Porcupine Caribou Management Board
Submission to YESAB

YESAB file 2014-0112: Eagle Plains Multi-Well Exploration Program by Northern Cross Yukon: Review of potential impacts and mitigations with respect to the Porcupine Caribou Herd

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Northern Cross Yukon (NCY) proposes to conduct a 20-well drill program that includes the use of winter and all-season roads and to conduct extended flow testing and reinjection of well by-products. This document provides a review of the program relative to Porcupine Caribou Herd ecology and distribution, with regard to caribou harvest in the region, and research on impacts to caribou. Each section provides suggested mitigations and recommendations.

Background on the Porcupine Caribou Herd

The Porcupine Caribou Herd is a barren-ground herd that ranges between Alaska, Yukon, and NWT, which numbers approximately 197,000 animals (ADF&G 2014). During recent land use planning they were deemed "the most important and valued ecological and socio-cultural resource" in the North Yukon (NYPC 2009). Annual monitoring of various population indicators and distribution that has occurred since the early 1970s has resulted in a rich dataset.

The sensitive nature of the Porcupine Caribou Herd is of enough concern that the Porcupine Caribou Management Board (PCMB) worked with all the caribou herd's user groups to develop a harvest management plan and accompanying Implementation plan. If traditional caribou users are have agreed to restrict their harvesting activities then other human activities in the herd's range may need to be altered or even avoided to protect the herd. In the review of this project, we believe the conservation of the Porcupine Caribou Herd should be of utmost importance. Although winter is not considered as crucial as periods like calving (PCTC 1993), we note that "[w]hatever happens in the winter affects the calf survival, affects the pregnancy the next year and virtually every aspect of productivity from age of first reproduction to calf survival" (Russell 2000). Unfortunately, when the herd is not thriving, the First Nation and Inuvialuit communities that have used the caribou for centuries also suffer. The Porcupine Caribou Herd connects the community members to each other and to the earth. Continuing Porcupine Caribou traditions is critical for healthy communities in the herd's range.

Presence in the project area and potential impacts

PCMB (2013) provides a thorough review of caribou use of the project area. In summary, over the past 43-year period, Porcupine Caribou have used or passed through the project area in 19 of the 43 winters. During the 2013-14 3D seismic project

caribou were present in relatively small numbers (e.g. hundreds) throughout the project, as noted in the project proposal. Many more caribou also appeared to migrate through the area in November to more southern wintering areas along the Ogilvie River and surrounding habitats. This is consistent with past observations where caribou may remain in this area or choose to use other habitats nearby. Timing of the migration is also typical, though again it should be noted that caribou migration through or to/from the area can occur as early as September and as late as early May.

Impacts of the current proposed project will last for many years or even decades (e.g. all-season road construction, extended flow testing for several years, year-round road traffic). As such, we will reiterate impacts outlined in PCMB (2013) and paraphrased in the project proposal, but will attempt to identify where impacts, effects, and subsequent mitigation is required more or less rigorously for this specific proposal.

For this project, impacts can be categorized into the following:

- Direct injury or mortality
- Loss of habitat and habitat effectiveness
- Cumulative effects

Direct injury or mortality

As noted in the proposal, wildlife collisions as a result of the project could occur along the Demptser Highway and along roads and trails within the project area. Injury or mortality of animals can also occur as caribou flee aircraft, vehicles, all-terrain vehicles and skidoos. The actual construction and placement of a road along with its maintenance can increase these effects by funnelling animals, making it more challenging for them to enter or exit the road alignment, attracting wildlife to the road, and most notably, by providing access to hunters and predators.

Of the above impacts, the completion of all-season roads is likely the most significant adverse effect of the project and should therefore receive the greatest level of care in planning as identified in the North Yukon Land Use Plan. Impacts resulting from the creation of all-season roads are difficult to reverse.

The proponent indicates that “[o]nce the wells are drilled, show promising signs of hydrocarbons, a decision regarding upgrading the winter road to all-season access may be made”. This appears to be a reasonable approach for determining if an all-season road should be constructed to the first well sites selected by the program. However, no other rationale is presented to justify the construction of all-season roads. Construction of all-season access to drill sites off the main roads prior to knowing if these would be producing wells should not occur as they will impact the Porcupine Caribou Herd.

