



# DEHCHO FIRST NATIONS

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DEHCHO FIRST NATIONS CLOSING ARGUMENTS  
to the  
Mackenzie Valley Environmental Impact Review Board

For the proposed Prairie Creek All-Season Road  
by the Canadian Zinc Corporation

May 19, 2017

## 1. Introduction

Dehcho First Nations (DFN) have been a part of the land in their traditional territory since time immemorial and continue to have a strong connection to the land for travel, harvest and spiritual purposes. In 2003, DFN signed a Memorandum of Understanding with the Government of Canada to expand Nahanni National Park to protect more than 95 percent of the Greater Nahanni Ecosystem while leaving a small buffer of non-park land around Nahanni Butte and the existing interests of two mining companies – Canadian Zinc and Northern Tungsten – intact.

In 2000, the Naha Dehé Consensus Team was formed and prepared an Ecological Vision for Nahanni National Park Reserve that states: *“Dene are inseparable from the land. Traditional subsistence harvest will continue to be an integral and sustainable part of the ecosystem and will occur in accordance with Dene laws and principles. Naha Dehé will continue to be revered as a place of mystery, spirituality and healing.”*

Concurrent with the park expansion, there has been continued interest from the Canadian Zinc Corporation (CZN) to develop and permit the Prairie Creek mine and road access through Nahanni National Park. With the development of the Prairie Creek mine are employment, business and training opportunities for Dehcho members. During the public hearing, DFN heard strong support from Dehcho members for the Canadian Zinc Prairie Creek all-season road. We support our communities in their positions of support in order to benefit from mine operations and business opportunities. We also believe that the economic opportunities to the Dehcho need to be balanced with the need for a high environmental standard.

In 2014, Canadian Zinc Corporation (CZN) began the process of filing for an Environmental Assessment for the proposed All-Season Access Road. Dehcho First Nations has been involved in the review of CZN’s proposed All-season Access Road from the beginning of the review process. DFN reviewed and commented on the Terms of Reference, reviewed the Developers Assessment Report, filed Information Requests and attended and asked questions at the Technical sessions and hearings. We have been and will continue to participate in this process because it allows us an opportunity to examine the environmental impacts of the proposed road before it is built.

In past development projects in the Dehcho, DFN has raised concerns regarding potential adverse environmental effects, proposed mitigation measures to address adverse environmental impacts and we have reviewed monitoring programs proposed by the proponent. Our position within the Environmental Assessment process has been guided by the principle that potential benefits from development must be balanced against potential impacts

to the environment. DFN has consistently maintained the position that we expect an environmental standard similar to other projects in the Northwest Territories.

We expect an evidence-based approach to this project. DFN wants fish, water and wildlife protected as much as possible. In practical terms, DFN has concerns regarding:

- Detailed design of the All-Season Road
- Impacts to grayling populations and benthic invertebrates in Sundog Creek from the Sundog Creek realignment.
- Impacts to safe travel along the all-season access road due to avalanches
- Impacts to northern mountain caribou.
- Impacts to archaeological resources.
- Access Management
- Opportunities for the Dehcho's Guardian Program

Thank you for the opportunity to submit a final submission for the Canadian Zinc All-Season Road alignment. If you have any questions, please contact Dahti Tsetso at 867-695-2355 or [dahti\\_tsetso@dehcho.org](mailto:dahti_tsetso@dehcho.org).

Mahsi cho,



Herb Norwegian  
Grand Chief  
Dehcho First Nations

## **2. Detailed design incomplete to assess the consequences of risk along the All-Season Access Road**

### **Background**

Currently, only a small portion of the detailed design work has been completed for the CZN All-Season Road Alignment.

Two risk assessments have been completed based on the current design of the Prairie Creek All-Season Road Alignment. MVEIRB's adequacy assessment of the Developers Assessment Report determined that the risk assessment submitted by CZN was inadequate and did not meet the Terms of Reference for vehicle accidents and malfunctions.

MVEIRB contracted Oboni Riskope to complete a risk assessment for vehicle accidents and malfunctions. Oboni concluded within their risk assessment presentation at the Technical Hearing on April 26, 2017 that if private vehicles were allowed on the Prairie Creek All-Season Road, it would have "dire consequences" on vehicle accidents and malfunctions. Given that there is currently no way to effectively prevent private vehicle access on the All-Season Road; it is evident that there could be significant adverse effects on vehicle accidents and therefore driver safety and spills.

The Oboni Riskope study also concluded that the time for rescue, damage and collateral damage of each accident has been grossly underestimated by CZN (PRD 524), which further compounds the impacts of the project on driver safety.

