Appendix 1: The Government of Yukon's comments on the Coastal Plain Oil and Gas Leasing Program Draft Environmental Impact Statement

Contents

1. Introduction

Provided below are comments as well as technical and scientific evidence compiled by the Government of Yukon in response to the Coastal Plain Oil and Gas Leasing Program draft Environmental Impact Statement (draft EIS) that the Bureau of Land Management is undertaking to implement the leasing program pursuant to the *Tax Act* (Public Law 115-97, Dec. 22, 2017).

2. Overall comments

The Government of Yukon has overall concerns with the draft EIS in how it considers transboundary effects, socio-economic and cultural values, as well as the level of quantitative analysis and the scope of the alternatives presented. In addition to these overall concerns, we have specific concerns with regard to the Porcupine caribou herd (see Section 3), polar bear (see Section 4), and wetlands (see Section 5).

2.1 Transboundary effects

The context for assessing transboundary effects of the project is varied:

- The *Council of Environmental Quality guidance on NEPA Analysis for Transboundary Impacts* (1997) describes the legal and policy requirement to conduct a thorough analysis of transboundary effects, concluding that "NEPA requires agencies to include analysis of reasonably foreseeable transboundary effects of proposed actions in their analysis of proposed actions in the United States. Such effects are best identified during the scoping stage, and should be analyzed to the best of the agency's ability using reasonably available information. Such analysis should be included in the EA or EIS prepared for the proposed action."
- Section 3(g) 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* speaks to the needs to assess impacts to Canadian subsistence users, while 2(b)(2) speaks 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. It does not exempt environmental assessment processes from these principles.
- The 1973 *Agreement on the Conservation of Polar Bears* signed by both the United States and Canada recognizes that the polar bears are a significant

resource of the Arctic which require additional protection, and that protection should be achieved through co-ordinated national measures.

Given the long history of cooperative management for the Porcupine caribou herd, the Government of Yukon is concerned that impacts to Canadian subsistence users are not fully considered. The draft EIS is clear that, "Canadian users accounted for 85 percent of the harvest, and Alaskan users were 15 percent of the harvest," 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" (Section 3.4.3, page 3-168). Despite this, impacts to Canadian subsistence users is only included in one table (Appendix M, Table M-21), one figure (Appendix A, Figure 3-7), and one map (Appendix A, Map 3-27).

The draft EIS is deficient with respect to transboundary effects because it does not provide equal consideration and analysis of how the project will impact Canadian subsistence users. It is further deficient by not providing a quantitative analysis of the impact to Porcupine Caribou of the project alternatives, and since no such complementary analysis exists for Canadian subsistence users, Yukon is unable to evaluate the context or intensity (i.e. significance in the *National Environmental Policy Act*) of potential direct or indirect impacts. A final significant deficiency is that the draft EIS is silent on mitigations for Canadian subsistence users.

The Government of Yukon's concerns about transboundary effects are further explored in Section 3.5 (for the Porcupine caribou herd) and 4.1 (for polar bears).

2.2 Socio-economic and cultural values

The Government of Yukon scoping phase comments included, but was not limited to, the Bureau's assessment of:

- Food security for communities and populations who use the caribou as a primary food source;
- Impacts on individual and community well-being in connection with the caribou; and
- Impacts, such as increased demand and access, to services for health and social programs, if access to caribou as a subsistence and cultural resource is diminished.

The draft EIS does not adequately consider impacts on Canadian harvesters. As the primary harvesters and subsistence users of the PCH, it is Canadians who will be the most impacted by herd declines. These impacts have been contemplated in the

draft EIS, but the main focus is on Alaskan communities. This deficiency should be addressed through a more complete analysis of impacts to all users of this transboundary herd. As it stands, the Canadian communities who will be most significantly impacted by the leasing and subsequent activities will receive none of the benefits that could lend to mitigation of these impacts. These effects should be examined.

In terms of the alternatives, only Alternative A (no oil and gas activity) would remove impacts. As Alternative A is expressed as non-viable, analysis on the other alternatives and the broader information in the draft EIS was considered for socio-economic and cultural values. The draft EIS describes the objectives for public safety impacts (and by extension public health impacts) in relation to contaminants in food sources in Alternatives B, C and D. It does not describe the potential for cultural impacts. The proposed Alternatives, therefore, fall far short of an adaptive, responsive management regime and amounts to one-way reporting that does not consider the cultural impacts related to declining caribou health from industrial disturbance.

While all alternatives have the same mitigation objectives, the Bureau of Land Management's strategic approach to holding oil and gas lease sales should be primarily focused on reducing the likelihood of impacts to the population levels of the PCH and other subsistence wildlife, while also minimizing or mitigating cultural impacts. The draft EIS fails to demonstrate how the Bureau of Land Management could be successful in its required operating procedure 7: "ensur[ing] that permitted activities do not create human health risks by contaminating subsistence foods," when the procedure can be waived by Authorized Officials. This approach should be reconsidered.

The nutritional value of caribou, a traditional food source, contributes to the health of Indigenous populations in Canada and the United States. Market-based foods in Canada's northern communities is expensive, exacerbating issues of food security for households with limited income, and potentially increasing needs for income supports. Traditional food sources, whether harvested directly by a household member or obtained through sharing or bartering, provide a foundational food source that cannot be merely supplemented with 'equivalent' foods as required; country foods are preferred and should not be considered as a nice-to-have supplement to grocery store foods. Substitution will not mitigate the impacts on individual and community well-being that are associated with loss of a culturally

important resource and practice. The draft EIS fails to consider these impacts at all in a Canadian context, much less propose specific mitigations to address these impacts.

In addition to providing a source of food, the harvesting of caribou is an activity with cultural, health, and recreational value. Individual and community well-being is supported and enhanced through participation in traditional activities (e.g., increasing or protecting cultural, intergenerational and community connectedness, and building or enhancing a sense of accomplishment or self-sufficiency). Further, the act of harvesting itself is a form of physical activity that provides health benefits. Impacts on the availability of caribou could result in an increased need for and use of social services (e.g. income supports; mental health services). Health services may also be impacted over the long-term, due to the risk of increased obesity and related chronic diseases that have been associated with a shift towards market-based foods among Indigenous communities. The draft EIS fails to quantify or propose mitigations to prevent a shift towards market-based foods in Canadian communities as a result of either declines in caribou availability or declines in caribou health as a result of industrial development. It also fails to quantify or propose mitigations at the individual or community scale for this erosion of strong cultural links to a vibrant herd through harvesting. These are significant deficiencies.

2.3 Lack of quantitative analysis

The draft EIS lacks the quantitative analysis necessary to evaluate the impacts of the proposed Alternatives on all species or ensure that they will not result in significant adverse impacts to environmental and socio-economic values. The consideration and analysis of the environmental impacts of various leasing alternatives are largely summaries that lack scope, methodology, best-available research, and evidence-based rationale. Examples include, but are not limited to, the following:

- The draft EIS does provide a single page synopsis of the "type, context and duration of potential effects of oil and gas exploration, construction, and drilling and operations on terrestrial mammals" (Section 3.3, Table 3-19, page 3-111). However, this summary is limited in scope as it contains little to no discussion on each species and provides no evidence for most of the information presented.

- Quantitative and objective cumulative effects analysis are not included in the draft EIS, although qualitative descriptions of potential factors are described in Section 3.3.4 (pages 3-109 to 3-110). The draft EIS concludes that "it is not possible to predict impacts on the PCH and CAH" with reference to climate change (page 3-109), which we believe should be factored into cumulative effects analysis where possible.

The draft EIS notes that "in the absence of quantitative data, best professional judgment prevailed" (Appendix F, page F-1). The Government of Yukon finds this lack of quantitative analysis deficient, and has provided significant new information in our comments for the Porcupine caribou herd (Section 3 and Appendix 2) as well as identified deficiencies in the draft EIS for polar bears (Section 4) that should be considered in a supplemental EIS. This level of analysis requested should be extended to other species noted in the draft EIS Table 3-19.

2.4 Scope of alternatives

The Government of Yukon recommends that a supplemental EIS is prepared which identifies action alternatives to meet, but not exceed, the 800,000 acre minimum lease area required by the *Tax Act*, Public Law 115-97.