The number of access points to these new roads is also important as they will improve access to new harvest areas from the Dempster Highway. Generally for wildlife in the Yukon, the creation of access is the biggest impact of a project, particularly when that

access is into a new area currently unavailable to people. Recently published research has found Porcupine Caribou avoided the Dempster Highway shortly after its construction by 30 km and though after 20 years this distance had decreased to 18.5 km, the herd continues to avoid the highway (Johnson and Russell 2014). While it is unlikely that the road alone caused the avoidance observed in the above paper, the added effects of heavy harvest and road traffic in combination with the road appear to have created an effect that still can be measured 40 years after its construction. As such, minimization of available roads that may be accessed for harvest is a key mitigation.

Suggested Mitigation and Recommendations:

- When wildlife are encountered within a right-of-way, vehicles will stop until wildlife are clear of the right-of-way.
- Any aircraft used to support the program will adhere to directions outlined in the "Flying in Caribou Country" information brochure.
- An Access Management Plan shall be developed in collaboration with the caribou working group (defined below) and submitted for review and approval prior to or accompanying application for project authorization. The Plan should address how new information will be incorporated and implemented.
- In addition to offering the following mitigations for authorizations, we also recommend that the following are incorporated within the Access Management Plan:
    - Snow berms will be broken at intervals along the road to allow caribou and other wildlife the opportunity for safe escape.
    - Brush and debris cleared from right-of-ways will be cut or removed so as to lie flat on the ground surface.
    - The number or access points on the highway will be limited to a maximum of four but ideally will be the least number technically feasible.
    - Roads will be gated and signed to prevent public access to the road.
    - The first several hundred metres of road from the Dempster Highway will be decommissioned and made impassable when wells are suspended, capped, or abandoned for longer than one year.
    - Sequencing and decision points for construction of all-season roads will be explicit in authorizations to ensure all-season road construction to any given well is only allowed when year-round extended flow testing is imminent.

- Road traffic will be monitored year-round to determine whether mitigations to limit use are effective and the results will be reported annually. Where mitigations are found not to be effective, NCY will put into effect other mitigations as deemed necessary by the Land Use Inspector to restrict non-authorized traffic.
- Where vegetation has not invaded all-season roads at closure NCY will scarify the road bed to promote vegetation establishment.
- Decommissioning and reclamation of the roads after work is complete.
- Access monitoring and reporting is clearly outlined.

Loss of habitat and habitat effectiveness

This is a broad class of effects that all ultimately result in a reduction of habitat and/or body condition for a species or group of species. For caribou, this can have a detrimental effect if high-quality habitat is not available or if foraging decreases as a result of behavioural changes (White 1983, Russell 2014). Documented effects vary across studies and are likely dependent on the species, time of year, environmental conditions, intensity of disturbance, and learned experiences of a group or individual animal. Many of these are described in greater detail in PCMB (2013).

This project varies from previous ones in the Eagle Plains area as it marks a shift toward a greater exposure to repeated disturbances through time over a larger footprint. Previous well-drilling projects have occurred in a relatively discrete area and during a discrete period of time. The current proposal differs in that the project footprint is larger and the time period for activities is recorded in years and possibly decades. Loss of habitat has been well-documented to a number of stimuli including all-season and winter roads, exploration activities, historic seismic lines, mining and oil and gas extraction, and tourism. Russell (2014) summarizes the zone of influence (ZOI) from multiple projects impacting caribou, but most relevant to this project are displacement distances caused by all-season roads and point-source disturbances He identifies in his review a ZOI of 4 km during construction of all-season roads and 1.5 km during road operations for barren-ground caribou in the NWT and NT, noting that projects there have acknowledged that ZOI may reach out to 5 km for exploration activities and road components alone. Johnson and Russell (2014) found low densities or widely distributed but low use access roads and 2D seismic lines were avoided by the Porcupine Caribou Herd in this area by 11 km shortly after their development, reducing that avoidance to 6 km following at least 20 years of non-use. Avoidance of the Dempster Highway was 30 km shortly after construction, reducing to 18.5 km after the features had been present for at least 20 years.

