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Attention: Coastal Plain Environmental Impact Statement

Dear Ms. Hayes,

The Government of Canada (Canada) appreciates the opportunity to provide comments in response to the “The Coastal Plain Oil and Gas Leasing Draft Environmental Impact Statement (EIS)” published in the U.S. Federal Register on 28 December 2018.

Canada is requesting that a Supplemental EIS be prepared to address the key areas for additional analysis and information as per the document attached.

Sincerely,

Eric Walsh
Director General
North America Strategy Bureau

Government of Canada Comments
on the
Coastal Plain Oil and Gas Leasing Draft
Environmental Impact Statement (dEIS)

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Government of Canada Comments on the draft Coastal Plain Oil and Gas Leasing Draft Environmental Impact Statement (dEIS)

The Government of Canada (Canada) appreciates the opportunity to provide its comments in response to the “The Coastal Plain Oil and Gas Leasing Draft Environmental Impact Statement (EIS)” published in the U.S. Federal Register on 28 December 2018, following our submission to the Bureau of Land Management (BLM) regarding the scope of the EIS on June 18th, 2018¹. We lay out our comments on the dEIS in two broad categories. First, we provide overarching comments describing significant issues and concerns with the dEIS, and introducing significant new scientific analyses pertaining to the alternatives presented in the dEIS. Second, we provide more detailed and specific technical comments in an annex that reviews our three areas of shared management responsibility (Porcupine Caribou Herd, Polar Bears, and Migratory Birds). This includes a comparison of what we requested in our initial input to the scoping process with the content and analysis in the dEIS. The concluding remarks in Part 1 represent conclusions from the entire document.

Part 1: Overarching Comments

Canada’s six major concerns with the dEIS can be summarized as:

1. The dEIS did not present all viable and reasonable alternatives for analysis, principally not presenting an 800,000 acre-leasing alternative.
2. The dEIS did not evaluate the transboundary effects of the proposed action alternatives in any meaningful way. This is a primary concern for Canada and was raised during the scoping phase.
3. The dEIS did not provide any quantitative analysis that compared the impacts of all action alternatives to the no action alternative. We posit that such analysis is essential to a reasoned choice among alternatives and that such analysis is feasible.
4. Using our independent, quantitative assessment of the potential impacts of the proposed action alternatives², Canada believes the risk to the Porcupine Caribou Herd (PCH; and therefore the impact on Canadian subsistence users) of undertaking the presented action alternatives is too high.
5. The dEIS provides no indication that many of the proposed mitigations for caribou have been proven effective, that lease holders would have any requirement to demonstrate their effectiveness, or that there would be any coordinated monitoring activities pre- or post-development to implement an adaptive management program that would inform revisions to area-wide mitigations going forward. Further, the dEIS indicates that many lease stipulations and Required Operating Practices may be waived at the discretion of a BLM Authorized Officer. Finally, there is no indication how the 2000 surface acre limit (as interpreted by BLM) will be enforced. These critical uncertainties further increase the perceived risk of development and degree of uncertainty.

¹ “GovCanada_ThompsonK_Email.pdf” in Comment Folder 11 on the ePlanning website for the Coastal Plain EIS.

² See following sections for details and reference

6. Canada is concerned that if the SAExploration seismic application³ is approved under a separate NEPA process prior to a preferred alternative being identified in a final EIS, that the selection of an alternative is being prejudiced and the mitigations for seismic outlined in the dEIS may not apply.

Canada is requesting that a Supplemental EIS be prepared to address the shortcomings identified in this submission.

Project Alternatives

The Government of Canada supports Alternative A (no action alternative), in agreement with our original position and submission to the 1987 Leasing EIS for the Coastal Plain⁴. Selecting this alternative would be the simplest way to ensure the objectives of the *1987 Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd*⁵ (hereafter referred to as the PCH Treaty) continue to be met. This outcome would also align with recommendation 5 of the Conservation of Arctic Flora and Fauna's 2013 Arctic Biodiversity Assessment report⁶ to "Advance the protection of large areas of ecologically important...terrestrial...habitats" including (5b) "caribou calving grounds" and most directly achieve the objectives of the PCH treaty.

Notwithstanding Canada's position above, the dEIS did not present the viable and reasonable alternative of leasing the minimum area required in PL 115-97. All of the presented action alternatives (B, C, D1 and D2) propose to lease *more* than the minimum area (800,000 acres) legislated by Congress. There is no explanation of how the conservation needs (generally) of our shared species covered by international agreements are best balanced with the leasing requirements of PL 115-97 by the action alternatives presented. Nor, in a more specific sense, is it apparent how the first two objectives⁷ of the PCH Treaty are met by leasing more area than what the law requires. The dEIS does not explain how the multiple purposes^{8,9} of the Arctic National Wildlife Refuge (ANWR) are best balanced by leasing more than the

³ <https://eplanning.blm.gov/epl-front-office/eplanning/projectSummary.do?methodName=renderDefaultProjectSummary&projectId=111085>

⁴ Position paper of Canada on the United States Department of the Interior's Draft "Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment". Ottawa, 1987.

⁵ <https://www.treaty-accord.gc.ca/text-texte.aspx?id=100687>

⁶ <https://www.arcticbiodiversity.is/the-report/report-for-policy-makers/policy-recommendations#mainstreaming>

⁷ 2(a): To conserve the Porcupine Caribou Herd and its habitat through international co-operation and co-ordination so that the risk of irreversible damage or long-term adverse effects as a result of use of caribou or their habitat is minimized;

2(b) To ensure opportunities for customary and traditional uses of the Porcupine Caribou Herd by:

(1) in Alaska, rural Alaska residents in accordance with 16 U.S.C. 3113 and 3114, AS 16.05.940(23), (28) and (32), and AS 16.05.258(c); and

(2) in Yukon and the Northwest Territories, Native users as defined by sections A8 and A9 of the Porcupine Caribou Management Agreement (signed on October 26, 1985) and those other users identified pursuant to the process described in section E2(e) of the said Agreement;

⁸ The Refuge purposes now include a statutory purpose of oil and gas leasing because of PL 115-97.

⁹ <https://www.fws.gov/refuge/arctic/purposes.html>

minimum area. Purpose (ii) under the Alaska National Interest Lands Conservation Act (ANILCA) is “to fulfill the international fish and wildlife treaty obligations of the United States”. The analysis to reconcile the (now) competing purposes of the Refuge is needed in the context of our international agreements on Porcupine Caribou, Polar Bears and Migratory Birds.

Section 2.3 (p. 2-39) of the dEIS provides the reasoning for not evaluating an action alternative that limits leasing to 800,000 acres of “those areas that have the highest potential for the discovery of hydrocarbons” (PL 115-97). However, this section of the dEIS *provides no support that such an alternative was not feasible*. The only reason discussed was that the current designation of hydrocarbon reserve potential in ANWR implies that there is not actually 800,000 acres of “high hydrocarbon potential” in the project area, and that some quantum of medium or low potential area must be leased to reach the total. However, aside from that statement of fact, there is no stated project purpose, identified need, or legal imperative provided to lease more than what the law requires. Canada is firmly of the view that since the stated need for the project is *only* PL 115-97 (p. ES-1), and the dEIS concludes that there will be unavoidable adverse effects (section 3.5, dEIS), including on the PCH and the customary and traditional use of that herd, that minimizing those adverse effects might partially be achieved by fully considering a project alternative that only leases the minimum required area. Canada requests that the BLM complete an analysis to determine if meeting the intended purposes of the ANWR¹⁰ may best be accomplished by leasing the minimum acreage required by PL 115-97. We note that, for Refuge management purposes, oil and gas leasing is subservient to the conservation purposes according to Fish and Wildlife Service policy¹¹.

Transboundary Effects and Subsistence Users.

The EIS provides almost no analysis of the transboundary effects that may result from the oil and gas development induced by the lease sales on Canadians and the resources we co-manage with the United States under formal agreements. Because of this omission, Canada finds that the dEIS is fundamentally flawed and requires a Supplemental EIS.

The legal requirement to conduct a thorough analysis of transboundary effects flows from the application of the 1997 Council of Environmental Quality (CEQ) guidance¹² and was described fully in the scoping letter sent in by the Inuvialuit¹³ and other scoping submissions, and the analysis of that requirement is not reproduced here. In addition, the Inuvialuit scoping letter described several other international agreements that draw attention to the need to carefully consider the impacts of potential development to subsistence users in Canada. Canada articulated our concerns over transboundary

¹⁰ <https://www.fws.gov/refuge/arctic/purposes.html>

¹¹ Line 1.15 of National Wildlife Refuge System Mission and Goals and Refuge Purposes, <https://www.fws.gov/policy/601fw1.html>

¹² Council on Environmental Quality Guidance on NEPA Analyses for Transboundary Impacts, <http://ceq.hss.doe.gov/nepa/regs/transguide.html>.

¹³ “WMAcNS_StaplesL_Email.pdf” in Comment Folder 29 on the ePlanning website for the Coastal Plain EIS.

impacts in our scoping letter¹⁴. Canada notes that although the CEQ document is cited repeatedly in the dEIS, the provisions concerning transboundary analyses are not referenced or assessed in the dEIS.

Additionally, a thorough consideration of transboundary effects in the dEIS would be inferred by the several clauses of our formal bilateral agreements to co-manage important species shared across our borders, particularly the PCH Treaty), the *Convention for the Protection of Migratory Birds in the United States and Canada* and the *Agreement on the Conservation of Polar Bears*. For example, the dEIS (p. 3-160) points out the need to assess impacts to Canadian subsistence users under section 3(g) of the PCH treaty. In addition to that clause, the first two sections of the preamble¹⁵ and clause 2(b)(2)¹⁶ directly speak to the international nature of the herd, that subsistence users include Canadians, and that ensuring continued customary and traditional use extends to subsistence users in both countries. There is no indication that users in one country should be considered differently in an EIS.

Notional impacts to Canadian users of the PCH are described on pp. 3-167 to 3-170 of the dEIS. The dEIS acknowledges that “Canadian users accounted for 85 percent of the harvest, and Alaska users were 15 percent of the harvest” (p. 3-168) and that “...these Canadian communities would be among the most likely to experience potential indirect impacts due to their proximity to and reliance on the PCH.” (p. 3-170). Figure 3-7, Map 3-27 and Table M-21 in the dEIS appear to be the sum of information that the analysis of potential impacts to Canadians are based on. This cursory examination does not provide thorough consideration and analysis of impacts to Canadian subsistence users. It is not clear why Canadian subsistence users, for all shared species under our bilateral agreements, are not fully considered in sections 3.4.2, 3.4.4, and 3.4.5.

Since there is no quantitative analysis of the impact to Porcupine Caribou of the project alternatives provided in the dEIS (see next issue, below), and also no such complementary analysis for Canadian subsistence users, Canada cannot evaluate the context or intensity (i.e. significance in NEPA) of these “potential indirect impacts”. The dEIS is silent on compensation for these potential impacts, even though there is a precedent for providing compensation for residual impacts in the National Petroleum

¹⁴ “GovCanada_ThompsonK_Email.pdf” in Comment Folder 11 on the ePlanning website for the Coastal Plain EIS.

¹⁵ RECOGNIZING that the Porcupine Caribou Herd regularly migrates across the international boundary between Canada and the United States of America and that caribou in their large free-roaming herds comprise a unique and irreplaceable natural resource of great value which each generation should maintain and make use of so as to conserve them for future generations;

ACKNOWLEDGING that there are various human uses of caribou and that for generations certain people of Yukon Territory and the Northwest Territories in Canada have customarily and traditionally harvested Porcupine Caribou to meet their nutritional, cultural and other essential needs and will continue to do so in the future, and that certain rural residents of the State of Alaska in the United States of America have harvested Porcupine Caribou for customary and traditional uses and will continue to do so in the future; and that these people should participate in the conservation of the Porcupine Caribou Herd and its habitat;

¹⁶ 2(b)(2) in Yukon and the Northwest Territories, Native users as defined by sections A8 and A9 of the Porcupine Caribou Management Agreement (signed on October 26, 1985) and those other users identified pursuant to the process described in section E2(e) of the said Agreement;

Reserve context¹⁷. Canada observes that U.S. citizens and governments will receive 100% of the economic benefits of development, yet most of the adverse impacts to subsistence users of PCH will be borne by Canadians.

Canada also did not find any analysis in the dEIS of subsistence user impact from potential impacts of the action alternatives to Polar Bear. The voluntary Inupiat–Inuvialuit Agreement on Polar Bear Harvest is mentioned in the dEIS (p.3-125) but is not discussed in the context of subsistence use or potential impacts.

Comparison of the Impacts of the Alternatives

Canada was unable to evaluate the impact of the action alternatives on the species covered by our international agreements from the information provided in the dEIS. The dEIS lacks a comparative analysis of the impacts of the various presented alternatives, aside from stating in plain terms what the affected acreage is for each type of proposed land tenure amongst the alternatives and a literature review of potential effects of development on caribou (or other shared species). Therefore, Canada had no quantitative basis to rigorously explore and objectively evaluate the impacts of the alternatives even though this is critical to a reasoned choice among alternatives and the overall costs of obtaining it were reasonable¹⁸. In the case of PCH and the South Beaufort Population of Polar Bears, these two populations are amongst the *best monitored* populations of their species in the world, yet no original analyses were conducted for the dEIS using this extensive, available data. The dEIS relies almost entirely on qualitative statements or simple comparisons of area affected by various proposed land tenures rather than the quantitative impact of those proposes on the actual species. The dEIS methodology notes that “in the absence of quantitative data, best professional judgement prevailed” (p. F-1). Canada found this lack of analysis inadequate, and this missing information prevented Canada from being able to understand the relative impacts of the action alternatives to our shared species.

Canada partnered with the Yukon Government and Government of the Northwest Territories to fund a comprehensive, quantitative analysis of the predicted impacts of all action alternatives on the PCH¹⁹.

The above noted study provided the following key information and analysis:

- A vulnerability analysis of the herd to development based on its sensitivity to development, its exposure to proposed development, the potential impact, and how that impact might be

¹⁷ See page 9 for the \$8 million dollar compensation fund for Greater Mooses Tooth 1 development in https://www.blm.gov/sites/blm.gov/files/Planning_Alaska_DRAFT_RMS_Technical_Companion.pdf

¹⁸ The “science report” study (next footnote) was completed for <\$80,000 USD and within a short timeframe.

¹⁹ Submitted to the Coastal Plain Leasing ePlanning registry by Yukon Government, and also available at <http://pcmb.ca/1002>

lessened by mitigation. This vulnerability analysis framework is modelled after the framework used by the International Panel on Climate Change²⁰.

- A comprehensive summary of the biology of the herd, including specific similarities and differences from the Central Arctic Herd (CAH) and other North American herds. This includes uncovering key linkages between climate and vital rates and how those differ from the CAH.
- A detailed analysis of movement patterns of PCH during the insect harassment season, including documenting single aggregations of ~120,000 animals – groups so large that there is no evidence *anywhere in the world* how that ‘super-group’ may respond to infrastructure during large daily movements.
- A thorough description of the critical importance of calving, post-calving and access to insect relief habitats to herd persistence.
- Application of a three-part, quantitative cumulative effects model that incorporates movement rates of caribou in relationship to proposed and existing development, effects of climate, energy-protein dynamics of cows and calves through time, and the resulting carry-through of impacts computed in those three models that translates to population size.
- Comparison, via the above-mentioned model, of baseline, full development, and the three main leasing alternatives to 10-year projections of PCH populations.

This analysis demonstrates that, despite the short timeline that for the dEIS to be produced, it would have been reasonable for the BLM to produce a detailed, quantitative analysis examining the impacts of the various action alternatives.

Risk to Porcupine Caribou Herd

Given the unique transboundary movements of the PCH and importance of the herd to Indigenous Peoples in their respective jurisdictions, the United States and Canada agreed to jointly manage the PCH by signing the PCH treaty. The purpose of the treaty is to ensure opportunities for customary and traditional use of the herd by conserving the herd and its habitat (PCH treaty, section 2). This requires bilateral cooperation. In particular, this is to be done “so that the risk of irreversible damage or long-term adverse effects as a result of use of caribou or their habitat is minimized” (PCH treaty, 2(a)).

The International Porcupine Caribou Board (IPCB), formed under the PCH treaty, has not formally recommended to the Parties (Governments of Canada & United States) specific definitions for some of the key language in the PCH treaty. In particular, “irreversible damage” or “significant long-term adverse

²⁰ See Glick, P., B.A. Stein, and N.A. Edelson, editors. 2011. Scanning the Conservation Horizon: A Guide to Climate Change Vulnerability Assessment. National Wildlife Federation, Washington, D.C. and Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on climate Change. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.) Cambridge University Press, Cambridge, UK.

impact” (PCH treaty, 3(d)) have not been defined. Consequently, each respective country must make their own determination.

As noted above, the dEIS did not provide either the full range of viable and reasonable alternatives nor the information required to rigorously explore and objectively evaluate the impacts of the proposed action alternatives. Our own Canadian analysis²¹ (hereafter referred to as the ‘science report’) provided a quantitative analysis of the alternatives and their predicted impact to the PCH, including mitigations.

Canada wishes to emphasize some of the following results below of the science report that build on the existing scientific record. Readers are urged to review the full report for much more detail and context.

On Sensitivity:

- Of all herds in North America that increased in the latter quarter of the 20th century, the PCH had the lowest rate of increase. This herd has amongst the lowest productivity of barren ground herds and has never exhibited high growth rates (never >5% annually) that might allow it to recover quickly from a serious decline.
- Herd growth or decline is highly sensitive to adult cow survival. A very small difference (5%) in cow survival is the difference between the herd increasing or decreasing.

On Differences from CAH:

- Numerically, the herds are not comparable: the size of CAH has varied from 5,000 to 68,000 animals and is currently at 28,000 (p. 3-104). The PCH is nearly 10 times as large, currently at 218,000. The estimated historical low herd size is 100,000 animals.
- The CAH has a larger, more homogenous low-lying coastal plain area available to it for calving, which has seemingly allowed it to shift its core-calving grounds away from, and in response to development without massive impacts to the herd. Some of the CAH cows calve in areas away from development. The 1002 coastal plain is narrow, squeezed between the coast and mountains, which limits alternative and equivalent calving areas to the 1002 lands. PCH calving density was 5 times higher than the CAH when the 2002 report²² was completed. This increases the relative exposure to development.
- The maximum growth rate of CAH has been more than double the PCH²³ (rates of up to 10-13% compared to ≤5% for PCH) indicating a very different ability to recover from declines.
- Harvest of CAH was actively managed in the oilfields, where road hunting was limited²⁴. The dEIS indicates that subsistence harvest will be allowed on access (gravel roads) created by development in the 1002 area, as well as hunting by oilfield workers once they are off shift. We

²¹ Submitted to the Coastal Plain Leasing ePlanning registry by Yukon Government, and also available at <http://pcmb.ca/1002>

²² Griffith et al. 2002. Section 3, The Porcupine Caribou Herd *in* Biological Science Report USGS/BRD 2002-001. <https://alaska.usgs.gov/products/pubs/2002/2002-USGS-BRD-BSR-2002-0001.pdf>

²³ Griffith et al. 2002. Section 3, The Porcupine Caribou Herd *in* Biological Science Report USGS/BRD 2002-001. <https://alaska.usgs.gov/products/pubs/2002/2002-USGS-BRD-BSR-2002-0001.pdf>

²⁴ http://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/research_pdfs/03_ca_3.0_man_si.pdf

expect the zone-of-influence (ZOI) will be significantly higher for roads in the 1002 area because of this hunting.