All of the action alternative presented in the draft EIS have footprints which exceed the 800,000 acres minimum lease area required by the *Tax Act*, Public Law 115-97. Alternatives B, C, D1 and D2 propose leasing acres that are significantly more than the minimum area required by the law (i.e., 1,037,200 to 1,563,500 acres). In fact, both Alternatives B and C are almost double the area required by Public Law 115-97.

Further, the United States Public Law 115-97 has a limit of up to 2,000 surface acres to be covered by production and support facilities. The draft EIS provides no indication that the 2,000 surface acre limit will be enforced, despite stating this limit as a key mitigation.

3. Porcupine caribou herd

The Government of Yukon has several major roles in the management of the Porcupine caribou herd (PCH) in both the domestic and international realms. Roles include membership on the International Porcupine Caribou Board, the Porcupine Caribou Management Board, and the Porcupine Caribou Technical Committee. In

recent years, and in partnership with several other governments, the Government of Yukon and the Alaska Department of Fish and Game have led most of the technical aspects of managing the herd including maintenance and management of the collar program, population and distribution monitoring, and harvest management. In particular, the Government of Yukon has led efforts to manage the spatial data collected for the herd. Our management of the PCH makes us uniquely able to provide comments on the data used for the draft EIS with respect to the herd.

Building on the previously shared scoping phase submission (Office of the Minster, 2018), the Government of Yukon's technical comments on potential impacts to PCH are provided below. The review incorporates a science-based vulnerability analysis of the proposed oil and gas development scenario Alternatives on the PCH. Key conclusions include:

- The draft EIS does not evaluate the transboundary effects of the proposed action Alternatives;
- Our analysis of significant new information (Russell and Gunn 2019) and the presented action Alternatives indicates there is a high risk to the sustainability of the Porcupine caribou herd, impacting subsistence users in Canada;
- The quantitative analysis conducted by Russell and Gunn (2019) compares the impacts of all action alternatives to the No Action Alternative (Alternative A). An analysis of this nature was feasible and necessary to make informed decisions;
- The draft EIS does not indicate how 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 revise mitigations going forward. This is a significant deficiency, given our low risk tolerance for impacts to the herd; and
- Confidence in the Alternatives is further eroded given that lease stipulations and required operating procedures may be waived at the discretion of a Bureau of Land Management Authorized Officer (draft EIS Volume 1, Page 2-3).

Below, Section 3.1 describes the independent analysis commissioned by Government of Yukon and other Canadian governments, which provides additional information about the Porcupine caribou herd. Sections 3.2 through 3.9 detail specific issues that the Government of Yukon identifies with the draft EIS. We request that a supplemental EIS is provided to address these topics.

3.1 Supplemental vulnerability analysis

In the summer of 2018, the Government of Yukon together with other Canadian governments commissioned an independent risk assessment to ensure a shared awareness of potential impacts to the PCH.

The supplemental analysis was conducted due the significance of ensuring the herd's sustainability to Yukoners, specifically the subsistence users who rely on the herd. The *Vulnerability analysis of the Porcupine Caribou Herd to potential development of the 1002 lands in the Arctic National Wildlife Refuge* report by Russell and Gunn (2019) is attached in Appendix 2 and is available on the Porcupine Caribou management Board's website (see http://www.pcmb.ca/). The report includes:

- A science-based risk assessment for how vulnerable the PCH is to the proposed to oil and gas development of the 1002 lands. The vulnerability analysis is modelled after the framework used by the International Panel on Climate Change (Glick et. al. 2011);
- A comprehensive summary and analysis of the biology of the herd, including comparisons to other North American herds. The analysis includes identifying key linkages between climate and vital rates;
- A detailed analysis of PCH movement patterns during the insect harassment season, which identifies herd aggregations of approximately 120,000 animals, also referred to as "super groups";
- A 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 relation 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; and

- A comparison of 10-year PCH population projections for scenarios in the proposed leasing areas that include baseline conditions (i.e., no development), full development, and the three main leasing action alternatives.

3.2 Proposed action alternatives pose a high risk to the Porcupine caribou herd

Based on the vulnerability analyses in the above referenced report, the action alternatives presented in the draft EIS present a high risk of adversely impacting the PCH. The Government of Yukon requests that a supplemental EIS with new alternatives be completed before the EIS is finalized to ensure the PCH and its habitat have adequate protection.

The draft EIS does not present quantitative analyses assessing the PCH population level impacts. The supplemental analysis completed by Russell and Gunn (2019) was commissioned by the Government of Yukon and its partners and includes a PCH vulnerability risk assessment of all action alternatives for both high and low starting population sizes under various climate scenarios, to understand the consequences of the leasing program through time. In all model runs the herd is projected to decline faster and grow slower. This suggests that it is still possible to achieve population growth while demographic impacts from a proposed oil and gas activity are occurring (see draft EIS, Section 3, page 114; Arthur and Del Vecchio 2009).

Population growth alone is not sufficient to describe the consequences of a development. For example, Russell and Gunn (2019) show that climate effects are likely the predominant factor governing the PCH; however, the authors also show that population increases will likely be diminished, and that under average or poor climate periods the herd's decline potential and magnitude of decline will be greater. In effect, the herd would not grow to its potential and would be at a greater risk of decline.

Given that this herd grows and declines slowly, demonstrating approximately 3.7 percent growth during its last increase phase (Caikoski 2018), its ability to recover (by way of growth) from adverse effects is more limited. This is in addition to the multiple points raised in the draft EIS (see Section 3, page 114) that describe why adverse effects to PCH would likely be greater than those to the Central Arctic herd, for example. This is concerning as it is indicative of a shift in population

dynamics that could result in the population losing more animals in a decline than can be made up in a growth phase.

To assess the adaptive capacity of the herd to the proposed Alternatives, Russell and Gunn (2019) estimated population decreases were more likely even **after** mitigation. The population effects are even greater with a smaller starting population (see Figures 1 and 2 below). A smaller PCH population is likely by the time any significant development would occur in 1002 lands based on timelines presented in the draft EIS (e.g., ~8 years from present). The herd's current population exceeds historical population estimates for the herd since the 1970's.