The mining projects referred to above differ from oil and gas exploration and production as roads are typically a single linear feature going to a point where a single development of high disturbance occurs. For oil and gas activities, roads are networks

over a landscape that allow access to several drill sites or well pads. As a development matures, the density of roads increases, gradually infilling a landscape and reducing security habitat (Wyoming Game and Fish Dept. 2010), which is habitat that is beyond the ZOI from a road. The point disturbance from wells can be much lower than would be expected from a mining development however locations are typically widespread across a landscape. From a wildlife perspective, road networks, the number and location of access points from highway systems, and the traffic found on highways and local roads are expected to be the greatest impact to wildlife (see Sawyer et al. 2008). The effect generally stems from the perception of animals that roads are risky locations that should be avoided and is generally enhanced by traffic volumes (Frid and Dill 2002, Gavin and Komers 2006).

The above identifies potential sources of habitat loss for the herd and the need for mitigation and best management practices that reduce caribou avoidance of the project area. It is also important to consider impacts to caribou that are not displaced by activities. Though the majority of caribou may decide not to use habitats adjacent to activities or areas of past disturbance, populations exhibit a wide range of behaviours and tolerances to disturbance. Individuals within a population have varying responses to disturbance; some individuals may avoid development and others may not, but both responses have an impact. In both cases, a reduction in food intake can have appreciable affects to individuals. For those left in a ZOI in many ways the impact is much easier to measure. Small changes in the ability to forage on the highest quality of vegetation available during winter can have appreciable impacts on not just fetal growth but also the ability of cows to produce milk the following summer, which in turn, affects calf growth and ultimately survival (White 1983). For a caribou that does not displace from a disturbance and decreases their intake of high-quality forage, there is clearly an impact and that impact extends not just to an exposed individual but also to their young birthed the following year.

For the Beverly-Qamanirjuaq herd, Russell (2014) examined this effect in detail by modelling the exposure to development within zones of influence over a period of 13 days to assess the loss in mass of lactating cows and their calves. He found that cows were most susceptible to loss of mass during the fall/rut period followed by post-calving, spring, late winter, calving and summer. Calves on the other hand were predictably most susceptible to mass loss during summer and post-calving, with few effects the remainder of the year. The impact of exposures resulted in small decreases in pregnancy rates and for calves an increase in overwinter mortality. For caribou undergoing higher rates of exposure over the fall and winter periods, it is expected that impacts will be much greater. Where possible, large groups of caribou should not be exposed to repeated disturbances to mitigate impacts and to ensure effects at an individual and population level are negligible.

Information Gap:

- Table 3-4 describes traffic volumes; however, the high and very high class have the same thresholds making it impossible to understand the full range of traffic to be expected. The table requires further clarification.

- No information is provided regarding reinjection of by-product (e.g., natural gas, water) into suspended wells. For caribou, significant adverse impacts could be caused by this additional component of the project due to increased road requirements or potentially pipelines.

- The above gaps have made assessing the impacts of total traffic volumes from the project impossible. Should volumes remain in the range provided by the proponent, we believe the enclosed mitigations would be sufficient; however, considerably higher traffic volumes may require additional mitigation to be considered should other significant adverse impacts be identified.

Suggested Mitigation and Recommendations:

- NCY will suspend activities if it is determined, through collar monitoring conducted in collaboration with Environment Yukon that the Porcupine Caribou Herd is wintering or migrating through and/or within 30 km of the project area.

- When wildlife are encountered within a right-of-way, vehicles will stop until wildlife are clear of the right-of-way.

- Any aircraft used to support the program will adhere to directions outlined in the “Flying in Caribou Country” information brochure.

- Snow berms will be broken at intervals along the road to allow caribou and other wildlife the opportunity for safe escape.

- Brush and debris cleared from right-of-ways will be cut or removed so as to lie flat on the ground surface.

- The proponent will initiate aerial surveys to determine the numbers and locations of Porcupine Caribou when: (1) 500 or more caribou, or (2) one or more GPS-collared caribou, are known to be within 30 km of ongoing or imminent project activities. Such surveys will be conducted monthly if the conditions/circumstances that initiated the survey continue to exist.

