



Animal Welfare Institute

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VIA ELECTRONIC MAIL (blm_ak_coastalplain_EIS@blm.gov)

Bureau of Land Management
Alaska State Office,
Attention—Coastal Plain EIS
222 West 7th Avenue, #13
Anchorage, AK 99513-7599

Re: Scoping Comments on Leasing Environmental Impact Statement (“Leasing EIS”) for the Coastal Plain Oil and Gas Leasing Program

To Whom It May Concern:

Please accept these comments on behalf of the Animal Welfare Institute (“AWI”) regarding the scope of issues to be considered by the Bureau of Land Management (“BLM”) in the planned Leasing Environmental Impact Statement (“EIS”) for the Coastal Plain Oil and Gas Leasing Program in Alaska. *See* 83 Fed. Reg. 17562 (April 20, 2018).

AWI, established in 1951, is one of America’s oldest animal welfare organizations. It is a non-profit charitable organization headquartered in Washington, DC. The organization is dedicated to reducing animal suffering caused by people by seeking better treatment of animals everywhere – in the wild, in the laboratory, on the farm, at home, and in commerce. This is accomplished through public education, research, collaborations with like-minded organizations, media relations, outreach to agencies, engaging its members and supporters, advocating for stronger laws both domestically and internationally, and through litigation.

The EIS will consider and analyze the potential environmental impacts of various leasing alternatives, including the areas to offer for sale, and the terms and conditions to be applied to leases and associated oil and gas activities. The EIS may also inform post-lease activities, including seismic and drilling exploration, development, and transportation of oil and gas in and from the Coastal Plain. *See* 83 Fed. Reg. 17562 (April 20, 2018). Because the agency is at the early scoping stage of the EIS process, these comments will focus on the overarching issues that must be covered in the EIS, including the categories of environmental impacts that should be considered for each alternative, the proper delineation of the purpose and need statement, and the reasonable set of alternatives that must be considered.

I. The Legal, Regulatory, and Procedural Requirements of the National Environmental Policy Act.

a. Legal Background.

The National Environmental Policy Act (“NEPA”), 42 U.S.C. § 4321, *et seq.*, is the “basic charter for protection of the environment.” 40 C.F.R. § 1500.1(a). *Dept. of Transp. v. Pub Citizen*, 541 U.S. 752, 756 (2004). In enacting NEPA, Congress declared a national policy of “creat[ing] and maintain[ing] conditions under which man and nature can exist in productive harmony.” *Or. Natural Desert Ass’n v. Bureau of Land Mgmt.*, 531 F.3d 1114, 1120 (9th Cir. 2008) (quoting 42 U.S.C. § 4331(a)). NEPA was adopted to “promote efforts which will prevent or eliminate damage to the environment and biosphere” in order to “fulfill the responsibility of each generation as trustee of the environment for succeeding generations.” 42 U.S.C. §§ 4321, 4331(b)(1). NEPA is intended to “ensure that [federal agencies] ... will have detailed information concerning significant environmental impacts” and “guarantee[] that the relevant information will be made available to the larger [public] audience.” *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 1998).

Congress also recognized “the worldwide and long-range character of environmental problems,” and therefore also directed that agencies support “programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind’s world environment[.]” 42 U.S.C. § 4332(F). This mandate is particularly relevant here because oil and gas development is a significant source of greenhouse gas emissions. These emissions contribute to global climate change, which is an issue of great international concern. Additionally, the caribou herds that migrate into the Coastal Plain, in particular the Porcupine Caribou Herd, maintain territory in both the United States and Canada and represents an ecologically, culturally, aesthetically, and biologically important wildlife attribute in both countries. These two issues will be discussed in greater detail in subsequent sections of this letter.

Under NEPA, before a federal agency takes a major federal action that significantly affects the quality of the environment, the agency must prepare an environmental impact statement. *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1067 (9th Cir. 2002) (quoting 43 U.S.C. § 4332(2)(C)); 40 C.F.R. § 1502.9. “An EIS is a thorough analysis of the potential environmental impact that ‘provide[s] full and fair discussion of significant environmental impacts and ... inform[s] decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.’” *Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 993 (9th Cir. 2004) (citing 40 C.F.R. § 1502.1). An EIS is NEPA’s “chief tool” and is “designed as an ‘action-forcing device to [e]nsure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government.’” *Or. Natural Desert Ass’n*, 531 F.3d at 1121 (quoting 40 C.F.R. § 1502.1).

An EIS must discuss the following issues: (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-

term uses of man's environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. 42 U.S.C. § 4322. An EIS must identify and analyze the direct, indirect, and cumulative effects of the proposed action. Indirect effects include "growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." *Id.* § 1508.8(b). Cumulative effects are defined as "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions." *Id.* § 1508.7. This analysis requires more than "general statements about possible effects and some risk" or simply conclusory statements regarding the impacts of a project. *Klamath Siskiyou Wildlands Center v. BLM*, 387 F.3d 989, 995 (9th Cir. 2004) (citation omitted); *Oregon Natural Resources Council v. BLM*, 470 F.3d 818, 822-23 (9th Cir. 2006). Conclusory statements alone "do not equip a decisionmaker to make an informed decision about alternative courses of action or a court to review the Secretary's reasoning." *NRDC v. Hodel*, 865 F.2d 288, 298 (D.C. Cir. 1988).

The EIS must also address various project alternatives and mitigation measures. 42 U.S.C. § 1502.16(e). Such mitigation measures may include: (a) avoiding the impact altogether by not taking a certain action or parts of an action. (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation. (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment. (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. (e) compensating for the impact by replacing or providing substitute resources or environments. *Id.* § 1508.20. An EIS must consider the environmental impacts (and appropriate mitigation measures) not only for its proposed action, but also for a set of reasonable alternatives.

The Council on Environmental Quality ("CEQ") has issued regulations mandating that agencies rely on "high-quality" scientific information in preparing an EIS. *Id.* §§ 1500.1(b), 1502.24 (directing agencies to "insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements"). This includes "identify[ing] any methodologies used and [making] explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement." *Id.* Moreover, where necessary scientific information does not already exist, if the data is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," the agency is required to collect the information to include in the EIS. *Id.* § 1502.22(a). Where there is incomplete information that is relevant to the reasonably foreseeable impacts of a project and essential for a reasoned choice among alternatives, the agencies must obtain that information unless the costs of doing so would be exorbitant or the means of obtaining the information are unknown. 40 C.F.R. § 1502.22. Even in those instances where complete data is unavailable, the EIS also must contain an analysis of the worst-case scenario resulting from the proposed project. *Friends of Endangered Species v. Jantzen*, 760 F.3d 976, 988 (9th Cir. 1985) citing *Save our Ecosystems v. Clark*, 747 F.2d 1240, 1243 (9th Cir. 1984); 40 C.F.R. § 1502.22.

It is well established that NEPA review cannot be "used to rationalize or justify decisions already made." 40 C.F.R. § 1502.5; *Metcalf v. Daley*, 214 F.3d 1135, 1141-42 (9th Cir.

2000) (“the comprehensive ‘hard look’ mandated by Congress and required by the statute must be timely, and it must be taken objectively and in good faith, not as an exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made.”)

b. The Alternatives Requirement is at the “Heart” of the NEPA Analysis.

The “heart” of the NEPA process is an agency’s duty to consider “alternatives to the proposed action” and to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. §§ 4332(2)(C)(iii), 4332(2)(E). The CEQ regulations require the action agency to: (a) rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated; (b) devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits; (c) include reasonable alternatives not within the jurisdiction of the lead agency; (d) include the alternative of no action; (e) identify the agency’s preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference; and (f) include appropriate mitigation measures not already included in the proposed action or alternatives. *Id.*; *see also* 43 C.F.R. § 46.415(b).

“A ‘viable but unexamined alternative renders [the] environmental impact statement inadequate.’” *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 814 (9th Cir. 1999) (quoting *Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir. 1985)). “The purpose of NEPA’s alternatives requirement is to ensure agencies do not undertake projects “without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of accomplishing the same result by entirely different means.” *Envtl. Defense Fund, Inc. v. U.S. Army Corps of Engrs.*, 492 F.2d 1123, 1135 (5th Cir. 1974). The courts, in the Ninth Circuit as well as elsewhere, have consistently held that an agency’s failure to consider a reasonable alternative is fatal to an agency’s NEPA analysis. *See, e.g., Idaho Conserv. League v. Mumma*, 956 F.2d 1508, 1519-20 (9th Cir. 1992) (“The existence of a viable, but unexamined alternative renders an environmental impact statement inadequate.”). If the agencies reject an alternative from consideration, they must explain why a particular option is not feasible and was therefore eliminated from further consideration. 40 C.F.R. § 1502.14(a). The courts will scrutinize this explanation to ensure that the reasons given are adequately supported by the record. *See Muckleshoot Indian Tribe*, 177 F.3d at 813-15, *Idaho Conserv. League*, 956 F.2d at 1522 (while agencies can use criteria to determine which options to fully evaluate, those criteria are subject to judicial review), *Citizens for a Better Henderson*, 768 F.2d at 1057.

c. Baseline Information and Analysis of the Affected Environment Must Be Comprehensive.

NEPA requires the agencies to “describe the environment of the areas to be affected or created by the alternatives under consideration.” 40 C.F.R. § 1502.15. The establishment of the baseline conditions of the affected environment is a fundamental requirement of the NEPA

process. Without establishing the baseline conditions which exist in the vicinity ... before [the project] begins, there is simply no way to determine what effect the proposed [project] will have on the environment and, consequently, no way to comply with NEPA. *Half Moon Bay Fisherman's Mark't Ass'n v. Carlucci*, 857 F.2d 505, 510 (9th Cir. 1988). Such baseline information and analysis must be part of any environmental review and be subject to public review and comment under NEPA. The lack of an adequate baseline analysis fatally flaws an EIS or EA. *Northern Plains v. Surf. Transp. Brd.*, 668 F.3d 1067, 1083 (9th Cir. 2011). “[W]ithout [baseline] data, an agency cannot carefully consider information about significant environment impacts. Thus, the agency fail[s] to consider an important aspect of the problem, resulting in an arbitrary and capricious decision.” *Id.* at 1085.

d. BLM Must Look at the Whole Action in its Analysis.

The regulations further provide that an EIS must systematically and comprehensively address all of the relevant environmental impacts of the action under consideration. *Id.* § 1502.16. NEPA characterizes environmental impacts broadly to include not only ecological effects, such as physical, chemical, radiological and biological effects, but also aesthetic, historic, cultural, economic, and social effects. *Id.* § 1508.8. With regard to “ecological effects” in particular, they include “effects on natural resources and the components, structures, and functioning of affected ecosystems,” including “effects on air and water and other natural systems.” *Id.* § 1508.8(b).

The agencies must look at the entire action, including not only the pipelines and wells drilled, but also the transportation of fluids including water onto the site and removal of waste fluids from the site—and the environmental impact of those operations wherever they occur, even if they take place off of the Coastal Plain. BLM cannot arbitrarily limit the scope of the environmental analysis. NEPA regulations and case law require that the agencies must evaluate all “reasonably foreseeable” direct and indirect effects of the proposed project. 40 C.F.R. § 1508.8; *Davis v. Coleman*, 521 F.2d 661, 676 (9th Cir. 1975). NEPA requires that an agency conduct all environmental analyses at “the earliest possible time.” 40 C.F.R. § 1501.2; *see also N.M. ex rel. Richardson v. Bureau of Land Mgmt.*, 565 F.3d 683, 718 (10th Cir. 2009). Here, this means that BLM must analyze all reasonably foreseeable impacts now—not segment the project approval into phases for analysis so that it is unable to prevent environmental impacts.

II. Environmental Impacts that BLM Should Address in the EIS.

The EIS must provide an analysis of the nature, intensity, and extent of potential environmental impacts, along with supporting science and data, of each alternative. Consideration should be given to the environmental impacts of all phases and components of oil and gas leasing, including, but not limited to, exploration, roads, pipelines, well pad development, development of associated facilities, fracking, movement of materials (e.g., construction materials, water, fracking fluids, personnel, gravel, and waste) to and from the sites, transport of oil and gas products at every stage of the process, and post-production activities, including decommissioning and reclamation.

a. Impacts to Wildlife Species.

Approximately 700 species of animals and plants inhabit ANWR, including more than 200 bird species, 4 species of mammals, and 42 fish species.¹ Oil and gas exploration and development activity can have wide-ranging impacts on wildlife and the ecosystem they inhabit, including: (1) habitat loss, fragmentation, and degradation, (2) harm from oil and gas wastewater, (3) mortality, lower reproductive success, and negative health effects, and (4) declines in density and abundance. The EIS should specifically identify the particularized impacts of the alternatives being considered, including the proposed action, on each species present within the Coastal Plain at any time during the year. An EIS that simply addresses generic impacts on terrestrial or aquatic wildlife as a whole would be insufficient to inform the agency and the public of the impacts of the proposal on specific species. The following is a non-exhaustive list of the impacts that should be considered for a select number of species that will be the most negatively impacted by oil and gas development in ANWR should it be permitted. These comments do not address impacts for all species that BLM should consider in its EIS.

i. Impacts to the Porcupine Caribou Herd.

