Beaufort Sea has led to an increase in the proportion of the SBS population coming onshore in summer and autumn (from 5.8 percent during 1986-1999 to 20 percent during 2000-2014) and a 30-day increase in time spent on land.[253] In addition, there is an increasing trend towards more bears denning on land in the winter.[254] The growing frequency of onshore denning is directly linked to diminished sea ice and the distance that pack

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[249] U.S. Fish & Wildlife Serv., Arctic National Wildlife Refuge Revised Comprehensive Conservation Plan, Final Environmental Impact Statement Volume 1 at 4-118 (2015); G. M Durner *et al*., *Polar bear maternal den habitat on the Arctic National Wildlife Refuge, Alaska.* 59 Arctic 31 (2006).

[250] U.S. Dep't of Interior, Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment, 30 (1987).

[251] U.S. Fish & Wildlife Serv., *Polar Bear Denning*, available at: https://www.fws.gov/refuge/arctic/pbdenning.html (last updated May 1, 2014).

[252] G. M. Durner *et al*., *Catalogue of Polar Bear (Ursus maritimus) Maternal Den Locations in the Beaufort Sea and Neighboring Regions, Alaska, 1910-2010,* USGS Data Series 568 (2010).

[253] T. C. Atwood *et al*., *Rapid environmental change drives increased land use by an Arctic marine predator*, PLoS One 11:e0155932 (2016).

[254] A. S. Fischbach *et al*., *Landward and eastward shift of Alaskan polar bear denning associated with recent sea ice changes*, 30 Polar Biology 1395 (2007); Olson et al. (2017).

ice has retreated from the coast.[255] Thus this climate-driven shift in denning habitat is predicted to continue.[256]

The lease sales are, by their nature, designed to lead to oil and gas development on vital Coastal Plain habitat, which will inevitably require associated pipelines, well pads, gravel mines, roads, airstrips and other infrastructure. The BLM must account for the resultant habitat loss, degradation and fragmentation of polar bear habitat in the EIS, with particular attention to potential for destruction or adverse modification of designated critical habitat. The EIS must fully analyze and disclose habitat loss, degradation and fragmentation in all management alternatives.

b. BLM Must Consider Impacts to Polar Bears from Disturbance and Displacement Caused by Oil and Gas Activities.

The BLM must evaluate the impacts to polar bears from disturbance and displacement resulting from lease sales and subsequent oil and gas exploration, drilling and production activities. Bears that are forced to den onshore are increasingly vulnerable to human encroachment, and denning females disturbed by human activities, including oil and gas development, may abandon their dens, causing a loss of cubs.[257] Bear denning selection and behavior is so sensitive to disturbance that Marine Mammal Protection Act incidental take regulations (ITR) for the Beaufort Sea and adjacent northern coast of Alaska (excluding the Arctic Refuge) stipulate that no activities may occur within 1.6 km (1 mile) of known or suspected polar bear dens.[258]

Polar bears are particularly vulnerable to anthropogenic disturbance during denning as compared to other times in their life cycle.[259] The best available science indicates that sows

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[255] *Id.*; 81 Fed. Reg. at 52287 (Aug. 5, 2016).

[256] *Id.*

[257] *See, e.g.*, S. C. Amstrup, *Human disturbances of denning polar bears in Alaska*, 46 Arctic 246 (1993).

[258] 81 Fed. Reg. at 52295 (Aug. 5, 2016). This ITR does not authorize oil and gas activities in the Arctic Refuge.

[259] 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).

entering dens or denning with cubs are more sensitive to noise disturbance than other demographic groups.[260] The mean dates of den entrance and emergence for polar bears that den onshore in the SBS population is November 11 and March 3, respectively.[261] Females observed with cubs emerged 15 days later than females observed without cubs.[262] Cubs, which are born in mid-winter, are generally unable to survive conditions outside the den until March or April.[263] 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.[264]

The oil and gas program is intended to lead to oil and gas development on the Coastal Plain, which could disturb polar bears at maternal den sites. BLM must analyze the effects of noise, vibration, human presence and other disturbance to polar bears produced by industrial activities, including seismic activities, drilling, infrastructure construction and maintenance, production facilities operations, and air, vessel and vehicle traffic. Polar bears have been documented to abandon their dens in response to various industry activities depending on the level of exposure and distance from the den site.[265] Seismic exploration on Alaska's North Slope, including the use of heavy vehicles and equipment, may have particular impacts as it occurs during the winter months[266] (January–May) and can extend into the spring (March–April), overlapping with denning season and the period when bears emerge to hunt prey on sea ice.[267] Subsequent development activities will result in additional surface disturbance and noise, causing further potential bear displacement. The EIS must evaluate both the direct, indirect and incremental cumulative effects that could occur as a result of potential exclusion or temporary avoidance of polar bears from feeding, resting, or denning areas and disruption of associated

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[260] 81 Fed. Reg. at 52291 (Aug. 5, 2016).

[261] K. D. Rode *et al., Den Phenology and reproductive success of polar bears in a changing climate.* 99 J. Mammalogy 16 (2018).

[262] *Id.*

[263] 81 Fed. Reg. at 52292.

[264] 75 Fed. Reg. at 76090.

[265] 81 Fed Reg. at 52292 (Aug. 5, 2016).

[266] 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.

[267] F. Messier *et al., Denning ecology of polar bears in the Canadian Arctic Archipelago*, 75 Journal of Mammalogy 2 (1994).

biological behaviors and processes as a result of disturbance and displacement caused by an oil and gas program.

c. BLM Must Consider Impacts to Polar Bears from Increased Human-Polar Bear Interactions.

Human-polar bear interactions are a management challenge in Alaska, and would escalate significantly on the Coastal Plain with the introduction of oil and gas development. Exacerbating the problem, the Coastal Plain is likely to become even more important to polar bears over the period of an oil and gas program. As sea ice continues to melt, polar bears will increasingly use terrestrial habitat, making them more vulnerable to interactions with humans and encounters with oil and gas development. Already the percentage of bears coming ashore on the Coastal Plain and staying for at least 21 days has at least tripled[268] as those bears are arriving earlier, staying later, and staying longer than ever before.[269]

Ample, local research is available on this topic. For example, one recent study found that during the annual sea ice minimum between 1989 and 2014, adult female polar bears in the SBS population spent less time in their preferred, prey-rich, shallow-water sea ice habitat in more recent years, corresponding with declines in availability of this preferred habitat type, and spent more time in lower-quality habitat—land and sea ice off the continental shelf—where they have reduced access to prey.[270] The study concluded that "[t]he substantially higher use of marginal habitats by SBS bears is an additional mechanism potentially explaining why this subpopulation has experienced negative effects of sea ice loss . . . ."[271] Another study found SBS bears exhibiting an alternative foraging strategy as sea ice disappears, represented by 'coastal' bears, which remain near shore for much of the year and use bowhead whale bone piles, in contrast to typical 'pelagic' bears, which hunt seals on sea ice.[272] Mammalian carnivores are known to

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[268] An average of 5.8% was recorded from 1986-1999 with an average of 20% from 2000-2014 and a high of 37% in 2013. T. C. Atwood *et al.*, *Rapid environmental change drives increased land use by an arctic marine predator*, 11 PLoS ONE e0155932 at 9 (2016).

[269] *Id.* at 12.

[270] Ware *et al.* (2017).

[271] *Id.* at 87.

[272] M.C. Rogers *et al.*, *Diet of female polar bears in the southern Beaufort Sea of Alaska: evidence for an emerging alternative foraging strategy in response to environmental change*, 38 Polar Biology 1035 (2015).

increasingly frequent human development and engage in risky behavior during extended periods of hunger,[273] and similar risk-prone behavior can be expected for polar bears as retreating sea ice prompts bears to increasingly seek food from human sources, thereby increasing threats to both humans and bears and provoking additional incidents of human-bear conflict.[274]

Increased use of terrestrial habitat has led, and will continue to lead, to a drastic increase in the harassment of polar bears by humans. According to one oil company, hazing at its facilities in and around the Beaufort Sea has more than tripled in the last three years compared to the three years prior, with 14 bears harassed in 2016 alone.[275] Though hazing in theory decreases the number of polar bears killed in defense of life or property, it is well known that polar bears have extremely high energy demands, and conserving energy is vital to their survival.[276] As such, harassment that results in movement, as hazing is intended to do, could lead to significant metabolic costs, especially if the metabolic response is sustained over an extended period of time.[277]

Harassment resulting in bears' running away will always have a high metabolic cost.[278] Moving at even relatively slow speeds results in bears' expending 13 times more energy than they otherwise would.[279] 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.[280]

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[273] *Cf.* K. Blecha *et al.*, *Hunger mediates apex predator's risk avoidance response in a wildland-urban interface*, 87 Journal of Animal Ecology 3 (2018).

[274] T. C. Atwood *et al.*, *Rapid environmental change drives increased land use by an arctic marine predator*, 11 PLoS ONE e0155932 at 14 (2016).

[275] T. C. Atwood *et al.*, *Rapid environmental change drives increased land use by an arctic marine predator*, 11 PLoS ONE e0155932 at 12 (2016).

[276] *See, e.g.*, S. Schliebe *et al.*, Range-wide Status Review of the Polar Bear (Ursus maritimus) at 15, 76, 85 (Dec. 21, 2006).

[277] P. D. Watts et al., *Energetic output of subadult polar bears (Ursus maritimus): resting, disturbance, and locomotion*, 98 Comparative Biochemistry and Physiology Part A: Physiology 191 (1991).

[278] *Id.* at 192.

[279] Schliebe (2006) at 75.

[280] *Id.* at 20.

Oil and gas development on the Coastal Plain will inevitably increase human-polar bear interactions and conflicts due to increased human presence and food attractants including toxic substances, and due to habitat loss and fragmentation leading to loss of access to preferred Coastal Plain den locations. Polar bears are not only driven by hunger to enter human settlements, but are also naturally curious and may investigate oil and gas exploration sites and drilling pads, which could increase human bear conflicts and deaths.[281] BLM must address methods for reducing human food, hazardous substances, and other attractants associated with Southern Beaufort Sea and Arctic Refuge Coastal Plain oil and gas development.

Current bear-human interactions are managed by a partnership between the North Slope Borough's Wildlife Department with staff in Kaktovik and FWS's Arctic Refuge and Marine Mammals Management staff via continued education and outreach to both Kaktovik residents and tourists visiting seasonally (August–October) to view polar bears. BLM must require the comprehensive use of the 2017 FWS Polar Bear Deterrence Training and Manual (to apply to oil and gas development), which provides information and training for minimizing polar bear-human interactions and maximizing the safety for both people and polar bears.[282] BLM must also engage with Kaktovik and Nuiqsut communities to minimize polar bear conflicts and work with FWS to produce and distribute written information such as the Kaktovik Barter Island FWS 2009 fact sheet.[283]

A comprehensive analysis would quantify projected levels of intentional or incidental harassment of polar bears from the activities resulting from the lease sales, from other Arctic oil and gas operations, and from other interactions with humans. This is a significant issue considering available information indicating that increasing harassment is likely having, and will continue to have, negative impacts on polar bears at the same time sea ice loss is having multiple, negative effects on polar bears.

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[281] M. Elfström, *Ultimate and proximate mechanisms underlying the occurrence of bears close to human settlements: review and management implications*, 44 Mammal Review (2014).

[282] U.S. Fish & Wildlife Serv., *Polar Bear Deterrent Training Manual* (2017); *available at*: https://www.fws.gov/alaska/fisheries/mmm/polarbear/det_training_manual.htm.

[283] U.S. Fish & Wildlife Serv., *Minimizing Polar Bear and Human Interactions at Barter Island, Alaska* (2009); *available at:* https://www.fws.gov/alaska/fisheries/mmm/polarbear/pdf/factsheets/pb_barter_09_final.pdf.

d. BLM Must Consider Threats to Polar Bears from Potential Oil Spills.

BLM must study the impacts on SBS polar bears from potential oil spills, which are an inevitable result of oil and gas development. 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. Polar bears could come into contact with oil either directly at feeding areas or through ingesting contaminated prey.[284] Polar bears must regularly groom themselves for thermoregulation, meaning they could also ingest oil on their fur; in experiments done on oil-exposed bears, all the subjects were dead within a month.[285] The long-term effects of an oil spill could be much greater, as polar bears are biological sinks for pollutants.[286] For example, toxins could bioaccumulate in polar bears after eating contaminated prey for years after the original spill.[287] BLM must fully assess and disclose these potential threats from oil spills, and must explore alternatives to reduce spills and protect areas of particular importance to bears, like feeding and resting areas, summer refugia and winter denning areas.

BLM must also create a reliable, evidence-based plan and funding source for cleaning up oil contamination, including preparedness drills and response capacity (both equipment and trained staff). Currently no reliable method exists for removing oil from sea ice in the arctic marine environment. *In situ* burning is not acceptable because it kills marine mammals when they surface for air and quickens the rate of ice melt. The chemical dispersants used in mitigating the Deepwater Horizon spill were found to be lethal to marine wildlife and are currently being investigated. BLM's clean-up plan must adhere to the U.S. Fish and Wildlife Service's Oil Spill

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[284] J. M. Neff, *Composition and fate of petroleum and spill-treating agents in the marine environment, in* SEA MAMMALS AND OIL: CONFRONTING THE RISKS 1 (J.R. Geraci & D.J. St. Aubin eds., 1990).

[285] D.J. St. Aubin, *Physiological and toxic effects on polar bears, in* SEA MAMMALS AND OIL: CONFRONTING THE RISKS 235 (J.R. Geraci & D.J. St. Aubin eds., 1990) (St. Aubin, *Physiological and toxic effects on polar bears*).

[286] R. J. Norstrom *et al.*, *Organochlorine contaminants in Arctic marine food chains: identification, geographical distribution and temporal trends in polar bears*, 22 Environmental Science and Technology 1063 (1988).

[287] *Id.*; Schliebe (2006) at 156, 166.

Response Plan for Polar Bears, and the plan must be integrated into industry preparedness and response planning.[288]

e. BLM Must Consider Impacts to Polar Bears from Increased Greenhouse Gas Emissions.

In addition to the direct impacts of development, the BLM must assess the contributions of a Coastal Plain oil and gas program to global GHG emissions both from onsite development activities and the future combustion of petroleum extracted from the refuge. Increased GHG emissions and continued climate change will exacerbate already-increasing energetic costs and nutritional stress on polar bears. The development and use of fossil fuels from the Arctic Refuge could measurably contribute to this threat, even on polar bears that never use the area. BLM must fully consider these effects.

The startling and depressing evidence of adverse impacts from climate change on polar bears is mounting. For example, 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.[289] This additional activity increased their estimated annual energy expenditure, and "likely exacerbate[s] the physiological stress experienced by polar bears in a warming Arctic."[290]

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

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[288] U.S. Fish & Wildlife Serv., *Oil Spill Response Plan for Polar Bears in Alaska* (2015); *available at*: https://www.fws.gov/alaska/fisheries/contaminants/pdf/Polar%20Bear%20WRP%20final%20v8_Public%20website.pdf.

[289] G.M. Durner *et al.*, *Increased Arctic sea ice drift alters adult female polar bear movements and energetics*, 23 Global Change Biology 3460 (2017).

[290] *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).

ice melt and food deprivation.[291] 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."[292]

Polar bears are also increasing long-distance swimming due to the decline in sea ice, which results in drowning, cub mortality, and physiological stress. 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.[293] 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."[294] 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.[295] 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."[296]

Oil and gas exploration, drilling and combustion undermines a key Conservation and Recovery Action in FWS's Polar Bear Conservation Management Plan: "[l]imit global atmospheric levels of greenhouse gases to levels appropriate for supporting polar bear recovery

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[291] J.P. Whiteman *et al.*, *Summer declines in activity and body temperature offer polar bears limited energy savings*, 349 Science 295 (2015).

[292] 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.

[293] 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).

[294] *Id.*

[295] N. W. Pilfold, *et al.*, *Migratory response of polar bears to sea ice loss: to swim or not to swim*, 40 Ecography 189 (2017).

[296] *Id.* at 189.

and conservation, primarily by reducing greenhouse gas emissions."[297] The BLM must analyze and fully disclose how developing and combusting fossil fuels extracted from the Coastal Plain could possibly contribute to conservation and recovery of this imperiled, iconic species.

f. BLM Must Consider Impacts to Polar Bears from a Decline in Primary Prey Species.

Exploration and development and vessel traffic could impede polar bear access to prey, which could affect their body condition and survival. Polar bears nearly exclusively consume seals. Their primary prey, ringed seals and bearded seals, live on ice edges that are already affected by loss of seasonal sea ice. Polar bears hunt for ringed and bearded seals in the spring and summer months when sea ice extent is greatest, and they can only access seals from the surface of sea ice.

BLM must assess how oil and gas exploration and drilling will directly and indirectly affect seal species populations, behavior and availability for polar bear predation. 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 impact seal feeding, pup survival and vulnerability to a suite of predators. For example, ice breakers used to move drilling vessels and related equipment to leased areas may fragment sea ice that ice-dependent seals require 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 fox and non-native red foxes (*Vulpes Vulpes)* and their predation on seal pups,[298] thereby increasing predator competition and loss of meat to scavenging, and further reducing polar bear access to prey.[299]

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[297] U.S. Fish & Wildlife Serv., *Polar Bear Conservation Management Plan* (2016) (U.S. Fish and Wildlife, Region 7, Anchorage, Alaska); available at https://www.fws.gov/alaska/fisheries/mmm/polarbear/pbmain.htm.

[298] L. E. Eberhardt, *et al., Arctic fox home range characteristics in an oil-development area*, 46 Journal of Wildlife Management 1 (1982).

[299] 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).

g. BLM Must Consider Cumulative, Additive and Synergistic Effects of Other Threats in Combination with Climate Change on Polar Bears

BLM must properly analyze the many cumulative, additive and synergistic impacts of the many threats and stressors to polar bears described above, which together could magnify impacts on the species and accelerate habitat loss on the Coastal Plain and across the region. 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.

Research exists on how oil and gas activities pose a multi-faceted threat to polar bears. For example, Amstrup et al. (2010) evaluated the future range-wide population status of polar bears under five GHG emissions scenarios.[300] 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.[301] 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.[302]

BLM must undertake its own analysis of potential cumulative impacts as they relate specifically to the Arctic Refuge and oil and gas development therein. As explained above, oil and gas development will increase GHG pollution while causing direct impacts to polar bears, elevating threats to the species and frustrating recovery. The BLM's cumulative effects analysis must include predicted impacts on polar bears under the "no action" management alternative to provide a baseline for understanding both current and potential future threats to the species. The agency's assessment must also consider how polar bears will become increasingly vulnerable to cumulative, additive and synergistic effects as development proceeds and climate change worsens over time.

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[300] S. C. Amstrup *et al., Greenhouse gas mitigation can reduce sea-ice loss and increase polar bear persistence*, 468 Nature 955 (2010).

[301] *Id.* at 3.

[302] *Id.*

3. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Muskoxen.

BLM must take a hard look at the myriad impacts of the proposed lease sales and resulting oil and gas development activities on muskoxen (*Ovibos moschatus*) and their habitats. A purpose of the Arctic Refuge identified by ANILCA is to conserve muskoxen,[303] and BLM must evaluate the impacts of the oil and gas program in light of this management purpose. Muskoxen 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,[304] oil and gas exploration and extraction can cause:

- displacement from preferred winter habitat
- increased energy needs related to disturbance and displacement
- decreased body condition of females
- increased incidents of predation
- decreased calf production and animal survival

The muskox population on the Coastal plan is small, isolated, and declining. After being extirpated from the region by the mid-1800s due to hunting,[305] muskoxen returned to the Arctic National Wildlife Refuge via reintroductions in 1969 and 1970.[306] The population grew to a high

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[303] ANILCA § 303(2)(B)(i).

[304] 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.

[305] Lent, P. C. 1999. Muskoxen and their hunters: a history. University of Oklahoma Press, Norman, Oklahoma.

[306] Jingfors, K.T. and D.R. Klein. 1982. Productivity in recently established muskox populations in Alaska. J. Wildl. Manage. 46:1092-1096.

of over 400 animals in the mid-1990s.[307] The larger population in northeast Alaska and northwest Canada dropped precipitously between 1998 and 2006,[308] largely due to losses from the Refuge, but may be stabilized. The dramatic decline is associated primarily with increased predation by grizzly bears,[309] but also disease,[310] winter weather,[311] distributional changes in the populations of other ungulates such as moose and caribou, and other factors.[312] 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.[313] Unlike other ungulates that inhabit the region, muskoxen do not migrate and persist in the Arctic year-round.[314] They build fat stores in summer, and conserve energy in winter by

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[307] Reynolds PE. 1998a. Dynamics and range expansion of a reestablished muskox population. J Wildl Manage 62: 734–744; Reynolds PE, Reynolds HV, Shideler RT. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13: 79–84.

[308] Reynolds PE, Reynolds HV, Shideler RT. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13: 79–84; Lenart EA. 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.

[309] Reynolds PE, Reynolds HV, Shideler RT. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13:79–84.

[310] Afema, Josephine A., Kimberlee B. Beckmen, Stephen M. Arthur, Kathy Burek Huntington, and Jonna AK Mazet. 2017. Disease complexity in a declining Alaskan muskox (*Ovibos moschatus*) population. Journal of Wildlife Diseases 53(2): 311-329.

[311] Berger, J., C., Hartway, A. Gruzdev, and M. Johnson. 2018. Climate Degradation and Extreme Icing Events Constrain Life in Cold-Adapted Mammals. Scientific Reports 8(1): 1156.

[312] Barboza PS, Reynolds PE. 2004. Monitoring nutrition of a large grazer: Muskoxen on the Arctic Refuge. Int Congr Ser 1275: 327–333.

[313] Reynolds PE. 1998b. Ecology of a reestablished population of muskoxen in northeastern Alaska. PhD Thesis, University of Alaska, Fairbanks, Alaska, 106 pp. Reynolds PE, Reynolds HV, Shideler RT. 2002. Predation and multiple kills of muskoxen by grizzly bears. Ursus 13: 79–84.

[314] Jingfors, K.T. 1982. Seasonal Activity Budgets and Movements of a Reintroduced Alaskan Muskox Herd. Journal Wildlife Management 46(2): 344-350.

trying to avoid movement.[315] Winter forage availability is typically of limited quantity and of low nutritional quality. Muskoxen winter habitat is restricted to shallow snows, often along windswept ridges because they do not move well in deep snow.[316] 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 muskoxen vulnerable to oil and gas development activities, particularly in winter.

a. BLM Must Consider Impacts to Muskoxen from Seismic and Other Activities in Winter.

Seismic exploration, which tends to occur in winter, and other oil and gas development activities, such as air and ground traffic, can disturb muskoxen and have detrimental impacts to the animals' energy balance.[317] Reactions to seismic activities can be variable, but some have responded with alert behavior, assorting in defensive formations, and running from the disturbance from distances up to 2.5 miles away from operations.[318] 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*"[319] (emphasis added). Calving season — just before snowmelt from mid-

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[315] J. Dau, 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. (2001).

[316] 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.

[317] 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.

[318] P.E. Reynolds and D.J. LaPlant. 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 of Muskoxen Relevant to the National Petroleum Reserve. Alaska Department of Fish and Game. Fairbanks, Alaska.

[319] 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.

April to mid-May — is a sensitive time, and anthropogenic disturbance can be particularly taxing.[320] If the same animals experience repeated disturbance, energetic deficits could lead to increased mortality rates.[321]

b. BLM Must Consider Impacts to Muskoxen 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.[322] Spills affecting waterways could have very detrimental effects to muskoxen because they congregate in riparian areas during summer months

Muskoxen are difficult to study, given the harsh conditions of where they live. But studies of oil spill impacts to cattle may be comparative. 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

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[320] 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.

[321] *Id.*

[322] McKendrick, J.E. and W. Mitchell. 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.

hydrocarbon inhalation and absorption through the skin. In addition to acute toxicity, mortality from chronic effects could occur well after a spill.[323]

c. BLM Must Consider Impacts to Muskoxen 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.[324] Gravel mining associated with oil and gas facility and road construction can cause harm from habitat loss, water loss, and disturbance and displacement.[325] Mining often occurs in river floodplains, where muskoxen congregate in the summer. Vegetation disturbance could lead to encroachment of non-native vegetation, affecting forage availability. The impacts of each of these activities on muskoxen must be considered in the EIS.

d. BLM Must Consider Impacts to Muskoxen from Increased Human Presence and Activity.

Grizzly bears are the primary predator on muskoxen, and they have caused 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. Muskoxen typically respond to predation threats by circling into defensive groups. They may also respond by running and abandoning a resting site, and leaving

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[323] 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.

[324] 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.

[325] *Id*.

calves vulnerable to predation. Recently, declines in caribou and moose populations in the region — the historic prey base for grizzlies — has led to increased predation of muskoxen.[326]

Increased human presence and access to the region due to an increase of roads will likely lead to increased hunting and poaching of muskoxen. Hunting pressure has increased in other areas inhabited by muskoxen 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.[327] 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.[328] All of these activities and impacts on muskoxen must be considered in the EIS.

e. BLM Must Consider the Cumulative, Additive, and Synergistic Impacts of Other Threats in Combination with Climate Change Effects on Muskoxen.

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.[329] More erratic weather conditions in the Arctic is likely also contributing to mortality and morbidity. For example, rain-on-snow (ROS) events can cause direct mortality by freezing animals in the path of an extreme occurrence. Such an occurrence caused the sudden death of over 50 muskoxen in northwestern Alaska.[330] These events can also create icing conditions that prevents access to forage, and this may have an

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[326] Arthur, Stephen M., and Patricia A. Del Vecchio. 2017. Effects of grizzly bear predation on muskoxen in northeastern Alaska. Ursus 28(1): 81-91.

[327] Schmidt, J. H., and T. S. Gorn. 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.

[328] Murphy, S.M. and B.E. Lawhead. 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.

[329] Berger, J. 2017. The Science and Challenges of Conserving Large Wild Mammals in 21st-Century American Protected Areas. Science, Conservation, and National Parks: 189.

[330] Dau, J. 2005. Two caribou mortality events in northwest Alaska: Possible causes and management implications. Rangifer 25: 37–50.

adverse impact on the long-term health of individuals, especially if they experience food deprivations as juveniles.[331] ROS events are likely to increase as climate warming increases. New diseases appearing in the northeastern population of muskoxen may be correlated with warming temperatures.[332] Illness causes mortality and can make animals more vulnerable to predation. The impacts of climate change on muskoxen must be considered in the EIS.

4. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Birds.

According to the Arctic Refuge CCP,[333] 201 bird species have been recorded in the Refuge. Of those, the following 92 breeding birds and nonbreeding migrants have been observed on the Refuge coastal plain (including inland coastal plain and nearshore islands). According to the U.S. Geological Survey, at least 57 of these species "regularly occur as breeding, nonbreeding, or both in the 1002 Area."[334] All but the two ptarmigan species and three grouse species are protected under the MBTA,[335] and several are protected under ESA or BGEPA, or are agency-designated sensitive species (see keys below tables). Some species that are uncommon breeders are present in larger numbers as nonbreeding migrants, such as the Greater White-fronted Goose and Brandt.[336]

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[331] Berger, J., C. Hartway, A. Gruzdev, and M. Johnson. 2018. Climate Degradation and Extreme Icing Events Constrain Life in Cold-Adapted Mammals. Scientific Reports 8(1): 1156.

[332] Kutz SJ, Jenkins EJ, Veitch AM, 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, Josephine A., Kimberlee B. Beckmen, Stephen M. Arthur, Kathy Burek Huntington, and Jonna AK Mazet. 2017. Disease complexity in a declining Alaskan muskox (Ovibos moschatus) population." Journal of Wildlife Diseases 53(2): 311-329.

[333] CCP Final EIS, Appendix F.

[334] Pearce, J.M. et al. 2018. Summary of Wildlife-Related Research on the Coastal Plain of the Arctic National Wildlife Refuge, Alaska, 2002–17. Open-File Report 2018-1003. US Geological Survey, Reston, VA.

[335] U.S. Fish and Wildlife Serv., Migratory Bird Act Protected Species, *available at*: https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php.

[336] Pearce, J.M. et al. 2018. Summary of Wildlife-Related Research on the Coastal Plain of the Arctic National Wildlife Refuge, Alaska, 2002–17. Open-File Report 2018-1003. US Geological Survey, Reston, VA.

Abundant, Common & Fairly Common Breeders	**Uncommon Breeders**	**Possible Breeders**	**Nonbreeding Species**	**Rare to Casual Breeders**
Cackling Goose	Greater White-fronted Goose	Northern Shoveler	Abundant to Common:	Trumpeter Swan
Tundra Swan	Brant*	Surf Scoter	Snow Goose	Mallard
Northern Pintail	Rough-legged Hawk	White-winged Scoter		Green-winged Teal
King Eider*	Golden Eagle	Horned Grebe	Uncommon:	Greater Scaup*
Common Eider (islands)	Gyrfalcon‡	Northern Harrier	American Wigeon	Lesser Scaup
Long-tailed Duck	Spotted Sandpiper	Merlin	Black Scoter*	SPECTACLED EIDER*
Red-breasted Merganser	Wandering Tattler*	***Bar-tailed Godwit****	***Yellow-billed Loon****	Harlequin Duck
Willow Ptarmigan‡	Baird's Sandpiper	Western Sandpiper		***Peregrine Falcon***
Rock Ptarmigan‡	***Dunlin****	Wilson's Snipe	Rare to Casual:	Sandhill Crane
Red-throated Loon	Stilt Sandpiper	Northern Shrike	Ross's Goose	Black-bellied Plover
Pacific Loon	***Buff-breasted Sandpiper****	Cliff Swallow	***Red Knot****	***Whimbrel****
American Golden-Plover†*	Long-billed Dowitcher		Sharp-tailed Sandpiper*	Sanderling
Semipalmated Plover	Sabine's Gull		Ivory Gull*	White-rumped Sandpiper
Upland Sandpiper	*Arctic Tern*		Ross's Gull*	Mew Gull
Ruddy Turnstone	Parasitic Jaeger		Herring Gull	Black Guillemot
Semipalmated Sandpiper†	**Short-eared Owl**		Thick-billed Murre	Common Raven‡
Pectoral Sandpiper†*	American Dipper‡			Horned Lark
Red-necked Phalarope	American Robin			Bluethroat
Red Phalarope	White-crowned Sparrow			American Pipit
Glaucous Gull				Yellow Warbler
Pomarine Jaeger				Fox Sparrow
Long-tailed Jaeger				
Snowy Owl‡*				
*Eastern Yellow Wagtail				
Lapland Longspur				
Snow Bunting				

American Tree Sparrow Savannah Sparrow Common Redpoll Hoary Redpoll				

Key to species designations:
ALLCAPS= Federally threatened under the ESA
SMALLCAPS = Protected under BGEPA
Bold = FWS Birds of Conservation Concern, National (2008)[337]
Italic = FWS Birds of Conservation Concern, Bird Conservation Region 3 (Arctic Plains & Mountains)[338]
Underlined= BLM Sensitive Species
†2016 Shorebirds of Conservation Concern[339] prepared for next revision of BCC list
*Audubon Alaska 2017 WatchList Species[340]
‡ Year-round resident

Additionally, the following species are known as rare to casual visitors to the coastal plain of the Refuge, but may in the future have increased presence in the area due to local and global change:

Rare to Casual Visitors		
Gadwall	Least Sandpiper	Violet-green Swallow*
Eurasian Wigeon	Ruff	Bank Swallow*
Canvasback	Black-legged Kittiwake*	Barn Swallow
STELLER'S EIDER	Bonaparte's Gull	Northern Wheatear
Common Goldeneye	Thayer's Gull	Gray-cheeked Thrush
Common Merganser	Slaty-backed Gull	Varied Thrush

[337] U.S. Fish and Wildlife Service, 2008. Birds of Conservation Concern. https://www.fws.gov/migratorybirds/pdf/management/BCC2008.pdf, Table 48
[338] *Id.*, Table 4
[339] U.S. Shorebird Conservation Plan Partnership. 2016. U.S. Shorebirds of Conservation Concern ─ 2016, *available at:* https://www.shorebirdplan.org/wp-content/uploads/2016/08/Shorebirds-Conservation-Concern-2016.pdf.
[340] Warnock, N. 2017. The Alaska WatchList 2017. Audubon Alaska, Anchorage, AK 99501.