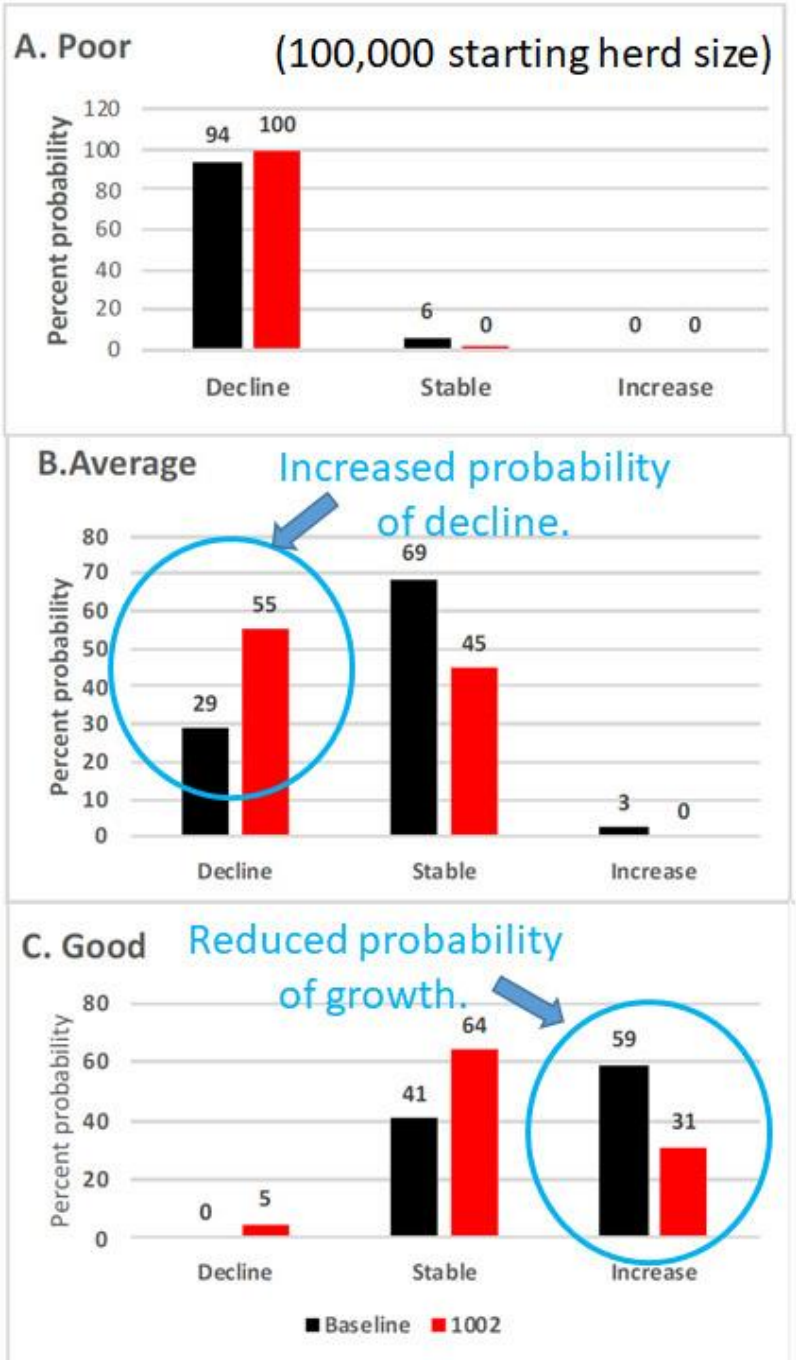

Figure 1: Probability of the PCH herd being in three categories of population change under current (black) versus full development (red) scenarios for 1002 lands. Stable is +/-4%, the observed range of natural variation; Decline or Increase is >4% change in the respective direction) is full development in the 1002 lands (red bars, '1002'. 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). Russell and Gunn (2019) 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 population fluctuations have shown). Refer to Russell and Gunn (2019) for a full explanation of this figure.

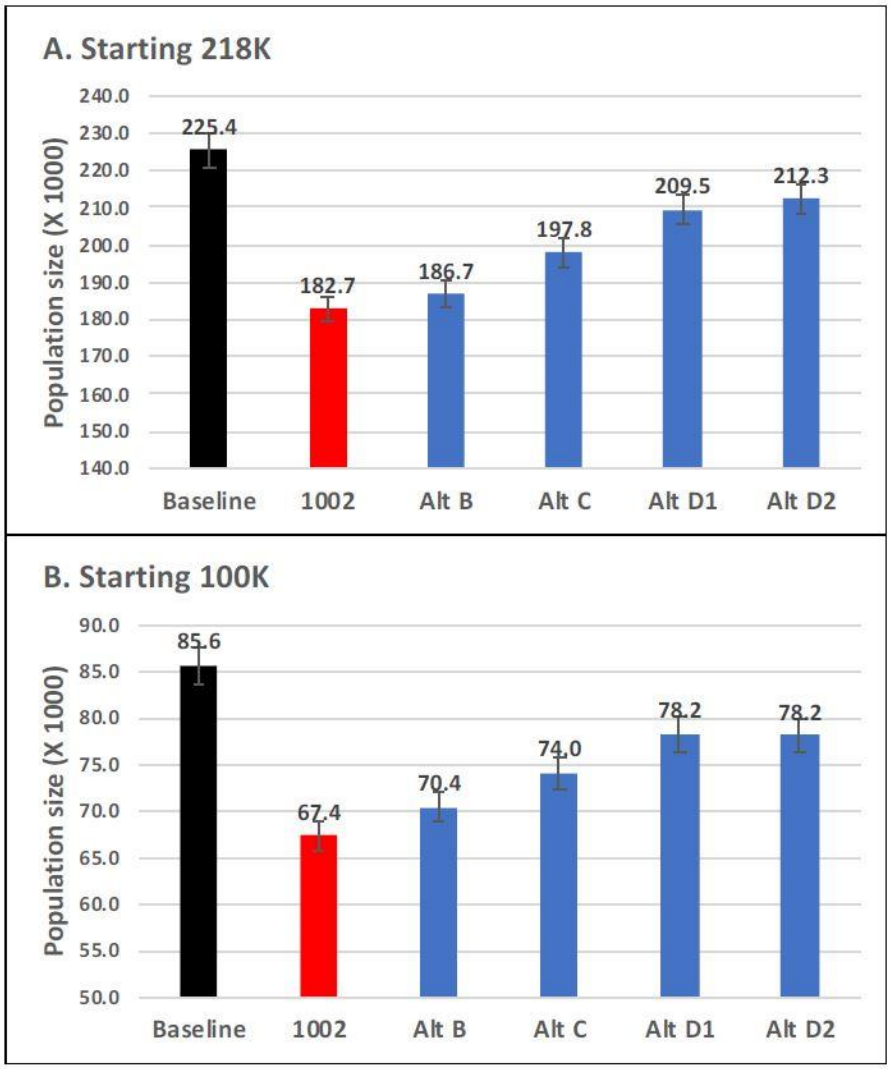

Figure 2: Projected population size of the PCH after 10 years from two initial starting sizes. Current on top panel, observed historical low for bottom panel under no development (black), full development (red), or the action alternatives presented in the draft EIS (blue). Note that potential additional harvest from allowing hunting from roads built for development (subsistence and off-duty oilfield workers) is not incorporated into this analysis. Refer to Russell and Gunn (2019) for a full explanation of this figure.

3.3 Post-calving movement in 1002 lands

The post-calving and insect relief (summer) periods align with aggregations of Porcupine caribou, also referred to as “super groups”, that use the whole of the 1002 lands.

The draft EIS acknowledges that aggregations move into and onto coastal areas, mountain ridges, aufeis, and remnant snow patches (see Section 3, page 105). However, design elements of the leasing program fail to take herd movements into account, and some information provided to support the conclusions of the draft EIS are incorrect. For example, the herd leaving the Coastal Plain by the end of June after 2000 (see draft EIS, Section 3) does not apply after 2014 when the herd once again shifted patterns towards an increasing use of 1002 lands, similar to what was noted between 1972 and 1999 (Russell et al. 1992). In 2018, most caribou did not leave the Coastal Plain until July 23-25, with some remaining much longer likely because of late spring and early summer conditions that year.

The herd’s use of the Coastal Plain is variable. There is little evidence in the draft EIS that considers caribou movement and potential impacts from oil and gas activity and infrastructure. Mitigations for the latter half of this period rely primarily on required operating procedure 23 and Lease Stipulation 6 in the case of Alternative D2.

The draft EIS also speaks to movement rates reaching an apex in July during peak insect harassment, but it does not provide descriptions or figures. Russell and Gunn (2019) provide detailed analyses of caribou movements during this critical period by describing aggregation timing, period, movement rate, pathway depictions, and identification of the spatial aspects of caribou movements and densities from 2014-2017. Knowledge of these caribou movement parameters is critical in scoping mitigation techniques and project designs. The draft EIS does not present data that quantifies or qualifies caribou movements beyond those resulting from seasonal range analyses recently updated by Suitor et al., (unpublished data) that were provided to the BLM and its consultants. While this analysis is useful in understanding the distribution of caribou, simple maps are presented and no further analysis of data using this dataset or available collar data is made. This is a major oversight and one that immediately calls into question the utility of all Alternatives presented since PCH is a primary value. As per Russell and Gunn (2019), movement analyses are not complicated and are extremely useful,

especially when combined with the seasonal range analysis presented in the draft EIS to gain a long-term perspective of use and risk for the herd.

Caribou movements during the oestrid harassment period are identified as unpredictable in the draft EIS (see Section 3, page 112) and a similar comment could be made during the earlier mosquito harassment period in late June and early July. During mosquito harassment, caribou make movements of up to 20 km per day with no specific directionality (Russell and Gunn 2019). The absence of this movement data and analysis, and the misleading way in which the oestrid harassment period is singled out could mean sufficient mitigation is not proposed during this key period of the caribou life cycle.

3.4 Failure to consider the effects of climate change

Climate change effects and potential impacts on PCH populations including potential trajectories are not adequately addressed, or in some cases not even attempted despite acknowledging the effects of climate change "could influence the rate or degree of the potential cumulative impacts" (draft EIS, Section 3, page 122).

