



Porcupine Caribou Management Board

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April 27, 2007

Spring 2007 Disposition Public Notice and Review
Government of Yukon, Department of Energy, Mines and Resources
Oil and Gas Management Branch
Suite 300, 211 Main Street
Whitehorse, Yukon Y1A 2B2

To Whom It May Concern:

Re Spring 2007 Oil and Gas Rights Disposition Review

The Porcupine Caribou Management Board (PCMB) would like to address all the Requests for Posting in this one single letter rather than addressing them separately. We appreciate that there are many factors that you will weigh in making your recommendations for oil and gas rights dispositions, and that the issues that concern our board are only part of that big picture.

The PCMB supports responsible development. While none of these RFPs stands out as being objectionable, it is the potential for cumulative impacts of the RFPs that concerns the PCMB. Twenty-four projects in the Eagle Plains area would very likely put serious stress on the Porcupine Caribou Herd. While we are not in a position to propose a limit on the quantity of dispositions that are approved, we instead make recommendations to help you in prioritizing.

In our submission, we will outline our concerns for you to bear in mind with all the other factors that you must consider when evaluating each project based on its individual merits. Armed with this information, we trust that you will approve only the most promising projects, and only the projects that are least likely to cause ecological damage.

The declining population of the Porcupine Caribou Herd means all projects that might affect the herd's use of its range, including all 25 of the RFPs, require caution. The PCMB is concerned about the impacts any of these projects will have on the Porcupine Caribou Herd. It is important to be aware that the PCMB has recently passed a resolution noting, among other things, that the herd is in immediate need of conservation.

The Porcupine Caribou Herd's population has been declining for at least 12 years, possibly as long as 17 years -- a worrying pattern. When the first reliable count was performed in 1972, the herd size was estimated to be about 105,000 caribou. The herd size grew steadily at about five percent each year until it reached 178,000 caribou in 1989. Other large migratory herds in the north also grew in population during this time period. Then the Porcupine Caribou Herd declined by three to four percent per year from 1989 to 1998. From 1998 to the last census in 2001, the herd declined at a rate of 1.5 percent per year to 123,000 caribou. Migration patterns and weather conditions have thwarted census attempts for the past four years, but the PCMB estimates that the herd's current population might be as low as 110,000 animals, based on annual recruitment and survival surveys.

The Board notes that wildlife tend to go through cycles of increasing and decreasing populations, and we should expect fluctuations in population. However, the Board believes this herd's population decline may be in excess of normal fluctuations. Most arctic barren ground caribou herds tend to follow a similar cycle; however, the Porcupine Caribou Herd's population cycle has not been consistent with the other herds. The Porcupine Caribou Herd increased at a slower rate than other herds in the 1980s. Then, in the 1990s, the Porcupine Caribou Herd's population peaked sooner and started to decline earlier than other herds. Until a census proves otherwise, the Board must manage the herd in a manner that is mindful of the indication that the population is declining. The Board is confident in the census techniques, and confident in the findings.

This matter of declining population is of enough concern that the Board is working with all of the caribou herd's user groups to develop a harvest management strategy as one means of protecting the herd. If the traditional caribou users are being asked to alter their harvesting activities, it goes without saying that other human activities in the range of the herd need to be altered or even avoided for the good of the Porcupine Caribou Herd. In this case, we believe that conservation of the herd should be of utmost importance when you consider the dispositions.

Any of the dispositions could potentially affect the health of the herd. The current decline of the population suggests that the herd might not be as resilient to the stresses of development as we would like to see. In addition to direct impacts of human activity, the projects also affect the herd's habitat. In turn, the wellbeing of the herd affects the ability of numerous native groups to participate in Porcupine Caribou traditions that have bonded the community members together as a community and to the earth for millennia. Instead of dealing now with specific types of projects, we would like to address impacts of any kind of development on the herd's habitat.