Common Loon	Glaucous-winged Gull	***Smith's Longspur***
Red-necked Grebe*	Least Auklet	Orange-crowned Warbler*
Northern Fulmar	Horned Puffin	Yellow-rumped Warbler
Short-tailed Shearwater	Tufted Puffin*	Northern Waterthrush
BALD EAGLE	Common Nighthawk	Wilson's Warbler
Sharp-shinned Hawk	Belted Kingfisher	Chipping Sparrow
Northern Goshawk	Say's Phoebe	White-throated Sparrow
American Kestrel	Gray Jay	Dark-eyed Junco
Killdeer	Tree Swallow	Red-winged Blackbird
Eurasian Dotterel		**Rusty blackbird**
Lesser Yellowlegs*		Brown-headed Cowbird
Hudsonian Godwit		Pine Siskin
Red-necked Stint		

Key to species designations:
ALLCAPS= Federally threatened under the ESA
SMALLCAPS = Protected under BGEPA
Bold = FWS Birds of Conservation Concern, National (2008)
Italic = FWS Birds of Conservation Concern, Bird Conservation Region 3 (Arctic Plains & Mountains
Underlined= BLM Sensitive Species
*Audubon Alaska 2017 WatchList Species

BLM must include a catalogue of the species of terrestrial, aquatic, and marine birds that use the Coastal Plain of the Arctic Refuge at various life stages, and include details on each species' status, distribution, abundance, and available conservation resources and discuss the impacts to each. The EIS should provide a monitoring plan to track effects of development, activity, noise, and climate on birds that breed, feed, molt, and stage in the planning area. The agency must also review existing literature and identify gaps in knowledge. The Coastal Plain of the Arctic Refuge is also an important migratory staging area for some bird species.[341] The agency should describe the migratory staging phenomenon, and analyze the ways that an oil and gas program in the program area may impact migratory staging.

[341] *See, e.g.*, Jerry W. Hupp and Donna G. Robertson, *Forage site selection by lesser snow geese during autumn staging on the Arctic National Wildlife Refuge, Alaska*, 138 Wildlife Monograph 3 (1998).

Conservation of the birds of the Arctic Refuge is of interest nationally and internationally, not just locally. Many Refuge species undertake lengthy migrations: the various species that occur in the Arctic Refuge migrate to all 50 states and six continents (see Appendix), so any impacts that reduce the likelihood of successful survival, breeding, and migration are of concern to people in other states and around the globe. This is particularly true for the species that are indicated above as being Birds of Conservation Concern at both the Bird Conservation Region and National level. The following statement from the 2012 National Petroleum Reserve-Alaska Final Integrated Activity Plan/Environmental Impact Statement (NPR-A FEIS) holds true for the birds of the Arctic National Wildlife Refuge as well:

> Because most of the species found in the NPR-A migrate along the Pacific and mid-continent flyways and other major corridors to areas where they spend most of the year, numerous stakeholder groups in Alaska south of the Arctic Coastal Plain, the lower 48 states, and elsewhere, are interested in their conservation and management. These groups include consumptive and nonconsumptive users and wildlife managers. One or more national conservation plans or international agreements signed by the U.S. address most stakeholder interests. These include the Migratory Bird Treaty Act conventions with Mexico, Canada, and Russia, the North American Waterfowl Management Plan, Partners in Flight Bird Conservation Plans, the Arctic Goose, Pacific Coast, and Sea Duck Joint Ventures, U.S. National Shorebird Plan, the North American Colonial Waterbird Plan, North American Bird Conservation Initiative, and the Conservation of Arctic Flora and Fauna.[342]

a. BLM must thoroughly assess the potential impacts of oil and gas spills and leaks on birds in the Refuge.

[342] Bureau of Land Management, National Petroleum Reserve-Alaska Final Environmental Impact Statement (NPR-A FEIS) (2012), Volume 1, Section 3.3.5 at 242, *available at*: https://eplanning.blm.gov/epl-front-office/projects/nepa/5251/41003/43153/Vol1_NPR-A_Final_IAP_FEIS.pdf.

An oil and gas program in the Arctic terrestrial environment will cause spills of oil and associated noxious fluids and materials.[343] Oil spills on land can have devastating effects on birds,[344] and can be particularly impactful when the spill reaches a water source such as a lagoon, estuary, or marine environment. As on the NPR-A, oil and gas drilling in the Arctic presents the threat of crude oil spills from "pipelines, storage tanks, production and exploration facilities, drilling rigs (well-control incidents), and vessels"[345] and spills of refined products, including "avian fuel, diesel fuel, engine lube, fuel oil, gasoline, grease, hydraulic oil, transformer oil, and transmission oil,"[346] from "barges, helicopters, airplanes, gravel pad facilities"[347] and along gravel or ice roads. Spills of any of these types of products that enter terrestrial, aquatic or marine habitats can lead to "direct oiling of plumage, oiling of eggs, ingestion of oil, contamination of food resources, disturbance due to cleanup efforts, and long- and short-term loss or alteration of habitat due to spilled oil and cleanup activities."[348]

The magnitude of these impacts depends upon the season, type, amount and location of the spill, and by the timeliness and effectiveness of the response, potentially an enormous challenge in the Arctic environment. A review of oil spills off the coast of Norway[349] found that: 2000-3000 seabirds were killed by release of 570 tonnes of oil released from the 2004 grounding of the *MS Rocknes*; 3,200-8,000 birds died from the 388 tonnes of oil released in by the MS *Server* in 2007; 1,500 to 2,000 common eider and 500 other birds died when 293 tonnes of heavy oil leaked from the 2009 grounding of the MS *Full City*; and 2,500-3,00 seabirds were killed when 112 tonnes leaked from the grounding of the "Godafoss" in 2009. In one of the worst

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[343] *See e.g.* Alaska Department of Environmental Conservation, *Annual Summary of Oil and Hazardous Substance Spills Fiscal Year 2014* (2015), *available at*: https://dec.alaska.gov/spar/ppr/spill-information/spill-data.

[344] *See* Frederick A. Leighton, *The toxicity of petroleum oils to birds*, 1 Environmental Reviews 92 (1993), *available at*: http://www.nrcresearchpress.com/doi/abs/10.1139/a93-008#.WxGaQkgvzIU.

[345] NPR-A Final EIS. Volume 2, Chapter 4, Section 4.3.8.2 at 179.

[346] *Id.*

[347] *Id.*

[348] *Id.* at 179–180.

[349] Boitsov, S. et al. 2013. Experiences from oil spills at the Norwegian coast. A summary of environmental effects. Norwegian Institute of Marine Research, 36 pp. https://www.hi.no/filarkiv/2012/07/hi-rapp_23-2012_oljeutslipp.pdf/en.

incidents known, 700,000 birds died as a result of contamination from the Deepwater Horizon disaster.[350]

Gas releases could result from "(1) loss of well control at production areas, (2) ruptured gas pipelines, and (3) leaks at gas processing facilities," which raises the possibility of explosion and further is associated with "increased air pollution and associated health impacts and exacerbated climate impacts."[351]

The agency should provide oil spill scenarios that include the likelihood, potential frequency, times of year, and potential volume of oil spills from development and vessel activity and the impacts to birds. The agency should then compare these oil spill scenarios with where they may occur in the planning area using hypothetical development scenarios. The agency should compare oil spill scenarios and hypothetical occurrences on the landscape with range maps, movement timing, and life histories of the bird species that occur in the Arctic Refuge. Areas of particular concern are along rivers, river deltas, and barrier island lagoons in the fall and spring, where birds concentrate for migration and post-nesting staging.

b. BLM must assess the impact of habitat loss on Refuge birds.

The oil and gas program will result in the direct and indirect loss of bird habitat from roads, infrastructure, and human activity. The program will also result in impacts to wetlands and aquatic habitat through water use and contamination. The agency should quantify and describe the acreage that will be disturbed, destroyed, or covered in the process of seismic work, gravel excavation, gravel staging areas, building roads, pipelines, drill pads, crew housing and support, water withdrawals, and other activity stemming from the oil and gas program.[352] Analysis of the habitat impacts must include the full range of developments and construction activities that have the potential to destroy, degrade and fragment habitats. For birds, particular attention must be

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[350] Haney, J.C., H.J. Geiger and J.W. Short. 2014. Bird mortality from the Deepwater Horizon oil spill. II. Carcass sampling and exposure probability in the coastal Gulf of Mexico. Marine Ecology Progress Series Vol. 513: 239–252. http://www.int-res.com/articles/meps_oa/m513p239.pdf.

[351] *State of California v. BLM*, *Sierra Club v. Zinke*, Case Nos. 17-cv-07186-WHO; 17-cv-07187-WHO (N.D. Cal. 2018) (Order denying motion to transfer venue and granting preliminary injunction), *available at:* https://earthjustice.org/sites/default/files/files/Order%20Granting%20PI%20and%20Denying%20Tranfer%20BLM%20Suspension.pdf.

[352] *See supra* Part V.D.1.c.

paid to areas that are important for seasonal congregation, including breeding colonies, molting areas, and migration staging zones. Site utilization, particularly by special status species (threatened species and birds of conservation concern), should be thoroughly assessed prior to undertaking any activities that destroy habitats, and every effort should be made to avoid and minimize these impacts. Effects to aquatic habitats must also be considered, including stream crossings, wetlands, and proximity to lakes. The EIS must explain the impacts to birds that will result from these activities and what remedies and mitigation measures the agency will apply to address these problems.

Winter exploration activities entail potential proximate impacts to fewer species than do disturbances in the breeding or migration seasons, as only a few bird species (ptarmigan, snowy owl, gyrfalcon, raven, and dipper) occupy the Refuge year-round. However, the residual effects of ice roads and ice pads constructed for winter exploration activities, and the grid patterns left by seismic exploration, can linger long outside the winter season in the fragile tundra and cause changes in spring flow and hydrology. Following seismic exploration of the Arctic Refuge in 1984-5, 5% of seismic trails had not recovered even after 25 years.[353] These medium- and long-term vegetation changes potentially impact available nesting habitat, cover, and food resources for various avian species.

Ice roads and other winter infrastructure also utilize large quantities of fresh water. Whether water withdrawals for ice production have long-term effects on aquatic habitats depends on the specific hydrologic conditions of the area; the depth, number and connectedness of aquatic resources affects the rate of recharge. This, in turn could affect habitat and food availability for waterfowl and shorebirds.[354]

c. BLM must assess and address other sources of additive mortality and behavioral disruption to birds, including collisions, nest destruction and predation, and noise disturbance.

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[353] U.S. Fish & Wildlife Service. Arctic National Wildlife Refuge, Seismic Trails. https://www.fws.gov/refuge/arctic/seismic.html.

[354] BLM, 2012. NPR-A FEIS, Volume 2, section 4.3.8.2 (page 168) https://eplanning.blm.gov/epl-front-office/projects/nepa/5251/41004/43154/Vol2_NPR-A_Final_IAP_FEIS.pdf

Collisions with static infrastructure is a prominent cause of bird mortality around the globe.[355] Across the U.S. and Canada, collisions with buildings annually kill 365–988 million birds in the U.S. and 16–42 million in Canada; with automobiles 200–340 million in the U.S. and 9–19 million in Canada, and power lines 8–57 million in the U.S. and 10– 41 million in Canada.[356] BLM must assess the potential for collision mortality from the structures and vehicles associated with oil and gas exploration and development and undertake management practices to reduce these sources. We find that many of the recommendations associated with reducing mortality from wind energy development[357] are potentially applicable here: "(1) Avoiding areas of high bird use (e.g., regularly used flight paths, migration corridors, and aggregation areas); (2) Avoiding areas inhabited by sensitive species or those of conservation concern; (3) Avoiding topographical features that promote foraging or that are used by migrating birds for uplift (e.g., the tops of slopes; Kitano and Shiraki 2013); (4) Avoiding areas of high biodiversity, endemism, and ecological sensitivity; (5) Developing conservation buffers for vulnerable species based on thresholds determined through empirical research; (6) Carefully selecting or modifying infrastructure to minimize collision risk or indirect effects," such as by modifying lighting or operations as conditions warrant. The agency should include discussion of lighted structures at night or in foggy conditions that may attract or disorient birds as they migrate or commute to foraging areas.

Tundra travel and development activities during the nesting season risks trampling or forcing the abandonment of bird nests. In Canada, it has been estimated that terrestrial oil and gas development (well sites, pipelines, oil sands, and seismic exploration) causes annual

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[355] Graham R. Martin, *Understanding bird collisions with man-made objects: a sensory ecology approach*, 153 Ibis 239 (2011), *available at*: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1474-919X.2011.01117.x; Andrew R. Jenkins, Jon J. Smallie, and Megan Diamond, *Avian collisions with power lines: a global review of causes and mitigation with a South African perspective*, 20 Bird Conservation International 263 (2010), *available at*: https://www.cambridge.org/core/journals/bird-conservation-international/article/avian-collisions-with-power-lines-a-global-review-of-causes-and-mitigation-with-a-south-african-perspective/8C0875430F0C4376693820CA3A90369C.

[356] Loss, S.R. 2016. Avian interactions with energy infrastructure in the context of other anthropogenic threats. The Condor 118: 424–432. http://www.americanornithologypubs.org/doi/pdf/10.1650/CONDOR-16-12.1

[357] Smith, J.A. and J.F. Dwyer. 2016. Avian interactions with renewable energy infrastructure: An update. The Condor 118: 411–423. http://www.americanornithologypubs.org/doi/pdf/10.1650/CONDOR-15-61.1

mortality of between 9,900–72,000 birds due to nest destruction.[358] The agency must assess the direct impacts from industrial activity on bird nest survivorship.

Buildings, human activity, and waste products attract mammalian predators. In an extremely horizontal landscape, infrastructure, vehicles, buildings, and other vertical structures can offer nesting and perching habitat for avian predators as well.[359] Infrastructure therefore may have an impact on tundra nesting birds via increased predation. The National Research Council, in its 2003 report on "Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope,"[360] notes that: Birds and their nests in the oil fields have a suite of predators, the most important of which are arctic foxes, glaucous gulls, grizzly bears, and ravens. The populations of all those predators have increased in the oil fields. . . most likely because of the increase in garbage." The NPR-A FEIS[361] also cites evidence that buildings and other structures on the North Slope have provided ravens with artificial nest locations, which may also contribute to increased predation pressure. Predation on passerine nests has been found to be higher within five kilometers of oilfield infrastructure on the Arctic coastal plain.[362]The EIS should describe, quantify, and analyze the increased predation on nesting birds that will occur from development infrastructure and compare the increased predation potential with the distribution and abundance of vulnerable bird species.

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.[363] For instance:

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[358] Loss, S.R. 2016.

[359] Liebezeit, J. R., 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, *Influence of human development and predators on nest survival of tundra birds, Arctic Coastal Plain, Alaska*, 19 Ecological Applications 1628 (2009), *available at*: https://www.ncbi.nlm.nih.gov/pubmed/19769108 .

[360] National Research Council, 2003. Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope. The National Academies Press, Washington, D.C., *available at:* http://www.nap.edu/openbook/0309087376/html/1.html.

[361] BLM, 2012. NPR-A FEIS, Volume 1 Section 3.5.8.8 (pp. 277-278).

[362] *See supra* Note 369.

[363] Clinton D. Francis and Jessica L. Blickley, *The influence of Anthropogenic Noise on Birds and Bird Studies*, 74 Ornithological Monographs 6 (2012), *available at*:

Aircraft: The noise of helicopter and plane overflights can elicit avoidance behaviors, including flushing from nests and disruption of feeding. This is particularly of concern with birds that are naïve to such disturbances, as is likely the case on the coastal plain of the Refuge. In Colorado, breeding Red-tailed hawks (*Buteo jamaicensis*) in an area newly exposed to low-level helicopter traffic flushed from nests at a much higher rate than those in an area that had experienced decades of such traffic (52% vs 8%).[364] Low-flying aircraft are also potentially problematic outside the breeding season. Low overflights of large helicopters were associated with significant weight loss in Pacific black brant (*Branta bernicla nigricans*) during their first week of molt near Teshekpuk Lake, Alaska.[365] Fall-staging brant also took flight in response to low-flying aircraft (particularly helicopters), as did Canada geese (*B. canadensis*) to a lesser extent.[366] During staging and feeding in preparation for autumn migration, low flying aircraft repeatedly prompted snow geese (*Chen caerulescens atlantica*) in a sanctuary in Quebec were to take flight, with disturbance to the entire flock in 20% of the cases and disruption to feeding behavior lasting a mean of 12 minutes. Furthermore, disturbance levels of greater than 2.0 per hour resulted in a 50% drop in the mean number of geese using the sanctuary the following day.[367] The combination of energy expenditure due to taking flight plus the loss of feeding time represented a significant energy loss for snow geese in the pre-migration staging.[368]

Vehicles, Equipment and Pedestrians: According to the NPR-A FEIS, "Activities related to oil and gas development and production, such as vehicle, aircraft, pedestrian, and boat traffic, routine maintenance activities, heavy equipment use, and oil and gas spill cleanup activities could create disturbances that affect birds. These disturbances could result in temporary or

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http://americanornithologypubs.org/doi/pdf/10.1525/om.2012.74.1.6?code=coop-site, *see also supra* Part VI.B.5.

[364] Anderson, D.E., O.J. Rongstad, and W.R. Mytton. 1989. Response of nesting Red-tailed Hawks to helicopter overflights. Condor 91(2):296-299.

[365] Miller, M.W. 1994. Route selection to minimize helicopter disturbance of molting Pacific Black Brant: a simulation. Arctic 47(4):341-349.

[366] Ward, D.H., R.A. Stehn, W.P. Erickson, and D.V. Derksen. 1999. Response of fall-staging Brant and Canada Geese to aircraft overflights in southwestern Alaska. Journal of Wildlife Management 63(1):373-381.

[367] Belanger, L. and J. Bedard. 1989. Responses of staging Snow Geese to human disturbance. Journal of Wildlife Management 53:713-719.

[368] Belanger, L. and J. Bedard. 1990. Energetic cost of man-induced disturbance to staging Snow Geese (*Chen caerulescens atlantica*). Journal of Wildlife Management 54:36-41.

permanent displacement from preferred habitats, potentially resulting in decreased nest attendance, nest abandonment, nest predation, and increased energy expenditures that could affect an individual bird's survival or reproduction."[369] While noise and dust are issues from motorized equipment, there is evidence that human foot traffic is also major cause of birds taking flight, particularly geese, swans and raptors.[370] Birds in molt that are unable to take flight may experience elevated stress and energetic loss when exposed to vehicular and pedestrian traffic. All these types of disturbances and impacts could also affect birds in the Arctic Refuge as well, and each should be thoroughly assessed. The EIS should catalogue 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.

Finally, the agency should consider impacts to birds within the project area at the project-, state-, national-, and global-population levels. The EIS should evaluate the cumulative impacts like collisions, acoustic effects, disturbance from vehicle and vessel traffic on water and land, habitat fragmentation and loss, road effects, increased predation from predator attraction to infrastructure, oil spills, water withdrawals and water contamination, and climate effects such as warmer soil temperatures, vegetation changes, and any shift in phenology that may affect foraging and nesting opportunities. The cumulative impact analysis is particularly critical for migratory birds because their life histories take them around the globe along migratory routes, where they require suitable stopover habitat and wintering habitat in addition to their Arctic nesting habitat. The effects on birds from one part of their life history can impact them in surprising ways in other times of their life cycle.[371] Threats and influences beyond the North Slope should be considered for migratory bird populations in the project area.

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[369]BLM, 2012. NPR-A FEIS, Volume 2, Section 4.3.8.2 (page 173).

[370] Johnson et al. 2003. Alpine avian monitoring program, 2001. Fourth annual and synthesis report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, AK. 194 pp.

[371] *See e.g.* Jan A. Van Gils, Simeon Lisovski, Tamar Lok, Wlodzimierz Meissner, Agnieszka Ozarowska, Jimmy De Fouw, Eldar Rakhimberdiev, Mikhail Y. Soloviev, Theunis Piersma, and Marcel Klaassen, *Body shrinkage due to Arctic warming reduces red knot fitness in tropical wintering range*, 13 Science 819 (2016).

5. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Terrestrial Mammals, including brown bears, wolves, and foxes.

a. BLM must assess and fully disclose the impacts of the oil and gas program on both predator and prey species, and predator-prey relationships.

BLM must take a hard look at how the proposed lease sales and subsequent oil and gas development will affect terrestrial mammals in the Arctic Refuge. The agency must study direct impacts, such as increased human interaction, increased reliance on human-created food sources, and increased habitat disruption. BLM must also analyze indirect impacts of these activities on wildlife, including potential effects on predator-prey relationships.

Existing oil and gas development on the North Slope has already altered wildlife behavior and distribution and created source-sink population dynamics for some species. Garbage and food associated with oil fields have produced higher than normal densities of predators (such as brown bears, arctic foxes, ravens, and glaucous gulls) that prey on bird eggs, nestlings, and fledglings. As a result, the reproduction rates of some bird species such as black brant, snow geese, eiders, and probably some shorebirds in industrial areas are, at least in some years, insufficient to balance mortality. These populations may persist in the oil fields only because of immigration of individuals from source areas where annual production exceeds mortality.[372]

In addition to drawing predators to prey habitats, oil and gas development may push prey toward predators. For example, it could displace caribou from preferred calving or feeding grounds on the Coastal Plain, forcing herds south or east, potentially increasing predation risk from brown bears and wolves that favor habitat to the south. Similarly, muskox populations that are already declining face increased predation risk if bear and wolf populations rise on the Coastal Plain or if development displaces muskoxen further south into traditionally denser bear and wolf habitats.

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[372] National Research Council 2003. *Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope*. Washington, DC: The National Academies Press, *available at*: https://doi.org/10.17226/10639.

Additional impacts to bird, caribou, and muskox populations are discussed in other sections of these comments. In addition to affecting the prey populations in the area, oil and gas development in the Arctic Refuge would adversely affect the predators themselves.

b. BLM Must Assess the Impacts of Increased Human-Brown Bear Interactions and the Alteration or Destruction of Brown Bear Habitat.

A purpose of the Arctic Refuge is to conserve brown bears (*Ursus arctos),*[373] and the BLM must evaluate the effects of the leasing program against this management standard. The brown bear inhabits the Arctic Refuge and the Coastal Plain and is a species known to be drawn to oil and gas development areas. BLM must analyze how development in the Refuge would affect brown bears. This is particularly important because brown bears in the Refuge have lower rates of reproduction than brown bears in other areas and there is a distinct lack of information about brown bears on the Coastal Plain.

In the Arctic Refuge, the average female brown bear does not successfully reproduce until age nine years.[374] The average litter size for brown bears in arctic areas is two, and cubs can have a high mortality rate during their first year. Weaning does not occur until age two or three years. The interval between successful litters exceeds three years. The delayed age for initial reproduction, long inter-birth intervals, small litters and high cub mortality result in low rates of reproduction for brown bears in northern latitudes.

Brown bears are more abundant in the foothills and mountains of the Brooks Range in the Arctic Refuge than on the Coastal Plain. A 2007 study estimated there were 390 brown bears in the foothills and mountains between the Canning River and the U.S.-Canada border (Game Management Unit 26C) and 269 brown bears in the northwestern Refuge and adjacent areas (Unit 26B). Population trends and distribution of brown bears south of the Brooks Range are not well known.[375]

Brown bear distribution was mapped based on annual locations of radio-collared bears during the first week of June from 1983 to 1994. There have been no additional distribution studies or updates of this information for the Refuge Coastal Plain since 2002.[376] BLM should

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[373] ANILCA § 303(2)(B)(i).
[374] CCP Final EIS at 4-123.
[375] *Id.* at 4-124.
[376] 2018 USGS Report at 7.

identify baseline brown bear distribution before developing any oil and gas program for the Coastal Plain to better understand subsequent significant changes in habitat use.

The existing infrastructure that supports industrial development in the Arctic substantially increases bear-human interactions. BLM must study how additional industrial development to support potential leases on the Refuge would exacerbate interactions. Development has led to at least temporarily increased brown bear population density and prey mortality near oil fields, and could have long-term impacts on brown bear populations on the North Slope.[377] There are a number of ways in which brown bears drawn to development areas are directly affected and BLM must analyze how the proposed lease sales and post-lease activity would perpetuate that.

For example, increased human presence could lead to increased hunting. An average of 36 brown bears were killed per year by general public hunters in and near the Refuge during 1993–2006.[378] The number of brown bears taken by subsistence hunters is unknown. New roads and increased presence of humans on the Coastal Plain could lead to increased hunting pressure on brown bears on the Coastal Plain, as development in the central Arctic increased potential hunter access by road and airstrip.[379] Defense of life and property (DLP) mortality of brown bears also arises with increased human presence and anthropogenic food availability. Twenty-one percent of oil-field brown bears were found to supplement natural forage with anthropogenic food sources; when access to garbage and human food was suddenly eliminated, food-conditioned bears suffered DLP mortalities at greater than sustainable rates.[380] Research on brown bear populations that use Prudhoe Bay oil fields showed that bears that consumed human food resources had higher than average cub survival (possibly also due to a scarcity of natural predators such as wolves, wolverines, and adult male bears). But this increased cub survival was offset by greater-than-average mortality among post-weaned subadults because their conditioning to human foods made them more vulnerable to hunters along the Dalton Highway, which included DLP take.[381]

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[377] National Research Council 2003 at 157–58.

[378] CCP Final EIS at 4-124.

[379] Shideler, R., and J. Hechtel. 2000. Grizzly bear. Pp. 105–132 in The Natural History of an Arctic Oil Field, J.C. Truett and S.R. Johnson, eds. San Diego: Academic Press.

[380] CCP Final EIS at 4-118.

[381] National Research Council 2003 at 118.

Construction of industrial facilities results in alteration or destruction of brown bear habitat, and as the amount of developed area expands so will the effects on bear habitat. Issues of potential concern include disturbance from roads and impacts of seismic exploration on denning habitat and denning bears, and habitat alterations that influence food availability.[382] The adverse effects of noise associated with road construction, pipeline installation, gravel mining and camp and drilling operations also must be considered within the EIS. Gravel mining in riparian corridors can also alter or destroy bear habitat and disturb bears. Those effects will be greater when development expands toward the foothills because brown bear densities are higher there than on the coastal plain.[383]

Overall, "oil and gas activities on Alaska's North Slope have changed the demographics of the [brown] bear population primarily because of the availability of anthropogenic food sources."[384] BLM must assess the likely impacts from development on the narrower Coastal Plain of the Arctic Refuge, which lies in closer proximity to the foothills where there are higher concentrations of brown bears.

c. BLM Must Assess the Impacts of Oil and Gas Activities on Arctic Foxes, Wolves and Associated Predator-Prey Relationships.

Other species are drawn to oil and gas development areas, including arctic foxes (*Alopex lagopus*) and gray wolves (*Canis lupus*). BLM must analyze how these species would be directly and indirectly affected by post-lease development activity and how that would, in turn, affect local prey populations such as birds and muskoxen. Arctic foxes gravitate toward developed areas, attracted by opportunities for shelter and food. In the Prudhoe Bay oilfield, foxes seek human food and garbage sources and den in culverts under roads and in underground utility corridors, and in sections of natural gas pipe. Particularly in winter, large concentrations of foxes occur at dumps and other developed areas, and garbage is commonly found at den sites in summer. The density and rate of occupancy of dens and the sizes of litters are greater in oil fields than in adjacent areas, resulting in a larger and more stable population.[385] To reduce the

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[382] *Id.*
[383] *Id.*
[384] *Id.*
[385] *Id.* at 117.

possibility of disease transmission to humans, especially rabies, oil companies have developed employee education programs and have trapped and removed foxes.[386]

The current concerns about foxes apply to proposed new development in the Arctic Refuge. A higher density of foxes over the long-term could result in reduced nesting success and smaller local and regional populations of some bird species.[387] Predation can be locally devastating to colonial birds that nest in areas normally inaccessible to foxes.[388] Human modification to habitats, such as roads or causeways that connect barrier islands to the mainland, could cause serious problems in such circumstances. Impacts could accumulate as more area is developed and as more nesting habitat is affected by fox predation.[389] The EIS must assess the likely impacts to birds on the Coastal Plain from increased predation by arctic foxes.

BLM must also study how development would contribute to increased greenhouse gas emissions, which further contribute to climate change. Arctic foxes are extremely vulnerable to the impacts of climate change particularly because rising temperatures will decrease the availability of their tundra habitat and increase the range of red foxes, which may compete with the Arctic foxes for prey and even kill Arctic foxes.[390] Their position will become increasingly vulnerable as climate change continues to occur and BLM must undertake analysis of the present impacts of climate change on the foxes, as well as future impacts.

In addition to foxes, BLM must analyze the impact of oil and gas development on wolves and their associated predator-prey relationships. A purpose of the Arctic Refuge is to conserve wolves,[391] and the EIS must evaluate the effects of the leasing program against this management standard. The geographic distribution of wolves within and adjacent to the Coastal Plain was mapped in the 1980s and early 1990s as part of a study on caribou predation; due to funding constraints those distributions were based solely on aerial surveys and wolves received only

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[386] *Id.*
[387] *Id.*
[388] *Id.*
[389] *Id.*
[390] Feng et al. 2011; Dalen et al. 2007.
[391] ANILCA § 303(2)(B)(i).

"cursory attention."[392] There has been no update of this information for the Coastal Plain since 2002.[393] Updated information is needed for BLM to evaluate the impacts in the EIS.

From what is known, it appears that wolves prefer the Brooks Range foothills area and are more likely to occur there than on the Coastal Plain. However, given potential effects, BLM must analyze wolf populations and the potential impacts of oil and gas development in the area on wolves and their prey, including muskoxen. Wolves will also experience permanent habitat loss and avoidance, and may be disturbed by air and surface traffic associated with post leasing activities. As noted above, oil and gas development in the Coastal Plain could also entice species such as arctic foxes, wolves, and brown bears, which would have negative impacts on those species, as well as their natural prey. The EIS must fully assess the cascading ecological effects of introducing oil and gas development to the Coastal Plain, including effects on both predators and prey.

6. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Marine Mammals, Including Whales and Ice Seals.

Leasing and oil and gas development activities will have potentially significant, but also uncertain, impacts on whales and ice seals that live in and around the Arctic Refuge. The Refuge supports the Beringia Distinct Population Segment of the bearded seal (*Erignathus barbatus*)[394] and the Arctic subspecies of the ringed seal (*Phoca hispida hispida*)[395] (together, ice seals), both of which are listed as threatened under the Endangered Species Act due to loss of sea ice and snow cover. Bowhead whale (*Balaena mysticetus*), listed as endangered under the Endangered Species Act, also use coastal waters offshore of the Refuge. BLM, therefore, must consult with the National Marine Fisheries Service to determine whether leasing may affect these species, and ensure that permitted activities do not jeopardize these species.

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[392] Douglas, D.C., Reynolds, P.E., and Rhode, E.B., 2002, Arctic Refuge coastal plain terrestrial wildlife research summaries, USGS Biological Science Report 2002-0001 at 51; available at: https://alaska.usgs.gov/products/pubs/2002/2002-USGS-BRD-BSR-2002-0001.pdf.

