Hamlet of Tuktoyaktuk, Town of Inuvik
Government of Northwest Territories

ISSUED FOR USE

RESPONSE TO THE OCTOBER 15, 2012 INFORMATION REQUESTS FROM THE ENVIRONMENTAL IMPACT REVIEW BOARD FOR CONSTRUCTION OF THE INUVIK TO TUKTOYAKTUK HIGHWAY, NWT

EIRB FILE NO. 02/10-05

October 22, 2012

ACRONYMS

CEA	Cumulative Effects Assessment
DFO	Fisheries and Oceans Canada
DOT	Department of Transportation (GNWT)
EIRB	Environmental Impact Review Board
EIS	Environmental Impact Statement
ENR	Environment and Natural Resources
GNWT	Government of the Northwest Territories
IR	Information Request
ITH	Inuvik to Tuktoyaktuk Highway
PWNHC	Prince of Wales Northern Heritage Centre
WEMP	Wildlife Effects Monitoring Program
WMAC (NWT)	Wildlife Management Advisory Council (Northwest Territories)
ZOI	Zone of Influence

The Developers of the proposed Inuvik to Tuktoyaktuk Highway are pleased to provide responses to the Information Requests (IRs) posted on the Environmental Impact Review Board's registry (on October 15 and 16, 2012). Information requests were submitted by:

- Prince of Wales Northern Heritage Centre;
- Wildlife Management Advisory Council (NWT);
- Fisheries and Oceans Canada; and
- Environmental Impact Review Board.

It is important to note that several questions from Wildlife Management Advisory Council (NWT) were regarding the Wildlife Environmental Management Plan (WEMP). The WEMP document was provided to EIRB as a draft for discussion, with the purpose of discussing the document further with WMAC and other organizations, prior to finalizing. As well, the WEMP document was prepared primarily by GNWT ENR, and as such, the GNWT ENR has provided separate responses to several of the information requests. These responses are denoted by the title "GNWT ENR Response" and are shown in bold.

IR Number: PWNHC-1

Source: **Prince of Wales Northern Heritage Centre, Department of Education, Culture and Employment, GNWT**

To: **GNWT Department of Transportation**

Subject: **Archaeological Impact Assessment of Proposed Granular Resource Sources**

Preamble

An archaeological impact assessment (AIA) of the right-of-way for the Inuvik to Tuktoyaktuk Highway was completed in 2011 but only 2 of the 7 proposed granular resource sources for the project were investigated at this time. DOT planned to conduct geotechnical assessment of all 7 proposed sources in the winter of 2012. As this assessment would require ground disturbance in areas not previously subject to an AIA, DOT and the PWNHC worked together to develop a mitigation plan that would allow the geotechnical investigations to proceed as planned:

- For borrow sources 307, 2.45, 173/305, 170 and 172, which were not subject to an AIA in 2011, 18" auger holes will be limited to the minimum number required to fully assess and prove the volume and quality of the material. The consultant's archaeologists will use all available information, including LIDAR maps of the source areas, to attempt to locate these holes in areas of lower potential for unrecorded archaeological sites. The consultant's archaeologists will advise the drilling supervisor how to monitor drill holes and associated soils for evidence of potential archaeological resources. The drilling supervisor will advise the archaeologists of the schedule for drilling of 18 inch holes at these sources and ensure the archaeologists are available to consult if archaeological resources are suspected or encountered. A post-impact archaeological assessment will be conducted on all of these sources in 2012.
- For borrow sources 314/325 and 312 the geotechnical program may proceed as planned. A post-impact archaeological assessment will be conducted at these sources in 2012.
- A pre-development AIA must be conducted at all sources that will be used for construction.

The post-impact archaeological assessment and pre-development AIAs required by this plan were completed in the summer of 2012. The final report has been reviewed in detail by the PWNHC.

In DOT's presentation on granular resources at the EIRB technical sessions, they identify 6 main granular resource sources for the Inuvik to Tuktoyaktuk Highway: PW2, 325/314, 309, 174, 170, and 177. Of these 6 sources, only 325/314 and 170 were subject to an AIA in 2012.

Request

1. The PWNHC requires clarification on DOT's plans to complete AIAs for the remaining granular resource sources in advance of geotechnical investigations and/or development.

Developer Response: PWNHC-1

Table TS-2-1 of the September 17, 2012 submission to EIRB titled *Erratum in Response to Information Requests Relative to Material Sources Raised at Technical Sessions, August 22 and 23, 2012* (EIRB registry document #311) identifies the following borrow sources for potential use during construction and operation: 170, 173/305, 174, 177, 307, 309, and 325/314.

As Archaeological Impact Assessment (AIA) was completed in 2012 on sources 170, 173/305, 307, and 325/314. The Developer will contact PWNHC to arrange suitable mitigation, including conducting additional AIAs, for the remaining sources (174, 177, 309) prior to conducting a geotechnical program or subsequent development of these sources.

IR Number: WMAC (NWT)-1

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Cumulative Effects Assessment**

Preamble

WMAC is pleased to note that the Developer acknowledges some of the deficiencies associated with its original CEA within the EIS. Changes that have been made include:

- A clear demarcation of the cumulative effects study area as opposed to a general description
- The inclusion of other past, present, and future linear developments within the cumulative effects study area
- An increased Zone of Influence (ZOI) of the ITH and these other linear developments from 0 to 1 km.

However, despite these improvements some important deficiencies remain unaddressed, including the inadequate 10-year time frame for the CEA, and its overly simplistic assessment of impact on key wildlife VECs such as caribou and grizzly bear.

To begin with, the original CEA within the EIS did not include the Husky Lakes – an area of immense importance to the Inuvialuit. WMAC notes that the revised CEA study area still only includes part of the Husky Lakes.

Request

1. Given their ecological and socio-economic importance, why are the Husky Lakes not included in their entirety within the revised CEA study area?

Developer Response: WMAC (NWT)-1

With respect, the Developer is fully aware of the ecological and socio-economic importance of the Husky Lakes area and has taken the Husky Lakes area into full and appropriate consideration throughout the development of the EIS and subsequent documentation provided to the EIRB.

However, some clarification on the inclusion of only part of the Husky Lakes within the CEA study area is warranted. In particular, it should be noted that the eastern boundary originally selected for the assessment of potential environmental effects within the EIS was based on the Regional Study Area (RSA) selected for the environmental assessment, which represented a distance of 15 km extending from both sides of the proposed alignment.

For purposes of the CEA, including the Supplemental CEA, the western boundary was extended to the Mackenzie River to include other past, current and proposed projects in this area, but the eastern boundary remained the same and was the boundary considered in calculating the total land area and vegetation cover types included within the CEA study area.

Although these calculations also included the water components within the CEA study area, including a portion of the Husky Lakes, it was not considered to be necessary or useful to include all of the waters comprising the Husky Lakes within the CEA study area. This was because, for purposes of the assessment, including the CEA, the land portions within the CEA study area were considered to be of primary importance to the assessment.

The projected physical footprints and potential zones of influence of the proposed Highway and other future potential projects assessed in the CEA and Supplemental CEA are not anticipated to encroach on the waters of the Husky Lakes.

IR Number: WMAC (NWT)-2

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Cumulative Effects Assessment**

Preamble

WMAC has previously highlighted the insufficient temporal boundary for the Developer's CEA within the original EIS. This appears to be unaltered so this remains a deficiency from WMAC's perspective

Request

1. Why is the temporal boundary for the CEA still unchanged at 10 years despite the EIRB's recognition that it should be at least 25 years.

Developer Response: WMAC (NWT)-2

The Supplemental Cumulative Effects Assessment (CEA) evaluated a state of overall development within the CEA study area that included consideration of all components of the MGP that might eventually be developed. In effect, the supplemental CEA considered and assessed proposed developments that may or may not occur in the next 10 to 25 years or perhaps longer.