Arctic warming has been measured at twice the rate of global averages resulting in long-term declines in snow cover, and an expansion and greening of tundra vegetation (Osborne, et al. 2018). This has direct consequences for wildlife populations, and in particular the PCH that relies on specific conditions for calving, post-calving, and insect relief. Griffith et al., (2002) predicts that an earlier spring will result in an increasing use of 1002 lands. Russell and Gunn (2019) confirm this prediction.

The draft EIS concludes that due to the complexity of climate effects on PCH, including beneficial and detrimental effects, it is impossible to model the net outcome (see Section 3, page 109). Climate change presents unavoidable uncertainty that will make management outcomes challenging. The supplemental analysis conducted by Russell and Gunn (2019) includes analysis that incorporates climate change. Their models demonstrate that there are considerably different outcomes depending on the long-term climate patterns that predominate over a decadal scale. As correctly stated in the draft EIS (see Section 3, page 110) "[d]evelopment alternatives that limit development to a smaller portion of previously used PCH calving grounds would allow caribou greater flexibility to adapt to changing conditions." However, the development Alternatives exceed the

minimum required leasing areas and do not provide caribou with greater flexibility to adapt. Further, there is no planning to address the future needs of PCH.

3.5 No analysis of transboundary effects

The *Agreement between the Government of Canada and the Government of the United States on the Conservation of the Porcupine Caribou Herd* (1987) is of particular relevance to the proposed development of the 1002 lands. Part 3 of this Agreement states the following points about conservation:

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

d. Where an activity in one country is determined to be likely to cause significant long-term adverse impact on the Porcupine Caribou Herd or its habitat, the other Party will be notified and given an opportunity to consult prior to final decision.

f. The Parties should avoid or minimize activities that would significantly disrupt migration or other important behaviour patterns of the Porcupine Caribou Herd or that would otherwise lessen the ability of users of Porcupine Caribou to use the Herd.

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.

The objectives of the Agreement clearly outline the transboundary nature of PCH and the importance of managing its habitat and use in a manner that considers transboundary effects. The Agreement seeks "[t]o ensure opportunities for customary and traditional use". Parties are to ensure "effective consideration" of proposed activities within the herd's range. The draft EIS acknowledges that the Canadian harvest accounts for 85 percent of the total harvest from 1992 to 1994 (see Section 3, page 168) and states that "Canadian communities would be among the most likely to experience potential indirect impacts due to their proximity to and reliance on PCH" (see Section 3, page 170). However, the draft EIS fails to complete any substantive analysis. For example, Appendix M provides detail on the

harvest and use patterns of the four Alaska communities, only identifying the Yukon and Northwest Territory licensed harvests in the summary Table M-21.

3.6 Misrepresentation of calving areas

PCH seasonal range data, specifically the concentrated calving areas in the 1002 lands, is misrepresented in the draft EIS due to an inaccurate description of the data and by failing to describe annual variation.

Calving seasonal ranges developed by the Government of Yukon (Suitor et al., unpublished data) and provided to the Bureau of Land Management and its consultants in July 2018, forms the fundamental basis of the Alternatives presented in the draft EIS. The 40 percent of years contour is used in draft EIS Alternatives, which consider the calving caribou areas and provide some level of protection for this vital lifecycle component. Figure 3 below depicts the sensitive habitats calving period map.

The draft EIS contains errors when describing caribou calving for the PCH. First, the data does not describe the concentrated calving area. The term "concentrated calving area" is generally used to describe kernel ranges that are estimated using the densest 50 percent of calving locations (Griffith et al. 2002). However, the data shared by Suitor et al. to the BLM and its consultants in July 2018 describe the frequency that 95 percent seasonal kernels of parturient cow caribou overlap during the calving period, defined as May 26-June 10. This will be included in the draft update of the Sensitive Habitats to the Porcupine Caribou Herd by the Porcupine Caribou Technical Committee that is currently underway. Regardless of this error, we support the use of this data as caribou are sensitive throughout the period, and not just at the moment that calves are born (Russell et al. 1993).

As a result of applying the general definition of a concentrated calving area, a second error appears in the interpretation and use of the shared data. Lease Stipulation 7 uses a polygon to describe the herd's primary calving habitat area, and relies on calving as a static spatial event. In the absence of other considerations, calving may be completely exposed to full development pressures as substantial inter-annual variation can occur (see Figure 3) as result of varying weather patterns driven by climatic cycles such as the Pacific and Arctic Decadal Oscillations (Griffith et al. 2002, Joly et al. 2011). Not only do weather conditions impact the distribution of the herd during spring migration and calving, but weather conditions can also have significant effects on demographic parameters for the

herd. For example, Russell and Gunn (2019) and Griffith et al. (2002) describe calf survival as a function of calving location. In particular, Russell and Gunn (2019) show increasing calf survival when calves are born in 1002 lands as compared to habitats further east. Their report also describes the necessity of caribou to calve where conditions are optimal, defined as the snow depth in mid-May on the Coastal Plain.

Selecting areas that are most frequently used by caribou for calving for protective actions is important. However, the current description of calving area in the draft EIS fails to capture calving that occurs west and north of the identified "calving area" (although this is recognized in Section 3, page 107). Spatially we can see in Figure 3 caribou calve in high densities west of the defined "calving area" including just east of the Canning River. In subsequent years, if calving occurs in these areas and Alternatives B, C, or D1 are chosen, calving caribou would be afforded no specific protective measures, but rather standard terms and conditions.

There is a need to identify protective measures throughout the proposed development as calving is not spatially or temporally static and may occur anywhere in the proposed leasing areas. In fact, the draft EIS identifies that with anticipated climate change patterns in the area, an increased frequency of calving can be anticipated in the future in the proposed leasing area (see Section 3, page 110). Alternatives do not consider this important aspect of PCH calving, nor do they provide any supporting information. A simple 40 percent contour of years is used without supporting data or analyses. This fact is acknowledged briefly in the draft EIS (see Section 3, page 107) when referencing a US Fish and Wildlife Service report (2015); however, this comment is the only acknowledgement of this important factor and the Alternatives do not seem to reflect these important aspects of calving ecology.

Lastly, the selection of the 40 percent of years contour to define the area that Lease Stipulation 7 applies to appears to be arbitrary (see draft EIS, Section 3, page 114). The basis of most caribou mitigations include Alternative D. No leasing and no surface occupancy are chosen based on the "primary calving habitat area". In particular, the use of no leasing areas is solely based on this parameter. However, an area that on average is used every third year (i.e., the 33 percent of years contour) is almost as important as one used on average every 2.5 years (i.e., 40 percent of years contour). The draft EIS selection of the 40 percent of years vs the 33 percent of years contour is not explained. It is unclear if the selection of the 40

percent of years will achieve effective conservation of calving. A simple review of the total acreage of each of these contours shows that selection of approximately 30 percent of years would meet the Public Law 115-97 leasing minimum requirement of 800,000 acre (see draft EIS, Section 3, page 114). The selection of the contour area for 30 percentage of years will minimize the "unavoidable adverse effects from the proposed oil and gas activities" (see draft EIS, Section 3.5) and support all Parties in meeting PCH conservation obligations. Similar selection issues are noted for the post-calving period (Lease Stipulation 8).