[393] 2018 USGS Report at 7.

[394] 77 Fed. Reg. 76740.

[395] 77 Fed. Reg. 76706.

Ice seals utilize sea ice around the Refuge, and inhabit coastal areas.[396] Camden Bay, just offshore the Refuge, provides important habitat for bowhead whales.[397] New information indicates that bowhead whales have used nearshore, shallow regions in recent years.[398] Scientists surmise that this shift may have occurred due to changes in food availability for the whales associated with changes in wind patterns and oceanic upwelling,[399] which will likely increase in the future.[400] Given how close these whales and seals are to shore and the fact that onshore development will also encourage offshore oil and gas development and associated activities, BLM must study and disclose the direct, indirect and cumulative impacts that the lease sales and development activities on the surrounding land would have on these species, including noise pollution and oil spills, as well as cumulative impacts related to increased greenhouse gas emissions contributing to climate change and other development actions in the Southern Beaufort Sea.

a. BLM Must Properly Consider the Impacts of Noise Pollution on Whales and Ice Seals from an Oil and Gas Program in the Arctic Refuge and the Southern Beaufort Sea.

The lease sales may lead to oil and gas development on the Coastal Plain. Oil and gas development generates noise through a variety of industrial activities, including pile driving, vessel and aircraft traffic, and drilling and production. For example, the 1987 Legislative EIS outlines some potential development traffic that would be relevant to analyze for noise pollution impacts in the current planning process, such as use of C-130 aircraft, helicopters, barges, and low ground pressure vehicles.[401] Extensive infrastructure construction and deconstruction would also occur, including drilling pads, camps, airstrips, roads, oil pipelines, and marine facilities.[402]

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[396] Lori Quackenbush, *et al.*, Biology of the Bearded Seal (*Erignathus barbatus*) in Alaska, 1961-2009, 4 (2011); Lori Quackenbush, *et al.*, Biology of the Ringed Seal (*Phoca hispida*) in Alaska, 1961-2009, 5 (2011); Lori Quackenbush, *et al.*, Biology of the Spotted Seal (*Phoca largha*) in Alaska, 1961-2009, 2 (2009).

[397] *See, e.g.*, National Oceanic and Atmospheric Administration, Effects of Oil and Gas Activities in the Arctic Ocean, Final Environmental Impact Statement at 4-496 (October 2016).

[398] Bureau of Ocean Energy Mgmt., Liberty Development and Production Plan: Draft Environmental Impact Statement, at 3-64, 4-259 (2017) [hereinafter "Liberty DEIS"].

[399] *Id.*

[400] *Id.* at 3-19.

[401] LEIS, ch. IV, at 83-89.

[402] *Id.*

BLM must analyze the full suite of activities and the noise and disruption they may introduce into the coastal marine environment.

BLM must consider the impacts of these activities based on current and evolving scientific understanding of how noise affects marine mammals. Most recent scientific information demonstrates that marine mammals are more sensitive to industrial noise than previously understood. Scientists are finding that behavioral disruptions are occurring at much lower noise exposure levels than the National Marine Fisheries Service's currently accepted threshold for Level B disturbance under the MMPA:[403]

> Level B takes . . . often occur well outside of our ability to directly observe the disruption, and typically outside the 1,000 m observation zones around such disruptive activities. The best available science clearly shows that behavioral disruptions occur at vastly lower noise exposure levels than the current regulatory thresholds for Level B disturbances, and at much larger distances than on-board Marine Mammal Observers or passive acoustic monitoring can document.[404]

Recent research on disruption thresholds has demonstrated, for example, that bowhead whales increase call rates at initial detection of airguns at 94 dB, then decrease after 127 dB, and stop calling above 160 dB;[405] that beluga whales are displaced from foraging areas beyond the 130 dB isopleth;[406] and that harbor porpoise buzz rates, a proxy for foraging success, decrease 15 percent with exposure to seismic airguns at 130 dB and above.[407] A low-frequency, high-

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[403] 160dBRMS re: 1μPa for behavioral disruption for impulsive noise (e.g., impact pile driving), 120dBRMS re: 1μPa for behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling); *see e.g., id.* at 4-108.

[404] D. Nowacek *et al.*, Comment Letter regarding Notice of Receipt of Applications for Incidental Harassment Authorization ("IHA") for Geophysical Surveys in the Atlantic Ocean at 3 (July 29, 2015).

[405] S.B. Blackwell *et al.*, Effects of airgun sounds on bowhead whale calling rates: Evidence for two behavioral thresholds, 10(6) PLoS ONE e0125720 (2015).

[406] G.W. Miller *et al.*, Monitoring seismic effects on marine mammals—southeastern Beaufort Sea, 2001-2002, *in* Armsworthy, S.L., *et al.* (eds.), *Offshore Oil and Gas Environmental Effects Monitoring/ Approaches and Technologies* 511-542 (2005).

[407] E. Pirotta *et al.*, Variation in harbour porpoise activity in response to seismic survey noise, 10 Biology Letters 20131090 (2014).

amplitude fish mapping device was recently found to silence humpback whales at a distance of 200 kilometers, where received levels ranged from 88 dB to 110 dB.[408]

Individual animals that encounter noise may move away or become habituated to the noise, but both of these adaptations can be harmful, especially if animals are moving away from feeding, breeding, or other biologically important areas. Moreover, there are often physical impacts to marine mammals that do not move away from the sound source: according to Bedjer et al. (2009), "several studies have indicated that physiological evidence of a response could be detected in animals even when they exhibited little or no behavioural reaction or sign of disturbance (Moen et al. 1982, Culik et al. 1990, Wilson et al. 1991, Nimon et al. 1995, Regel & Putz 1997, Ratz & Thompson 1999, Müllner et al. 2004)."[409] Habituation is hard to determine because the only way to know if a population has truly habituated is if "studies adopt a long-term experimental design involving sequential sampling of the same individuals at different levels of exposure to a disturbance, [if not, then] they will be unable to meet the conditions required to detect behavioural habituation or sensitisation."[410] Therefore, the assumption that animals would habituate to noise is not an assumption that can readily be supported by available information, and in fact, is contrary to much of the available information, as discussed below.

Ice seals use sound for navigation, communication, foraging, and to avoid predation,[411] and are extremely sensitive to sound. For example, spotted seals were found to have some of the lowest hearing thresholds out of water of any marine mammal recorded, and have an extremely sensitive hearing range in water.[412] A study of spotted seal haulout patterns in Piltun Lagoon on Sakhalin Island noted that small motorboats operated by local fishers and hunters and helicopters related to offshore oil and gas development activities caused the majority of hauled-out seals to

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[408] D. Risch *et al.*, Changes in humpback whale song occurrence in response to an acoustic source 200 km away, 7(1) PLoS ONE e29741 (2012).

[409] L. Bejder *et al.*, Impact assessment research: Use and misuse of habituation, sensitisation and tolerance in describing wildlife responses to anthropogenic stimuli, 395 Marine Ecology Progress Series 177 (2009).

[410] *Id.* at 181.

[411] J.M. Sills *et al.*, Amphibious hearing in spotted seals (Phoca largha): underwater audiograms, aerial audiograms and critical ratio measurements, 217 The Journal of Experimental Biology 726 (2014).

[412] *Id*.

flee into the water quickly.[413] Ringed seals also are sensitive to aircraft noise and flee into the water in response.[414] Thus, low-flying aircraft and vessel noises cause hauled-out seals to move into the water, disrupting the animals' normal behavior and causing additional and unnecessary energy expenditures. Anthropogenic noise can also mask important communications with conspecifics, increase stress levels, and induce temporary or permanent hearing threshold shifts in pinnipeds.[415] Beluga and bowhead whales found in the area may also experience effects caused by increased noise, such as reduced reproduction, negatively affected health, and even death. [416]

BLM must fully assess the ways in which industrial noise will affect seals and whales using coastal waters offshore of the Refuge, assessing the full suite of noise-creating activities and using the newest scientific information about sound effects, which may well require undertaking new studies of the potential impacts of increased noise pollution on seals and whales. This would require identifying key locations and periods for marine mammal species' travel, feeding, rearing and mating areas to evaluate the effects of displacing animals from these areas.

b. BLM Must Analyze and Fully Disclose the Impacts of Oil Spills on Whales and Ice Seals from an Oil and Gas Program in the Arctic Refuge and the Southern Beaufort Sea.

i. Impacts of Oil Spills

The available information indicates that oil spills have significant negative impacts on whales, other cetaceans, and seals, and BLM must analyze this in the EIS. Particularly, BLM

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[413] A.L. Bradford *et al.*, Spotted seal haul-out patterns in a coastal lagoon on Sakhalin Island, Russia. 30 Mammal Study 145 (2005).

[414] E.W. Born *et al.*, Escape response of hauled out ringed seals (Phoca hispida) to aircraft disturbance, 21 Polar Biology 171 (1999).

[415] R.A. Kastelein *et al.*, Underwater audiogram of a Pacific walrus (Odobenus rosmarus divergens) measured with narrow-band frequency modulated signals, 112 Journal of Acoustical Society of America 2173 (2002).

[416] *See, e.g.*, T.A. Romano *et al.*, Anthropogenic sound and marine mammal health: measures of the nervous and immune systems before and after intense sound exposure, 61 Canadian Journal of Aquatic Science, 1124 (2004) (finding increased levels of stress hormones following noise exposure study using a captive beluga and noting increased stress can weaken the immune system and potentially affect fertility, growth rates, and mortality).

must assess potential impacts of onshore oil spills, and spills from ships and loading facilities on marine wildlife habitat, including species migrating through the coastal area. Understanding these impacts is vital as oil spills "are an inevitable consequence of oil-field development."[417]

Oil spills have documented lethal and sublethal impacts on marine species,[418] and oil spilled onshore could cause the same impacts if it reached the water. Direct impacts to wildlife from exposure to oil include behavioral alteration, suppressed growth, induced or inhibited enzyme systems, reduced immunity to disease and parasites, lesions, tainted flesh, and chronic mortality.[419] Marine mammals can be exposed to oil internally by inhaling volatile compounds at the surface, swallowing oil, or consuming oil-contaminated prey, and externally by swimming in oil.[420] Exposure to toxic fumes from hydrocarbons during oil spills has been recently linked to mortality in cetaceans, even years after such accidents.[421]

Oil spills can kill individual ice seals and have population-level impacts by decreasing survival and reproductive success, inhibiting normal behaviors, and exerting deleterious health effects. For example, seals depend on scent to establish a mother-pup bond, and mothers often do not recognize their oil-coated pups.[422] Oiled pups may be prematurely abandoned, reducing the pups' chances of survival. During the nursing period, ringed, bearded, and spotted seals return to the water several times a day between nursing bouts, increasing the chances of repeated contact with oil.[423]

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[417] LEIS at 115.

[418] C.H. Peterson *et al.*, Long-term ecosystem response to the Exxon Valdez oil spill, 302 Science 2082-2086 (2003); S. Venn-Watson *et al.*, Adrenal Gland and Lung Lesions in Gulf of Mexico Common Bottlenose Dolphins (Tursiops truncatus) Found Dead following the Deepwater Horizon Oil Spill. 10 *PLoS ONE* e0126538 (2015) (Venn-Watson *et al.* (2015)).

[419] D.A. Holdway, The acute and chronic effects of wastes associated with offshore oil and gas production on temperate and tropical marine ecological processes, 44 Marine Pollution Bulletin 185 (2002).

[420] National Marine Fisheries Service, Impacts of Oil on Marine Mammals and Sea Turtles.

[421] Venn-Watson *et al.* (2015).

[422] D. J. St. Aubin, *Physiological and toxic effects on pinnipeds*, *in* SEA MAMMALS AND OIL: CONFRONTING THE RISKS 121 at 131 (J. R. Geraci & D. J. St. Aubin eds., 1990).

[423] *Id.* at 100.

Oil spills also impede seals' foraging activities. Seals are reluctant to enter into the water when oil is present in the sea,[424] reducing their chances of getting food. Exposure to oil may also interfere with locomotion, especially in young seals. Studies have documented two gray seal pups' drowning because their flippers were stuck to the sides of their bodies, preventing them from swimming.[425] And direct ingestion of oil, ingestion of contaminated prey, or inhalation of hydrocarbon vapors can cause serious health effects, or even death.[426]

Oil spills could also harm whales and ice seals by reducing their prey. Oil contamination of mollusks has been found to impair growth, fertilization, and development of embryos, kill gill tissue, and encourage cancerous growths.[427] Additionally, exposure to crude oil also adversely affects fish at all stages.[428] Early life stages of fish are particularly sensitive to the effects of toxic oil components such as polycyclic aromatic hydrocarbons, which can cause larval deformation and death.[429] Adult fish exposed to oil can suffer from reduced growth, enlarged liver, changes in heart and respiration rates, fin erosion, and reproductive impairment.[430] Exposure to crude oil has also been linked to long-term population effects in fish. A recent study based on 25 years of research demonstrated that embryonic salmon and herring exposed to very low levels of crude oil can develop heart defects that reduce their later survival, indicating that spills may have much more widespread impacts than previously thought.[431]

Scientific research indicates that small spills can have substantial negative impacts on the Arctic ecosystem. For example, one study found that only small amounts of oil spilled into the ocean reduced hatching rates of *C. hyperboreus* copepods significantly —the fattest of the Arctic

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[424] *Id.* at 132.

[425] *Id.* at 134

[426] 77 Fed. Reg. at 76746.

[427] J. M. Neff *et al.*, Histopathologic and biochemical responses in Arctic marine bivalve molluscs exposed to experimentally spilled oil, 40 Arctic 220 (1987).

[428] M.G. Carls *et al.*, Sensitivity of fish embryos to weathered crude oil: part I. Low-level exposure during incubation causes malformations, genetic damage, and mortality in larval pacific herring (Clupea pallasi), 18 Environmental Toxicology and Chemistry 481 (1999) (Carls *et al.* (1999)); J. Bernanke and H.-R. Kohler, The impact of environmental chemicals on wildlife vertebrates, 198 Reviews of Environmental Contamination and Toxicology 1 (2008).

[429] *See, e.g.*, Carls, et al. (1999) at 488-490.

[430] Bernanke and Kohler 2009.

[431] J. P. Incardona *et al.*, Very low embryonic crude oil exposures cause lasting cardiac defects in salmon and herring. 5 Scientific Reports 13499 (2015).

copepods.[432] Moreover, the species' eggs are covered by only a thin membrane that is permeable to organic substances such as oil, which can penetrate the egg and lead to mortality.[433] As such, an oil spill could wipe out an entire generation of these copepods.[434] This could have substantial negative impacts on whales that feed on copepods, such as bowhead whales whose primary prey is copepods,[435] and could also have other ripple effects up the food chain.[436]

ii. Challenges of Cleaning and Containing an Oil Spill in the Arctic Marine Environment

BLM also must consider that oil spilled in the Arctic Ocean is almost impossible to contain and clean adequately, especially where there is inadequate infrastructure and technology to deal with an oil spill. The region is the most daunting and remote environment in the country. A spill would occur more than a thousand miles from the nearest Coast Guard station, with the constant threat of sea ice, subzero temperatures, and darkness up to 20 hours a day. The remote location, lack of infrastructure, extreme cold, changing ice conditions, high winds, and low visibility would combine to make spill response operations difficult or ineffective. In light of these concerns, BLM must address the difficulties of responding to an oil spill in the ocean from lease sale activities.

First, BLM must address the unique nature of the Arctic Ocean's oil spill response gap,[437] which is more significant than anywhere else in the country. According to the Canadian National Energy Board, in the Arctic, oil spill cleanup would be impossible on average three to five days of each week due to weather and sea conditions.[438] A recent analysis confirmed that conditions

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[432] R.D. Nørregaard *et al.*, Evaluating pyrene toxicity on Arctic key copepod species Calanus hyperboreus, 23 Ecotoxicology 163 (2014); *see also* Kristian Sjøgren, Even tiny oil spills may break Arctic food chain, Science Nordic, Jan. 30, 2014 (Sjøgren 2015) (one of the Calanus hyperboreus study's authors discussing finding).

[433] *Id.*

[434] *Id.*

[435] *See, e.g.*, Liberty DEIS at 3-71.

[436] Sjøgren 2014.

[437] A response gap analysis evaluates the amount of time oil spill responders are unable to work based on, among other things, adverse weather conditions, and delays in deployment of equipment and personnel. *See generally* Pew Environment Group, Oceans North U.S., Response Gap Fact Sheet (Sept. 1, 2013) (noting the value of a response-gap analysis).

[438] See J. George, Most Arctic Oil Spills Impossible to Clean Up: WWF, NUNATSIAQ NEWS (Sept. 8, 2011) (George 2011); *see also* S. L. Ross Environmental Research Ltd., *Spill*

in the Beaufort Sea would not be suitable for mechanical recovery of oil 98 percent of the time during winter (from November to June).[439] As the USGS has explained, "[u]nderstanding what combination of countermeasures will likely be available under the temporal and spatial variability of the Arctic is *essential* to assess environmental risks from any potential spilled oil."[440]

Second, the EIS must acknowledge that there is no proven way to recover significant oil quantities in conditions prevalent in the Arctic.[441] Mechanical containment and recovery strategies can be significantly hindered by ice coverage in the Arctic Ocean. According to the Minerals Management Service, in broken ice conditions, oil spill recovery rates drop dramatically to between "1 [percent] to 20 [percent] depending on the degree of ice coverage and if responding during freeze-up or spring break-up."[442] Following the most recent offshore spill exercises in the Beaufort Sea in 2000,[443] the Nuka Research and Planning Group explained, "the limit to mechanical recovery with containment booms and skimmers in ice-infested waters is generally considered to be 20-30% ice coverage . . . However, the 2000 offshore response exercises in the Alaska Beaufort Sea demonstrated that the actual operating limits were closer to

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Response Gap Study for the Canadian Beaufort Sea and the Canadian Davis Strait at 28 (July 12, 2011) (noting that, from July through October, conditions in the nearshore Beaufort Sea would be favorable for cleanup only 32 to 77 percent of the time; at other times of year, "active response would be deferred until the following melt season").

[439] Nuka Research and Planning Group, LLC, Estimating an Oil Spill Response Gap for the U.S. Arctic Ocean (Revised) at 30, 53, Tbl. 18 (June 2016).

440 USGS Report at 130 (emphasis added).

[441] Even under warmer conditions, and with a vast response capacity entirely unavailable in the Arctic, oil recovery in marine waters is limited; only three percent was skimmed from the water in the case of the *Deepwater Horizon* spill. NOAA, *Federal Science Report Details Fate of Oil from BP Spill* (Nov. 2010); *see also* WWF Canada, *WWF Report Shows Limited Response Possible to Arctic Oil Spill* (Sept. 8, 2011) (finding that oil spill clean-up is impossible 54 to 81 percent of time during the warmest five months in the near offshore Beaufort Sea and 100 percent of the time during the other seven to eight months of the year).

442 Minerals Mangement [sic] Service, Arctic Oil Spill Response Research and Development Program, A Decade of Achievement at 14 (2009) ("5 to 30% for open ocean response without broken ice").

[443] *See* T. L. Robertson & E. DeCola, Joint Agency Evaluation of the Spring and Fall 2000 North Slope Broken Ice Exercises (Dec. 18, 2000).

10%. . . .”[444] Roughly ten years after the Beaufort Sea oil spill exercises, Pew Environmental Group commissioned a report that reached the same troubling conclusions regarding mechanical cleanup in the Arctic Ocean:

> If a major blowout were to occur in the Arctic OCS, the same mechanical cleanup techniques [as those used in the *Deepwater Horizon* spill response] (boats with skimmers and booms) would be applied at a much less efficient recovery rate. Although some refinements have been made to adapt certain types of equipment for use in cold or ice-infested waters, there have been no breakthroughs in oil spill response technologies to significantly enhance the capacity to recover oil when sea ice is present. The National Academy of Sciences (NAS) determined that ‘no current cleanup methods remove more than a small fraction of oil spilled in marine waters, especially in the presence of broken ice’ (National Research Council-NAS 2003).[445]

A 2014 review by the National Research Council confirms these findings:

> Conventional booms and skimmers become increasingly ineffective as ice concentrations increase. Limited effectiveness is possible in very open drift ice (1/10 to 3/10) and in isolated polynyas within closer pack ice. The presence of ice interferes with boom operation and reduces flow to the skimmer head, greatly reducing overall effectiveness.[446]

The EIS must address these problems in a realistic way and apply its conclusions to the unique circumstances presented here, including the possibility of an oil spill during fall freezing and spring breakup.

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[444] Nuka Research & Planning Group, LLC, Oil Spill Response Mechanical Response Recovery Systems for Ice-Infested Waters: Examinations of Technologies for the Alaskan Beaufort Sea at 58 (June 2007).

[445] Pew Report at 8.

[446] Committee on Responding to Oil Spills in the U.S. Arctic Marine Environment, Responding to Oil Spills in the U.S. Arctic Marine Environment at 92 (2014).

c. BLM Must Adequately Consider How Climate Change Will Exacerbate Existing Threats to Whales and Ice Seals from an Oil and Gas Program in the Arctic Refuge and the Southern Beaufort Sea

As climate change continues, the absorption of carbon dioxide by the ocean could create noisier oceans (particularly as noise from potential development increases).[447] When carbon dioxide reacts in the ocean, it lowers pH, creating more acidic waters. The more acidic the water, the less sound waves are absorbed. Researchers predict that ocean acidification will reduce the intrinsic ability of surface seawater to absorb sound at frequencies important to marine mammals by 40 percent by 2050 because of increased carbon dioxide acidifying our oceans.[448] Such changes will only exacerbate the harms from noise pollution from oil and gas drilling operations in the Arctic and other anthropogenic noise sources.

Melting sea ice from climate change also affects ice seals. Bearded seals rely on sea ice for breeding, feeding, giving birth, molting, and other essential life functions.[449] And ringed seals excavate subnivian lairs in snowdrifts over breathing holes, which they use for resting, giving birth, and nursing pups.[450] Without sufficient sea ice and snow cover, ringed seals freeze to death or are taken by predators.[451] Research has documented a nearly 100 percent mortality rate when snow cover was insufficient to build snow caves.[452]

Recent studies also show that loss of sea ice is leading to poor body condition in ringed seals. For example, Harwood et al. (2015) found that ringed seals in the Beaufort Sea experienced a significant decline in body condition over the last two decades, as well as low pup production in recent years (2012, 2013, 2014), which could have far-reaching negative

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[447] K.C. Hester *et al.*, Unanticipated consequences of ocean acidification: A noisier ocean at lower pH, 35 Geophysical Research Letters L19601 (2008).

[448] *Id.*

[449] 77 Fed. Reg. 76740, 76742 (Dec. 28, 2012) (final rule listing bearded seals as threatened under the ESA).

[450] 77 Fed. Reg. 76706, 76709 (Dec. 28, 2012) (final rule listing Arctic ringed seals as threatened under the ESA).

[451] *Id.*

[452] *Id.*

consequences in the Beaufort Sea ecosystem.[453] And MacIntyre et al. (2015) found that "losses in ice cover may negatively affect bearded seals, not just by loss of habitat but also by altering the behavioral ecology" of the population in the Beaufort Sea region.[454] In other words, climate change stress is increasing for ice seals, and already having negative effects on populations. BLM must address how the lease sales and oil and gas activities will exacerbate these effects. and oil and gas activities will exacerbate these effects.

d. The BLM Must Adequately Consider the Cumulative Impacts and Synergistic Effects from an Oil and Gas Program in the Arctic Refuge and the Southern Beaufort Sea on Marine Species.

The EIS must address all known and anticipated cumulative impacts and synergistic effects from Arctic Refuge and Southern Beaufort Sea lease sales, exploration and oil and gas drilling. These impacts will likely be significant to the long-term viability of bowhead and beluga whales and other Arctic marine species.

Numerous vessels, drill rigs and other support sea and air craft will need to travel through the Bering Sea and Bering Strait to reach the Southern Beaufort Sea and Arctic Refuge Coastal Plain. The U.S. Coast Guard concluded that changing sea ice, unpredictable weather and increased marine vessel traffic combine to "make the Bering Strait region increasingly vulnerable to maritime casualties."[455] The Bering Strait is also "a bottleneck that connects two unique, but globally significant large marine ecosystems: the Bering Sea, part of the North Pacific Ocean, and the Chukchi Sea, part of the Arctic Ocean."[456] Due to decreasing sea ice, Bering Strait ship transits increased 118 percent from 220 in 2008 to 480 in 2012; this trend is expected to continue.[457] Increasing vessel traffic could result in a higher risk and impact from shipping accidents and oil spills. Current Bering Strait maritime vessel transit routes overlap one of the largest migratory marine wildlife corridors on the planet.[458]

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[453] L. A. Harwood, *et al*., Change in the Beaufort Sea ecosystem: Diverging trends in body condition and/or production in five marine vertebrate species, 136 Progress in Oceanography 263 (2015).

[454] K. MacIntyre, The relationship between sea ice concentration and the spatio-temporal distribution of vocalizing bearded seals (Erignathus barbatus) in the Bering, Chukchi, and Beaufort Seas from 2008 to 2011, 136 Progress in Oceanography 241 (2015).

[455] U.S. COAST GUARD, ARCTIC STRATEGY 13 (2013).

[456] L. BRIGHAM, *ET AL.*, ARCTIC MARINE SHIPPING ASSESSMENT BERING SEA REGION CASE STUDY 2 (2009).

[457] U.S. COAST GUARD, ARCTIC STRATEGY (2013).

[458] L. BRIGHAM, *ET AL.* (2009).

Increased vessel transits due to sea ice loss, coupled with increasing oil exploration and development in the Chukchi and Beaufort seas, makes a spill affecting Arctic marine wildlife all but inevitable, especially since marine mammals are changing their spring travel patterns due to extremely low sea ice in the Bering and Chukchi Seas. For example, FWS (pers. comm.) shared that bowhead whales are traveling north through the Bering Sea to the Chukchi and Beaufort Seas one month earlier this year and Arctic ice dependent seals are now resting on Aleutian Islands, far south of where they should be in April and May due to severe lack of sea ice this year in the Bering Sea off western Alaska.

Potential conflicts between increased ship traffic and large marine pinnipeds and cetaceans in this maritime region include increased ambient and underwater ship noise, ship strikes, entanglement in marine debris and pollution (including oil spills).[459] Arctic species that may be affected from increased ship traffic include threatened polar bears (*Ursus maritimus*), Pacific walrus (*Odobenus rosmarus* ssp. *divergens*), the Alaska stock of bearded seal, Western Arctic stock of bowhead whale, Bering Sea stock of harbor porpoise (*Phocoena phocoena*), the Western North Pacific stock of humpback whale (*Megaptera novaeangliae*), the Alaska stock of ringed seal, and North Pacific stock of sperm whale (*Physeter macrocephalus*) and the critically endangered North Pacific right whale (*Eubalaena japonica*).

7. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Fish.

Freshwater and near-shore waters of the Coastal Plain contain numerous Arctic fish species that are sensitive to stressors from oil and gas development. The two most abundant anadromous fish species, Dolly Varden (*Salvelinus malma*) and Arctic Cisco (*Coregonus autumnalis*),[460] are also the most harvested subsistence fish resources, with thousands of pounds harvested annually in the Kaktovik subsistence fishery.[461] Arctic Cisco have not been documented using freshwater habitat within the Coastal Plain, but extensively use nearshore habitat within the Beaufort Seas as essential foraging habitat between their spawning migration

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[459] ARCTIC DATABASE, 2020 FUTURE SCENARIO FOR THE BERING STRAIT REGION (undated); *available at*: http://www.arctis-search.com/2020+Future+Scenario+for+the+Bering+Strait+Region.

[460] Craig 1984.

[461] Bacon et al. 2009.

to the Mackenzie River and overwintering location in the Colville River Delta.[462] Dolly Varden have two life forms and both resident and anadromous forms are present in freshwater and nearshore habitats.[463] Other fishes within the Coastal Plain freshwater habitat include Lake Trout (*Salvelinus namaycush*), Arctic Grayling (*Thymallus arcticus*), Burbot (*Lota lota*), Ninespine Stickleback (*Pungitius pungitus*), and Slimy Sculpin (*Cottus cognatus*).[464] The delta and lower sections of many of the rivers within the Coastal Plain contain extensive essential fish habitat such as rearing areas for juvenile Dolly Varden[465] as well as distinct overwintering areas located at perennial springs and deep sections of rivers.[466] Another type of essential fish habitat, spawning areas, are located upstream of the Coastal Plain and many post spawned Dolly Varden either migrate downstream and overwinter at perennial springs within the Coastal Plain or nearby watersheds.[467]

Due to the limited amount of available winter liquid water, if ice roads are built using water extracted from rivers there will likely be both short and long-term impacts on fish populations. Impacts could include direct loss of overwintering habitat, reduced dissolved oxygen concentrations, and increased stress and mortality of Dolly Varden or other Arctic fishes.[468] 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.[469]

BLM must consider impacts from the full suite of exploration, development and production on fish habitat, and complete an Essential Fish Habitat Consultation that includes these activities. Construction of gravel and ice roads, pipelines, and other infrastructure with river crossings would mobilize sediment, with associated impacts to rearing, spawning, and

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[462] Reist and Bond 1988, Brown 2008.
[463] Ward and Craig 1974.
[464] U.S. Fish and Wildlife Service 2015.
[465] Ward and Craig 1974.
[466] Craig and McCart 1974, Viavant 2005, Brown et al. 2014.
[467] Brown et al 2014.
[468] *See, e.g.*, Gaboury and Patalas 1984, Evans 2007, Cott et al. 2008.
[469] McCauley et al. 2003, Popper et al. 2005.

overwinter habitat,[470] as well as the health and behavior of fishes.[471] 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.[472] 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,[473] introduction of non-native species and increased fishing pressure all of which would have both short and long-term impacts to fish populations.[474]

The leasing EIS must fully analyze these and all other reasonably foreseeable direct, indirect, and cumulative impacts to fish and subsistence biological resources of the Coastal Plain associated with all phases of development. The BLM must also fully address the following considerations and information gaps:

- Identify all water withdrawal sites (lakes and rivers) and fully analyze how winter fish presence will be accurately detected and adverse impacts avoided, minimized, and mitigated.
- Fully analyze and articulate how essential fish habitat (spawning, overwintering, and rearing) will be managed or avoided so that development does not have negative impacts on fish populations.
- Fully analyze and articulate how stream crossing structures within floodplain channels (50 yr-200 yr.) will be managed to minimize impacts to essential fish habitat, the natural flow regime, and aquatic ecological processes.
- Fully analyze and identify the physiological and behavioral impacts associated with sediment mobilization and deposition on Arctic fishes.
- Fully analyze and identify how temporary and permanent fish passage restrictions will be avoided or minimized to allow seasonal movement patterns by fish species such as Dolly Varden and Arctic Grayling.
- Fully articulate how important Dolly Varden and Arctic Cisco populations will be monitored to detect short and long term negative impacts to the subsistence fishery.

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[470] *See, e.g.*, Robertson et al. 2006.
[471] *See, e.g.*, Newcombe and Macdonald 1991, Reid et al. 2003, Robertson et al. 2006.
[472] Semple et al. 1995.
[473] Schein et al. 2009, Kanigan and Kokelj 2010
[474] Schindler 2001.

8. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Connectivity and Habitat Fragmentation.