Increased activity in the herd's range will pose a disturbance for the Porcupine Caribou Herd as a result of:

1. Increased levels of traffic,
2. Increased recreational activity,
3. Increased harvesting interests on caribou along the Dempster Highway related directly or indirectly to the projects,
4. Increased habitat fragmentation,
5. Increased risk of wildland fire,
6. Increased risk from invasive species,
7. Increased pressure on co-management boards, and
8. Cumulative impacts.

1. Increased levels of traffic

(a) Direct loss of caribou due to road-kills or injuries

Information on vehicles colliding with caribou is largely anecdotal, although patrolling Conservation Officers record incidents as they encounter them. There are unsubstantiated reports of larger vehicles such as tractor-trailers hitting and killing many caribou at a time. These types of incidents are disturbing to hear about but can exaggerate the magnitude of the problem. In 1999, Department of Highways personnel working along the Dempster Highway estimated the number of caribou killed in vehicle collisions. In "typical" years where there are many caribou crossing the road and a large number of vehicles traveling the road, their estimate was about 100 caribou per year. Conservation Officers in the region think that the number of collisions recently is much less than it has been in the past. Reasons for this apparent reduction in incidents are unclear. However, it is intuitive that if more vehicles are using the highway, it is likely that more caribou will be hit by vehicles, especially if the snow is deep, because caribou may be reluctant to leave the road surface when approached by vehicles.

For many years, YTG and the PCMB have been aware of locals' concerns regarding caribou mortality from vehicle collisions. Various options have been proposed to try and reduce the number of caribou killed, but none have been implemented. If the projects proceed, a decision will have to be made quickly. One common suggestion is to erect signs when caribou are near the road. Signage along the highway is discouraged for several reasons. First, signs, especially large ones, are sometimes viewed as visual litter. Along the Dempster Highway where not even power or phone lines are present, natural viewscapes are particularly valued. In addition, it has been our experience that we often need to provide a fair bit of background to an issue to make the message clear. Unfortunately, this results in a sign that can't possibly be read by people traveling at highway speeds. Too much text usually means that travelers will not even read them. Another problem is that regular travelers will often stop noticing signs over time, including the wildlife alert signs used elsewhere in the territory.

The Yukon portion of the highway is almost 500 kilometers long and caribou may be found in any portion of that area during the fall and winter months. It has been proposed that portable alert signs with a striking or unique design be placed when caribou arrive in an area, and the signs would then be moved as the caribou distribution changes. This would be labor intensive, but perhaps the best option for on-the-ground warnings of the presence of caribou near the road. Temporary flashing signs can deliver a short message such as "Caution: caribou crossing."

A pamphlet outlining very general information may be useful to let inexperienced travelers know where and in what season caribou may typically be encountered and how to reduce the risk of hitting a caribou on the road. These pamphlets could be widely available to companies and individuals providing support services to the projects.

(b) Indirect loss of caribou due to displacement of caribou from roads (by avoidance) resulting in reduced availability of habitat

Caribou behavior related to traffic or other human-induced disturbance is difficult to study. Generally, researchers have found that caribou (*rangifer* species) react more strongly to different human sources of disturbance in the springtime during calving than at other times of the year. The caribou will tend to appear in the Eagle Plains area during winter, when they are more resilient, but the cumulative effects of many projects should not be underestimated.

There have been several studies of Porcupine Caribou near the Dempster Highway based on traffic levels at that time. Conclusions based on field behavioral studies done in the 1970s and 1980s are weak, but they reported little effect on caribou. These studies were done during times of relatively little traffic and hunting activity. Some local people report that high levels of hunting and traffic can and have turned migrating caribou away from the highway in the fall, thereby effectively preventing caribou from reaching winter ranges to the east of the highway. It is also thought that it is more difficult to turn caribou migrating caribou in the spring since they are intent on moving to the calving grounds. We believe that hunting activities are relatively more disturbing to caribou than traffic along the highway. In 1998, the PCMB responded to this concern by recommending a hunting closure for one week in the fall. One-week hunting closures have been announced each year since that time.