The EIS must analyze potential effects of oil and gas leasing on the Coastal Plain on caribou (*Rangifer tarandus*), with an emphasis on the Porcupine Caribou Herd (“PCH”) and the Central Arctic Herd (“CAH”). The Porcupine caribou are an important part of the ecosystem of the Coastal Plain, both depending on and enriching the environment in which they live.² The herd migrates 700 miles, twice a year, to ANWR’s Coastal Plain during calving season.³ The Porcupine caribou herd has calved in the Coastal Plain for thousands of years. Females return there year after year to give birth. Approximately 40,000 calves are born on the Coastal Plain each year.⁴ The PCH mainly uses the Coastal Plain as a staging ground with the south central portion representing a core caribou calving ground. The PCH uses the western portion of the

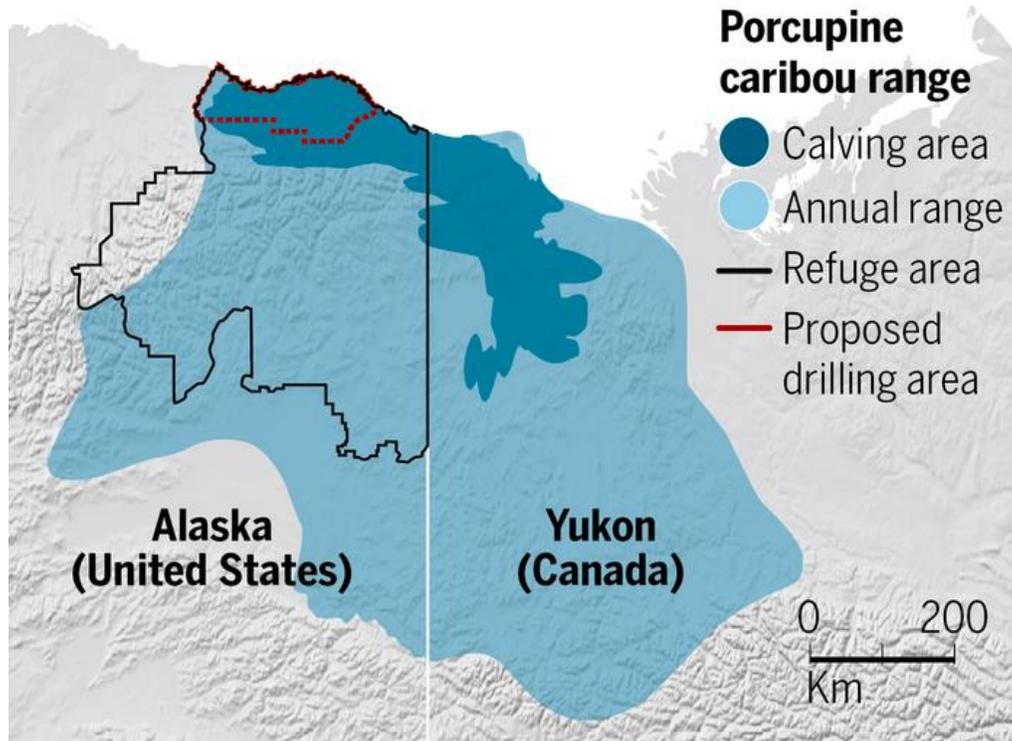
¹ U.S. Fish and Wildlife Service, Wildlife and Habitat, Arctic National Wildlife Refuge. 2013. Available at: https://www.fws.gov/refuge/arctic/wildlife_habitat.html; Fecht, Sarah, Arctic National Wildlife Refuge: How Drilling for Oil Could Impact Wildlife, State of the Planet, Earth Institute of Columbia University. Dec. 6, 2017. Available at: <http://blogs.ei.columbia.edu/2017/12/06/arctic-national-wildlife-refuge-drilling-oil-impact-wildlife/>.

² Mergener, Adam, et al., The Arctic National Wildlife Reserve: Save the Caribou, University of Massachusetts. Dec. 4, 2017. Available at: <https://blogs.umass.edu/natsci397a-cross/the-arctic-national-wildlife-reserve-save-the-caribou/>.

³ U.S. Fish and Wildlife Service, Caribou. 2016. Available at: <https://www.fws.gov/refuge/arctic/caribou.html>; Mission 2007: Devising and Analyzing the Most Environmentally Correct Method for Drilling in the 1002 Region of the Arctic National Wildlife Refuge, Massachusetts Institute of Technology. Available at: <http://web.mit.edu/12.000/www/m2007/teams/editing/report.html>.

⁴ Bourne, Joel, Arctic Refuge Has Lots of Wildlife – Oil, Maybe Not So Much, National Geographic. Dec. 17, 2017. Available at: <https://news.nationalgeographic.com/2017/12/arctic-wildlife-refuge-tax-bill-oil-drilling-environment/>.

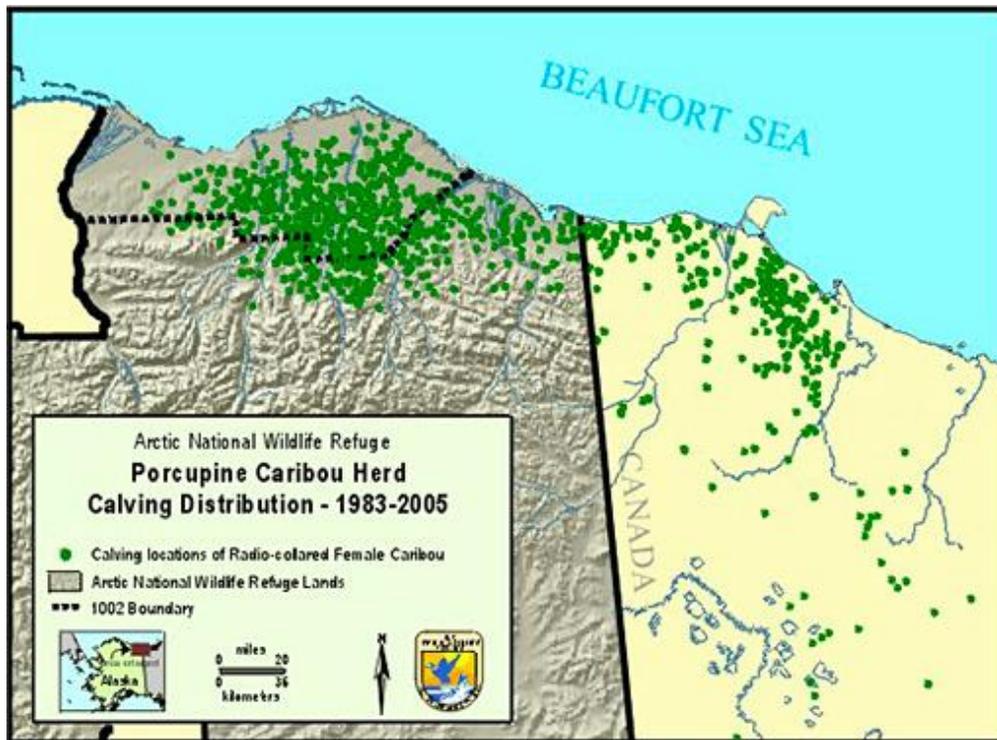
Coastal Plain as a post-calving ground.⁵ The CAH also uses a portion of the Coastal Plain for calving. Scientists anticipate that if a full suite of leases were issued for oil and gas across ANWR, about 303,000 acres of calving habitat, or 37 percent of all calving habitat, would be affected.⁶ As demonstrated by the two maps below, a significant portion of the PCH's calving grounds are located within the proposed drilling area.



Porcupine caribou Range, U.S. Department of Interior, Biological Science Report USGS/BRD/BSR-2002-0001 at 2, Fig. 3.2.

⁵ Mission 2007: Devising and Analyzing the Most Environmental Correct Method for Drilling in the 1002 Region of the Arctic National Wildlife Refuge, Massachusetts Institute of Technology. Available at: <http://web.mit.edu/12.000/www/m2007/teams/editing/report.html>.

⁶ Clough, N.K., Patton, P.C., and Christiansen, A.C., eds. 1987. 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: Washington, D.C., U.S. Fish and Wildlife Service, U.S. Geological Survey and Bureau of Land Management, v. 1 at 536. Available at: <https://pubs.usgs.gov/fedgov/70039559/report.pdf>.



Porcupine Caribou Herd Calving Distribution 1983-2005, U.S. Fish & Wildlife Service

The impacts on the PCH and CAH from oil and gas exploration and development may be severely detrimental to the health of the herd. Caribou are known to be skittish and wary of human activity preferring to seek out alternate high-quality forage areas in order to avoid industrial sites.⁷ Various studies support the conclusion that industrial activity disturbs caribou and alters their behavioral patterns. A summary of such studies was reported by Science:

In Canada's Northwest Territories . . . researchers found that caribou spent less time than expected in areas as far as 14 kilometers away from diamond mines. To the west of the Arctic refuge, in the heart of the North Slope oil fields, researchers with the U.S. Geological Survey (USGS) found that, in the 1980s and 1990s, the Central Arctic caribou herd shifted calving areas away from well concentrations. And in long term studies of the Porcupine herd (named after the Porcupine River in the Yukon and Alaska), Johnson found that even decades after oil development in the Canadian portion of its range, caribou were still avoiding areas within 6 kilometers of roads and wells.⁸

⁷ Cornwall, Warren, Drilling in Arctic Refuge could put North America's Largest Caribou Herd at Risk, Science. Nov. 21, 2017. Available at:

<http://www.sciencemag.org/news/2017/11/drilling-arctic-refuge-could-put-north-america-s-largest-caribou-herd-risk>.

⁸ *Id.*

Despite the tendency of caribou to avoid industrial sites, the caribou in the PCH often calve on a slice of the Arctic refuge's coastal plain that can be as narrow as 14 kilometers in places, located between the Brooks Range mountains and the Arctic Ocean. These animals do not have many options for expanding or altering their calving location.⁹ Due to the fact that caribou cannot entirely avoid industrial activity on the Coastal Plain, the EIS must carefully examine the potential impacts that oil and gas exploration and development activities would have on the long-term health of the PCH. Oil and gas exploration and drilling in ANWR would require large amounts of infrastructure, including pipelines, wells, and roads.¹⁰

Information gathered from biological, seismic and geological studies were used to complete a Legislative Environmental Impact Statement (LEIS), which was submitted to Congress in 1987, and described the potential impacts of oil and gas development.¹¹ The impacts included, among other things, negative responses towards human infrastructure and other disturbances.¹² A Massachusetts Institute of Technology study found that:

[D]isturbances such as roads and noise pollution could potentially affect the survival rates of species which breed and calve in the area, as well as species which depend on the region for nutrition [T]he preservation of the 1002 region is essential to the survival of the porcupine caribou herd This is an extremely critical time period for the calves because of their vulnerability to predators and great nutritional need.¹³

The inherent antipredator response of new caribou mothers during the first three weeks of calving makes them wary of roads, pipelines, vehicles, and human activity.¹⁴ Mothers with calves try to stay at least 4 km from roads, and researchers have documented displacement of calving grounds away from oil field structures.¹⁵ One study indicated, based on satellite photos that distinguish between high and low-quality vegetation, that the vegetation in alternative calving grounds that the caribou used as a result of displacement was deficient in nutrients compared with the preferred and traditional grounds. This nutritional deficiency was identified as

⁹ *Id.*

¹⁰ Bettino, Lauren et al., Impacts of Oil Drilling in the Arctic National Wildlife Refuge, University of Massachusetts. Dec. 3, 2015. Available at: <https://blogs.umass.edu/natsci397a-cross/impacts-of-oil-drilling-in-the-arctic-national-wildlife-refuge/>.

¹¹ 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. 2000. Available at: http://arcticcircle.uconn.edu/ANWR/anwr_fws.htm.

¹² Bettino, Lauren et al., Impacts of Oil Drilling in the Arctic National Wildlife Refuge, University of Massachusetts. Dec. 3, 2015. Available at: <https://blogs.umass.edu/natsci397a-cross/impacts-of-oil-drilling-in-the-arctic-national-wildlife-refuge/>.

¹³ Mission 2007: Devising and Analyzing the Most Environmental Correct Method for Drilling in the 1002 Region of the Arctic National Wildlife Refuge, Massachusetts Institute of Technology. Available at: <http://web.mit.edu/12.000/www/m2007/teams/editing/report.html>.

¹⁴ Pelley, Janet, Will Drilling for Oil Disrupt the Arctic National Wildlife Refuge? Environmental Science and Technology at 246. June 2001. Available at:

<https://pubs.acs.org/doi/pdfplus/10.1021/es0123756>.

¹⁵ *Id.*

the cause for a decline in caribou fertility rates from 83 percent on the traditional calving grounds to 65 percent of cows calving on the alternative grounds.¹⁶

Additionally, noise pollution from oil fields in the 1002 area historically have caused the PCH to cease migration to areas of the Coastal Plain for calving season. Many animals cannot tolerate drilling noises in excess of 75 decibels, causing them to avoid those areas.¹⁷ Furthermore, main pipelines can adversely alter caribou movement after calving, as they seek relief from harassment by insects. Oil development in the 1002 area could reduce the access to these important relief habitats. If caribou cannot freely move to a lower density insect habitat, there could be severe consequences, including disease or death, particularly for calves.¹⁸

These impacts can strongly effect calf survival and the long term stability of the PCH and CAH. An article published in Science reported that a “2002 USGS modeling study estimated that if drilling on the coastal plain were as extensive as on the North Slope, the survival rate of caribou calves would drop by as much as 8%, depending on where most calving occurred, in part because of greater exposure to predators and lower-quality forage.”¹⁹ Other researchers report even higher mortality rates, with models suggesting that displacement from the calving grounds will lead to an 18–20 percent increase in calf mortality, causing dramatic herd declines.²⁰ Additionally, in 1992, the Alaska Department of Fish and Game found that calf survival was very high on the Coastal Plain, and very low when the caribou were displaced further south or east²¹—as would result from oil and gas development in the 1002 area . Such mortality could

¹⁶ *Id.* at 246-47.