Within the Oboni Riskope report, it points out several limitations of the information provided to date by CZN. Riskope notes the following:

- The narrow road base, which does not consider any margin for vehicle slippage, and remains a significant point of concern.
- No mitigations have been yet designed for rock falls, landslides or avalanches; all the slopes are completely unmitigated.
- Mitigations of man-made slopes (cuts in the uphill side of the road) has been mentioned in various extant records, but no final plan proposed. In ORA's experience, "man-made slopes can generate frequent and damaging slides and rock falls which at this point have not been evaluated for lack of information".

### Proponent Statement

CZN does not support the results of Oboni Riskope's Risk Assessment for the Prairie Creek All-Season will have severe negative consequences as a result of vehicle accidents and malfunctions.

### DFN Statement

Based on the information provided by Oboni Riskope, DFN is of the opinion that the road (as it is currently designed) could result in significant adverse effects to human life or spills as a result of vehicle accidents and malfunctions.

The most appropriate way to address the risk of the proposed Prairie Creek All-Season Road is for CZN to complete the detailed design of the road alignment and provide a risk assessment based on the detailed road design. This detailed design of the proposed All-Season road alignment should be accompanied by a full-suite of information that will inform an updated risk assessment. This information includes: avalanche management plan, mitigations on landslide hazard, Emergency response Plan and a Traffic Management Plan.

### Measure 1

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DFN recommends that MVEIRB apply the following measures to prevent significant adverse effects to vehicle accidents and malfunctions along the proposed All-Season Road Alignment, prior to permitting:

Design report, drawing and construction specifications that are signed and stamped by a NAPEG engineer.

Detailed map of the final alignment of the proposed all-season road alignment with mapped locations of landslide and avalanche hazard.

Details on how man-made slopes will impact landslide and avalanche hazard along the proposed all-season road alignment.

Avalanche Hazard Management Plan

Emergency Response Plan

Spill contingency and response plan

Traffic Management Plan (including how CZN will deal with non-mine traffic and CZN's Journey Management System for mine traffic)

Updated risk assessment of accidents and malfunctions to mitigate accident occurrence.

### 3. Water withdrawal for dust control

#### Issue Statement

The proposed all-season road alignment will require water withdrawal from lakes for dust suppression. Currently, CZN is proposing to withdraw up to 5% annually from lakes adjacent to the proposed All-Season Road. To monitor water levels, CZN is proposing to track water withdrawal volumes “by using an in-line flow meter, or by recording the number of fills of tanks of known capacity. Records will be kept and can be provided at regular intervals along with other road monitoring data” (PRD 282).

#### Proponent’s Conclusion

CZN assumes that “spring runoff will replenish all lakes to full capacity prior to the summer period. The rate of extraction for any given lake within the summer period will be limited by the fact that watering for dust control is not needed on successive days.”

#### DFN’s Conclusion and Rationale

DFN agrees with the necessity of water withdrawal to manage dust control along the proposed All-season road. However, water withdrawal from lakes has the potential to impact water levels, which could result in impacts to aquatic ecosystems.

DFN disagrees with CZN that the “risks are insignificant” as a result of water withdrawal from local water bodies. CZN has no data to conclude that the spring runoff will replenish all lakes to full capacity prior to the summer period. In fact, if CZN withdraws 5% annually from a lake, over a 17-year mine life; a total of 85% of the water volume of the lake would be withdrawn over the course of the project. While CZN indicates that they will record water withdrawn from the lake, they have no proposed monitoring to adequately monitor lake levels.

DFN agrees with Parks Canada and Department of Fisheries and Oceans Canada Technical Reports that installing a water gauge would allow the proponent to establish lake level volumes, establish lake level thresholds and apply management and contingency plans if certain thresholds are met.

#### Measure 2

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DFN recommends that if the project is approved, MVEIRB apply the following measure to prevent potentially significant adverse effects to lake volumes and the associated aquatic ecosystems:

a. CZN will install water gauge stations at the lakes from which water will be withdrawn for dust control along the proposed All-Season Access Road.

b. CZN will develop and implement a monitoring program based on the water gauge stations. This will include when and how many readings will be taken. The monitoring program will include thresholds for when adaptive management is applied. The program must be reviewed and approved by DFN, DFO and PCA prior to permitting.