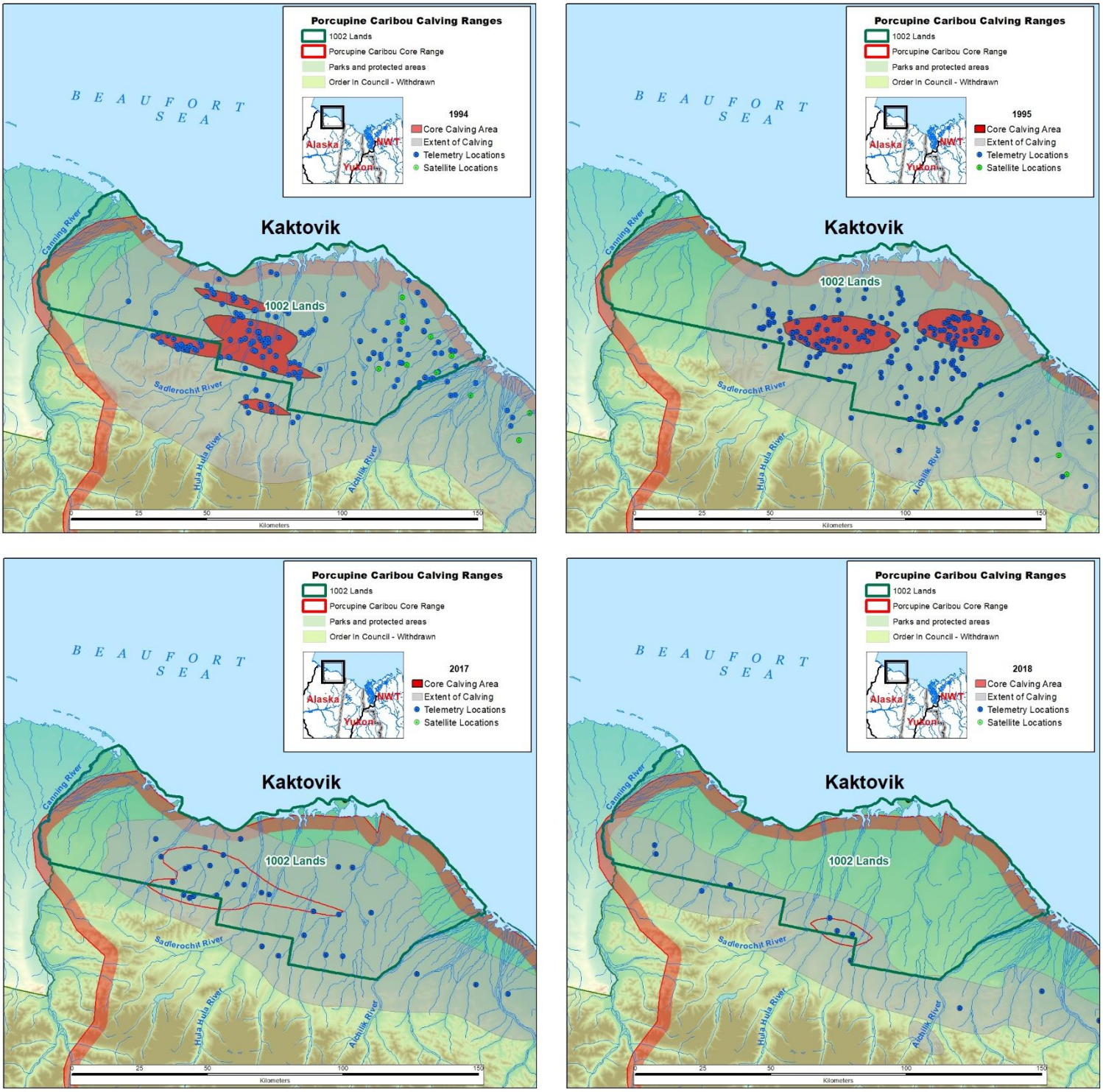

Figure 3 – Porcupine caribou calving varies annually as a result of changing snow conditions on the Coastal Plain. Here we provide 4 examples of years when Porcupine caribou calved further west than the "primary calving habitat area". In several cases this includes the core calving area used by

the herd in that specific year. Under Lease Stipulation 7, these caribou would have had no specific protections.

3.7 Reliance on habituation to oil and gas infrastructure

The draft EIS states caribou "may habituate to low-level constant noise and oilfield activities on roads and pads" (see Section 3, page 114); however, there is no literature that clearly supports that caribou will habituate or that speaks to the demographic outcomes (i.e., factors that influence population growth or decline) of potential habituation. Habituation to infrastructure is very unlikely based on experiences elsewhere and specifically because of the period in which PCH use the project area.

Other references throughout the draft EIS used to support this position may not be appropriate. For example, the draft EIS identifies Johnson and Russell (2014) when describing potential habituation of the PCH to infrastructure (i.e., the Dempster Highway in Yukon). However, this is likely a misrepresentation of the paper, which states this as a single hypothesis without any explicit testing. The authors were attempting to understand differences in avoidance of 30 kilometers between 1985 and 1998, and a reduction in avoidance of 18.5 km between 1999 and 2001. The draft EIS fails to acknowledge that the authors also identify two other equally probable and more likely hypotheses including that habitat recovery from seismic exploration conducted in the 1960's may have been responsible, and/or a major change in harvesting practices along the Dempster Highway during this period may have led to changes in caribou behaviour between these periods.

Although the draft EIS makes assertions regarding habituation of caribou to development, it also qualifies the statement as excluding cows and calves. Raising this potential outcome is misleading for the PCH as this herd will only be located in proposed leasing areas immediately prior to calving, calving, post-calving and early summer (all periods of sensitivity to infrastructure). In particular, the bulk of the herd will most frequently be present in the proposed leasing areas during post-calving (Russell and Gunn, 2019, Figure 11), which is precisely the period excluded (see draft EIS, Section 3, page 114). The habituation to infrastructure cannot be anticipated based on all evidence presented, including the draft EIS, and references should be removed or qualified with respect to PCH use of the 1002 lands.

3.8 Insufficient use and analysis of available data

The most recent PCH data (including all satellite GPS collar locations from 2012 to July 2018) was made available by Government of Yukon to the Bureau of Land Management and its consultants in July 2018 for the purposes of developing a draft EIS; however, data and much of the information presented in the draft EIS is dated and focuses on PCH analyses completed prior to the release of the 1002 Report (Griffith et al. 2002). While the analyses in that report are substantial and important, there is considerably more updated data describing the locations used by the herd, calving events and success, etc. — all of which relate to the herd's conservation requirements.

For example, since 2012, the Porcupine Caribou Technical Committee has focused on deploying satellite GPS collars that gather locations every 2.5 hours during the spring, summer, and fall periods when the herd may be present in 1002, and every 10 hours over the more sedentary winter period. Satellite GPS collar numbers have increased in recent years and are now maintained at approximately 100 satellite GPS collars. However, this data was only used in the draft EIS to describe the frequency of use of seasonal ranges (Appendix A, Map 3-21); an analysis that was provided by the Government of Yukon in July 2018 (Suitor et al., unpublished data). This data was not used in the draft EIS to analyze movement or assess occupancy. In addition to collar data, there is additional monitoring data for other caribou herds (i.e., Central Arctic Caribou Herd) from ongoing oil and gas operations in Alaska that could have been used in the draft EIS.

In the draft EIS, the baseline data for the PCH provided is minimal and insufficient to allow reviewers to assess the proposed Alternatives. An understanding of the ecology of a species, including its use of a specific area, is required to design successful management interventions. Yet information describing the PCH's use of the area is summed up in Section 3.3.4 (see pages 3-103 to 3-107) as well as three maps (see Appendix A, Map 3-21). This summary is inadequate to describe the PCH baseline as no spatial information is presented about the herd's migration in and out of 1002 lands, the basic relationships between the herd and environment are not examined, and detailed habitat use information is not described.

The draft EIS relies on a definition of calving areas as the basis for designing many elements of the four development Alternatives (e.g., "primary calving use area").

However, information describing calving is largely focused on information up to 2001, with the exception of Map 3-21 (see Appendix A), which displays calving frequency with data incorporated after 2001. While we agree that the frequency maps are useful for planning, they alone are likely insufficient to detail the requirements of the herd with respect to range use. Multiple data sets are available describing seasonal range use since the early 1970's. We provide an example of several products in Figure 3 to demonstrate how its absence in the draft EIS may result in poor design consideration.

There is no quantitative assessment of population-level impacts in the draft EIS, despite this being a critical element to allow for an assessment of impacts to subsistence users as required in the ANILCA Section 810 analysis. The draft EIS states that subsistence users may be impacted by changes in PCH distribution or abundance and by disturbance to subsistence activities. While minimal quantitative information is presented on distribution, no quantitative information is presented for population level impacts that could occur as a result of leasing activities as a result of Public Law 115-87.

In addition to not providing a quantitative assessment of population impacts, there is no effort in the draft EIS to examine the impacts through the full population cycle of the PCH. The PCH population has varied from a low of 100,000 caribou in the 1970's to its current high of 218,000 caribou. As demonstrated by Russell and Gunn (2019), the effects of development will vary based on the herd's population size; therefore an assessment throughout the life cycle of the herd is required.