Conserving wildlife corridors is one of the best strategies to mitigate the negative impacts of habitat fragmentation and support wildlife species to adapt to climate change[475] and other stressors. Management that seeks to maintain or restore connectivity between protected or otherwise intact natural areas are now considered critical to biodiversity conservation.[476] Scientists agree that "the preponderance of evidence is that corridors almost certainly facilitate travel by many species."[477] The FWS Strategic Plan for Responding to Accelerating Climate Change states that ''processes such as pollination, seed dispersal, nutrient cycling, natural disturbance cycles, predator-prey relations, and others must be part of the natural landscapes we seek to maintain or restore. These processes are likely to function more optimally in landscapes composed of large habitat blocks connected by well-placed corridors.''[478] Many analytical frameworks for identifying and prioritizing specific habitat corridors to preserve landscape connectivity have been formulated.[479] New research has confirmed the importance of proactive management to conserve habitat connectivity for native plants and animals in central and northeastern Alaska.[480]

States and federal agencies are increasingly providing for wildlife corridors and habitat connectivity in planning and management. The Western Governors' Association approved a

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[475] Nicole E. Heller & Erika S. Zavaleta, *Biodiversity Management in the Face of Climate Change: A Review of 22 Years of Recommendations*, 142(1) Biological Conservation 14 (2009).

[476] Jodi A. Hilty et al., *Corridor Ecology: The Science and Practice of Linking Landscapes for Biodiversity Conservation* (Island Press 2006); Philip D. Taylor et al., *Connectivity Conservation* 29-43 (Kevin R. Crooks & M. Sanjayan, Cambridge U. Press, 2006).

[477] Paul Beier & Reed F. Noss, *Do Habitat Corridors Provide Connectivity?*, 12(6) Conservation Biology 1241-52 (1998).

[478] U.S. Fish & Wildlife Serv., Rising to the Urgent Challenge Strategic Plan for Responding to Accelerating Climate Change 23 (2010).

[479] Carlos Carroll et al., *Use of Linkage Mapping and Centrality Analysis Across Habitat Gradients to Conserve Connectivity of Gray Wolf Populations in Western North America*, 26(1) Conservation Biology 78–87 (2012); Brad H. McRae et al., *Using Circuit Theory to Model Connectivity in Ecology and Conservation*, 89(10) Ecology 2712–24 (2008); Andrew G. Bunn et al., *Landscape Connectivity: A Conservation Application of Graph Theory*, 59(4) J. of Envtl. Mgmt. 265–278 (2000).

[480] Dawn R. Magness et al., *Using Topographic Geodiversity to Connect Conservation Lands in the Central Yukon, Alaska*, 33(4) Landscape Ecology 547 (2018).

policy resolution in 2007 calling for the protection of wildlife corridors and crucial wildlife in the West, including Alaska.[481] The BLM, in accordance with federal planning mandates, is committed to addressing ecological effects in planning, including "effects on natural resources and on the components, structures, and functioning of affected ecosystems,"[482] which should include habitat connectivity. The agency operationalized this direction in its Land Use Planning Handbook, stating that plan "analysis should describe the status, or present characteristics and condition of the public land; the status of physical and biological processes that affect ecosystem function; the condition of individual components such as soil, water, vegetation, and wildlife habitat; and the relative value and scarcity of the resources."[483] These data and characteristics are relevant to habitat connectivity; BLM planning should account for connectivity, including identifying wildlife corridors in the current planning process. The North Slope Rapid Ecological Assessment commission by the BLM provides useful information on habitat types and wildlife movement in the planning area.[484] BLM must consider impacts from the full suite of exploration, development and production on habitat connectivity and habitat fragmentation.

9. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on BLM Sensitive Species.

The Federal Land Policy and Management Act (FLPMA) mandates BLM to "protect" ecological and environmental values and "provide food and habitat for fish and wildlife" in the agency's administration of federal lands, waters and resources.[485] In accordance with the act and a host of other authorities, BLM promulgated a policy for the "conservation of BLM special status species and the ecosystems upon which they depend on BLM-administered lands."[486] Special status species include plants, animals and insects listed or proposed for listing under the Endangered Species Act and "sensitive species," designated by BLM State Directors, that require special management consideration to promote their conservation and reduce the likelihood and

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[481] Western Governors' Association, Policy Resolution 07-01 (Feb. 27, 2007).

[482] 40 C.F.R. § 1508.8.

[483] BUREAU OF LAND MANAGEMENT, BLM LAND USE PLANNING HANDBOOK (H-1601-1) (2005) at 20.

[484] E.J. Trammell, M.L. Carlson, N. Fresco, T. Gotthardt, M.L. McTeague, and D. Vadapalli, eds., North Slope Rapid Ecoregional Assessment. Prepared for the Bureau of Land Management, U.S. Department of the Interior. Anchorage, Alaska.

[485] 43 U.S.C. § 1701(a)(8).

[486] SPECIAL STATUS SPECIES MANAGEMENT MANUAL at 6840.01.

need for future listing under the ESA.[487] "BLM-administered lands" includes split-estate lands, where the agency manages only the subsurface estate.[488]

The special status species policy details the BLM's responsibilities for conserving and contributing to the recovery of ESA-listed species, which are described throughout these comments. A review of relevant authorities, including the Arctic Refuge CCP and NatureServe data (focusing on three HUC-8 watersheds on the North Slope of the Refuge, 190605-01, 02 and 03), found approximately 19 sensitive species designated by the BLM Alaska State Office to occur on the Arctic Refuge Coastal Plain, though with varying levels of certainty. These include seven bird species, one mammal, one fish, eight plant species and two insects respectively listed below:

1. Rusty blackbird (*Euphagus* carolinus) [casual visitor]
2. Golden eagle (*Aquila chrysaetos*) [uncommon breeder]
3. Arctic peregrine falcon (*Falco peregrinus* tundrius) [rare breeder, uncommon visitor]
4. Red knot (*Calidris* canutus) (nonbreeding migrant]
5. Yellow-billed loon (*Gavia adamsii*) [nonbreeding migrant]
6. Short-eared owl (*Asio* flammeus) [uncommon breeder]
7. Trumpeter swan (*Cygnus buccinator*) [rare breeder]

8. Pacific walrus (*Odobenus rosmarus* ssp. *divergens*)

9. Arctic char (*Salvelinus alpinus*)

10. Pygmy aster (*Aster pygmaeus*)
11. False-oats, Siberian false-oats (*Trisetum sibiricum* ssp. *litorale*)
12. Muir's fleabane (*Erigeron muirii*)
13. Plant sp. (*Papaver gorodkovii*)
14. Plant sp. (*Puccinellia* wrightii) [possible]
15. Walpole poppy (*Papaver walpolei*)
16. Sabine-grass (*Pleuropogon* sabinei) [possible]
17. Wallflower sp. (*Erysimum asperum* spp. *angustatum*) [possible]

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[487] *Id.*
[488] *Id.* at Glossary 1.

18. Mayfly (*Acentrella feropagus*) [unknown]
19. Alaska sallfly (*Alaskaperla ovibovis*) [unknown]

BLM's policy states that "planning process[es]…shall address sensitive species and their habitats in land use plans and associated NEPA documents" and that "land use plans shall be sufficiently detailed to identify and resolve significant land use conflicts with Bureau sensitive species without deferring conflict resolution to implementation-level planning."[489] In implementing the policy, the agency is committed "to determining, to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluating the significance of BLM-administered lands and actions undertaken by the BLM in conserving those species."[490] Moreover, the agency is to ensure "that BLM activities affecting Bureau sensitive species are carried out in a way that is consistent with its objectives for managing those species and their habitats at the appropriate spatial scale."[491] Consistent with other Department of the Interior and agency policy, BLM is obligated to coordinate with Indian tribes, including Alaska Natives, in planning and management of special status species.[492]

10. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on State Wildlife Action Plan Species.

The EIS must consider and analyze the direct, indirect, and cumulative effects of an oil and gas program on species recognized under the State of Alaska's State Wildlife Action Plan (SWAP). SWAPs are state blueprints for conserving the full diversity of our nation's fish and wildlife. Each state plan identifies "species of greatest conservation need," their habitats, threats, and needed conservation actions, including priorities and goals for recovering imperiled species. SWAPs are developed in partnership with federal, state, and local agencies, Indian tribes, non-governmental organizations, academic institutions, private landowners, and the public. Each SWAP must include eight statutory elements and must be approved by the U.S. Fish and Wildlife Service before a state can receive federal funding to support conservation activities contained in its plan.

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[489] *Id.* at 6840.06.2B.
[490] *Id.* at 6840.06.2B.
[491] *Id.*
[492] *Id.* at 6840.06.3A.

Alaska's SWAP was revised in 2015[493] and identifies more than 375 species of greatest conservation need in the state,[494] including plants and animals that depend on the Arctic National Wildlife Refuge, such as polar bear, arctic fox, arctic char, bald and golden eagle, Peregrine falcon, and beluga whale.[495] Species added to the list are at risk (including candidate and listed species under the ESA); culturally, ecologically, or economically important; serve as sentinel species (indicators of environmental change); and/or are stewardship species (species with a high percentage of their North American or global populations in Alaska).[496] The Alaska SWAP notes the importance of the Arctic Refuge and the Coastal Plain to wildlife in the state.[497]

Congress directed that states develop and implement SWAPs in coordination with federal agencies,[498] and the Alaska SWAP anticipates federal cooperation in implementing plan components (noting the extensive federal lands and waters and numerous federal management authorities that apply in the state). Many Alaska species of greatest conservation need are also BLM-designated sensitive species, which the BLM is already committed to conserving (see elsewhere in these comments). FLPMA[499] and BLM's administrative procedures otherwise direct the agency to use a collaborative approach to planning that is "consistent with [other governmental entities'] plans and policies…to the maximum extent consistent with Federal law"[500] and "address(es) common needs and goals within the planning area."[501] This includes "working in close coordination with state wildlife agencies, and drawing on state comprehensive wildlife conservation strategies [a.k.a. SWAPs]."[502] The BLM's Land Use Planning Handbook even identifies in what section of a NEPA planning document the agency should describe

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[493] ALASKA DEPARTMENT OF FISH AND GAME. 2015 ALASKA WILDLIFE ACTION PLAN (2015).

[494] USGS, Alaska 2015 State Wildlife Action Plan, *available at*: https://www.sciencebase.gov/catalog/item/595a98e3e4b0d1f9f0528535.

[495] ALASKA DEPARTMENT OF FISH AND GAME. 2015 ALASKA WILDLIFE ACTION PLAN, APPEND. A (2015).

[496] *Id. at* 28-32.

[497] *Id*. at 34-36, 85.

[498] 66 Fed. Reg. 7657–60

[499] 43 U.S.C. § 1712(b)(9).

[500] BUREAU OF LAND MANAGEMENT, BLM LAND USE PLANNING MANUAL (1601) (2000) at 1601.02C.

[501] *Id.* at 1601.06C2.

[502] BUREAU OF LAND MANAGEMENT, BLM LAND USE PLANNING HANDBOOK, APPEND. C (H-1601-1) (2005) at 6.

coordination with SWAPs.[503] BLM must consider the impacts of an oil and gas program on both the species identified in the SWAP as well as how it may impact the coordination and management of the SWAP itself.

B. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Surface Resources.

1. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Water and Hydrology.

There are a number of issues that BLM must consider in the leasing EIS related to water and hydrology impacts. Water, including rivers, lakes, and ponds, cover very little of the Coastal Plain, much less in comparison to the Western North Slope. As the USGS explained, "[u]nderstanding water resources in the [Coastal Plain] informs questions related to multiple ecosystems as well as possible infrastructure development."[504] While some water resource data has been collected, very little is known about how development infrastructure or water withdrawal would affect aquatic ecosystems within the Refuge. Ensuring accurate and updated information on water resources (including baseline water quality) and appropriate modeling is important not only to understand the impacts of oil and gas activities to water resources but also to understanding the synergistic impacts between local hydrology and aquatic and terrestrial ecosystems and potential impacts.

The Coastal Plain of the Arctic National Wildlife Refuge contains a variety of permafrost dominated lentic and lotic ecosystems including large rivers, springs, aufeis, taliks, small beaded streams and both shallow and deep thermokarst lakes that are sensitive to oil and gas development. Compared to the rest of the North Slope Coastal Plain, the area within the Arctic Refuge lacks widespread deep lakes to provide water sources for ice roads,[505] and areas that do contain deep lakes will need to be carefully managed for impacts to surface water connectivity, seasonal flow regime patterns, and processes within aquatic ecosystems.

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[503] *Id.*, Append. F at 12.
[504] 2018 USGS Report at 20.
[505] Trawicki et al. 1991, Lyons and Trawicki 1994.

Impacts from improper water withdrawals could include loss of overwintering habitat, degraded water quality, loss of littoral habitat and freezing of fish eggs or benthos.[506] While historically considered as a potential water source for ice roads, lotic environments should be avoided due to the high potential for detrimental aquatic impacts.[507] Due to the lack of available winter water for ice roads, development will likely require construction, maintenance, and use of numerous permanent gravel roads, which in turn have a number of significant impacts.[508]

Both short and long-term impacts from roads, stream crossings and development within the riverine floodplain may occur and could include increased sediment transport and deposition, increased frequency of mass wasting and slump events, and degraded water quality and habitat.[509] Associated negative impacts to Arctic fish populations from degraded water quality and habitats are likely to include minor to severe impacts to essential fish habitat (i.e., spawning, rearing, and overwintering) quality and quantity and to Arctic fish fitness.[510]

The EIS must fully analyze these and all other reasonably foreseeable direct, indirect, and cumulative impacts to water resources and hydrology of the Coastal Plain associated with all phases of development. Specifically, BLM must fully address the following considerations and information gaps:

- Identify water withdrawal amounts and locations under each alternative and fully analyze associated impacts to Arctic fishes. BLM must also identify and analyze a full suite of protective measures to avoid, minimize, and mitigate adverse impacts to fish and hydrology associated with water withdrawals.
- Ensure adequate information on the spatial and temporal variability of winter liquid water and dissolved oxygen concentrations in lakes within the study area.
- Identify and analyze a full suite of protective measures for designation, construction, and maintenance of stream crossings to minimize impacts to water quality, natural flow regimes and ecological processes.
- Ensure that river and stream setbacks minimize impacts to riparian and floodplain processes.
- Fully analyze physiological and behavioral impacts on Arctic fishes, migratory birds, and other aquatic life from impacts to water resources associated with all phases of oil and gas development.

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[506] Gaboury and Patalas 1984, Turner et al. 2005, Cott et al. 2008.
[507] Bendock 1976.
[508] *See, e.g.*, DFO 2000; *see also infra* Part VI.E.1.c.
[509] *See, e.g.*, Newcombe and Macdonald 1991, Robertson et al 2006.
[510] *See, e.g.*, Goldes et al. 1988, Berg and Northcote 1985, Reynolds et al. 1989.

a. BLM must study the impacts of the lease sales and resulting future activity on water quantity.

BLM must take a hard look at the impacts of the lease sales and post-lease oil and gas development activity on water quantity in the Coastal Plain. Typical oil and gas development projects involve constructing large drill pads, drill camps, and roads using ice produced from water in surrounding areas.[511] These developments require massive amounts of water. For example, in the NPRA, oil exploration activities consume millions of gallons of water each season.[512] Water from surrounding areas is used for drilling ("a 10,000 foot well could require approximately 420,000 to 1.9 million gallons of water") and waterflooding, which requires about 760 million gallons per year for a 50,000 barrel per day operation.[513] Water is also used for the camp water supply ("approximately 100 gallons per day for each person"), as well as road and pad maintenance ("approximately 20 percent of the initial volume of water required to construct the road or pad") throughout the season.[514] Moreover, hydraulic fracturing is increasingly being used onshore and offshore Alaska,[515] and fracking increases water use. Between 2000 and 2014, the average water used for fracking a horizontal well increased from 177,000 gallons to 4 million gallons.[516]

Free flowing water in the Coastal Plain is limited, despite the area being classified as wetlands — most of the lakes are shallow and cover less than one square mile.[517] And the last comprehensive assessment of the area (done by DOI in 1987) noted that very little is known about the rivers that run through it.[518] That study concluded that obtaining water for these

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[511] LEIS at 84 (1987); U.S. Dep't of Interior, National Petroleum Reserve-Alaska Final Integrated Activity Plan/Environmental Impact Statement, Vol. 1 at 196 (2012) [hereinafter "NPR-A IAP/EIS"].

[512] NPR-A IAP/EIS Vol. 1 at 196.

[513] *Id.* Vol. 2 at 19, 36, 37.

[514] *Id*. Vol. 1 at 196, Vol. 2 at 19, 21, 36.

[515] Fracfocus.org, Hydraulically Fractured Wells in Alaska, https://fracfocusdata.org/DisclosureSearch/Search.aspx (last visited May 16, 2018).

[516]T. J Gallegos *et al.*, *Hydraulic fracturing water use variability in the United States and potential environmental implications*, 51 WATER RESOUR. RES. 5839 (2015).. RES. 5839 (2015).

[517] LEIS at 13.

[518] *Id.* at 13–14.

activities in the Coastal Plain "has the potential for major adverse effects."[519] The hydrology of the area is also changing rapidly, as the climate changes. Climate change will have varied and complex effects throughout the region and is predicted to particularly affect the coastal areas.[520] BLM must undertake studies of how climate change will act cumulatively and synergistically with water withdrawals in the Refuge throughout the period of potential leased activities.

"Water is the lifeblood of the Arctic National Wildlife Refuge,"[521] and BLM must study how oil and gas development in the Refuge would affect the various species relying on its water sources. While there are similarities in hydrology across the Arctic Coastal Plain,[522] BLM must study the differences and how post-lease activities would affect areas that could be leased. For example, the Sadlerochit Spring region within the Coastal Plain is of particular importance to the region as it has a large discharge and constant temperature, which allows it to support a dense population of microorganisms, fish (such as Arctic char and grayling), birds, and plants that may not be found elsewhere in the region.[523] Muskoxen rely heavily on the availability of water in this area and other riparian areas of the Refuge.[524] Furthermore, there is very little open water available in the winter in the Refuge, and species such as American dippers rely on what little water is available and are restricted to where they can access it.[525] Modifications to surface water flow could also affect caribou habitat.[526] 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.[527]

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[519] *Id.* at 111, 113 ("The dedicated industrial use of the limited natural fresh-water sources of the 1002 area would be a major effect.").

[520] CCP Final EIS at 4-27, 60, 73-78; NPR-A IAP/EIS, Vol. 1 at 142-44.

[521] U.S. Fish & Wildlife Serv., *Water and Water Rights*, https://www.fws.gov/refuge/arctic/water.html (last updated Jan. 14, 2014).

[522] Svetlana L. Stuefer, Recent Extreme Runoff Observations From Coastal Arctic Watersheds in Alaska, AGU Publications (2017)

[523] LEIS at 19.

[524] *Id.* at 26.

[525] *Id.* at 33.

[526] *Id.* at 119.

[527] 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/

Anadromous and fresh-water fish in the Refuge are dependent upon maintenance of water supplies in the region, particularly for their below-ice winter habitat needs.[528] Fish may be killed or trapped if they are swept into reservoirs built to serve these water needs,[529] but there are also risks to fish beyond the direct impacts of the water supply reservoirs. "Overwintering habitat is probably the greatest factor limiting Arctic anadromous and fresh-water fish populations," and the suitability of this habitat depends partly on the volume of the pools in which the fish reside.[530] BLM must also study how oil and gas development could affect beaded streams (which consist of regularly spaced pools connected by narrow channels) in leased areas.[531]

Lastly, BLM must also consider how deconstruction (i.e., thawing) of the ice construction will affect water quantity. Allowing water to melt into different water sources could have impacts on both the originating and receiving sources. Permafrost prevents water from percolating through soil, as it does in many areas,[532] so BLM must study whether and how recharge of depleted water sources would occur.[533]

b. BLM Must Consider Existing Protections and Recommendations for Water Quantity and Water Resources on the Coastal Plain.

There are pending instream flow reservation applications for 152 waters on the Coastal Plain, including 140 lakes and 12 rivers.[534] Maintaining water quantity is one of the ANILCA purposes for the entire Arctic Refuge.[535] The instream flow applications were submitted in the

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[528] CCP Final EIS at 4-73.
[529] *Id.* at 136
[530] *Id.* at 34.
[531] William Morris, Seasonal Movements and Habitat Use of Arctic Grayling (Thymallus arcticus), Burbot (Lota Lota), and Broad Whitefish (Coregonus Nasus) within the fish creek drainage of the National Petroleum Reserve-Alaska, 2001-2002, 50, 52, 57, 60 (2003).
[532] U.S. Fish & Wildlife Serv., *Water and Water Rights*, https://www.fws.gov/refuge/arctic/water.html; CCP Final EIS at 4-38.
[533] *See* CCP Final EIS at 4-38 (noting that water resource data is limited in the Refuge).
[534] U.S. Fish and Wildlife Service, Realty & Natural Resources, Water Resources, Arctic National Wildlife Refuge, *available at*: https://www.fws.gov/alaska/water/arctic_water_rights.htm (last visited April 20, 2018).
[535] ANILCA § 305.

mid-1990s to "protect the habitat, migration, and propagation of fish and wildlife."[536] While the Alaska Department of Natural Resources (DNR) has yet to adjudicate the applications, all applications have priority dates from the 1990s corresponding to the date of their submission.[537] The EIS must acknowledge these applications and address how water quantity resources will be managed consistent with the pending applications and the water quantity purpose of the Refuge.

Finally, the Hulahula River, which runs across the Coastal Plain, was recommended for designation under the Wild and Scenic Rivers Act and inclusion in the National Wild and Scenic River System as a Wild river.[538] "Wild" rivers "denote[] minimal access and development."[539] In assessing the suitability of the Hulahula for designation, FWS stated that "[m]ulti-cultural exchange and contemporary cultural values and uses combine to give the Hulahula River outstandingly remarkable cultural values," that "[t]he Hulahula River has outstandingly remarkable recreational values [] is unique from other rivers in Alaska and those in the NWSRS," that it "offers an unparalleled northern arctic recreational experience," and that it is "one of the most important subsistence rivers on the north side of the Refuge, particularly for fishing and Dall's sheep hunting."[540] The Hulahula was recommended for wild river designation because of its "remarkable recreational values."[541] As the CCP acknowledged, "[u]ntil Congress makes a decision [on the recommendation], under Alternative E the Refuge will maintain the free-flowing condition, water quality, recommended classification (i.e., wild), and the outstandingly remarkable and other values of the [Hulahula] river[]."[542] The BLM must address the recommendation of the Hulahula as a wild river and consider the impacts of any oil and gas development and related activities on the outstandingly remarkable values for which the river was recommended and ensure its proper management.

2. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Air Quality.

The leasing EIS must rigorously assess the significant air quality impacts associated with all phases of an oil and gas development program for the Coastal Plain. An adequate NEPA

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[536] *Id.*
[537] *See* Alaska Constitution, Art. VIII, sec. 13, AS 46.15.040, .050.
[538] CCP ROD at 1, 3, 12; 16 U.S.C. §§ 1271, 1273.
[539] CCP Final EIS, Appendix I at I-2; 16 U.S.C. § 1273(b)(1).
[540] CCP Final EIS Appendix I at 74, 77.
[541] CCP Final EIS, Chapter 3 at 3-56
[542] CCP Final EIS, Chapter 3 at 3-56; *see also* CCP Final EIS, Chapter 3 at 3-3 ("Recommending rivers for inclusion in the NWSRS requires the implementation of management prescriptions intended to protect the rivers' values.").

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 greenhouse gas emissions and climate change impacts associated with all phases of oil and gas development. In order to adequately do so, BLM must perform a quantitative analysis of criteria pollutants — a qualitative analysis is insufficient.

To comply with NEPA, BLM must analyze enforceable mitigation measures to protect air quality. BLM must fully analyze and condition any 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. Reasonable alternatives to eliminate or mitigate exceedances of the NAAQS for NO_x, particulate matter, and ozone, unacceptable health risks from near-field HAPs concentrations, and climate change impacts must include a combination of management of the pace, location, and intensity of development and various control techniques. BLM should also work with stakeholders and commit to regularly updating regional cumulative air quality modeling and analysis.

BLM must also take a hard look at greenhouse gas emissions and climate change impacts associated with all phases of development.[543] Methane is a prime contributor to short-term climate change over the next few decades and a prime target for near-term greenhouse gas reductions.[544] There are many proven technologies and practices available to significantly reduce methane emissions from oil and gas operations. These technologies offer opportunities for significant cost-savings from recovered methane gas and prevent waste of oil and gas resources and associated economic value. Many proven methane emission controls for the oil and gas sector also have the co-benefit of reducing emissions of volatile organic compounds and HAPs.

a. BLM Must Perform a Full-Scale Dispersion Modeling Analysis to Inform Its Evaluation of the Direct, Indirect, and Cumulative Impacts from All Reasonably Foreseeable, Full-Scale Development Scenarios.

Air quality modeling is a necessary tool for assessing future air pollutant impacts under NEPA. Air quality models simulate the physical and chemical processes that affect air pollutants as they disperse and react in the atmosphere. They are used to estimate pollutant concentrations at locations of interest based on inputs that include meteorological data and source-specific parameters, such as emission rates and source characteristics (*e.g.*, location, height, etc.). Air quality modeling is the only way to evaluate how emissions sources will impact air quality aside

[543] *See infra* Part VI.D.
[544] *Id.*

from direct monitoring, which is only able to measure real-time pollution levels at the location of the monitoring device.

BLM must prepare a modeling analysis of the direct, indirect, and cumulative impacts on air quality that could occur under the various alternatives in the leasing EIS considering all phases of oil and gas activities. For each alternative, a comprehensive emissions inventory should be developed and used as input to an air quality dispersion modeling analysis in order to fully assess the impacts on air quality throughout the region from the development of the leased parcels.

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). We encourage BLM 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 the proposed lease sales and subsequent development on Arctic Refuge air quality.

BLM should also 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 Analyses And Mitigation For Federal Oil And Gas Decisions Through The National Environmental Policy Act Process Understanding (Air Quality MOU), signed June 23, 2011. Modeling must be conducted pursuant to the Air Quality MOU between these agencies regarding air quality analyses and mitigation in connection with oil and gas development on Federal lands.

To ensure the professional and scientific integrity of the air quality analysis,[545] BLM should use EPA-preferred models and modeling practices specified in EPA's recently-updated Guideline on Air Quality Models[546] and include the following components:

A Near-Field Modeling Analysis to Assess Localized Criteria Air Pollutant Impacts: BLM must

[545] 40 C.F.R. § 1502.24.
[546] 40 C.F.R. Part 51, Appendix W.

perform a near-field modeling analysis of localized maximum ambient air impacts from the direct and indirect emissions from the development of leased parcels to assess whether the activities allowed under each alternative would exceed the National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD) increments in Class II areas.[547] BLM should assess the development impacts on the exposed population, including the Native Village of Kaktovik. The agency should model the maximum emission rates from sources over the averaging times of the standard for which impacts are being assessed. The modeling analysis should be based on meteorological input data according to EPA's Guideline on Air Quality Models.[548] For the NAAQS analysis, appropriate background concentrations reflective of current air quality in the area should be added to the modeling results.[549]

A Near-Field Modeling Analysis to Assess Localized Hazardous Air Pollutant Impacts: BLM must perform a near-field modeling analysis of localized maximum ambient hazardous air pollutant (HAP) impacts from the direct and indirect emissions from the development of leased parcels to assess whether the activities allowed under each alternative will cause adverse health impacts.[550] The acute reference exposure limits should be used as a comparison for short-term development impacts, and non-cancer reference concentrations for chronic inhalation should be used as a comparison for annual impacts. BLM should also assess long-term cancer risk. BLM should assess these health risks along with the cumulative HAP impacts to the exposed

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[547] Under the Clean Air Act, Class I areas receive the highest degree of protection, with only a small amount of certain kinds of additional air pollution allowed. Mandatory Class I areas were designated by Congress and include international parks, areas in the National Wilderness Preservation System, or national parks larger than 6,000 acres, that were in existence (or authorized) on August 7, 1977. Large national parks and wilderness areas established since 1977, such as most park areas in Alaska, have not been designated subsequently as Class I. The Mollie Beattie Wilderness in the Arctic National Wildlife Refuge was designated in 1980 by ANILCA, so it is not a Mandatory Class I area. CCP Final EIS, Volume 3 (Response to Public Comments) at 3-17. Congress initially designated all other attainment areas as Class II and allowed only a moderate increase in certain air pollutants. The Arctic Refuge overall is designated as a Class II Area. Congress prohibited re-designation of some Class II areas that exceed 10,000 acres to the less protective Class III status. These areas are called Class II floor areas, and the Arctic Refuge's Mollie Beattie Wilderness is a Class II floor area. *Id.*

[548] *See, e.g.*, Section 8.4 of EPA's Guideline on Air Quality Models at 40 C.F.R. Part 51, Appendix W.

[549] *See infra* Part VI.B.2.g; Section 8.3 of EPA's Guideline on Air Quality Models at 40 C.F.R. Part 51, Appendix W.

[550] *See infra* Part VI.C.4.

population, including the Native Village of Kaktovik. BLM's HAP assessment should be a cumulative one, not just an analysis of the incremental risk associated with the proposed action, which would be imposed on top of existing health risks in the area. The HAP assessment should include the full suite of Mobile Source Air Toxics (MSAT), methanol, chlorinated solvents used on-site, carbonyl compounds used in flaring and diesel particulate matter and should include construction activities as well as oil and gas production activities. BLM should also include ultrafine particles (UFPs) in this assessment, which are particulate matter of nanoscale size. Though not regulated by EPA as ambient air pollution particles, UFPs are far smaller than the regulated PM10 and PM2.5 particle classes and are believed to have several more aggressive health implications than those classes of larger particulates.[551]

A Far-Field Modeling Analysis to Assess Air Quality Impacts on Sensitive Class II Areas: BLM must perform a far-field modeling analysis of the impacts from the direct and indirect emissions from the development of the leased parcels to assess whether the specific activities under each alternative would adversely impact air quality in sensitive Class II areas, including the Mollie Beattie Wilderness and the remainder of the Arctic Refuge. The analysis should include all sensitive Class II areas that could be affected by emissions from the proposed lease development. BLM should model the maximum emission rates from sources over the averaging times of the standard for which compliance is being assessed. For visibility impacts, this requires modeling of the maximum 24-hour average emission rates. The modeling analysis should be based on meteorological input data according to EPA's Guideline on Air Quality Models.[552] The far-field analysis should assess the impacts of the alternatives on PSD increments and on air quality related values, including visibility and deposition.

A Cumulative Air Quality Impacts Analysis: BLM must perform a cumulative analysis of air quality impacts that could occur under each alternative. Specifically, the cumulative analysis must include impacts from all existing sources and reasonably foreseeable sources of air emissions that could impact the same area. BLM should model the maximum emission rates from all sources over the averaging times of the standard for which compliance is being assessed. The cumulative modeling analysis should adhere to EPA's Guideline on Air Quality Models,

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[551] Kumar, P., et al, Environment International, Vol. 66, May 2014, 1-10, *available at*: https://www.sciencedirect.com/science/article/pii/S016041201400018X.