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#### 4. Concentrate containment along the CZN All-Season Access Road

##### Background

The Red Dog Mine transports lead and zinc concentrate along an all season road 24 miles from the mine site to the sea port. Studies have linked the transport of concentrate from the Red Dog Mine to elevated levels of lead, zinc and other metals in the environment due to fugitive dust from the vehicle containers. Hasselbach, et al. (2004) found that elevated levels of heavy metals extend up to 25 km from the haul road<sup>1</sup>. In streams near the mine, cadmium and lead concentrations in tissue of juvenile Dolly Varden were significantly higher in fish downstream from the haul road compared with upstream fish (Ott and Morris, 2004)<sup>2</sup>.

##### DFN's position

The type of concentrate containment used by CZN could potentially have a significant impact on lead-zinc contaminate levels along the All-season road. CZN has already indicated that they will use bagged concentrate or concentrate haulage fleets with trailers that have hydraulically operated steel covers to minimize spills. However, DFN believes that other measures of containment could cause significant adverse impacts and it is not clearly stated in the commitments table what the method of containment will be used.

We are seeking a clear measure regarding containment, so all parties clearly understand what ore containment was decided on in the MVEIRB process.

##### Measure 3

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If the project is approved, CZN will only transport lead and zinc concentrates using double containment of bagged concentrate within a container or concentrate haulage fleet with trailers that have hydraulically operated steel covers and solid sides to minimize spills or fugitive dust.

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<sup>1</sup> Hasselbach, L, Ver Hoef, J, Ford, J, Neitlich, P, Crecelius, E, Berryman, et al. Spatial patterns of cadmium and lead deposition on and adjacent to National Park Service lands near Red Dog Mine, Alaska: NPS Final Report. NPS/AR/NRTR- 2004-45. Available from Western Arctic National Parklands, P.O. Box 1029, Kotzebue, Alaska 99752, USA; 2004.

<sup>2</sup> Ott, Alvin G., and William A. Morris. *Aquatic biomonitoring at Red Dog Mine, 2003*. Alaska Department of Natural Resources, Office of Habitat Management and Permitting, 2004.

## **5. Significant adverse impacts due to an incomplete understanding of the mitigation measures and commitments proposed by CZN**

### **Issue**

There is a potential for significance adverse impacts due to an incomplete understanding of the mitigation measures and commitments proposed by CZN.

### **Background**

CZN has committed to numerous mitigation measures throughout numerous documents and appendices including the Developer's Assessment Report and associated appendices, the Wildlife Mitigation and Monitoring Plan, Alpine Solution's Report, Hatfield Report, archaeological report, information request responses and memos. In total, DFN notes that there are 35 documents on the registry that contain mitigation measures or contribute to our basic understanding of the project.

With the volume of documents on registry, it is unclear to DFN the specifics of all the mitigation measures or commitments made by the proponent over the course of the project. DFN has concerns that not capturing the specifics of the mitigation measures over the course of the project could lead to a significant adverse effect due to a poor understanding of the project and project mitigations. In the case of a change of management within CZN or a buy-out of CZN, it could be unclear to the proponent what the specifics of the commitments or mitigations are. Different regulators will also be involved in the permitting phase of this project and without clear commitments and mitigation measures, it will be difficult for future regulators to understand what was committed to in the MVEIRB process.

MVEIRB staff has advised DFN to highlight elements of the project that could lead to a significant adverse effect and that should require detailed commitments and/or mitigation measures. DFN believes that almost any aspect of the project could lead to a significant adverse effect and that part of MVEIRB's role is to provide a clear list of mitigation measures and commitments at the conclusion of the EA.

### **Measure 4**

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If the project is approved, DFN recommends that MVEIRB provide detailed commitment and mitigation tables for the CZN All-Season Access Road that captures ALL of the commitments and mitigation measures within the various documents for the project.

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## 8. Impacts to Cultural Heritage

### Background

The proponents' initial position with respect to Cultural Heritage was that sufficient work had been done in previous Canadian Zinc environmental assessments (DAR, [PR#55](#)). The proponent also proposed that Nahanni Butte Dene Band members would accompany road workers to watch for signs of heritage resources. A number of Parties have previously questioned the efficacy of that approach, in particular during the June 14<sup>th</sup> technical sessions held in Yellowknife ([PR#232](#)).

In the technical sessions, GNWT staff clarified that CZN's proposed approach would not meet requirements by the legislation / regulations (Tech Sessions, [PR#232](#)). Specifically, in order to obtain an archaeological permit, a primary investigator with sufficient professional training and credentials would be required. Canadian Zinc subsequently agreed to contract an Archaeological Overview Assessment (AOA), which was completed by Lifeways of Canada Limited and submitted to the Board on November 29<sup>th</sup>, 2016 ([PR#379](#)).