- Spring and early summer forage conditions appear to be more critical to the PCH compared to the CAH, for which fall conditions the previous year correlate best with early calf survival. Thus, the documented displacement of calving in the CAH, if experienced with development in the PCH, would have more significant impacts on calf survival (for the PCH) than occurred in the CAH.
- The PCH undertakes substantially larger annual movements than the CAH, and as might be inferred from the first bullet on population size, and the size of aggregations of PCH moving during the insect harassment season are have no parallel to the CAH.

On the importance of the 1002 area:

- Based on data since 1972, cows used the 1002 area EVERY year and at least some cows calved there every year except 2000, 2001, 2007, and 2009.
- Early calf survival averages 10% higher in years that higher than average calving occurs in the 1002 area.
- The 1002 area is critically important not just for calving, but also for post-calving and for insect relief habitat. Extensive, critical use occurs in all areas of hydrocarbon potential.
- The 1002 area is the best area in the range of the PCH for high quality and available forage for promoting calf survival and recruitment.
- Even in years where cows could not calve in 1002 lands, they bring their calves there for the post-calving and insect harassment season.
- The importance of the 1002 lands appears to be increasing through time.

On Key Uncertainties

- Where will development actually occur in the 1002 lands, and will that be one large field or many smaller fields?
- How effective are the proposed mitigations? Where is the evidence?
- How many of the proposed mitigations/ROPs/Lease stipulations will be waived by the BLM Authorizing Officer?
- How will roads and pipelines affect the movements of aggregations of 100,000+ caribou?
- How will allowing hunting along roads increase the zone of influence/areas avoided by caribou?
- Will increased access to the herd via gravel roads increase the U.S. harvest? How will the U.S. monitor caribou harvest when no formal subsistence harvest reporting system currently exists.
- What will the herd size be once development starts?
- Is it a reasonable assumption that the entire 1002 area will be developed in the future – including areas proposed as “no surface occupancy” and “not available for leasing”, given the

pattern of development expansion from the original Prudhoe Bay oilfield and the formal re-opening of the process to reconsider the NPR-A areas currently not available for leasing²⁵?

On the projected impacts of development²⁶:

- In all model runs of all starting population sizes and climate conditions, development caused the herd to decline faster and grow slower (Figure 1), thus leading to a tipping point that risks a population losing more animals in a decline than can be made up in a growth phase.
- Modelling results for population projections predicted the following decreases **after** mitigation was considered under the action alternatives in the dEIS (Figure 2): Starting with the current population high of 218,000 caribou, declines of 17%, 12%, 7%, and 6% were predicted for action alternatives B, C, D1 and D2 respectively. Starting with the historical low population of 100,000 animals, declines of 18%, 14%, 9% and 9% were predicted. These declines assume the same level of harvest as currently observed, but the dEIS indicates that hunting will be allowed along gravel roads in the 1002 lands, potentially increasing harvest.

²⁵ <https://www.federalregister.gov/documents/2018/11/21/2018-25336/notice-of-intent-to-prepare-an-integrated-activity-plan-and-environmental-impact-statement-for-the>

²⁶ Results were presented for the impacts at the current (highest observed) population level (218,000), and the lowest observed population level (100,000) knowing that the population will fluctuate naturally in the absence of development. Results were also modelled for 10 year periods with poor, average, or good weather conditions – thereby incorporating potential climate variability.

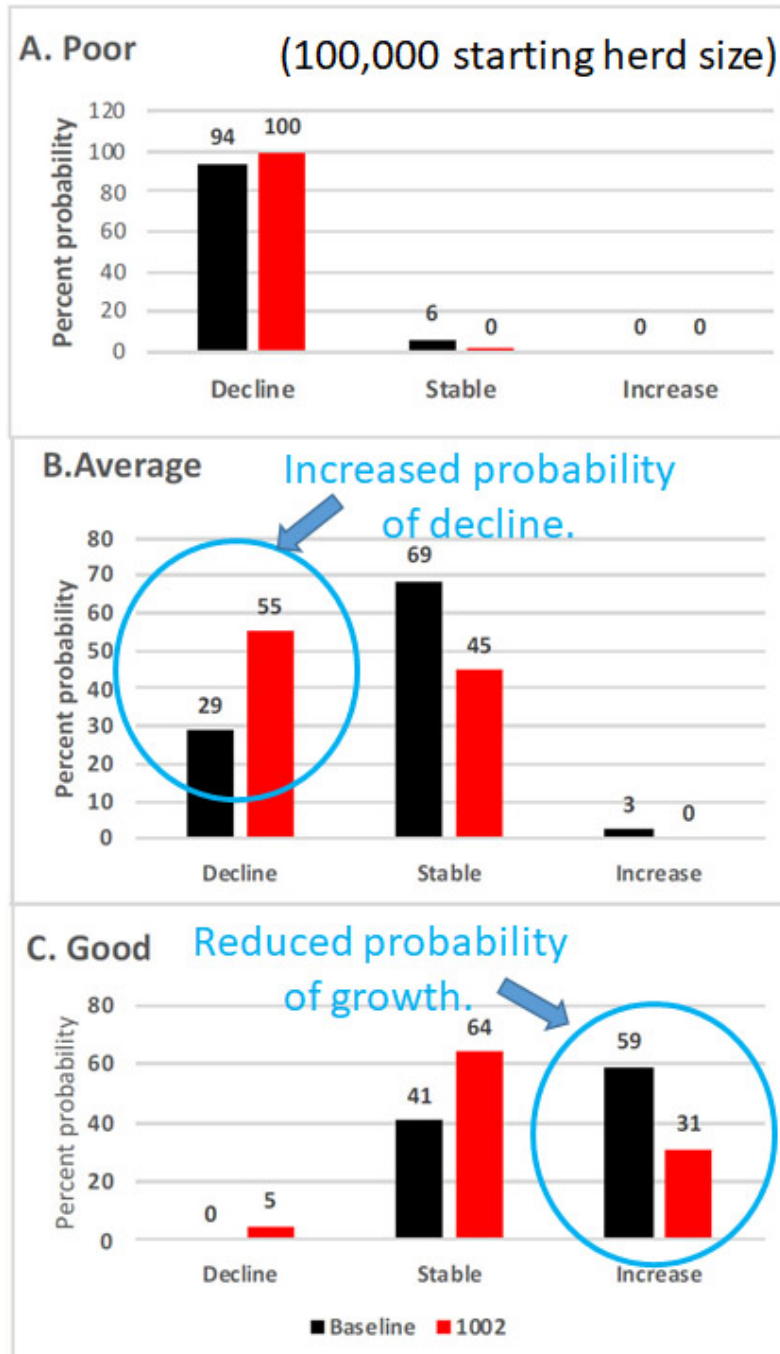


Figure 1: Probability of the PCH herd being in three categories of population change under current (black bars) versus full development (red bars) scenarios for 1002 lands (stable is +/-4%, the observed range of natural variation; Decline or Increase is >4% change in the respective direction). These results, shown for three runs of climate conditions explained in the report, highlight how development will increase the probability of declines that are larger than those observed historically under “normal climate conditions” (B: middle panel) and will constrain growth under “good climate conditions” (C: Lower panel). The science report explains the strong role that climate conditions can have on mediating caribou populations, and the top panel of this figure shows that in successive years of poor conditions, caribou will generally do poorly even without

development (as observed historical population fluctuations have shown). Refer to the science report²⁷ for a full explanation of this figure.

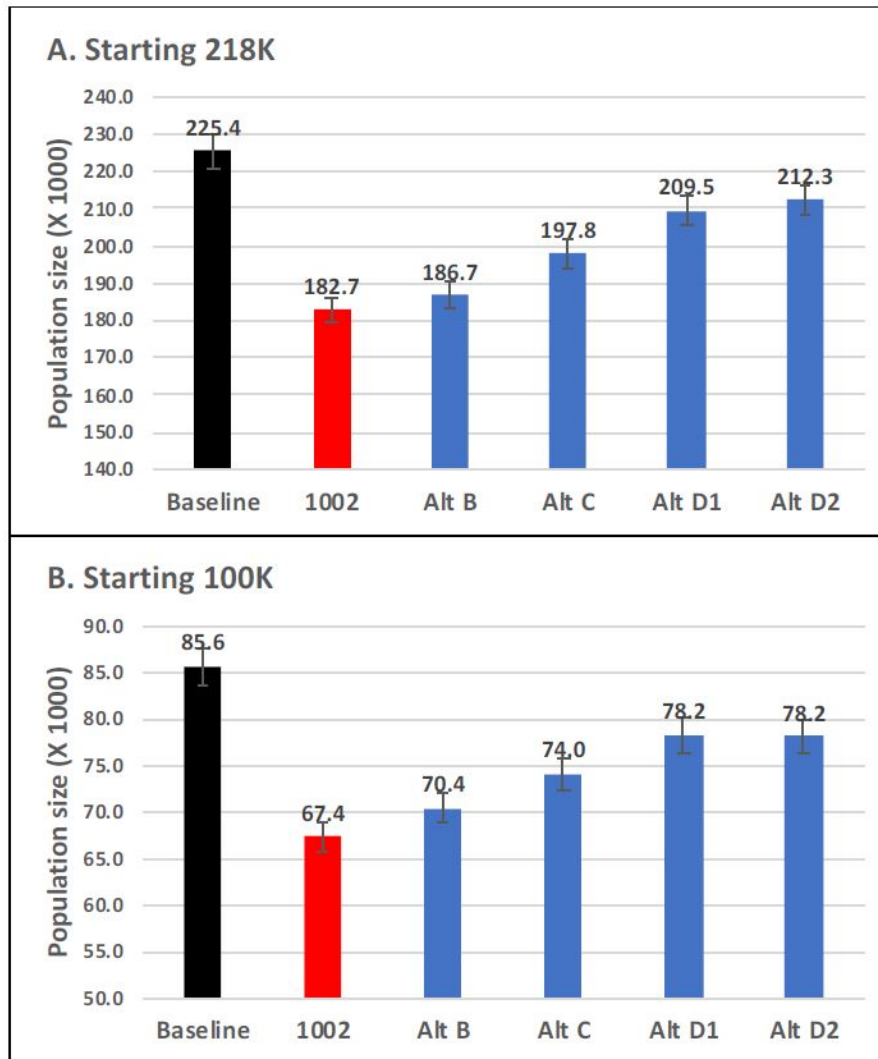


Figure 2: Projected population size of the PCH after 10 years from two initial starting sizes (current on top panel, observed historical low for bottom panel) under no development (black), full development (red), or the action alternatives presented in the dEIS (blue). Note that potential additional harvest from allowing hunting from roads built for development (subsistence and off-duty oilfield workers) is not incorporated into this analysis. Refer to the science report²⁷ for a full explanation of this figure.

Given the above analysis pointing out the sensitivity of the PCH, importance of the 1002 area to them, the differences between the CAH and PCH, the significant uncertainties and the results of our comprehensive analysis, Canada concludes **there is a risk of a significant, long term adverse impact on the herd under 3(d) of the PCH Treaty for the action alternatives presented in the dEIS.** Canada's position is that the current risk, as presented by the action alternatives in the dEIS, is too high.

²⁷ Submitted to the Coastal Plain Leasing ePlanning registry by Yukon Government, and also available at <http://pcmb.ca/1002>

Mitigation Effectiveness, Monitoring, Enforcement, Discretion and Oversight

The Canadian science report gives a succinct summary of all the proposed mitigations in the dEIS (section 5.2.1 of the science report). Several notable elements emerge from that summary including that, in the classical mitigation hierarchy of avoidance, minimization and offsetting & compensation, the third category was not applied. Also, the actual effectiveness of many of the mitigations is weakly (at best) or not supported by peer reviewed literature. For example, the traffic management suggestions such as convoying have not been demonstrated to work, with the limited studies failing to make conclusion for a variety of reasons²⁸. Nor was evidence provided in the dEIS that non-reflective coatings on pipelines serve a purpose for caribou mitigation. No evidence was provided that stopping major construction, while allowing drilling, would make a difference to zones-of-influence. Expanding Table 3-19 to indicate which mitigation(s) or measure(s) applies to each potential effect in the table, along with cited literature for each line supporting the effectiveness of the proposed mitigation(s) would add clarity to the dEIS.

Some of the proposed mitigations are too vague to evaluate or are unproven. The dEIS provides the 2000 surface acre limit (as interpreted in the dEIS) as a key mitigation. However, the areal limit on graveled surfaces is only constrained through time by restoration under ROP 35 with the goal to “ensure eventual restoration of ecosystem function and meet minimal standards to restore general wilderness characteristics.” There is no guideline or timeline for what meets the restored status before additional acreage can be covered with gravel. The dEIS does not describe any reclamation ‘success stories’ from the North Slope, but instead states “Reclamation has not been proven for gravel removal in the arctic environment once operations have ceased” (p. 3-57). It is therefore unclear how much PCH habitat could be impacted by gravel or gravel-impacted areas in the long term. ROP 33 outlines a system to track the area and type of developments in with spatially explicit data. Canadian management agencies or the International Porcupine Caribou Board are not listed as having access to these data. A description could not be found in the dEIS as to how the 2000 surface acre limit would be enforced (by whom or under what statute).

Lease stipulation 6 is meant to “ensure unhindered movement of caribou through the area” by using ROP 23 and some discretionary timing limitations for construction activities. Unfortunately, the dEIS does not contain a movement study of PCH, does not analyze collar data from CAH to quantify the effectiveness of various historical pipeline heights and orientations, or traffic frequency effects to large aggregations of caribou (though these data could have been analyzed), and does not contemplate the potential size of current PCH aggregations (that are 2 orders of magnitude larger than the dEIS’s 1000 animals) and how such large groups might behave.

Canada is also concerned that many of the mitigations are tied to specific spatial areas, such as the dEIS’s definition of the calving area – and will not apply when caribou calve in other areas. The dEIS provides evidence that PCH calve throughout the 1002 area (Map 3-23), but most frequently in the

²⁸ See p. 74, Lawhead, B. E., A. K. Prichard, M. J. Macander, and M. Emers. 2004. Caribou Mitigation Monitoring Study for the Meltwater Project, 2003. Third annual report for ConocoPhillips Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks

southeast. Because of these spatial definitions, some Alternatives (e.g. B) there will be years where the PCH calve outside the area defined as the “primary calving habitat”²⁹ (Lease Stipulation 7), and therefore may be no mitigations aside from “standard terms and conditions”. It could not be determined from the dEIS what suite of procedures fall under “standard terms and conditions”. Canada notes that any area used by the caribou for calving in any year is *critical for that year*, as would other within-year use of post-calving areas or insect relief habitat. There should be aspatial mitigations and measures that aim to minimize the impact to caribou during calving when they calve outside the areas defined in Lease Stipulation 7.

Some lease stipulations and Required Operating Practices (ROP) require monitoring plans (including plans that are only required under certain action alternatives). There are very few requirements for pre-construction monitoring³⁰ or baseline data collection that would permit a rigorous Before-After scientific assessment of the impacts of development and therefore, tests of mitigation effectiveness. It is unclear why, after decades of experience on the North Slope, more rigorous scientific requirements are not prescribed for potential lease owners. Canada also notes that there is no requirement that any of the studies and data, aside from air monitoring data in ROP 6, would become publicly available, potentially hindering Canadian management agencies from accessing valuable information. Finally, Canada’s experience is that in regions with multiple companies operating and having wildlife monitoring or reporting requirements, that an independent oversight board or organization may be a way to ensure studies are coordinated, well designed, well funded (by pooling resources of multiple companies for regional efforts) and publicly available. In collaboration with regulatory authorities, the independent agency could use these studies as part of a formal adaptive management framework. The dEIS did not contain any recommendations or requirements for such an entity (existing or new) or adaptive management framework.

A particular concern that creates uncertainty in the potential effectiveness of many proposed mitigations is that they appear discretionary. In many instances, mitigations and measures can be waived by the “BLM Authorized Officer”. Though this term is defined in the glossary, it is unclear to what level in the organization this authority is normally delegated. More concerning however is that there are no criteria in the dEIS that indicate how such discretionary authority will be objectively applied. The United States Government Accountability Office report GAO-17-307³¹ concludes that *“Because BLM does not consistently track exception request data or have a consistent process for considering requests and clearly documenting decisions, BLM may be unable to provide reasonable assurance that it is meeting its environmental responsibilities.”* Because of this independent assessment, and the frequent use of discretionary authority listed in the lease stipulations and ROP’s, Canada is left with a high degree of uncertainty. This uncertainty, in addition to the concerns raised in the preceding paragraphs of this

²⁹ Terminology is not used consistently in the dEIS. Page 3-106 defines the terms used for calving areas, but without any methodology or detail on how they are defined from collar locations. “Primary calving habitat” is not defined along with the 4 other terms listed on that page. None of these terms are linked to the quantitative descriptions in Table J-15.

³⁰ For example, ROP 23 item (f) has a requirement for a pre-construction movement study if the BLM Authorized Officer determines it is necessary based on the listed criteria. Pre- or post-construction monitoring requirements directly for caribou appear limited to the single preceding item. Plans for vehicle use management include a discretionary caribou monitoring requirement. Aircraft management plans do not report or study caribou.

³¹ <https://www.gao.gov/products/GAO-17-307>

section, contributes to Canada's assessment that the risk of the action alternatives presented in the dEIS is too high.

Potential Approval of SAExploration Seismic Proposal prior to a final EIS

Canada's opinion is that all oil and gas related exploration and development in the 1002 area, if it proceeds, should only proceed after the leasing EIS is complete and a preferred alternative has been selected along with ROPs and other mitigations that apply equally to all projects going forward. Currently, the SAExploration proposal³² for seismic exploration includes the entire 1002 area and some near shore waters. The proposal is led by a private company that would receive compensation for their project expenses by selling the data they collect to any interested parties. The dEIS includes action alternatives that includes areas **not** available for lease. It is not apparent to Canada why a private company would invest substantial capital to collect data that could never generate a financial return unless they have a reasonable expectation that all of their proposed project area is marketable. This infers that the selection of a preferred alternative, though not identified in the dEIS, may be prejudiced. It is unclear to Canada if separating the two environmental review processes, with the seismic application potentially preceding the leasing EIS process conclusion, creates a project segmentation issue.