Based on the Developer's understanding of past, existing and foreseeable future projects, the only other projects that could conceivably interact in a potentially cumulative manner with the proposed Highway project's relatively short-term construction phase and initial years of operation are the existing buried Ikhil Pipeline project and the proposed South Parsons Gas Supply project. These projects could potentially be approved and under construction during the period of Highway construction.

Currently it remains uncertain when and, perhaps if the Mackenzie Gas Project (MGP) and the associated Parsons Lake Gas project will be developed. However, it is apparent that the proposed Highway will be constructed and in operation before construction of the proposed MGP and the Parsons Lake Gas project and associated infrastructure is initiated.

IR Number: WMAC (NWT)-3

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Cumulative Effects Assessment**

Preamble

WMAC took the time and effort to reference a number of published scientific studies to show that the potential ZOI of the ITH was not non-existent for caribou as proposed in the original EIS, but could be as large as 15 km. The Developer has now adopted a ZOI of 1 km using the following logic.

For purposes of this supplemental cumulative effects assessment, as discussed during the Inuvik Hearings, given the generally low physical profile of the proposed Highway on the landscape, the low level of traffic expected to use the Highway (150-200 vehicles per day) and with the application of the available mitigation and management measures described in the EIS and updated commitments, a potential 1 km zone of influence, within which potential residual effects to wildlife species may occur, was selected.

The Developer provides no scientific support for the selection of 1 km as the potential ZOI. WMAC continues to believe that this is underestimating the potential ZOI, especially for caribou. The revised ZOI is also at odds with the effects distance selected (ironically 15 km) by the Developer in the Wildlife Effects Monitoring Program (WEMP) as discussed in the next section.

Request

1. What is the scientific basis for the selection of 1 km as the potential ZOI for wildlife, especially for large ranging species such as caribou and grizzly bear?

Developer Response: WMAC (NWT)-3

With respect, the Developer feels it is necessary to clarify that it was never assumed, or represented in the EIS, that there was no potential zone of influence (ZOI) associated with the construction and operation of the Highway. Rather, as indicated in the EIS and the Supplementary CEA, potential environmental effects of the proposed Highway project were discussed and assessed for all VECs in Section 4.0 (Impact Assessment) of the EIS.

In general, the predicted residual effects on all VECs related to the relatively short-term construction phase and longer-term operations phase of the Highway were predicted to be low in magnitude and localized to the immediate Project footprint area or the Local Study Area (500 m). For wildlife species, the majority of the predicted residual effects were also of a generally short term and rapidly reversible nature.

Caribou

The Developer appreciates that WMAC took the time and effort to reference a number of published scientific studies pertaining to the subject of potential zones of influence, in particular related to caribou and reindeer. The Developer reviewed each of the references provided and used them, as well as other references related to caribou behavior, possible reductions in habitat effectiveness and responses to roads and other industrial developments to ultimately select the 1 km ZOI employed in the Supplemental CEA.

The Developer acknowledges that it was a challenge to select an appropriate zone of influence for the proposed Highway, as most of the documented research to date has been carried out in conjunction with major northern developments such as the world-scale Prudhoe Bay oilfield development, the major Diamond mines and associated infrastructure in the NWT, and intense levels of development in Scandinavia, including hydroelectric developments, power lines, resorts and dams.

As noted by ENR in its response to Undertaking Number 3, dated September 27, it (ENR) does not currently have the barren-ground caribou data to quantitatively predict a ZOI for a single road with low traffic volumes that is not subject to harvesting. Based on the Developers review of the available literature, including the references provided by WMAC, only a few studies have tried to assess the potential ZOI related to relatively remote, low traffic roads.

Schindler et al (2006) reported on the effects of an all-weather logging road on winter woodland caribou habitat in southeastern Manitoba. The Happy Lake logging road is the only main access through the Owl Lake caribou herd winter range. Analysis of caribou locations and movement illustrated less use of high quality habitat by caribou adjacent to the road. The loss of functional habitat in this study was suggested to occur within 1 km of the road. Schindler et al (2006) noted that the potential loss of functional habitat should be incorporated into integrated forestry and caribou conservation strategies for that area. Continued road management was recommended to minimize the potential sensory disturbance and associated impacts of all-weather access on boreal woodland caribou.

Oberg (2001) investigated the response of migratory mountain (woodland) caribou to linear features, including streams, roads and seismic lines in the foothills of west-central Alberta using GPS telemetry data from twelve caribou collected over two winters (1998-2000), and compared to a GIS base map of linear features. The study found that caribou locations were distributed non-randomly around streams and roads, with preference increasing as the distance from these linear features increased. Caribou avoided streams to a maximum distance of 250 m, and roads to a maximum distance of 500 m. Insufficient caribou locations occurred around active roads for separate analysis, but caribou avoided in-active roads to a distance of 250 m, signaling that the mechanism for avoidance may be more than a response to increased human activity.

Dyer et al (2001) investigated woodland caribou avoidance responses to petroleum exploration and developments and associated infrastructure in a 6,000 km^2 study area in northeastern Alberta. The movements of 36 GPS collared caribou were tracked for a 12-month period, yielding 43,415 locations. They analyzed caribou locations, controlling for vegetation cover classes to remove confounding effects of habitat, and grouped to examine seasonal variation in distribution. The main objective of the study was to examine variation in avoidance response over time and quantify avoidance in terms of functional habitat loss. They defined avoidance as lower than expected use of areas adjacent to developments, compared with use of areas farther from developments.

The study found that caribou generally avoided human developments with the level of avoidance appearing to be related to the level of human activity in the study area. Dyer et al (2001) recorded maximum avoidance distances of 1,000 m for well sites, and 250 m for roads and seismic lines. Avoidance effects were found to be highest in late winter and during calving and lowest during summer, possibly as a result of lower traffic levels at that time. Based on these findings, management strategies were proposed to balance caribou conservation with resource extraction in northern Alberta.

In the North, as indicated by GNWT (ENR) in Response 73.2, the Dempster Highway is considered to be the most comparable road to use to estimate the potential effects of the Inuvik to Tuktoyaktuk Highway project on the barren-ground herds in the Inuvialuit Settlement Region. The Dempster Highway was built between 1958 and 1979; it has similar design parameters as those proposed for the Inuvik to Tuktoyaktuk Highway and has been in use for more than 40 years. The effects of the Dempster Highway's construction and operation were studied by the Canadian Wildlife Service and the Yukon Government. Both levels of government determined there were no significant adverse effects on that herd resulting from the Dempster Highway.

Despite initial concerns raised regarding the impact of the road on caribou, ENR's response to IR 73.2 (Registry document #169) quotes Spotswood (2010) as saying *"following a three-year study, the Canadian Wildlife Service reported in 1982 [GNWT ENR Note: likely Russell et al. 1985] that the caribou would cross the road, even where the banks are steep. It also noted that they had started using the road themselves to travel, and even loafed around on it sometimes."*

Research and monitoring activities, guided by a Porcupine Caribou Management Plan, have continued. The Porcupine Caribou Herd Satellite Collar Program is one component of the management program. The cooperative project between a number of wildlife agencies and Boards use satellite radio-collars to document the seasonal range use and migration patterns of the herd. A review of the collared animal maps on the Management Board's website demonstrate that individual collared animals cross the Dempster Highway in some years but not in others. They do not always cross in the same areas but use different parts of the available range over time. Some of the herd never crosses the highway at all. As the Porcupine Caribou Management Board notes on its website *"Most of this very large area is used quite often by the herd; however use of specific areas (other than during calving) is not always predictable."*

In discussions with GNWT ENR and presented in Undertaking #3, the effects of the Dempster Highway on the Porcupine Barren-ground Caribou Herd provide the best applicable example on which to base predictions of the effects a northern road. The key differences between the Porcupine and ISR herds that may lead to differences in behavioural responses (i.e. degree of avoidance of available habitat or permeability of barrier) of caribou between the two roads are likely related to level and type of human activities including harvesting and the amount of traffic. The larger Porcupine herd likely receives greater harvesting pressure, and certainly does currently, as the area of the proposed Inuvik to Tuktoyaktuk Highway between these two communities has been closed to the harvesting of caribou for all hunters since 2007.