The authors of the AOA identified several areas that will be disturbed through construction at which there is likely high potential for cultural heritage resources. The authors recommended that an Archaeological Impact Assessment (AIA) be conducted preconstruction (p.9). Specifically, the AIA "should focus on the infrastructure associated with the Project, especially the borrow sources, camps, staging areas, drainage crossings and areas that were not included in the previous studies or identified specifically during consultation with Nahanni Butte Dene", in particular:

- Between Highway 7 and Wolverine Pass- proposed borrow sources and water crossing
- From Wolverine Pass to Sundog Creek (Figure 2 Maps 5 to 7) the borrow sources, drainage crossing, Wolverine Pass, and flat areas along the drainage valleys
- From Sundog Creek to the Prairie Mine Site – those areas identified as having elevated potential, and only where new disturbance will occur.

The AOA also recommended that cultural resource protection plan be developed. The report reads:

*"Once the AIA has been completed, irrespective of the results, a Cultural Resource Protection Plan will be developed. The plan will build on the heritage resource booklet and will include illustrated descriptions of site types that are common to the Project area with examples from the AIA or previous research."*

*Once the AIA is completed, in the unlikely event that cultural material is uncovered during the construction of the Project, work should stop temporarily and depending on the jurisdiction involved, either Parks or the PWNHC be contacted to discuss how to proceed."*

#### Developer's Conclusions

CZN has committed to completing an AIA for the project.

#### DFN's Conclusions

Cultural heritage resources provide valuable insights into the lives of Dehcho ancestors and tell rich stories about their skills, practices and land occupancy. AOAs followed by AIAs and cultural resource protection plans have therefore become a minimum standard expected by a proponent when a proposed disturbance will jeopardize potential cultural resources on public lands.

Dehcho First Nations have traditionally used the areas which would be disturbed by the footprint of the proposed all-season road, as noted in the Addendum to the TK Assessment of the Prairie Creek Mine: "Given that the ancestors of the Nahæê Dehé people are known to have traveled overland to a greater extent than via waterways, the mountain passes that provide easy access into and between valleys are potential areas for pre-historic and historic artifacts" ([PR#18](#)).

The AIA should include pedestrian studies of all high potential areas and should be of sufficient scope with sufficient resources that likely heritage resources will be identified (such rigor could be addressed through the archaeological permitting process). The current AOA used previously recorded sites to predict high potential areas for cultural resources. However, according to PC Technical Report (PRD#452) there has been limited archaeological investigation conducted in NNPR and most of the work was at low elevations.

DFN believes that review of DFN's Traditional Land Use Information housed by the Dehcho Land Use Planning Committee could yield information to aid in identifying and protecting heritage resources along the proposed all-season road alignment. In addition to Traditional Land Use information, further work is needed on traditional ecological knowledge (TEK) to determining historical resource potential along the proposed all-season road alignment.

DFN recommends that the how the TEK information will be collected will be determined by the local community. As described in Usher (2000): "*Documentation and communication of TEK,*

*regardless of who does it, require the support, cooperation, and involvement of the community involved. Individuals from outside the community who seek TEK need to negotiate the basis for doing so. This is a standard requirement of ethical research guidelines, and is sometimes also a permitting requirement. Researchers must gain the trust of and be accountable to the persons providing TEK. They do this by, among other things, fully disclosing the objectives and uses of the research, obtaining informed consent of individual participants, involving the community in the design and conduct of the research, and entering into an agreement about data ownership and access.”<sup>3</sup>*

## Measure 5

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DFN recommends that the Board apply the following measures to prevent significant adverse effects to heritage resources from the All-Season Road, should the project be approved.

- a. The Terms of Reference for the proposed all season road AIA shall be developed in collaboration with and approved by DFN, LKFN and NBDB.

The Terms of Reference will include 1.) model of archeological potential in the GIS Potential Model Categories 1-4 outlined in the AOA, 2.) assess areas of potential impacts including borrow sources, water course crossings, camps, staging areas, right-of-ways and road alignments and 3.) incorporate traditional knowledge from all communities that may have knowledge of the project area and 4.) incorporate DFN’s traditional land use information for knowledge on camping sites and harvesting areas.

- b. A community co-researcher will be hired to aid in collecting field archaeological data.
- c. DFN and the DLUPC will decide upon the company or person that will be using DFN’s TLU information to provide CZN with information on archaeological potential. DFN/DLUPC will enter into an agreement with this company on confidentiality, data access and sharing.
- d. The local community will decide upon the company or person completing the traditional knowledge study. A community co-researcher will be hired to aid in collecting traditional knowledge information and will be selected by the local community.
- e. The local community will help determine the methods for the TEK study including the use of the research, the design of the project, data agreement (about data ownership and access), who will be interviewed and what interview method will be used (group versus individual).