The leasing EIS process is meant to identify the cumulative impact of reasonably foreseeable activities, and ensure a thorough environmental review. There are public analyses³³ that conclude there may be significant adverse effects of the proposed SAExploration program, and those analyses should be considered in the leasing EIS. For instance, it is not apparent how ROP 10 and 11 in the dEIS may be met given the data³⁴ indicating that minimum snow depth conditions required by the ROPs are rarely met in much of the 1002 area.

³² <https://eplanning.blm.gov/epl-front-office/eplanning/projectSummary.do?methodName=renderDefaultProjectSummary&projectId=111085>

³³ https://www.geobotany.uaf.edu/library/pubs/WalkerDA2019_seismic_exploration_whitepaper.pdf

³⁴ https://www.geobotany.uaf.edu/library/pubs/WalkerDA2019_seismic_exploration_whitepaper.pdf

Concluding Remarks

Thirty-one years ago this February, Canada formally responded to a draft ANWR Coastal Plain resource assessment³⁵. Our key comments in 1987 included:

- “It is the conclusion of the Government of Canada that in this case the risks associated with opening the coastal plain to development far outweigh the potential benefits”;
- “The draft EIS, however, does not address the fact that the most heavily affected species are shared resources.”;
- “The draft EIS largely underestimates the significance of development to Canadian subsistence users.”; and,
- “Canada notes that the draft does not provide for an assessment of the cumulative effects of development on 1002 lands with other regional developments.”

With 30 years of additional data collection and study on the key shared resources, significant legislative and case-law improvements in environmental impact assessment practice, and a significant volume of clearly stated concerns during the scoping phase, many of our concerns remain the same.

The dEIS failed to present a full range of viable and reasonable alternatives for review, did not provide meaningful and reasonably available data and analyses that would allow an understanding of the impact of the alternatives provided, essentially did not address the transboundary effects of the proposal on Canadians, provided no cumulative effects analysis and, finally, provided a series of mitigations, stipulations and ROPs that are largely discretionary. Because of these shortcomings, Canada was not able to evaluate the actual impact of the proposed action alternatives in the context of our international agreements on shared resources. Section 3(g) of the PCH treaty requires “When evaluating the environmental consequences of a proposed activity, the Parties will consider and analyze potential impacts, including cumulative impacts, to the Porcupine Caribou Herd, its habitat and affected users of Porcupine Caribou.” The dEIS does not meet this requirement to an acceptable standard.

Canada therefore requests that a Supplemental EIS be prepared to address these shortcomings and other issues identified in this submission.

³⁵ Position paper of Canada on the United States Department of the Interior’s Draft “Arctic National Wildlife Refuge, Alaska Coastal Plain Resource Assessment”. Ottawa, 1987.

Part 2: Annex of Detailed and Specific Comments

Porcupine Caribou Herd

Overall Comments

First, some key points extracted from the dEIS for context: The operations will follow ROPs already developed and used for oil and gas extraction in Alaska. The ROPs specific to caribou (ROP 23) are intended to “Minimize disruption of caribou movement and subsistence use”. ROP 23 includes a description of a) elevated pipelines (7 m), b) access ramps or buried pipelines in strategic locations, c) a minimum distance of 500 m between roads and pipelines, d) non-reflective coating on pipelines, e) orientation of structures to avoid corralling effects, f) studies of recent caribou movements, and g) vehicle management plans. ROP 34 also adds stipulations for aircrafts over calving and post-calving areas (stricter under Alternative D). After land tenure decisions (no leasing, no surface disturbance, timing limits, etc.), these are the main proposed mitigations at this stage in the development process.

Some important technical points that Canada refers to in our detailed comments: For all alternatives, primary calving areas for the PCH were defined as areas with a higher-than-average density of cows about to give birth during more than 40 percent of the years surveyed. **Alternatives B and C** use a similar no-construction Timing Limitation (TL) during calving (20 May to 20 June) in the calving area of the Porcupine caribou herd, although they reserve the right to approve major construction (“approved by the BLM Authorized Officer...”). Traffic is tolerated during this period, but slowed down to 25 km/h when caribou are within 800 m of the road. Drilling is also tolerated within the calving area during the calving season. **Alternative B** uses this TL on 721,200 acres, whereas **Alternative C** uses it on only 115,000 acres (with the remaining 606,200 acres on “no surface occupancy”). Of course, this means that habitat will be disturbed during most of the year, and will not have time to recover in time for the calving/post-calving period. **Alternative D** removes 476,600 acres included in the PCH calving area that would not be offered for oil and gas extraction, and subjects the remaining 244,600 acres to “no surface occupancy”.

Post-calving areas for the PCH were defined as the areas with a higher-than-average density of cows during the post-calving period for “more than 40 percent of the years”. This includes and extends beyond the primary calving area (p. 2-14). The EIS refers to ROP 23 for guidance about this area under **Alternative B**. **Alternative C** talks about evacuating sections of roads “whenever an attempted crossing by a large number of caribou (approximately 100 or more) appears to be imminent (June 15–July 20)”. **Alternative D** would exclude facilities, but tolerate roads, oil pads, and pipelines in the post-calving area, and would use a similar TL for road evacuations.

Errors of fact

Canada did not note any errors of fact about caribou ecology. However, some descriptions, especially of the methodology used to determine calving/post-calving areas and to calculate areas occupied by various stipulations, are vague or incomplete, making it difficult to detect any errors. We have identified such gaps in our specific comments.

What is included in the dEIS is of a relatively high quality, and without obvious mistakes. However, in some cases the lack of specification with respect to methodology limits our ability to determine the soundness of the analysis.

One error not fully recognizing the importance of post-calving areas, as well as downplaying the importance of 1002 lands for caribou during other seasons. Post-calving and insect-relief aggregations are critical periods for barren-ground caribou. Another area of specific concern is the area of stipulations comparing number of years when caribou were present; this is detailed further in our paragraph on errors of analysis.

Errors of omission

Canada found that many references for caribou studies were included in the dEIS. When references were clearly lacking, we highlighted it in our specific comments.

However, there were no new quantitative analyses conducted for the dEIS and most of the references used were dated. They dated back to an era when many studies about the effects of oilfield development on caribou were contradictory (for a discussion of this problem, see the review by Vistnes and Nellemann, 2008³⁶). This means that literature is available to support that caribou react strongly to development (the current consensus among researchers), but literature is also available to support that development does not have a strong impact on caribou. Given time constraints, we were unable to identify every instance where the dEIS used only one side of the evidence vs. both sides. However, it is a common best practice to recognize and cite studies that support a statement, with at least mention of the studies that do not support it. Canada did not see such an effort to report both sides of the story in this dEIS.

In terms of omissions of impacts, we highlight in our specific comments that functional habitat loss, zones of influence, and the possibility of migration disruption were areas where the dEIS was lacking. Although all of these impacts are somewhat linked, there is abundant literature on these subjects that was not reported in the dEIS. Sometimes these terminologies are hinted at in the document, but the dEIS did not explore them in enough depth. The review section is adequate, but tells nothing about the acceptability of these risks at this critical stage of land tenure planning. It is still hard to determine which of these effects will influence caribou, but most importantly, what will be the consequences of these effects on caribou demography. For example, the dEIS recognizes that “*if future development causes*

³⁶ The matter of spatial and temporal scales: a review of reindeer and caribou response to human activity. *Polar Biol.* 31: 399–407

large-scale displacement of the PCH from the calving grounds in the program area, the calving distribution would most likely shift to the east or southeast, [generating an] 8 percent decline in annual calf survival if there were full development of the 1002 Area” (p. 3-114) but does not follow up with a discussion on the consequences of such a decline, nor does it introduce mitigation measures that could be used to prevent this decline. Further there is no assessment of cumulative effects of development of 1002 lands incremental to existing development elsewhere in the range in combination with potential impacts of climate change (see points raised in scoping review and detailed review comments).

A robust approach to mitigation is lacking. While the dEIS discusses ROPs and stipulations, more detail is warranted, specifically in a formal adaptive management context by having an independent oversight board for development, coordinated before-and-after studies, publicly available data and results, and timely revision of ROPs, stipulations, and mitigations. Canada sees this approach, including formal testing of mitigations, as an opportunity that was not realized for the Prudhoe Bay area.

Errors of analysis

The dEIS does not share enough specific information to make a thorough determination on errors of fact. However, Canada has identified two major elements that warrant explicit further attention.

Canada has a significant concern about the dEIS identification of calving/post-calving areas. For calving areas, the dEIS used “*areas with a higher-than-average density of cows about to give birth during more than 40 percent of the years surveyed*”. Not only is this vague (see specific comments), but it raises the question: why 40%? This value is not justified in the dEIS, and moreover does not consider the change in use of the calving grounds through time. The dEIS needs to take a rigorous, defensible and transparent approach to defining this value as it drives the land tenure options to a significant degree. Currently, a single sentence (for each) in Table 2-2 is used to define calving and post-calving areas. See more details in the specific comments. Another problem with the calving areas description is that the areas seem to change depending on alternatives.

Canada’s second concern is the calculations of stipulation areas based on number of years caribou were present. It seems that the dEIS considered each category of use by caribou (20-30% of the years, >40%, etc.) as independent units. A more useful metric would have been to consider these categories as what they are, i.e., proportions of the years caribou are present, thus using categories such as >20%, >30%, >40%, etc. It is not possible to compare a proportion of years ranging between two set values (say between 20% and 30%) to a category spanning a much larger range, e.g. 40% to 100%. Comparing those two categories simply doesn’t make any sense. Technically this does not cause problems for the mapping of areas, but it does matter when calculations of the areas covered by these categories are made. This may look like a simple mistake (the numbers do not add up in Table J-15), but we suspect it may have large consequences on the actual acreages mentioned everywhere throughout the dEIS. This needs to be corrected.

Potential and/or known effectiveness of any proposed stipulations/mitigations

It is not possible to understand what the consequences of these various action alternatives will be on caribou demography based on information presented in the dEIS. Canada's comments in Part 1 of this submission outline the issues and concerns.

Do conclusions on impact make sense given all the preceding considerations?

Canada notes that the dEIS downplayed the effects of new development on an otherwise pristine barren-ground caribou calving ground. Though it was pointed out in several places that the biology and space use of the PCH and CAH is quite different³⁷, the dEIS assumes that mitigations and approaches used for the CAH will work well for the PCH. Canada cannot reconcile these basic but conflicting tenets based on information in the dEIS.

Finally, **the PCH is the ONLY barren-ground caribou herd in North America to be stable/increasing AND at high population levels.** In our opinion this success is significantly related to having intact calving grounds in concert with other factors noted in the science summary report³⁸. Canada notes that the calving grounds of the herd, and a significant portion of their range, has either been formally protected or put under a conservation management regime in Canada as shown in Fig. 3 and 4 in this document. Also, Fig. 4 clarifies some misinformation that Canada has developed oil and gas resources within the calving grounds of the herd. Since the PCH treaty was signed, there has not been a single well drilled in the PCH's Canadian calving grounds³⁹.

³⁷ e.g. *"The patterns of CAH demography following development should be applied to the PCH with caution for several reasons: movements and demography of the PCH are different from the CAH, concentrated calving density of the PCH is much higher than the CAH, and areas next to the PCH calving grounds contain less high-quality forage and higher predator densities and exhibit more topographic relief than do the current PCH calving grounds (Clough et al. 1987; Griffith et al. 2002)" (dEIS p. 3-114)*

³⁸ Submitted to the Coastal Plain Leasing ePlanning registry by Yukon Government, and also available at <http://pcmb.ca/1002>

³⁹ <http://mapservices.gov.yk.ca/OilGas/Load.htm>

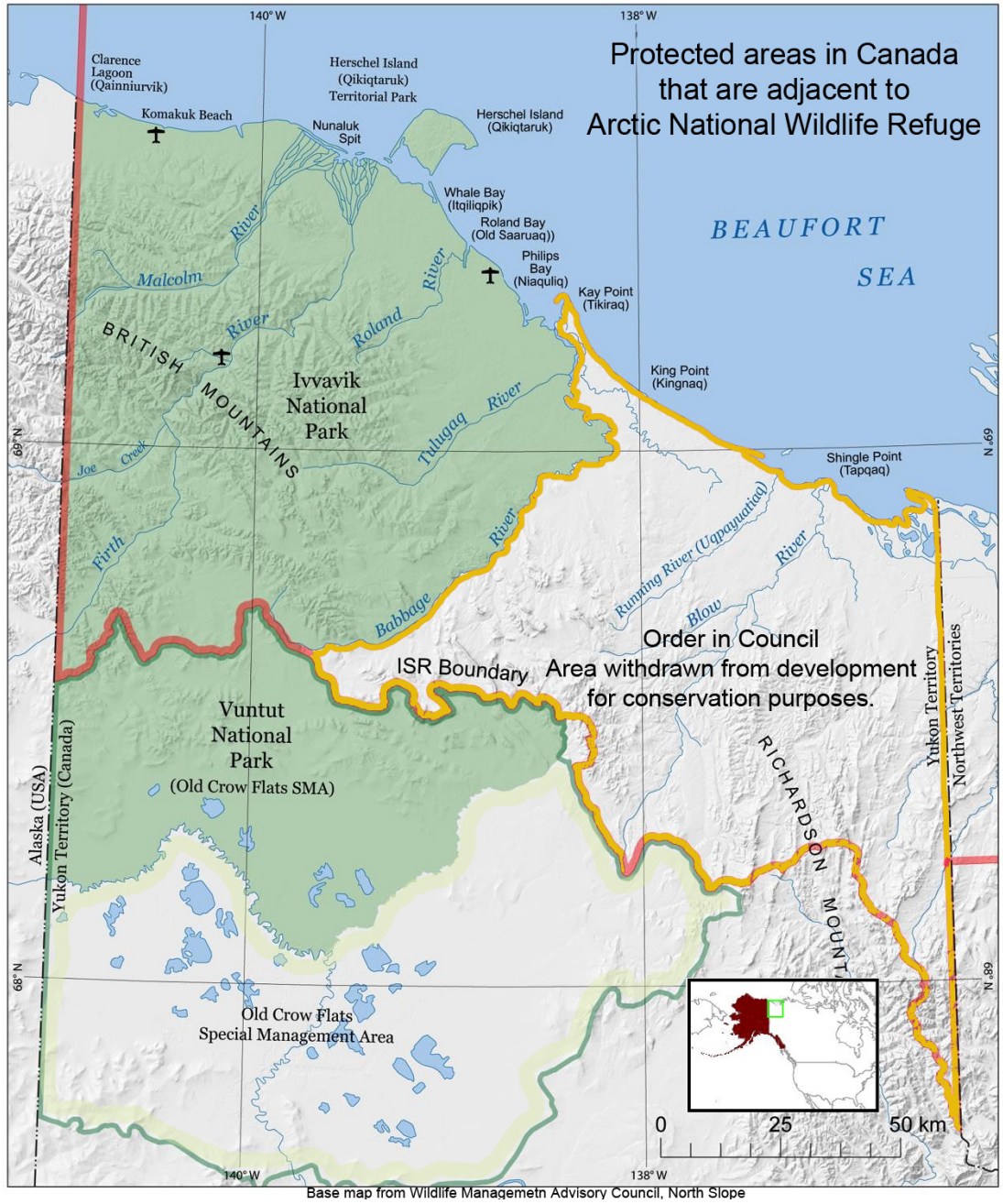


Figure 3: National Parks and other protected areas in the northern portion of the range of the Porcupine Caribou Herd in Canada. ISR boundary refers to the Inuvialuit Settlement Region boundary. SMA is a Special Management Area. There are additional formally protected and conservation areas south of this area as shown in Fig. 2.

Porcupine Caribou Core Range, Protected Areas and Oil and Gas Activities in Yukon: Post 1987

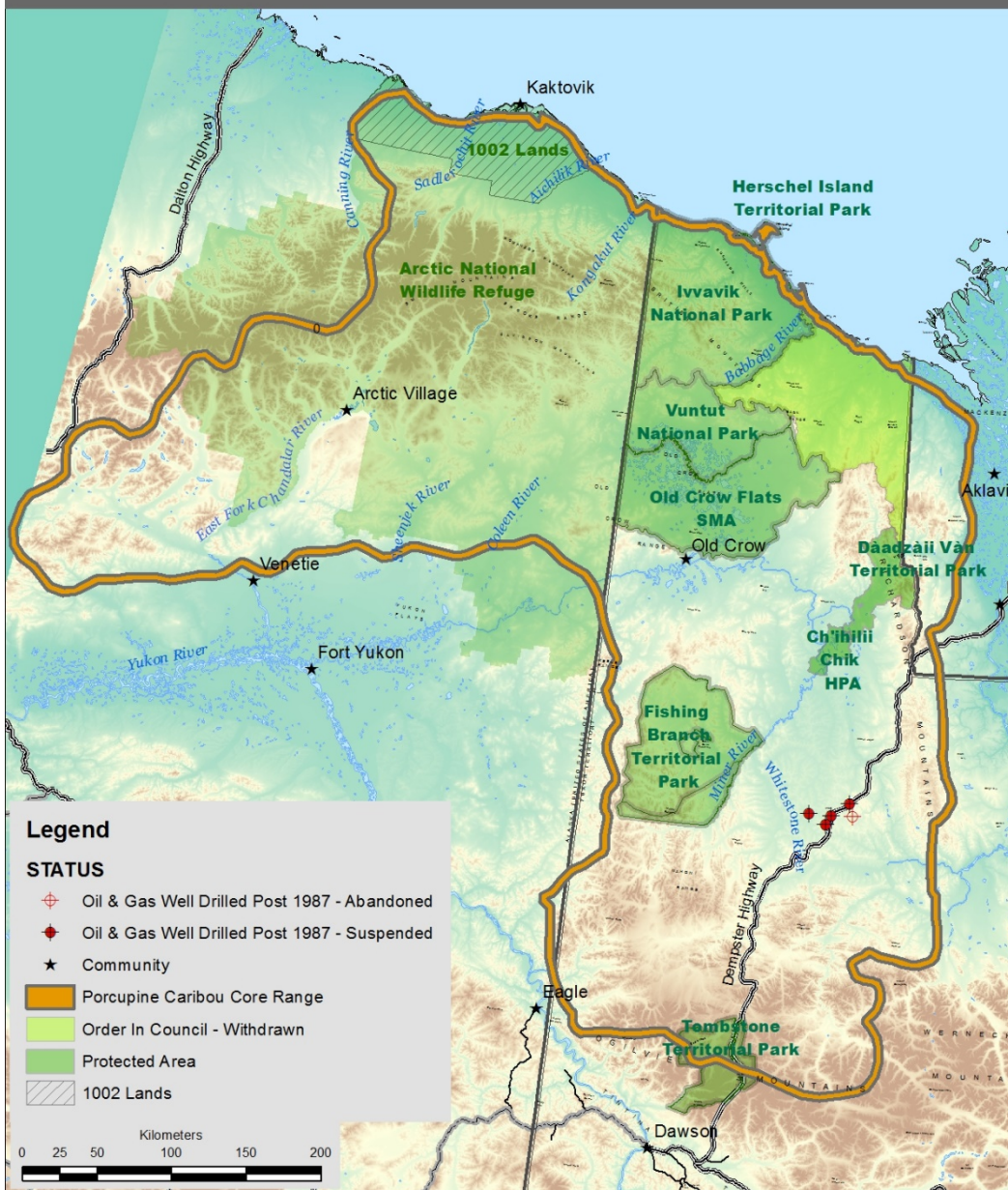


Figure 4: The core range of the PCH, as defined by the Porcupine Caribou Technical Committee and accepted by the International Porcupine Caribou Board. This map highlights other existing protected areas in the range of the herd that is south of areas frequently used for calving in Canada. The map also clarifies that since the 1987 PCH treaty was signed, Canada has not developed any oil and gas resources in the calving areas of the herd. Finally, portions of the range may have additional conservation areas once the draft Peel Watershed Land Use Plan⁴⁰ is completed in 2019 or 2020 and the Dawson Land Use Plan is completed in several years (map source: M. Suitor, Yukon Government)

⁴⁰ See <http://peel.planyukon.ca/> and see Figure 2.20 and Map 2 therein.