3.9 Inappropriate comparisons to Central Arctic herd

The draft EIS uses the neighbouring Central Arctic herd (CAH) to demonstrate the effectiveness of proposed mitigation measures; however, the authors draw inappropriate comparisons for two reasons:

1. The differences between the CAH and the PCH are well documented. Due to these differences, it is unreliable to create direct linkages for management prescriptions for the PCH.
2. The comparisons drawn between the CAH and PCH are done using inadequate data and analysis from the CAH.

Differences between the herds are described by Russell and Gunn (2019) as follows:

- 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 according to the draft EIS (Section 3.3.4, page 3-104). The PCH is nearly 10 times as large, currently at 218,000 with the lowest estimated size of 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 Griffith et al. (2002) report was completed. This increases the PCH's relative exposure to development.
- The maximum growth rate of CAH has been more than double the PCH, according to the Griffith et al. (2002) report, (rates of up to 10-13 percent compared to 5 percent for PCH). This indicates that the CAH has a very different ability to recover from declines.
- Harvest of CAH was actively managed in the oilfields, where road hunting was limited (Alaska Department of Fish and Game 2003). The draft EIS 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 expect the zone of influence for the PCH 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, while CAH early calf survival is correlated with fall conditions the previous year. 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 the size of aggregations of PCH moving during the insect harassment season have no parallel in the CAH.

Given these significant differences, extreme caution is warranted in the use of mitigation that may not even be proven with the CAH let alone with the PCH (Russell and Gunn 2019). For example Cronin et al., (1994) stated that:

> "*Such large differences in herd and range size [of Western Arctic Herd and PCH] make extrapolating results from the CAH questionable. Other aspects of the annual cycle and ecology of these populations differ in ways that could affect application of effective mitigation measures…During the post calving and insect periods, groups of up to 50,000 PCH caribou could encounter oil fields. One cannot predict the effect of oil field structures on such large groups.*"

In this case, analysis of large groups of CAH caribou (>100 caribou) interacting with roads and pipelines is sufficiently rare to not permit quantitative analysis (Lawhead et al. 2006). With PCH, we can easily anticipate aggregations of tens of thousands of caribou interacting with proposed roads and pipelines as described by the draft EIS. Therefore, the parallels in the draft EIS between the PCH and the CAH are misleading.

As described above, data from the CAH is not directly comparable, as it is referenced in the draft EIS. Nonetheless, it is important to evaluate potential effects using the best available data from the region. With clear acknowledgement of the differences between the herds, data from the CAH could have been used to better characterize potential effects and the effectiveness of mitigation measures; however, the authors did not present or analyze the best available information for the CAH. Currently, data from the CAH is summarized in Section 3.19 (page 3-114), but the analyses referred to date back to the 1980-1990's with the most recent reports dated to 2006. This is despite the advent and common deployment of high resolution satellite GPS collars among the herd over the past decade.

A potential outcome from this lack of analysis is the application of a zone of influence of 2.49 miles. While this value is well established in Alaska's regulatory framework, it may not be applicable for the draft EIS. Significant data has been collected for the CAH that is not referenced or analyzed in the draft EIS to determine if this same zone of influence should be updated as a starting point in the draft EIS (Russell and Gunn 2019).

If CAH data is used as a starting point for PCH potential impact analysis, it is important to address the differences in how the herds aggregate. We know that

the post-calving and insect relief periods overlap, with large aggregations of caribou seeking insect relief and forage during a period of peak lactation requirements. Manseau (1996) found that dense aggregations of caribou were at significant energy deficits and were required to move substantially to meet their needs. As experienced with the CAH, Manseau's (1996) findings are critical when considering the efficacy of specific mitigations. However, the CAH and the PCH differ greatly in their orders of magnitude.

Cronin et al., (1994) state that caution is required when comparing the PCH and CAH owing to significant differences between them. In fact, Russell and Gunn (2019) demonstrate that it is likely that PCH aggregations or "super groups" exceed 100,000 in some instances whereas CAH aggregations are an order of magnitude smaller. With PCH in mind we can easily anticipate aggregations of tens of thousands of caribou interacting with roads and pipelines as described and anticipated by the draft EIS. A supplemental EIS should describe how these two herds differ in movement, use, density, and potential for interaction with infrastructure.

4. Polar bears

Polar bears are perhaps the most iconic wildlife species that people around the world associate with the Arctic. Similar to caribou, polar bears are a wildlife species inextricably tied to the national identify of Canadians. Indeed, of the world's 19 subpopulations of polar bears, 14 of them occur wholly or partially within Canada (Peacock et al. 2011).

Polar bears are also a species of international conservation concern. They are listed as Threatened under the United States *Endangered Species Act*, and within Canada they are listed as Special Concern in the Canadian *Species at Risk Act*. Polar bears are an apex predator that depend on the sea ice as a platform to hunt seals, their primary prey. Global climate change, however, has resulted in reduced temporal coverage of ice cover in portions of polar bear range. Moreover, predictions based on climate models indicate that losses in ice cover will continue. It is predicted that polar bear subpopulations will decline in association with the loss of sea ice (Regehr et al. 2010, 2017, Bromaghin et al. 2015, Atwood et al. 2016b). Polar bears are documented to have changed their behaviour in response to the loss of sea ice. For example, polar bears in the Southern Beaufort subpopulation have spent more time on land (Schliebe et al. 2008, Atwood et al.

2016a, Wilson et al. 2017), den more often on land (Fischbach et al. 2007), and have changed their diet and social behaviour (Rode et al. 2014, Miller et al. 2015, Rogers et al. 2015). While changes in the extent of sea ice cover is the ultimate threat to polar bears, proximate threats include the potential for increased human-polar conflicts as bears are spending more time on land (Atwood et al. 2017, Wilder et al. 2017).

The Southern Beaufort subpopulation of polar bears—a transboundary subpopulation shared between the United States and Canada—is likely one that will be most impacted by the loss of sea ice due to global climate change (Durner et al. 2009, Hunter et al. 2010, Regehr et al. 2016). As such, activities that threaten the persistence of polar bears ought to be clearly identified and avoided or mitigated to ensure that populations are not further impacted by humans. Human activities that may affect the survival and reproduction of polar bears have the potential to impact the persistence of this local population through cumulative effects that may be difficult to fully predict or mitigate.

The Arctic National Wildlife Refuge is an increasingly important area for polar bears of the Southern Beaufort subpopulation (Durner et al. 2006, Fischbach et al. 2007). A large percentage (77 percent) of Coastal Plain Oil and Gas Leasing Program occurs on lands identified by the US Fish and Wildlife Service as critical denning habitat for polar bears (see Map 3-24). Therefore, development in in the 1002 lands of the Arctic National Wildlife Refuge has great potential to affect the status of the Southern Beaufort subpopulation. This is particularly evident when considering the increasing use of the area by large congregations of these bears (Wilson et al. 2014, Miller et al. 2015), and the cumulative effects they are likely to face by sea ice loss and development in their critical habitat. Given the potential effects of the leasing program on polar bears in the 1002 lands (e.g., Amstrup 1993, Durner et al. 2006), a clear and comprehensive assessment of the potential impacts to the Southern Beaufort polar bear subpopulation is a prerequisite to development.

As a shared resource between Canada and the United States, and valued internationally, protection of polar bears in the southern Beaufort Sea from human developments is paramount. The draft EIS identifies polar bears as a “special status species” requiring a higher duty of care in the final EIS. The Government of Yukon agrees with this assessment, and believes it is essential that a higher duty of care for polar bears is continued through to the final EIS.

While there are likely to be a myriad of potential impacts of the leasing program to polar bears, the focus needs to be on the protection of den sites and the reduction of incidental take due human-polar bear conflicts. These are likely to be the most immediate threats to polar bears from development in the affected area. In our view, the draft EIS correctly identifies what are likely to be the major impacts to polar bears from the Coastal Plain Oil and Gas Leasing Program. Agreement on the key issues that need to be addressed in the final EIS is vital, and we believe that the draft EIS has focused on the two most significant impacts to polar bears from the leasing program.