Much of the harvesting pressure along the Dempster Highway occurs within 10 km of either side of the highway and GNWT ENR, independent of the Developer, is of the opinion that this harvesting pressure could influence the use of habitat within an estimated ZOI of 4-5 km. Although the traffic level on the Dempster Highway is relatively light, it is expected to continue to have considerably higher traffic volumes than those expected for the Inuvik to Tuktoyaktuk Highway.

Unpublished aerial survey data for November 15, 1999 provided by Yukon Environment (Cooley, D. Unpublished file 2001) to the GNWT ENR also showed a harvest-related ZOI of about 5 km on either side of the Dempster Highway in the Yukon at that time. As indicated by ENR, the herd was being actively harvested and disturbed by off road vehicles at that time.

Although the Developer has considered the ZOI estimated for the Dempster Highway, which is essentially based on the significant annual caribou harvesting pressures experienced along this highway, the Developer is of the view that this circumstance is not necessarily applicable to the proposed Inuvik to Tuktoyaktuk Highway. In particular, as previously noted, since 2007 to the present, there has been a complete ban on caribou harvesting within the entire area (Area I/BC/07) of the proposed Highway.

The Developer recognizes the need for the involvement of the existing co-management organizations (i.e. Inuvialuit Game Council and Wildlife Management Advisory Council), together with the HTCs and GNWT ENR in determining ongoing harvest management options during the long term operations phase of the Highway.

The legal basis for the establishment of harvest management regulations remains under the *NWT Wildlife Act*. As described in the Developer Response to information request 34 (Registry document #112), some of the harvest management options that could be considered, depending on the condition of the caribou herds include:

- No hunting zones / Restricted hunting areas
- Establishment of a Special Management Area
- Reduced hunting quotas;
- Hunter check stations;
- Conservation education programs; and
- Voluntary measures.

Based on the current established approach to the effective management of caribou harvesting in the general area of the proposed Highway, and the limited available scientific information on remote, low traffic northern roads, the 1 km zone of influence selected by the Developer for the Supplementary CEA was intended to address the potential residual effects to wildlife species, including potential cumulative effects, related to the relatively short-term construction period and the longer term operational period of the Highway.

Given the generally low physical profile of the proposed Highway on the landscape, the low level of traffic expected to use the Highway (150 – 200 vehicles per day) and with the application of the available mitigation and management measures described in the EIS and updated commitments, the Developer remains confident that the 1 km ZOI selected for the Supplementary CEA is appropriate.

Grizzly Bear

The adoption of the 1 km ZOI for the Supplemental CEA for grizzly bear was also based on review and consideration of the available literature and northern knowledge related to grizzly bear behavior, possible reductions in habitat effectiveness and reported responses of grizzly bear to roads and other industrial developments.

Based on North American studies, grizzly bear response to linear developments varies. Studies in southern Canada and the United States have reported that grizzly bears can avoid roads by 500 m (e.g., Benn and Herrero 2002; Mace et al. 1996; Wielgus et al. 2002; Waller and Servheen 2005).

There appears to have been relatively limited work conducted in the north; however, on the NWT central barrens, resource selection modeling conducted by Johnson et al. (2005) predicted that grizzly bears avoided forested areas, demonstrated weak selection for portions of the study area dominated by riparian and low shrub habitat types, and strong selection for patches of esker. Model coefficients suggested that mineral exploration sites had a moderate negative influence on habitat use to a distance of 23 km, while the coefficients for outfitter camps were smaller, having a predicted effect on habitat use over a distance of 12 km.

Regarding denning, as indicated in the EIS, a literature review by Linnell et al. (2000) indicated that grizzly bears might abandon a den within 1 km of a disturbance and more likely within 200 m. Reynolds et al. (1986) found that no bears deserted their dens despite seismic activity within 800 m, and in one instance the passage of a supply train within 100 m. Harding & Nagy (1980) reported that bears may be displaced from their dens by intensive activity and that they typically select den sites >1 km from human activities, and may otherwise abandon their site.

Guidelines for establishing setback distances appear to vary across regions and jurisdictions. Setback distances for bear dens vary depending on the type, intensity and duration of the activity. Bear response guidelines issued by the Inuvik Region (2005-2006) for oil and gas activities suggest a 300 m setback distance; without discussion of the level and amount of disturbance particular activities may cause.

In GNWT ENR's response to EIRB Undertaking# 3, ENR reported that studies of seismic drilling in Alaska indicated no abandonment of dens resulting from vehicles within 100 m, or shot hole drilling within 1.4 km in mid-March. ENR advised that although abandonment of dens (temporary or permanent) is more likely within 200 m to 300 m, records of abandonment of dens are limited. ENR also noted that grizzly bears will likely avoid establishing winter dens within 500 m of the Highway alignment during operations.

In addition, ENR indicated that grizzly bears will likely modify their feeding and movement behaviour near summer construction activities and during Highway operation. However, due to low site fidelity and low bear densities, ENR anticipated that the bears will likely move to other areas. The amount of time spent feeding near the Highway during operations would likely be affected within 0 m to 250 m, depending on availability of food resources and vehicle movement. ENR also indicated that the ZOI will likely vary by sex/age of the bears, time of day and presence absence of vehicles.

The Developer originally set 500 m as the critical setback from known dens during the construction phase around borrow sources, based on the timing, duration and type of activities expected, and with the understanding that this was a conservative distance based on the older region-specific guidelines of 300 m. As discussed in Section 4.2.3.1 of the EIS, noise generated during the construction phase, during which disturbance of grizzly dens might be a concern, but is anticipated to be intermittent, temporary and mostly related to the operation of construction equipment. Blasting associated with aggregate borrow source activities, the most intense disturbance type, is expected to be limited and infrequent during the construction phase.

Minimum distances are also suggested for a number of furbearer species. The rationale for these distances is largely based on the collective expert opinion of various wildlife biologists that reviewed drafts of the guidelines. These guidelines were not available at the time the EIS was produced but the recommended setbacks will be reviewed as part of Wildlife and Wildlife Habitat Protection Plan development. As part of this planning, the Developer will determine setback distances depending on the type and timing of activity for each site once detailed design is completed.

The Developer's primary mitigation for grizzly bears is the avoidance of undertaking activities in winter at a specific site if a fall pre-construction denning survey indicate grizzly are actively denning in or near a borrow source. Should blasting be required, the procedure will be for a wildlife monitor to survey the area within the specified setback of the blast site [both before and after blasting] to determine if an active den missed during the fall aerial survey could be disturbed or if a bear exits a den in response to the blast. If a bear has been found to be disturbed, larger setback distances will need to be considered. During operations, it is expected that bears will habituate or avoid denning in close proximity to the Highway right-of-way.

Based on the Developer's review and assessment of the information discussed herein, the generally low physical profile of the proposed Highway on the landscape, the low level of traffic expected to use the Highway (150 – 200 vehicles per day) and with the application of the available mitigation and management measures described in the EIS and updated commitments, the Developer remains confident that the 1 km ZOI selected for the Supplementary CEA is appropriate.

References

AANDC, DFO, EC CWS, and GNWT ENR. 2011. Northern Land Use Guidelines: Northwest Territories Seismic Operations. Volume 09a.