[552] *See, e.g.*, Section 8.4 of EPA's Guideline on Air Quality Models at 40 C.F.R. Part 51, Appendix W.

including guidance for modeling ozone and secondarily-formed particulate matter (including $PM_{2.5}$ and PM_{10}).[553]

b. Model Scenarios

Regarding its scenarios, BLM must account for concurrent oil and gas development activities (*e.g.*, construction, drilling, well intervention, and ongoing maintenance activities) in its modeled scenarios. BLM should ensure that the modeling fully accounts for all emissions sources in the year with maximum emissions, making sure to include all oil and gas development and operation activities that will be occurring concurrently. BLM should ensure that the emissions from reasonably foreseeable development sources also reflect the maximum emissions scenarios for each pollutant.

c. Meteorological Data

BLM must also reconcile data gaps in the available meteorological record for the North Slope. In a 2011 report, the Alaska Department of Environmental Conservation concluded:

> The stringent requirements of the meteorological data used in dispersion modeling for regulatory applications result in data gaps in the meteorological record on the North Slope. These gaps are realized in both spatial and temporal contexts. The spatial aspect of these gaps refers to the limited geographic coverage which makes finding representative data in many areas of the North Slope a challenge, while the temporal gaps are primarily associated with the period of record of usable data.[554]

In addressing these gaps, BLM must follow EPA's Guidance on Air Quality Models regarding meteorological input data for the air quality analyses conducted for the leasing EIS.[555] EPA's recommendations for meteorological input data for photochemical grid modeling are contained in the latest version of EPA's Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze.[556] BLM should consult with EPA and the

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[553] *See* Section 5 of EPA's Guideline on Air Quality Models at 40 C.F.R. Part 51, Appendix W.

[554] Alaska Department of Environmental Conservation, *Emissions, Meteorological Data, and Air Pollutant Monitoring for Alaska's North Slope*, pp. 5-7 (2011), *available at* http://dec.alaska.gov/air/ap/NS_Report.html.

[555] *See* Section 8.4 of EPA's Guideline on Air Quality Models at 40 C.F.R. Part 51, Appendix W.

[556] https://www3.epa.gov/scram001/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf.

State regarding the appropriate meteorological data to be used for the leasing EIS and ensure that meteorological data are collected in the communities closest to development. Any data used in the analysis should be reviewed and approved by EPA or the State to ensure the data satisfy EPA guidelines.

d. Emissions Inventory

BLM must ensure that all assumptions regarding operations and control effectiveness which are the basis for the modeling analysis are established as enforceable mitigation measures and implemented through lease and permit stipulations. Otherwise, BLM should model emission sources under maximum possible operating conditions and assuming no controls. The inventory of emissions must be representative of maximum operating scenarios. BLM must provide sufficient detail in the leasing EIS for stakeholders to review and assess the underlying assumptions used in developing the emission inventories.

e. Background Monitoring Data

BLM must fully account for all sources of background air quality to ensure that additional impacts from the anticipated oil and gas development will not cause or contribute to exceedances of the NAAQS and to provide an accurate baseline for purposes of NEPA compliance. BLM should consult with EPA, the State, and the North Slope Borough regarding the appropriate representative background concentrations to be used for the leasing EIS. EPA or the State should review and approve any data used in the analysis to ensure proper collection and quality assurance. BLM should not remove data from the monitoring dataset for exceptional events without making a determination based on relevant EPA criteria and procedures.[557] The background air monitoring data utilized should be made publicly available. BLM should also include in the leasing EIS alternatives enforceable commitments to improve air quality monitoring and data prior to authorization of any leasing or development of the coastal plain.

[557] *See* https://www.epa.gov/air-quality-analysis/treatment-air-quality-data-influenced-exceptional-events.

f. Modeling of Existing Sources

BLM cannot assume that existing sources are accounted for in its background monitoring data. Background monitoring data is limited to providing a historical account of concentrations observed at a fixed location and therefore does not reflect what could potentially occur at another location under maximum operating scenarios from all existing sources in the area and/or under different meteorological conditions. As discussed in EPA's Guideline on Air Quality Models, modeling of existing sources is necessary for sources that are not adequately represented by ambient monitoring data.[558] BLM may not rely on its background monitoring data to reflect existing sources in the region absent a showing that that monitoring data accurately reflects the impacts of existing sources under operating and meteorological conditions that result in maximum concentrations and that the data have been properly collected and quality assured. Instead, BLM must inventory and model existing sources affecting the region for its cumulative effects analysis.

g. Combining Modeled and Monitored Concentrations in a NAAQS Analysis

In combining modeled and monitored concentrations in a NAAQS analysis, BLM must utilize methods that ensure exceedances will not occur in the future. For example, pairing of monitored and modeled data, in time — as opposed to adding a single representative background concentration to the modeled design value concentration — should only be used in very limited situations, with adequate justification, and according to EPA guidance.[559]

h. BLM Must Assure the Prevention of Significant Deterioration of Air Quality.

Further, as required by the Clean Air Act, BLM must complete a proper PSD increment analysis to determine how much of the available increments have already been consumed in the affected area and how much additional increment is available for consumption from all phases of an oil and gas development program for the coastal plain. This should include an analysis of all increment consuming and increment expanding sources that impact the area, including an inventory of increment-affecting emissions. An approach that compares modeled project impacts to Class II PSD increments would be insufficient because it would only show how much of the

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[558] *See* Section 8.3 of 40 C.F.R. Part 51, Appendix W.

[559] *See, e.g.*, March 1, 2011 EPA Memo Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, p. 17.

available PSD increments are consumed by the predicted modeled concentrations from oil and gas development sources and therefore not ensure that air quality will not deteriorate more than is allowed under the Clean Air Act.

3. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Wilderness Values and Designated Wilderness.

Both existing and potential future designated Wilderness are resources and values of the Arctic National Wildlife Refuge which must be addressed in the EIS. Specifically, the EIS must fully analyze all reasonably foreseeable direct, indirect, and cumulative impacts to the Refuge's existing and recommended Wilderness resource associated with all phases of an oil and gas program, including leasing, exploration and development.

The Arctic Refuge is distinctive among refuges— it was established specifically to preserve wilderness values. As outlined above, the Arctic Refuge and Coastal Plain have exceptional wilderness values.[560] The Coastal Plain in particular 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 Caribou Herd, 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 contains outstanding wilderness and wildlife 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."[561] The definition does not require a pristine area with no evidence of human activities. Rather, an area must appear substantially natural to the average visitor, and human imprints cannot dominate.

When Congress passed ANILCA, section 1002 set out to:

> . . . provide for a comprehensive and continuing inventory and assessment of the fish and wildlife resources of the coastal plain of the Arctic National Wildlife Refuge; an analysis of the impacts of oil and gas exploration, development, and production, and to authorize

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[560] *See supra* Part II, VI.B.3.
[561] 16 U.C.S. § 1131(c).

> exploratory activity within the coastal plain in a manner that avoids significant adverse effects on the fish and wildlife and other resources.

The resulting studies done under section 1002 of ANILCA documented the outstanding wilderness and wildlife values of the Refuge's Coastal Plain, demonstrating that the Coastal Plain is an extraordinary wilderness enclave and vital wildlife sanctuary. [562]

The wilderness values of the refuge were further documented and underscored in the 2015 CCP. The CCP identified the Refuge's wilderness characteristics as among it's "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.[563]

In the final decision 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."[564] According to FWS, the Coastal Plain has exceptional wilderness characteristics and values.[565] The majority of the Refuge lands added by ANILCA (south of the then-Arctic National Wildlife Range) are also recommended for Wilderness designation because of their exceptional wilderness values.[566] The EIS must consider the impact of oil and gas on the wilderness characteristics and values of the Coastal Plain and ensure protection of those values. The EIS should also consider whether there will be any impacts to the

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[562] In April 1987, Secretary of the Interior, Donald Hodel, disregarded what the studies showed and forwarded the Final LEIS and Arctic National Wildlife Refuge Coastal Plain Resource Assessment to Congress, with a recommendation that Congress authorize full-scale oil and gas leasing for the entire 1.5 million acres of the Coastal Plain. This recommendation ignored the fact that the assessment itself confirmed the internationally significant wilderness and wildlife values of the coastal plain.

[563] CCP Final EIS, Chapter 1 at 1-23.

[564] CCP ROD at 12.

[565] CCP Final EIS, Appendix H at H-12.

[566] CCP Final EIS, Appendix H at H-9, H-11.

wilderness values of the ANILCA-added southern areas and consider how best to protect the values in that area as well.

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.[567] This area is "the largest, wildest, and most diverse Wilderness in the National Wildlife Refuge System."[568] Wilderness enjoys our nation's strongest protections. Under the Wilderness Act, Wilderness areas must be:

> administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness. . . [569]

Additionally, the Wilderness Act mandates that:

> each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this chapter, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.[570]

To comply with the mandates under the Wilderness Act and ANILCA, the EIS must consider the impacts of any oil and gas activities in the Coastal Plain on the designated Wilderness within the Arctic Refuge. 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.

Adverse impacts to wilderness characteristics from oil and gas exploration, leasing, and development include but are not limited to:

- Roads and infrastructure affecting the areas' roadlessness;

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[567] ANILCA § 702(3).
[568] CCP Final EIS, Chapter 4 at 4-15.
[569] 16 U.S.C. § 1131(a).
[570] 16 U.S.C. 1133(b).

- The sights and sounds associated with exploration and development activities and associated infrastructure degrading opportunities for solitude and primitive recreation and the apparent naturalness of the area; and
- Exploration and development activities degrading air and water quality, wildlife habitat, and other ecological, scientific, scenic, and historical values.

a. Wilderness Stewardship

The 2015 Record of Decision for the CCP was finalized prior to passage of the 2017 Tax Act, and BLM must address in the EIS how the agency intends to resolve the discrepancies between the two. The Tax Act does not render the original purposes of the Refuge irrelevant; nor does it render the management direction and implications resulting from the final CCP irrelevant. Wilderness stewardship is a critical part of national wildlife refuge and ecosystem management and should be addressed as the BLM analyzes leasing, exploration and development impacts in the EIS. The EIS should address how the BLM and FWS intends to meet wilderness management and stewardship directives resulting from the CCP:[571]

Allow natural processes to operate freely within Wilderness. Wilderness stewardship and management requires uses to minimize impacts to wilderness values. In Wilderness, the natural forces of insects, disease, wildfire, wind, and wildlife are the overarching managers, though exceptions to this may be made in order to protect communities, life and property particularly in the event of fire.

Manage Wilderness as a distinct resource with inseparable parts. BLM will need to address the integrity of the whole Wilderness area, making management decisions that are mindful of what impact decisions could have on Wilderness. The ecoregion or ecosystem context of a Wilderness also needs to be addressed to determine what decisions are being made outside of the Wilderness that could affect or impact it.

Set carrying capacities to prevent unnatural change. Wilderness has a limited capacity to absorb the impacts of use and still retain its wilderness qualities. BLM should address how the

[571] These wilderness stewardship points have been adapted from the publications: National Park Service, Keeping it Wild in the National Park Service: A User Guide to Integrating Wilderness Character into Park Planning, Management, and Monitoring (2014), *available at* https://www.fs.fed.us/rm/pubs_other/rmrs_2014_landres_p001.pdf and Chad P. Dawson and John C. Hendee, Wilderness Management: Stewardship and Protection of Resources and Values (4th ed. 2009).

agency will work within the Limits of Acceptable Change framework to protect the wilderness character of the Arctic Refuge.

Monitor the social and ecological conditions of the area as a key to long-term Wilderness stewardship. Only through sound research and monitoring can the BLM identify baseline conditions and determine whether management objectives have been met.

Control and reduce the adverse impacts of human use in wilderness through education or minimum regulation. Wilderness management is not passive; it is very active, but it should be designed to be as unobtrusive as possible. The BLM should address temporal or spatial permitting or zoning of Wilderness in very high use areas to protect the quality of the visitor experience. However, when use levels threaten the wilderness resource, then BLM must limit uses to protect the Wilderness.

4. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Soils and Permafrost.

Numerous factors contribute to permafrost impact, including infrastructure, roads, a warming climate, and human activity including seismic work. Melting permafrost is creating an increasingly thermokarst landscape in the Arctic and the Arctic Refuge has particularly ice-rich soils. BLM should analyze coastal plain vegetation and soils and their disturbance and recovery patterns from past, present and future activities including seismic surveys and associated activities, vehicle activity, ice infrastructure, gravel structures, ports, oil and gas wells, air pollution, gravel mine and water reservoir sites, dust from gravel roads, spills and contaminants, abandonment and reclamation work, climate change and permafrost melt. In order to properly consider the exploration and development impacts and mitigation opportunities for these resources, the agency should conduct a fine-scale analysis of soils and permafrost, with analysis of different development scenarios.

5. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Soundscapes.

Soundscapes are a public land resource affected by agency-authorized uses such as oil and gas development, with corresponding impacts on other resources including wildlife, wilderness, and recreation. The final EIS for the Arctic Refuge CCP recognizes this:

> 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.[572]

As FWS recognizes, preservation of natural soundscapes is an important component of achieving the Refuge's purposes of conserving wildlife, habitat, wilderness, and recreation.

Noise can affect the physiology, behavior, and spatial distribution of wildlife. While impacts vary by species and habitat, studies have shown that anthropogenic noise, including from oil and gas development, can impact species in ways crucial to survival and reproductive success.[573] For instance, as described in detail above, marine mammals are particularly sensitive to noise impacts.[574]

Noise also affects caribou. Experiments testing the response of wild woodland caribou to simulated seismic exploration found that caribou responded to noise disturbance by increasing movement rates, displacement distances, and energy expenditure, though effects were relatively short-lived.[575] A study of response to simulated drilling noise by white tailed deer found that deer avoided areas near loud noise sources but did not increase their home range sizes or movement rates relative to control animals.[576] BLM must carefully evaluate the impacts of noise from fixed-wing aircraft and helicopters on caribou. A variety of studies have also shown that caribou respond to aircraft overflights, with cows with young calves reacting most strongly, especially during calving and post-calving seasons.[577] Alaska Native communities have long voiced concerns regarding the effects of aircraft noise and activity on caribou, given corresponding impacts to subsistence.[578]

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[572] CCP Final EIS 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)).

[573] *E.g.*, Keyel et al. 2017 (in press); Shannon et al. 2016; Barber et al. 2009.

[574] *See supra* Part VI.A.6.a.

[575] Bradshaw et al. 1997, 1998.

[576] Drolet et al. 2016.

[577] Calef et al. 1976; Maier et al. 1998; Wolfe et al. 2000.

[578] *E.g.*, Georgette and Loon 1988; Halas 2015.

Noise from all stages of industrial activity can also 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.[579] The EIS should catalogue 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.

Anthropogenic noise also has significant impacts on recreationists who visit natural areas like the Refuge to escape non-natural noises and attain a sense of solitude and tranquility. Studies have found that anthropogenic noise interferes with the quality of the visitor experience and even impacts the perceived visual and aesthetic qualities of the landscape.[580] Non-natural noise degrades wilderness characteristics, including apparent naturalness and opportunities for solitude.[581]

BLM must take a hard look at these and other reasonably foreseeable impacts of oil and gas leasing and development to the natural soundscape of the coastal plain. Indeed, BLM Manual 7300.06D requires the agency to consider noise and its potential impacts on public lands during planning and project authorizations:

> When BLM programs, projects, and/or use authorizations have the potential to affect existing resources that may be sensitive to noise such as public health and safety, wildlife, heritage resources, wilderness, wildland/urban interface areas, and other special value areas . . . , BLM will consider noise and its potential impacts on the public and the environment, as well as any appropriate mitigation measures, during the planning and authorization review process.

Courts have affirmed the responsibility of federal land management agencies to evaluate noise impacts on the natural soundscape, including in the context of authorizing oil and gas

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[579] Clinton D. Francis and Jessica L. Blickley, *The influence of Anthropogenic Noise on Birds and Bird Studies*, 74 Ornithological Monographs 6 (2012), *available at*: http://americanornithologypubs.org/doi/pdf/10.1525/om.2012.74.1.6?code=coop-site.

[580] *E.g.*, Mace 1999.

[581] *See* 16 U.S.C. § 1131(c).

development or other noise-producing activities that could impact wildlife, wilderness, or recreation.[582]

BLM must utilize acoustic modeling to fully analyze the impacts of each alternative on the natural soundscape of the Coastal Plain and the resources that would be affected by anthropogenic noise associated with oil and gas development. This will require accurate data on background ambient noise levels to establish the necessary baseline. Methods for obtaining this data could be adapted from other acoustic studies in northern Alaska.[583] The 2010 study conducted in conjunction with the proposed Point Thomson Development Project that measured ambient noise levels at six locations adjacent to the northwestern border of the Refuge is inadequate to provide an accurate baseline for modeling and analysis of reasonably foreseeable noise impacts associated with developing an oil and gas program for the coastal plain.[584] That study focused on areas adjacent to the Refuge that are affected by noise associated with nearby oil production and associated industrial sites; it did not measure ambient noise levels within and throughout the coastal plain.[585] Nevertheless, the study documented that natural ambient sound levels even along the northwestern boundary of the Refuge are low, with sounds from insects, animals, water features, and other natural sources dominating the soundscape.[586] Presumably baseline noise levels within and throughout the coastal plain will be even lower, though may be affected by existing aircraft activity throughout the region.

After gathering sufficient baseline soundscape data, BLM must conduct a proper noise impact study, including acoustic modeling of all development scenarios. Various models and methodologies that constitute the best available scientific information are available for purposes of conducting soundscape modeling. Based on the results of the modeling, 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. BLM also must fully analyze the reasonably foreseeable acoustic impacts on the Refuge's wilderness resources and on recreationists' experiences. The agency must consider and fully

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[582] *See, e.g., S. Utah Wilderness Alliance v. U.S. Dep't of Interior*, No. 2:13-cv-01060-EJF, 2016 U.S. Dist. LEXIS 140624, *20–*24 (Oct. 3, 2016); *Izaak Walton League of Am. v. Kimbell*, 516 F. Supp. 2d 982, 995–97 (D. Minn. 2007).

[583] Betchkal 2015; Stinchcomb 2017.

[584] *See* CCP Final EIS at 4-44 (describing 2010 study).

[585] *Id.*

[586] *Id.*

analyze all options for avoiding, minimizing, and mitigating adverse impacts to natural soundscapes.

6. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Coastal and Marine Areas, Including Marine Protected Areas.

An oil and gas program in the planning area could potentially connect to marine and coastal areas by way of infrastructure, water use and hydrology, and vessel traffic. In order to analyze these activities, the agency will need to present a thorough documentation and analysis of coastal and marine hydrology during different seasons, coastal and underwater geology, characteristics of sea ice coverage and movement, coastal and marine currents along the mainland and between nearby barrier islands, and the physical and chemical characteristics of marine and coastal zones. The agency must also address threats and rules applicable to the Marine Protected Area within the boundaries of the Arctic National Wildlife Refuge.[587]

7. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Tundra and Vegetation.

Oil and gas operations have the potential to cause considerable impacts to tundra and vegetation; the EIS must fully consider the impacts to these resources. The Coastal Plain is comprised of gently rolling terrain, with tussocks, shrubs, and graminoids.[588] Riparian and flood plains support willows and related plant communities.[589] Because of the climate and soil conditions, the vegetation is generally slow-growing and "very sensitive to disturbance."[590] The occurrence and distribution of plants is already being affected by climate change, and continued effects are likely. The distribution and availability of various vegetation is very important for the wildlife that rely on it at critical stages of its life cycle, like calving, migration, and staging.

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[587] *See* CCP Final EIS at 4-13 ("In 2005, all marine waters located within Refuge boundaries were nominated as part of the National Marine Protected Area System. Currently, approximately 91,000 acres of marine waters and lagoons located off the northern coast of the Refuge are a designated marine protected area (MPA)."

[588] 2002 USGS Report at 2.

[589] 2002 USGS at 2.

[590] Janet C. Jorgenson, *et al*. Long-term recovery patterns of arctic tundra after winter seismic exploration, *Ecological Applications* 20(1) at 205 (2010).

Inventory and mapping of vegetation at a sufficient level to evaluate impacts and inform avoidance areas, stipulations, mitigation measures, and reclamation standards is lacking for the Coastal Plain.[591] A change in plant occurrence can have significant impacts on wildlife that is dependent on the vegetation for forage and habitat.[592] Climate change and disturbance also bring the threat of invasive species.[593] BLM must gather updated information about tundra and vegetation cover in order to evaluate the impacts from oil and gas.[594] The EIS must include information about the impacts from oil and gas activities to tundra and vegetation and also consider how to protect vegetation from direct, indirect and cumulative impacts. Oil and gas is known to have long-term and significant direct impacts to tundra and vegetation — the impacts to the tundra and vegetation from seismic that occurred in the mid-1980s is still visible today[595] — and activities have the ability to have indirect effects as well, like the introduction of invasive species. The EIS must account for these impacts and address how best to avoid and reduce them.

The EIS must also address reclamation of tundra and vegetation from the impacts of any oil and gas activities. Reclamation in the Arctic is very challenging, and its takes decades for areas to recover, if they ever do.[596] The EIS must consider reclamation and address the challenges and feasibility of reclaiming areas impacted by oil and gas activities.

C. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Social Systems and Uses.

1. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Subsistence Uses and Resources.[597]

Six communities (Arctic Village, Chalkyitsik, Fort Yukon, Kaktovik, Venetie, and Wiseman) are in or relatively close to Arctic Refuge and use the Refuge for subsistence purposes.[598] In addition, the following communities have geographic or cultural ties to Arctic Refuge and its subsistence resources: Beaver, Circle, Birch Creek, and Stevens Village in

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[591] CCP Final EIS at 4-45–4-53; 2002 USGS at 4; 2018 USGS Report at 3.
[592] CCP Final EIS at 4-59.
[593] CCP Final EIS at 4-58–4-59.
[594] *See also infra* Part V.F.
[595] *See* Jorgenson, *et al.*, *infra* Note 588.
[596] 2003 NRC Report at 158.
[597] *See also infra* Part VII.
[598] CCP Final EIS, Chapter 4 at 4-174.

Alaska, and Old Crow, Fort McPherson, Tsiigehtchic, Aklavik, and Inuvik in Canada.[599] These communities have a "mixed subsistence-market" economy, combining subsistence and commercial-wage activities. Subsistence is a way of life that involves the harvest, preparation, sharing, and consumption of wild resources for food and other culturally important purposes. In rural Alaska that includes hunting, fishing, and gathering activities, which are vital to the preservation of communities and their culture.[600] Subsistence resources have pronounced health, economic, cultural, and spiritual importance in the lives of rural Alaskans.[601]

Subsistence use areas vary among communities that utilize the resources of the Arctic Refuge, and seasonally within communities. In Arctic Village, for example, residents vary their activities between fishing, berry-picking, and harvesting waterfowl throughout the summer, to hunting migrating caribou in the fall into the winter, to ice fishing and fur trapping throughout the winter until spring.[602] By contrast, subsistence harvest studies for Kaktovik in 1995 indicated that 61% of the subsistence harvest (in edible pounds of food) were from marine mammals.[603]

BLM should not consider allowing any oil and gas activities on the Coastal Plain until sufficient baseline data is collected and meaningful studies completed on how such activities would impact subsistence resources and practices, including the harvest, preparation, sharing, and consumption of wild foods and materials. Such studies should include current, geographically specific data and document the types of resources, percent of harvest (for caribou), percent of harvesters, timing of activities, and method of transportation for hunters within the study area. We note that such caribou studies are typically done in a ten-year time frames. There is a roughly 12 year data gap since completion of the most recent Kaktovik 10-year study (1996/97-2005/06) of caribou hunting areas as reported by Kaktovik residents.[604] BLM cannot adequately evaluate impacts to caribou without completing further studies.

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[599] *Id*.
[600] *Id*. at 4-172 (quoting Alaska Federation of Natives (2005)).
[601] *Id*.
[602] *Id*. at 4-178.
[603] *Id*. at 4-196.
[604] *See* Stephen R. Braund & Associates, Subsistence Mapping Of Nuiqsut, Kaktovik, And Barrow (2010), 135–43, *available at*: http://www.north-slope.org/assets/images/uploads/Braund%202010%20Beaufort%20maps%20MMS_MP_Final_Report_Apr2010.pdf

Furthermore, how development will impact subsistence's connection to residents' human health, economic circumstances, environmental justice, and sociocultural systems should be analyzed.

Researchers must work with communities to ensure this information is collected in an unobtrusive manner, and must include traditional knowledge in its baseline analysis. BLM should also carefully consider data and findings identified in other relevant NEPA analyses, such as the CCP Final EIS and ROD and the Point Thompson Final EIS.[605]

BLM must identify and fully evaluate all potential impacts to subsistence resources, taking a broad geographic and temporal scope. BLM must consider impacts to subsistence from all phases of oil and gas activities, from seismic exploration to development and transportation (for example, barging impacts). BLM should consider impacts associated with construction and operation of project facilities, vessel, vehicle, and aircraft traffic, and all potential infrastructure. Impacts will vary by season, and may last for multiple generations. These impacts must be accounted for.

Subsistence practices that could be particularly affected by oil and gas development include caribou, bird, and small mammal hunting, as well as fishing. Primary impacts to subsistence will likely be caused by reduced availability of subsistence resources, reduced access to subsistence use areas, and hunter avoidance of industrial areas. Though potential impacts to wildlife resources may be identified as minimal, changes in resource access and availability, including perceived changes in fish and wildlife health due to development, may affect subsistence.[606] This is because subsistence users generally rely on healthy subsistence resources being present in traditional use areas, and some harvesters are often limited in their ability to access resources beyond traditional use areas at the expected time of year.[607] Further, any impacts from development will likely be exacerbated by climate change effects which are already being felt in the Arctic and must be fully evaluated.

2. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Social and Cultural Systems.

BLM must acknowledge and evaluate the impact of oil and gas development on the social and cultural systems to nearby communities. Several factors related to oil and gas activities are

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[605] U.S. Army Corps of Engineers, Alaska District, Point Thomson Project Final Environmental Impact Statement (July 2012).

[606] Point Thompson EIS, vol. 3 at 5-602.

[607] *Id.*

likely to affect socio-cultural systems, as has been demonstrated by communities in the western Arctic that are dealing with oil and gas development. As described above, development would likely cause disruptions to subsistence activities and uses. Subsistence activities are critically important to the cultural identity and social cohesion of the Gwich'in. Disruption of subsistence activities may affect social and kinship ties, many of which are based upon the harvesting, processing, distribution, and consumption of subsistence resources.

Development may also cause increased or variable income among households, such as those that include any ASRC or other ANCSA corporation shareholders or employable individuals versus those households that do not. In addition to the potential for increased tensions within the community due to income disparities, there may also be increased social and political tensions between different population sectors and community institutions that either support or oppose development. Potential new oil and gas development increases the likelihood for such disagreements within the community to occur, thus affecting social cohesion.

BLM must evaluate impacts to local communities from an influx of non-Native residents not associated with existing community, non-resident temporary workers (e.g., oil industry workers), and increased interaction between residents and non-resident workers. This includes research crews, as well as personnel associated with oil and gas permitting processes. BLM must also consider the stress of this and other necessary permitting processes and associated public meetings. BLM should also conduct a social impacts assessment as part of the EIS process.

3. BLM Must Analyze and Fully Disclose the Environmental Justice Impacts of an Oil and Gas Program.

Executive Order No. 12898, issued by President Clinton 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."

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.[608] 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."[609] Oil and gas development activities could result in the gradual loss, decline, or change in subsistence resources upon which local low-income and minority residents depend. This would place a disproportionate weight of any adverse effects on low-income and/or minority populations.

BLM must give affected communities opportunities to provide input into the environmental review process. However, it is likely that the potential impacts to subsistence resources by displacement and impacts to access by subsistence users will raise significant Environmental Justice issues. BLM must carefully consider these impacts in a transparent and meaningful manner in this NEPA process.

4. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Public Health.

The BLM must thoroughly analyze in the leasing EIS how all phases of an oil and gas leasing program will impact the health[610] of the region's residents. This analysis should include Kaktovik and all Alaskan and Canadian communities that are connected to the Coastal Plain through ecological and social systems, like the Porcupine Caribou Herd. Arctic Village, Fort Yukon, Venetie, Chalkyitsik, Beaver, and Canadian villages such as Old Crow and Fort McPherson should be formally identified within the EIS as potentially affected communities (PACs).

To adequately analyze human health impacts, BLM must complete a thorough Health Impact Assessment (HIA).[611] HIAs are an internationally used preventative health tool that anticipates the human health impacts of new or existing development projects, programs, or policies. The overall goal of this type of assessment is to identify and minimize negative health

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[608] CCP Final EIS, Chapter 5, at 5-121.

[609] *Id*.

[610] Health, as defined by the World Health Organization, is the "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." *See* http://www.who.int/about/mission/en/

[611] See: Lock, K. (2000). Health impact assessment. *British Medical Journal*, 320 (7246), 1395.

effects of a particular action. This type of analysis has an established framework and methodology that will allow BLM to take a hard look at the health impacts of various leasing alternatives and compare them to the no action alternative.[612] This analysis should focus on how oil leasing, exploration, construction, operation, and the cumulative effects of development will expose residents to health risks, as well as how direct and indirect determinants that positively contribute to health may be compromised by development-related activities. Feedbacks of health outcomes and responses should also be considered.

Updated health data will be needed to complete a comprehensive HIA, which must not be foregone in favor of BLM's arbitrary timeframe to complete its NEPA process within one year. The HIA should be integrated into the EIS, or released as a stand-alone document for public comment at the same time as the Draft EIS. Allowing public review and comment on the HIA is critically important to ensure the process is transparent and that the document fully analyzes the health concerns raised by the public and local communities.

BLM's HIA should include, but not necessarily be limited to, the following specific elements:

Baseline Conditions When analyzing the effects of an action or actions on human health, comprehensive baseline data is essential. Baseline data allows public health experts to understand pre-development conditions and potential future trends associated with how proposed actions on the landscape and/or within communities may change health outcomes for particular populations.

BLM should consider not allowing any oil and gas activities on the Coastal Plain until all necessary studies are completed and comprehensive baseline data is collected. BLM's failure to comprehensively establish a baseline for PACs would irreversibly compromise how oil development's health impacts are studied and fully understood. Baseline studies 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, as described below.[613]

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[612] See: Technical Guidance for Health Impact Assessment in Alaska at: http://dhss.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf.

[613] *See infra* Part VI.C.1 and *supra* Part VII.

BLM should also reach out to PACs to gather data on which to base the HIA. Additionally, BLM should survey and relate the experiences of communities in Alaska, like Nuiqsut, that are near oil activities to inform the bases for this HIA.

Subsistence and Human Health While ecosystems are a foundational determinant of the public's health and wellness everywhere, in Alaska's subsistence-based and largely indigenous communities this connection is particularly important.[614] When analyzing human health, BLM must comprehensively examine how oil and gas development will impact the numerous health benefits that subsistence resources and practices provide to regional residents. These benefits, which are discussed in greater detail below, include food security and nutrition, social networks, and mental health.

Food Security and Nutrition BLM must consider how a Coastal Plain leasing program will impact regional residents' food security.[615] All three pillars of food security should be examined: food availability, food access, and food use.[616] Within each of these pillars, attention should be given to the importance of nutrition and traditional foods. Relatedly, the HIA must examine how oil and gas activities will impact the harvest, preparation, sharing, and consumption of wild resources through the lens of dietary change. Specifically, the HIA should address how oil development will lead to changes in diet for regional residents.

Social Networks Social networks contribute significantly to human health outcomes.[617] The HIA must analyze how changes to the harvesting, preparing, sharing, and consumption of wild

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[614] See: 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.

[615] 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.

[616] See: World Health Organization. (2014). Trade, Foreign Policy, Diplomacy, and Health: Food Security, *available at:*
at: http://www.who.int/trade/glossary/story028/en/.

[617] *See* Smith, K.P. and Christakis, N.A. (2003). Social Networks and Health. *The Annual Review of Sociology*, 34: 405-429.

resources will impact social networks and community structure within PACs.[618] How these networks may change and how these alterations will impact residents' health must be considered and described.

Mental Health The act of procuring and providing traditional subsistence resources has positive psychological health benefits at the individual and community level. How an oil development program may disrupt traditional practices, cultural identity, and mental health should be analyzed.[619] Moreover, the anxiety and stress of development should also be considered. Here, BLM should examine how development will impact relationships, including sociocultural and socioeconomic systems relationships to mental health.