There is some evidence that caribou avoid the immediate area of the highway (within five kilometers); however, it is thought that this avoidance is in response to hunting, especially snow machine assisted hunting. During the one-week hunting closure, caribou can be present in very large numbers in the road corridor, but most disappear once hunting resumes. Vehicles do travel the highway during the closure. Many hunters and highway travelers report some avoidance of traffic by caribou, but these behaviors are of relatively low magnitude and short term, and caribou do eventually cross the road once the vehicle has passed and no more traffic comes. The worry is that the frequency of vehicles may rise to the point where caribou will not have the opportunity to cross the road between encounters with vehicles. There may be confounding effects between hunting and traffic; caribou exposed to much hunting seem to be more wary of traffic

and will react more strongly to a vehicle on the highway whether or not that vehicle is related to hunting.

Disruption to breeding activities is also a potential problem. Migration often coincides with the period of the rut, which means it is possible for the caribou to be rutting when they arrive at the highway. Local observation/opinion as well as monitoring of birth rates indicate that the current level of human activities that the caribou experience has not had an effect on breeding.

While the extent is unclear, it is clear that caribou tend to avoid human activity. The most recent *Rangifer Report* noted that “Around the mid 1980s, focus shifted to regional scale landscape ecology studies, reporting that reindeer and caribou reduced the use of areas within 5 km from infrastructure and human activity by 50-95%, depending on type of disturbance, landscape, season, sensitivity of herds, and sex and age distribution of animals.” (Ingunn, V. and C. Nellemann. 2007. Impacts of human activity on reindeer and caribou: the matter of spatial and temporal scales. The 14th Nordic Conference on Reindeer and Reindeer Husbandry Research. Vantaa, Finland. 20-22. March 2006).

2. Increased recreational activity

The Porcupine Caribou Herd is becoming famous worldwide, and people enjoy viewing caribou. Again, relative to hunting, these human behaviors are thought to be much less disturbing to caribou. In many other areas where hunting activity does not occur (e.g., parks in northern B.C.), caribou seem to readily habituate to vehicles and people. In the past, PCMB members from the caribou user communities have discouraged territorial governments from promoting caribou viewing during the hunting closure. Frequently community members have stressed that “the point is to leave the caribou alone – leave them alone and undisturbed.” Despite this concern, many viewers are drawn to the highway to view and photograph caribou during the one-week closure, and Government of Yukon has made efforts not to promote caribou viewing but to manage the viewing activity that’s already occurring. Hunters and viewers consider human viewing activities (i.e., vehicles and people in the field but no shooting) to be much less disturbing to caribou than hunting related activities.

Caribou viewing and hunting are not really compatible activities. There can be a safety issue, as quite often when the caribou are concentrated, hunting activity also concentrates. Also, caribou viewers prefer to watch and film caribou in an as-close-to-natural state as possible. Filming hunting activity and fleeing caribou is not really what they are looking for. It is only natural that caribou viewers would be attracted to the one-week closure: lots of caribou and no hunting.

The Dempster Highway itself is unique, as it is the only highway in Canada that crosses the Arctic Circle. It also bisects the Canadian portion of the Porcupine Caribou winter range. Most years, at some point during the late fall, Porcupine Caribou arrive somewhere along the Dempster Highway. The caribou may not remain close to the highway for the duration of the winter months (although some years they do). During years where Porcupine Caribou cross the Dempster to the east of the highway in the

fall, they will recross the highway the following spring on their way back north to the calving grounds (though only if they have wintered east of the road).

The use of motorized vehicles off of the roadbed of the Dempster Highway is limited to snow machines; therefore, ATVs or trucks off the highway is not a significant issue. Snow machine use by recreationists is likely not a serious problem, particularly if the users do not chase or harass the caribou (an illegal activity, but it has been reported nonetheless). Even hunters who use snow machines acknowledge that the use of snow machines by hunters is a major factor in changing caribou behavior near the highway. However, caribou react differently if a snow machine operator is hunting (approaching, stalking) or is simply passing by. If the snow machine is not actively hunting, caribou seem to be vigilant but do not exhibit avoidance behaviors.

Recent concern about the effects of snow machines on vegetation and habitat along the Dempster Highway has resulted in two studies. One study is looking to quantify the effects of recreational snow machine use during late winter on vegetation, and another is to quantify the effects of snow machine assisted hunting during early winter months on vegetation, snow and permafrost.