¹⁷ Drolet, Amelie, Côté, Steeve, and Dussault, Christian, Simulated drilling noise affects the space use of a large terrestrial mammal, *Wildlife Biology* 22(6), p. 284-293. 2016. Available at: <http://www.bioone.org/doi/full/10.2981/wlb.00225>; Mergener, Adam, et al., *The Arctic National Wildlife Reserve: Save the Caribou*, University of Massachusetts. Dec. 4, 2017. Available at: <https://blogs.umass.edu/natsci397a-cross/the-arctic-national-wildlife-reserve-save-the-caribou/>.

¹⁸ Clough, N.K., Patton, P.C., and Christiansen, A.C., eds., 1987, *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*: Washington, D.C., U.S. Fish and Wildlife Service, U.S. Geological Survey and Bureau of Land Management, v. 1 at 122. Available at: <https://pubs.usgs.gov/fedgov/70039559/report.pdf>.

¹⁹ Cornwall, Warren, *Drilling in Arctic Refuge could put North America’s Largest Caribou Herd at Risk*, *Science*. Nov. 21, 2017. Available at: <http://www.sciencemag.org/news/2017/11/drilling-arctic-refuge-could-put-north-america-s-largest-caribou-herd-risk>.

²⁰ Pelley, Janet, *Will Drilling for Oil Disrupt the Arctic National Wildlife Refuge?* *Environmental Science and Technology* at 247. June 2001. Available at: <https://pubs.acs.org/doi/pdfplus/10.1021/es0123756>.

²¹ Kenneth Whitten, *Movement Patterns of the Porcupine Caribou Herd in Relation to Oil Development*, Alaska Department of Fish and Game, Division of Wildlife Conservation. November 1992. Available at: http://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/research_pdfs/92_ca_porc_whitten.pdf.

ultimately cause herd numbers to fluctuate more dramatically, and make it harder for caribou to recover from declines.²²

It is vital to consider the migratory paths and calving grounds of the PCH and CAH in determining the impact of oil and gas lease sales and development in ANWR. The direct, indirect, and cumulative impacts of all oil and gas exploration and development activities on migration routes and important habitat, including calving grounds, must be fully disclosed in the Draft EIS. These areas have, in large part, remained undisturbed for centuries.²³ This must include the impacts associated with any efforts to mitigate such impacts.

Additionally, although caribou are not a threatened species, many biologists anticipate they may be on the brink of a steep decline due to the impacts of climate change. The EIS must consider the cumulative effects of oil and gas development upon caribou populations that are already stressed from a rapidly changing environment.²⁴ Spring is beginning earlier in the Arctic, with snow melting sooner and nutritious plants emerging earlier.²⁵ The caribou, however, have not adapted to these changes, so they are beginning to miss the prime foraging season.²⁶ At the same time, warmer conditions allow mosquitoes and flies to emerge earlier, reproduce more rapidly, and survive longer. One recent study has found that probability of juvenile mosquitoes surviving to adulthood could increase 53 percent under a 2 degree Celsius warming scenario.²⁷ Mosquitos and flies can attack, weaken, and kill calves, and caribou attacked by insects spend less time foraging and more time running, which reduces fitness and survival.²⁸

²² Cornwall, Warren, Drilling in Arctic Refuge could put North America's Largest Caribou Herd at Risk, Science. Nov. 21, 2017. Available at:

<http://www.sciencemag.org/news/2017/11/drilling-arctic-refuge-could-put-north-america-s-largest-caribou-herd-risk>.

²³ Mission 2007: Devising and Analyzing the Most Environmental Correct Method for Drilling in the 1002 Region of the Arctic National Wildlife Refuge, Massachusetts Institute of Technology. Available at: <http://web.mit.edu/12.000/www/m2007/teams/editing/report.html>.

²⁴ Bourne, Joel, Arctic Refuge Has Lots of Wildlife – Oil, Maybe Not So Much, National Geographic. Dec. 17, 2017. Available at: <https://news.nationalgeographic.com/2017/12/arctic-wildlife-refuge-tax-bill-oil-drilling-environment/>.

²⁵ *Id.*

²⁶ *Id.*

²⁷ Culler, Lauren, Ayres, Matthew, and Virginia, Ross, In a warmer Arctic, mosquitos avoid increased mortality from predators by growing faster, The Royal Society. 2015. Available at: <http://rsps.royalsocietypublishing.org/content/282/1815/20151549>

²⁸ Bourne, Joel, Arctic Refuge Has Lots of Wildlife – Oil, Maybe Not So Much, National Geographic. Dec. 17, 2017. Available at: <https://news.nationalgeographic.com/2017/12/arctic-wildlife-refuge-tax-bill-oil-drilling-environment/>; Welch, Craig, Why the Arctic's mosquito problem is getting bigger, badder. September 15, 2015. Available at: <https://news.nationalgeographic.com/2015/09/150915-Arctic-mosquito-warming-caribou-Greenland-climate-CO2/>.

Furthermore, the EIS must address potential violations of the 1987 agreement entered into between the United States and Canada to protect the PCH and its habitat,²⁹ known as the Caribou Conservation Agreement.³⁰ This is particularly important since the government of Canada has issued a statement opposing drilling in the refuge.³¹

The Agreement requires consideration of the following: (1) recognition of the importance of conserving the habitat of the PCH, including such areas required for calving, post-calving, migration, wintering and insect relief; (2) an understanding that the conservation of the PCH and its habitat requires goodwill among landowners, wildlife managers, users of the caribou and other users of the area; (3) recognition that the PCH should be conserved according to ecological principles and that actions for the conservation of the PCH that result in the long-term detriment of other indigenous species of wild fauna and flora should be avoided.³² All aspects of this Agreement should be addressed in the EIS.

ii. Impacts to Polar Bears.

The EIS must consider the impacts of oil and gas exploration and development in the Coastal Plain on polar bears (*Ursus maritimus*), which are listed as a threatened species under the Endangered Species Act and designated as depleted under the Marine Mammal Protection Act.³³ One important impact that polar bears face from oil and gas development in the Coastal Plain is disturbance of their denning sites. Only approximately 25,000 polar bears exist today,³⁴ and roughly 50 bears come into the Arctic Refuge each year in September, with denning beginning in the late fall. These bears are part of the Southern Beaufort Sea population, which numbers about 900 animals.³⁵ According to the Fish and Wildlife Service, which tracks collared polar bears, “collared bears are a subset of the total number of bears that use this area. Tracking of the collared bears identified 53 dens along the mainland coast, 26 (50%) of which were within the

²⁹ U.S. Fish and Wildlife Service, Press Release: United States and Canada Sign Caribou Conservation Agreement. July 17, 1987. Available at: <https://www.fws.gov/news/Historic/NewsReleases/1987/19870717.pdf>.

³⁰ Agreement between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd. July 17, 1987. Available at: <http://www.treaty-accord.gc.ca/text-texte.aspx?id=100687>.

³¹ Dillon, Jeremy, Canada Sees ANWR Drilling Threat to Border-Crossing Caribou, Roll Call. Nov. 2, 2017. Available at: <https://www.rollcall.com/news/politics/canada-calls-anwr-drilling-threat-border-crossing-caribou>.

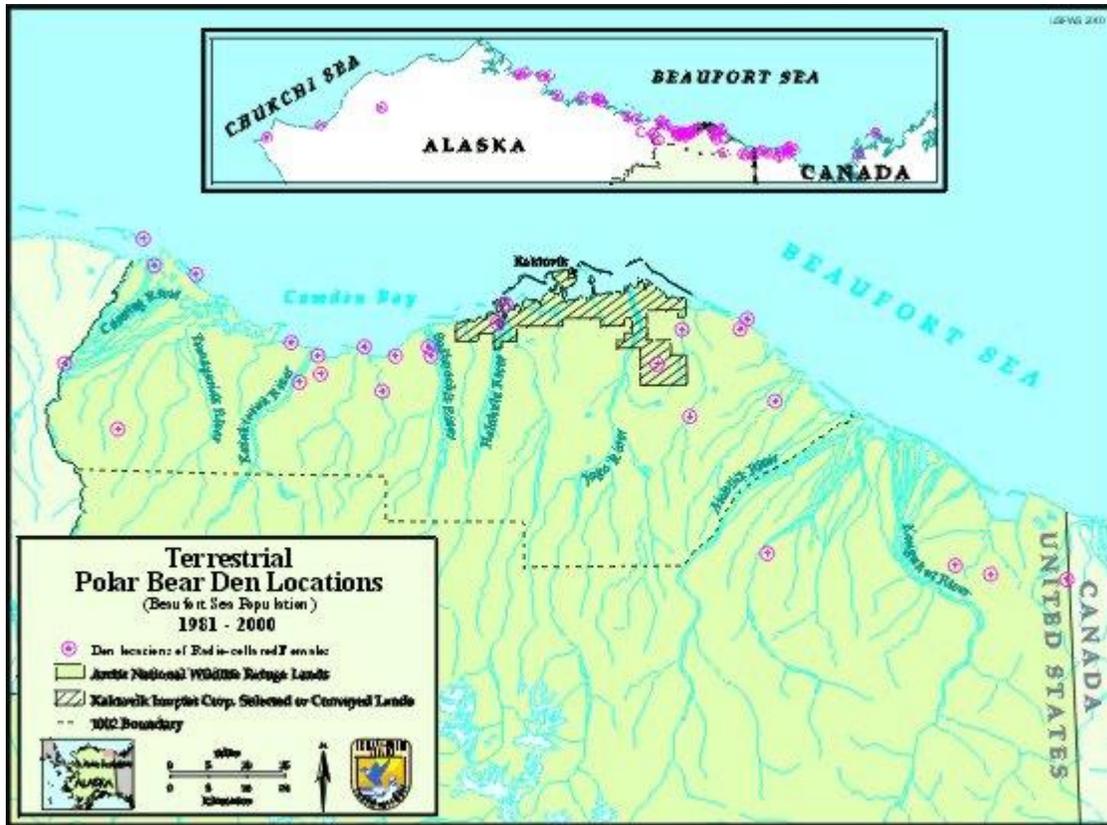
³² Agreement between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd. July 17, 1987. Available at: <http://www.treaty-accord.gc.ca/text-texte.aspx?id=100687>.

³³ U.S. Fish and Wildlife Service, Endangered Species Act Listing: Polar Bear. July 2017. Available at: <https://www.fws.gov/alaska/fisheries/mmm/polarbear/esa.htm>.

³⁴ IUCN/SSC Polar Bear Specialist Group, global polar bear population estimates. 2014. Available at: <http://pbsg.npolar.no/en/status/pb-global-estimate.html>; IUCN/SSC Polar Bear Specialist Group, Summary of polar bear population status per 2017. 2017. Available at: <http://pbsg.npolar.no/en/status/status-table.html>.

³⁵ National Wildlife Refuge Association, Protecting the Arctic National Wildlife Refuge, Available at: <https://www.refugeassociation.org/advocacy/refuge-issues/arctic/>.

bounds of the Arctic National Wildlife Refuge. Twenty-two of the 53 dens (42%) were within the bounds of the 1002 area.³⁶ Polar bears give birth during mid-winter in deep dens of ice and snow. The Coastal Plain hosts the highest density of polar bear dens in Alaska, and is a critical site for polar bears to make their dens and give birth.³⁷ As climate change shrinks sea ice, biologists anticipate that even more bears will be forced to build their snow dens onshore, making the Coastal Plain even more vital in the future.³⁸ The map below shows the location of known polar bear dens documented between 1981 to 2000.



Amstrup, S.C. 2002. Movements and Population Dynamics of Polar Bears, p. 65-70, in D.C. Douglas, P.E. Reynolds, and E.B. Rhode, editors. Arctic Refuge Coastal Plain Terrestrial Wildlife Research Summaries. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR-2002-0001.

³⁶ U.S. Fish and Wildlife Service, Polar Bear Denning. 2014. Available at: <https://www.fws.gov/refuge/arctic/pbdenning.html>.

³⁷ Bourne, Joel, Arctic Refuge Has Lots of Wildlife – Oil, Maybe Not So Much, National Geographic. Dec. 17, 2017. Available at: <https://news.nationalgeographic.com/2017/12/arctic-wildlife-refuge-tax-bill-oil-drilling-environment/>.

³⁸ *Id.*

Denning polar bears subjected to human disturbances may abandon dens before their young can survive an Arctic winter.³⁹ This, in turn, can adversely affect their winter survival and could increase risks to humans due to a potential increase in polar bear/human conflicts by polar bears who abandon their dens. This potential impact has caused Alaskan state agencies to require that winter activities by humans must avoid dens.⁴⁰

Energy exploration often involves seismic testing to identify oil and gas deposits, mentioned above. Seismic surveys are the primary tool of exploration companies in the United States for use terrestrial habitats.⁴¹ The seismic wave is produced by either large vehicles with equipment that vibrates the ground, or by explosive charges set off in shallow holes.⁴² Seismic blasts can drive a mother bear to abandon her cubs in their den.⁴³ It can also cause animals, including polar bears, to alter their natural migration patterns. The EIS must fully evaluate the direct, indirect, and cumulative impact of such testing methods and procedures on polar bears and other wildlife. This analysis should extend to any mitigation measures that may be employed to reduce such impacts including, but not limited to, requirements to map existing dens to impose buffer zones to ensure that those dens are not disturbed.