Benn, B., and S. Herrero. 2002. Grizzly bear mortality and human access in Banff and Yoho National Parks, 1971-98. Ursus: 213-221.

Cooley, D. 2008. Yukon Environment, Pers. Comm. (with ENR) December 2008. Unpublished file. Quoted in Padilla 2010.

Dyer, S. J., J. P O'Neill, S. M. Wasel, and S. Boutin. 2001. Avoidance of Industrial Development by Woodland Caribou. Journal of Wildlife Management, Vol. 65, No. 3 (Jul., 2001), pp. 531-542.

Johnson, C. J., M. S. Boyce, R. L. Case, H. D. Cluff, R. J. Gau, A. Gunn, and R. Mulders. 2005. Cumulative effects of human developments on arctic wildlife. Wildlife Monographs, 160: 1-36.

Harding, L., and J. A. Nagy. 1980. Responses of grizzly bears to hydrocarbon exploration on Richards Island, Northwest Territories, Canada. Int. Conf. Bear Res. and Manage. 4, 277-80.

Linnell, J.D.C., J. E. Swenson, R. Andersen, and B. Barnes.. 2000. How Vulnerable are Denning Bears to Disturbance? Wildlife Society Bulletin, 28, 400-413.

Mace, R. D., J. S. Waller, T. L. Manley, L. J. Lyon, and H. Zuuring. 1996. Relationships among grizzly bears, roads, and habitat in the Swan Mountains, Montana. Journal of Applied Ecology, 33: 1395-1404.

Oberg., P. R. 2001. Responses of Mountain Caribou to Linear Features in a West-central Alberta Landscape. Thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science in Wildlife Ecology and Management, Department of Renewable Resources, Edmonton, Alberta.

Reynolds, P.E., H.V. Reynolds III, and E.H. Follmann. 1986. Responses of grizzly bears to seismic surveys in northern Alaska. International Conference on Bear Research and Management, Proceedings 6, 169-175.

Russell, D.E., and A. M. Martell. 1985. Influence of the Dempster Highway on the activity of the Porcupine Caribou Herd. In A. M. Martell and D.E. Russell (eds.): Caribou and human activity. Proceedings of the First North American Caribou Workshop, Whitehorse, YT, 1983. Pp. 22-26. Canadian Wildlife Service.

Schindler, D. W., D. Walker, T. Davis, and R. Westwood. 2006. Determining effects of an all-weather logging road on winter woodland caribou habitat use in south-eastern Manitoba. Rangifer, Special Issue No. 17, 2007. Presented at the Eleventh North American Caribou Workshop, Jasper, Alberta, Canada, 23-27 April, 2006.

Spotswood, K. 2010. Dempster Decision.http://yukoninfo.com/dempster/fromtrailtohighway.htm.

Waller, J. S., and C. Servheen. 2005. Effects of transportation infrastructure on grizzly bears in northwestern Montana. Journal of Wildlife Management, 69 (3): 985-1000.

Wielgus, R. B., P. R. Vernier, and T. Schivatcheva. 2002. Grizzly bear use of open, closed, and restricted forestry roads. Canadian Journal of Forest Research, 32 (9): 1597-1606.

IR Number: WMAC (NWT)-4

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Cumulative Effects Assessment**

Preamble

The Developer assesses the impact to key wildlife VECs such as caribou by simply calculating the area occupied by their 1 km ZOI as a proportion of both CEA study area and the respective caribou herds' winter ranges. Because the percentages are small, the Developer states:

It is therefore concluded that the potential residual effects on caribou related to the Highway, and potential residual effects associated with past, present and potential future projects within a combined zone of influence of 1 km for each of these possible projects will not result in a potentially significant cumulative effect on either the Cape Bathurst or Bluenose-west caribou herds while they are on their winter range, when they are typically present in the greatest numbers within the general area, including the cumulative effects study area.

Notwithstanding WMAC's contention that the 1 km ZOI is scientifically unsubstantiated and an underestimate (e.g. see the Developer's own reference to the active avoidance and disruption of grizzly bear foraging activities of up to 4 km from human disturbance), this areal [sic] approach to impact assessment by itself is overly simplistic. Roads and other linear developments always occupy small percentages of the landscapes in which they occur. However, their ecological effects are amplified orders of magnitude above this simple math by the fact that ecological pressures, either directly or indirectly, are operating along their entire lengths. These pressures take advantage of the linear aspect of roads and similar developments to gain access to previously undisturbed portions of the landscape. Combined with the very large home and/or herd ranges of some wildlife VECs (e.g. grizzly bear, wolverine, caribou), roads exert ecological influences well beyond their relatively small footprint. Baseline information should therefore always include the movement ecology of these wide-ranging species before and after road construction in order to fully predict impacts. Alas, these data are largely absent from this CEA.

Request

1. What is the scientific rationale for concluding that the ITH will have no significant effect on wildlife in the absence of data on the movement ecology of wide ranging species?

Developer Response: WMAC (NWT)-4

The Developer would initially like to note that the approach taken to quantify potential cumulative effects associated with the proposed short-term construction and longer-term operation of the Inuvik to Tuktoyaktuk Highway is based on accepted practices for undertaking a more quantitative cumulative effects assessment.

The methodology employed has been previously accepted for various recent, considerably more complex industrial developments and undertakings such as mining, oil and gas and hydro projects and linear developments such as power lines, roads and pipelines in other northern and western Canadian jurisdictions. These jurisdictions include the Mackenzie Valley Environmental Impact Review Board, the Nunavut Impact Review Board, the Alberta Energy Utilities Board and the British Columbia Environmental Assessment Office.

Regarding Request 1 as phrased above, the Developer notes that this is a misrepresentation of what was actually concluded in the Supplementary CEA, which was stated in italics in the preamble and is repeated here:

It is therefore concluded that the potential residual effects on caribou related to the Highway, and potential residual effects associated with past, present and potential future projects within a combined zone of influence of 1 km for each of these possible projects will not result in a potentially significant cumulative effect on either the Cape Bathurst or Bluenose-west caribou herds while they are on their winter range, when they are typically present in the greatest numbers within the general area, including the cumulative effects study area.

The Developer also has some difficulty understanding WMACs point that no data on the movement ecology of wide ranging species were presented because such data were discussed in the Supplementary CEA, with reference to additional documentation in the EIS as appropriate for the wide-ranging species evaluated.

The quantified scientific rationale for the above conclusion is as stated in that section of the Supplementary CEA. In particular, as stated:

Relative to the overall estimated size of the Cape Bathurst and Bluenose-West caribou herd winter ranges as presented in Table 11, the combined footprint of the Highway and all of the past, present and proposed projects considered in this assessment represents 0.0029% of the Cape Bathurst herd winter range and 0.00027% of the Bluenose-west herd winter range.

Following application of the potential 1 km zones of influence associated with the Highway and each of the past, present and proposed projects considered, the total estimated indirect potential zone of influence footprints is 71,049.18 ha, representing 12.10% of the cumulative effects study area. However, as previously indicated, this represents an overestimation of the more likely zone of influence around, in particular, each of the existing and proposed buried pipelines, which would more likely be expected to be limited to the range of 5-20 m.

Relative to the overall estimated size of the Cape Bathurst and Bluenose-West caribou herd winter ranges as presented in Table 11, the combined 1 km potential zones of influence of the proposed Highway and all of the past, present and proposed projects considered in this assessment represents 0.097% of the Cape Bathurst herd winter range and 0.0091% of the Bluenose-west herd winter range.

Based on this analysis it is apparent that very small percentages of the total estimated winter ranges of the Cape Bathurst and Bluenose-west herd could potentially be affected by the proposed Highway and all of the past, present and proposed projects considered in this assessment.