Risk of Harm and Injury In the case of Nuiqsut, the disturbances of oil development are forcing hunters to travel further from their community to access caribou and other subsistence resources.[620] This increased travel increases the risk of harm and injury because hunters must travel longer distances and have an increased exposure to harsh and often dangerous conditions. BLM should complete a risk assessment for subsistence practices affected by development.

Climate Change The HIA should address the cumulative impact that oil activities may have on human health when combined with the impacts of climate change. Specifically, BLM must consider how climate change affects the social and environmental determinants of health within the region for PACs.[621] This analysis should include, but not be limited to, mental health, air quality, impacts to subsistence resources and practices, and food security. Ongoing and reasonably foreseeable climate change impacts and stressors must be integrated into BLM's baseline and across all alternatives.

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[618] *See* Kofinas, Gary, Shauna B. BurnSilver, James Magdanz, Rhian Stotts, and Marcy Okada (2016), Subsistence Sharing Networks and Cooperation: Kaktovik, Wainwright, and Venetie, Alaska. BOEM Report 2015-023DOI; AFES Report MP 2015-02. School of Natural Resources and Extension, University of Alaska Fairbanks.

[619] See: McGrath-Hanna, N.K. et al. (2003). Diet and Mental Health in the Arctic: Is Diet an Important Risk Factor for Mental Health in Circumpolar Peoples? – Review. *International Journal of Circumpolar Health*, 63(3): 228-241.

[620] *See* Final Supplemental Environmental Impact Statement for the Greater Mooses Tooth One development project (2014).

[621] *See* Assessment of the Potential Health Impacts of Climate Change in Alaska at: http://www.epi.alaska.gov/bulletins/docs/rr2018_01.pdf

5. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Recreation and Aesthetic Uses.

The Arctic National Wildlife Range was originally designated to "preserv[e the] unique wildlife, wilderness and recreational values" of the area.[622] These original purposes still apply and require DOI to preserve the Refuge's wilderness character, including opportunities for adventure, discovery, and the experience of solitude, isolation and unconfined recreation. Coupled with the additional purposes added by ANILCA, DOI is required to preserve wildlife, wilderness, and recreational values throughout the coastal plain of the Arctic Refuge.

The leasing EIS must fully analyze how oil and gas leasing will affect the visitor experience, recreational opportunities, and the unique wilderness-dependent recreational values that currently exist throughout the Refuge — both in and adjacent to the Coastal Plain. BLM must analyze how any foreseeable changes to the condition of the Coastal Plain and the untrammeled nature of the adjacent designated Wilderness associated with all phases of an oil and gas program will affect the visitor experience and the unique recreation values of the Refuge. This includes direct, indirect, and cumulative impacts to the resources that dictate the recreational experience of Refuge visitors, including but not limited to: viewsheds and aesthetics, soundscapes, air and water quality, wildlife, designated and recommended Wilderness, Wild River nominations and designations, wildness of rivers, watersheds, soils and vegetation, and other wilderness characteristics. BLM must also analyze economic impacts associated with degradation of recreational uses and experiences.

To ensure an adequate baseline for analysis, BLM must compile accurate and up-to-date visitor use and recreation data, along with associated economic benefits. BLM also must address how it will monitor and respond to changes to recreation and the visitor experience.

6. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program on Archeological and Cultural Resources.

BLM must take a hard look at the impacts on archeological and cultural resources in the EIS. Inventory and consultation under section 106 of the National Historic Preservation Act of

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[622] PLO 2214 at 1.

1966 (NHPA)[623] is necessary to inform the required NEPA analysis. Section 106 requires Federal agencies to consider the effects of their decisions on historic properties. The responsible Federal agency first determines whether the action it is undertaking or authorizing may affect historic properties. Historic properties are properties that are included in the National Register of Historic Places, or that meet the criteria specified in the National Register's Criteria for Evaluation.[624] If the agency action may impact historic properties, it must consult with the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO). The NHPA's implementing regulations[625] govern the Section 106 process and outlines how Federal agencies engage in consultation, identify historic properties, determine whether and how such properties may be affected, and resolve adverse effects. BLM must allow the SHPO and the Advisory Council on Historic Preservation, a Federal agency, to comment on these proposed activities.

In the Final EIS and CCP for the Arctic Refuge, FWS made it a priority to prepare an Integrated Cultural Resource Management Plan (ICRMP) to improve conservation of cultural resources and provide guidance for cultural resource management on Refuge lands.[626] Only limited areas of the Refuge have been systematically studied for cultural resources, leaving the vast majority of lands unknown to archaeologists.[627] The potential to discover unknown sites is high in the Arctic Refuge. BLM must conduct a survey of the Coastal Plain prior to authorizing any oil and gas activities.

As part of these cultural resource inventories, BLM should consider places eligible for listing in the National Register of Historic Places. Property is eligible for inclusion in the Register if it meets criteria specified in the National Register's Criteria for Evaluation ("Criteria"). The NHPA requires agencies to ensure that properties listed or eligible to be listed on the National Historic Register are preserved to maintain their historic, archaeological, architectural, and cultural values.[628] Thus, BLM must identify historic properties in consultation

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[623] 54 U.S.C. § 306108.
[624] 36 C.F.R. § 60.4.
[625] 36 C.F.R. part 800 (Protection of Historic Properties).
[626] CCP Final EIS, Chapter 2 at 2-28.
[627] *Id*. at 2-29.
[628] 54 U.S.C. §306102(b)(2).

with the Alaska SHPO and consider whether such properties are eligible for inclusion on the National Register of Historic Places.

Oil and gas leasing activities in the Arctic Refuge have the potential to affect historic places, due to ground disturbing activities such as seismic exploration, drilling, and excavation of gravel for construction of permanent facilities.[629] BLM must, therefore, consult with the Alaska SHPO and tribes as part of this process and fully comply with the requirements in the NHPA's implementing regulations to determine how proposed activities could impact cultural resources listed on, or eligible for inclusion in, the National Register of Historic Places. BLM must also evaluate the impacts of an oil and gas program on all cultural and archeological resources.

D. BLM MUST ANALYZE AND FULLY DISCLOSE THE CONTRIBUTIONS OF THE OIL AND GAS PROGRAM TO GLOBAL CLIMATE CHANGE AND THE IMPACTS OF CLIMATE CHANGE ON THE ARCTIC REFUGE.

Oil and gas leasing in the Arctic Refuge is incommensurate with staying within the United States' and global carbon budgets necessary for avoiding the worst impacts of climate change to natural and human communities. The EIS must fully account for the greenhouse gases that will be emitted as a result of Refuge drilling and analyze their climate consequences. The EIS must also analyze the ongoing impacts to Refuge resources and values from climate change and how those harms will act cumulatively and synergistically with the effects of fossil fuel development.

1. Fossil Fuel Extraction from the Refuge Is Not Compatible with Staying Within the United States' and Global Carbon Budgets Necessary for Avoiding the Worst Impacts of Climate Change.

The United States has committed to climate change targets that require the nation to steadily decrease greenhouse gas emissions. Under the Paris Agreement,[630] which the United

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[629] *See* BLM NPR-A Final IAP/EIS, Vol. 4, 98-102 (discussion of oil and gas exploration and development activities which may impact paleontological resources).

[630] 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, (Dec. 12, 2015) (Paris Agreement). On December 12, 2015, 197 nation-state and supra-national organization parties meeting in Paris at the 2015 United Nations Framework Convention on

States signed on April 22, 2016, as a legally binding instrument through executive agreement,[631] the United States committed to holding the 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."[632] The Agreement requires a "well below 2°C" climate target because 2°C of warming is no longer considered a safe guardrail for avoiding catastrophic climate impacts and runaway climate change.[633] Under the Agreement, the U.S. Nationally Determined Contribution is to reduce net greenhouse gas emissions by 26 to 28 percent below 2005 levels by 2025.[634] Although President Trump has announced his intent to withdraw the United States from the Paris Agreement, that process will take four years and could be overridden in the next presidential election. Moreover, the Paris Agreement represents the international consensus to address greenhouse gas emissions; it remains a relevant consideration in determining our nation's energy needs. Independent of the Paris Agreement, the United States in 2009 set a long-term goal of reducing emissions by 83 percent below 2005 levels by 2050.[635]

United States greenhouse gas commitments are not compatible with authorizing new fossil fuel extraction on federal land or waters in frontier areas such as the Arctic Refuge. According to the Intergovernmental Panel on Climate Change, total cumulative anthropogenic emissions of CO_2 must remain below about 1,000 gigatonnes ($GtCO_2$) from 2011 onward for a 66 percent probability of limiting warming to 2°C above pre-industrial levels, and to 400 $GtCO_2$

Climate Change Conference of the Parties consented to the Paris Agreement committing its parties to take action so as to avoid dangerous climate change.

[631] *See* 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, (Dec. 12, 2015).

[632] *See* Paris Agreement at Art. 2.

[633] *See* United Nations Subsidiary Body for Scientific and Technological Advice, "Report on the Structured Expert Dialogue on the 2013-2015 review," FCCC/SB/2015/1NF.1 (2015) (presenting a comprehensive scientific review under the United Nations Framework Convention on Climate Change of the global impacts of 1.5°C versus 2°C warming); *see also* C-F. Schleussner *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).

[634] U.S. Nationally Determined Contribution submitted to the United Nations Framework Convention on Climate Change (undated).

[635] U.S. Department of State, US Climate Action Report 2010 at 3 (June 2010); The White House, *President to Attend Copenhagen Talks: Administration Announces US Emission Target for Copenhagen* (Nov. 25, 2009).

from 2011 onward for a 66 percent probability of limiting warming to 1.5°C.[636] These carbon budgets have been reduced to 850 $GtCO_2$ and 240 $GtCO_2$, respectively, from 2015 onward.[637]

There is a large body of scientific research that concludes that the vast majority of global and U.S. fossil fuels must stay in the ground in order to hold temperature rise to well below 2°C.[638] Scientific studies have estimated that 68 to 80 percent of global fossil fuel reserves must not be extracted and consumed to limit temperature rise to 2°C based on a 1,000 $GtCO_2$ carbon budget.[639] An estimated 85 percent of known fossil fuel reserves must stay in the ground for a 50 percent chance of limiting temperature rise to 1.5°C.[640] Effectively, to limit temperature rise to 2°C, fossil fuel emissions must be phased out globally by mid-century.[641]

In addition, a 2016 analysis found that carbon emissions from developed reserves in currently operating oil and gas fields and coal mines would lead to global temperature rise

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[636] Intergovernmental Panel on Climate Change (IPCC), 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, at 63-64 & Tbl. 2.2 (2014).

[637] J. Rogelj *et al*., *Differences between carbon budget estimates unraveled*, 6 NATURE CLIMATE CHANGE 245, 245, Tbl. 2 (2016).

[638] The IPCC estimates that global fossil fuel reserves exceed the remaining carbon budget for staying below 2°C by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2°C by 31 to 50 times. *See* T. Bruckner *et al*., *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, at 525, Table 7.2 (2014) (estimates of fossil reserves and resource and their carbon content).

[639] To limit temperature rise to 2°C based on a 1,000 $GtCO_2$ carbon budget from 2011 onward, studies indicate that 80 percent (Carbon Tracker Initiative 2013), 76 percent (Raupach et al. 2014), and 68 percent (Oil Change International 2016) of global fossil fuel reserves must stay in the ground. *See generally* Carbon Tracker Initiative, Unburnable Carbon – Are the world's financial markets carrying a carbon bubble? at 2 (2013); M. Raupach *et al*., *Sharing a quota on cumulative carbon emissions*, 4 NATURE CLIMATE CHANGE 873 (2014); Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production at 6 (Sept. 2016) (Oil Change International).

[640] Oil Change International at 6.

[641] Rogelj *et al*. 2015 estimated that a reasonable likelihood of limiting warming to 1.5° or 2°C requires global CO_2 emissions to be phased out by mid-century and likely as early as 2040-2045. *See* J. Rogelj *et al*., *Energy system transformations for limiting end-of-century warming to below 1.5°C*, 5 NATURE CLIMATE CHANGE 519 (2015).

beyond 2°C.[642] Excluding coal, currently operating oil and gas fields alone would take the world beyond 1.5°C.[643] To stay well below 2°C, the 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.[644] Moreover, some fields and mines, primarily in rich countries, must be closed before fully exploiting their resources.[645] 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."[646]

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)."[647]

On November 3, 2017, the U.S. Global Change Research Program — comprised of the nation's top climate scientists — published a final report "designed to be an authoritative assessment of the science of climate change, with a focus on the United States, to serve as the foundation for efforts to assess climate-related risks and inform decision-making about responses."[648] The report explicitly does not include policy recommendations,[649] but its findings unambiguously compel the conclusion that expanded Arctic fossil fuel development would seriously hinder our ability to avoid the worst effects of climate change.

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[642] Oil Change International at 5.
[643] *Id.*
[644] *Id.*
[645] *Id*.
[646] C. McGlade & P. Ekins, *The geographical distribution of fossil fuels unused when limiting global warming to 2°C*, 517 NATURE 187, 187, 190 (2015).
[647] 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).
[648] U.S. GLOBAL CHANGE RESEARCH PROGRAM, CLIMATE SCIENCE SPECIAL REPORT 1 (Nov. 4, 2017).
[649] *Id.*

The report confirms the basics — that "[t]he global, long-term, and unambiguous warming trend has continued during recent years"[650] that "it is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century . . . [and that] there is no convincing alternative explanation supported by the extent of the observational evidence."[651] It also confirms that the Arctic is particularly hard-hit: it "is warming at a rate approximately twice as fast as the global average;"[652] "Arctic sea ice loss is expected to continue through the 21st century, *very likely* resulting in nearly sea ice-free late summers by the 2040s (*very high confidence*);"[653] and "multiple lines of evidence provide *very high confidence* of enhanced Arctic warming with potentially significant impacts on coastal communities and marine ecosystems."[654] The report concludes "[i]t is *very likely* that human activities have contributed to Arctic surface temperature warming, sea ice loss since 1979, glacier mass loss, and Northern Hemisphere snow extent decline observed across the Arctic."[655]

The report highlights the urgent need to act if we are to address climate change. It concludes "[t]he present-day emissions rate of nearly 10 [gigatonnes of carbon (GtC)] per year suggests that there is no climate analog for this century any time in at least the last 50 million years."[656] If we are to avoid the worst effects of climate change, nations must drastically and rapidly limit the amount of carbon they emit into the atmosphere. The report confirms that there is a limit to the amount of carbon that can be emitted — "CO_2 emissions must stay below about 800 GtC in order to provide a two-thirds likelihood of preventing 3.6 [degrees Fahrenheit (2 degrees Celsius)] of warming." [657] It tells us how much more can be emitted until that limit is reached — approximately 230 GtC.[658] And it provides an estimate of how long, under standard projection scenarios, it will take to reach that threshold — "this cumulative carbon threshold would be exceeded in approximately two decades."[659] Thus, "[s]tabilizing global mean temperature to less than 3.6 [degrees Fahrenheit (2 degrees Celsius)] above preindustrial levels

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[650] *Id.* at 13.
[651] *Id.* at 12.
[652] *Id.* at 23.
[653] *Id.* at 29.
[654] *Id.* at 316; *see also id.* at 28–29, 195, 307-08, 316 & 318 (describing evidence).
[655] *Id.* at 319.
[656] *Id.* at 31.
[657] *Id.* at 31–32.
[658] *Id.* at 32.
[659] *Id.*; *see also id.* at 16 (describing scenarios).

requires substantial reductions in net global CO_2 emissions prior to 2040 relative to present-day values and likely requires net emissions to become zero or possibly negative later in the century."[660]

The report supports key truths about oil development and the Arctic: (i) the Arctic is ground zero for climate change and thus no place to burden with fossil fuel development, particularly black carbon production that has local effects; and, (ii) even if it could be developed safely, Arctic oil and gas, which is years away from production under the best scenarios, *cannot* be part of our energy future because by then the nation must be well on its way to transitioning away from fossil fuels to avoid the worst effects of climate change.

The United States recognizes 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 climate and environmental goals, and Indigenous rights and agreements."[661] 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,"[662] 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.

2. NEPA Requires BLM to Analyze How Leasing in the Refuge Will Contribute to Climate Change.

NEPA requires BLM to assess the indirect and cumulative effects of leasing in the Refuge, including the climate effects. Indirect effects are those "caused by the action, and later in time or further removed in distance, but still reasonably foreseeable."[663] Cumulative effects are the incremental effects of the action in combination with "other past, present, and reasonably

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[660] *Id.* at 31, 393.

[661] The White House, *U.S.-Canada Joint Statement on Climate, Energy, and Arctic Leadership* (Mar. 10, 2016).

[662] *Id.*

[663] *S. Fork Band Council of W. Shoshone of Nev. v. U.S. Dep't of the Interior*, 588 F.3d 718, 725 (9th Cir. 2009) (quoting 40 C.F.R. § 1508.8(b)).

foreseeable future actions."[664] The cumulative impact analysis "must be more than perfunctory"; it must provide a "useful analysis of the cumulative impacts of past, present, and future projects."[665]

NEPA also requires agencies to describe "connected" or "cumulative" actions in a single environmental review.[666] The purpose of this requirement "is to prevent an agency from dividing a project into multiple 'actions,' each of which individually has an insignificant environmental impact, but which collectively have a substantial impact."[667] NEPA requires "reasonable forecasting," which includes the consideration of "reasonably foreseeable future actions . . . even if they are not specific proposals."[668] "Because speculation is implicit in NEPA," agencies may not "shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry."[669]

It is now well established that when an agency considers a decision that has the potential to cause greenhouse gas emissions that contribute to climate change, NEPA requires the agency to analyze and disclose the effects of these emissions as indirect or cumulative effects. BLM must, accordingly, quantify and analyze the climate impacts from the potential emissions for this action, including analyzing those impacts for reach alternative. In *Center for Biological Diversity v. National Highway Traffic Safety Administration*, the Ninth Circuit held that "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."[670] There the court held that the EPA must assess the climate impacts of a fuel economy rule (CAFE) "in light of other CAFE rulemakings and other past, present, and reasonably foreseeable future actions, regardless of what agency or person

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[664] *See Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 993 (9th Cir. 2004) (quoting 40 C.F.R. § 1508.7).

[665] *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1075 (9th Cir. 2002) (internal citation omitted).

[666] 40 C.F.R. § 1508.25(a); *Klamath-Siskiyou*, 387 F.3d at 999.

[667] *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 969 (9th Cir. 2006) (internal quotation marks omitted).

[668] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) (citation omitted).

[669] *Id.* (internal quotations omitted).

[670] 538 F.3d 1172, 1217 (9th Cir. 2008).

undertakes such other actions."[671] Numerous other courts have affirmed the necessity of analyzing the climate consequences of an action under NEPA, in a wide variety of contexts.[672]

In sum, BLM's EIS must include an accurate assessment of the serious effects of burning the oil and gas that could be developed in the Refuge. More broadly, 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 greenhouse gas emissions.[673] Recent scholarship has calculated that a cessation of fossil fuel extraction on federally owned lands would reduce global carbon dioxide emissions by an estimated 280 million tons annually by 2030, and has provided analytical tools for the assessment of such supply-side restrictions which

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[671] *Id*.

[672] *See, e.g.*, *Sierra Club v. Fed. Energy Regulatory Comm'n*, 867 F.3d 1357, 1373 (D.C. Cir. 2017) (holding that agencies must analyze the climate effects of burning fossil fuels conveyed by pipeline projects they approve and reasoning that the consumption of those fuels was not just "reasonably foreseeable" but was "the project's entire purpose"); *WildEarth Guardians v. BLM*, 870 F.3d 1222, 1226, 1233–34 (10th Cir. 2017) (rejecting 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); *Mid States Coalition for Progress v. Surface Transportation Board*, 345 F.3d 520, 549–50 (8th Cir. 2003) (holding that NEPA required an agency deciding whether to approve a railroad line providing access to coal mining areas to disclose and analyze the impacts of future combustion of the mined coal); *Mont. Envtl. Info. Ctr. v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074, 1094–99 (D. Mont. 2017), *amended in part, adhered to in part sub nom. Montana Envtl. Info. Ctr. v. U.S. Office of Surface Mining*, No. CV 15-106-M-DWM, 2017 WL 5047901 (D. Mont. Nov. 3, 2017) (holding that an agency must quantify the costs of greenhouse gas emissions from a fossil-fuels-extraction project if it quantifies the benefits in a NEPA document); *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1196-98 (D. Colo. 2014) (holding that NEPA required analysis of the climate effects of burning fossil fuels that could be produced as a result of land management decision).by pipeline projects they approve and reasoning that the consumption of those fuels was not just "reasonably foreseeable" but was "the project's entire purpose").

[673] *See* The Wilderness Society, Federal Lands Emissions Accountability Tool (emissions from the production and combustion of fossil fuels on federal lands are equivalent to 20% of all U.S. GHG emissions), *available at*: https://wilderness.org/federal-lands-emissions-accountability-tool.

could be used to inform environmental review of the individual and cumulative impacts of federal leasing decisions.[674]

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.[675] Leasing in the Refuge, which could lead to oil production for many years into the future, would undermine the country's — and the world's — urgently needed implementation of its goals for moving swiftly away from dependence on carbon-based fuels.[676] BLM's NEPA analysis will have to ask and answer a set of questions about how the choice to authorize leasing in the Refuge relates to the nation's overall carbon budget and to decisions about whether to

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[674] *See* Erickson, P. & Lazarus, M. Climatic Change (2018). https://doi.org/10.1007/s10584-018-2152-z ("Our findings here indicate that restricting future lease issuance and renewal could lead to reductions in federal fossil fuel production of about 37% in 2030. This restriction would lead to slightly higher fossil fuel prices, stimulating added production from other sources, resulting in a lesser overall net effect on global fossil fuel use and CO_2 emissions. (Market-induced emissions leakage is not unique to action on the supply side: it also occurs for demand-side policies, though often smaller in magnitude.) Considering these effects, we estimate that the lease restriction policy would reduce global CO_2 emissions by 280 Mt in 2030, an amount on par with, and in many cases greater than, that of other major policies in President Obama's climate action plan…. The analytical tools used here can also help inform the environmental review of projects that would affect future fossil fuel supply. Many environmental review processes have assumed perfect substitution, i.e., that each ton of coal or barrel of oil delivered to the market by a new project would simply offset, one-for-one, a ton or barrel produced elsewhere, with no net effect on greenhouse gas emissions (Burger and Wentz 2017). As a US appeals judge wrote, however, this assumption of perfect substitution assumption is 'irrational,' in that it contradicts basic supply and demand principles (Briscoe 2017). Further, as our analysis shows, the assumption of perfect substitution is also unnecessary, as methods exist to provide estimates of net production and CO_2 impacts. Indeed, our analysis developed no new methods; it simply used existing tools to look at the question of substitution for multiple fuels for a particular policy context.").

[675] P. Erickson et al., Stockholm Environment Institute, Making future US offshore oil leasing more consistent with climate goals, Discussion Brief (2016).

[676] *See* The Wilderness Society, In the Dark (Lifecycle emissions from energy production on federal lands lag far behind where they need to be in order to meet domestic and international climate goals. Leasing in the Refuge would lead us further off course), *available at*: https://wilderness.org/sites/default/files/IntheDarkReport_FINAL_Jan_2018.pdf.

pursue other fossil fuels in light of the reality that a vast majority of already-discovered — much less undiscovered — fossil fuels must be left undeveloped.

3. NEPA Requires BLM to Assess Climate Change Impacts to the Proposed Action, and the Cumulative and Synergistic Effects of Oil and Gas Development and Climate Change in the Refuge.

In addition to analyzing the indirect and cumulative impacts of the greenhouse gas emissions that will result from developing the Refuge, BLM must also analyze how the ongoing and increasing effects from climate change into the baseline against which the alternatives will be evaluated and how existing and increasing climate change impacts will act cumulatively and synergistically with effects from drilling in the Refuge.[677]

Alaska has warmed more than twice as fast as the rest of the United States over the past 60 years, and the Arctic is expected to warm by an additional 10°F to 12°F.[678] This rapid warming presents myriad disruptions to Arctic ecosystems, including in the Refuge. In the Arctic, climate change is causing, and will continue to cause, sea-level rise, sea-ice melt, river flow (which cause strudel scour) changes, and permafrost thaw.

Permafrost plays an essential role in the Refuge by making the ground watertight and maintaining the vast network of wetlands and lakes across the tundra that provide habitat for animals and plants. Permafrost underlies 80% of the land surface in Alaska, and permafrost thaw is already underway in interior and southern Alaska where permafrost temperatures are near the thaw point.[679] In northern Alaska, permafrost temperature has increased by up to 2 to 3°C since the 1980s, including areas of the Refuge.[680] Models project that permafrost in Alaska will continue to thaw, and that near-surface permafrost may be entirely lost from large parts of

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[677] *See Klamath-Siskiyou Wildlands Ctr.*, 387 F.3d at 993.

[678] Melillo, Jerry M, Terese (T.C.) Richmond & Gary W. Yohe (eds.), Climate Change Impacts in the United States: The Third National Climate Assessment, U.S. Global Change Research Program at 45(2014); USGCRP, Fourth National Climate Assessment, Volume I at 345-346.

[679] Melillo et al., *supra*.

[680] Jorgenson, M. T., Shur, Y. L., & Pullman, E. R. (2006). Abrupt increase in permafrost degradation in Arctic Alaska. Geophysical Research Letters, 33(2); Osterkamp, T. E., & Jorgenson, J. C. (2006). Warming of permafrost in the Arctic National Wildlife Refuge, Alaska. Permafrost and Periglacial Processes, 17(1), 65-69.

Alaska by the end of the century.[681] As permafrost thaws, it releases carbon dioxide and the powerful greenhouse gas methane into the atmosphere, which contribute to further warming in a reinforcing feedback loop.[682]

Alaskan shorelines are eroding at an accelerating rate due to the combined effects of sea-ice loss, increasing sea surface temperatures, increasing terrestrial permafrost degradation, rising sea levels, and increases in storm power and corresponding wave action.[683] Indeed, coastal erosion rates have doubled since the 1950s along the Beaufort Sea shoreline.[684] Increasing coastal erosion jeopardizes species that use coastal habitats for breeding, such as the polar bear, which uses the Coastal Plain of the Refuge for denning.[685]

The EIS must analyze oil and gas activities in the Refuge in the context of these and other ongoing climate impacts.[686] BLM's analysis of these cumulative effects must be in-depth and must incorporate the best available science.[687] The harmful effects of climate change will act cumulatively and synergistically with the effects of drilling in the Refuge, leading to a significant

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[681] Melillo et al. (2014).

[682] Koven, C. D., Ringeval, B., Friedlingstein, P., Ciais, P., Cadule, P., Khvorostyanov, D., & Tarnocai, C. (2011). Permafrost carbon-climate feedbacks accelerate global warming. Proceedings of the National Academy of Sciences, 108(36), 14769-14774; Schaefer, K., Zhang, T., Bruhwiler, L., & Barrett, A. P. (2011). Amount and timing of permafrost carbon release in response to climate warming. Tellus B, 63(2), 165-180.

[683] B. M. Jones et al., Increase in the rate and uniformity of coastline erosion in Arctic Alaska, 36 Geophysical Research Letters at 3 (2009) (Jones et al. 2009); C. D. Koven et al., Permafrost carbon-climate feedbacks accelerate global warming, 108 Proceedings Nat. Academy Sci. 14769 (2011); N. J. Pastick et al., Distribution of near-surface permafrost in Alaska: Estimates of present and future conditions, 168 Remote Sensing of Environment 301 (2015); K. R. Barnhart et al., The effect of changing sea ice on the physical vulnerability of Arctic coasts, 8 The Cryosphere 1777 (2014); K. R. Barnhart et al., Modeling erosion of ice-rich permafrost bluffs along the Alaskan Beaufort Sea coast, 119 J. Geophys. Res. Earth Surf. 1155 (2014).

[684] H. Lantuit & W. H. Pollard, Fifty years of coastal erosion and retrogressive thaw slump activity on Herschel Island, southern Beaufort Sea, Yukon Territory, Canada, 95 Geomorphology 84, at 92, 96, 97 (2008); J. C. Mars & D. W. Houseknecht, Quantitative remote sensing study indicates a doubling of coastal erosion rate in past 50 yr along a segment of the Arctic coast in Alaska, 35 Geology 583 (2008); cf. Jones et al. 2009.

[685] Durner, G. M., Amstrup, S. C., & Ambrosius, K. J. (2006). Polar bear maternal den habitat in the Arctic National Wildlife Refuge, Alaska. Arctic, 31-36.

[686] 40 C.F.R. § 1508.7.

[687] *Kern*, 284 F.3d at 1075.

increase in threats to Arctic species and ecosystems. Moreover, BLM must grapple with the fact that these threats will grow over time, as the impacts from climate change become more severe, and the survival of many Arctic species becomes more and more precarious.

Furthermore, BLM is obligated under NEPA to evaluate how climate change will affect proposed leasing, exploration, and development of oil and gas on the Coastal Plain. Warming temperatures are causing shorter ice road seasons, which are presenting challenges to current operations which will likely continue to worsen. Permafrost degradation may impair the integrity of oil and gas infrastructure and any gravel roadways used for access. Climate change is leading to increased storm intensity, which may make accessing remote sites by aircraft challenging in the event of an emergency. BLM must carefully consider how a changing climate will impact development in each exploration and development scenario or alternative analyzed in the EIS.

4. BLM Must Consider the Cumulative Impacts of Climate Change on Biological Resources in the Refuge.

Under NEPA, the BLM must consider direct, indirect, and cumulative effects;[688] 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,[689] BLM must address the additive, synergistic, and countervailing impacts between the effects of climate change and the effects of the various alternatives.

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[688] 40 C.F.R. § 1508.25(c)

[689] 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.

a. BLM Must Utilize Recent, Credible and Comprehensive Information, Such as the "2017 Climate Science Special Report," As the Information Basis for Assessment of Climate Change and its Impacts on the North Slope of Alaska.

As described above in this section, in November of 2017, the multi-agency U.S. Global Change Research Program released Volume I of the congressionally mandated Fourth National Climate Assessment. This volume, the "Climate Science Special Report" (CSSR),[690] is a stand-alone report on the state of science relating to climate change and its physical impacts and forms the scientific underpinnings of the upcoming Volume II of NCA4 — "Climate Change Impacts, Risks, and Adaptation in the United States," a draft of which was released in early 2018 for public review but has not yet been finalized. The CSSR was compiled by multiple authors representing federal science agencies, national laboratories, and universities, following strict standards of utility, transparency and traceability, objectivity, and integrity and security in the evaluation and inclusion of scientific information. The CSSR thus represents the best available information on the state of the climate and its impacts in the United States, superseding previous editions of the National Climate Assessment and the synthesis reports of the Intergovernmental Panel on Climate Change.

The key findings of the CSSR are that: 1) "Global annually averaged surface air temperature has increased by about 1.8°F (1.0°C) over the last 115 years (1901–2016). This period is now the warmest in the history of modern civilization;" and 2) This assessment concludes, based on extensive evidence, that it is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century."[691]

Impacts to Alaska and the Arctic are covered in Chapter 11 of the CSSR.[692] In general, Alaska is warming faster than the rest of the nation, and the northern part of the state and

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[690] 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/.

[691] *Id* at 10.