What follows below are areas that the Government of Yukon believes represent major deficiencies in the draft EIS regarding polar bears. Further work is necessary with respect to these deficiencies to ensure that polar bears in the Beaufort Sea are not deleteriously impacted by the Coastal Plain Oil and Gas Leasing Program. The Government of Yukon requests a supplemental EIS with further consideration of how best to identify and mitigate the potential impacts of proposed developments in the leasing program area on polar bears.

4.1 Little acknowledgment of polar bears as a shared resource

While the draft EIS correctly notes that the Porcupine caribou herd is a shared resource between the United States and Canada, there is no similar recognition that polar bears are as well. Important international agreements on the conservation of polar bears exist, yet these are not discussed in Section 1.9, and are only rarely noted in the rest of the draft EIS (although they are listed in Appendix D). Moreover, given that polar bears in the Coastal Plain Oil and Gas Leasing Program area are a part of a shared subpopulation it is surprising that neither their legal status in Canada, nor the Canadian management plan that includes the Southern Beaufort Sea subpopulation (Joint Secretariat 2017), is mentioned or taken into consideration in the draft EIS.

A supplemental EIS needs to explicitly recognize the 1973 *Agreement on the Conservation of Polar Bears and their Habita*t, signed by all range states for the species—including the United States—in Section 1.9. The agreement provides provisions for the protection of polar bears from over harvest and habitat destruction (Prestrud and Stirling 1994). Specifically, Article II of the agreement states that: "*Each Contracting Party shall take appropriate action to protect the ecosystems of which polar bears are a part, with special attention to habitat*

components such as denning and feeding sites and migration patterns, and shall manage polar bear populations in accordance with sound conservation practices based on the best available scientific data." A supplemental EIS must explicitly outline measures that will ensure that the proposed Coastal Plain Oil and Gas Leasing Program is not in contravention of Article II of the agreement, particularly with respect to denning sites. The legal status of the Southern Beaufort Sea subpopulation as a species of Special Concern under Canada's *Species at Risk Act* should also be acknowledged.

A supplemental EIS also needs to more explicitly acknowledge the 1988 *Agreement between the Inuvialuit and the Inupiat on Polar Bear Management in the Southern Beaufort Sea*, which is a user-to-user agreement on the conservation of polar bears specific to the Southern Beaufort subpopulation. This model international agreement between Aboriginal People in Canada and the United States largely focuses on harvest quotas within and between the two nations, and highlights the cultural significance of this shared subpopulation to people in both countries (Brower et al. 2002). This international agreement needs to be specifically referenced in Section 1.9. More pointedly, however, the draft EIS fails to note how incidental take regulations may impact polar bear hunters in either nation.

Polar bears have been assessed as a species of Special Concern in Canada (Peacock et al. 2011), and are listed in Canada's *Species at Risk Act*. The legal status of the Southern Beaufort subpopulation in Canada needs to be acknowledged in the EIS. Similarly, there is no mention in the draft EIS of the 2017 *Inuvialuit Settlement Region Polar Bear Joint Management Plan* (Joint Secretariat 2017). This subpopulation-level management plan was developed by Inuvialuit and the relevant co-management councils, and should be acknowledged in the EIS.

It is important to acknowledge that polar bears in the 1002 lands are a shared population with Canada. Moreover, it is important to explicitly address how proposed development in the 1002 lands can be consistent with the management and conservation of this shared polar bear subpopulation in Canada.

4.2 Lack of Traditional Knowledge

There is a marked lack of Traditional Knowledge about polar bears in the draft EIS (notwithstanding map 3-39 in Volume 2). This is surprising given that Traditional Knowledge of bears in the Southern Beaufort and adjacent populations has been recently collected and published (e.g., Voorhees et al. 2014, Joint Secretariat 2015).

In particular, the report on Inuvialuit knowledge of polar bears in the Southern Beaufort Sea by the Joint Secretariat (2015) is a valuable source of information about the behaviour, movements, and habitat of polar bears near the leasing area. This report and other relevant sources of Traditional Knowledge need to be better considered and referenced by the EIS.

4.3 Effect sizes of alternatives are not addressed

A major shortfall is that the draft EIS fails to consider *what* the impacts may be to polar bears as a result of development of the Coastal Plain. Rather, the focus in the draft EIS is primarily on how to mitigate for potential impacts. While the mitigation of anticipated impacts is important, the Government of Yukon requests a larger consideration to explicitly address what the predicted impacts of Alternatives A to D are on the polar bear population and the communities that depend on them.

Without providing a quantified impact associated with the predicted effect of each proposed alternatives it is difficult to objectively assess the proposals put forth in the draft EIS. This deficiency makes it impossible to assess questions such as: What is the predicted impact of Alternative B compared to Alternative D on the Southern Beaufort subpopulation of polar bears? Answers to such questions are vital prior to proceeding with development on the Coastal Plain.

A suggested approach to overcome this shortfall in the draft EIS is to develop mathematical models of the potential impact of the various leasing alternatives on the polar bear population size and trend. Such models should explicitly examine the impacts of various leasing scenarios on the size, structure, and demography of the polar bear population. These models need to also consider the future viability of the population under various proposed scenarios and include a measure of confidence.

It cannot be emphasized enough that a modeling exercise needs to address the cumulative impacts of the leasing program on the polar bear population. That is, losses due to disturbance of denning females, loss of denning habitat, or bears killed in human-bear conflicts, for example, must be considered simultaneously in the models.

Given the dynamic socio-ecological nature of the region it will be hard to predict precisely what the impact to polar bears may be for each alternative proposed. For such models to be informative for decision-making, they should provide a range of scenarios under each alternative. For instance, the number of denning females

disturbed may range widely depending on how many den in the area, which itself is dependent on sea ice conditions. To account for this, the model for each alternative needs to consider historic or present conditions as well as future conditions under climate change scenarios.

The amount of scientific information that has been amassed in the past 40 or so years for the Southern Beaufort Sea polar bear subpopulation is perhaps greater than that for any other subpopulation. Additionally, there is an even greater wealth of Traditional Knowledge about bears in this subpopulation in both Canada and Alaska. This knowledge, as well as the expert opinion of local scientists and hunters, should be harnessed to develop models to explicitly assess the potential impacts of the leasing program on polar bears. Several population models already exist for this subpopulation (e.g., Regher et al. 2017), and a recent model for the neighbouring Chuckhi Sea subpopulation is informative in terms of integrating scientific and Traditional Knowledge (Regher et al. 2018).

4.4 Limited protection of denning areas

Den sites are particularly important to polar bears (Amstrup 1993, Durner et al. 2006), and they have been identified as critical habitat for the species in Alaska. The area affected by the leasing program is largely (77 percent) identified as critical denning habitat for polar bears. Protection of denning habitat is important from two different perspectives: a) ensuring that the physical denning habitat, and access to it, remains available to female polar bears, and b) avoiding disturbance to denning individuals. As such, considerable effort has been expended on the Beaufort Coastal Plain to better understand where and when polar bears den (Amstrup and Gardner 1994, Durner et al. 2001, 2003, 2006, Fischbach et al. 2007), the impact of human disturbance to denning polar bears (Blix and Lentfer 1992, Amstrup 1993), and how to locate denning areas (Durner et al. 2001, 2103, Amstrup et al. 2004, Liston et al. 2016). The draft EIS emphases mitigating potential impact of the Coastal Plain Oil and Gas Leasing Program on denning areas and denning bears. Despite this emphasis, the Government of Yukon identifies several serious concerns with the limited protection of denning polar bears and denning areas identified in the alternatives presented in the draft EIS.

Given that Alternative A is not being considered as a viable scenario, it is the Government of Yukon's view that only Alternative D provides a meaningful attempt to provide mitigations from the Coastal Plain Oil and Gas Leasing Program for polar

bears, particularly with respect to the protection of denning habitat and females in dens. Specifically, for Alternatives B and C, Lease Stipulation 5 - which aims to protect polar bear denning habitat - does not outline any project-specific requirements or standards. While timing limitations may apply under all alternatives proposed, without them being spatially bound to high probability denning areas, their effectiveness in Alternatives B and C are unknown. Alternative D is the only alternative that imposes, under Lease Stipulation 5, no surface occupancy restrictions in the immediate vicinity of identified polar bear dens. There are not any no surface occupancy restrictions for polar bear den sites in Alternatives B or C.