Another concern is the impact of an oil or chemical spill on polar bears, their habitat, and other wildlife. Scientists are concerned that spilled oil would collect in leads in the ice and between ice floes, affecting both polar bears, their seal prey, and other wildlife including whales which are of importance to indigenous whalers in Alaska and Canada.⁴⁴ Oil collects in polar bear fur, causing the bears to ingest toxins as they try to groom themselves. This can lead to kidney failure, digestive disorders, and brain damage, which are ultimately fatal. Lost insulation from hair loss, and skin and eye irritations are other potential adverse effects.⁴⁵

BLM must also take into account the ongoing threat of climate change by considering the cumulative effects of oil and gas development upon polar bear populations that are already

³⁹ Durner, George, Amstrup, Steven, and Ambrosius, Ken, *Polar Bear Maternal Den Habitat in the Arctic National Wildlife Refuge, Alaska*, 59 Arctic Institute of North America 1. 2006.

Available at <https://arctic.journalhosting.ucalgary.ca/arctic/index.php/arctic/article/view/361>.

⁴⁰ Shideler, Dick, Alaska Dept. of Fish and Game, Detecting Grizzly and Polar bear dens on Alaska's North Slope. Available at:

http://www.adfg.alaska.gov/index.cfm?adfg=wildlifeneews.view_article&articles_id=708.

⁴¹ McFarland, John, How do seismic surveys work?, Oil and Gas Lawyer Blog. Apr. 15, 2009.

Available at: <https://www.oilandgaslawyerblog.com/2009/04/how-do-seismic-surveys-work.html>.

⁴² *Id.*

⁴³ Linnell, John, et al., How vulnerable are denning bears to disturbance? Wildlife Society Bulletin, v. 28, p. 400-413. 2000. Available at: <http://bearproject.info/wp-content/uploads/2014/07/A-26-denning-disturbance.pdf>.

⁴⁴ Derocher, Andrew, Lunn, Nicholas, Stirling, Ian. 2004. Polar Bears in a Warming Climate. Integrative & Comparative Biology, v. 44, p. 163-176. Available at:

<https://academic.oup.com/icb/article/44/2/163/674253>.

⁴⁵ Polar Bears International, Commercial Activity. Available at:

<https://polarbearsinternational.org/climate-change/commercial-activity/>.

stressed from a rapidly changing environment. Due to climbing temperatures, last year's arctic sea ice reached a record low wintertime maximum extent, according to scientists at NASA.⁴⁶ Loss of this sea-ice habitat and its direct impact on reducing access to their primary prey species, ringed seals, is a major issue of concern for the polar bear.⁴⁷ These impacts are causing polar bears to spend more time on land, where they can't hunt their main seal prey, or to embark on prolonged swims in search of sea ice. What is left of the sea ice is increasingly farther offshore over deep, largely unproductive waters.⁴⁸ Long distance swims are especially hard on younger bears and adults in poor body condition. Reduced body fat gives these bears lower energy reserves and less insulation in the icy waters of the Arctic sea. A study of 68 satellite-collared female polar bears with cubs found those bears that undertook long distance swims had a slightly higher cub mortality rate. Five of the 11 mothers who set off on long distance swims lost their cubs before, during, or shortly after the swim.⁴⁹ In one study, a collared female polar bear embarked on a marathon, 426-mile swim over nine days without finding a resting place. She lost her cub and 22 percent of her body weight.⁵⁰

The U.S. Geological Survey published a report on wildlife-related research on the Coastal Plain.⁵¹ This summary included the following information on the effects of climate change in this region:

Climate conditions of the 1002 Area and surrounding region have changed over recent decades. Jorgenson and others (2015a) reported that the mean annual temperature at the Kuparuk weather station, 190 km west of the 1002 Area, increased by 2.5 °C between 1984 and 2009. Gustine and others (2017) determined that from 1970 to 2013, average air temperatures during the growing season along the Dalton Highway, from the Brooks Range to Prudhoe Bay, showed long-term upward trends, with the greatest increase recorded in the coastal plain near Prudhoe Bay. The rapid increase in May air temperature has

⁴⁶ National Aeronautics and Space Administration, Sea Ice extent sinks to record lows at both poles. 2017. Available at: <https://www.nasa.gov/feature/goddard/2017/sea-ice-extent-sinks-to-record-lows-at-both-poles>.

⁴⁷ Polar Bears International, Polar Bear Status. Available at: <https://polarbearsinternational.org/climate-change/status>.

⁴⁸ Polar Bears International, Polar Bear Status. Available at: <https://polarbearsinternational.org/climate-change/status>.

⁴⁹ Pagano, A.M. et al., Long-distance swimming by polar bears (*Ursus maritimus*) of the southern Beaufort Sea during years of extensive open water. *Canadian Journal of Zoology*, v. 90, p. 663-676. 2012. Available at: <http://www.nrcresearchpress.com/doi/pdf/10.1139/z2012-033>.

⁵⁰ Durner, George, 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, *Polar Biology*. 2011. Available at: https://www.fws.gov/alaska/fisheries/mmm/polarbear/pdf/Durner_etal_2011_Long_Distance_Swim_Polar_Biology.pdf

⁵¹ Pearce, John, et al., Summary of Wildlife-Related Research on the Coastal Plain of the Arctic National Wildlife Refuge, Alaska, 2002-17, United States Geological Survey. 2017. Available at: <https://pubs.usgs.gov/of/2018/1003/ofr20181003.pdf>.

driven a trend in markedly earlier snow melt dates, which advanced by about 10 days between 1941 and 2004, leading to a longer growing season (Hinzman and others, 2005). Gustine and others (2017) also determined that day of spring ground thaw (≥ 0 °C) occurred 8 days earlier (range = 2–13 days) and the length of the vegetation growing season was 11 days longer (range = 0–20 days) in 2013 than in the 1970s. Warmer air temperatures have been accompanied by warmer near surface water temperatures along the coast, which increased by 1.0–1.5 °C from 2007 to 2011 relative to the 1982–2011 long-term mean (Stroeve and others, 2014). Warmer air and ocean temperatures have altered sea ice extent and phenology, causing the annual number of days the southern Beaufort Sea was covered by ice to decrease at a rate of -17.5 days per decade from 1979 to 2014 (Stern and Laidre, 2016). Since the late 1990s, the mean duration of the open-water season (that is, period of time when sea ice is largely absent from the biologically productive continental shelf) has increased by 36 days (Atwood and others, 2016).⁵²

iii. Impacts to Muskoxen.

Muskoxen (*Ovibos moschatus*) are an important component of the Arctic environment. They were successfully restored to the ANWR in 1969 and 1970.⁵³ Muskoxen live on the coastal plain of the Arctic Refuge on a year-round basis⁵⁴ and therefore would be vulnerable to winter and summer oil and gas exploration activities, as well as year-round production.⁵⁵ The majority of the muskoxen, approximately 250, live in the Coastal Plain area year-round.⁵⁶

In recent years, the number of muskox calves produced in the Coastal Plain has declined.⁵⁷ As snow depth limits access to muskoxen's winter habitat, in years of deep snow or a prolonged snow season fat reserves are depleted and fewer calves are produced. Muskox calves are born in April and May, several weeks before green forage is available. This requires pregnant females to maintain their body weight throughout winter to have enough reserves to produce milk for a calf.⁵⁸ Muskoxen frequently use areas in or near riparian habitats that are also sites of

⁵² *Id.* at 2.

⁵³ U.S. Fish and Wildlife Service. 1995. Muskox (*Ovibos moschatus*). Species Fact Sheet, Wildlife Biologue Series. Available at: <http://training.fws.gov/library/pubunit.html>; Reynolds, P. E. 1998. Dynamics and range expansion of a reestablished muskox population. *Journal of Wildlife Management* 62, p. 734-744.

⁵⁴ Reynolds, P.E. 1992. Seasonal differences in the distribution and movements of muskoxen (*Ovibos moschatus*) in northeastern Alaska. *Rangifer* 12, p.171-172.

⁵⁵ Wilson, K. J., and D. R. Klein. 1991. The characteristics of muskox late winter habitat in the Arctic National Wildlife Refuge, Alaska. *Rangifer* 11, p. 79-80.

⁵⁶ Nelleman, C. and P. E. Reynolds. 1997. Predicting late winter distribution of muskoxen using an index of terrain ruggedness. *Arctic and Alpine Research*. 29, p. 334-338.

⁵⁷ 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. 2000. Available at: http://arcticcircle.uconn.edu/ANWR/anwr_fws.htm.

⁵⁸ U.S. Fish and Wildlife. 2001. Official website for the Arctic National Wildlife Refuge: <http://www.r7.fws.gov/nwr/arctic/muskox.html>.

important sources for water and gravel needed for exploration drilling and development.⁵⁹ If muskoxen are displaced from winter habitats due to oil and gas exploration and development into areas of deeper snow, the muskoxen will have to expend more energy to survive, possibly increasing mortality and reducing reproduction rates.

If muskoxen are disturbed during the calving period in April and May, the mortality of young calves will likely increase if they are unable to remain with their herd. Muskoxen respond to predators and other disturbances by moving into a defensive group with the calves in the middle. This reduces the likelihood of a predator killing calves. Acute or chronic disturbance can force muskox herds to flee⁶⁰ and/or to constantly be on the move, which can have energetic consequences influencing mortality and reproductive rates, and can result in the deaths of young calves that are left behind.⁶¹ The loss or displacement of only a few animals or groups is predicted to have a major impact on this small population.⁶² Overall, the most likely effects of petroleum exploration and development on muskoxen include: displacement from preferred winter habitat, increased energy needs related to disturbance and displacement, decreased body condition of females, increased incidents of predation, and decreased calf production and animal survival.⁶³ The EIS must carefully examine all of these potential impacts from the proposed action and alternatives.

iv. Impacts to Wolverines.

Wolverines (*Gulo gulo*) travel in all types of arctic terrain, and females may use snowdrifts along small tundra streams for dens. The cumulative effects of displacement, avoidance, and reduced food resources as a result of oil and gas exploration and development could result in long-term changes in wolverine distribution.⁶⁴ The EIS should examine the direct effects of its proposed action and alternatives on wolverines, as well as the indirect and cumulative effects on the species posed by climate change.

⁵⁹ Wilson, K. J., and D. R. Klein. 1991. The characteristics of muskox late winter habitat in the Arctic National Wildlife Refuge, Alaska. *Rangifer* 11, p. 79-80; Nelleman, C. and P. E. Reynolds. 1997. Predicting late winter distribution of muskoxen using an index of terrain ruggedness. *Arctic and Alpine Research*. 29, p. 334-338; Gray, D. R. 1990. Muskox - Hinterland Who's Who. Canadian Wildlife Service, Environment Canada. Available at: <http://www.scf-cws.ec.gc.ca/hww-fap/muskox/muskox.html>.

⁶⁰ 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. 2000. Available at: http://arcticcircle.uconn.edu/ANWR/anwr_fws.htm.

⁶¹ *Id.*

⁶² Clough, N.K., Patton, P.C., and Christiansen, A.C., eds. 1987. 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: Washington, D.C., U.S. Fish and Wildlife Service, U.S. Geological Survey and Bureau of Land Management, v. 1 at 166. Available at: <https://pubs.usgs.gov/fedgov/70039559/report.pdf>.

⁶³ *Id.*

⁶⁴ World Wildlife Fund, Protection of the Arctic National Wildlife Refuge: key to managing one of the world's most biologically valuable ecoregions, the Arctic coastal tundra. Available at: http://web.mit.edu/12.000/www/m2007/teams/editing/Environment/anwr_position.pdf.

v. Impacts to Wolves and Brown Bears.

Wolves (*Canus lupus*) and brown bears (*Ursus arctos*) primarily den in the foothills and mountains south of the coastal plain in the refuge. During spring, wolves and bears travel to the coastal tundra where they prey on newborn caribou. The EIS should evaluate how changes in the availability of prey species due to the impacts of oil and gas exploration and development on caribou (see Section II.a.i) may directly, indirectly, and cumulatively impact wolves and brown bears. This should include an evaluation of potential impacts of decreased prey availability, harassment and disturbance from exploration and development activities including in denning habitat, increased mortality rates, and declining reproductive rates on the short and long term population trends of wolves and brown bears and the broader ecosystem-wide impacts of potential declines in apex predator numbers.

vi. Impacts to Arctic Char, Grayling, and Other Fish Species and Marine Mammals.

The EIS should describe the current quality and of ANWR habitat, its use by marine mammals, fish, and other marine life, including identifying known migration routes, timing of migratory movements, areas of use both year-round and seasonally, population estimates and trends, and existing threats to these species. If marine habitats will be impacted by marine traffic associated with transport of the sealift modules and other project supplies, project construction and operation, or discharges (accidental and intentional), the Draft EIS should disclose the impacts to marine and aquatic habitat and the mitigation measures that would be implemented to minimize such impacts.