IR Number: WMAC (NWT)-5

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Preamble

WMAC is also pleased to be finally able to review a draft of the Developer's proposed Wildlife Effects Monitoring Program. According to the Developer, the WEMP is designed to evaluate the effect of the proposed highway on the movement, habitat selection, and direct mortality of barren-ground grizzly bears:

The program will be targeted to the Regional Study Area (RSA) described in the EIS, which is a 15 km wide buffer running along the proposed highway corridor and existing Source 177 access road. Wildlife monitoring is proposed to occur prior to construction, during highway construction, and five years after the highway has been opened for use. This will allow for a clearer understanding of wildlife movement, habitat selection and mortality before, during, and after the highway has been constructed. As a result, the impact of the highway on wildlife can be assessed and any mitigation actions can be tested and revised, if necessary.

WMAC finds it puzzling that the Developer continues to reject a maximum ZOI of 15 km for caribou in the CEA yet embraces an identical effects distance within the WEMP. Effects monitoring should flow directly from the CEA so it makes even more sense for the Developer to adopt a potential ZOI of 15 km for caribou

Request

1. Why are the potential ZOI for caribou in the CEA and the effects distance for the WEMP not the same?

Developer Response: WMAC (NWT)-5

With respect, the 15 km wide buffer referenced by WMAC, which is actually 30 km wide (15 km on each side of the Highway), within which wildlife presence, wildlife movements and habitat selection will be evaluated by the WEMP is not intended to imply that this is the potential ZOI for caribou in the vicinity of the proposed Highway. Rather, as stated in the EIS and reiterated in the WEMP, the 15 km buffer is simply intended to be an appropriate regional study area boundary, comparable to the 15 km wide buffer on either side of the proposed Highway that was established as the Regional Study Area (RSA) for purposes of the EIS.

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

GNWT ENR provided a more detailed discussion of ZOI for barren-ground caribou (see Undertaking# 3). As the geofence type collars will provide hourly locations when a collared animal is within 15 km either side of the highway alignment, the draft WEMP is designed to determine the accuracy of ZOI in relation to the ITH and the two specific herds of concern regardless of the various predictions made by parties to the EIR.

IR Number: WMAC (NWT)-6

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Preamble

As stated by the Developer above, wildlife monitoring is supposed to begin prior to road construction. However, construction is proposed to begin this winter, i.e. 2012/2013. As the Developer admits:

There is some baseline wildlife information available in and around the area of the proposed highway. Most of the information that does exist is from collared caribou in the Cape Bathurst and Tuktoyaktuk Peninsula herds, but these collaring programs were designed for previous population surveys and not for the collection of the type of detailed information that is necessary to evaluate highway impacts on winter caribou habitat selection and movement. Similarly, there is some information on grizzly bear distribution in the Regional Study Area (RSA), but not at a fine enough scale to accurately determine the impact of the highway on bears. Other wildlife information in this area is sparse as there were few wildlife concerns prior to the proposal of the all season highway.

So the Developer is concluding that there is no existing information with which to evaluate the effects of the road upon the wildlife of the area. This is particularly disturbing from a caribou perspective, particularly from WMAC's Worst Case Scenario point of view – the loss of caribou harvest for an extended period of time.

Request

1. Why wasn't an appropriate baseline information on wildlife collected prior to road construction beginning?
2. On what scientific basis was the previously collected data on radio-collared caribou rejected as a source of potential baseline information for evaluating the effects of the ITH?
3. How many animals in each herd were fitted with such collars?
4. What other existing baseline information on wildlife was examined and rejected?

Developer Response: WMAC (NWT)-6.1

The Developer would like to point out that the section quoted above is from the draft WEMP and is referring to having enough data to be able to determine if the predictions of effects of the Highway are correct. There is an appropriate amount of baseline data for this stage of the environmental assessment and data collection continues in collaboration with GNWT ENR.

The GNWT ENR and Environment Canada (EC) have overall management responsibility for wildlife in the NWT. Both agencies conduct or coordinate baseline information on an ongoing basis for priority species and for management purposes. This includes vegetation baseline, which is key to

understanding habitat for wildlife. It should be clear that substantial baseline information was presented in the EIS and subsequent filings including those prepared by GNWT ENR. Much of the baseline data collections in the area were conducted under the Western Biophysical Program and collection of baseline data continues.

For site-specific information, GNWT ENR and EC indicated a need for additional information at a meeting in April 2011. The Developer provided a Terms of Reference for review in August 2011 and work proceeded over the fall and winter of 2011-12. The necessary fieldwork to complete the work occurred in June-July 2012.

Developer Response: WMAC (NWT)-6.2

During preparation of the EIS, existing radio-collared caribou information was used. However, GNWT ENR had indicated its data would not substantively assist in localized understanding of range use as the number of locations per day was not adequate during the winter period as its objective was focused on population monitoring as opposed to fine scale range use. GNWT ENR biologists undertook to present information on range use based on a set of radio-collared animals in IR Response 73.2 (Registry document #169). The response elaborates on the limitations of the past radio-collaring. The data from radio-collared caribou is not being "*rejected as a source of potential baseline information for evaluating the effects of the ITH*." But the draft WEMP indicated that additional data is already being collected as a result of collaring programs designed for other purposes.

Developer Response: WMAC(NWT)-6.3

GNWT ENR's response is as follows.

GNWT ENR Response:

Collaring caribou with satellite collars has been undertaken in the area since 1996 (Nagy et al 2005) to define seasonal and cumulative ranges. Table 1 of this paper gives the numbers of collars deployed during the 1996 to 2003 period. Table 1 in Nagy and Johnson (2006) shows the number of collars deployed in 2005 and 2006. The satellite collars were only set to get a location once every 10 days in the winter period.

In 2006, some GPS collars were deployed for the first time. These collars collected three locations a day all year round. Collars were also deployed before the 2009 survey (ENR unpublished data). The number of collars deployed in 2012 is in the draft WEMP.

Developer Response: WMAC (NWT)-6.4

To the best of our knowledge, no data were rejected.

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

As indicated in GNWT ENR's WEMP, the level of fine-scale baseline information varies. The wildlife and vegetation supplemental reports and fieldwork were intended to fill in local area details for specific species and to allow habitat assessments for wildlife species in general. These studies also allowed the Developer to confirm the presence or absence of species for which the existing baseline was weak (for example, bird species at risk).

IR Number: WMAC (NWT)-7

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Preamble

The Developer goes on to state:

ENR deployed a number of GPS collars on caribou in the Cape Bathurst and Tuktoyaktuk Peninsula herds in March 2012. Collars were deployed to start the baseline collection of information for the WEMP and as part of the preparation for the July 2012 post-calving ground surveys for both herds.

A total of forty-six GPS/satellite collars were placed on caribou from the Cape Bathurst and Tuktoyaktuk Peninsula herds in march 2012. These collars provide three locations daily. Ten of the deployed collars were equipped with a geofence, allowing more data to be collected if the caribou move into the area of the proposed road (one location every hour). Additional collars will be deployed in March 2013, and as necessary additional collars will be purchased and deployed in March 2014, March 2017, and March 2020 in order to maintain thirty collars/herd for both herds.

Request

1. On what scientific basis were the sample sizes of 46, 10, and 30 collared caribou determined?
2. Are these numbers large enough to detect an effect of the road should it occur?
3. Has a statistical power analysis been conducted?
4. Why have caribou from the Bluenose-West herd been omitted from the WEMP when they clearly used the area before their population declined?

Developer Response: WMAC (NWT)-7.1

The WEMP was developed by GNWT ENR and will be implemented by GNWT ENR on behalf of the Developer.