3. Increased harvesting interests on caribou

Harvest and issues around hunt management as a result of the access provided by the Dempster Highway is probably the largest management issue at this time. For caribou in general, the consequences of road access into or through the winter range can be substantial. The potential of over-harvest and related issues is a concern, and hunting should be actively managed in these circumstances.

For Porcupine Caribou, the Dempster Highway provides important access to the herd by many user groups, including subsistence hunters. Land Claim Agreements in the Canadian range of the herd assure regional subsistence harvesters preferential access to caribou. Non-subsistence hunters, a small portion of Porcupine Caribou Herd users, are regulated, but regulations are considerably more lenient than for other smaller caribou herds in Yukon.

Harvest levels are not known with any precision, and the lack of data prevents a full evaluation of the contribution of harvest to the documented population decline. As noted, however, we do believe that this herd has continued its decline since 2001 and the uncertainty around the herd status may mean we are coming to the point where we need to change the harvesting regime. The PCMB has been leading an initiative to develop a Harvest Management Strategy for the herd in Canada.

Harvest by employees and support personnel for oil and gas projects in Eagle Plains (assuming they qualify to hunt this herd) could represent an added burden to a herd that is already under considerable pressure, and this added harvest will need to be managed.

4. Increased habitat fragmentation

Access to project areas will increase habitat fragmentation. Whether all-season or winter-only roads are used, roads and trails fragment the habitat of the herd. Projects that require cutting seismic lines will fragment the landscape further still, even though modern practices tend to minimize this damage. This can affect herd movements, change how the herd uses the land, and provide predators easier access to the caribou.

With increased ATV and snow machine use for exploration as well as recreation, more tundra could be damaged by the machines, which in turn would deprive the caribou of vital forage that they need to survive the winter and reproduce in the spring. Damaged tundra can take several decades to rehabilitate, so increased snow machine use could potentially deprive the herd of important parts of its habitat for extended periods, and well outside the project areas.

It is the cumulative impacts of these many projects rather than whatever damage an individual project might cause that greatly concerns the Board.

5. Increased risk of wildland fire

While fire is a natural part of forest renewal in the boreal forest ecosystem, an increased incidence of fire caused by human activities, coupled with an increase in the occurrence of “fire weather” (hot, dry, windy conditions) that correspond with climate change (Arctic Climate Impact Assessment, 2005, Cambridge University Press, p 1042) would reduce the availability of older, mature forest habitats with their associated lichen groundcover [Smith et al (eds), Ecoregions of the Yukon Territory, PARC Technical Bulletin No. 04-01, 2004]. Caribou of the Porcupine Herd subsist on lichen in winter; landscape scale change that limits lichen cover at any given point in time on the winter range would have implications to the overall health of the herd. Increased human presence in the project areas, coupled with the increase in traffic on the Dempster Highway associated with the projects, will increase fire risk, which further risks the availability of lichen for the herd.

6. Increased risk from invasive species

There is increased potential for introduction of invasive species as a result of these projects, due to the increased use of the Dempster Highway and new road access. Even in situations in which no new roads are being built, traffic along the Dempster Highway will increase to accommodate these projects, and traffic will arrive from far away, increasing risk of introduction of invasive species. *Roads create a threat to biological diversity out of proportion to relatively small habitat they displace* (Christen, D. & G. Matlack. 2006. The Role of Roadsides in Plant Invasions: a Demographic Approach. Conservation Biology 20: 385 – 391).

Increased Dempster Highway traffic requires more grading and road improvements, which affects the adjacent vegetation and makes it more vulnerable to invasive species. Road improvements and maintenance increase plant invasion (Gelbard & Belnap. 2003. Roads as Conduits for Exotic Plant Invasions in a Semiarid Landscape. Conservation Biology 17: 420-432).