Further, if any offshore oil and gas exploration is planned then the Draft EIS should include a thorough examination of the marine life that could be impacted and the consequences of such impacts. Oil and gas activities are known to threaten fish and other marine wildlife as they rely on clean water and healthy coastlines to survive. Seismic airgun blasting can travel great distances and can impact invertebrates, fish, whales and other marine mammals, by changing behaviors, including those necessary for their survival, resulting in temporary or permanent hearing loss, and causing mortality. Additionally, overwintering habitat for arctic char (*Salvelinus alpinus*), arctic grayling (*Thymallus arcticus*), and other fish is very limited in rivers and lakes in ANWR. Surface water withdrawals to supply the water requirements of oil and gas development will likely have a major impact on these species' limited overwintering habitats, as discussed further in Section II.f. There could also be major effects from oil spills in fish habitats. Anadromous fish habitat degradation in nearshore coastal waters would be expected from causeways, docks, and other facilities. These potential impacts must be examined in the EIS.

vii. Impact on Snow Geese and other Migratory Birds.

The EIS should evaluate the potential impact of the proposed action and alternatives on the snow goose (*Chen caerulescens*), a migratory bird that would likely be harmed by oil and gas

development in the Coastal Plain,⁶⁵ and on other migratory birds that pass through the Coastal Plain.

The snow goose is known to be very sensitive to human disturbance, especially from aircraft.⁶⁶ It migrates from nesting grounds in Canada to wintering grounds in California, and the Arctic Refuge coastal tundra is a resting point for the bird in the fall. The rich vegetation of the tundra nourishes the birds prior to their migration south. The birds eat three times their weight every day, in order to increase their fat reserves. As stated by the USFWS, “snow geese feed on small patches of vegetation that are widely distributed across the Refuge's coastal tundra, so a large area is necessary to meet their needs. They are extremely sensitive to disturbance, often flying away from their feeding sites when human activities occur several miles distant. Oil exploration and development would displace snow geese from areas of critical importance to their well-being and survival.”⁶⁷ Being displaced from a prime feeding habitat, when preparing for migration, would likely reduce their fitness for migration and, consequently, reduce their winter survival. As stated by Alaska Audubon, “more than 80% of the feeding habitat preferred by Snow Geese within the Arctic Refuge is located inside the 1002 Area. Indeed, the U.S. Department of the Interior estimates that oil development could displace Snow Geese from as much as 45% of their preferred feeding habitat within the 1002 Area.”⁶⁸ Any infrastructure development in this sensitive area would mean unavoidable loss of nesting, brood-rearing, and feeding habitats. Indirect effects such as altered water drainage, water depletion, dust accumulation, light and noise pollution, and habitat fragmentation would result in indirect and cumulative impacts far beyond the physical area of development.

The Coastal Plain is used by 135 species of migratory birds, including numerous shorebirds, waterfowl, loons, songbirds, and raptors. Oil development on the Coastal Plain would likely result in habitat loss, disturbance, and displacement or abandonment of important nesting, feeding, molting and staging areas.⁶⁹ The Coastal Plain is located approximately 30 miles from existing pipelines and more than 50 miles from existing oil-supporting infrastructure. Consequently, if oil and gas exploration and development is permitted, the area would have to be fully developed to both find and allow production of such resources. This would require the

⁶⁵ U.S. Fish and Wildlife Service, Migratory Bird Treaty Act protected species (10.13 list). 2013. Available at: <https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php>.

⁶⁶ Audubon Alaska, Birds and Oil Development in the Arctic Refuge. Available at: <https://ak.audubon.org/sites/g/files/amh551/f/arcticrefuge-birdsandoildevelopment.pdf>.

⁶⁷ 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. 2000. Available at: http://arcticcircle.uconn.edu/ANWR/anwr_fws.htm.

⁶⁸ Audubon Alaska, Birds and Oil Development in the Arctic Refuge at p. 5. Available at: <https://ak.audubon.org/sites/g/files/amh551/f/arcticrefuge-birdsandoildevelopment.pdf>.

⁶⁹ 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. 2000. Available at: http://arcticcircle.uconn.edu/ANWR/anwr_fws.htm.

construction of roads, pipelines, facilities, gravel pits, utility lines, landfills, and employee support buildings.⁷⁰

The direct, indirect, and cumulative impacts of such oil and gas field development could be far reaching for birds, and the EIS must examine these impacts. For example, oil and gas fields inevitably attract predators as a result of human food waste and garbage which predators, like the arctic fox, will identify as a food source. In turn, the fox and other predators whose normal movement and habitat use patterns are disrupted by the development, will prey on protected nesting birds in the area⁷¹ resulting in a cascade of impacts throughout the ecosystem's food web.

An oil or chemical spill would significantly harm bird species. If the spill reached wetlands and coastal lagoons, waterfowl, loons, and shorebirds could suffer especially serious and long-lasting damage.⁷² There is ample evidence, from previous spills, of the far-reaching and long-term damage a spill will create.⁷³

Additionally, with limited, sensitive habitats for the migratory birds of the Arctic, climate change is leaving them with nowhere to go. A recent paper⁷⁴ researching the subject of the effects of climate change on arctic migratory birds states:

A projected percent of species decline for these birds over the next 70-year period is 66-83%. These numbers are troubling even though we know high northern latitudes experience more than double the global average of climate change intensity[.]... The results concluded that 3-5 of the 24 species will lose more than 95% of their climatically suitable breeding-conditions, and 16-20 species lose at least 50%. ... Most species not only witness a decline in stable breeding conditions, but shifts in the conditions impact the birds as well.⁷⁵

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² Audubon Alaska, *Birds and Oil Development in the Arctic Refuge* at p. 2. Available at: <https://ak.audubon.org/sites/g/files/amh551/f/arcticrefuge-birdsandoildevelopment.pdf>.

⁷³ See, e.g., Castege I, Lalanne Y, Gouriou Y, Hemery G, Girin M, D'Amico F. Estimating actual seabird mortality at sea and relationship with oil spills: lessons from the "Prestige" oil spill in Aquitaine (France). *Ardeola*. 2007. 54(2): 289e307.

⁷⁴ H. S. Wauchope, J. D. Shaw, Ø. Varpe, E. G. Lappo, D. Boertmann, R. B. Lanctot, and R. A. Fuller, *Rapid Climate-driven Loss of Breeding Habitat for Arctic Migratory Birds*, *Global Change Biology*, 23, p. 1085–1094. 2017. Available at:

<https://rampages.us/birdnonescense/2017/05/03/climate-change-effects-on-arctic-migratory-birds/>.

⁷⁵ *Id.*

Scientists have already observed several migratory bird species laying their eggs earlier and the geographic range of bird species is changing as a result of the warming climate.⁷⁶ Those that traditionally nest in a slim area of the Arctic are starting to encounter – and compete with – other species that usually nest further south, but are now moving north to seek preferred climatic conditions. Further, new species migrating to the Arctic as a result of climate change could introduce new diseases and parasites that would threaten indigenous species.⁷⁷ There is little doubt climate change will exact a huge toll on migratory birds in the Coastal Plain independent of impacts associated with proposed oil and gas development. As such the direct, indirect and cumulative impacts of such development on birds must be evaluated in the EIS.

b. BLM Should Consider the Following Best Management Practices and Mitigation Measures to Reduce Negative Impacts on Wildlife.

As discussed above, the proposed project has the potential to impact fish, birds, terrestrial and marine mammals, and their habitat. While the BLM is legally obligated to fully evaluate the environmental impacts of this action on wildlife, water and air quality, vegetation, habitat quality and quantity (including unique habitats), human health and safety, indigenous people, and cultural and ethnographic resources, if it includes potential mitigation measures in its analysis additional information and analyses is mandated.

Monitoring is an important element in identifying and understanding the consequences of the proposed action and alternatives including the performance of any proposed mitigation measures. In this case, comprehensive monitoring is needed to evaluate population changes that may be occurring not only from the proposed project, but from natural factors and climate change. The EIS should describe a monitoring program designed to assess both impacts from the project and the effectiveness of measures utilized to mitigate such impacts. Clear monitoring goals and objectives should be identified, such as: what parameters are to be monitored; where and when monitoring will take place; who will be responsible for monitoring; how the information will be evaluated; what actions, such as contingencies, adaptive management, corrections to future actions, will be taken based on the information; and how the public can get information on mitigation effectiveness and monitoring results.

In addition to monitoring, mitigation measures, if proposed, must be effective in reducing the negative impacts of oil and gas exploration and development on wildlife. For example, vessels and aircraft used for monitoring or mitigation, given their potential to cause significant disturbance to wildlife, must avoid areas where species that are sensitive to noise or

⁷⁶ Carey, Cynthia, The Impact of climate change on the annual cycles of birds, *Philosophical Transactions of the Royal Society of London Biological Sciences*, 364(1534), p. 3321-3330. 2009. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2781852/>.

⁷⁷ H. S. Wauchope, J. D. Shaw, Ø. Varpe, E. G. Lappo, D. Boertmann, R. B. Lanctot, and R. A. Fuller, *Rapid Climate-driven Loss of Breeding Habitat for Arctic Migratory Birds*, *Global Change Biology*, 23, p. 1085–1094. 2017. Available at: <https://rampages.us/birdnonescense/2017/05/03/climate-change-effects-on-arctic-migratory-birds/>; World Wildlife Fund, *Effects of climate change on Arctic migratory birds*. Available at: http://awsassets.panda.org/downloads/arctic_birds_factsheet.pdf.

movement are concentrated. Concentrations may be seasonal or year-round and may be due to behavior (e.g., flocks or herds) or limited habitat (e.g., polar bear denning). Consequently, any aircraft that the BLM may propose to be used in support of exploration and development activities should maintain an altitude sufficient to avoid harassing concentrations of caribou and other wildlife. Except in the case of emergency, refueling of helicopters and aircraft on or near bodies of water should be prohibited. The impacts of the use of any nonessential air and vessel traffic that may be associated with the proposed action or alternatives must be evaluated and, ideally, should occur prior to or after the period of whale migration through the area. Essential traffic (traffic that could not reasonably occur prior to or after the period of whale migration through the area) shall avoid disrupting whale migration.

c. BLM Must Consult with the U.S. Fish and Wildlife Service and National Marine Fisheries Service to Comply with the Endangered Species Act and Marine Mammal Protection Act.

The proposed project may impact protected species listed under the Endangered Species Act (“ESA”) and the Marine Mammal Protection Act (“MMPA”). The Draft EIS should identify the endangered, threatened, and candidate species under these Acts. The Draft EIS also should describe the critical habitat for the species; identify any impacts the project will have on the species and their critical habitats; and how the proposed project will meet all requirements under ESA and MMPA, including consultation with the U.S. Fish and Wildlife Service (“USFWS”) and the National Marine Fisheries Service (“NMFS”). The ESA requires the lead agency to consult with the USFWS and the NMFS in cases where proposed projects could potentially impact listed species or critical habitat(s) ensure its actions will not jeopardize ESA listed species or destroy or adversely modify critical habitat. The ESA requires that each federal agency “insure that any action authorized, funded, or carried out” by the agency “is not likely to jeopardize the continued existence” of any listed species by consulting with FWS. 16 U.S.C. § 1536(a)(2).

Section 7(a)(2) of the ESA requires that “[e]ach federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any endangered species or threatened species” or “result in the destruction or adverse modification of” a listed species’ designated critical habitat. 16 U.S.C. § 1536(a)(2). To ensure compliance with these substantive provisions, the “action agency” must “consult” with and obtain the expert opinion of the USFWS, before the agency takes any discretionary action that “may affect” a listed species or designated critical habitat. *Id.*; 50 C.F.R. § 402.14(a); *Nat’l Wildlife Fed’n v. Nat’l Marine Fisheries Serv.*, 524 F.3d 917, 924 (9th Cir. 2008).

Issuance of an oil and gas lease represents a federal action that may affect listed species or critical habitat, and leasing therefore may not occur without completion of the consultation process. *See* 16 U.S.C. § 1536(a); 50 C.F.R. §§ 402.14, 402.13; *Connor v. Burford*, 848 F. 2d 1441, 1455 (9th Cir. 1988) (BLM could not issue oil and gas leases until USFWS analyzed consequences of all stages of leasing plan in a Biological Opinion). The EIS may need to include a biological assessment and a description of the outcome of consultation with the USFWS and NMFS. For listed species like the polar bear and bowhead whale, the Draft EIS should insure

that proposed action and its alternatives would not threaten the viability of populations. Biological assessments should be developed prior to the Draft EIS and their results summarized and disclosed in the document. By doing this, the Draft EIS would demonstrate that ESA and MMPA procedures are being followed and that listed species and their habitats are being protected.

d. BLM Must Examine Its Duties under the Migratory Bird Treaty Act.

The Migratory Bird Treaty Act (“MBTA”), 16 U.S.C. §§ 703-712 (§709 omitted), which was signed into law in 1918, is among the oldest wildlife protection laws established by the United States. The MBTA provides that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird, unless authorized under a permit issued by the Secretary of the Interior. 50 C.F.R. § 10.13. Over 800 species are currently on the list of protected migratory birds.⁷⁸ Nearly 140 of those species are known to use the Coastal Plain, including numerous shorebirds, waterfowl, loons, songbirds, and raptors. Oil development on the Coastal Plain would likely result in habitat loss, disturbance, and displacement or abandonment of important nesting, feeding, molting and staging areas.⁷⁹ Where federal agencies authorize a project which will inevitably result in migratory bird mortalities, without first obtaining authorization from the Department of Interior to take migratory birds, the agency’s actions are unlawful. *Humane Society of the U.S. v. Glickman*, 217 F.3d 882, 884-88 (D.C. Cir. 2000). The Draft EIS should address BLM’s responsibilities under MBTA.

e. BLM Must Adequately Analyze Impacts to Air Quality.