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<sup>3</sup> Usher, P. J. (2000). Traditional ecological knowledge in environmental assessment and management. *Arctic*, 183-193.

- f. CZN will conduct the AIA prior to permits or licenses being issued.
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## 9. Northern Mountain Caribou

DFN maintains that there could be potential significant, adverse impacts on Northern Mountain Caribou due to the All Season Road, particularly at the local population level. This position remains consistent with and is based on the evidence presented in the DFN and PCA Technical Reports ([PR#459](#) and [PR#452](#)) and PCA statements made at the Public Hearing (Day 3, [PR#528](#)).

CZN have noted a Redstone herd estimate of 10,000 animals, with a 20-year population trend considered to be stable ([PR#484](#), Addendum 1 of CZN response to technical reports). However, as PCA acknowledged at the Public Hearing (Day 3, [PR#528](#), p.77), the best available information on the Redstone herd currently comes from the federal *Management Plan for the Northern Population of Woodland Caribou (Rangifer tarandus caribou) in Canada*, which estimates the population at 5,000 to 10,000 animals, with low confidence in this estimate from 1997 and a population trend of 'Unknown'.<sup>4</sup> PCA also stress the need to assess effects at the local population level (Public Hearing Day 3, [PR#528](#), p.89), consistent with the Terms of Reference ([PR#42](#)). In addition to the COSEWIC designation of 'Special Concern', Northern Mountain Caribou received an upgraded NWT General Status Rank of 'Sensitive' (from 'Secure') in September 2016. Northern Mountain Caribou are not due for NWT Species at Risk Committee Assessment until 2019, and there are currently no co-management plans yet for any of the herds.

Despite CZN previously disagreeing about the existence of a sedentary, resident population in the project area ([PR#282](#), p.2), they have since conceded that this small population likely does exist (Public Hearing Day 3, [PR#528](#), p.113; [PR#484](#), Addendum 1 of CZN response to technical reports). This change has directly arisen from PCA evidence presented throughout the Environmental Assessment process, which has been generated via ongoing and current data collection.

PCA have repeatedly indicated that CZN's DAR and subsequent positions claiming low significance of effects on Northern Mountain Caribou are based on "incorrect, outdated. Information," and instead that "wildlife studies in the project area, albeit limited, consistently report caribou in the project area. Information from hunting outfitters, park staff observations, remote camera images, and recent satellite collar data confirm caribou in the project area and their year-round presence," as well as calving activity within the project area ([PR#452](#), p.13). There is insufficient evidence for CZN to determine only 'trace occurrence' of Northern Mountain Caribou in the project area ([PR#484](#)).

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<sup>4</sup> Environment and Climate Change Canada. 2012 Management Plan for the Northern Mountain Population of Woodland Caribou (*Rangifer tarandus caribou*) in Canada. *Species at Risk Act Management Plan Series*. Environment and Climate Change Canada, Ottawa. vii + 79 pp.

DFN recommends that the Review Board adopt the following Measure put forward by PCA ([PR#452](#), p.16) in order to prevent potential, significant impacts on Northern Mountain Caribou from the All Season Road:

#### Measure 6

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CZN shall develop a systematic monitoring program to address potential impacts to the Northern Mountain Population of Woodland Caribou from the all season road. This monitoring program must include annual aerial surveys to provide a population index and composition during rut and additional seasonal ungulate surveys as required. Track and scat surveys or the use of a camera trap design could also be implemented.

The monitoring program needs to demonstrate how the resulting data will be incorporated into adaptive management (i.e., define thresholds and actions) and must be developed in collaboration with (and approved by) Parks Canada during the regulatory phase, should the project proceed to that phase. Further mitigations may be required, such as timing windows or identified sensitive areas with limitations on use. Parks Canada supports an adaptive management approach based on the results of the monitoring program. Until notified otherwise by Parks Canada, CZN shall provide annual monitoring updates to Parks Canada to ensure that appropriate management responses/mitigation adjustments can be implemented.

These responses/mitigation adjustments must be approved by Parks Canada.

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As noted by PCA at the Public Hearing (Day 3, [PR#528](#), p.83), aerial surveys are the standard for population surveys for Northern Mountain Caribou in the Yukon. CZN have acknowledged that trail cameras should be considered for monitoring caribou occurrence ([PR#484](#), CZN response to technical reports, p.3). CZN have described their proposed monitoring method of observation as 'opportunistic' ([PR#484](#), Addendum 1 of CZN response to technical reports). As DFN and PCA have stressed, a more systematic, structured monitoring program is required (Day 3, [PR#528](#), p.88, 218).