Roads are the primary conduit for introduction of invasive species. Increased traffic has been shown to facilitate the dispersal of exotic diseases and insects. Vehicles transport exotic species into uninfested areas (Gelbard, J.L. & J. Belnap, *ibid.*), and dispersal of biological agents such as root disease can affect ecosystems far from the road that facilitated access (Trombulak, S.C. & Fissell, C.A. 1999, Review of Ecological Effects of Roads on Terrestrial and Aquatic communities. Conservation biology 14: 18-30.).

In addition, roads alter habitats and stress native species, thus enabling exotic species to establish colonies along roads (Lavoie, C., et al, Submitted. How does common ragweed ... spread in Quebec? A historical analysis using herbarium records. Journal of Biogeography). Roads also facilitate invasion by acting as movement corridors, channeling population expansion and aiding dispersal (Christen & Matlack, *ibid.*). Moreover, dispersal of invasive species is enhanced by adhesion to vehicles, wind-funneling and preferential movement by animals along road corridors. Roadsides store exotic plant propagules for release during disturbance (Christen & Matlack, *ibid.*).

Roads fragment habitat, which promotes weedy species with high dispersal capacities over less mobile species. Some vertebrate and invertebrate species are inhibited by large road clearings. Invasive species cover was found to be three times greater along paved roads than along dirt tracks (Gelbard & Belnap, *ibid.*). Thus, invasive species have an ecosystem-wide impact: exotic vegetation affects bird and animal communities (Trombulak & Frissell, *ibid.*).

Exotic species invasions are expected to increase due to climate change. Changes in temperature and precipitation can alter resource availability and habitat suitability for exotic species that have previously been unable to establish themselves.

Southern Canadian provinces are dealing with major invasive species issues from which the Yukon has been protected due to both distance and climate. The combination of a warming climate and greater human activity in the Northern Yukon could therefore irreparably alter the environment with a proliferation of invasive species.

7. Increased pressure on co-management boards

The Board notes, as well, that increased human activity in the range of the herd resulting from the proposed projects increases the work of the PCMB. The Board must consider increased hunting pressure, increased loss of animals from vehicles, change in the herd's use of the range, increased snow machine harassment. As these changes occur, they affect all the Board's decisions. Thus, the Board will be required to review these changes in the context of the herd's population, health, and migration patterns. Board members and Porcupine Caribou Technical Committee members come from all around the range of the herd as well as Whitehorse, and thus bringing members together for meetings is time-consuming and expensive. Even conference calls end up being costly. This increased work stretches the capacity of the Board and the caribou user organizations that the members represent.

8. Cumulative impacts

Cumulative impacts are changes to the environment caused by an activity, combined with other past, present and future activities. In the case of the Porcupine Caribou Herd, cumulative impacts include not only the proposed projects in question, but also activities throughout the herd's range.

Eagle Plains is an important part of the herd's winter habitat. Although caribou are most resilient to human activity during wintertime, their winter habitat is still important to their survival. In addition, studies show that as human activity increases, the number of caribou in the area will decrease, displacing the caribou from their chosen habitat. "Whatever 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." (Quote from Don Russell, Canadian Wildlife Service; 2000 presentation: *Porcupine Caribou Habitat and Oil and Gas Development in the North Yukon.*) All 25 RFPs affect part of the wintering range, directly by access roads and the project footprints, as well as indirectly, by increasing traffic on the Dempster Highway.

The Dempster Highway — including a corridor as wide as 200 metres on either side of the highway — cuts through an important part of the herd's winter range. There is a need for a comprehensive monitoring program to assess the effects of dust on lichen and other vegetation. Lichen is of key importance to caribou nutrition. If the quality of the habitat is compromised by traffic associated with these projects or with newly constructed access roads, or if the caribou avoid the area because of increased human presence, then the available and effective winter range is reduced. The caribou's overwinter survival could be compromised, as well. Because the herd's population is already declining, extreme caution should be taken to ensure the herd's challenges are not exacerbated.

Climate change has the potential to threaten the resilience of the Porcupine Caribou Herd and may alter their use of the landscape. The future range of the herd given these changing conditions is unknown. This means that displacement of the herd as a result of these projects might be more damaging than we can anticipate today.