Oil and gas operations emit numerous air pollutants, including volatile organic compounds (“VOCs”), Nitrogen Oxides (“NOX”), sulfur dioxide (“SOX”), particulate matter (PM, including both PM2.5 and PM10), hydrogen sulfide, and methane. VOCs make up approximately 3.5 percent of the gases emitted by oil or gas operations.⁸⁰ VOCs emitted include benzene, toluene, ethyl benzene, and xylene, which Congress has listed as Hazardous Air Pollutants. 42 U.S.C. § 7412(b). There is substantial evidence that these chemicals are harmful to human health.⁸¹ Oil and gas operations also produce significant amounts of NOX, the primary

⁷⁸ U.S. Fish and Wildlife Service, Migratory Bird Treaty Act protected species (10.13 list). 2013. Available at: <https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php>.

⁷⁹ 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. 2000. Available at: http://arcticcircle.uconn.edu/ANWR/anwr_fws.htm.

⁸⁰ Brown, Heather, Memorandum to Bruce Moore, U.S.EPA/OAQPS/SPPD re Composition of Natural Gas for use in the Oil and Natural Gas Sector Rulemaking, July 28, 2011 at 3.

⁸¹ Colborn, Theo et al., Natural Gas Operations for a Public Health Perspective, 17 Human and Ecological Risk Assessment 1039. 2011; McKenzie, Lisa et al., Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources, *Sci Total Environ* at 5. 2012, doi:10.1016/j.scitotenv.2012.02.018.

sources of which are compressor engines, turbines, other engines used in drilling, and flaring.⁸² Both VOCs and NOX are ozone precursors.⁸³ Ozone can result in serious health conditions, including heart and lung disease and mortality.⁸⁴

The oil and gas industry is also a major source of particulate matter. The heavy equipment regularly used in oil and gas development burns diesel fuel, which generates fine particulate matter that is particularly harmful to human health.⁸⁵ The National Air Toxics Assessment asserts that a large number of human epidemiology studies show increased lung cancer associated with diesel exhaust and significant potential for non-cancer health effects.⁸⁶ The Control of Emissions of Hazardous Air Pollutants from Mobile Sources Final Rule lists 21 compounds emitted from motor vehicles that are known or suspect to cause cancer or other serious health effects,⁸⁷ including development of chronic respiratory disease.⁸⁸ Additionally, vehicles traveling on unpaved roads, as would likely be the case in development of the Coastal Plain, results in airborne dust, which is another source of particulate matter.⁸⁹

Oil and gas operations can also emit hydrogen sulfide during all stages of operation, including exploration, extraction, treatment and storage, transportation, and refining.⁹⁰ Long-term exposure to hydrogen sulfide is linked to respiratory infections, eye, nose, and throat

⁸² See, e.g., U.S. Environmental Protection Agency, Oil and Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution: Background Technical Support Document for Proposed Standards at 3-6. July 2011; Armendariz, Al, Emissions for Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements at 24. 2009.

⁸³ National Research Council, VOCs and Nox: Relationship to ozone and associated pollutants at 163, in Rethinking the Ozone Problem in Urban and Regional Air Pollution. 2001. Available at: <https://www.nap.edu/read/1889/chapter/8>.

⁸⁴ U.S. Environmental Protection Agency, Integrated Science Assessment (ISA) for Ozone (O₃) and Related Photochemical Oxidants (2013).

⁸⁵ Earthworks, Sources of Oil and Gas Pollution (2011). (can you find a better cite?); Bay Area Air Quality Management District, Particulate Matter Overview, Particulate Matter and Human Health (2012).

⁸⁶ U.S. Environmental Protection Agency. 2011 National Air Toxics Assessment Results. Available at: <https://www.epa.gov/national-air-toxics-assessment/2011-nata-assessment-results>.

⁸⁷ 40 C.F.R. 59, 80, 85, 86 (2007).

⁸⁸ U.S. Environmental Protection Agency, National Ambient Air Quality Standards for Particulate Matter Proposed Rule, 77 Fed. Reg. 38,890, 38,893 (June 29, 2012).

⁸⁹ U.S. Environmental Protection Agency, Regulatory Impact Analysis for the Proposed Revisions to the National Ambient Air Quality Standards for Particulate Matter. June 2012.

⁹⁰ Skrtic, Lana, Hydrogen Sulfide, Oil and Gas, and People's Health. 2006. Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.368.3550&rep=rep1&type=pdf>; Eastern Research Group, Inc. Preferred and Alternative Methods for Estimating Air Emissions from Oil and Gas Field Production and Processing Operations. 1999. Available at: <https://www.epa.gov/sites/production/files/2015-08/documents/ii10.pdf>.

irritation, breathlessness, nausea, dizziness, confusion, and headaches.⁹¹ Additionally, oil and gas operations emit significant amounts of methane. In addition to its role as a greenhouse gas, methane contributes to increased concentrations of ground-level ozone because it is an ozone precursor.⁹²

Fracking, which involves injecting liquid at high pressure to extract oil and gas, results in additional air pollution that can create a severe threat to human health. Although it is unknown at this time whether fracking would be used to extract oil and gas in the Coastal Plain, due to the prevalence of the method in on-shore oil and gas industry in the United States, the use and impact of fracking should be considered in the EIS. One analysis found that 37 percent of the chemicals found at fracked gas wells were volatile. Of those volatile chemicals, 81 percent can harm the brain and nervous system, 71 percent can harm the cardiovascular system and blood, and 66 percent can harm the kidneys.⁹³ Lastly, mercury emissions, as well as NOX and carbon monoxide emissions, are associated with the use of flares in the oil and natural gas industry.⁹⁴

The Clean Air Act requires the agencies to comply with, *inter alia*, the national primary and secondary ambient air quality standards, 40 C.F.R. § 50.1-50.14, along with requirements for the prevention of significant deterioration of air quality, 40 C.F.R. §§ 51.166 & 52.21, protection of visibility, 40 C.F.R. § 51.300, and with the general conformity prohibition, 40 C.F.R. § 51.580. The EIS must consider current local air quality and the significant risk of additional impairment from the proposed project, associated transportation, and other cumulative projects. The EIS should disclose whether toxics emissions would result from project construction and operations, estimate emissions of criteria pollutants for the project area, and discuss the timeframe for release of these emissions over the lifespan of the project. The EIS should further discuss the cancer and non-cancer health effects associated with air toxics and diesel particulate matter, and identify populations that are likely to be exposed to these emissions.

In preparing the Draft EIS, BLM should document the approach used to analyze and predict air quality impacts. The protocol should describe the model(s) that will be used for analysis, including model parameters, modeling boundaries, and important model inputs such as meteorology, background data, and emission inventories. The BLM must adequately describe the

⁹¹ U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Report to Congress on Hydrogen Sulfide Air Emissions Associated with the Extraction of Oil and Natural Gas (EPA-453/R-93-045) at I. Oct. 1993.

⁹² U.S. Environmental Protection Agency, Oil and Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews Proposed Rule, 76 Fed. Reg. 52,738 (Aug 23, 2011).

⁹³ Colborn, Theo et al., Natural Gas Operations for a Public Health Perspective, 17 Human and Ecological Risk Assessment 1039. 2011.

⁹⁴ Fawole, O.G., Cai X.M., MacKenzie A.R., Gas flaring and resultant air pollution: a review focusing on black carbon, Environmental Pollution, v. 216, p. 182-197. 2016. Abstract available at: <https://www.ncbi.nlm.nih.gov/pubmed/27262132>; Petro-Industry News, Unconsidered mercury emissions from the oil and gas industry. 2015. Available at: <https://www.petro-online.com/article/measurement-and-testing/14/qa3/unconsidered-mercury-emissions-from-the-oil-and-gas-industry/1979>.

baseline conditions and calculate the true impacts of the proposal on air quality including direct, indirect, and cumulative impacts. The EIS should clearly identify the air quality permits that will be required and the amount and type of data that will be needed for these permits. Furthermore, the EIS must also identify available methods for controlling air pollution emissions based on NEPA's requirement that the agency identify mitigation measures, 40 C.F.R. § 1508.25, and consider all reasonable alternatives. *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008) (citing 40 C.F.R. § 1502.14(a)).

f. The Draft EIS Must Adequately Investigate Impacts on Water Resources.

Oil and gas exploration and development can pose significant threats to water resources. The Draft EIS should evaluate direct, indirect, and cumulative impacts to surface water resources and wetlands in the Coastal Plain. Specifically, the Draft EIS should examine alterations to the landscape that would likely occur as a result of development of the leases and predicted impacts to stream and wetlands discharge, riparian habitat, water quality, and flow.

i. Sedimentation.

Development of oil and gas resources on the Coastal Plain will require substantial infrastructure as well as heavy equipment to construct roads, pipelines, well pads, airstrips, facilities, and buildings. Construction and use of roads, well pads, and airstrips in particular contribute heavily to sedimentation in streams and wetlands.⁹⁵ An increase in sediment levels in surface water systems can change thermal processes, which has the potential to degrade water quality and negatively impact fish species. Such construction will also result in varying levels of soil compaction, which would alter hydrology and runoff, thus affecting flows and delivery of pollutants to bodies of water and wetlands.

ii. Chemical and Oil Spills.

Chemical and oil spills can result from equipment failures, accidents, negligence, or intentional dumping.⁹⁶ The potential impact of fracking, if this method is likely to be used to extract oil and gas, on the Coastal Plain's water resources should also be examined because the fluids associated with fracking have the potential to contaminate water resources. The spilling or leaking of fracking fluids, flowback, or produced water is a significant concern, and can occur at the surface and underground. At the surface, mechanical failure or operator error during the process has caused leaks from tanks, valves, and pipes.⁹⁷

⁹⁵ See Entrekin, Sally, *et al.*, Rapid Expansion of Natural Gas Development Poses a Threat to Surface Waters, 9 *Front Ecol Environ* 503, 507. 2011.

⁹⁶ Cooper, Mary, Increasing U.S. dependence on oil imports heightens risks to environment, *CQ Researcher*, 2:2. 1992. Available at: <http://library.cqpress.com/cqresearcher/document.php?id=cqresrre1992011700>.

⁹⁷ Kletz, Trevor, *What Went Wrong? Case histories of process plant disasters and how they could have been avoided*. 2009. 5th ed. Available at: <https://www.sciencedirect.com/science/book/9781856175319>; Natural Resources Defense

Underground, fracking can contaminate groundwater in a number of ways. First, faulty well construction, cementing, or casing,⁹⁸ as well as the injection of fracking waste underground, can all lead to leaks.⁹⁹ Chemicals present in these fluids can include VOCs, such as benzene, toluene, xylenes, and acetone.¹⁰⁰ The Draft EIS should address the impact of chemical, oil, and fracking fluid spills on water resources, and discuss mitigation measures to reduce the likelihood of spills occurring and to increase the effectiveness of the response in the event a spill does occur.

iii. Volume of Water Used to Produce Oil and Gas.

Large amounts of water are required to develop oil and gas. Ice roads require 1–1.5 million gallons of water per mile, and a one-well drilling operation requires 1.7 million gallons of water for camp use and blending drilling muds over a four-month period.¹⁰¹ Fracking also consumes a significant amount of water, to which chemicals and proppants are added.¹⁰² North Slope oil operations consume 27 billion gallons of water annually.¹⁰³

Water resources are much more limited in the Coastal Plain. In winter, only about nine million gallons of liquid water are available in the Coastal Plain, which is enough to freeze into and maintain only 10 miles of ice roads. Therefore, full exploration and development could not rely solely on temporary ice pads and roads, but rather, it would require a network of permanent

Council, Water Facts: Hydraulic Fracturing can potentially Contaminate Drinking Water Sources at 2. 2012; Food & Water Watch, The Case for a Ban on Fracking at 5. 2012.

⁹⁸ U.S. Environmental Protection Agency, Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External review draft). 2015. Available at:

<https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=244651>; Vaidyanathan, Gayathri, Fracking can contaminate drinking water, Scientific American. 2016. Available at: <https://www.scientificamerican.com/article/fracking-can-contaminate-drinking-water/>; NRDC, Water Facts at 2; Food & Water Watch 2012 at 7.

⁹⁹ Kusnetz, North Dakota; Lustgarten, Abraham, Polluted Water Fuels a Battle for Answers, ProPublica. 2012; Lustgarten, Abraham, Injection Wells: The Poison Beneath Us, ProPublica at 2. 2012; Lustgarten, Abraham, Whiff of Phenol Spells Trouble, ProPublica. 2012.

¹⁰⁰ U.S. Environmental Protection Agency, Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External review draft). 2015. Available at:

<https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=244651>;

¹⁰¹ Linnell, John, et al., How vulnerable are denning bears to disturbance? Wildlife Society Bulletin, v. 28, p. 400-413. 2000. Available at: <http://bearproject.info/wp-content/uploads/2014/07/A-26-denning-disturbance.pdf>.

¹⁰² U.S. Environmental Protection Agency, Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External review draft). 2015. Available at:

<https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=244651>.