## 10. Access management

### Background

A number of questions and concerns remain outstanding regarding access management of the All Season Road, including safety issues, the potential to affect harvestable species abundance and distribution, and changes to harvesting pressure and harvesting areas.

Throughout the course of the Environmental Assessment (including Public Hearing Day 3, [PR#528](#)), concerns with access have been raised, and CZN will realistically have to account for the associated risks. As a one-way haul road, the potential for unauthorized access of the All Season Road presents a significant adverse safety risk for mine and non-mine traffic. The Review Board has acknowledged the potential for expanded access to caribou via the All Season Road, and the significant burden placed on community-based monitors as the primary mechanism of access management (Public Hearing Day 3, [PR#528](#), p.49-50).

### Measure 7

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DFN recommends that if the project is approved, MVEIRB adopt the following Measure to help address access management issues:

CZN, in consultation with PCA, GNWT, DFN and NDDDB shall develop a Traffic Management Plan for approval, prior to the project permitting phase.

The Plan will detail CZN's procedure for responding to unauthorized vehicle access of the All Season Road, including accident response

CZN will fund an independent DFN Guardians Program comprised of members from the Naha Dehé Dene Band, Liidlíi Kue First Nation and other DFN members as appropriate and needed. The Guardians Program will provide independent employees to monitor and manage access issues

CZN shall outline responsibilities and mechanisms for continued access management, should the project go into Care and Maintenance

CZN shall install remote camera stations along the road to monitor and quantify how many people are using the road other than CZN employees or contractors

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## 11. Avalanche Hazard

### Developer's position

CanZinc has committed to following up on the recommendations in the (Alpine Solutions) report (avalanches) at the appropriate time in advance of winter road construction.

### DFN's Position

At this stage in the Environmental Assessment, there has been no specific mitigation measures designed for avalanches and it has been deferred to the detailed design phase of the project. DFN's position is essentially the same as the Alpine Solutions report that there could be significant adverse effects due to avalanche risk depending on how mitigation measures are applied.

Alpine Solutions (2012) states that "Potential consequences of avalanches reaching the winter road include traffic delays due to road blockage, potential vehicle damage, occupant injury or fatality, and mine concentrate spillage. In addition any fixed infrastructure (such as bridges) located in avalanche areas may be at risk if they are not designed for avalanche impact. Associated consequences may include economic losses resulting from the above, and impact to company reputation."

DFN is recommending that the measures for avalanches provide clarity regarding what work on avalanche hazard CZN will complete during the detailed design phase. The commitment that CZN "will follow-up on the Alpine Solutions report in advance of road construction" is too vague for DFN. We want a clear understanding of what avalanche hazard work the proponent will be completing during the detailed design phase.

### Measure 8

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DFN recommends that if the project is approved, MVEIRB introduce the following measures pertaining to avalanches:

CanZinc will provide the following information during the detailed design phase and prior to permitting:

- Road layout on attached avalanche hazard maps will be reviewed and confirmed once the road alignment is finalized.
- A helicopter based reconnaissance will be completed in order to refine avalanche path locations and hazard areas. The helicopter based access would allow for ground based assessments in select areas. This reconnaissance could be completed during summer or winter season.

- If a more detailed risk assessment is required, a linear risk analysis should be undertaken. A typical method which can be used to compare with other industrial roads is the 'Avalanche Hazard Index' (Schaerer, 1984)
  - An avalanche hazard management plan will be prepared for the Prairie Creek winter road. The plan should specify all measures employed to reduce risk to vehicles and occupants. In addition the plan should include an emergency response plan.
  - If structures such as bridges are to be installed at creek and river crossings near avalanche paths along the mountain segment of the road, an assessment of potential avalanche impact should be undertaken.
  - If mine activities are proposed to occur in valleys and slopes surrounding the immediate mine site area, an avalanche risk assessment should be prepared for those activities.
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From Alpine Solutions (2012): "Considering avalanches are not expected to be frequent during December through February, it is unlikely that an avalanche technician would be required to be on site for this period. However, during spring daily weather and snowpack analysis may be required to predict timing of avalanche events."

DFN recommends that CZN/Alpine Solution provide mitigation measures surrounding conditions that may cause an increased avalanche potential in December through February. We note that there is inter-annual variability in how much snow is present in December through February and we frequently experience unusual warming events during these months – both of which have the potential to impact the avalanche potential along the All-Season Road Alignment.