Detailed Comments in Reference to Canada’s Scoping Letter – Porcupine Caribou Herd

Canada outlined in our scoping letter⁴¹ what we recommended be included in the EIS. The table below compares what we requested, where we found information about that topic in the dEIS, our determination if the request was addressed, our assessment of how well it was addressed, and supporting information and commentary.

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
Fully describe potential impacts to key species of the proposed leasing + impacts of pre-and post-lease activities such a seismic and drilling exploration, development, and transportation + induced development including the impacts of malfunctions	Chapter 3 – Affected Environment and Environmental Consequences and Direct and Indirect Impacts Section 3.3.4 Terrestrial Mammals Table 3-19	Partially	<p>Poor</p> <p>The dEIS cites previous literature reviews for impacts, summarized in Table 3-19. One reference is out of print and all date prior to 2006. Failure to complete any quantitative analysis is blamed on uncertainties around the influence of climate change on the rate or degree of impacts and lack of specific project plans.</p> <p>The dEIS discusses and acknowledges multiple potential impacts to caribou throughout the oil-field development process (based mainly on experience with the CAH) but cite ROP’s as sufficient to minimize these impacts. However, information within literature reviews state that while there is data related to the success of elevated pipeline height (>7m), there is no information for crossing success of cows immediately prior to and during calving and the need for further research to clarify responses to roads and other multiple impacts and success of mitigation measures (Cronin et al. 1994, Lawhead et al. 2006).</p>
Clear statements on the	Chapter 3 – Affected	No	Insufficient

⁴¹ “GovCanada_ThompsonK_Email.pdf” in Comment Folder 11 on the ePlanning website for the Coastal Plain EIS.

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
significance of those potential impacts	Environment and Environmental Consequences Section 3.3.4 Terrestrial Mammals Table 3-19		The dEIS states if potential impacts are “Adverse” or “Beneficial” but not if they are “Significant”. In the dEIS Glossary a “significant impact is one that exceeds a certain threshold level and evaluated based of the severity of the impact and likelihood of its occurrence”. No thresholds, severity measurements or indications of likelihood of occurrence are provided for caribou in any of the scenarios.
Project (i.e. the leasing) alternatives or alternative means for the project.	Chapter 2 - Alternatives	Partially	<p>Poor</p> <p>Outlines 3 alternatives (not including the no development alternative); however, all alternatives are in excess of 800,000 acres and maximize the 2000-acre surface disturbance rule. Could have been a wider range of alternatives presented and an 800,000 acre alternative.</p> <p>The dEIS does not discuss other alternatives to the project as the dEIS is bound by legislation (PL 115-97).</p>
Fully describe critical thresholds or limits to development + the legislative framework to support them	Chapter 2 - Alternatives (pdf pg 31) Section 2.2 Description of the Alternatives (pdf pg 31) Section 2.3 Alternatives Considered But Eliminated from Detailed Analysis (pdf pg 69) Appendix B, Table B-5 Appendix B.7.5	No	<p>Insufficient</p> <p>No critical thresholds or limits to development are outlined for caribou in the dEIS. All alternatives are expected to reach or exceed the 2,000 acre disturbance threshold (Table B-5). Additional roads could be built through Native or State lands that could exceed the 2,000 acre threshold (B.9.3). Reclaimed facilities (2-5 years) can continue to be added to the 2000 acre surface disturbance limit so theoretically construction and expansion can go on indefinitely. There is no definition in the dEIS when disturbed lands would be deemed suitable caribou habitat after reclamation.</p> <p>Protective measures outlined in the alternatives come in the form of lease stipulations (1, 6, 7, 8, 9), and Required Operating Procedures (ROP 23 and ROP 34). They outline suspension of construction activities, limits on vehicle and aircraft use and speeds during calving (May 20-June 20), and road evacuations during imminent crossings during post calving periods (June 15-July 20). They also outline numbers of calving cows (10% of pop) or caribou (100) that would trigger construction suspensions. These do not constitute critical or tested thresholds or limits to development.</p>

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
	Abandonment and Reclamation Appendix D. Laws and Regulations		However, lease stipulations can be subject to a waiver, exception or a modification by the BLM Authorized Officer at any time during the life of the lease. It is unclear who would be responsible for monitoring and enforcing lease stipulations and ROP measures. Appendix D of the dEIS outlines that USFWS has responsibilities for monitoring and mitigation efforts.
Fully describe additive , multiplicative and synergistic cumulative effects of proposed leasing and induced development on key species in relation to existing natural and anthropogenic stressors	Chapter 3 – Affected Environmental Consequences Section 3.3.4 Terrestrial Mammals Cumulative Impacts Appendix F.3 Cumulative Impacts Appendix F.4.15 Terrestrial Mammals	No	Insufficient Insufficient quantitative analysis of cumulative effects of various scenarios. Lacking an “impact rating”, or the relative contribution of the action alternatives to cumulative effects as outlined in the dEIS Methods section (F.3.1). Unclear how they consider the interaction among the impacts of proposed actions. Most “Impact Indicators” are the amount of area affected, qualitative assessments or descriptions of the potential impacts (Table F.4.15). No quantitative analysis of scenarios was completed for terrestrial mammals. Qualitative analysis also assumes that subsistence hunting will be allowed along gravel roads, underestimates displacement of maternal caribou, and assumes that mitigation measures will mitigate the effect of roads and pipelines on caribou movement. These assumptions are not supported in other existing North Slope oilfield operations or cited literature. The population impacts of increased (unregulated) hunting pressure of caribou on all oil-field road where hunting has not occurred in the past is unprecedented. There is no mention of creating a US Caribou Harvest Monitoring Plan to track the impact of increased access on caribou hunting. Section 3(g) of the PCH treaty requires “When evaluating the environmental consequences of a proposed activity, the Parties will consider and analyze potential impacts, including cumulative impacts, to the Porcupine Caribou Herd, its habitat and affected users of Porcupine Caribou.” The dEIS does not meet this requirement to an acceptable standard.
Fully describe the requirements for effectiveness monitoring (of any proposed mitigations	Chapter 1.7 Collaboration and Coordination	Partially	Poor The dEIS does not actually outline specifics around effectiveness monitoring of their mitigation efforts. Within the document the following accountable agencies and plans

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
relevant to this phase of the process) including listing accountable agencies for any monitoring	Appendix D. 2 Federal Laws and Regulations		<p>are listed:</p> <p>Leasee - must submit the following plans with the development proposal after the lease sale is complete:</p> <ul style="list-style-type: none"> • Impact, avoidance and monitoring plan • Stop Work Plan • Vehicle Use Monitoring Plan <p>However, many lease stipulations can be subject to a waiver, exception or a modification by the BLM Authorized Officer at any time during the life of the lease. There are no plans listed for adaptive management, effectiveness monitoring or enforcement; however, BLM can evaluate the adequacy of the dEIS in between lease sales to supplement or revise the dEIS. The dEIS lists the following responsible agencies: USFWS Mitigation Policy – responsible for providing direction on how to develop mitigation recommendations to offset the impacts of dev. on species or their habitats. USFWS Section 303 (2) of ANILCA – fulfill international treaty obligations, conserve fish and wildlife, continued subsistence uses by local residents. NWR System Administration Act – USFWS required to monitor the status and trends of fish, wildlife and plants in each refuge. ANILCA (810) – effect of fed. Actions on subsistence uses and needs of public lands ADF&G – evaluates impacts on fish, wildlife and users, and presents recommendations to the Alaska Dept. of Natural Resources.</p>
For PCH			
Description of the use and importance of the Coastal Plain in ANWR to the movements of each species (and each life stage), during each season of the year and across multiple years (including decades – e.g. scale of the Pacific Decadal Oscillation) – include scientifically defensible	Chapter 3.3.4 – Terrestrial Mammals Map 3-21 Appendix J.3 Terrestrial Mammals Table J-12 to J13	Partially	<p>Insufficient</p> <p>Seasonal Use – Map 3-21, no reference, or explanation of methods behind the mapped caribou distributions used in the dEIS.</p> <p>Importance – no determination of importance or sensitivity of different life stages. dEIS only used Sensitive Habitats Report (PCTC 1993) to show limited use of area in winter. PCH primary calving habitat – No rationale or methodology is provided for the area defined as “area with a higher-than-average density of cows about to give birth during more than 40 percent of the years surveyed”. This is a pivotal measurement by which all the scenarios are compared and spatial bounds by which ROP and lease stipulations are applied.</p>

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
methods of delineation and rating of areas for importance			Yearly – some discussion of yearly patterns of use and possible involvement of PDO. Movements – no analysis of movement within the study area or main migration pathways in and out of study area. Both scientific and TEK data exists on this topic.
The likely effects of development on space use and movement by each of the key species should be examined, including abandonment or stranding of specific seasonal habitats	Chapter 3, Section 3.3.4 Caribou	No	<p>Insufficient</p> <p>No spatial analysis of caribou space use and changes to movement patterns between scenarios is provided.</p> <p>A non-spatial analysis in the dEIS identified 633,000 acres (PCA calving displacement area) as potential disturbance and displacement for maternal caribou with young calves using an assumption of 2.49 miles around active infrastructure (could vary with road and pad scenarios, and overlap). The dEIS also assumed that caribou moving through the area would experience delays and deflections when encountering roads and pipelines; however, they do not expand on this assumption for each scenario or on the herd level effects.</p> <p>The dEIS cites Griffiths et al. (2002) that calving distribution would shift to the east or southeast and in years of early snowmelt when calving in the program area predicting an 8% decline in calf survival enough to halt herd growth. It suggests that a change in the shape of the calving distribution and not just location may be a weakness of this analysis. The dEIS not address or refute the Griffiths et al (2002) analysis.</p>
In addition to the spatial and temporal analysis, an examination of how that use may change in the future with changes to spring snow melt and plant phenology, changes in precipitation, temperature, permafrost, and offshore ice conditions and extent (as it influences on-shore use by the species)	Chapter 3 – Affected Environment and Environmental Consequences, Climate Change	No	<p>Poor</p> <p>Qualitative discussion of the possible adverse and beneficial impacts of climate change (timing of snowmelt, vegetation growth, access to forage, changes in vegetation growth, insects, river breakup, calving distribution) and how this introduces uncertainty in projecting impacts of development. No examination of how these climate patterns may affect future caribou demographics or habitat use.</p>
An examination of scenarios of potential development /	Chapter 3 – Affected Environment and	No	<p>Insufficient</p> <p>No comprehensive analysis of scenarios with regards to energy balance changes and</p>

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
<p>leasing and how that may affect each species within the spatial and temporal bounds and environmental changes listed above – should be comprehensive, including energy balance changes and impacts to reproduction, predator-prey dynamics, contaminants (including dust), increased mortality, and other direct and indirect effects on the key species and issues</p>	<p>Environmental Consequences Appendix F. Approach to the Environmental Analysis</p>		<p>impacts to reproduction, predator-prey dynamics, contaminants (including dust), increased mortality, and other direct and indirect effects on the key species and issues</p>
<p>An analysis of how any of the potential, predicted changes from development may impact subsistence harvesting of the above-mentioned species – should not be limited to only the harvesters that may access those species during the time they are in the Coastal Plain (i.e. transboundary effects on subsistence harvesting should be fully analyzed)</p>	<p>Appendix E – ANILCA Section 810 Preliminary Evaluation Table E-2, E-3 Chapter 2, Table 2-2 (pdf pg 62) Chapter 3, Section 3.4.3 (pdf pg 229)</p>	<p>Partially</p>	<p>Insufficient</p> <p>Findings for all Alternatives reported no significant restriction to subsistence uses with the exception of Kaktovik due to the potential decrease in access to fish, marine mammals and PCH caribou. However, Table E-3 indicates a major cumulative impact on the physical limitation on access for caribou and moderate impacts to abundance and availability of caribou (Table E-2). Harvest and sharing patterns of 22 Alaskan communities and 7 Canadian user groups are relevant if post-lease oil and gas activities change caribou resource availability or abundance for those users.</p> <p>A significant impact to subsistence resources is defined by BLM (2011) by large reductions in resource abundance, major redistribution of resources, extensive interference with access, or major increases in use by non-subsistence users (pg. E-1). The interaction of the thresholds in Table E-2 and E-3 and the Section 810 evaluation are unclear.</p> <p>The evaluation also assumes that all impacts are mitigated by lease stipulations and ROP's.</p> <p>The dEIS states “PCH caribou abundance may be affected due to minor displacement of</p>

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			<p>maternal caribou but large-scale displacement and consequent large decreases in the abundance of PCH caribou available for subsistence use is unlikely (E.2.2.4 Findings)” No references, tables, figures to support to support this statement is provided. Definitions of a key terms are also not provided as to what constitutes a “large-scale displacement” or “large decrease”.</p> <p>No analysis of transboundary effects of Canadian subsistence hunters/communities is included in Section E.2 although Canadian users are discussed in other sections as major harvesters of the PCH (85%) and will most likely to experience potential indirect impacts due to their proximity and reliance on the PCH.</p>
<p>A comprehensive up-to-date review of the potential impacts of oil and gas development in an arctic environment, including suggested mitigations and documentation of their effectiveness, including from grey literature</p>	<p>Chapter 3.3.4 Terrestrial Mammals</p>	<p>Partially</p>	<p>Poor</p> <p>The dEIS cites four literature reviews when discussing impacts. The results of these are summarized in Table 3-19. The references are <2006 and one is out of print. The reviews contain many caveats and cite the need for further information to supplement limited data on the success of the mitigation measures. See below:</p> <p>Cronin et al. 1994 – Caveats and recommendations not found in dEIS (from Executive Summary)</p> <ul style="list-style-type: none"> • “Lack of pre-development data and information about factors known to affect population dynamics of other Arctic herds prevent us from drawing firm conclusions about the effects of oil field development on the CAH”. • “Crossing success of caribou immediately prior to and during calving has not been determined...” • “Minimize the number of roads in caribou calving areas” <p>Lawhead et al. 2006 (from Abstract)</p> <ul style="list-style-type: none"> • “Needs for further information regarding the effects of pipeline characteristics on caribou crossing success include the adequacy of the 1.5 m high pipelines in winter (to supplement the scant data available); the effects of habituation; the effects of reflectivity of pipeline sheathing and other potentially confounding factors..... And the adequacy of the 1.5 m minimum height for crossings by subsistence users on

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			<p>snowmobiles.”</p> <p>Murphy and Lawhead. 2006.</p> <ul style="list-style-type: none"> • The Wildlife Management Institute (1991) states that it is valid “to some extent” to extrapolate impacts from data collected on the CAH to the PCH; however, they caution that differences between CAH and PCH were substantial and more research specific to PCH would be necessary. • Suggest design features for mitigating impacts that are mostly included in the dEIS with the exception of roadless development in new “satellite” fields. This option is rarely mentioned in the dEIS. • States that “Empirical evidence documenting habituation generally is lacking. CAH experience indicates that female caribou with new born calves are not likely to habituate to oil-field activity and infrastructure.” • “Habituate slowly or not at all to people on foot or large moving objects such as vehicles”. <p>Other reviews not cited in this section:</p> <p>https://ak.audubon.org/sites/g/files/amh551/f/road_aircraft_access_report_final.pdf</p> <p>Russell and Gunn. 2017. Assessing caribou vulnerability to oil and gas exploration and development in Eagle Plains, Yukon. http://www.emr.gov.yk.ca/oilandgas/pdf/caribou-vulnerability-oil-and-gas-eagle-plains-march-2017.pdf</p> <p>Vistnes and Nelleman. 2008. The matter of spatial and temporal scales: a review of reindeer and caribou response to human activity. https://link.springer.com/article/10.1007/s00300-007-0377-9</p> <p>Boulanger et al. 2012. Estimating the zone of influence of industrial developments on wildlife: a migratory caribou Rangifer <i>tarandus groenlandicus</i> and diamond mine case study. https://bioone.org/journals/Wildlife-Biology/volume-18/issue-2/11-045/Estimating-the-zone-of-influence-of-industrial-developments-on-wildlife/10.2981/11-045.full</p>

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
			Ballard et al. 2006. Caribou and Oil Fields. Chapter 5 in The Natural History of an Arctic Oil Field: development and the biota.
Species-specific Content - PCH			
Description of the reproductive biology and ecology of the PCH including comparisons to other migratory herds (specifically CAH), to point out similarities and differences and the importance of calving grounds.	3.3.4 Terrestrial Mammals	Partially	Adequate Describes life history and habitat use during calving and use of the program area. CAH comparisons to PCH within dEIS - <ul style="list-style-type: none"> “PCH have less exposure to human development, therefore expected to have stronger reactions to infrastructure for some years” (no reference provided). dEIS cites that the PCH and CAH differ in herd movements, demography, concentrated calving density higher in PCH, areas next to PCH calving grounds lower quality, PCH have higher predator densities and more topographic relief.
Consideration of a full-development scenario for the coastal plain and how it would affect the PCH demographic rates, including recruitment, adult female survival, growth rate and examination of the likely mechanisms.	3.3.4 Terrestrial Mammals, Direct and Indirect Impacts Table 3-19	No	Insufficient Both Alternative B and C could result in full-development scenarios for the Coastal Plain. The dEIS mentions the impacts of seismic, which could occur across the whole Coastal Plain, but does not include pre-lease activities in the impact analysis. There is no discussion in the dEIS of how potential impacts and alternatives would affect herd demography and trends. <ul style="list-style-type: none"> Recruitment metrics - none Adult cow metrics - none Lag effects on vital rates - none Change in age structure - none Parameters change with climate variability - none Interaction of population size and trend and development - none Effects of development and how they vary based on trend and size of herd – none
A description and explanation	3.3.4 Terrestrial	Partially	Poor

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
of the strategy by PCH to choose specific, buy varying calving areas each year, how that contributes to overall reproductive success, and what the effects of development may do to this strategy and herd success.	Mammals		<p>dEIS explains the strategy the PCH have for selecting calving areas and how this contributes to overall reproductive success.</p> <p>The dEIS predicts that with development calving distribution to likely shift to east or southeast and displacement is more likely in years with early snowmelt. However, it does not discuss the impacts of this displacement on reproductive success and ultimately herd success (e.g. increased predation, energy budgets, low-quality forage, calf body weights and recruitment).</p>
Additional – caribou specific			
Description of any mitigations or practices that will be required of any development in ANWR, understanding that project specific mitigations will be determined in a separate regulatory process – for instance road bed construction guidelines, ice-road reqs, predator mgmt. plans, traffic mgmt. plans, pipeline heights, well pad spacing, seasonal restrictions or ‘stop work’ situations, areas off-limits to development w/in CP.	Chapter 2 – Alternatives (pdf pg 32), Table 2-2 (pdf pg 34) Appendix B. Reasonably Foreseeable Development Scenarios, Figure B-1 and B-2	Partially	<p>Poor</p> <p>Mitigations or stipulations are discussed sufficiently but there are exceptions to mitigation requirements and lack of separate regulatory and enforcement plans. Mitigations to reduce impacts to caribou include:</p> <ul style="list-style-type: none"> • Lease stipulations that reference caribou (1, 6, 7, 8, 9) • Required Operating Procedures that include mitigation measures (ROP 23, 34, 36, 40). • Areas off-limits to development w/in Coastal Plain identified in alternative D1/D2 <p>Omissions –</p> <ul style="list-style-type: none"> • No separate regulatory process for mitigation, enforcement or effectiveness monitoring outlined in dEIS • One of the impacts outlined in the dEIS was the accumulation of dust along roadsides. “Dust may add toxic metals to roadside vegetation that mammals forage.” There was no mitigation measure to address dust generation or measure its effects. • Lease Stipulation 9 would not allow wells of CPF’s within 1 mile of the coast to accommodate large, fast-moving aggregations of both CAH and PCH along the coast in calving and post-calving seasons. However, sewer treatment plants, barge landings, storage pads, roads and pipelines would be allowed and oriented (N-S) that would impede movement along the coast (Figure B-1 and B-2) if mitigation measures were not sufficient to reduce these impacts. There is no evidence provided in the dEIS that large, fast-moving aggregations are restricted to the coast only. The Canadian science report shows that such aggregations can occur in many areas.