¹⁰³ Linnell, John, et al., How vulnerable are denning bears to disturbance? Wildlife Society Bulletin, v. 28, p. 400-413. 2000. Available at: <http://bearproject.info/wp-content/uploads/2014/07/A-26-denning-disturbance.pdf>.

gravel pads and roads.¹⁰⁴ To the extent that ice roads are used, when an ice road melts, the water runs over the surface into streams, usually outside the original watershed from which it was withdrawn. Because the permafrost does not allow groundwater movement between water bodies, lakes are filled only by snowmelt and may take more than two years to refill.¹⁰⁵ If the limited water available on the Coastal Plain is used for oil and gas exploration and development activities, snowmelt may not be sufficient to restore pre-use water levels which will adversely impact flora and wildlife in the Coastal Plain. The Draft EIS should identify the environmental impacts associated with the extraction of water to be used for oil and gas exploration and development, how it is transported to the site, the potential release of contaminants or disease organisms into aquatic areas near development sites and associated structures (including roads), and, more broadly, how the use of water resources will impact flora and wildlife at both water sources and in riparian/aquatic habitats at development sites and surrounding areas.

iv. Compliance with the Clean Water Act.

The Draft EIS should evaluate how the antidegradation provisions of Section 303(d) of the Clean Water Act (“CWA”) would be met. Section 303(d) of the CWA requires states to identify water bodies that do not meet water quality standards and to develop water quality restoration plans to meet water quality criteria. Where water quality standards are being met, antidegradation provisions apply. The provisions prohibit degrading water quality unless an analysis shows that important economic and social development necessitates degrading water quality. The Draft EIS should identify: (1) which waters may be impacted; (2) the nature of potential impacts; (3) specific pollutants likely to impact those waters; and (4) the bodies of water located in the Coastal Plain that are listed on Alaska’s most current EPA-approved 303(d) list, if applicable. The Draft EIS should describe existing restoration and enhancement efforts for those waters and fully evaluate the likelihood of success for any mitigation measures that should be implemented to avoid further degradation of impaired waters.

The Draft EIS should also document that, pursuant to Section 402 of the CWA, any construction project that disturbs one or more acres requires a construction stormwater discharge permit under Alaska’s Pollutant Discharge Elimination System permit program. The Draft EIS should identify all waters of the United States that would potentially be impacted by the proposed project and identified alternatives. This discussion should include the use of maps that clearly identify all waters within the project area. The discussion should include acreages and channel lengths, habitat types, values, and functions of these waters. The BLM should evaluate whether development of the oil and gas leases would require issuance of Section 404 permits. If so, pursuant to 40 CFR 230, any permitted discharge into waters of the U.S. must be the least environmentally damaging practicable alternative available to achieve the project purpose. The Draft EIS should include an evaluation of different alternatives in this context in order to

¹⁰⁴ 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. 2000. Available at: http://arcticcircle.uconn.edu/ANWR/anwr_fws.htm.

¹⁰⁵ Linnell, John, et al., How vulnerable are denning bears to disturbance? Wildlife Society Bulletin, v. 28, p. 400-413. 2000. Available at: <http://bearproject.info/wp-content/uploads/2014/07/A-26-denning-disturbance.pdf>.

demonstrate the project's compliance with the 404(b)(1) Guidelines. The Draft EIS should discuss alternatives to avoid or minimize the potential for such discharges.

Lastly, the Draft EIS should address the following: (1) the measures will BLM require to ensure adequate monitoring of water impacts for the entire production cycle; (2) the baseline data that is available to ensure that monitoring of impacts can be carried out effectively; (3) the methods BLM intends to use to collect baseline data that is not currently available; and (4) the additional bonding that BLM will require for potential impacts to surface waters.

g. The Draft EIS Must Analyze Climate Change Impacts.

BLM must consider the potential direct, indirect, and cumulative impacts its proposed action and alternatives will have on the climate in order to comply with NEPA. BLM may not simply conclude that the proposed action will have a negligible effect on climate change without performing an analysis to support that conclusion.

This analysis should be based on CEQ's December 2014 Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews (Climate Change Guidance). As the Climate Change Guidance explains, although "[c]limate change is a particularly complex challenge given its global nature and inherent interrelationships among its sources, causation, mechanisms of action, and impacts," it is a "fundamental environmental issue, and the relation of Federal actions to it falls squarely within NEPA's focus."¹⁰⁶ The Guidance states that "analyzing the proposed action's climate impacts and the effects of climate change relevant to the proposed action's environmental outcomes can provide useful information to decision-makers and the public and should be very similar to considering the impacts of other environmental stressors under NEPA."¹⁰⁷

This is consistent with CEQ's Guidance on Considering Cumulative Effects under NEPA (Cumulative Impacts Guidance), which directs agencies to consider impacts on the "global atmosphere." Cumulative Impacts Guidance at 15; *see also id.* at 13 (describing "release of greenhouse gases" as a cumulative effect to be considered in NEPA analyses). In performing a full analysis of climate impacts, BLM must consider all potential sources of greenhouse gases, including, for example, the greenhouse gas emissions generated by transporting large amounts of water to the leasing site(s). Therefore, the EIS should include the following: (1) an estimate of the greenhouse gas ("GHG") emissions associated with the proposed action; (2) qualitatively describe relevant climate change impacts; (3) analyze reasonable alternatives and/or practicable mitigation measures to reduce project-related GHG emissions; (4) address the appropriateness of incorporating GHG reduction measures and resilience to foreseeable climate change at the development stage.

¹⁰⁶ CEQ Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews at 2. Dec. 2014.

¹⁰⁷ *Id.*

Oil and gas operations are a significant contributor to climate change. This is due to emissions from the operations themselves, and emissions from the combustion of the oil and gas produced. Oil and gas operations also release large amounts of methane. Methane is a potent GHG that contributes substantially to global climate change. Its global warming potential is approximately 33 times that of carbon dioxide over a 100 year time frame and 105 times that of carbon dioxide over a 20 year time frame.¹⁰⁸ While the exact amount of methane released from oil and gas operations is not clear, EPA has estimated that “oil and gas systems are the largest human-made source of methane emissions and account for 37 percent of methane emissions in the United States or 3.8 percent of the total greenhouse gas emissions in the United States.”¹⁰⁹

For natural gas operations, production generates the largest amount of GHG emissions. However, these emissions occur in all sectors of the natural gas industry, from drilling and production to processing, transmission, and distribution.¹¹⁰ For the oil industry, GHG emissions result “primarily from field production operations . . . , oil storage tanks, and production-related equipment”¹¹¹ Significant sources of emissions include well venting and flaring, pneumatic devices, dehydrators and pumps, and compressors.¹¹²

The Climate Change Guidance outlines a framework of analysis for these issues. Regarding the potential of the proposed action and action alternatives to impact the climate, the Climate Change Guidance provides that agencies should “account for greenhouse gas emissions from the proposed action and any connected actions,” and that the emissions considered should include all those that have “a reasonably close causal relationship to the Federal action, such as those that may occur as a predicate for the agency action (often referred to as upstream emissions) and as a consequence of the agency action (often referred to as downstream emissions)[.]”¹¹³ The Climate Change Guidance also takes into account the difficulties in

¹⁰⁸ Howarth, Robert, et al., Methane and the greenhouse-gas footprint of natural gas from shale formations, *Climatic Change*. Mar. 31, 2011; Shindell, Drew, Improved Attribution of Climate Forcing to Emissions, 326 *Science* 716. 2009.

¹⁰⁹ U.S. Environmental Protection Agency, Natural Gas STAR Program, Basic Information, Major Methane Emission Sources and Opportunities to Reduce Methane Emissions; *see also* Petron, Gabrielle, et al., Hydrocarbon emissions characterization in the Colorado Front Range: A pilot study, 117 *Journal of Geophysical Research*. 2012.

¹¹⁰ Howarth, Robert, et al., Methane and the greenhouse-gas footprint of natural gas from shale formations, *Climatic Change*. Mar. 31, 2011; Wang, Jinsheng, et al., Reducing the Greenhouse Gas Footprint of Shale. 2011; Alvarez, Ramon et al., Greater focus needed on methane leakage from natural gas infrastructure, *Proc of Nat'l Acad. Science Early Edition* at 3. Feb 13, 2012; *see also* Howarth, Robert, et al., Venting and Leaking of Methane from Shale Gas Development: Response to Cathles et al.. 2012; Hou, Deyi, et al., Shale gas can be a double-edged sword for climate change, *Nature Climate Change* at 386. 2012.

¹¹¹ Williams, Megan and Copeland, Cindy, Methane Controls for the Oil and Gas Production Sector (2010).

¹¹² U.S. Environmental Protection Agency, Natural Gas STAR Program, Basic Information, Major Methane Emission Sources and Opportunities to Reduce Methane Emissions.

¹¹³ CEQ Revised Draft Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews at 11. Dec. 2014.

attributing specific climate impacts to individual projects. To address this, CEQ recommends that agencies use the projected GHG emissions and also, when appropriate, potential changes in carbon sequestration and storage, as a proxy for assessing a proposed action's potential climate change impacts.¹¹⁴ As CEQ explains:

[M]any agency NEPA analyses to date have concluded that GHG emissions from an individual agency action will have small, if any, potential climate change effects. Government action occurs incrementally, program-by-program and step-by-step, and climate impacts are not attributable to any single action, but are exacerbated by a series of smaller decisions, including decisions made by the government. Therefore, the statement that emissions from a government action or approval represent only a small fraction of global emissions is more a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether to consider climate impacts under NEPA. Moreover, these comparisons are not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations. This approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make relatively small additions to global atmospheric GHG concentrations that collectively have huge impact.¹¹⁵

Finally, the CEQ Guidance directs agencies to consider two specific impact areas relating to climate change: “(1) the potential effects of a proposed action on climate change as indicated by its GHG Emissions; and (2) the implications of climate change for the environmental effects of a proposed action.” This direction is vital to the Draft EIS, due to both the significant contribution made by federally leased oil and gas to the United States’ GHG emissions as well as the threats to public lands posed by climate change.

The Draft EIS should include carbon and methane emissions inventory estimates for the action and all alternatives. The Draft EIS should also use the federal government’s Social Cost of Carbon toolkit to quantify the externalized cost of the emissions for which oil and gas development pursuant to the leases would be responsible. These estimates should include the end-use emissions of all oil and gas produced as a result of BLM’s decision to issue leases on the Coastal Plain, rather than simply the front-end emissions of producing the oil and gas. A separate category should be provided for methane. Other agencies have begun to include this kind of analysis in their environmental review documents. For example, the Department of Energy has begun doing lifecycle GHG analyses when considering the impacts associated with Liquid Natural Gas terminals and exports.¹¹⁶ The Forest Service has also considered carbon dioxide

¹¹⁴ *Id.* at 8.

¹¹⁵ *Id.* at 9.

¹¹⁶ *See* Dept. of Energy, Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas. May 2014; Dept. of Energy, Office of Fossil Energy, Freeport LNG Expansion, Docket no. 10-161-Ing, Final Opinion and Order. Nov. 14, 2014; Dept. of Energy, Addendum to Environmental Review Documents Concerning Exports of Natural Gas. Aug. 2014; Dept. of Energy, Life Cycle Greenhouse Gas Perspective on Exporting LNG. May 29, 2014.

emissions from coal combustion anticipated to be produced under coal leases,¹¹⁷ and the State Department included a GHG emissions analysis in its review of the Keystone XL Pipeline.¹¹⁸ Finally, numerous courts have confirmed that, to comply with NEPA, agencies must consider emissions associated with fossil fuel projects.¹¹⁹ BLM itself has also begun to include some consideration of downstream emissions in EISs.¹²⁰

A full life-cycle analysis must include the emissions prior to combustion. This includes emissions related to the electricity and fossil fuels used to operate mining equipment, as well as those associated with the transportation of oil and gas and related infrastructure. BLM should also work to monetize the impacts of these GHG emissions using the EPA's social cost of methane and the Interagency Working Group's social cost of carbon methodologies, as well as the USGS carbon database. Relying on these data, BLM should develop quarterly estimates of all GHG emissions associated with the extraction, transport, and consumption of oil and gas and report the carbon emissions and impacts of its leasing decision.

h. The Draft EIS should Address the Potential Number and Placement of Roads Pipelines as a Result of the Proposed Action each Alternative and Examine the Environmental Impacts of Roads and Pipelines.

A full analysis of the impacts associated with road and pipeline development should be included in the Draft EIS. These impacts include, but are not limited to, impoundment of water, dust impacts to the adjacent tundra resulting in temporal changes in snowmelt and increased thermokarst, and impacts to wildlife habitat, including, but not limited to, the impact of habitat fragmentation. While it is impossible at this stage to know exactly where roads and pipelines may be built, BLM should make an honest effort to use prior oil and gas road proliferation calculation formulas employed in nearby oil and gas development areas and potential new leases to determine where roads and pipelines might be likely to be built, as well as estimates of how many miles of new roads and pipelines would be built under each alternative. These estimates should also include temporary roads alongside planned or potential pipelines.

¹¹⁷ U.S. Forest Serv., Final EIS, Federal Coal Lease Modifications. Aug. 2012; *see also* U.S. Forest Serv., ROD and EIS, Oil and Gas Leasing Analysis, Fishlake National Forest. Aug. 2013.

¹¹⁸ U.S. Dept. of State, Final Supplemental EIS for the Keystone XL Project § 4.14.3 Appendix U. Jan. 2014.