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

As indicated in GNWT ENR IR Response #73.3 (Registry document #169), the department obtained 60 collars in total but was only able to deploy 46 collars in March 2012. The 30 collars per herd is the minimum number recommended by a power analysis carried out by Rettie (2008) to conduct a post-calving photo survey for population size. The Department intends to deploy the remaining collars in March 2013. These collars are set to collect three locations a day. The Department is aware that barren-ground caribou can move substantial distances in a 24 hour period (see examples in Appendix B of IR Response #73 (Registry document #169). Collar data does not provide an understanding of fine scale behavioural movements. However, to turn collars to greater locations per day substantially limits the battery life of a collar. Instead, the department was offered an opportunity to deploy a new collar type that will provide one location per hour while the collar is within 15 km of the right-of-way. This is the first time ENR has used these new collar types and 10 was considered to be an adequate number to test these collars. Based on the performance of these collars, ENR may deploy more of this type of collar for the programs described in the draft WEMP.

Developer Response: WMAC (NWT)-7.2

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

As indicated in Appendix B of IR Response #73 (Registry document #169), a sample of collared animals from 2005 to 2010 indicate that individual caribou are highly variable in their use of fall and winter range. This is also reflected in the behaviour of collared animals in the Porcupine Caribou Herd. RSF analysis in other areas have been able to determine ZOI around different disturbances on the landscape and with GPS and geofence collars the ability to detect changes in the movements rates should be better. The power analysis that will be undertaken (see ENR response to WMAC (NWT)-7.3) and the ongoing analysis of the data committed to in the draft WEMP should help make sure the program will be able to test the predictions as outlined in the draft WEMP.

Developer Response: WMAC (NWT)-7.3

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

There has been no statistical power analysis to determine the number of collars needed to date. As mentioned in ENR response to WMAC (NWT)-7.1, the number of collars deployed was determined by the needs of the population estimate work, ENR has assured the Developer that as the draft WEMP is moved forward for comment consideration by the co-management partners, results from a power analysis will be provided before March 2013.

Developer Response: WMAC (NWT)-7.4

As indicated in IR Responses, GNWT ENR has indicated that collared animals from the Bluenose-West Herd have not used any historic range in the ITH area for the past 10 years. GNWT ENR is not considering this herd in the WEMP as it is unlikely that animals from this will approach the area.

It is the Developers understanding that there were still collars deployed in 2012 on the Bluenose-west herd for the other monitoring conducted by ENR. The Caribou Forever Strategy provides details on the collaring program that is underway for the Bluenose-West herd. While the intent of this work is to provide information to allow for adequate population monitoring, should Bluenose-West herd animals begin to re-use the ITH project area, it is expected the collaring results under that program will indicate that. It should be clear, the draft WEMP was designed increase the likelihood that some collared animal will use range within the ITH project; allowing ENR to test the extent of behavioural and movement changes in animals. It was felt that including the Bluenose-West Herd at this time is not the best use of resources to meet that objective.

IR Number: WMAC (NWT)-8

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Preamble

Unlike some caribou, no grizzly bears have been fitted with GPS/satellite collars prior to the construction of the road:

A total of fifteen GPS/satellite collars will be deployed on grizzly bears in or near the RSA in May 2013. These collars will be programmed to provide six locations a day in the active period and one location daily during hibernation. Depending on the performance of the caribou collars, grizzly collars may be equipped with a geofence that allows more data to be collected if the bears move into the area of the proposed highway (one location every hour). Additional collars will be deployed to keep the number of bears collared around fifteen, likely in May 2015, May 2017, and May 2019.

Request

1. How does the Developer reconcile the fact that the WEMP will likely fail to detect an effect of the road on grizzly bears because the collars will be fitted too late?

Developer Response: WMAC (NWT)-8

With respect, the Developer does not agree with WMAC on this matter. Subject to a receiving a positive Decision Report from the EIRB, the Developer's current plan is to initiate late winter 2012/13 upgrading of the existing Tuktoyaktuk to Source 177 Access Road and the upgrading of the existing Navy Road leading from Inuvik to KM 0 of the Highway at the end of Navy Road.

Since this proposed upgrading work will be conducted during the winter period when grizzly bears are expected to be in hibernation, and based on surveys done to date, no known dens have been recorded in either of these two initial construction areas. As a result, the Developer does not anticipate that any grizzly bears will be exposed to construction-related disturbances during this first year of abbreviated construction along existing portions of road.

However, the implementation of the proposed WEMP in the summer of 2013 is expected to generate useful baseline information in preparation for assessing possible effects on grizzly bear during the main construction winters that will follow. There is also baseline data that was collected by studies conducted under the Western Biophysical Program and University of Alberta.

The WEMP was developed by GNWT ENR and will be implemented by GNWT ENR on behalf of the Developer. The WEMP is a draft document and will undergo further refinement in discussion with co-management partners.

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

As the ITH is primarily winter construction, the objective of grizzly bear portion of the draft WEMP is primarily to better understand the behavioural changes, if any, of bears during the operations phase with the caveat that den emergence may occur while construction work is still occurring. Past studies, as identified in GNWT ENR response to information requests (registry document #170), indicate that grizzly bears are wide ranging and exist at low densities. The number of individuals expected to occur within the ITH project area is expected to be correspondingly low. While some behavioural change may occur during construction this is expected to be minimal as responses to denning site construction occurs in late summer / early fall whereas winter construction will not start until December. GNWT ENR has informed the Developer that, with the mitigations included in the commitments table; it does not expect adverse effects given that it is felt denning habitat is not a limiting factor in the area adjacent to the right-of-way, granular sources or winter access routes.

IR Number: WMAC (NWT)-9

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Request

1. On what scientific basis was the sample size of 15 collared grizzly bears determined?
2. Is this number large enough to detect an effect of the road should it occur?
3. Has a statistical power analysis been conducted?

Developer Response: WMAC (NWT)-9.1

The WEMP was developed by GNWT ENR and will be implemented by GNWT ENR on behalf of the Developer. The WEMP is a draft document and will undergo further refinement in discussion with co-management partners.

GNWT ENR Response:

The intent of the grizzly bear collaring in the draft WEMP is to use the opportunity to try to gain knowledge of the behavioural response of a sample of grizzly bears to road construction and operations. The number of collars is an attempt at a balance between concerns about collaring and getting a sample size large enough so a subsample of collared bears will be exposed to the road and the adjacent area. There is significant baseline data collected between 2002 and 2007 to provide movement rates of bears in the region and, as most of the construction, activities will be in winter when bears are hibernating, additional years of baseline data collection may be possible. Additional collars may need to be deployed if grizzly bears die, of either natural causes or harvest.

Developer Response: WMAC (NWT)-9.2

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

The densities of grizzly bear population in the Inuvialuit Settlement Region are low and GNWT ENR expects relatively few home ranges will occur within the Inuvik to Tuktoyaktuk Highway Project corridor. At this time, the objective is to test the prediction that bears will cross the highway and to gain a better understanding of behavioural changes. This does not require a substantial sample size to test this prediction but it does require some bears to use the area immediately adjacent to the road and cross the road. The power

analysis that will be undertaken will help to assess the sample size but it is difficult to ensure at least a sample of observations will occur (i.e. that some of the collared bears would use ranges near the Project during operations). Deployment of collars from bears denning near the highway will increase the probability of use of the area.

Developer Response: WMAC (NWT)-9.3

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

A statistical analysis has not been conducted but will be undertaken before any deployments and finalization of the draft WEMP.

IR Number: WMAC (NWT)-10

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Preamble

Two other important wildlife species, the wolverine and the wolf, are included within the WEMP. As with the grizzly bear, the program will not begin monitoring these species before road construction has already begun (i.e. 2013).

Request

1. How does the Developer reconcile the fact that the WEMP will likely fail to detect an effect of the road on wolverines and wolves because their effects monitoring will begin too late?

Developer Response: WMAC (NWT)-10

With respect, the Developer would like to clarify the statement made by the WMAC. In particular, based on the proposed WEMP, monitoring of wolves and wolverines will begin prior to construction of the road as potential work in 2012/2013 in not new road construction.