Even though Alternative D is the best of the three Alternatives considered in the draft EIS, it provides only limited protection of denning habitat. Maps 2-6 and 2-8 in Appendix A of the draft EIS clearly show that Lease Stipulation 5 covers only a small portion of the identified critical denning habitat that has been identified by the United States Fish and Wildlife Service (see Appendix A, Map 3-24). Our calculations indicate that Lease Stipulation 5 applies to less than 9 percent of the identified critical habitat of polar bears in the lease program area. This is insufficient, particularly because bears may be increasingly relying on denning areas on land in the 1002 lands. It is unclear why Lease Stipulation 5 would apply to only within 5 miles of the coast when Map 3-24 (see Appendix A) clearly shows denning areas identified by Durner et al. (2006) much further inland. In our view, polar bear den sites and denning areas should be subject to no surface occupancy and timing limitation restrictions regardless of where they occur within the identified critical habitat. That is, 100 percent of the identified critical denning habitat within the leasing program area should be subject to Lease Stipulation 5.

A further concern the Government of Yukon identifies with Lease Stipulation 5 is that the no surface occupancy and timing limitation restrictions apply to only within 1 mile of polar bear dens. Notwithstanding the anecdotal observations provided by Amstrup (1993) of disturbance to habituated bears in Prudhoe Bay, there is no scientific basis to suggest that polar bears not habituated to humans can successfully den in such close proximity to development activities. The Government of Yukon requests stronger evidence to suggest that 1 mile is sufficient to not damage or destroy denning habitat, or disturb denning females. In the absence of further evidence to support the 1 mile threshold, we suggest a more precautionary approach that creates significantly larger buffers around dens to ensure that

denning habitat remains functional to polar bears and ensures that denning females are not disturbed. Expert knowledge by polar bear scientists and local Inupiat and Inuvialuit is one approach to developing a more defensible buffer around dens for the application of Lease Stipulation 5.

A final consideration pertaining to Lease Stipulation 5 is that the science of locating polar bear denning habitat remains in its infancy and requires further research and development. This is notwithstanding the promising results from recent studies on the Coastal Plain (Durner et al. 2001, 2103, Amstrup et al. 2004, Liston et al. 2016). The Government of Yukon is concerned that it will be difficult to protect polar bear denning areas using Lease Stipulation 5 if we cannot yet adequately identify these areas in the leasing area. As such, we encourage a very liberal determination of polar bear denning habitat and the application of Lease Stipulation 5 until our knowledge of polar bear denning habitat matures and we can more reliably locate dens ahead of development.

Required operating procedures (ROP) 10, 15, 34, and 42 in the draft EIS aim to further protect the destruction of polar bear denning habitat or avoid human disturbance to wildlife in the leasing program area. These are important. The Government of Yukon suggests that ROP 34 should explicitly state no landing of aircraft within 1 mile of potential polar bear denning areas during the timing limitations identified in Lease Stipulation 5 (i.e., 30 October to 15 April). This change would ensure that denning females and their dependent cubs are not disturbed by aircraft landing near their dens.

In summary, the draft EIS falls short of providing effective and defensible protection of critical polar bear denning habitat and denning polar bears. These deficiencies need to be addressed in a supplemental EIS to ensure that critical habitat for polar bears is conserved in light of development in the leasing program area. The Government of Yukon strongly suggests the development of additional alternatives that protect more identified critical habitat than Alternative D. Additionally, Lease Stipulation 5 needs to be revisited to further examine the suitability and defensibility of 1 mile buffer around den sites.

4.5 Assessment of the potential impacts of incidental take

It may be reasonably expected that human-polar bear conflicts will increase with development in the lease area, and these may result in the killing of polar bears in the defence of human life and property. The draft EIS correctly puts an emphasis

on the reduction of the incidental take of polar bears. For example, ROPs 1 and 4 in the draft EIS give considerable attention to actions leases would need to take to reduce the potential of human-polar bear conflicts. Procedure 4, in particular, draws specifically on the United States Fish and Wildlife Service's Polar Bear Mitigation Plan for measures leases would be required to use to reduce the potential of polar bears killed as a result of conflicts.

Scientific evidence suggests that the Southern Beaufort polar bear subpopulation is likely to decline in the coming years as a result of sea ice loss (Regher et al., 2010, 2017, Atwood et al. 2016b). With bears increasingly spending more time on land in the region (Schliebe et al. 2008, Atwood et al. 2016a, Wilson et al. 2017), there is a substantial concern that conflicts between bears and people will increase (Atwood et al. 2017, Wilder et al. 2017), particularly with increased human development of key polar bear habitat. As a result of the Coastal Plain Oil and Gas Leasing Program, human-polar conflicts may reduce the survival of bears. Cumulatively, the loss of bears due to sea ice, harvest, and other ongoing factors, as well as any new and additional loss of bears due to conflicts with humans as a result of the leasing program, may have a detrimental impact on the population size and trend. Losses due to human-bear conflicts is likely to have an associated impact on local people as those losses would come off of the annual quota allocated to Inuvialuit communities in Canada for harvest (Brower et al. 2002).

The draft EIS dismisses the number of bears that may be killed as a result of conflicts with humans in the leasing program area as a trivial number. This is a major failing. Historic numbers of bears killed in defence of life or property in the southern Beaufort Sea are likely not a reliable indicator of how many may be taken in the future due to such conflicts. Polar bears in the Beaufort Sea are spending increasingly more time on land (Schliebe et al. 2008, Atwood et al. 2016a,b, Wilson et al. 2017) and are in worse health (Rode et al. 2015, Whiteman et al. 2018) then in the recent past, therefore, it stands to reason that more bears may encounter human developments, perhaps in search of human sources of food. This will almost assuredly result in greater conflicts with people.

While the emphasis on the reduction of human-polar bear conflicts through ROPs 1 and 4 is noteworthy, these procedures are operational in nature and the draft EIS does not address what the potential impacts of incidental take of polar bears as a result of the leasing program may be. That is, the key questions from an impact assessment perspective are largely not acknowledged or addressed in the draft

EIS. The key questions that should be asked in the EIS process need to focus on how would the predicted incidental take polar bears as a result of the leasing program affect the overall population size and structure, as well as the subsistence harvest quota by Inuvialuit and Inupiat hunters.

A suggested approach to address the predicted impact of incidental take on polar bears and the communities that depend upon them is to undertake a population modeling exercise that explicitly considers a range of bears that may be killed due to conflicts in the leasing program area. Analyses need to consider minimum and maximum estimated number of bears lost to incidental take because sea ice loss will likely affect the number of bears killed to an unknown extent. The model should predict the outcome on the status (size and trend) of the southern Beaufort Sea subpopulation under different scenarios, with the number of bears killed as incidental take forming the various scenarios. An example of such an approach already occurs for this population of bears, albeit in a slightly different context (see Regher et al. 2017). A supplemental EIS should provide a modeled, predicted impact of human-polar bear conflicts as a result of the leasing program on the status of the population as well as the harvest quota for local communities. From such models thresholds for considering various management interventions can be planned and implemented as necessary.

5. Wetlands

As stated in the draft EIS, at least 96 percent of the 1002 lands are classified as wetland:

"*Most of the landscape in the program area is considered to be jurisdictional wetland (USFWS 2018) and NWI data indicate that at least 96 percent of the program area is classified as wetlands or waters of the US; the 4 percent of the program area that is unmapped is also likely to consist of wetlands or waters*" (pages 3-67 to 3-68).

The Government of Yukon notes that both Canada and the United States are parties to the 1971 *Convention on Wetlands on International Importance especially as Waterfowl Habitat* (known as the Ramsar Convention). The Convention compels signatories in Article 3(1) to "formulate and implement their planning so as to promote … as far as possible the wise use of wetlands in their territory."

The Parties have taken steps to define how the term “wise use” should be interpreted and applied. Under the Ramsar Convention, recommendation 6.2 on Environmental Impact Assessment (adopted by the Parties in 1996) calls on agencies “to integrate environmental considerations in relation to wetlands into planning decisions in a clear and publicly transparent manner.”

The draft EIS’s treatment of wetlands is insufficient. Although the document recognizes that the project area is almost entirely wetland, there is no indication in the draft EIS of how the Ramsar Convention’s principle of wise use has been integrated into scenario planning or mitigations.

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