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
			<ul style="list-style-type: none"> The dEIS is relatively silent on the accommodation for harvesters (i.e. pipeline height, hunting regulations) and the impact of increased road access on caribou harvest.
<p>A thorough analysis of the likely components of projects that will fall outside the '2000 acre limit' that is described in PL 115-97 – specifically how roads, gravel mines / borrow pits, exploration or delineation wells, water reservoir pits, or other features might be limited or accounted for in the footprint of induced development – though gravel piers for pipelines are included, the footprint of the pipeline itself, how it fragments the habitat or impedes movement s/b included – ZOI s/b part of the footprint</p>	<p>Chapter 1 – Introduction, Section 1.9.1 Tax Cuts and Jobs Act of 2017 (Public Law 115-97) (pdf pg 28)</p>	<p>No</p>	<p>Insufficient</p> <p>The 2000 acre limit is applied to the total acreage of production and support facilities existing at any given moment in time, as opposed to the cumulative total acreage of production and support facilities that may ever exist (PL115-97 indicates a temporal limit intended by Congress). Inclusion of all facilities, including those constructed with snow, (not included in the 2000-acre limit) would make the “establishment of an oil and gas program on the CP – impracticable” (1-6).</p> <p>There are no restrictions on the use of winter snow/ice surfaces assuming tundra surface is left undisturbed and excludes gravel mines given they supply raw materials for construction and not themselves oil and gas facilities. Gravel mines are not slated for reclamation and would be allowed to become permanent lakes thereby altering the original topography and lasting beyond the development phase (3.2.9). Gravel mines = 300 acres for each action alternative</p> <p>Ice infrastructure (e.g. pads and roads) “are predicted to have negligible impacts on topography but could affect permafrost and surface water geomorphic features” (3.2.9). There is no reference provided that support the negligible effects of ice infrastructure specific to the CP. A recent white paper by D.A. Walker et al. (2019) from the Alaska Geobotany Center (Publication 19-01) conclude “that there will likely be significant, extensive and long-lasting direct, indirect and cumulative impacts of 3-D seismic to the microtopography, hydrology, permafrost and vegetation of the 1002 area”. They call for the EIS to look at the interaction of these seismic impacts with the ongoing and anticipated effects of climate change and likely development that would follow the seismic surveys.</p> <p>Zone of Influence – the dEIS may underestimate ZOI for caribou. The dEIS uses a 2.49 mile ZOI for maternal caribou during a 3 week period from roads and pads to assess</p>

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			<p>disturbance and displacement. This and other work on the North Slope also shows avoidance of 1,640-2,381 feet from active roads and pads, and 1.25 -2.5 miles (pg. 3-114). ZOI from other oil-field features, not covered under the 2000-acre limit, are not discussed (e.g. pipelines, gravel pits). Other work on ZOI for barren ground caribou, including PCH, were not incorporated into the analysis.</p> <p>Boulanger et al. 2012 – ZOI open pit mines in Bathurst range 6.8-8.7 miles (July-mid Oct). Larger response related to fine dust deposition in open, tundra habitats.</p> <p>Johnson and Russel 2014 – avoidance in response to human development for PCH. Response and ZOI decreases over time suggesting habituation but still significant compared to other herds. ZOI changes depending on time frame (1985-98, 1999-2012); Main roads: 30 km – 18.5 km Settlements: 38 km – 34.5 km Wells, trails, winter roads, seismic lines: 11 km – 6 km</p>
Analysis should specify how much of the CP could be development within a '2000 acre limit' as variously defined	Chapter 1 Section 1.9.1 Tax Cuts and Jobs Act of 2017 (Public Law 115-97) (pdf pg 28)	Partially	<p>Poor</p> <p>The dEIS states that previously developed land can be reclaimed and reincorporated indefinitely into the 2000 acre limit. This suggests that the whole of the Coastal Plain could at some time experience development in every scenario with exception of the caribou calving areas not offered for lease sale in alternatives D1 and D2. Additional roads could be built through Native or State lands that could exceed the 2,000 acre threshold (B.9.3).</p>
Treaty Links within EIS	Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd		<p>The dEIS made no explicit reference to many specific requirements of the PCH Treaty. Canada requests that the U.S. indicate how the dEIS has met each of the following clauses of the PCH Treaty:</p> <p>2 (a) To conserve the Porcupine Caribou Herd and its habitat through international co-operation and co-ordination so that the risk of irreversible damage or long-term adverse effects as a result of use of caribou or their habitat is minimized</p> <p>2 (b) To ensure opportunities for customary and traditional uses of the Porcupine</p>

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
			<p>Caribou Herd by signatories of the PCMA.</p> <p>2 (c) To enable users of Porcupine Caribou to participate in the international coordination of the conservation of the Porcupine Caribou Herd and its habitat</p> <p>2 (d) To encourage co-operation and communication among governments, users of Porcupine Caribou and others to achieve these objectives</p> <p>3 (b) The Parties will ensure that the Porcupine Caribou Herd, its habitat and the interests of users of Porcupine Caribou are given effective consideration in evaluating proposed activities within the range of the Herd</p> <p>3 (e) Activities requiring a Party's approval having a potential significant impact on the conservation or use of the Porcupine Caribou Herd or its habitat may require mitigation.</p> <p>3 (f). The Parties should avoid or minimize activities that would significantly disrupt migration or other important behavior patterns of the Porcupine Caribou Herd or that would otherwise lessen the ability of users of Porcupine Caribou to use the Herd</p> <p>3 (g). When evaluating the environmental consequences of a proposed activity, the Parties will consider and analyze potential impacts, including cumulative impacts, to the Porcupine Caribou Herd, its habitat and affected users of Porcupine Caribou.</p>
Impacts to Canadian subsistence harvesting	Appendix F.4.19 Subsistence Uses and Resources		<p>Increases to US subsistence harvest would be anticipated due to;</p> <ul style="list-style-type: none"> • Increased road access within the 1002 lands near communities • subsistence hunting allowed along all gravel roads within the oil-fields • increased number of hunters as oil and gas workers allowed to hunt after work shift is complete (3-173). • If the Dalton highway is connected to area, other resident harvesters may access the area, increasing harvesting pressure. • apparent lack of harvest monitoring plan (Table F.4.19) could provide uncertainty in overall harvest numbers and inability to model or predict impact of management

Canada Scoping Request	dEIS Location	Addressed in dEIS (No, Partially, Yes)	Extent or Quality (Insufficient, Poor, Adequate)
			scenarios (e.g. Harvest Management Plan, Canadian [domestic] Porcupine Caribou Management Board).

Detailed Scientific Review Comments

ES 4, Provides a bulleted summary of general impacts. The cumulative effects of these impacts are not adequately considered in the dEIS. In fact, the cumulative impact sub-sections found in section 3 of the dEIS are perfunctory at best and do not adequately summarize the possible synergistic and layered effects of development related disturbance over space and time.

ES 2-11 to 2-15 Lease stipulations 6, 7 and 8, There is no direct connection made between the mitigation measures described and the evidence base on their effectiveness in reducing the impacts they are intended to address. The specific measures listed should be accompanied by an evidence based analysis of their effectiveness at various scales over time. How strong is the evidence base? What are the uncertainties? What are the challenges to implementation based on other development contexts? Addressing these and other questions would highlight how limited these measures are likely to be at mitigating overall impact.

1-2, Table 1-1, The potential barge port (intended to connect with Dutch Harbor) seems to be placed in the native-conveyed lands. Is that considered in the calculations in Table 1-1?

2-11 to 2-15 and 2-17 (lease stipulations and ROPs), Of the total set of anticipated impacts on caribou, how many are targeted by these measures and how many would remain unmitigated?

2-13, Table 2-2, *“Primary calving areas for the PCH were defined as areas with a **higher-than-average density of cows about to give birth** during more than 40 percent of the years surveyed”*. Higher than average density means what exactly? Density relates to an abundance over a given area, and thus average density would mean that each cell of the study area was used to determine a mean density? We suspect this is a “way-of-saying” statement rather than a real objective value (e.g., all density values above a given mean), thus it is subject to interpretation.

2-13, Table 2-2, *“Primary calving areas for the PCH were defined as areas with a higher-than-average density of cows about to give birth during **more than 40 percent of the years surveyed**”*. This seems to be based on data provided on Appendix Map 3-21, i.e., between 22 and 37 years of data. Not clear where these data come from (Canada understands calving grounds have been mapped back to 1970). It is not clear how many cows were available each year. It would also help to know the change in use through time. Also, 40% could seem like a relatively conservative estimate (here, smaller is better for caribou conservation), but what is the rationale for using this value? It would be critical to know at what % the area reaches a plateau. From Map 3-21, it seems like using 30% would grant a much larger (and continuous) zone of protection, at least during the post-calving period.

2-14, Table 2-2, The area occupied by calving and post-calving areas seems to change depending on the alternative (e.g., Alternative C on Map 2-4 vs. Alternative D1 on Map 2-6). This is not explained in Table 2-2, where instead all areas have exactly the same definition. This makes a comparison of alternatives C and D difficult for the post-calving area calculations. The area used by caribou should not change under

various alternatives; caribou use of calving/post-calving areas was determined in an environment with no development.

2-14, Table 2-2, On evacuating sections of roads *“whenever an attempted crossing by a large number of caribou (approximately 100 or more) appears to be imminent (June 15–July 20)”*. It is unclear if this measure is feasible. This needs to be explained in greater detail, including any information about whether or not this was tested elsewhere and what the effectiveness was (provide a citation to a formal study that is publicly available).

2-27 (ROP 23), Same general comment as made in relation to lease stipulations 6, 7 and 8: What evidence is there to support the effectiveness of these measures? Canada’s understanding is that the evidence base from Prudhoe Bay is largely inconclusive in this respect.

2-31, The measures for minimizing aircraft disturbance to caribou are inadequate – no flight ceiling altitudes are identified, measures to limit helicopter landings in calving habitat are ambiguous (what does ‘minimize’ imply?), no oversight/enforcement framework is provided. Additionally, the dEIS needs to account for low-lying cloud on the coastal plain rendering aviation guidelines untenable. The only way to effectively mitigate aircraft disturbance in that geographical context is to reduce or eliminate air traffic in sensitive areas.

3-17 (Section 3.2.3), Acknowledges potential impacts of noise disturbance to natural soundscapes, but does not provide content on possible impacts to caribou. If these are unknown, this should be highlighted as a significant uncertainty that would justify adoption of the precautionary principle.

- See also 3-113: *“Few data are available on the effects of noise and light on caribou. Tyler et al. (2018) suggested that caribou may avoid power lines in winter due to their ability to detect light in the ultraviolet range. Noise and light associated with vehicles, aircraft, and other human activity is likely to increase the level of disturbance associated with those activities, which could result in negative effects on terrestrial mammals, due to increased disturbance, altered behavior, and displacement.”*

3-73 through to 3-110: The quotes below extracted from the dEIS highlight considerable uncertainty in the current understanding of how and to what extent the herd will be impacted. It speaks to the importance of adopting a precautionary approach.

- 3-73: *“The lease stipulations in the TL areas restrict construction between May 20 and July 20 to reduce disturbance to calving and post-calving caribou. This restriction, however, would not preserve vulnerable vegetation or wetland types because construction would be permitted outside the TL period and would still affect vegetation and wetlands.”*
- 3-105: *“...most adult females older than 2 years of age give birth to a single calf in late May or early June [Note: this appears to be an error. Most 3 year old cows do not have cows in most years, few 2 year old cows ever do]. Caribou calving grounds in Arctic Alaska are in*

- areas with few predators and with abundant, early emerging forage plants (especially tussock cotton grass, Eriophorum vaginatum), which are high in protein and are highly digestible (Kuropat 1984; Griffith et al. 2002; Johnstone et al. 2002)."*
- 3-106: *"The annual calving grounds were in areas with higher rates of increase in NDVI, which is thought to indicate higher quality forage. The annual concentrated calving areas in those annual calving grounds were characterized by higher forage biomass, as measured by NDVI (Griffith et al. 2002). PCH caribou feed primarily on immature flowers of tussock cottongrass early in June, in wet sedge meadows, herbaceous tussock tundra, and riparian vegetation types; then later in June they forage primarily on willows and herbaceous plants (Griffith et al. 2002; Johnstone et al. 2002)."*
 - 3-107: *"The USFWS (2015a) concluded that, due to the annual variability in the calving area, the PCH needs a large region from which to select the best conditions for calving in a given year."*
 - 3-109: *"Changes in winter precipitation could change access to forage and energetic demands for cratering through snow. Increases in rain-on-snow events could greatly decrease access to winter forage (Hansen et al. 2011; Albon et al. 2016; Loe et al. 2016). Changes in timing of snowmelt and vegetation growth could create a phenological mismatch²⁶ between timing of calving and the emergence of highly nutritious forage (Post and Forchhammer 2008). Gustine et al. (2017) found no evidence of a spring nourishment mismatch for caribou in Alaska but suggested that one may occur in fall with increased warming. If mosquitos emerge closer to calving, it could result in a higher rate of separation of calves, poorer body quality of maternal caribou, and higher calf mortality. Earlier melting of ice and snow and earlier river breakup could alter the timing or difficulty of caribou migrations (Sharma et al. 2009; Leblond et al. 2016)."*
 - 3-109: *"Because climate change could involve both adverse and beneficial effects on caribou, it is not possible to predict the impacts on the PCH and CAH; however, climate change could affect caribou demographics as well as habitat use and introduce additional uncertainty into projections of impacts due to development."*
 - 3-110: *"The PCH calving distribution varies with the onset of spring seasonal changes and is typically farther west during warmer springs (Griffith et al. 2002); hence, climate warming could result in more frequent calving in the program area or a western shift in concentrated calving areas."*
 - 3-115: *"Caribou crossing success in the program area would vary by season, behavioral motivation, level of habituation, and human activity levels."*

3-106, start of the PCH Use of the Program Area section: *"Caribou use of the program area varies greatly throughout the year"*. It has also varied among years. It would be helpful to see how caribou have used the 1002 lands, in relation with the size of the herd, from the 1980s to today. This needs to be part of the dEIS.

3-106, next sentence: *"The principal use by the PCH occurs in the spring and summer, during spring migration and the calving, post-calving, and insect seasons"*. How were these polygons obtained (methodology)? We know Yukon Government sent data to the BLM for this, but the dEIS is silent on methods, restrictions, caveats, etc. Canada understands that these values represent an overlay of

multiple years, but the underlying polygons for each years: were they kernels? If so, what %? We need to understand the methodology. What were the specific instructions and limitations provided to analysts when the caribou data was provided to them?

3-110, Direct and Indirect Impacts: *“The impacts of oil and gas development on caribou have been summarized in various reviews, along with appropriate mitigation measures”*. An additional reference is: J. Gonet and F. Schmiegelow, November 2017. Annotated bibliography of barren-ground caribou response to disturbance: Preliminary assessment to support initial scoping exercise⁴².

3-110, Seismic Exploration section. The US could consider new technologies that do not disturb the ground as much, such as the new portable technologies currently used in some regions of Canada (see e.g., <https://www.jwnenergy.com/article/2017/4/new-seismic-technology-allows-explor-go-where-no-seismic-crews-have-gone/>).

More generally, Canada has reservations about the U.S. potentially allowing seismic exploration to occur before the EIS for lease sale is complete. Specifically, if the U.S. selects a preferred alternative that includes areas that are NOT available for lease, any seismic program should be constrained similarly for two reasons. First, not constraining it would send a signal that the U.S. may not necessarily intend to maintain an area with no lease sales, pending seismic survey results. Second, if an independent operator is allowed to invest significant resources to survey areas that are purportedly not available for leasing, it amplifies the signal that the U.S. may plan to lease such “off limits” areas pending results of seismic. It would be unusual for a private company investing large amounts of money to survey an area that will never be available for leasing unless a future lease sale is reasonably likely.

3-112, The sub-section on cumulative impacts does not adequately consider the cumulative impact over time of the many different forms of disturbance to caribou covered in section 3.3.4.

3-112, Construction section: do all of the activities described under construction correspond to the activities that would need to end under TL during the calving (B-D1) and post-calving (D2) periods?

3-112, next paragraph: *“the BLM calculated estimates of the area within 2.49 miles for potential displacement of calving caribou”* 4 km displacement: why is this value used? This needs to be justified, and supported with references.