The cumulative effects of the projects could potentially affect lichen availability for the herd. Greater traffic volumes stir up increased dust in the area of the roadway, which can potentially increase the area affected by invasive species. Lichens are the main food for the Porcupine Caribou, and decreased availability and lowered quality of lichen in the area of the projects could impact the health of the herd. Coupled with caribou avoiding project areas, this change in the winter range could affect the herd's overwinter survival and productivity and affect the caribou migration pattern. If the caribou are displaced from the area, then the caribou will be forced to live with a "second-best" wintering range. The herd's declining population might be an indication that the herd is not as resilient as it should be to this kind of displacement.

In summary, the PCMB is concerned about the projects introducing increased levels of traffic and increased recreational activity in the range of the herd. In addition, there could be increased harvesting interests. The increased human presence might contribute to the caribou avoiding portions of its range. Increased risk from wildland fires and from invasive species could potentially affect the habitat quality and availability. Finally, the cumulative effects of all the increased human activity could affect the herd's use of the range as well as the herd's productivity. ***While none of these effects in isolation might have a serious impact, cumulatively, and in combination with other effects in the range, the effects could potentially be serious, bearing in mind the herd's declining population.***

Recommendations

As we already noted, the PCMB supports responsible development. In the case of this review, the PCMB urges to make your recommendations that support the long-term conservation of the herd and its habitat. Where information is lacking or limited, we urge you to recommend a cautionary approach, and establish monitoring systems.

The PCMB makes the following recommendations:

- Much work has been done by the North Yukon Planning Commission, in cooperation with all groups with an interest in the region. In addition, the planning work of the Peel Watershed Planning Commission has begun. The Board recommends that approval of any activity in the area be delayed until the completion of land use plans.
- A comprehensive, long-term monitoring program should be undertaken immediately in the Yukon to assess the cumulative effects of human activity on ecosystems, with a specific focus to include the effects on the Porcupine Caribou Herd. This program should be designed to be consistent with the CircumArctic Rangifer Monitoring and Assessment Network as well as with the NWT Cumulative Effects Assessment and Management Strategy and Framework and with the NWT Cumulative Impact Monitoring Program.
- A comprehensive study should be undertaken to assess the effects of highway traffic on lichen and other vegetation.
- Please consider cumulative impacts when you consider the dispositions.
- Priority should be given to projects that minimize potential for damage to the landscape. Examples include:
 - Areas that can be accessed using existing roadways or shared roadways in favour of projects that create new roadways
 - If access roads must be constructed, the shorter the road the better
 - Areas that have been identified as having a more resilient landscape are preferable
 - Areas that can be accessed by using water bodies to create winter-only roads are preferable
 - For many years, Government of Yukon and the PCMB have been aware of locals' concerns regarding caribou mortality from vehicle collisions. Various options have been proposed to try and reduce the number of caribou killed, but none have been implemented. If there is

to be a significant increase in traffic due to the number of projects in the area, Government of Yukon and PCMB will need to re-open these discussions and implement a plan quickly.

Finally, we would like to close our submission by noting that the Porcupine Caribou Herd migrates through the traditional territories not only of Vuntut Gwitch'in First Nation and Tr'ondek Hwech'in, but also of the First Nation of Nacho Nyak Dun, Inuvialuit, and other Gwich'in First Nations in the Northwest Territories. Although these groups are represented on our Board, we do not speak for these organizations. Harvest of the Porcupine Caribou Herd is a traditional practice of these native groups since time immemorial. Although the land involved in the current review of oil and gas rights dispositions is outside these traditional territories, the habitat of the herd is affected. Thus, an argument can be made that the wellbeing of the herd represents valued cultural and heritage components even to First Nations whose traditional territories are far from the lands in question.

Thank you for your consideration of this matter. Not only is the health of the Porcupine Caribou Herd a valid consideration for its own sake, but the health of the herd is also critical in maintaining centuries of caribou traditions for First Nations in the herd's range.

If you have any questions, please do not hesitate to contact our office.

Sincerely,



per: Joe Tetlich
Chair