[692] Taylor, P.C., W. Maslowski, J. Perlwitz, and D.J. Wuebbles, 2017: Arctic changes and their effects on Alaska and the rest of the United States. [pp. 303-332 In *ibid*.].

adjacent waters, including the North Slope, is warming faster than the rest of the state. The authors conclude with "*high confidence*" that human activities are driving these effects and that it is "very likely" that the trend of Alaska's warming outpacing lower latitude warming through the coming decades. Key findings are quoted below, with the authors' confidence level in parentheses:

Temperature: "Annual average near-surface air temperatures across Alaska and the Arctic have increased over the last 50 years at a rate more than twice as fast as the global average temperature (*very high confidence*)." Furthermore, according to research published in 2014,[693] the warming signal has been strongest in the northernmost part of the state: "Especially strong warming has occurred over Alaska's North Slope during autumn. For example, Utqiagvik's (formally Barrow) warming since 1979 exceeds 7°F (3.8°C) in September, 12°F (6.6°C) in October, and 10°F (5.5°C) in November."

Permafrost: "Rising Alaskan permafrost temperatures are causing permafrost to thaw and become more discontinuous; this process releases additional carbon dioxide and methane, resulting in an amplifying feedback and additional warming (*high confidence*)." As with temperature, the effects are most pronounced in the northern part of the state, including the area of the Arctic Refuge: "[P]ermafrost on the North Slope is warming more rapidly than in the interior. Permafrost temperatures across the North Slope at various depths ranging from 39 to 65 feet (12 to 20 meters) have warmed between 0.3° and 1.3°F (0.2° and 0.7°C) per decade over the observational period."

Sea Ice: "Arctic land and sea ice loss observed in the last three decades continues, in some cases accelerating (*very high confidence*)." "Since the early 1980s, annual average arctic sea ice has decreased in extent between 3.5% and 4.1% per decade, become thinner by between 4.3 and 7.5 feet, and began melting at least 15 more days each year. September sea ice extent has decreased between 10.7% and 15.9% per decade (*very high confidence*). Arctic-wide ice loss is expected to continue through the 21st century, very likely resulting in nearly sea ice-free late summers by the 2040s (*very high confidence*)." Again, the declines have been most pronounced at the highest latitudes, with ice loss in the Beaufort Sea averaging on the high end of the

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[693] Wendler, G., B. Moore, and K. Galloway, Strong temperature increase and shrinking sea ice in Arctic Alaska, The Open Atmospheric Science Journal, 8, 7-15 (2014), http://dx.doi.org/10.2174/1874282301408010007.

statewide average, at 4.1% per decade. Observed data in the months since the publication of the CSSR indicate that this trend continues unabated. According to the Snow and Ice Data Center, sea ice extent has set a daily record low every single day through the first four months of 2018 (January 1 through April 30).[694]

Ocean Impacts: The two most important ocean impacts are temperature change, which affects sea ice, oxygen content, metabolic activity and patterns of nutrient upwelling; and acidification, which interferes with calcium uptake in shell-building organisms, including plankton, mollusks and crustaceans. "Satellite-observed Arctic Ocean sea surface temperatures, poleward of 60°N, exhibit a trend of 0.16° ± 0.02°F (0.09° ± 0.01°C) per decade." The deeper water of the Arctic Ocean, "between 150 and 900 meters—has warmed by 0.86° ± 0.09°F (0.48° ± 0.05°C) per decade; the most recent decade being the warmest" of the "last 1,150 years for which proxy indicators provide records." Regarding acidification, "Coastal Alaska and its ecosystems are especially vulnerable to ocean acidification because of the high sensitivity of Arctic Ocean water chemistry to changes in sea ice, respiration of organic matter, upwelling, and increasing river runoff. Sea ice loss and a longer melt season contribute to increased vulnerability of the Arctic Ocean to acidification by lowering total alkalinity, permitting greater upwelling, and influencing the primary production characteristics in coastal Alaska."

We also recommend that BLM conduct downscaled modeling, according to the methodology with in the NPRA Final EIS Appendix C,[695] for a more detailed and fine-scale understanding of climate changes within the Arctic National Wildlife Refuge.

b. BLM Must Consider the Impacts of Climate Changes on Terrestrial, Aquatic and Marine Habitats and Wildlife

The changes to temperature, sea ice, permafrost and ocean chemistry described above are already having, and are projected to continue to have, myriad profound effects on the biological environment. As described in more detail in the Polar Bears section of this document, loss of sea ice due to climate warming is a primary threat to that species.[696] This is a critically important

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[694] National Snow and Ice Data Center, Arctic Sea Ice News & Analysis, Charctic Interactive Sea Ice Graph, *available at*: https://nsidc.org/arcticseaicenews/charctic-interactive-sea-ice-graph/.

[695] NPRA IAP EIS, at app.C.

[696] 73 Fed. Reg. 28,212 (May 15, 2008).

climate change effect, but unfortunately is only one of many faced by wildlife. A sampling of potential other climate effects includes:

Warming temperatures: Higher temperatures benefit the already-prodigious insect populations of the Arctic,[697] to the point where mosquito and black fly harassment can interfere with feeding activities, as has been observed in caribou.[698] Other species may also exhibit physiologic or stress responses to warming temperatures. Warming may also hasten the drying of small ponds and lakes, leading to a loss of habitat for nesting waterfowl.[699] Warming summer temperatures also dry out vegetation and enhance susceptibility to fire.[700]

Sea Ice Loss and Ocean Changes: In addition to the high-profile impacts on polar bear habitat, changes in the timing and pattern of sea ice melt impact phytoplankton growth,[701] which may have food web impacts that resonate through the marine ecosystem, with effects on zooplankton, fish, marine mammals and sea birds. Marine ecosystem dynamics are also undoubtedly influenced by acidification. Sea ice retreat also leaves coastal regions vulnerable to the erosive effects of storms and waves, which may negatively impact coastal habitats, including that of breeding birds.

Changes in Precipitation Timing and Amount: Precipitation changes could be among the most significant impacts for Arctic ecosystems and wildlife. Warming can shift the winter and spring precipitation regime from snow to freezing rain and ice, which interferes with caribou

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[697] Frazier, M.R. et al. 2006. Thermodynamics constrains the evolution of insect population growth rates: Warmer is better. American Naturalist 168(4):521-530.

[698] Skarin A, et al. 2004. Insect avoidance may override human disturbances in reindeer habitat selection. Rangifer 24(2):95-103.

[699] Riordan, B. et al. 2006. Shrinking ponds in subarctic Alaska based on 1950-2002 remotely sensed images. Journal of Geophysical Research: Biogeosciences 111:G4.

[700] Young, A.M. et al. 2017. Climatic thresholds shape northern high-latitude fire regimes and imply vulnerability to future climate change. Ecogeography 40(5):606-617.

[701] Nat'l Snow & Ice Data Ctr., Wildlife: Phytoplankton, https://nsidc.org/cryosphere/seaice/environment/phytoplankton.html (last visited June 5, 2018).

foraging success[702] and reduces nestling survival in early-nesting birds like ptarmigan.[703] Type, timing, amount, spatial distribution and persistence of precipitation fundamentally impact all aspects of life in the Arctic, and BLM's analysis of the effects of oil and gas exploration and development must address the effects of these changes as a cumulative impact.

c. BLM Should Utilize Existing Information on Climate Change Vulnerability to Assess Climate Change Cumulative Effects, and Supplement with New Information Where Needed.

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. Fortunately, a substantial amount of information is already available to address these questions. The most relevant and recent information can be found in the Arctic National Wildlife Refuge Revised Comprehensive Conservation Plan, which addresses climate change in detail, particularly in the "Affected Environment" chapter.[704] The Plan discusses climate change impacts to Vegetation (section 4.3.3), Fish (4.3.5.4), Birds (4.3.6.11) and Mammals (4.3.7).

Another model for inclusion of the climate change context in cumulative impacts analysis is the National Petroleum Reserve-Alaska Final Integrated Activity Plan/Environmental Impact Statement.[705] The Environmental Consequences Chapter touches on the interaction between exploration and development activities and climate change effects on Vegetation (section 4.8.7.5), Wetlands and Floodplains (4.8.7.6), Fish (4.8.7.7), Birds (4.8.7.8), Terrestrial Mammals (4.8.7.9), and Marine Mammals (4.8.7.10). The treatment, however, is somewhat cursory and addresses neither the full range of species affected nor the full range of potential climate effects.

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[702] Kolder, J. and R. Aanes. 2004. Effect of winter snow and ground-icing on a Svalbard reindeer population: Results of a simple snowpack model. Arctic, Antarctic, and Alpine Research 36(3):333–341.

[703] Wann, G.T. 2012. Long-term demography of a white-tailed ptarmigan (Lagopus leucura) population in Colorado. MS thesis. Colorado State Univ. Ft. Collins, CO, *available at*: http://hdl.handle.net/10217/68138.

[704] CCP Final EIS, *supra*, at vol.1, ch.4.

[705] NPRA IAP/EIS, *supra*, at vol.4.

Defenders of Wildlife has assessed the climate change vulnerability of every mammal species that utilizes the terrestrial habitats of the Arctic National Wildlife Refuge. That report, titled "No Refuge from Warming,"[706] utilized a standard methodology, NatureServe's Climate Change Vulnerability Index,[707] and found that 16 of the 38 mammal species found on the Refuge are Extremely or Highly Vulnerable to climate change. Six species—polar bear, arctic fox, muskox, tundra vole, brown lemming and collared lemming—are "extremely vulnerable" to climate change, indicating an extremely high likelihood that their numbers or range within the refuge will substantially decrease or disappear by 2050. Ten species—lynx, wolverine, caribou, Dall sheep, Alaska marmot, arctic ground squirrel, singing vole, northern bog lemming, tundra shrew and barren ground shrew—were assessed as "highly vulnerable," their abundance or range likely to decrease significantly by 2050. In general, species whose habitats are on the North Slope and Coastal Plain were more likely to be threatened by climate change than those whose ranges extend into the southern part of the Refuge.

The Arctic has warmed more than much of the rest of the country in recent years, and future climate change projections indicate that this trend will continue. This drastic and destabilizing change makes it of vital importance to maintain habitat connectivity by protecting Arctic habitats from disturbance and destruction. 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 results of the report's assessment are summarized in Table 1a and 1b below, and the full report and supplementary information are included as an attachment to these comments.

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[706] 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.

[707] Nature Serve, Climate Change Vulnerability Index: Overview, http://www.natureserve.org/conservation-tools/climate-change-vulnerability-index (last visited June 5, 2018).

5. BLM Must Evaluate the Extent to which Drilling Activities Will Contribute to Climate-Forcing "Black Carbon."

According to EPA, black carbon "is now recognized as an important climate-forcing agent with particular impact on the arctic region."[708] Black carbon, or more colloquially, "soot," is comprised of "small dark particles that remain after incomplete combustion of fossil fuel or biomass."[709] 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."[710] 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]."[711] Indeed, "[s]tudies have shown that [black carbon] has especially strong impacts in the Arctic, contributing to earlier spring melting and sea ice decline."[712] The acceleration of melting due to black carbon deposition is "believed to contribute significantly to the rapid melting of Arctic and Himalayan glaciers."[713]

"[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.[714] 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."[715]

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[708] 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).

[709] 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.

[710] EPA, REPORT TO CONGRESS ON BLACK CARBON at iii, xxviii, 3, 17 (Mar. 2012).

[711] *Id.* at iii, 18.

[712] *Id.* at 4.

[713] Rao & Somers, *supra*, at 10.

[714] *Id.* at 12.

[715] *Id.* at 13–14.

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.[716] 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.[717] 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,[718] 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." [719] 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.[720] The EIS must fully analyze potential black carbon emissions in light of these commitments.

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[716] *Id.* at 2.

[717] *Id.*

[718] 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.

[719] 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.

[720] 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-ACMMUS10_FAIRBANKS_2017_EGBCM-report-complete-with-covers-and-colophon-letter-size.pdf?sequence=5&isAllowed=y

E. BLM MUST ANALYZE AND FULLY DISCLOSE THE IMPACTS OF AN OIL AND GAS PROGRAM FROM ALL PHASES OF OIL AND GAS ACTIVITIES ON BOTH FEDERAL AND PRIVATE LANDS.

The NOI indicated that it will address leasing.[721] This is too narrow a scope for the EIS. While the leasing decision may not authorize any on-the-ground activities, those activities are a reasonably foreseeable consequence of the lease sale — indeed, they are its point. Accordingly, BLM must clearly describe these activities and their impacts for the decision maker and the public.[722] This requires BLM to look at the impacts from activities associated with all phases of oil and gas: leasing, exploration (including pre- and post-leasing seismic and drilling), development, production, and transportation. Consideration of the effects of all phases is necessary to meet BLM's obligations under NEPA to take a "hard look" at the direct, indirect, and cumulative impacts of the action.[723] Subsequent phases of oil and gas are an indirect effect of leasing the Coastal Plain that must be considered.[724] There are also private lands held by the Kaktovik Inupiat Corporation and the Arctic Slope Regional Corporation and native allotments within the Arctic Refuge. Impacts from any development activities on private lands held by the Kaktovik Inupiat Corporation and the Arctic Slope Regional Corporation within the Arctic Refuge must also be considered.

1. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program from All Phases of Oil and Gas Development and Activities.

a. Leasing Impacts

Issuing an oil and gas lease can be an irretrievable commitment of resources.[725] This is because oil and gas leases confer "the right to use so much of the leased lands as is necessary to explore for, drill for, mine, extract, remove and dispose of all the leased resource in a leasehold," subject to stipulations and other laws.[726]

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[721] 83 Fed. Reg. 17562.

[722] *See, e.g., Native Vill. of Point Hope v. Jewell*, 740 F.3d 489, 503 (9th Cir. 2014); *Com. of Mass. v. Watt*, 716 F.2d 946, 950 (1st Cir. 1983). *Com. of Mass. v. Watt*, 716 F.2d 946, 950 (1st Cir. 1983).

[723] *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1240–41 (9th Cir. 2005).

[724] 40 C.F.R. § 1508.8(b).

[725] *See, e.g., New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 718 (10th Cir. 2009); *Pennaco Energy, Inc. v. U.S. Dep't of the Interior*, 377 F.3d 1147, 1160 (10th Cir. 2004).

[726] *New Mexico ex rel. Richardson*, 565 F.3d at 718.

The manner in which federal agencies interpret this conveyance has significant impacts on how land will be managed — and also how it will not be managed. In short, once leased, and regardless of development potential or actual ongoing development, leased land often is not proactively managed for wildlife, recreation, or land conservation. For example, in the Grand Junction Resource Management Plan (RMP) in Colorado, the BLM described that even undeveloped leases on low-potential lands prevented management of those lands to protect wilderness characteristics, stating:

> 139,900 acres of lands with wilderness characteristics have been classified as having low, very low, or no potential . . . . While there is no potential for fluid mineral development in most of the lands with wilderness characteristics units, the majority of the areas, totaling 101,100 acres (59 percent), are already leased for oil and gas development.[727]

Similarly, in the Bighorn Basin RMP in Wyoming, the BLM considered whether to manage 43 inventoried units, totaling over 476,000 acres, to protect their wilderness characteristics. Ultimately, none of the units are being managed to protect wilderness characteristics because they contain oil and gas leases.[728] Consequently, once BLM leases land to the fossil fuel industry, management for conservation even on sensitive lands with important wildlife habitat, wilderness values, or cultural resources is, as a practical matter, much more difficult.

As part of analyzing the likely impacts of leasing on the Coastal Plain, BLM must consider the impacts from leasing to management for other resources, including wildlife habitat, subsistence, recreation, and tourism.

b. Seismic Exploration Impacts

Seismic surveys taking place during the winter could industrialize the Coastal Plain. Source and receiver lines typically would be placed just a few hundred feet apart. Some of the

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[727] *See* Grand Junction Proposed RMP, at 4-289 to 4-290.

[728] *See* Bighorn Basin Proposed RMP, Appendix S at Table S-1 ("Rationale for Not Managing Lands with Wilderness Characteristics for Naturalness, Outstanding Opportunities for Solitude, and Primitive and Unconfined Recreation, by Field Office and Unit" includes statement with respect to a leased area that "[i]t is recommended not to manage for wilderness characteristics because of the existing leases for oil and gas.").

significant adverse impacts from seismic activities include noise and other impacts on wildlife, including denning polar bears, damage to the tundra by moving heavy equipment and operating a mobile camp with hundreds of people, use of large amounts of water in a water-limited region, discharge of wastewater to the environment, and effects to wildlife energetics and activities by performing seismic work beyond the short winter season. Seismic exploration is a component of oil and gas leasing activities on the North Slope, and these impacts must be analyzed as part of the EIS.

Recent news articles have indicated the possibility that seismic activities on the Coastal Plain may begin prior to leasing.[729] The EIS needs to study the impacts of these activities, which would impact the baseline analysis. Seismic activities should not be authorized prior to completion of the leasing EIS.

c. Infrastructure Impacts

Oil and gas exploratory drilling and production would have a variety of significant impacts associated with infrastructure. These include impacts associated with the physical footprint of the infrastructure, acquisition of materials such as gravel to build the infrastructure, the infrastructure itself, and infrastructure operations. BLM must assess full development scenarios, including exploratory and production-related drilling infrastructure. Such development could potentially sprawl over vast stretches of the Coastal Plain. The Tax Act does not contain requirements to consolidate operations or avoid duplicative infrastructure — actions which will be necessary to minimize infrastructure footprints and associated significant impacts — but BLM should consider scenarios that assess such development.[730] BLM must thoroughly analyze impacts associated with infrastructure under all development scenarios considered, including providing estimates of surface acreage disturbance. Further, BLM must explain how it will allocate acreage between potential lessees, both from an initial lease sale and between lessees from different lease sales given the cumulative 2,000-acre limitation on surface development.

Road infrastructure, in particular, has significant, adverse effects on wildlife and other resources that must be fully analyzed. Permanent road construction and maintenance requires gravel transport and mining, with associated impacts on wildlife habitat. Stream crossings for roads require bridges or adequately sized and maintained culverts to ensure water flow and

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[729] Steven Mufson & Juliet Eilperin, "Companies take first steps to drill for oil in Arctic National Wildlife Refuge," *Washington Post* (May 31, 2018).

[730] *See supra* Part V.D.1c.

adequate fish passage and to prevent the alteration or creation of flooded wetlands. Roads fragment habitat, with associated avoidance behavior by caribou and other wildlife. Raised permanent roads built to protect permafrost make subsistence travel more difficult and can also have a deterrent effect on migratory species like caribou. Temporary ice roads require significant water and ice withdrawals which can adversely impact over-wintering fish in lakes. Temporary, compacted snow roads can harm tundra growth, as the snow overlying those areas likely will require more time to melt during the very short growing season, and snow compaction can affect surface flows. Similarly, gravel well pad construction and operation will adversely affect wildlife habitat. Wildlife generally avoid pads because they are noisy areas with humans around. Pads and roads also require significant quantities of mined gravel. BLM must fully analyze all of these infrastructure impacts.

Finally, BLM must consider and account for the fact that transmission pipelines can be constructed and monitored without roads. There are two crude oil transmission pipelines in the Arctic without roads, the Alpine to Kuparuk pipeline (34 miles long, 95,000 bbl/day) and the Badami to Endicott pipeline (25 miles long, peak transmission was 7,450 bbl/day).

BLM must examine the full range of other infrastructure and activities associated with gravel mining sites and activities necessary to build pads, roads, airstrips, and other infrastructure. All oil and gas leasing action alternatives considered in the EIS should include estimates of cubic yards of gravel required for eventual exploration and development activities, based on BLM's Exploration and Development Scenario. It is likely that eventual exploration and development will require vast amounts of gravel to complete.

BLM must also identify potential material sites, as gravel extraction may significantly impact surrounding areas. Gravel extraction is generally done in large, open pit mines typically located away from major streams and lakes. Although direct stream impacts may be mostly mitigated, 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.[731] The resulting overburden stockpile disturbs tundra, and the gravel pit itself causes

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[731] BENJAMIN SULLENDER, AUDUBON ALASKA, ECOLOGICAL IMPACTS OF ROAD- AND AIRCRAFT-BASED ACCESS TO OIL INFRASTRUCTURE 19 (July 2017), *available at* http://ak.audubon.org/sites/g/files/amh551/f/road_aircraft_access_report_final_0.pdf (internal citations omitted).

permanent changes to the area's thermal regime due to "thaw bulbs" forming in the permafrost around the unfrozen water during flooding.[732] 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.[733] BLM must fully analyze the impacts from gravel extraction activities.

Gravel extraction sites located on BLM-managed lands are subject to regulations governing contracts and permits for mineral materials (*see* 43 C.F.R. Subparts 3601-3604). BLM must identify whether it will apply these regulations to any material sites that may be identified within the Coastal Plain. 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.[734] To the extent BLM anticipates gravel resources being transported from outside of the Arctic Refuge, it must also identify these areas and discuss potential options and impacts of transportation.

d. Spill Impacts

Oil exploration and production is an inherently complicated and messy business that will inevitably result in releases of crude oil, other toxic materials, air pollutants, and wastes and wastewaters. Even the highest-performing and most well-financed operators suffer from crude oil, hazardous materials, and produced water spills that adversely affect the tundra and, in many cases, the region's surface waters. Operators, for example, cannot prevent all exploratory and production-related blowouts, also known as losses of well control, because companies may encounter unexpected or changing subsurface conditions that have not been adequately addressed during drilling. Similarly, major and minor spills can occur from corrosion, human errors, inadequate maintenance, earthquakes, infrastructure failures, and freezing. Inadequate leak detection and valve placement for gathering and transmission pipelines can also lead to larger spills. Management and disposal of drilling muds and cuttings, produced water and other forms of wastewater including oil-contaminated storm-water, and hydraulic fracturing related chemicals and wastes can have significant impacts as well. Appendix 6 catalogues relevant

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[732] *Id*. (internal citations omitted).
[733] *Id*. (internal citations omitted).
[734] *See* Chandler Lake Land Exchange Agreement, Appendix 2. C., pp. 29-32 (1983); *see supra* Part VI.E.2.

blowouts and spill data and demonstrates their ubiquitous nature. BLM must analyze all reasonably foreseeable impacts associated with potential blowouts and spills.

Leak detection and spill response for transmission pipelines can be accomplished without roads or increased air traffic. Leak detection can be done electronically. Helicopters and snow-machines could be used in the winter for access spill response, and low-ground-pressure vehicles and hovercraft could be used in the summer.[735] The effectiveness of and impacts from spill response should be evaluated.

BLM must also fully assess the impacts (including cumulative impacts) of oil spills reaching the coast and Beaufort Sea, either through spills into streams that flow to the sea or directly into the sea from ships or pipelines associated with Refuge development.[736] As described above, there is no effective way to clean up spilled oil in the icy and stormy conditions that often prevail in the Arctic Ocean.

Finally, BLM must fully analyze and consider how it will ensure operators will comply with all relevant lease stipulations, and state and federal regulatory requirements, particularly given the remoteness of the region and associated challenges with and costs of performing regulatory inspections.

e. Other Impacts

Beyond infrastructure and spill impacts, oil development creates air pollution and noise from generators, trucks, aircraft, and processing facilities; generates waste streams and wastewaters from drilling operations and living quarters; uses substantial quantities of surface water; restricts access for subsistence, sport hunting and fishing and other forms of recreation; and creates safety and fire risks. BLM must fully analyze all of these impacts.

BLM may not rely on directional or extended reach drilling to claim that numerous significant impacts associated with development will be eliminated or mitigated. Directional or extended reach drilling for oil has the same impacts as vertical well drilling with one exception — smaller well pads. Directional drilling requires surface occupancy for drill rigs, well pads, pipelines, roads and human infrastructure at locations near to but not immediately above oil and gas reservoirs. Permanent gravel roads and airstrips are still used, pipelines are still required, and

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[735] *See* NPRA draft IAP, Chapter 4 at 46.
[736] *See supra* Part VI.A.6.b.

air pollution and spills are still inevitable. As a result, there still will be wildlife habitat losses and adverse impacts to subsistence from directional drilling that need to be considered as part of this EIS. Even at the supposedly state-of-the-art Alpine facility, ConocoPhillips has still relied heavily on gravel roads, gravel pads, and other permanent infrastructure to support its oil operations — all of which has had serious adverse impacts to subsistence and other resources.

For technical reasons, directional drilling only has a range of a few miles. The maximum horizontal distance drilled to date on the North Slope is approximately five miles. Even the new, costly "state-of-the-art" drilling rig Doyon is building, which is expected to be operational in 2020, only will be able to drill wells 6.25 miles away. Moreover, that distance would be the exception, not the rule.

Because of higher costs due to longer wells, directional drilling may or may not be used by industry for exploratory drilling. As discussed by Mr. Kevin Banks of DNR during the May 10, 2011 Senate Energy and Natural Resources Committee hearing, oil companies actually prefer not to use directional drilling for exploratory wells because doing so would provide less technical information about subsurface conditions. The EIS must acknowledge the realities and shortcomings of directional drilling, , as well as the limited number of rigs capable of extended reach drilling that are likely to be used in the Coastal Plain.

2. BLM Must Analyze and Fully Disclose the Impacts of an Oil and Gas Program from Activities on Private Corporation Lands and Native Allotments.

Under the Alaska Native Claims Settlement Act (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.[737] 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.[738] But Congress prohibited regional corporations — like ASRC — from acquiring the subsurface rights to surface lands selected by a village corporation if those surface lands where within a pre-ANCSA refuge like the Arctic Refuge.[739]

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[737] *See* 43 U.S.C. §§ 1611(a)(1), 1613(a).
[738] 43 U.S.C. § 1613(f).
[739] 43 U.S.C. §§ 1611(a)(1), 1613(f).

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).[740] The General Accounting Office later found that the land exchange was not in the public interest for multiple reasons.[741]

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, which requires that land within the boundaries of a refuge "remain subject to the laws and regulations governing use and development" of that refuge.[742] 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.

The EIS must 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.

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[740] 16 U.S.C. § 3192(h)(2) & Public Law 100-395 (Aug. 16, 1988).

[741] *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.

[742] 43 U.S.C. § 1621(g).

BLM should also address how it will conduct the compatibility determination called for under ANCSA section 22(g) for these lands.[743] BLM must also explain how it interprets the application of the stipulations and conditions in the 1983 Agreement and other environmentally protective measures to these lands in light of the 1983 Agreement.

There are also a number of native allotments on the Coastal Plain. These lands are privately held, with the subsurface held by ASRC. The EIS must describe how many allotments occur within the Coastal Plain and identify their locations and acreage. BLM should also consider the impacts of oil and gas activities on native allotments and describe how the BLM can protect the resources and values of the allotments from oil and gas activities, and the impacts of such activities on the Coastal Plain. Furthermore, there are a large number of unresolved Native allotment claims on the Coastal Plain of the Arctic Refuge. BLM must also address how it will address those, including address how long will it take to adjudicate these claims and the potential impacts to the rights of claimants.

F. BLM MUST ANALYZE AND FULLY DISCLOSE THE CUMULATIVE IMPACTS FROM OIL AND GAS ACTIVITIES AND REASONABLY FORESEEABLE PROJECTS.

NEPA requires that BLM "consider the cumulative impacts of [this] project together with 'past, present and reasonably foreseeable future actions.'"[744] "Cumulative actions" are those "which when viewed with other proposed actions have cumulatively significant impacts."[745] "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."[746] Such impacts can result from individually minor but collectively significant actions taking place over a period of time.[747]

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[743] 43 U.S.C. § 1621(g); *see also* Agreement Between Arctic Slope Regional Corporation and the United States of America, Appendix 1 at 1 (Aug. 9, 1983) (stating that section 22(g) of ANCSA applies to the exchanged lands).

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

[745] 40 C.F.R. § 1508.25(a)(2).

[746] *Id.* § 1508.7.

[747] *Id.*

The cumulative impacts from oil and gas activities are considerable. Following a request from Congress, in 2003, the National Academy of Sciences published a report on the cumulative impacts of the environmental effects of oil and gas activities on the North Slope.[748] In that report, the National Academy recognized that there was an essential trade-off with industrialization and the intact physical environment: "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."[749] The National Academy also noted that the effects on the physical environment from oil and gas activities and infrastructure extend well beyond the footprint, and accumulate and persist even after the activity may cease.[750]

BLM must identify and fully consider the potential cumulative effects of leasing, which requires considering all subsequent phases of oil and gas activities on the Coastal Plain, in addition to all reasonably foreseeable future actions, to meet its obligations under NEPA to evaluate the cumulative impacts of leasing the Coastal Plain.[751] This means that BLM must create development scenarios for the Coastal Plain based on occurrences of economically recoverable oil and activities associated with exploration, development, production, and transportation.[752] It is vital that the BLM thoroughly consider the impacts from all phases in this EIS so that the agency can craft appropriate lease stipulations and conditions now to address impacts at later phases and meet statutory duties.

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[748] 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 (2003).

[749] *Id.* at 10.

[750] *Id.* at 156.

[751] *See* IAP at Chapter 4, p. 1 (stating that when evaluating the cumulative effects of oil and gas, the BLM would look at "not only those actions that may follow from the decisions in this plan, but also actions undertaken by others within and outside the planning area"); *see also* Council on Environmental Quality, Executive Office of the President, Considering Cumulative Effects Under the National Environmental Policy Act at 1 (Jan. 1997) ("The range of actions that must be considered includes not only the project proposal but all connected and similar actions that could contribute to cumulative effects. Specifically, NEPA requires that all related actions be addressed in the same analysis.").

[752] *See supra* Part VI.E.1.

There are a number of foreseeable developments and decisions that could further exacerbate the cumulative impacts to the region that BLM must consider. These include:

- pre-leasing seismic activities that could occur,
- the Arctic Strategic Transportation and Resources (ASTAR) project in which the State of Alaska is proposing to construct a series of interconnected gravel roads or rights-of-way spanning portions of the North Slope Borough, possibly including the Coastal Plain,[753]
- oil and gas activities occurring in the near shore (i.e., state waters) and OCS areas of the Beaufort Sea, including the potential for additional leasing and oil and gas activities and infrastructure in those areas and additional support infrastructure and activities within or adjacent to the Refuge,
- the Alaska Natural Gas Pipeline and other commercial natural gas pipelines and related activities,
- expanded oil and gas development to the west of the Arctic Refuge boundary,
- expanded oil and gas leasing and development in the National Petroleum Reserve–Alaska, and
- increased vessel traffic in the Beaufort, Bering, and Chukchi seas.

Particularly given the migratory nature of much of the wildlife that relies on the Coastal Plain and adjacent waters, a full assessment of the effects from these projects is vital to an assessment of the cumulative impacts. BLM must also describe and assess how development in the Coastal Plain could catalyze additional development in other areas throughout the Arctic. For example, infrastructure related to Coastal Plain development may facilitate development of oil and gas offshore adjacent to the Refuge in state and federal waters.

1. BLM Must Acknowledge that impacts of permitted development across the Arctic have a long history of being worse than what agencies predicted.

BLM must acknowledge that there is a pattern of agencies underestimating the effects of oil and gas projects across the North Slope.[754] According to the National Research Council, "[t]he effects of industrial activities are not limited to the footprint of a structure or to its

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[753] Shady Grove Oliver, *Cost Comes Into Focus Amid ASTAR Testimony*, ARCTIC SOUNDER, Apr. 27, 2018, available at http://www.thearcticsounder.com/article/1817cost_comes_into_focus_amid_astar_testimony.

[754] *See generally* The Wilderness Society, Broken Promises, available at https://wilderness.org/resource/broken-promises-reality-oil-development-americas-arctic.

immediate vicinity; a variety of influences can extend some distance from the actual footprint."[755] Thus, "[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 of this to wildland values. All of these effects result in the erosion of wildland and other values over an area far exceeding the area directly affected."[756]

Examples of underestimated effects abound:

- In the recent EIS for the GMT1 development project in the NPRA, BLM acknowledged that "the intensity of [development] impacts and the overall degree of impacts may be higher than previously anticipated" in earlier EISs assessing development in the Reserve.[757]
- The original Alpine field — specifically promoted as a "roadless development" when initially proposed — had three miles of roads when it began pumping crude in 2000, but now has many more miles of roads and other infrastructure built since then.[758]
- New discoveries in the Western Arctic on state and federal lands have been dubbed a "string of pearls" and are resulting in new processing facilities and increased industrial activity significantly farther west than Alpine.[759]

Thus, in assessing cumulative impacts, BLM cannot simply rely on the description of effects from prior NEPA analyses for projects in the Arctic. It must analyze anew the potential effects of development based on updated projections of impacts that take into account past understatements and the way development is actually proceeding.