3-112, second to last paragraph: *“Habitat loss would reduce forage availability for herbivorous terrestrial mammals. For most terrestrial mammals, foraging habitat is abundant across the program area.”* This statement is very general. What about the availability of specific food items, such as lichens? The dEIS

⁴² Available at http://lupit.nunavut.ca/app/dms/script/dms_download.php?fileid=14842&applicationid=0&sessionid=mo57flsd8bde3co75qvl9h3en4

needs to include an estimate of the habitat loss under various alternatives. Simply saying “some habitat will be lost” is not enough.

3-113, first paragraph: More information should be provided about the potential disruption of migrations by infrastructure (especially linear structures, such as roads). Recent studies are available, including in Alaska.

3-113, second paragraph: “*Few data are available on the effects of noise [...] on caribou*”. True, but this effect is more-or-less captured within the zone of influence of industrial infrastructure (along with all other potential stimuli). Zones of influence have been studied for barren-ground caribou, and this discussion needs to appear in the dEIS.

3-113, 5th paragraph: “*Potential behavioral effects of disturbance on caribou include displacement of maternal caribou during calving and early lactation.*” It is indeed a behavioral reaction, but that can have drastic consequences, including the death of the fetus /calf. Then a bit later, the dEIS states: “*Potential disturbance could result in behavioral responses, such as reduced foraging rates...*” It is odd that foraging rates are included in the general “behavioral responses”. Foraging is a behavior, but it is vital to the survival of the individual, just as mating is a behavior that is vital to the survival of the species.

3-113, 5th paragraph: “*...and potentially during spring and fall migrations for the smaller numbers of caribou present in those seasons*”. The start point of a fall migration is the calving ground. The end point of a spring migration is the calving ground. If ~50% of caribou are present on the program area during calving, it follows that their migrations will also have the potential to be influenced. Again, more information should be provided about the potential disruption of migrations by oil and gas development.

3-114, on the concept of habituation: Habituation is likely only possible if the disturbance is perceived by the animals as having no relationship with increased mortality on the long-term. This is not the case with many infrastructure such as roads. Roads remain a predation risk that has been noted in many studies. If the stimulus remains tied to an increased probability of dying, it is not apparent how the animals could habituate. In fact, it would go against natural selection theory. “Habituation” is a vague notion. Caribou *have* to deal with the fact that new roads are built in their home range, and thus must modify their behavior to deal with this new reality. Is this really habituation, or just a normal behavioral response to a change in the environment? “Habituation” has the unwarranted connotation that disturbances do not “matter” after a while. A more parsimonious explanation would be that this behavior can be explained by a trade-off between reacting strongly to the disturbance (because it is a source of increased mortality) vs. not reacting too strongly to it (because chronic levels of stress have negative impacts on their physiology), and thus we should expect a decrease in reactivity with time (unless predators learn how to use them and become increasingly efficient with time). Using a stretch of the habituation terminology, it is not correct to state that prey are “habituated” to their predators, yet they have evolved together for thousands of years. Caribou just have adapted behaviors to “deal” with it. That does not mean that ‘some’ individuals may not be more tolerant to disturbances than others (for

example, males) and thus could be found near infrastructure. The real question is, however, whether or not these individuals have an important contribution to the growth of the population. Generally speaking, pregnant mothers are more critical to the growth of the herd, and they are known to be extremely sensitive to disturbance. On the question of habituation, we note that ZOIs discussed in Johnson and Russell⁴³ were not cited in the dEIS.

Significantly, the EIS states that it is assumed that “subsistence hunting will be allowed along gravel roads” (F-28). This would increase the ZOI associated with roads by combining a predation + hunting risk, and this must be reviewed and analyzed.

3-114, 4th par., section describing Table J-15 is not clear enough to understand the table. First, the category <20% means that it must include 0-20% of years that calving caribou are present. If, by analogy, 100% of years that calving caribou were present requires that all years have at least a caribou for a given cell of the grid, then close to 0% means that only one year is required to have at least one caribou present. Thus, the % of the coastal plain covered by this category should be the largest, and the area should reduce with stricter values of >20%, >30%, and >40%. This is not the case in Table J15... because it used separate, additive categories, which are very hard to compare. A more useful way to categorize calving habitat would be the area covered with caribou present at least 40% of years (>40), the area covered with caribou present at least 30% of years (>30), and the area covered with caribou present at least 20% of years (>20). This means that all years included in the category >40 would also be included in the >30, and all years included in the >30 would also be included in the >20. This would really show the increase in area occupied by an increasingly large amount of animal-years, instead of pre-determined brackets that do not compare in range. Moreover, the first 0-20% value encompasses 455,900 acres of the coastal plain, and then adding 20-30%, 30-40%, and >40% ends up covering a total of 1,487,100 acres. This would represent 95.1% of the total area. However, adding the % values in Table J15 grants 100.1% ... All of this needs to be clarified, as it is at the basis of all calculations for the various alternatives. Note that, visually, the current brackets allow to have non-overlapping range categories (and thus, map 3-21 is probably reliable). However, it is the interpolation to acreage that is biased with this method.

3-114, next sentence: “*All of the area in the annual calving grounds of the PCH (at least 30 percent of years)...*” See the previous comment. Technically this category does not exist. There is only 30-40, not >30 like suggested in this sentence. Also, why switch to 30 when 40 is used everywhere else? Does that mean that the area covered by the category 30-40 is in medium-low HCP, or all of the 30-40 and >40? This comment also raises the issue: why choose 40% of all years as a threshold for considering this area as the calving range. An equally (un)justified value could be >30% of all years. Or it could be argued that recent years are more representative of the current distribution of the PCH, and thus a value based on >XX% of the last 10 years could be more reasonable. Another potential idea could be to weight years, with recent years weighted more than earlier years... This is a major concern, because all calculations

⁴³ Johnson, C.J. and D.E. Russell. 2014. Long-term distribution responses of a migratory caribou herd to human disturbance. *Biol. Conserve.* 177:52-63.

(including calculations on the proportion of petroleum resources overlapping calving habitat) depend on the definition of 1) what constitutes a calving area, and 2) where it is located. Currently there is only a statement about what was used, without any justification.

3-116, 2nd par., “*ROP 34 requires an aircraft use plan and would place limits on aircraft altitude and landings near known subsistence hunting camps and cabins and in the PCH calving area (all action alternatives) and the PCH post-calving area (Alternative D only).*” This fails to emphasize the important role of post-calving areas. Currently the dEIS puts more restrictions on the calving grounds, but much less on the post-calving areas. Yet post-calving is a critical time for the survival of calves. Additional protection should be put on the post-calving areas, and the dEIS should recognize that these areas are critical for barren-ground caribou.

3-116, 5th par., “*The potential effects of habitat loss are long term and would continue throughout drilling and operations.*” Habitat can be lost (the 2000 acres that are covered in gravel), but a portion of the habitat can also lose its function, what is called functional habitat loss. This represents, for example, the zone of influence around roads and mines that caribou stop using. For example, an abandoned oil drill could have a small effect around it (e.g., only a visual repulsion) or none at all after a few years, whereas an active oil drill could have an effect over several km. An estimate of the functional habitat loss needs to be made in this dEIS. The dEIS uses 2.5 miles for all effects, but this should be discussed in more length (e.g., why use 2.5 miles when other cited studies have found larger effects).

3-116, end of 5th par., “*however, the frequency of spills would be limited by BMPs*”. This is the only “mitigation” suggested in this dEIS for oil spills in the terrestrial mammals section. This needs significantly better explanation.

3-117, 2nd par.: “*Dust generated during future creation of and travel on gravel roads may add toxic metals to roadside vegetation that mammals forage (Walker and Everett 1987; Shoty et al. 2016; Knight et al. 2017).*” This should be thoroughly reviewed, as it has been perceived by many subsistence users as having a strong negative impact on caribou.

3-118, 3-119, 3-200, These pages provide important comparisons between the percentage of Tussock Tundra type land cover in the program area that would be affected/unaffected under the different development scenarios. This is a key piece of information pointing out the importance of this ecotype as forage habitat for caribou during the calving period.

3-118, first sentence: “*while caribou avoidance of roads in other seasons appears to be positively related to the intensity of the disturbance (Leblond et al. 2013)*”. Yes, although this study was made in a highly-disturbed area. Generally, Canada’s opinion is that the impact of disturbances is not linear across the full gradient of disturbance impacts on caribou (or any vertebrate for that matter). Take for example a gradient varying between 0 and 10, 0 being no disturbance at all, and 10 being such disturbance that the animal cannot complete its daily activities normally and dies. In this context, we believe the reactivity of the animal will be much stronger at the low-to-mid range of the gradient (0-6), compared to the higher range of values (8 to 9). The disturbance of the pristine calving grounds of the PCH will have much more

drastic impacts than anything that was measured during the establishment of a new highway in the already highly-disturbed region of Charlevoix cited in the above paper.

3-118, next par.: *“caribou exhibit less displacement from properly designed infrastructure during the post-calving period, compared with the calving period.”* Provide a reference to substantiate this claim.

3-118, next par.: *“A total of 9.4 percent of the preferred Tussock Tundra land-cover type...”* How was preference assessed? Was preference assessed for the period corresponding to calving/post-calving?

3-118, 4th par.: *“Alternative B would place an area predicted to contain 0.27–1.65 percent of the CAH during different seasons.”* How was this estimated? Only PCH is explained, and hidden in Table 2-2.

3-119, and elsewhere: *“caribou are generally able to navigate these structures, especially following habituation...”* See the previous comments on habituation.

3-119, 7th par.: *“Of the high use PCH post-calving area (used in greater than 40 percent of years), Alternative C would place 450,400 acres (80.6 percent) off limits to surface occupancy, would place TLs on 108,000 acres (19.3 percent)...”* Not easy to know exactly which TLs are included here (must go back to Table 2-2). Re-explain here whether this only includes TLs about traffic restriction, no-major-construction, or both.

3-120, seismic exploration section: *“Alternative D would close 476,600 acres of the PCH primary calving habitat area to lease sales; however, seismic activity could occur over the entire program area.”* Why is it the case? In other words, if extraction is prohibited, why would the U.S. allow exploration as we noted above?

3-120, Construction section: *“Alternative D would close to lease sales or to surface occupancy [...] all 721,200 acres of the PCH primary calving habitat area.”* Here it says that Alternative D closes all the calving ground to development, yet later it says that it authorizes 8,900 acres in either standard development (D1) or TLs (D2). Which is it?

3-121, 4th par.: *“Alternative D1 would place 714,000 acres (98.0 percent) off limits to lease sales or surface occupancy, would control surface use in 5,400 acres (0.1 percent)”*. Control surface use needs to be defined much more specifically than is in the Glossary. Also, later the dEIS states: *“Alternative D1 would [...] control surface use in or use only standard terms and conditions”*. Which is it?

3-122, section on cumulative impacts: Canada cannot find a cumulative impacts analysis of the proposed actions anywhere in the dEIS (it is not listed in the Table of Contents). Individual sections have some sections titled cumulative impacts, but there is no comprehensive section. Was this omitted? In addition

to the NEPA definition we point out there are other good examples of cumulative effects analysis guidance⁴⁴.

3-247: Section 3.5 is perfunctory and does not adequately summarise or highlight the unavoidable adverse effects. Based on section 3.2 and 3.3 there are numerous unavoidable effects and a great deal of uncertainty about the level of impact in relation to many anticipated disturbances. In its current form, this section constitutes a missed opportunity to provide a coherent assessment of the information presented on the consequences of development.

B-15: *“Figure B-2 shows how the hypothetical layout could be adjusted for caribou mitigation if deemed appropriate by permitting agencies.”* This requires justification and explanation.

⁴⁴ Johnson, C.J., Ehlers, L.P.W., and Seip, D.R. 2015. Witnessing extinction - Cumulative impacts across landscapes and the future loss of an evolutionarily significant unit of woodland caribou in Canada. *Biol. Conserv.* 186: 176–186, as well as Johnson, C.J., Boyce, M.S., Case, R.L., Cluff, H.D., Gau, R.J., Gunn, A., and Mulders, R. 2005. Cumulative effects of human developments on Arctic wildlife. *Wildl. Monogr.* 160(1): 1–36.

Polar Bears

Overall Comments

Canada and United States have a long history of shared management and conservation of polar bears in the Beaufort Sea that includes *The 1973 Agreement on the Conservation of Polar Bears*, the *2008 Memorandum of Understanding between Environment and Climate Change Canada and the United States Department of the Interior for the Conservation and Management of Shared Polar Bear Populations* and the *Polar Bear Circumpolar Action Plan (CAP)*. These agreements are foundational to the long term conservation of the species in light of the current threats of climate change. Polar bears from the southern Beaufort Sea polar bear population occur within both Canadian and US portions of the Beaufort Sea and therefore share the impacts of potential development regardless of jurisdiction. The southern Beaufort Sea polar bear population is currently experiencing one of the most rapid rates of habitat loss (i.e. sea ice) across the polar bears circumpolar range. Documented declines in growth, body condition and survival in association with estimated declines in overall abundance by up to 40% all suggest that this population is being stressed by climate change. Thus, additional stressors have the potential to have cumulative and synergistic effects that could potentially threaten the long-term persistence of this population.

The dEIS released by the BLM makes adequate use of available peer reviewed literature as well as grey literature on polar bears to assess the potential impacts of exploration and development in the Arctic National Wildlife Refuge. However, the dEIS fails to integrate available government data on polar bear habitat use, distribution and movements to fully assess the potential impacts of development on the species. **Although the most significant risks are identified, no efforts are made to model those risks (e.g. likelihood of mortality) under different development scenarios.** In addition, the dEIS lacks detail on monitoring the effectiveness of mitigation measures that would allow for a forensic assessment of the cumulative impacts of exploration and development. Finally, throughout the dEIS, incidental take regulations (ITRs) are referred to as an important measure in mitigating the impacts of exploration and oil and gas development. However, we note that the Arctic National Wildlife Refuge is currently not covered under the current ITR for the Beaufort Sea (81 Fed. Reg. 52276 (Aug. 5, 2016). Ensuring that ITRs are in place will be critical for the protection of denning female bears and their young as well as for mitigating potential human polar bear conflicts that may result in removal of bears from the southern Beaufort Sea polar bear population.

Detailed Comments in Reference to Canada’s Scoping Letter – Polar Bears

Canada outlined in our scoping letter⁴⁵ what we recommended be included in the EIS. The table below compares what we requested, where we found information about that topic in the dEIS, our determination if the request was addressed, our assessment of how well it was addressed, and supporting information and commentary.

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
Fully describe potential impacts to key species of the proposed leasing + impacts of pre-and post-lease activities such a seismic and drilling exploration, development, and transportation + induced development including the impacts of malfunctions	Chapter 3 – Affected Environment and Environmental Consequences and Direct and Indirect Impacts Section 3.3.5 Marine Mammals Table 3-23 & 3-24	Partially	Adequate BLM adequately describes the expected impacts on polar bears. The dEIS focuses primarily on disturbance of maternal denning habitat/denning female bear and the potential for human polar bear interactions as a result of exploration and development activities. Other sources of mortality including vehicle strikes, and exposure to contaminants from leaks are spills are discussed. Both lease stipulations and required operating procedures provide mitigation measures to minimize disturbance of bears in critical coastal and maternity denning habitats (Map 2-34). The dEIS does discuss the impacts of oil spills on polar bears (3-141) but does not quantify the potential impacts of spill scenarios (e.g. spills) in the proposed development area.
Clear statements on the	Chapter 3 – Affected	Partially	Insufficient

⁴⁵ “GovCanada_ThompsonK_Email.pdf” in Comment Folder 11 on the ePlanning website for the Coastal Plain EIS.

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
significance of those potential impacts	Environment and Environmental Consequences Section 3.3.5 Marine Mammals		The dEIS states that “In summary, although the potential for injury or mortality could be high when developing new oil and gas projects in polar bear habitat, the risks are well understood. Also, effective mitigation is available and has been implemented in the established North Slope oilfields west of the program area. With mitigation in place, the net effects of program-related activities are likely to be negligible in terms of injury and mortality at the population level. Given the current and predicted continuing decline of the SBS stock of polar bears, emphasis would be placed on avoiding injury or mortality, and current mitigation measures appear to be effective at reducing such risks.” Although the most significant risks are identified no efforts are made to model those risks (e.g. likelihood of mortality) under different development scenarios.
Fully describe critical thresholds or limits to development + the legislative framework to support them	Chapter 2 - Alternatives (pdf pg 31) Section 2.2 Description of the Alternatives (pdf pg 31) Section 2.3 Alternatives Considered But Eliminated from Detailed Analysis (pdf pg 69) Appendix B, Table B-5 Appendix B.7.5 Abandonment and Reclamation Appendix D. Laws and Regulations	No	Poor No critical thresholds or limits to development are outlined for polar bear in the dEIS. Protective measures for polar bears are outlined in the alternatives including lease stipulations (1,,4,5,9) and required operating procedures (4,10,15,46) but do not identify critical threshold or limits to development.
Fully describe additive , multiplicative and synergistic cumulative effects of proposed leasing and induced	Chapter 3 – Affected Environmental Consequences Section 3.3.5 Marine	Partially	Poor The dEIS describes cumulative effects for polar bears “Considering the effects of post-lease oil and gas activities in conjunction with human-bear interactions, and other reasonably foreseeable future actions, the effects post-lease oil and gas activities would

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
development on key species in relation to existing natural and anthropogenic stressors	Mammals Cumulative Impacts Appendix F.3 Cumulative Impacts Appendix F.4.16 Marine Mammals		have additive cumulative effects on polar bears, possibly resulting in additional impacts on the SBS stock of polar bears. The effects of climate change described under Affected Environment above, could influence the rate or degree of the potential cumulative impacts.” But does not quantify how those effects are likely to impacts that status of the southern Beaufort Sea polar bear population. There is no overarching cumulative effects analysis in the dEIS.
Fully describe the requirements for effectiveness monitoring (of any proposed mitigations relevant to this phase of the process) including listing accountable agencies for any monitoring	Chapter 1.7 Collaboration and Coordination Appendix D. 2 Federal Laws and Regulations	Partially	Insufficient The dEIS does not outline specifics around effectiveness monitoring relating to surveys of polar bear maternity denning habitat and or evidence of den abandonment. LOA issued by USFWS and ITR’s do require “monitoring and reporting of bear sightings and encounters using trained observers, as well as training of personnel in nonlethal means of protection (deterrence and hazing) or effectiveness of deterrence programs.”
For PCH, Polar Bear and Migratory Birds			
Description of the use and importance of the Coastal Plain in ANWR to the movements of each species (and each life stage), during each season of the year and across multiple years (including decades – e.g. scale of the Pacific Decadal Oscillation) – include scientifically defensible methods of delineation and rating of areas for importance	Chapter 3.3.5 –Marine Mammals Table J-12 to J13 Chapter 3.3.5 –Marine Mammals	Partially	Insufficient The EIS describes general seasonal use is in the development area but fails to make use of detailed movement and space use data from long-term collaring programs led by the Alaska USGS. The dEIS cites and acknowledges increase use of coastal habitats by polar bears as a result of degrading sea ice conditions but makes no effort to map out available government data on the distribution of polar bears during the ice-free season to identify potential hot spots. Previously described critical habitat and historical den locations are identified (Map 3-24).
The likely effects of	Chapter 3.3.5 –Marine	No	Insufficient

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
development on space use and movement by each of the key species should be examined, including abandonment or stranding of specific seasonal habitats	Mammals		No spatial analysis of polar bear space use or changes to movement as a result of alternative development scenarios. BLM acknowledges that bears will be disturbed and will likely move but there are no detailed discussion of changes in space use other than females may start denning in areas removed from development activity.
In addition to the spatial and temporal analysis, an examination of how that use may change in the future with changes to spring snow melt and plant phenology, changes in precipitation, temperature, permafrost, and offshore ice conditions and extent (as it influences on-shore use by the species)	Chapter 3 – Affected Environment and Environmental Consequences, Climate Change Chapter 3.3.5 – Marine Mammals	Yes	Adequate The dEIS acknowledges increased space use of coastal areas and increased denning rates on land based on current trends observed from aerial surveys (Schliebe et al. 2006) and recent analysis of denning activity (Olson et al. 2017) in terrestrial and sea ice habitats. Both changes in use are linked to long-term declines in the availability of sea ice.
An examination of scenarios of potential development / leasing and how that may affect each species within the spatial and temporal bounds and environmental changes listed above – should be comprehensive, including energy balance changes and impacts to reproduction, predator-prey dynamics, contaminants (including dust), increased mortality, and other direct and indirect	Chapter 3 – Affected Environment and Environmental Consequences Appendix F. Approach to the Environmental Analysis Chapter 3.3.5 –Marine Mammals	No	Insufficient No comprehensive analysis of scenarios with regards to energy balance changes and impacts to reproduction, predator-prey dynamics, contaminants, increased mortality, and other direct and indirect effects on polar bear or their prey.