#### Measure 9

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DFN recommends that if approved, MVEIRB introduce the following measures pertaining to avalanches:

CZN provide information on how they will detect and mitigate for high avalanche hazards from December to February.

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## 12. Sundog Creek Realignment

### Background

The Sundog Creek will be realigned from its natural streambed to a constructed streambed to facilitate construction of the proposed All-season road. CZN maintains that moving the existing stream channels to new areas within floodplain that were recently dry will result in short term losses in the quality of fish habitats (PRD 368).

### Developer's position

CZN maintains the belief that the benthic invertebrate assemblages should return to similar species diversity and densities within a short timeframe post-diversion. CZN's opinion is based partially on the fact that there will be downstream drift of benthic invertebrates, which will colonize the new channel. CZN may consider conducting a study to assess potential effects on benthic invertebrate assemblages in Sundog Creek, with the study counting towards offset of potential losses.

CZN also notes that Arctic grayling are present in the Sundog Creek realignment. Arctic grayling life history information was compiled from scientific literature (e.g., Larocque et al 2014 and Hubert et al 1985). Life-history information suggests that Sundog Creek in the areas of proposed road encroachments and proposed channel relocation is likely used primarily as migration habitat.

### DFN's position

DFN agrees with Parks Canada (PC) that CZN's assertion that recolonization will take one season is unsubstantiated and also has concerns that there could be significant adverse impacts to benthic invertebrates. PC continues to hold the opinion that the realignment of a section of Sundog Creek to a new area in the floodplain that was recently dry will adversely affect benthic macroinvertebrates. Benthic macroinvertebrates, such as insects, worms and crustaceans are a food source for many species in the Sundog Creek drainage. Rerouting and training of the stream channel in Sundog Creek will impact short-term composition and abundance of the benthic macroinvertebrate community.

Colonization of benthic macroinvertebrates in new reaches of the stream is highly variable and can take months to years (Mackay, 1988).

DFN also has concerns regarding Arctic grayling that are present in the Sundog Creek realignment and the potential for significant adverse impacts resulting from the realignment on Arctic grayling.

#### Measure 10

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DFN recommends that if this project is approved, MVEIRB apply the following measures to prevent potentially significant temporary adverse impacts on the rerouted section of Sundog Creek.

CZN requires a Fisheries Act authorization for off-setting along the Sundog Creek Realignment. A monitoring plan is required to assess if the created habitat is successfully functional and sustainable. DFN recommends that CZN continue to work with DFO, PC, LKFN, DFN and NDDB on the off-setting of the Sundog Creek Realignment.

CZN will develop and deploy a program to monitor the duration of reductions in the ecological performance of the realigned section of Sundog Creek using benthic macroinvertebrates as a biological indicator.

CZN will develop an adaptive management plan for benthic macroinvertebrates to address potential impacts from the all-season road.

CZN will develop and deploy a program to monitor Arctic grayling in Sundog Creek before and after the realignment is complete.

CZN will develop an adaptive management plan for Arctic grayling to address potential impacts from the all-season road.

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### 13. Community Monitoring

#### Background

Part of mitigation and monitoring commitments for the Jay Project (PRD #211) includes community based monitoring programs. The purpose of these programs is to “participate in site activities designed to determine whether mine activities have effects on the environment, wildlife, or their habitats, and if so, how to mitigate these effects.” Active participation in these programs provides an opportunity for communities and participants to provide feedback on how the Ekati Environment Department conducts its monitoring programs at the Ekati Mine.

The goal of the monitoring program is to ensure that the mitigation measures proposed by the proponent are fully and effectively implemented, and significant adverse impacts on the environment are mitigated, throughout all phases of the development.

#### DFN’s position

DFN requests that any monitoring programs for the CZN All-Season Access Road entail CZN funding of a DFN Guardians Program, comprised of members from the Naha Dehé Dene Band, Liidlíi Kue First Nation (per Public Hearing Day 3, [PR#528](#), p.33) and other DFN members as appropriate and needed. These Guardians would be independent, as opposed to community-based monitoring employees of CZN (as suggested by CZN at Public Hearing Day 3, [PR#528](#), p.51). The program should be designed to build the community capacity in monitoring in a manner that is meaningful. The program should also enable local members to share their knowledge, so that both western science and traditional knowledge informs the program and any resulting management decisions.

