



## Porcupine Caribou Management Board

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April 30, 2007

Paula Pacholek  
Joint Review Panel Manager  
Suite 302 Professional Building, Box 2412  
Inuvik, NT X0E 0T0

Dear Ms. Pacholek:

### **Re: Response to Undertaking J-U-00134**

Pursuant to Undertaking J-U-00134, the Porcupine Caribou Management Board (PCMB or Board) requested the Porcupine Caribou Technical Committee to meet and review the Environmental Impact Statements for the Mackenzie Gas Project (MGP). The Board notes the following concerns about the project and makes recommendations, as follows.

The declining Porcupine Caribou Herd population means all projects that might affect the herd's use of its range, including the MGP, require caution.

The Board is concerned about the impacts the project 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.

This herd has been declining for at least 12 years, possibly as long as 17 years, presenting 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 4 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 PCMB 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 this 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 Porcupine 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 MGP.

The physical location of the pipeline and project footprint themselves do not affect the Porcupine Caribou directly, but the anticipated increase in traffic along the Dempster Highway is a very real concern to the PCMB. Increased traffic on the Dempster Highway will pose a disturbance for the Porcupine Caribou Herd, as follows:

1. Increased levels of traffic,
2. Increased recreational activity,
3. Increased harvesting interests on caribou along the Dempster Highway related directly and indirectly to the Mackenzie Gas Project,
4. Increased risk of wildland fire,
5. Increased risk from invasive species,
6. Increased pressure on co-management board, and
7. 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. If Peel River and McKenzie River ferries are pulled before migration starts there is less traffic and hunting on road. Major truck traffic occurs right before ferries come out in the fall and in the spring before ice bridges are shut down for the season. 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, 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 the MGP proceeds, 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:

- 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.
- 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.
- 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 occur 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 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 with a short message such as “Caution: caribou crossing” is another option.

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 MGP.

**(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 during calving than at other times of the year.

There have been several studies of Porcupine Caribou near the Dempster. Field behavioral studies done in the 1970s and 1980s are weak but concluded little effect on caribou based on traffic levels at that time. 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.

There is some evidence that caribou do 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 relatively low magnitude, 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.

## **2. Increased recreational activity**

The Porcupine Caribou Herd is becoming famous world-wide 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 Porcupine 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 re-cross 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 road bed of the Dempster Highway is limited to snow machines therefore ATVs or trucks off the highway is not a large issue. Snow machine use by recreationists is likely not a large 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 operator 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 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 winter range can be quite large. The potential of over-harvest and related issues can be large 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 previously noted, we do believe, however, 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 Board has been leading an initiative to develop a Harvest Management Strategy for the herd in Canada.

Harvest by employees and support personnel for the MGP (assuming they qualify to hunt this herd) could represent an added burden to a herd that's already under considerable pressure and this added harvest will need to be managed.

#### **4. 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 activity on the Dempster Highway associated with the project will increase fire risk, and wildland fires have the potential to affect the herd's use of the range.

#### **5. Increased risk from invasive species**

The PCMB is concerned about the introduction of invasive species due to the increased use of the Dempster Highway. In addition to increased traffic, the 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.).

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*). 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*).

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.

## **6. Increased pressure on co-management boards**

The Board notes, as well, that increased human activity in the range of the herd resulting from the MGP increases the work of the Board. 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 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.

## 7. 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 MGP, but also activities throughout the herd's range.

Although caribou are most resilient to human activity during wintertime, their winter habitat, including the area around the Dempster Highway is still important to their survival. 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*.

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 monitoring program to assess 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 the MGP, or if the caribou avoid the area because of increased traffic, then the available and effective winter range is reduced. Consequently, 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. This is significant, given that the pattern of decline of the herd's population suggests that the herd is less able to withstand natural or human-induced stresses.

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 increased activity on and near the Dempster Highway might be more damaging than we can anticipate today.

The cumulative effects of the MGP could potentially affect lichen availability for the herd. Greater traffic volumes stir up increased dust in the area of the highway, which can potentially increase the area affected by invasive species. Lichens are the main food for the Porcupine Caribou, and decreased availability of lichen in the area of the Dempster Highway could impact availability and quality of lichen in the herd's winter range. 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 MGP 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***

The PCMB supports responsible development. In the case of the MGP proposal, the Board urges you to make 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:

- 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 Northwest Territories Cumulative Effects Assessment and Management Strategy and Framework and with the Northwest Territories Cumulative Impact Monitoring Program.
- A comprehensive study should be undertaken to assess the effects of highway traffic on lichen and other vegetation.
- Wildlife environmental monitors from local First Nations should be contracted by MGP proponents to record, respond to and report caribou and other wildlife sightings on the Dempster Highway and communicate the presence of wildlife via radio to employees and contractors.
- In times of the year when there tends to be a there is a high concentration of caribou near the highway, employees and contractors should be compelled to reduce travel speed to 50 km/hr to reduce potential for vehicle collisions with caribou, even when there are no caribou sightings. Conservation Officers monitor herd movement on conventional and satellite radio collars, and they can notify drivers of when and where there is high risk for collision and enforce the speed limit. Conservation Officers should be empowered to require lower night driving speeds, as well, for all employees and contractors.
- In addition to slower speeds for "high-risk" areas, all contractors and employees should be directed to relay isolated sightings of wildlife by radio to all vehicles to reduce collision occurrences, and all vehicles should reduce speed to 50 km/hr in that location.
- Wildlife-vehicle collisions tend to occur more often than expected, at night, on dry road conditions (due to higher driving speeds on dry roads) and by larger

vehicles. The ability for a motorist to avoid a collision is reduced in all these situations due to reduced visibility and increased stopping distances. By decreasing the speed, the motorist can compensate for the increased probability of being involved in a collision.

- Employees and contractors should maintain a minimum line of sight of 300 m so that wildlife collisions can be avoided.
- Give caribou the right of way when encountered on the highway.
- Temporary flashing signs with a short message such as “Caution: caribou crossing” should be strategically erected in areas along highway with a high caribou concentration.
- Report wildlife incidents or mortalities to Conservation Officers.
- Prohibit hunting by employees and contractors.
- Employees and contractors should be prohibited from recreational snow machine use near the Dempster Highway.
- Proponents should make every reasonable effort to minimize dust dispersal by their vehicles.
- Policies need to be developed to ensure employees and contractors do not cause accidental fires, and fire suppression plans must be developed.

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