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
effects on the key species and issues			
An analysis of how any of the potential, predicted changes from development may impact subsistence harvesting of the above-mentioned species – should not be limited to only the harvesters that may access those species during the time they are in the Coastal Plain (i.e. transboundary effects on subsistence harvesting should be fully analyzed)	Appendix E – ANILCA Section 810 Preliminary Evaluation Chapter 2, Table 2-2 (pdf pg 62) Chapter 3, Section 3.4.3 (pdf pg 229) Chapter 3.3.5 –Marine Mammals	No	Insufficient The dEIS states “The principal mechanism for regulating human activities in regard to polar bears are incidental take authorizations, generally in the form of ITRs. These regulations allow industry operators to unintentionally take small numbers of polar bears provided that it results in negligible impacts on the species and does not have an unmitigable adverse impact on the availability of the species for subsistence use by Alaska Natives. (3-125).” No comments or analyses are provided on transboundary effects or impacts on subsistence harvesting in Canada under the Inuvialuit-Inupiat Polar Bear Management Agreement.
A comprehensive up-to-date review of the potential impacts of oil and gas development in an arctic environment, including suggested mitigations and documentation of their effectiveness, including from grey literature		Partially	Insufficient The dEIS relies heavily on existing reports and peer reviewed literature on polar bear habitat use, life history and vulnerability to sources of disturbance. Impacts under existing mitigation measures as a result of ITR’s are considered “negligible” based on evaluations of previously reported rates of mortality associated with oil and gas development on the North Slope of Alaska. However, the dEIS does not assess the effectiveness of denning surveys as a mitigative measure to avoid den abandonment or potential mortality to denning females and their young.
Species Specific Content			
A description of the potential for human-bear interactions and incidental take of polar bears during exploration, development and production. Specifically, given an	Table 2-2 Lease Stipulation 9 (Map 2-2); Table 2-2 Required Operating Procedure 4; Table 2-2 Required Operating Procedure	Yes	Adequate Development and exploration would require a Letter of Authorization from the USFWS that would involve incidental take regulations to minimize human bear conflicts. BLM has provided adequate background indicating that the current ITR/LOA process is effective at addressing and mitigating the risks of polar bear encounters with humans

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
<p>increased presence of humans on the landscape, coupled with polar bears spending increased time on land in association with sea ice loss caused by climate change, the potential for human-bear interactions is likely to increase. Unless steps are taken to reduce the frequency of conflicts, both human life and polar bear life will be put at risk. From a conservation perspective, additional human-caused polar bear mortality is a conservation threat in subpopulation that is predicted to decline due to deteriorating ice conditions;</p>	<p>46; Chapter 3 (3-125); Chapter 3 (3-141); Chapter 3 (3-144);</p>		
<p>A description of the potential loss of maternity denning habitat or direct reproductive success that may result from disturbance (including during seismic exploration), as well as describing the potential effects of disturbing denning females, particularly within the 32 km coastline buffer identified as critical habitat.</p>	<p>Table 2-2 Lease Stipulation 1 (Map 2-2); Lease Stipulation 4 (Map 2-2 and 2-4); Lease Stipulation 5 (Map 2-6 and 2-8); Table 2-2 Required Operating Procedure 10; Table 2-2 Required Operating Procedure 15; Chapter 3 (3-128);</p>	<p>Partially</p>	<p>Insufficient BLM describes the potential percentage of polar bear maternal denning habitat impacted under different proposed development alternatives as well as the number of historical dens that would occur in those areas. They provide one estimate of the number of females predicted to den in the development area in annual basis but do not quantify the likelihood that potential dens would be disturbed. The dEIS however does not assess the effectiveness of denning surveys as a mitigative measure to avoid den abandonment or potential mortality to denning females and their young. This represents the most vulnerable life history stage for polar bears and likely the greatest risk of mortality as a result of development activities.</p>

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
An increasing proportion of polar bears in the Southern Beaufort Sea subpopulation are believed to den on land in association with sea ice loss.	Chapter 3 (3-137); Chapter 3 (3-144); Table 3-22, 3-23 and 3-24), Appendix F (F.4.16); Map 2-8; Map 3-24;		
Additional Considerations			
Description of any mitigations or practices that will be required of any development in ANWR, understanding that project specific mitigations will be determined in a separate regulatory process – for instance road bed construction guidelines, ice-road reqs, predator mgmt. plans, traffic mgmt. plans, pipeline heights, well pad spacing, seasonal restrictions or ‘stop work’ situations, areas off-limits to development w/in CP	Chapter 2 – Alternatives (pdf pg 32), Table 2-2 (pdf pg 34) Table 2-2 lease stipulations (1,4,5,9) and required operating procedures (4,10,15,46).	Yes	Adequate Mitigation measures or stipulations are described for development alternatives (i.e. lease stipulations (1,4,5,9 and required operating procedures 4,10,15,46). All alternatives include some level of mitigation for the disturbance of denning female bears and required mitigation measures for human polar bear interactions.
A thorough analysis of the likely components of projects that will fall outside the ‘2000 acre limit’ that is described in PL 115-97 – specifically how roads, gravel mines / borrow pits, exploration or delineation wells, water	Chapter 1 – Introduction, Section 1.9.1 Tax Cuts and Jobs Act of 2017 (Public Law 115-97) (pdf pg 28)	No	Insufficient No information is presented on zones of influence for polar bears.

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
reservoir pits, or other features might be limited or accounted for in the footprint of induced development – though gravel piers for pipelines are included, the footprint of the pipeline itself, how it fragments the habitat or impedes movement s/b included – ZOI s/b part of the footprint			
Analysis should specify how much of the CP could be development within a '2000 acre limit' as variously defined	Chapter 1 Section 1.9.1 Tax Cuts and Jobs Act of 2017 (Public Law 115-97) (pdf pg 28)	Partially	Poor The dEIS states that “Under this interpretation the reclaimed acreage of Federal land formerly containing production and support facilities would no longer count towards the 2,000-acre limit.” With the section on remediation/reclamation, this could potentially result in development in all areas of the coastal plain that are not offered for lease sale or protected under lease stipulations (e.g. Leas Stipulation 1. Lease Stipulation 5 Alternative D etc.)

Migratory Birds

Overall Comments

After reviewing the dEIS sections for birds shared under our Migratory Birds Convention, it appears that the highest risk may be related to increased shipping traffic. This results in 2 major issues:

1. Potential for catastrophic oil spills/pollution on large groups of molting birds (e.g. eiders, sea ducks, loons, Brant).
2. Increased disturbance to staging/molting/wintering birds (e.g. both species of Eiders) that may reduce their survival and/or reproductive success.

Additional details and comments about these issues are found in our detailed comments below.

Detailed Comments in Reference to Canada's Scoping Letter – Migratory Birds

Canada outlined in our scoping letter⁴⁶ what we recommended be included in the EIS. The table below compares what we requested, where we found information about that topic in the dEIS, our determination if the request was addressed, our assessment of how well it was addressed, and supporting information and commentary.

⁴⁶ "GovCanada_ThompsonK_Email.pdf" in Comment Folder 11 on the ePlanning website for the Coastal Plain EIS.

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
Fully describe potential impacts to key species of the proposed leasing + impacts of pre-and post-lease activities such a seismic and drilling exploration, development, and transportation + induced development including the impacts of malfunctions	Chapter 3 – Affected Environment and Environmental Consequences and Direct and Indirect Impacts Section 3.3.3 Birds Table J-9, J-10	Partially	<p>Adequate or Poor Depending on Species</p> <p>The dEIS describes the potential impacts to migratory birds qualitatively due to unavailability of resource and impact data or because project-specific details are uncertain/unknown. Four (4) categories of impact are described: habitat loss and alteration, disturbance and displacement (including alteration of behavior), injury and mortality, and attraction of predators and scavengers (including both mammals and birds) to human activity or facilities with subsequent changes in predator abundance. Incidental take is not discussed except for Spectacled Eider on p 3-93, presumably because of implementing the M-opinion (https://www.doi.gov/sites/doi.gov/files/uploads/m-37050.pdf).</p> <p>Impacts are only discussed in general terms. Specific examples are limited. This is likely due to the highly variable requirements of the bird species described in Tables J-9 and J-10.</p> <p>Specific examples related to key species are limited to:</p> <ol style="list-style-type: none"> 1. Impacts of habitat alteration due changes in hydrology of lakes/shoreline habitat (e.g. water drawdowns, gravel mining, water chemistry changes) and the potential long-term loss of breeding habitat of loons (Pacific, Red-throated and Yellow-billed Loons). There is no indication of mitigation measures. 2. Short-term localized effects of modifications to the sea floor in shallow water needed for barge activity (i.e. screeding and sediment plumes) on benthic feeding birds, Long-tailed Duck, Common and King Eiders, and scoters. The dEIS implies that since the birds can relocate impacts should be minimal. However, there is no discussion of timelines expected for regeneration of impacted marine habitats. 3. Disturbance and/or displacement effects on molting Long-tailed Duck due to increased marine traffic which is expected to be minimal due to the low-site fidelity of the species to a specific molting location. However, this is not expanded to other molting species. 4. Mitigation of collisions risk for Common Eider and other low-flying birds

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
			<p>with structural infrastructure (towers, lights, guy wires) with BMPs is not defined. Mitigation measures for collisions with vehicles are not discussed.</p> <p>5. The dEIS focuses on the impacts of air-traffic disturbance to Lesser Snow Goose but does not expand to other species. Potential increased harvest pressure on Lesser Snow Goose is also discussed due to increased access due to the construction of roads/infrastructure.</p> <p>The dEIS discusses the impact of different oil-spill scenarios on migratory birds, including inland and marine, but does not quantify the impact of specific scenarios. The dEIS does acknowledge there is a potential for extensive impact to large numbers of molting/feeding/migrating under a large-scale marine spill scenario.</p>
<p>Clear statements on the significance of those potential impacts</p>	<p>Chapter 3 – Affected Environment and Environmental Consequences Section 3.3.3 Birds</p>	<p>Partially</p>	<p>Insufficient</p> <p>The dEIS states that detailed distribution and abundance data for the program area is lacking for many species. Contemporary data are also lacking for most species and what is available was only collected for 1 or 2 years over a small proportion of the survey area or at a low intensity. Since waterfowl, waterbirds, landbirds and shorebirds are patchily distributed on the landscape it is difficult to determine accurate abundance estimates. Since the program area contains fewer waterbodies compared to sites further west with population/distribution survey work the EIS provides only a general overview of impacts to migratory birds.</p>

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
			<p>The EIS states a range of possible effects on various species, impacts are discussed in very generalized terms to identify multiple potential impacts to a multitude of species.</p> <p>The dEIS does not provide specific insight on local abundance or population level impacts on key species. There is no effort to model impacts on key species (e.g. Common Eider, King Eider, Lesser Snow Goose, Yellow-billed Loon, Whimbrel, Ruddy Turnstone, Stilt Sandpiper, Pectoral Sandpiper, American Golden-Plover).</p>
Fully describe critical thresholds or limits to development + the legislative framework to support them	Chapter 2 - Alternatives (pdf pg 31) Section 2.2 Description of the Alternatives (pdf pg 31) Section 2.3 Alternatives Considered But Eliminated from Detailed Analysis (pdf pg 69) Appendix B, Table B-5 Appendix B.7.5 Abandonment and Reclamation Appendix D. Laws and Regulations	No	<p>Poor</p> <p>No critical thresholds or limits to development specific to migratory birds are outlined in the EIS.</p> <p>Protective measures for migratory birds are partially rolled-into habitat, fish, polar bear and caribou protective measures including lease stipulations (1,2,4,9) and required operating procedures (3,7,8,11,18,34).</p> <p>Specific required operation procedures for migratory birds include: ROP 25: avoiding human caused changes in predator populations of ground nesting birds. ROP 26, reduction of risk of attractions and collisions between migratory birds and oil and gas and related facilities during low light conditions. ROP 27, minimize the impacts to bird species from direct interacting with oil and gas facilities. ROP 30, prevent or minimize the loss of nesting habitat for cliff-nesting raptors. ROP 31, prevent or minimize the loss of raptors due to electrocution by power lines. ROP32, avoid and reduce temporary impacts on productivity from disturbance near Stellar’s Eider or Spectacled Eider nests.</p>
Fully describe additive , multiplicative and synergistic	Chapter 3 – Affected Environmental	Partially	Poor

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
cumulative effects of proposed leasing and induced development on key species in relation to existing natural and anthropogenic stressors	Consequences Section 3.3.3 Birds Cumulative Impacts Appendix F.3 Cumulative Impacts Appendix F.4.14 Birds		<p>The EIS describes cumulative effects for migratory birds as qualitative impacts: “Past, present, and reasonably foreseeable oil and gas development impacts would be common to the impacts described for developments pursuant to the program area lease sales. They would increase the occurrence and intensity of these common impacts. Such projects are likely in both terrestrial and marine environments and would affect birds in both.”</p> <p>Specific reference is made in the dEIS to increased predator densities and predation effects, increased disturbance due to transportation and potential increases in subsistence harvest (egg and bird hunting) if residents of adjacent villages are allowed access to roads. Climate change is mentioned and is expected to impact shoreline erosion rates as well as various other habitat effects described in the Affected Environment section; with respect to cumulative effects: “The effects of climate change described under <i>Affected Environment</i> above, could influence the rate or degree of the potential cumulative impacts.”</p> <p>The EIS does not quantify how cumulative effects are likely to impact populations.</p> <p>While additional harvest pressure on overabundant species (Lesser Snow Goose) populations could potentially have some benefits (e.g. reducing overabundant populations). The cumulative effect of additional development on other species that may be at risk or undergoing population declines (shorebirds) or that congregate in large numbers (Common Eider, King Eider) off shore are not described.</p>
Fully describe the requirements for effectiveness monitoring (of any proposed mitigations relevant to this phase of the process) including listing accountable agencies for any monitoring	Chapter 1.7 Collaboration and Coordination Appendix D. 2 Federal Laws and Regulations	Partially	<p>Insufficient</p> <p>The dEIS states that the USFWS was consulted early in the process, and that USFWS provided input on issues, data collection and review and alternatives development.</p> <p>USFWS manages the 1002 area and is responsible for implementation of the Migratory Bird Treaty Act and Endangered Species Act. However, no details are provided related to effective monitoring of migratory birds. Nor is there reference</p>

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
			to on-going baseline monitoring conducted by USFWS in the 1002 area for migratory birds.
For PCH, Polar Bear and Migratory Birds			
Description of the use and importance of the Coastal Plain in the 1002 area to the movements of each species (and each life stage), during each season of the year and across multiple years (including decades – e.g. scale of the Pacific Decadal Oscillation) – include scientifically defensible methods of delineation and rating of areas for importance	Chapter 3.3.3 – Birds Maps 3-14 to 3-20 Figure 3-6 Appendix J.2 - Birds Table J-9 and J-10	Partially	<p>Poor</p> <p>The EIS describes general seasonal use, primarily during the high occupancy period of migration/nesting/staging between May – September, in the development area for major groups of birds (Waterbirds, Shorebirds, Larids, Raptors, Landbirds, Seabirds), with specific focus on Eiders, Long-tailed Duck, scoters and Lesser Snow Goose.</p> <p>The EIS references available historical survey data. A few bird species have been relatively well studied in the 1002 area (e.g. Golden Eagle and fall-staging Lesser Snow Goose). However, the EIS states that: “detailed distribution and abundance data for the program area are lacking for many, and contemporary data are lacking for most bird species.”</p> <p>The data that is available is sparse due to constraints of the long-term survey designs: “Since 1986, the U.S. Fish and Wildlife Service has conducted annual aerial surveys of much of the Arctic Coastal Plain of northern Alaska to generate indices of nesting waterbird population size and trends over time (Stehn and others, 2013); however, prior to 2018 only about a quarter of the area was included, and it was surveyed at the lowest intensity, making estimates of waterbird abundance and distribution across the program area relatively unreliable.”.</p> <p>Delineation of areas of importance are adequate for coastal breeding waterfowl/waterbirds (Maps 3-14 to 3-20) and staging Lesser Snow Goose only. The EIS does not delineate or rate habitat of importance for any other species, including candidate species at risk (shorebirds) that Canada identified in our scoping letter.</p>

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
			<p>The EIS does not delineate or rank risks of potential routes for barge traffic along shipping routes in the Beaufort Sea. Barge traffic increases the risk of accidental spills of both marine fuel (diesel) and extracted oil/gas products from the lease production sites for key species that rely almost exclusively on marine habitat during migration/molting and wintering (e.g. Common Eider, King Eider, Stellar's Eider, Spectacled Eider, Brant).</p>
<p>The likely effects of development on space use and movement by each of the key species should be examined, including abandonment or stranding of specific seasonal habitats</p>	<p>Chapter 3, Section 3.3.5</p>	<p>Partially</p>	<p>Adequate</p> <p>Spatial analysis on the effects of development on space use and movement of migratory bird species in response to development is based on estimated displacement distances and impact buffers around infrastructure derived from the literature. Disturbance and displacement effects are expected to be highly variable depending on species and the buffers are guidelines only. Potential site abandonment (e.g. nest abandonment) is discussed in general terms related to localized/buffer areas of impact for all species (landbirds and shorebirds).</p> <p>There are few examples of effects of development on space use and movement of key species. For Long-tailed Duck and other benthic feeding birds screeching and barging is described as having a short term (one season) effect and birds molting birds are expected to move to adjacent areas in response to development activities in a particular lagoon. One-season is likely a substantial under-estimate of the time required for shallow marine areas to recover from screeching and support foraging birds.</p>
<p>In addition to the spatial and temporal analysis, an examination of how that use may change in the future with changes to spring snow melt and plant phenology, changes in</p>	<p>Chapter 3 – Affected Environment and Environmental Consequences, Climate Change Chapter 3.3.3 - Birds</p>	<p>Yes</p>	<p>Poor</p> <p>The EIS describes potential changes due to climate change only in general terms; impacts are expected to be variable depending on the species and habitat considered.</p>