- The proponent will suspend drilling and road construction when 250 or more caribou (as determined by aerial surveys or direct observations) are found to be within 4 km of these activities. The suspension of activities will remain in effect until less than 250 caribou (as determined by the aerial surveys or direct observations) are found to be within 4 km of drilling and road construction activities; and resumption of drilling and road construction activities shall require the approval of the Chief Operations Officer.

- The proponent shall suspend operation of drills and road construction activities when 25 or more caribou are known to be within 600 meters of a work site.

Cumulative effects

Beyond direct impacts from a single project, impacts can be cumulative. The relationship and how each might offset or carry over to another aspect of caribou ecology is complex. Even more challenging is the integration of environmental change. For example, in the range of the Porcupine Caribou, various climate scenarios have predicted an increase in fire regimes that will reduce the amount of wintering habitats for the herd by up to 21% (Gustine et al. 2014). This will place a much greater importance on any remaining habitats to ensure the herd remains resilient. The combination of losses of habitat from industry, highways, and forest fires is complex and their population implications are even more challenging to understand.

To make matters more difficult, we also know that management must consider all levels of population size when considering the life of a project — for example, the herd was known to number only 123,000 caribou in 2001 but has increased to 197,000 caribou in 2013 (PCMB 2013). Within the lifetime of impacts caused by this project, it is extremely likely that the herd will once again decline to a population low before hopefully rebounding yet again. Assessing some of these impacts in a cumulative manner is challenging but now becoming possible as demonstrated by Russell (2014). The PCMB will continue working with partners to develop these models in the coming years to help identify the principles by which development should occur to ensure cumulative effects do not have significant impacts on the herd.

Until we better understand the cumulative impacts on this herd, we acknowledge that work completed by the North Yukon Land Use Plan has identified thresholds of linear disturbance for landscape management units (LMU) including LMU 9. While these do not necessarily consider the full range of potential cumulative impacts that may occur from a project, a series of projects or environmental events, these remain an excellent starting point.

Suggested Mitigation and Recommendations:

- NCY in collaboration with responsible bodies (e.g. YESAB, Yukon Land Use Planning Commission) will ensure the proposed project does not exceed the cumulative impact threshold for this land management unit.
- A fuller assessment of potential cumulative impacts is required than currently presented.

Adaptive Management

In 2013, YESAB 2013-0067 resulted in multiple commitments from NCY, including the following with respect to adaptive management of caribou:

- A working group was established that was comprised of a number of parties, including the PCMB.
- NCY committed to initiating discussions on long-term monitoring in November 2013.

The working group met a number of times over the winter of 2013-14. Unfortunately, no terms of reference were developed for the group, and possibly as a result, many of the members became dissatisfied with the process and outcomes of the meetings. The PCMB and other members of that group felt very strongly that NCY did not respond to recommendations by the group in a way that was beneficial for the Porcupine Caribou Herd and that respected cooperative management principles. For example, when caribou were known to be in the project area after the commencement of the project, the working group requested an aerial survey be done to determine caribou numbers and proximity. This request was repeatedly denied, as NCY unilaterally deemed it unnecessary and too costly.

With respect to commitments made to enter into discussion on long-term monitoring, no activity has occurred to date other than statements made that NCY would not do any long-term monitoring associated with the seismic program in 2013-14.

Due to NCY's reluctance to implement any recommendations not specifically identified in a Decision document, the PCMB strongly recommends that specificity be provided regarding important actions or definitions, such as how many "a significant number" of caribou refers to, or the proximity (in metres) that caribou need to be in relation to project activity to trigger specific actions or mitigation measures.

Suggested Mitigation and Recommendations:

- A caribou working group will be established with a terms of reference that addresses the following:
    - Objectives of the group
    - Work of the group
    - Implementation of recommendations
- The caribou working group should include representation from First Nation Governments with Traditional Territories overlapping or immediately adjacent to the project area, appropriate Government agencies and Boards or Councils including PCMB.

- The proponent will submit a wildlife effects monitoring plan that includes standardized wildlife observation and monitoring protocols for review and approval prior to or accompanying an application for authorizations.