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[755] NRC Report at 9.

[756] *Id.* at 148.

[757] BLM, Supplemental Environmental Impact Statement for the Alpine Satellite Development Plan for the Proposed Greater Mooses Tooth One Development Plan at Vol I, p 423 (Oct. 2014), *available at:* https://eplanning.blm.gov/epl-front-office/projects/nepa/37035/50832/55575/GMT1_Final_SEIS_Volume_1_Oct_2014_(2)_508.pdf

[758] Broken Promises at 8-9.

[759] Tim Bradner, *Ratcheting Up*, FRONTIERSMAN, April 21, 2018, available at http://www.frontiersman.com/business/ratcheting-up/article_dda92c24-45b7-11e8-a008-0b176b106442.html

G. BLM MUST ANALYZE AND FULLY DISCLOSE THE CROSS-BORDER, TRANSBOUNDARY, AND INTERNATIONAL IMPACTS OF AN OIL AND GAS PROGRAM.

The NEPA requirement to consider transboundary effects has long been recognized in the federal courts.[760] For example, in a case involving DOI and the provincial government of Manitoba, the D.C. District Court ruled that "NEPA requires agencies to consider reasonably foreseeable transboundary effects resulting from a major federal action taken within the United States." [761] Reflecting the NEPA case law, in 1997, 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."[762] CEQ advised federal agencies to "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." To obtain information about potential transboundary effects, CEQ said federal agencies "should contact agencies in the affected country with relevant expertise."

As discussed elsewhere in these comments, resources that are likely to be particularly affected by oil and gas activities in the Arctic Refuge Coastal Plain, causing reasonably foreseeable transboundary effects that must be considered, include but are not limited to:

- Caribou,
- Polar Bear,
- Migratory Birds, such as snow geese,
- Fish,
- Water resources,
- Air quality,
- Human health and food security, and
- Socio-economic/Subsistence.

In the EIS, BLM must address how it, along with other U.S. government agencies, will coordinate and cooperate with the Canadian federal, territorial, and First Nation governments to

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[760] *See, e.g., 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).

[761] *Manitoba v. Salazar*, 691 F. Supp. 2d 37 (D.D.C. 2010).

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

ensure that all reasonably foreseeable transboundary effects are identified, documented, and carefully evaluated in the EIS.

H. BLM Must Analyze and Fully Disclose the Economic Impacts of an Oil and Gas Program and Conduct an Analysis of Potential Oil Development.

1. BLM Must Analyze and Fully Disclose the Economic Impacts of Potential Oil Development.

Proponents of drilling for oil and gas in the Coastal Plain of the Arctic Refuge commonly make inaccurate and misleading claims that Arctic drilling will displace oil imports, lower domestic gas prices, raise revenue to bring down the federal deficit, and create thousands of jobs. These promised economic benefits, however, are based on outdated or inaccurate information, faulty assumptions, and a skewed economic perspective on the short- and long-term commodity and subsistence values of the Refuge. Given the enormous risk to wildlife, ecosystems, and human welfare that such oil exploration and development would impose, the EIS must closely, carefully, and critically examine these asserted benefits.

Attached to these scoping comments is a report prepared for The Wilderness Society by economists Dr. Carolyn Alkire and Anna Perry with Key-Log Economics, titled "Arctic National Wildlife Refuge: Economics of Potential Oil Development." Published in November 2017, the report contains up-to-date information regarding several economic issues that must be addressed in the EIS. We urge the BLM to utilize this information in the economic effects analysis of the proposed oil and gas program and alternatives in the EIS, including the following issues.

First, the EIS must acknowledge that the economic context of U.S. domestic oil production, both currently and in the long-term, has changed dramatically in recent years. Since 2010, "tight oil" produced through hydraulic fracturing has greatly expanded oil output and recoverable reserves in the lower 48 states.[763] Alaska accounted for 20% to 25% of total U.S. production in the 1980s and 1990s, but as of 2016, Alaskan crude oil production made up only

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[763] See, e.g., D. Murphy. 2017. The Case Against Oil Production within the Arctic National Wildlife Refuge, available at: http://akbriefing.wikispaces.com/file/view/Oil+Production+in+ANWR+-+Impacts+on+Deficit+and+National+Energy+Security.pdf/620673185/Oil%20Production%20in%20ANWR%20-%20Impacts%20on%20Deficit%20and%20National%20Energy%20Security.pdf.

5.5% of total U.S. supply. Regardless of oil and gas leasing in the Coastal Plain, Alaskan oil production will likely continue to be dwarfed by tight, or shale, oil production in the lower 48 states in coming decades. Oil reserves in the Permian Basin of Texas alone are estimated to hold 60 to 70 billion barrels while the NPRA and adjacent lands and waters are estimated to contain a mean of 8.7 billion barrels of undiscovered, technically recoverable oil.[764]

One of the most important trends over the past few years has been the growing disparity in the relative production costs of tight oil in the lower 48 compared to Alaskan Arctic oil. The break-even price for North American tight oil is $40-$60 per barrel, whereas the average cost of extracting oil from the Arctic is $75 per barrel.[765] Since tight oil is out-competing Arctic oil, any oil production in the Coastal Plain could be economically inefficient compared to tight oil in the lower 48. Therefore, the EIS should estimate *economically* recoverable oil — that portion of technically recoverable oil which can be produced for less than the price of oil in the market — and the degree to which Arctic production costs and global market prices would affect the volume produced.

Second, the EIS must critically examine the disingenuous claim of Arctic Refuge oil drilling proponents that Arctic oil would reduce U.S. "dependence" on foreign oil imports. In fact, production of tight oil from the lower 48 has increased so much in recent years that the U.S. began exporting oil in 2016, after a 40-year ban on such exports.

Furthermore, the assumption that oil from the Arctic Refuge would displace U.S. imports neglects existing infrastructure capacity and the flow of oil from Alaska's North Slope to end-consumers on the West Coast. A recent analysis by DeRosa and Flanagan (2017) using the National Transportation Fuels Model shows that North Slope oil would primarily either be exported or shipped to West Coast ports, resulting in minor declines in the flow of both foreign imports and tight oil from the Bakken basin.

Third, the EIS must be upfront that there is very little chance that oil production from the Refuge would have any effect on oil prices or downstream gas prices for consumers. The reality is that oil prices in the U.S. are determined in world markets. A decade-old analysis of Arctic

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[764] USGS, 2017. Assessment of undiscovered oil and gas resources in the Cretaceous Nanushuk and Torok Formations, Alaska North Slope, and summary of resource potential of the National Petroleum Reserve in Alaska, 2017, available at: .https://pubs.er.usgs.gov/publication/fs20173088.

[765] *See* D. Murphy, The Case Against Oil Production within the Arctic National Wildlife Refuge at 6.

drilling by the Energy Information Administration found that any impact on prices at the pump — perhaps 1% at most — would likely only be felt during a single peak production year, no sooner than 2033. Moreover, the Organization of Petroleum Exporting Countries (OPEC) could easily neutralize any price impact by decreasing supplies to match additional production from Alaska.

Future global oil prices and OPEC production are much more likely to affect Arctic drilling than vice versa, i.e., Alaska is a price-taker, not a price-maker. That is partially because, as noted earlier, the average cost of extracting oil from the Arctic is $75/barrel, which is almost three times the cost of extraction in the Middle East. As a high-cost producer, Arctic oil production is more economically vulnerable to downturns in world oil prices than less-costly tight oil production in the lower 48.

Fourth, the EIS must take a hard look at the magnitude and timing of impacts of the proposed oil and gas leasing program and alternatives on the federal deficit. The premise for including the Coastal Plain oil and gas leasing program in the Tax Act was an assumption — based on a controversial estimate by the Congressional Budget Office[766] — that the program would generate $2.2 billion in "bonus bids" by 2027 (ten years from enactment of legislation), of which $1.1 billion would reduce the federal deficit.[767] That amounts to an average bonus bid of $2,750/acre for the 800,000 acres required to be leased by the Tax Act.

However, the recent history of bidding on oil and gas leases in Alaska's North Slope region indicates that the CBO estimate is wildly optimistic. On-shore bonus bids between 2000 and 2016 averaged just $34/acre, including 4.7 million acres that were leased in the NPR-A for a total of $197 million, or $42/acre.[768] The BLM should therefore undertake an independent analysis of likely bonus bids for oil and gas leasing in the Coastal Plain using the latest available bidding data in the region.

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[766] Congressional Budget Office, Cost Estimate, A Legislative Proposal Related to the Arctic National Wildlife Refuge (Nov. 8, 2017), *available at*: https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=3454269F-6DC5-4E6C-9F23-99D1E3E64698. The CBO based its estimate on "historical information about oil and gas leasing in the United States and on information from DOI, EIA, and individuals working in the oil and gas industry about factors that affect the amounts that companies are willing to pay to acquire oil and gas leases."

[767] According to the fiscal year 2018 budget, projected receipts from leasing represent less than 0.5% of the total budget deficit reductions proposed (Office of Management and Budget, 2017)

[768] Murphy, op. cit.

In addition, the EIS should consider the considerable time lag between potential approval of oil and gas development and production, and subsequent royalty payments to the U.S. Treasury. These payments may not reach the Treasury until 10-20 years after leasing is approved.

a. BLM Must Analyze How Arctic Refuge Drilling Would Affect Employment and the Subsistence Economy in the Short- and Long-Term.

The EIS must acknowledge that because oil is a non-renewable, finite resource, oil industry jobs resulting from drilling in the Arctic Refuge would be temporary, lasting no more than a few decades. After peak production, oil output and employment would decline until production ceased altogether, at which point the oil industry would abandon the area and related employment would cease. In addition, a distinction should clearly be made between new jobs created (thus reducing unemployment) and jobs filled by people previously employed elsewhere (a shift in jobs) which results in no net job creation.

In contrast to the transient, boom-and-bust nature of oil development, the Porcupine Caribou Herd and natural habitats of the Arctic Refuge have been the socio-economic backbone of the Gwich'in people and other Alaska Native and Canadian First Nations for millennia. Therefore, the relatively short-term employment benefits of drilling must be carefully weighed against the risk of sacrificing a sustainable economic asset of immense value.

From an economic sustainability perspective, the central question that the EIS must address is this: Looking 50-70 years into the future — after recoverable oil is exhausted and/or abandoned — would it better to have (a) no Arctic-based oil drilling jobs and no Arctic caribou-based subsistence economy and society, having been irreversibly destroyed by the oil drilling, or (b) no Arctic-based drilling jobs and a healthy Arctic caribou-based subsistence economy that may continue to thrive for many centuries into the future?

B. Trans-Alaska Pipeline Operation without Arctic Refuge Oil.

The EIS also must accurately describe the operation and longevity of the Trans-Alaska Pipeline System (TAPS) without Arctic Refuge oil. There are several ways to ensure that TAPS continues to operate over the long-term including technical upgrades to the pipeline such as adding heat. TAPS' operator, Alyeska, is employing those measures. Notably, although TAPS currently is operating at less than at its peak, pipelines are always designed and operated to carry less than peak flow and it is in no danger of shutting down due to low oil flow. Despite some in-

state and DC-based rhetoric, Arctic Refuge oil and gas is not necessary to ensure that TAPS remains operational.[769]

2. Economic Considerations for Delaying Leasing.

In addition to the economic points raised in the above-referenced report, the EIS must consider if and when economic and other relevant considerations should dictate when leasing and development should actually occur.

As summarized in the Mineral Leasing Act, for example, the national policy underlying oil and gas leasing is "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*."[770] 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.

In this context, the BLM can and should apply the principles of option value or informational values, which permit the agency 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.[771] In the context of the Coastal Plain, there are significant considerations that would support delaying leasing. 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."[772]

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. 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. As discussed above, the Tax Act leaves BLM with ample

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[769] See Epstein, L., Trans-Alaska Oil Pipeline Flow: Doing Just Fine After Forty Years, 11 pp. https://wilderness.org/sites/default/files/Alaska%20Pipeline%20Report.pdf (June 2017).

[770] 30 U.S.C. § 21a (emphasis added).

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

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

discretion to condition exploration and development on specific circumstances and, by suspending leases, BLM can 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. This approach must be considered in the range of alternatives.

The EIS for leasing must evaluate the economic benefits that could arise from delaying leasing 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. Further, the Mineral Leasing Act underscores the importance of looking at economic and environmental needs in making leasing decisions. Given the importance and vulnerability of the Coastal Plain of the Arctic Refuge, an option value analysis should be part of a comprehensive evaluation of the impacts of leasing and should inform alternatives to simply proceeding with leasing in the EIS.

VII. BLM MUST CONDUCT A COMPREHENSIVE ANILCA SECTION 810 ANALYSIS.

Title VIII of ANILCA recognizes that subsistence uses and the continuation of subsistence opportunities are in the public interest and provides a framework to consider and protect subsistence uses in agency decision making processes.[773] As the Supreme Court explained:

> [t]he purpose of ANILCA § 810 is to protect Alaskan subsistence resources from unnecessary destruction. Section 810 does not prohibit all federal land use actions which would adversely affect subsistence resources but sets forth a procedure through which such effects 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.[774]

Thus, ANILCA section 810 imposes a two-tiered process to evaluate a project's impacts on subsistence uses. First, the federal agency:

> [i]n determining whether to withdraw, reserve, lease, or otherwise permit the use,

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[773] 16 U.S.C. §§ 3111–3126.
[774] *Amoco Production Co. v. Village of Gambell, Alaska*, 480 U.S. 531, 544 (1987).

> occupancy, or disposition of public lands . . . shall 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 public lands needed for subsistence purposes.[775]

This initial finding is referred to as the "tier-1" determination,[776] and requires the agency to consider the cumulative impacts in making the determination.[777]

If the agency, after conducting the tier-1 analysis, determines that the activity will not "significantly restrict subsistence uses,"[778] then the agency issues a Finding of No Significant Restriction (FONSI) 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 make conduct a "tier-2" analysis.[779] Under tier-2, the agency must determine that any restriction on subsistence is necessary considering 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 steps to minimize the adverse impacts to subsistence uses and resources from any use.[780] Thus, as the Ninth Circuit explained, ANILCA section 810 imposes procedural requirements as well as substantive restrictions on the agency's decisions.[781] The agency must also provide notice to local and regional councils and hold hearings.

The NOI indicates that BLM will consider the impacts to subsistence use and resources and how to minimize any impacts from any impacts that result from restrictions that BLM determines are necessary.[782] Oil and gas leasing and any associated activities on the Coastal Plain will adversely affect subsistence resources and will likely significantly restrict subsistence

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[775] ANILCA § 810(a), 16 U.S.C. § 3120(a).

[776] *Hanlon v. Barton*, 470 F. Supp. 1446, 1448 (D. Alaska 1988)

[777] *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).

[778] 16 U.S.C. § 3120(a).

[779] *Kunaknana v. Clark*, 742 F.2d 1145, 1151 (9th Cit. 1984); *Hanlon*, 470 F. Supp. at 1448.

[780] 16 U.S.C. § 3120(a)(1)–(3).

[781] *Sierra Club v. Marsh*, 872 F.2d 497, 502–03 (9th Cir. 1989).

[782] 83 Fed. Reg. 17,563.

use. Those impacts will be felt by those using the subsistence resources within the Coastal Plain, but also those that depend on the subsistence resources that the Coastal Plain supports beyond its boundaries. BLM must consider the impacts to all subsistence users of Coastal Plain resources. BLM must consider the impacts to the Inupiat of the North Slope as well as the Gwich'in of Alaska and Canada, who are heavily dependent on the Porcupine Caribou Herd as it follows its historic migratory route through the Gwich'in homelands. BLM should provide a thorough discussion of whether the alternatives do, in fact, involve the minimal amount of public lands necessary to accomplish the purpose of the use and a thorough analysis of what steps it anticipates taking to minimize the adverse impacts to subsistence uses and resources.[783]

VIII. CONCLUSION

As outlined above, BLM must address numerous issues and conduct a robust analysis to comply with its legal duties before it can authorize any oil and gas activities on the Coastal Plain. 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.

Appendices:
Appendix 1-A Narrow Margin map
Appendix 2-Vulnerable Species charts 1a & 1b
Appendix 3-References Cited for Caribou Section
Appendix 4-References Cited for Soundscapes and Acoustics Section
Appendix 5-References Cited for Hydrology and Fish Sections
Appendix 6-Relevant Blowout and Spill Data

Attachments:
Defenders of Wildlife, No Refuge from Warming
Defenders of Wildlife, No Refuge from Warming Supplementary Materials
The Wilderness Society, Arctic National Wildlife Refuge: Economics of Potential Oil Development
National Wildlife Refuge Association Ltr. re: Timeline for Arctic Refuge Leasing EIS

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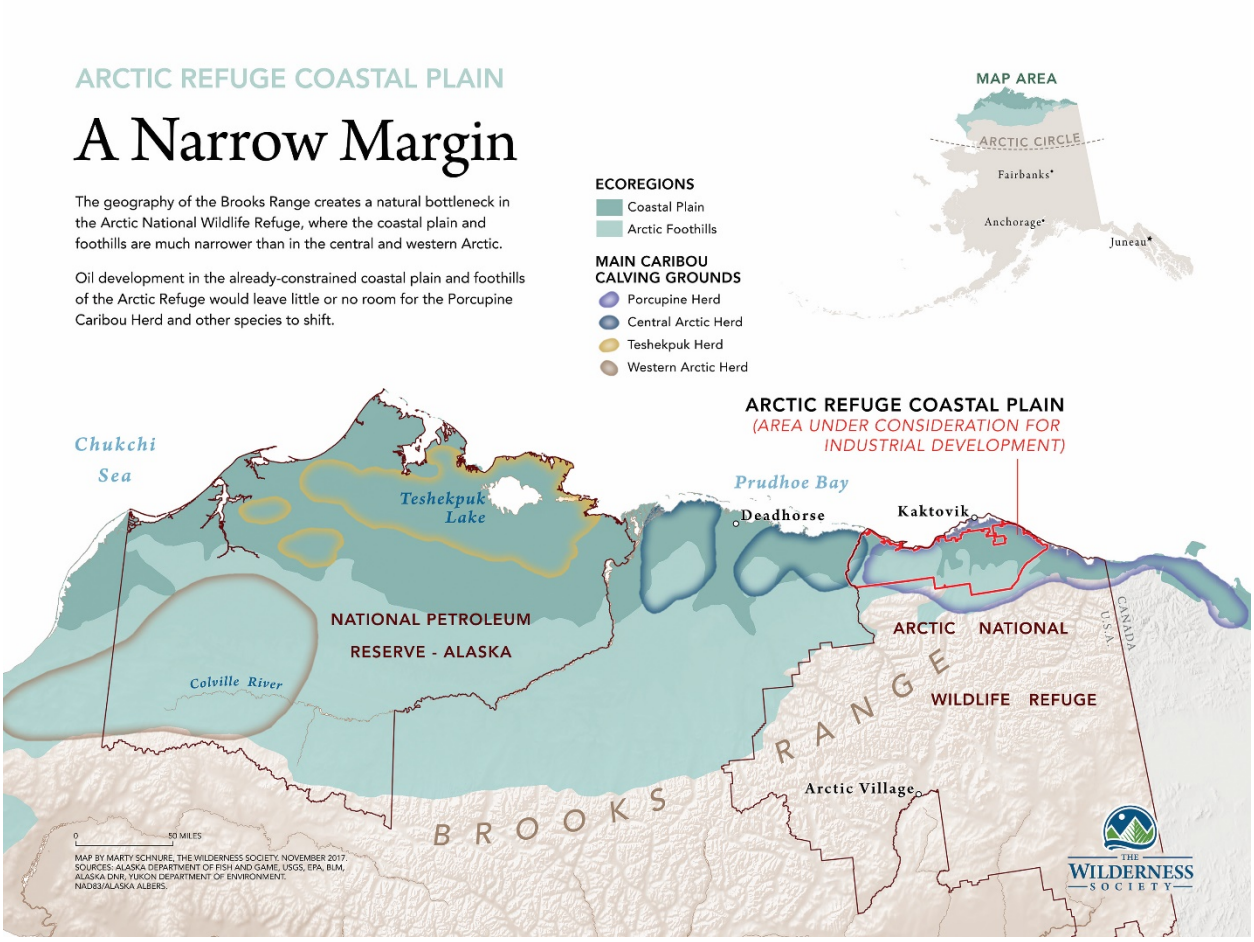
[783] *See also supra* Part V.F., VI.C.1.

Appendix 1


ARCTIC REFUGE COASTAL PLAIN
A Narrow Margin
The geography of the Brooks Range creates a natural bottleneck in the Arctic National Wildlife Refuge, where the coastal plain and foothills are much narrower than in the central and western Arctic.
Oil development in the already-constrained coastal plain and foothills of the Arctic Refuge would leave little or no room for the Porcupine Caribou Herd and other species to shift.
ECOREGIONS
Coastal Plain
Arctic Foothills
MAIN CARIBOU CALVING GROUNDS
Porcupine Herd
Central Arctic Herd
Teshekpuk Herd
Western Arctic Herd
MAP AREA
ARCTIC CIRCLE
Fairbanks
Anchorage
Juneau
ARCTIC REFUGE COASTAL PLAIN
(AREA UNDER CONSIDERATION FOR INDUSTRIAL DEVELOPMENT)
Chukchi Sea
Teshekpuk Lake
Prudhoe Bay
Deadhorse
Kaktovik
NATIONAL PETROLEUM RESERVE - ALASKA
Colville River
ARCTIC NATIONAL WILDLIFE REFUGE
BROOKS RANGE
Arctic Village
U.S.A.
CANADA
0 50 MILES
MAP BY MARTY SCHNURE, THE WILDERNESS SOCIETY. NOVEMBER 2017.
SOURCES: ALASKA DEPARTMENT OF FISH AND GAME, USGS, EPA, BLM, ALASKA DNR, YUKON DEPARTMENT OF ENVIRONMENT.
NAD83/ALASKA ALBERS.
THE WILDERNESS SOCIETY

Appendix 2

EXTREMELY VULNERABLE SPECIES

- Greatly increases vulnerability
- Increases vulnerability
- Somewhat increases vulnerability

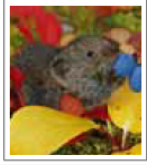
EXTREMELY VULNERABLE SPECIES		CONTRIBUTING FACTORS								
		Sea level rise	Natural barriers to range shift	Sensitivity to rising temperature	Sensitivity to moisture change	Sensitivity to changes in fires and floods	Dependence on ice and snow	Habitat versatility	Dietary versatility	Genetic factors
Polar Bear 	Adapted to life on Arctic sea ice and classified as marine mammal. Hunts preferred prey, seals, from ice. Dens and gives birth along coast of refuge, where sea-ice loss is already accelerating. Population predicted to decline by two-thirds over next 50 years as sea ice continues to disappear.	●	●	●			●		●	●
Arctic Fox 	Turns white in winter. Acute hearing helps locate small rodents under snow. Habitat in refuge confined to narrow strip of tundra bordered by the ocean. Faces competition from larger red fox as boreal forest expands northward with climate change.	●	●	●			●		●	●
Muskox 	Grazes on tundra vegetation that freezing rains can encase in ice. Also vulnerable to parasites that thrive in warmer temperatures. With fewer than 300 in refuge, lacks genetic variation that facilitates adaptability.	●	●	●	●	●			●	●
Collared Lemming 	Feeds on plants and twigs in upland areas of tundra. Only rodent that turns white in winter. Depends on snow cover for insulation and to avoid predators. Ocean limits ability to shift northward.		●	●			●			
Brown Lemming 	Found in moister areas of tundra, not as far north as collared lemming. Relies on snow cover for winter insulation and predator avoidance. Habitat sensitive to drying out as snowpack and other variables change.		●	●	●		●	●		
Tundra Vole 	Lives in dense vegetation at edges of streams and marshes. Eats grasses and sedges in summer and stores roots and seeds for later. Lower survival documented in warmer winters due to freeze-thaw cycle icing over feeding areas. Encroachment of forest on tundra also a threat.		●	●	●	●	●			

Table 1a. Arctic National Wildlife Refuge mammal species that are "Extremely Vulnerable" to climate change

HIGHLY VULNERABLE SPECIES

● Greatly increases vulnerability
● Increases vulnerability
● Somewhat increases vulnerability

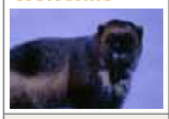
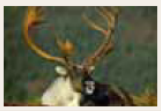
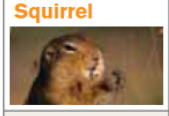
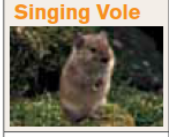
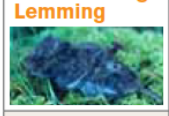
		CONTRIBUTING FACTORS								
		Sea level rise	Natural barriers to range shift	Sensitivity to rising temperature	Sensitivity to moisture change	Sensitivity to changes in fires and floods	Dependence on ice and snow	Habitat versatility	Dietary versatility	Genetic factors
Lynx 	Solitary boreal forest cat. Snowshoe hares preferred prey, but also hunts rodents, aided by big feet and light build that offer advantage over other predators in snow. Changes in snowpack bring coyotes and other competitors to lynx habitat.		●		●	●	●			
Wolverine 	Largest terrestrial member of weasel family. Hunts small mammals and scavenges carrion in forested mountains. Young born in den dug by female in snow for insulation and protection. Requires persistent spring snow for denning and cannot tolerate hot summers.		●	●		●				●
Caribou 	Migratory grazer already declining due to ice storms glazing over tundra vegetation; more frequent fires that kill lichens it eats; peaking of best spring forage before herd arrives in refuge to breed; and increase in mosquitoes significant enough to interfere with feeding.		●	●	●	●			●	
Dall Sheep 	High mountain slopes of Brooks Range in refuge northernmost extent of population. Forages in alpine meadows and avoids deep snow. Vulnerable due to narrow habitat requirements and potential increase in parasites.		●	●	●					●
Alaska Marmot 	Larger rodent found only on slopes of Brooks Range. Spends most of year in hibernation, emerging in late spring to feed on vegetation until first snow sends back underground. Small window for feeding and breeding and dependence on sensitive alpine tundra pose risk.		●	●		●	●			
Arctic Ground Squirrel 	Lives on upland ridges and tundra. Needs well-drained soils for burrowing. In hibernation has lowest body temperature of any mammal. Sensitive to changes in temperature, moisture and snow cover and limited by narrow habitat range.		●	●	●		●			
Singing Vole 	Named for characteristic vocalization. Active year-round in moist areas of tundra. Feeds on plants it gathers and dries on rocks. Threats include encroachment of shrubs on tundra, increased flooding, and icing of food stores.		●	●	●		●			
Northern Bog Lemming 	Lives near bogs and in damp meadows. Eats mostly grasses and sedges. Nests in underground burrows or under logs, hummocks or snow. Already rare, specific habitat requirements and reliance on snow cover for insulation leave highly susceptible to climate change.		●	●	●		●	●		
Tundra Shrew 	Tiny insect-eater found in shrubby areas, especially on hillsides. Consumes up to three times weight in food per day. Vulnerable due to narrow range of potential habitats and limited dispersal ability.		●	●			●			
Barren Ground Shrew 	Wet area counterpart to tundra shrew. Poorly studied insectivore, but likely vulnerable due to narrow habitat range on coastal plain of refuge.		●	●			●			

Table 1b. Arctic National Wildlife Refuge mammal species that are "Highly Vulnerable" to climate change.

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Appendix 6—Relevant Blowout and Spill Data

In 2016, British Petroleum (BP) had a production well blowout near its Prudhoe Bay infrastructure on the North Slope. This unexpected event could have been much more serious had the gas ignited. International well kill specialists Boots & Coots came to Alaska to shut down this well. Later in 2016, the Alaska Oil and Gas Conservation Commission (which oversees all oil and gas wells in the state) ordered a review of every North Slope well to determine if they have similar designs with the potential for dangerous and environmentally damaging blowouts.[784] BP determined the cause of the blowout was thawed permafrost.[785]

During the winter of 2012, Repsol had an exploratory well blowout on the North Slope that spewed an estimated 42,000 gallons of drilling muds. It took a month to plug that well because frigid temperatures slowed down or prevented work during that period.

BP's March 2006 pipeline spill of over 200,000 gallons was the largest crude oil spill to occur in the North Slope oil fields. It brought national attention to the chronic nature of such spills. Another pipeline spill in August 2006 resulted in shutdown of BP production in Prudhoe Bay and brought to light major concerns about systemic neglect of key infrastructure. Lack of adequate preventive maintenance is not a new issue, however, as corrosion problems in Prudhoe Bay and other oil field pipelines have been raised previously by regulators and others, including as early as 1999 by the Alaska Department of Environmental Conservation.[786]

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[784] DEMARBAN, A., STATE REGULATORS LAUNCH WIDE REVIEW OF NORTH SLOPE OIL FIELDS FOLLOWING BP LEAK, *ALASKA DISPATCH NEWS*, RETRIEVED NOVEMBER 1, 2017 FROM HTTPS://WWW.ADN.COM/BUSINESS-ECONOMY/ENERGY/2017/10/30/STATE-REGULATORS-LAUNCH-WIDE-REVIEW-OF-NORTH-SLOPE-OIL-FIELDS-FOLLOWING-BP-LEAK/ (OCTOBER 30, 2017).

[785] BP Exploration., October 2017 Update to the DS02-)3 Accidental Oil and Gas Release.

[786] Charter for the Development of the Alaskan North Slope, December 2, 1999, (BP ARCO Merger Agreement), http://www.dec.state.ak.us/spar/ipp/docs/Charter%20Agreement.pdf.

The State of Alaska completed a report in November 2010[787] which reviewed over 6,000 North Slope spills from 1995-2009. This report showed that there were 44 loss-of-integrity spills each year[788] with 4.8 of those each year on average greater than 1,000 gallons,[789] meaning that there is a spill of 1,000 gallons or more nearly every two months.

In 2009, The Wilderness Society issued a report on North Slope spills entitled *Broken Promises*[790] which should be used in conjunction with the state's North Slope spill report. This Wilderness Society report shows a spill frequency on the North Slope of 450 spills each year from 1996-2008, with the difference being that the state included only "production-related" spills in its analysis and excluded North Slope toxic chemical (e.g., antifreeze) and refined product (e.g., diesel) spills - many of which are related to oil development - as well as spills indirectly related to oil production infrastructure, such as those from drilling or workover operations and from vehicles.

Looking at the raw data reported to the Alaska Department of Environmental Conservation,[791] there were 121 reported crude oil spills on the North Slope during the five years from October 30, 2012 until October 30, 2017, or approximately two crude oil spills per month. Additionally, there have been 1,647 reported spills of all types on the North Slope during this period, which is nearly one spill per day.

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[787] 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 http://dec.alaska.gov/spar/PPR/ara/documents/101123NSSAReportvSCREENwMAPS.pdf (November 2010).

[788] *Id.* at 21.

[789] *Id.* at 23.

[790] The Wilderness Society, Broken Promises: The Reality of Oil Development in America's Arctic (2nd Edition) (2009).

[791] See the Alaska Department of Environmental Conservation Spills Database Search website: http://dec.alaska.gov/Applications/SPAR/PublicMVC/PERP/SpillSearch.