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
precipitation, temperature, permafrost, and offshore ice conditions and extent (as it influences on-shore use by the species)			
An examination of scenarios of potential development / leasing and how that may affect each species within the spatial and temporal bounds and environmental changes listed above – should be comprehensive, including energy balance changes and impacts to reproduction, predator-prey dynamics, contaminants (including dust), increased mortality, and other direct and indirect effects on the key species and issues	Chapter 3 – Affected Environment and Environmental Consequences Appendix F. Approach to the Environmental Analysis Chapter 3.3.3 – Birds	No	Insufficient No comprehensive analysis for key species of scenarios with regards to energy balance changes and impacts to reproduction, predator-prey dynamics, contaminants, increased mortality, and other direct and indirect effects. Impacts are discussed in general terms and are expected to vary depending on the species.
An analysis of how any of the potential, predicted changes from development may impact subsistence harvesting of the above-mentioned species – should not be limited to only the harvesters that may access those species during the time they are in the Coastal Plain (i.e. transboundary effects on subsistence harvesting should be	Appendix E – ANILCA Section 810 Preliminary Evaluation Chapter 3.3.3 – Birds	Partially	Insufficient Impacts to migratory birds are not included in Appendix E – ANILCA The EIS describes impacts to subsistence harvesting in the cumulative effects section. Subsistence harvest of egg harvesting and bird hunting within the 1002 area are expected to continue at a rate similar to pre/non development scenarios. If additional road infrastructure is developed residents of adjacent villages may increase their subsistence harvest. Risks to populations of geese and their subsistence harvest due to development are likely minimal. Populations of geese that nest and stage in the 1002 area are either

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
fully analyzed)			<p>at or above their NAWMP 2012 population objectives. Lesser Snow Goose are considered overabundant and are subject to special conservation measures in Canada in an attempt to control the species abundance.</p> <p>Risks to the Canadian subsistence harvest of Common Eider and King Eider are tied to increased marine traffic. Both species of eider are important subsistence species for Northern Indigenous Peoples. Data is limited but subsistence harvest estimate is 2,500 Common Eider annually; King Eider may make up 96% of the species harvested in June near Ulukhaktok.</p> <p>Eiders congregate in large, dense flocks, consisting of thousands of birds, during winter, molting and migration and are at risk from increased marine shipping traffic in the Beaufort and offshore development. Disturbance from shipping, increased human activity, and pollution (e.g. accidental spills, chronic discharge) may have adverse effects on both species that spend the majority of their life cycles in marine habitat</p> <p>No comments were provided on transboundary effects or impacts on subsistence harvesting in Canada of King Eider, Common Eider, Brant, Lesser Snow Goose, and other species.</p>
A comprehensive up-to-date review of the potential impacts of oil and gas development in an arctic environment, including suggested mitigations and documentation of their effectiveness, including from grey literature		Partially	<p>Adequate</p> <p>Impacts of oil and gas development are highly variable depending on species-specific factors. The EIS reports a range of possible effects based on existing reports and peer reviewed literature on habitat use, population status, behavior and vulnerability to disturbance. Literature seems current, including Pearce et al. 2018 (the ANWR science update).</p>
Species Specific Content			
An examination of the impacts	Chapter 3, Section	Partially	Insufficient

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
<p>on shared populations, such as snow geese, with particular consideration of shared populations using the Coastal Plain that may have conservation concerns, including such species as Buff-breasted Sandpiper, Whimbrel, Ruddy Turnstone, Sharp-tailed Sandpiper, Pectoral Sandpiper, American Golden-Plover, Yellow-billed Loon.</p>	<p>3.3.3 Birds</p>		<p>Impacts of water use habitat alteration due changes in hydrology of lakes/shoreline habitat (e.g. water drawdowns, gravel mining, water chemistry changes) and the potential long-term loss of breeding habitat of loons (Pacific, Red-throated and Yellow-billed Loons) that could impact breeding populations. There is no indication of mitigation measures to prevent population level effects.</p> <p>Significant discussion centered on impacts to Lesser Snow Goose populations and methods to reduce effects under Alternatives C and D. However, Lesser Snow Goose populations are overabundant and likely do not require additional protection/conservation measures.</p> <p>Mention of protection of Whimbrel and American Golden-Plover habitat in Alternatives C and D (no-lease areas and NSO/CSU areas) related to protection of caribou calving habitat. However, specific mitigation measures are lacking. Other key species of conservation concern, e.g. shorebirds, are not mentioned specifically nor are specific protection measures presented.</p>
<p>Additional Considerations</p>			
<p>Description of any mitigations or practices that will be required of any development in the 1002 area, understanding that project specific mitigations will be determined in a separate regulatory process – for instance road bed construction guidelines, ice-road reqs, predator mgmt. plans, traffic mgmt. plans, pipeline heights, well pad spacing, seasonal restrictions or ‘stop work’ situations, areas off-limits to development w/in CP</p>	<p>Chapter 2 – Alternatives (pdf pg 32), Table 2-2 (pdf pg 34) Table 2-2 lease stipulations (1,2,4,9) and required operating procedures (25,26,27,30,31,32).</p>	<p>Partially</p>	<p>Poor</p> <p>Protective measures for migratory birds are partially rolled-into habitat, fish polar bear and caribou protective measures including lease stipulations (1,2,4,9) and required operating procedures (3,7,8,11,18,34).</p> <p>Specific required operation procedures for migratory birds include: ROP 25: avoiding human caused changes in predator populations of ground nesting birds. ROP 26, reduction of risk of attractions and collisions between migratory birds and oil and gas and related facilities during low light conditions. ROP 27, minimize the impacts to bird species from direct interacting with oil and gas facilities. ROP 30, prevent or minimize the loss of nesting habitat for cliff-nesting raptors. ROP 31, prevent or minimize the loss of raptors due to electrocution by power lines. ROP32, avoid and reduce temporary impacts on productivity from disturbance near Stellar’s Eider or Spectacled Eider nests.</p>

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			<p>Mitigations and practices required were limited to the lease stipulations and ROPs – reference was made to Best Management Practices but they were not described further. General mitigation measures were suggested in the text but no indication if they would be required or monitored for effectiveness. Standard operating terms and conditions were not described. Exceptions to lease stipulations and ROPs could be made by an authorized BLM officer and it was not described further what the resulting effect/significance of these exceptions would be.</p>
<p>A thorough analysis of the likely components of projects that will fall outside the ‘2000 acre limit’ that is described in PL 115-97 – specifically how roads, gravel mines / borrow pits, exploration or delineation wells, water reservoir pits, or other features might be limited or accounted for in the footprint of induced development – though gravel piers for pipelines are included, the footprint of the pipeline itself, how it fragments the habitat or impedes movement s/b included – ZOI s/b part of the footprint</p>	<p>Chapter 1 – Introduction, Section 1.9.1 Tax Cuts and Jobs Act of 2017 (Public Law 115-97) (pdf pg 28) Chapter 3, Section 3.3.3 Birds</p>	<p>Partially</p>	<p>Adequate for land, Poor for marine features Project impacts outside the 2000 acre (8.09km²) limit are described based on buffer zones for dust shadows and gravel spray extending 328 feet (99.97m) beyond gravel roads.</p> <p>The dEIS provides a hypothetical example using a standardized anchor field: “(one CPF and 6 radiating 8-mile access roads to 6 drill pads, one STP pad, and a 30-mile access road, totaling 750 acres), the area within 328 feet for impacts of dust fallout, gravel spray, thermokarsting, and impoundments was estimated to be about 6,607 acres . The actual area potentially affected would depend entirely on the configuration of roads, but these numbers indicate that indirect impacts of gravel roads and pads would affect an additional area about 7 to 8 times larger than the gravel footprint.”</p> <p>Equivalent estimates of zones of impact/influence are not provided for lagoon or coastline habitat in response to screeding for barge landing/access. Zones of impact are not described for shipping routes in the marine and coastal areas. Impacts of screeding are described as short term (one season) in shallow water regions of the lagoon prior to barge arrival. The dEIS reports only on the number of central processing facilities (CPF) expected to require barge access for construction (2 barges x at a 10-15 year interval, up to 3 active sites at any one time), but does not include any information on the use of barges for resupply or other transport requirements.</p>

Canada Scoping Request	EIS Location	Addressed in EIS (Yes, No, Partially)	Extent or Quality (Adequate, Poor, Insufficient)
Analysis should specify how much of the CP could be development within a '2000 acre limit' as variously defined	Chapter 1 Section 1.9.1 Tax Cuts and Jobs Act of 2017 (Public Law 115-97) (pdf pg 28)	Partially	Poor The dEIS states that "Under this interpretation the reclaimed acreage of Federal land formerly containing production and support facilities would no longer count towards the 2,000-acre limit." With the section on remediation/reclamation, this could potentially result in development in all areas of the coastal plain that are not offered for lease sale or protected under lease stipulations (e.g. Leas Stipulation 1. Lease Stipulation 5 Alternative D etc.)

Geese and Swans

Lesser Snow Goose

Three populations of Lesser Snow Goose (LESG) are likely to occur in ANWR that are of relevance to Canada: Mid-continent, Western Arctic and Wrangle Island. ANWR supports a relatively small proportion of breeding birds; majority (~95%) of the western arctic population breeds on Banks Island in the NWT, with smaller colonies elsewhere in the NWT and Alaska. However, ANWR provides key fall staging habitat for LESG. Both Mid-continent and Western Arctic populations likely intermix during staging in ANWR but it is unclear as to what (if any) proportion of the Wrangle Island birds stage in ANWR.

All LESG populations are above their 2012 North American Waterfowl Management Plan (NAWMP) population objectives. Two populations are overabundant: the Mid-continent population was formally designated as overabundant in 1999 and the Western Arctic population in 2014. Both populations are subject to special measures in an attempt to control the species abundance (e.g. spring harvest, liberalized bag limits).

Geese (including LESG) are an important part of subsistence harvest species for Northern Indigenous Peoples in Canada. Due to the high abundance (or overabundance) of the majority of goose populations in the western arctic the subsistence harvest is not at high risk due to oil and gas development in the project area. Nor is there a high risk to sport harvest of the above species. There is currently no open season on Tundra Swans in Canada; however, there is some limited harvest in the USA.

Brant:

Two populations of Brant (BRAN) that breed in Canada may use coastal lagoons/shoreline habitats in ANWR for staging: Western High Arctic Brant and Black Brant. Western High Arctic Brant breed on the Parry and Queen Elizabeth Islands in the NWT while Black Brant are more widely distributed and nest in the western Canadian arctic as well as Alaska's North Slope. The primary/best documented staging area for Brant is Izembek Lagoon in the Aleutian Islands, but are likely to breed and stage along the North Slope.

Brant populations are susceptible to heavy losses and/or nesting failure due to starvation; this is due to the species dependence exclusively on marine habitat and food resources (e.g. eelgrass beds). Unlike other species of geese that benefit in winter from agricultural land conversion and crop wastage/spillage Brant have not undergone exponential population growth. The coastal breeding habitat of some Brant colonies could be impacted by expanding LESG colonies.

Oil and gas development within ANWR may have some impacts on Brant populations, but the dEIS did not adequately describe them. Shoreline development, additional barge traffic and increased risk of oil spills/pollution along the barrier islands of ANWR and Alaska's North Slope may affect local Brant colonies.

Development of oil and gas leases in ANWAR poses a risk to Brant through increased traffic along the shipping routes in the Beaufort Sea. Increased shipping traffic increases the risk of accidental spills of both marine fuel (diesel) and extracted oil/gas products from the lease production sites, but the dEIS does not describe these risks well. Risks from oil spills and marine disturbance pose the greatest risk to Brant during migration and staging when the bulk of the population is concentrated in a small area along the shoreline or open water. In addition, an oil/fuel spill along the shipping route to Dutch Harbour poses a low likelihood but high risk/impact scenario to a key staging site (Izembek Lagoon, Alaska) and the bulk of western Brant populations during migration/staging.

Sea Ducks

Common Eider and King Eider

Common Eider (COEI) that breed in the central and western Canadian Arctic are from the Pacific population and are thought to overwinter in open water areas in Alaska (e.g. Bering Sea + Aleutian Islands). COEI populations are difficult to monitor due to their remote breeding and wintering habitats (arctic and marine); there are no annual population surveys. Based on migration counts at Point Barrow (Nuvuk) Alaska, the Pacific population declined by 53% between 1976 and 2003-04. Breeding populations have declined by 50% at key sites near Bathurst Inlet NU between 1995 and 2007-2008, but stabilized in 2015-2016; and declined by 78% at Queen Maud Gulf in between 1995 and 2016.

King Eider (KIEI) breeding in the western arctic (Canada and northern Alaska) along with additional birds that breed in Russia make up the Western population. These birds overwinter in open water areas in the Bearing Sea, Aleutian Islands, etc. Canada has a core responsibility for KIEI populations since the species is not associated with any of the flyways and a significant proportion of the species breeds in the Canadian arctic. KIEI are also difficult to monitor due to their remote breeding and wintering habitats; there are no annual surveys for the species. Trends data from migration counts at Point Barrow (Nuvuk), Alaska, indicate the population declined by 56% between 1976 and 2003-04. Breeding surveys on Western Victoria Island indicate the species declined by 54% between the early 1990s and 2004-05 with the greatest decline near Ulukhaktok, NWT.

Annual weather and ice cover conditions directly affect breeding success for COEI and KIEI. Starvation during spring migration (ice cover). Both species of eider are long-lived and show strong female breeding site fidelity, female and duckling survival both likely play an important factor in population dynamics.

Both species of eider are important subsistence species for northern Indigenous Peoples. Data is limited but subsistence harvest estimate is 2,500 COEI annually; KIEI may make up 96% of the species harvested in June near Ulukhaktok.

Direct impacts of oil and gas leasing development within the project area may have some impact on locally breeding Pacific COEI and Western KIEI populations. Shoreline development, additional barge traffic and increased risk of oil spills/pollution along the barrier islands of ANWR and Alaska's North Slope may impact locally breeding COEI and KIEI.

Eiders congregate in large, dense flocks consisting of thousands of birds, during winter, moulting and migration. Increased marine shipping traffic in the Beaufort and offshore development because of oil and gas leases in ANWR is the greatest threat to both species of eider. Disturbance from shipping, increased human activity, and pollution (e.g. accidental spills, chronic discharge) may have adverse effects on both species that spend the majority of their life cycles in marine habitats. Additional information on mitigations for minimizing the probability of a spill must be provided, including details on required hull designs, containment features and contingencies, and spill response and clean up plans (and their feasibility during the projected barging season).

Long-tailed Ducks, Scoters (Surf Scoter/Black Scoter/White-winged Scoter)

Long-tailed Ducks (LTDU) and scoters nest in low densities across the arctic (and ANWR) and winter along the Pacific coast from Alaska to California. Like eiders, scoters and LTDU data is lacking related to the population status, basic demographics and life histories of these species; for instance the major breeding/moulting/staging and wintering areas are poorly defined. The Waterfowl Breeding Population and Habitat Survey (WBPHS) poorly sample these species, due to a miss-match in timing of the survey compared to the species arrival on their breeding habitat. Further, the WHPBS only covers a small fraction of the breeding habitats for these species and detections for scoters are lumped due to difficulties in differentiating the three species; LTDU was dropped from the survey in 2012.

Loons (Pacific, Red-throated, Yellow-billed)

Three species of loons are could be impacted by development within the project area. Loons are more dependent on inland wetland habitats (e.g. large lakes/wetlands) for breeding habitats. Population estimates for loons are derived partially from WBPHS data as well as other aerial breeding and wintering surveys. Loons are a non-harvested species and lack harvest data and detailed population estimates. Yellow-billed loons are listed as a mid-level priority species for assessment as a species at risk in Canada.

Like eiders, scoters, LTDU and loons have relatively low reproductive rates and low reproductive success making adult survival a key factor for population stability/growth. Risks to these species are similar to those for COEI and KIEI. Since they breed in relatively low densities direct impacts from oil and gas development in ANWR is likely to be minimal. Development of inland wetland areas may have some impact on locally breeding birds. However, during migration, staging and moulting these species congregate in large flocks and are vulnerable to disturbance from shipping traffic, increased human activity and pollution (oil spills, chronic discharge etc.).

Shorebirds

Shorebirds population estimates and distribution models derived from the Program for Regional and International Shorebird Monitoring (PRISM) data show a general trend of higher population densities in the National Petroleum Reserve area of Alaska compared to the project area. Shorebirds are broadly distributed on the arctic landscape with some exceptions, e.g. Ruddy Turnstones tend to have clumped distribution. Based on preliminary PRISM models, shorebirds tend to occupy primarily moist or wet tundra habitats on Alaska's North Slope (with some exceptions, e.g. American Golden Plover has an upland distribution). Shorebird habitat quality and availability maybe degraded by overabundant Lesser Snow Goose colonies and is already undergoing changes due to climate change.

Shorebird populations are declining. Three species that are likely to occur in in the project area are listed under the Canadian Species At Risk Act (SARA); Buff-breasted Sandpiper (Special Concern), Red-necked Phalarope (Special Concern) and Red Knot (Special Concern, Threatened or Endangered depending on the population). Several other species likely to breed in in the project area are priority candidates for species at risk assessment. High priority candidates include Ruddy Turnstone, Semipalmated Sandpiper, Short-billed Dowitcher and Whimbrel; mid priority candidates include Stilt Sandpiper Pectoral, Sandpiper and American Golden-plover. These are the species that Canada is most concerned about.

Oil and gas development within the project area is likely to directly affect locally breeding birds. Alteration to drainage regimes and wetland habitat distribution due to road and/or infrastructure construction are likely to have the greatest impact on shorebirds. However, since shorebirds breed in relatively low densities, impacts at the overall population level are more difficult to understand and the dEIS provided no quantitative analyses or estimates. Since several species of shorebird that breed in the project area are already listed under Canada's federal Species At Risk Act and a significant number are candidates for at-risk assessment, additional analyses of impacts and concomitant mitigation measures may be necessary to minimize impacts of oil and gas development on these species. Canada requests this greater level of specificity.

General References for Bird Section

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