- The proponent will submit weekly wildlife observation reports and annual wildlife effects monitoring reports and ensure the PCMB is included in the distribution of these reports.

Harvesting

Porcupine Caribou are the most valued ecosystem component in the project area and are likely one of the most valued ecosystem components for the whole northern Yukon, portions of the NWT and Alaska. Harvesting provides communities with traditional healthy food options that are directly tied to the maintenance of cultural practices, as the communities, First Nations, and Inuvialuit utilize this important resource. As such, harvesting is a critical aspect in managing the herd, as demonstrated by the unique Porcupine Caribou harvest management plan. As such, we would like to clarify multiple statements found in the proposal.

- NCY asserts that "[t]here is no hunting allowed on the NCY property". For clarity, under the Yukon's *Wildlife Act* section 13(1):

  > A person shall not hunt or trap wildlife within one kilometre of a building which is a residence, whether or not the occupants are present in the building at the time, unless the person has the permission of the occupants to do so.

  NCY may decide to not provide permission to people to hunt within one km of their main camp located at kilometer 325 of the Dempster Highway; however, NCY does not have the right to limit hunting in the project area as a whole.

- The PCMB supports NCY's commitment to not allow employees to hunt while on a work rotation.

- Page 117, Table 8-1 is misleading as it only represents licensed harvest in the particular four subzones and is limited to 2009 to 2013. While the data are likely representative of licensed harvest for most species for licensed hunters, they are not representative of caribou harvest. Caribou harvest is "highly dependent on caribou distribution, road conditions, weather, etc." (PCMB 2013). The period selected has seen some of the lowest use by Porcupine Caribou of the project area since systematic monitoring of the herd was initiated in 1970. Because we expect that the herd will again use this area, it is important to be careful in selecting how data is used to represent statistics like harvest. For example, using licensed harvest since 1979 would find harvest totalled more than 310 caribou in subzones 155 and 156 alone (PCMB 2013). Most of this harvest occurred in a few specific years.

- Page 122, section 9.1.1 discusses impacted harvesting opportunities only for VG, NND, TGC, and TH harvesters. This is incomplete, as beneficiaries of the *Inuvialuit Final Agreement* and all Gwich'in Participants have rights to harvest in the region extended through the *Porcupine Caribou Management Agreement*.

- Further in this assessment, it is mentioned that "PCH moves through the area during the fall and into the early winter when activities will be suspended as NCY waits for snow to construct access." As noted earlier in the proposal, Porcupine Caribou may be present in the project area from September through May, and in fact, during the 2013 seismic project were present during the entire length of the program, as noted in Appendix O. Timelines indicated by NCY's proposal do not concur with this assertion, as summer programs are expected to last into November when caribou should be present if they intend to winter in the area or in habitats farther south. During the 2013-14 3D seismic program, harvest did occur throughout the length of the winter within proximity to the project and likely totaled in the thousands of caribou (please note this number will be better identified during the PCMB's Annual Harvest Meeting in February 2015). Based on reports and firsthand observations, harvest in the seismic area did not intensify until April when significant harvest did occur in the project area. In winters when Porcupine Caribou numbers are high in this area but not readily available elsewhere, it can be expected that harvest could number into the hundreds or even the thousands in the project area. We also note that the presence of all-season roads would negate the seasonality of the program, making it year-round, thus potentially extending the timing of impacts. NCY suggests that "[i]n the event the ability to harvest is impacted by the proposed Project, FN have the potential to hunt elsewhere, or at another time." The PCMB is very concerned about this statement, in light of the points noted above. As indicated, harvesters need to be able to hunt when and where caribou are available — including the project area — as it is *their right* to do so when conservation is not a concern.

- Appendix E is a plan to avoid impacts to Porcupine Caribou harvesting activities. In the plan, it discusses the development of a baseline study of hunting activity in the Eagle Plains area in the middle of winter. Care should be taken before instituting such a study to ensure study design is sound and that actual baseline conditions are being captured. Any study that wishes to assess harvest in this area will require a long-term study to provide any meaningful data for the reasons described above (e.g. caribou presence, road conditions, timing, etc.). This should be developed in conjunction with the caribou working group.

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