¹¹⁹ *See* Michael Burger and Jessica Wentz, *Downstream and Upstream Greenhouse Gas Emissions: The Proper Scope of NEPA Review* at 6, 28-57 (Columbia Law School Mar. 2016); *see, e.g., High Country Conservation Advocates v. United States Forest Serv.*, 52 F. Supp. 3d 1174, 1196 (D. Colo. 2014).

¹²⁰ *See* Bureau of Land Mgmt., Final EIS for the Wright Area Coal Lease Applications, 4-140. July 2010; Bureau of Land Mgmt., Final Supplemental EIS for the Leasing and Underground Mining of the Greens Hollow Federal Coal Lease Tract. Feb. 2015.

i. The Draft EIS Should Examine Impacts to Cultural Resources.

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the impacts of their actions on historic properties. Since the Arctic coast is recognized for frequent historical use by the Iñupiat, the Alaska State Historic Preservation Officer will need to be consulted on the proposed action and alternatives. The 1992 amendments to NHPA required consultation with tribal governments under Section 106. Tribal governments must be consulted about actions on or affecting their lands or resources. Consultation must respect tribal sovereignty and the government-to-government relationship between the federal and tribal governments.

The Draft EIS should evaluate the historic extent and condition of the environment to adequately address impacts to cultural resources of concern to tribal governments. Potential impacts to resources of concern to the tribes may include, but are not limited to, impacts to cultural resource areas, archaeological sites, traditional cultural properties of landscapes, sacred sites, and environments with cultural resources significance. The Draft EIS should disclose the historical and traditional significance of the project area to native people of Alaska, the importance of hunting, fishing, and gathering uses of the area by Alaska Natives, any long term traditional ecological management of the area, and any significant historical events that took place there.

Of particular importance is the role of caribou in the culture of Alaska Natives. To determine whether the area of potential effect would be eligible for the National Register of Historic Places, the perspectives of the tribal government(s) should be considered. Such considerations should include the list above as well as significant events that may have taken place in the past (establishment of trade routes and gathering sites, etc.). If adverse effects to traditional cultural properties, sacred sites, or other areas of cultural resource concern are identified, any Memorandum of Agreement (Section 106 MOA) developed to resolve these concerns under Section 106 should be addressed in the Record of Decision (“ROD”). Unless there is some compelling reason to do otherwise, the Section 106 MOA should be fully executed before the ROD is issued, and the ROD should provide for implementation of the terms of the MOA.

j. The Draft EIS Should Discuss Decommissioning and Reclamation.

The Draft EIS should address issues associated with post-production activities, including facility abandonment, dismantlement and removal of infrastructure, and subsequent site restoration, rehabilitation, and reclamation. NEPA requires agencies to consider appropriate mitigation measures, which include: (1) “[r]ectifying the impact by repairing, rehabilitating, or restoring the affected environment,” (2) “[r]educing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and/or (3) “[c]ompensating for the impact by replacing or providing substitute resources or environments.” 40 C.F.R. § 1508.20. Timely and effective reclamation practices are essential to protecting land and water resources, minimizing the length of time lands are disturbed, maintaining stable non-eroding

production sites, reducing fugitive dust from unvegetated areas, and achieving productive end land uses. Inadequate reclamation has substantial adverse impacts, including the spread of noxious weeds, decreased air quality as a result of a larger area of disturbance, less water restoration, and a loss of wildlife habitat.

Timely and effective decommissioning and reclamation depends upon the lessee's financial resources and the security of those resources. Because bonding amounts and types directly affect long term environmental performance, the Draft EIS should address reclamation bonding. The Draft EIS should identify the bond amounts that would be sufficient to cover projected restoration requirements by providing the formulas used to create them, and by comparing those formulas to actual reclamation costs at comparable facilities elsewhere in the Arctic region. The BLM should use its authority to disallow corporate guarantees for reclamation bonds and instead require cash to be placed in trust accounts, prior to initiation of development, for each facility that is developed. Even if bonds are held at the state level, it is the BLM's responsibility to ensure that lands under its jurisdiction will be properly reclaimed when oil or gas production ends. To address this concern, the BLM should consider no longer awarding leases to any company that is self-bonded, regardless of the current financial condition of the company. The BLM has this discretion, regardless of federal and state reclamation bonding requirements, to set a higher standard for bonding in such a highly sensitive and pristine area as the Coastal Plain.

k. The Draft EIS Should Evaluate the Environmental Justice Implications of its Proposed Action and Alternatives.

The Draft EIS should clearly disclose what efforts were taken to ensure effective public participation in the scoping process and throughout the decision-making process. In addition, because low income, minority and Alaska Native communities could be impacted by the proposed project, the Draft EIS should disclose what efforts were taken to meet environmental justice requirements consistent with EO 12898 Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.

l. The Draft EIS Should Consider the Effect of Noise and Artificial Light from the Proposed Action and Alternatives.

A careful analysis of noise expected due to construction, well maintenance and operation, gravel use, facility size, and a pipeline and road route is necessary to provide information key to determining appropriate alternatives and to evaluate potential mitigation measures. Additionally, any noise and artificial light analysis should discuss the impact of that noise upon the individual species identified in Section II.a. It is necessary to understand how noise and artificial light will impact natural behaviors of these species, including, but not limited to, migration, foraging, resting, sleeping, rearing, and mating activities.

m. The Draft EIS should include a Health Impact Assessment Specific to the Proposed Action and Alternatives.

Consistent with Sections 4321 and 4331 of NEPA, CEQ Guidance, and the goals of Executive Orders 12898 and 13045, if human health could be impacted by the proposed action and alternatives, the BLM should undertake a screening process to determine the direct, indirect and cumulative health effects of its proposed action. Aspects of human health that should be considered include, but are not limited to, public, environmental, mental, social, and cultural health. To address these aspects, the screening should include analyses of air and water pollution, light and noise pollution, traffic safety, food security, and factors that contribute to degraded mental health of impacted residents and industry workers. Depending on the results of the screening, an analysis of health effects, such as a health risk assessment or Health Impact Assessment (HIA), may need to be conducted to determine the direct, indirect and cumulative impacts to health. HIA is an accepted tool used internationally in evaluating public health impacts from various policies, programs, projects, and proposals. We recommend that the BLM partner with local, state, tribal and federal health officials to conduct the appropriate analysis, and to determine appropriate and effective mitigation of health impacts.

n. The Draft EIS should Examine Management and Disposal of Solid and Hazardous Wastes.

The management and disposal of solid and hazardous wastes are regulated under the Resource Conservation and Recovery Act (RCRA). Management and disposal of solid waste are delegated to the State of Alaska but regulated by the Environmental Protection Agency. The Draft EIS should clearly identify any solid and hazardous wastes that are anticipated to be generated from the construction and operation of oil and gas facilities pursuant to the leases, the anticipated management of these wastes, as well as potential direct, indirect and cumulative impacts of solid and hazardous materials management and storage. For hydrocarbon products, the requirements should be consistent with those of the Pipeline and Hazardous Materials Safety Administration, and other applicable federal, state and local requirements. While certain oil and gas exploration and production wastes have been exempted from regulation as hazardous waste, this exemption does not cover all oil field hazardous wastes. The Draft EIS should also include discussion regarding any reasonably anticipated releases and/or spills associated with these wastes, and potential impacts from such events. Finally, the Draft EIS should discuss how compliance with applicable RCRA regulations and state requirements will be ensured.

o. The Draft EIS Should Examine the Potential Impact of Invasive Species.

The Draft EIS should also describe measures that demonstrate the project's consistency with Executive Order 13112 regarding invasive species as well as the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as reauthorized and amended by the National Invasive Species Act of 1996.

The U.S. Coast Guard and the State of Alaska must prevent the introduction of aquatic non-indigenous species from ballast water into Alaskan waters. Because the uptake and discharge of ballast water is one of the most substantial pathways for the introduction and spread

of aquatic invasive species, the Draft EIS should include information about current aquatic invasive species presence and measures to be taken to prevent introduction and spread of non-indigenous species in the project area marine habitat via ballast water.

The Draft EIS should include any existing BLM regulations, guidance, or policies providing direction for ballast water and noxious species management, a description of current conditions, and best management practices that will be utilized to address invasive species. Of particular concern are potential impacts resulting from species adaptability, in light of climate change. It is important to recognize the limitations of ballast water exchange as an invasive species control measure, and that ballast water discharge is not the only vector for introduction of aquatic organisms. Some species can travel on the infrastructure of the vessel or can be discharged from other waste streams. Due to rapid changes in the Arctic, the project area may be particularly vulnerable to colonization by exotic species.

The Draft EIS should also address terrestrial invasive species. The proposed action will require new roads. Roads, however, facilitate the spread of invasive species.¹²¹ Furthermore, invasive species often become established on disturbed land¹²² which inevitably results from oil and gas development due to the construction of wellpads, pipelines, and associated facilities. The Draft EIS should also discuss measures that would be implemented to reduce the likelihood of introduction and spread of both aquatic and terrestrial invasive species for the proposed action and all alternatives.

p. The Draft EIS Should Address Land Use Impacts of the Proposed Action and Alternatives.

Land use impacts would include, but not be limited to, disturbance of existing land uses within work areas during construction and creation of permanent right-of-ways for construction, operations, and maintenance of the pipeline and aboveground facilities. The Draft EIS should document all existing land cover and uses within the project area, impacts by the project to the land cover and uses, and mitigation measures that would be implemented to reduce the impacts. One of the primary, direct impacts of construction on land use would be the removal or alteration of vegetation. Although vegetation can be replanted, ecosystem restoration of the Alaskan tundra is often not successful and, when successful, can take up to 20 years or more, making the construction impacts to these resources long term and in some cases permanent. The Draft EIS should describe the impacts to existing land use practices, indicate if the impacts would be

¹²¹ Martin W. Doyle, Emily H. Stanley, David G. Havlick, Mark J. Kaiser, George Steinbach, William L. Graf, Gerald E. Galloway, J. Adam Riggsbee, Aging Infrastructure and Ecosystem Restoration, 319 Science 286, 286. 2008; Franz Ingelfinger & Stanley Anderson, Passerine Response to Roads Associated with Natural Gas Extraction in a Sagebrush Steppe Habitat, 64 Western North American Naturalist 385, 392. 2004.

¹²² Erich Haber, Impact of Invasive Plants on Species and Habitats at Risk in Canada 3. 1998; Joseph M. DiTomaso, Invasive Weeds in Rangelands: Species, impacts, and Management, 48 Weed Science 255, 261. 2000.

permanent or temporary, and fully disclose and evaluate measures that could be taken to compensate for the loss of resources if oil and gas exploration and development within the project area is authorized.

q. The Draft EIS Should Examine Seismic Hazards.

The construction and operation of oil and gas development projects may cause or be affected by increased seismicity in tectonically active zones. Also, ground movement on nearby faults can cause pipelines to rupture, resulting in discharge of oil, condensates and gas. Therefore, we recommend that the Draft EIS discuss the potential for seismic risk and how this risk will be evaluated, monitored, and managed. A seismic map should either be referenced or included in the Draft EIS. The construction of the proposed project must use appropriate seismic design and construction standards and practices.

III. Procedural Matters that the Draft EIS Should Address.

a. Alternatives Analysis.

NEPA requires the BLM to include and fully evaluate a range of reasonable alternatives, including a no action alternative, in the Draft EIS. Reasonable alternatives are those that meet the stated purpose and need for the project and that are responsive to the issues identified during the scoping process and through tribal consultation. The CEQ recommends that all reasonable alternatives be considered, even if some of them are outside the capability or the jurisdiction of the agency preparing the EIS for the proposed action.

The Draft EIS should identify specific criteria that were used to: (1) develop the range of reasonable alternatives, (2) eliminate alternatives considered, and (3) select the agency preferred alternative. These criteria should be based on factors such as conservation of important aquatic and terrestrial habitats, maintaining wildlife and fish passage, technical feasibility, and public safety. The alternatives criteria should also incorporate substantive issues identified during the public scoping process and tribal consultations. Furthermore, alternative evaluation criteria should be identified early in the alternatives development process and be developed in conjunction with agencies, affected communities, and other stakeholders. Once the full range of alternatives is developed, the alternatives should be screened using the previously established criteria to eliminate those that are not reasonable or would not meet the purpose and need. Alternatives should be evaluated on each level based on the evaluation criteria determined from the project purpose, need, goals, and objectives.

b. The Public Involvement Process.

The proposed project has the potential to affect traditional subsistence and cultural practices and resources of certain tribal members and Native Alaskans living near and utilizing resources near the project area. Tribal governments whose members or traditional resources may be impacted, either directly and indirectly, by this action should be invited to consult on a

government-to-government basis on this project, consistent with Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments). Executive Order 13175 states that the U.S. government will continue “to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, trust resources, and Indian tribal treaty and other rights.” Documentation of these consultations should be included in the Draft EIS, as should any activities to address any concerns identified by tribal governments.

c. Purpose and Need for the Project.

The purpose and need statement should reflect the broader public purpose and need for the project, with a focus on the purpose and need for the BLMs’ action, decision(s) and analysis consistent with the implementing regulations for NEPA. In supporting the statement of purpose and need, the Draft EIS should discuss the proposed project in the context of the broader energy market, including identification of existing hydrocarbon product providers and sources and proposed transportation systems, as well as clearly describe how the need for the proposed action has been determined.

IV. Conclusion.

Thank you for your consideration of these comments. If you have any questions or there is any additional information we can provide at this stage, please do not hesitate to contact me.

Sincerely,

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