Subject to a receiving a positive Decision Report from the EIRB, the Developer's current plan is to initiate late winter 2012/13 upgrading of the existing Tuktoyaktuk to Source 177 Access Road and the upgrading of the existing Navy Road leading from Inuvik to KM 0 of the Highway at the end of Navy Road. These proposed activities, although significant for the local contractors, will be conducted along previously established road corridors, in relative close proximity to the existing communities of Tuktoyaktuk and Inuvik, where wolves and wolverines are not expected to be present in potentially significant numbers.

The implementation of the proposed WEMP in the spring/summer of 2013 is expected to generate useful baseline information in preparation for assessing possible effects on these species during the main construction winters that will follow. Also based on the construction plans it will be possible to collect additional baseline data from the central section of the Highway for wolf den locations prior one or two years prior to construction activities in that section.

It must be clear that monitoring of wolves in the proposed WEMP is dependent on locating enough wolf dens in the RSA pre construction to be able to statistically measure an effect during construction. If this is not possible, this aspect of the WEMP will be dropped.

IR Number: WMAC (NWT)-11

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Preamble

WMAC's final concern lies in the rather short 5-year timeline associated with the WEMP. Some of the effects of the new road may take longer to manifest themselves in the populations of wildlife in the area. For this reason, WMAC believes that WEMP should be at least 10 years in length.

Request

1. How was the timeline for WEMP fixed at 5 years?
2. Was the timeline influenced by the short temporal boundary for the CEA?

Developer Response: WMAC (NWT)-11.1

The Draft WEMP was developed by GNWT ENR and will be implemented by GNWT ENR on behalf of the Developer. The WEMP is a draft document and will undergo further refinement in discussion with co-management partners.

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

The timeline for caribou effects monitoring was established by GNWT ENR on the basis of providing two years of behavioural data ahead of construction, three years monitoring of construction activities to provide information that could lead to modification of mitigation procedures to reduce effects based on learning between years of construction (i.e., potential to modify the construction phase Wildlife and Wildlife Habitat Protection Plan), and up to five years of monitoring during operations to confirm Developer mitigations (i.e., to modify the operations phase Wildlife and Wildlife Habitat Protection Plan). If there is no change in movement rates in the first five years then there will be no need to continue. If the results vary, ENR may re-evaluate that later.

Developer Response: WMAC (NWT)-11.2

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

GNWT ENR did not use the Developer's EIS temporal timeline for the cumulative effects as caribou and grizzly bear and other wildlife species populations are managed over the long-term by ENR with their co-management partners. A cumulative effects follow-up program is intended to test predictions or to learn from projects.

GNWT ENR's mandate is to manage populations over time and is not restricted to timelines such as the one used by the developer. In addition, the natural factors affecting the cycles in barren-ground caribou populations are considered unpredictable. Populations, such as the Porcupine Herd are a primary example. After 40 years of a highway and continued harvesting, the herd population has cycled; returning to higher numbers in July 2010. Similarly, grizzly bear populations are affected by harvesting which is adjusted to correspond to population levels over time. GNWT ENR may reconsider its radio-collaring activities dependent on overall caribou management research needs and the results from the WEMP as it is proposed.

IR Number: WMAC (NWT)-12

Source: **WMAC (NWT)**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Wildlife Effects Monitoring Program**

Preamble

Despite the various shortcomings of the Developer's CEA and WEMP, WMAC believes that there may still be an opportunity to improve the quality and effectiveness of both these project elements through the greater utilization of already existing wildlife data in conjunction with dedicated and determined efforts to collect meaningful effects data in the future.

Many aboriginal groups are becoming increasingly concerned about the use of radio collars as a means of gathering data for caribou. Collaring can have a deleterious affect [sic] on caribou, and as such, the reduction in its use is a possibility.

Request

1. How does the Developer plan to gather monitoring data for caribou if the number of allowable collars are reduced?
2. How does the Developer plan to gather monitoring data with a reduction in sampling sizes?

Developer Response: WMAC (NWT)-12.1

The WEMP was developed by GNWT ENR and will be implemented by GNWT ENR on behalf of the Developer. The WEMP is a draft document and will undergo further refinement in discussion with co-management partners.

GNWT ENR's response to this question is as follows.

GNWT ENR Response:

Most of the barren-ground caribou collaring falls under ENR's Caribou Forever Strategy. Aboriginal groups are involved in a co-management process for decisions such as numbers of radio-collars placed on animals. Should a request to reduce or eliminate collars, these groups will also be aware of the implications of such reductions in terms of obtaining information for caribou management but also for effects monitoring for the Inuvik to Tuktoyaktuk Highway. The Developer itself is not responsible for such decisions directly and cannot comment on the likelihood of such changes. If this were the case, efforts would be made to determine an alternative monitoring plan. However, currently, without the use of collars, the determination of ZOI and changes in movement rates will likely be more difficult and not as definitive. Alternative methods used in other areas include aerial flights and on the ground monitoring.

Developer Response: WMAC (NWT)-12.2

GNWT ENR is ultimately responsible for wildlife management of species (excluding those under the management responsibility of Environment Canada) in the NWT. The draft WEMP, developed by GNWT ENR and Department of Transportation, will be finalized in consultation with co-management partners. Should alternative or new monitoring approaches be deemed necessary, these will be developed by the same collaborative approach.

IR Number: DFO-1

Source: **Fisheries and Oceans Canada**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Lessons Learned – Tuktoyaktuk to Source 177 Road**

Preamble

In its response to DFO Hearing Undertaking #1 (Sept. 20, 2012), DFO stated that a "lessons learned" analysis was requested and confirmed that the proponent would provide this as an appendix to the Hydrotechnical Report. This undertaking, the Inuvik technical session transcripts, as well as past requests (DFO IR #1 — March 1, 2012) detail the topics that should be considered:

- High-flow design considerations
- culvert embedding
- providing fish passage
- beaver dam management
- culvert ice management/road blowout avoidance
- riprap management (cleanliness and size)
- sediment and erosion control fencing management
- placement of overflow culverts
- including biological and subsistence harvesting into crossing selection criteria
- monitoring and monitor training
- communications between regulators, proponents and contractors

A 'lessons learned' document was provided as Appendix K to the Hydrotechnical Report. Winter construction efficiency, embankment construction, blasting, pit selection, and road shaping and stability were outlined. It was acknowledged that issues pertaining to culverts and riprap needed to be solved prior to construction, and that the sediment and erosion control measures had been successful.

Request

1. The information for this request remains outstanding.

Developer Response: DFO-1

Responses are provided as follows for each topic listed above:

- High-flow design considerations

  The Hydrotechnical Report includes flow analysis for up to 1:100 year design period. This high flow analysis we consider to have addressed this particular requirement.

- culvert embedding

  The specifics on culvert installation details, including such things as embedment, camber, cut off walls, overexcavation, insulation, and other items have not been determined at this point in the design process.

  Additional analysis and information review as to the best practice for this Project needs to be completed. The proponent anticipates completing this analysis prior to the finalization of design details for the project.

- providing fish passage

  All crossings on this Project will be designed to meet DFO guidelines for providing fish passage, whether or not the studies at the time of design have indicated that there will be fish in that watercourse or not.

- beaver dam management

  DOT has standard maintenance procedures in place to address blockages caused by beaver activities. These standard procedures will be utilized, along with any site-specific measures deemed necessary for each culvert.

- culvert ice management/road blowout avoidance

  Similarly to all existing arctic highway culverts, new culvert crossings will require ice management to avoid road washout at freshette. This Project does not raise any unusual requirements beyond those currently dealt with by DOT maintenance.

- riprap management (cleanliness and size)

  As noted in the Hydrotechnical Report, rip-rap sourcing will be a concern for this Project. The sources of rip-rap, type of material, and size required will all be addressed in the detailed design of the project. All selected rip-rap will meet DFO requirements for cleanliness prior to emplacement.

- sediment and erosion control fencing management

  As noted in the Lessons Learns section of the Hydrotechnical Report, it is anticipated that sediment and erosion control measures similar to that of the Tuktoyaktuk to Source 177 Access Road will be used for this Project.

- placement of overflow culverts

  The requirement for and placement of overflow culverts on this Project have not been determined at this time. That will be evaluated at detailed design. In general, however, culvert crossings will be a single culvert without overflow culverts, other than possibly those installed in infill areas of floodplains on a few crossings.

IR Number: DFO-2

Source: **Fisheries and Oceans Canada**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Fish Habitat Assessment**

Preamble

In its response to DFO Hearing Undertaking #1 (Sept. 20, 2012), DFO identified gaps within the Master Watercourse Crossing Table with regards to the fish habitat assessment. A previous request (DFO IR #1 — March 1, 2012) outlined the requirements of the table:

a. total number of crossings for the entire route and consistent names/ID;
b. Crossing type/design with a discussion on how each crossing design will meet the objectives at each location including ensuring no impacts to fish passage or habitat, maintaining flow, etc.
c. Stream type with description of up and downstream connections;
d. Flow data including at freshet;
e. Bank-full or wetted width; and
f. Details on habitat condition and suitability

Both the Hydrotechnical Report and the Fish Habitat Assessments previously provided include some of the information listed above. DFO notes that some of the crossings are noted in the table to be either moved from the original location or to have another crossing added near to the original crossing. Both of these changes may affect the fish habitat assessment at that location.

Request

1. Please provide DFO with the information on the crossings that are data deficient within the crossing table.
2. Please provide DFO with a response regarding DFO's recommendation that a winter survey of fish habitat be completed on crossings that have potential overwintering habitat and are planned as culvert crossings.

Developer Response: DFO-2

As per our response on September 13, 2012, all stream crossings that will utilize a culvert are expected to be frozen to the stream bed during the winter period. If water is present during the winter period due to subterranean water upwelling, water depths within the watercourse would still be too low to permit fish overwintering. Due to the low potential for the presence of fish overwintering habitat, a winter field survey of watercourses to be crossed using culverts is not deemed necessary.

IR Number: DFO-3

Source: **Fisheries and Oceans Canada**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Crossing Scenarios and Subsequent Impact Assessment**

Preamble

The 'scenario' description has been discussed at previous meetings, the Inuvik technical session, and the Inuvik public hearing. In its response to DFO Hearing Undertaking #1 (Sept. 20, 2012), DFO outlined the details expected for those scenarios: the types of crossings that will be employed along the highway route, the number of each of those crossings, the mitigations to be used at each of those types of crossings, and the residual impacts that remain after mitigation.

The Hydrotechnical Report provided the numbers of each of the following categories of crossing (minor, intermediate, major) as well as provided approximate numbers for each type of crossing. It also outlined many options for mitigation for erosion, scour, and sediment control that could be used at the sites, however did not specify which mitigations would be used or are practical for the crossings that will be installed.

Request

1. DFO requests that information be provided on the scenarios (general construction techniques, season of construction, general mitigation), as well as provide an assessment on the impacts to fish and fish habitat.

Developer Response: DFO-3

The general construction techniques to be used for each culvert crossing, will follow a similar pattern to that of the Tuktoyaktuk to Source 177 Access Road construction with possible variation in specific details.

Construction will be in winter, with the majority of the crossings frozen to the bottom. The culvert will be installed utilizing clean gravels in the pipezone to allow compaction. Specifics of the installation are to be determined prior to the completion of detailed design. See also the response to DFO-1.

Erosion Control measures and rip-rap will be installed in the early spring, before freshette.

IR Number: DFO-4

Source: **Fisheries and Oceans Canada**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Water Crossings — Summer Installations**

Preamble

In its response to DFO Hearing Undertaking #1 (Sept. 20, 2012), DFO stated that clarification is required on whether the practice of open water crossing installation will be used for the project.

Request

1. Please provide DFO with clarification on whether crossing installations will occur in the open water season. If open water installation is being considered for this project, please provide a description of the likely scenario of installation with recommended mitigation measures. An assessment of the impacts of the installation of these crossings should be completed and included in the environmental impact assessment.

Developer Response: DFO-4

In general, there are no open water season culvert installations planned for this Project.

Bridge installations may take place in the open water season, with the majority of the works done during winter. There is no in stream work during open water anticipated for this Project.

IR Number: EIRB-1

Source: **Environmental Impact Review Board**
To: **GNWT Department of Transportation, Town of Inuvik, Hamlet of Tuktoyaktuk**
Subject: **Developer Commitments**

Preamble

Following the Public Hearings held in Inuvik on September 18 and 19, 2012 and in Tuktoyaktuk on September 24 and 25, 2012 the Developer met with several Parties to discuss the proposed ITH Project. The Developer met with the following Parties:

Party	Meeting Date
IGC	September 28, 2012
FJMC & DFO	September 28, 2012
FJMC	October 1, 2012
WMAC (NWT)	October 5, 2012

Request

1. Please provide the Panel with a complete list and the details of all commitments made to these Parties at these meetings.

Developer Response: EIRB-1

The Developer would like to make a correction to the preamble. The Developer met with:

- Inuvialuit Game Council (IGC) on September 28, 2012 (meeting summary is posted to the EIRB Registry, Document #320)
- Fisheries Joint Management Committee (FJMC) on September 28, 2012 (meeting summary is posted to the EIRB Registry, Document #321). Note: Fisheries and Oceans Canada were in attendance, but the meeting was specifically with FJMC.
- Wildlife Management Advisory Council (NWT) on October 5, 2012 (meeting record is posted to the EIRB Registry, Documents #327 and 332)

There was no meeting held with FJMC on October 1, 2012.

Developer commitments made at the meetings are as follows:

- IGC meeting:
  - For culvert design, the Developer will use best lessons learned from the Tuktoyaktuk to Source 177 Access Road, the Dempster Highway, and Russia.
  - The Developer will follow DFO guidelines for Culvert design.
  - The Developer will not use reclaimed borrow sources (gravel pits) again.
  - There will be gravel stockpiles for surfacing.
  - Climate change is being considered for Highway construction
- FJMC meeting:
  - The Developer will provide a PDF copy of the final Hydrotechnical Report to FJMC next week, after it is submitted to EIRB on October 5, 2012.
  - The Developer will set up meetings with TIWG in October-November 2012.
  - The Developer will be meeting with Tuktoyaktuk and Inuvik HTCs in October or November 2012.
  - The Developer wants to develop a framework for the fisheries management plan and fill in agency responsibilities.
  - The Developer can, in principle, give a commitment for funding monitoring, but currently does not have funding. This will be better defined as we go forward.
  - The Developer will report back to FJMC November 1, 2012 regarding the status of management plan work.
  - The Developer will collect the draft Husky Lakes Management Plan and Modeling Report from DFO.
  - The Developer will send joint minutes (ITH proponent and FJMC) of this meeting to EIRB.
- WMAC (NWT) meeting:
  - The Developer will submit a Wildlife and Wildlife Habitat Protection Plan before there is a final decision from the EIRB. The plan will not be final until after the EIRB has reached a decision as there may be recommendations for the plan.
  - The Developer will engage the HTCs in Inuvik and Tuktoyaktuk.
  - The Developer will engage the WMAC resource person on an ongoing basis and the WMAC resource person will determine how to engage the WMAC members.
  - The Developer will develop draft plans for review by WMAC.
  - The Developer will present the draft plans to WMAC at their December meeting.