The Review Board has precedent for Measures pertaining to monitoring and adaptive management, and could integrate with other monitoring measures or include it as a broader Measure:

#### Measure 11

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In order to ensure that the measures that CZN is responsible for are fully and effectively implemented, and significant adverse impacts on the environment are mitigated, throughout all phases of the development, CZN will:

1. Establish and implement monitoring programs to fulfill the following objectives:
  - a) to measure the effects of the Prairie Creek All-season road on the environment;
  - b) to assess the implementation and effectiveness of the measures in this Report of EA to prevent or minimize impacts on the environment;
  - c) to assess the accuracy of CZN’s predictions made during the environmental

assessment, regarding the impacts of the Prairie Creek All-season road on the environment;  
and  
d) to provide relevant data and information to support regional monitoring  
initiatives.

Implement adaptive management processes that use the results of monitoring  
programs to systematically adjust mitigation actions in order to minimize adverse impacts on  
the environment.

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#### **14. Commitments related to Northern Mountain Caribou**

##### **Issue**

There is a potential for significance adverse impacts on Boreal Caribou due to an incomplete understanding of the mitigation measures and commitments proposed by CZN.

##### **Background**

CZN has committed to numerous mitigation measures throughout numerous documents and appendices, information request responses and memos.

With the volume of documents on registry, it is unclear to DFN the specifics of all the mitigation measures or commitments made by the proponent over the course of the project. DFN has concerns that not capturing the specifics of the mitigation measures over the course of the project could lead to a significant adverse effect due to a poor understanding of the project and project mitigations. In the case of a change of management within CZN or a buy-out of CZN, it could be unclear to the proponent what the specifics of the commitments or mitigations are. Different regulators will also be involved in the permitting phase of this project and without clear commitments and mitigation measures, it will be difficult for future regulators to understand what was committed to in the MVEIRB process.

##### **Measure 12**

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DFN recommends that if this project is approved, MVEIRB will provide detailed mitigation measure and commitments related to Boreal Caribou and Northern Mountain Caribou:

<b>Proposed DAR mitigation</b>  <b>*Categories derived from Boreal Caribou Recovery Strategy (Environment Canada 2012) Possible Mitigation Techniques (see <a href="#">PR#186</a>).</b>	
<b>DAR Mitigation</b>	<b>DFN Comments</b>
Development footprint/habitat disturbance	
<ul style="list-style-type: none"> <li>▪ Project generally follows the approved winter road to the extent possible (10.2 km of re-alignment is the most current proposed route within Boreal Caribou range)</li> <li>▪ Project designed to utilize borrow material within the proposed road right-of-way, to the extent possible</li> <li>▪ Temporary camps to use borrow sources and existing camp locations, where possible</li> <li>▪ Reclaim borrow sources when no longer needed</li> </ul>	DFN agrees that the proponents proposed mitigations are necessary and help to mitigate potential effects.
Preservation of biophysical attributes	
<ul style="list-style-type: none"> <li>▪ Project inherently designed to avoid peatlands, lowlands, and open water habitats, to the extent possible</li> <li>▪ Project re-alignment near the east toe of the Nahanni Range to Nahanni Butte following stakeholder advice to avoid Boreal Caribou habitat in the lowlands</li> </ul>	
Minimization of disturbance by adapting shape	
<ul style="list-style-type: none"> <li>▪ To the extent that the proposed all season road can adapt its shape, the Project:</li> <li>▪ Reduces road access into borrow sources by utilizing material within and immediately adjacent to the road right-of-way (only 2.5 ha of borrow source roads proposed)</li> <li>▪ Reduces road access by utilizing existing borrow sources for temporary construction camp locations</li> </ul>	
Prevention of boreal caribou harassment	
<ul style="list-style-type: none"> <li>▪ Low traffic volumes (approximately 15 haul trucks per day)</li> <li>▪ Low traffic speeds to substantially reduce noise or other associated potential effects</li> </ul>	

<ul style="list-style-type: none"> <li>▪ If caribou reported beyond 500 m of the Project footprint, traffic are to be reduced to half the posted maximum speed limit, 30 km/hr, within 1 km of the sighting or as soon as the animal is sighted</li> <li>▪ If caribou reported on the road or within 500 m of the Project footprint, traffic or activity will cease at least 500 m from (or at first observation of) the animal(s) and all headlights turned off until the animal moves off at least another 100 m from the road or 5 minutes after last visual. Once traffic resumes, speed reduced to half the posted speed limit within 1 km of the sighting</li> <li>▪ Confine other Project-related activity to two transfer facilities approx. 70 km apart (straight line distance))</li> <li>▪ Concentrate construction activities temporally and spatially by adopting a sequential development strategy as much as possible (including blasting, if required)</li> </ul>	
Pollution mitigation	
<ul style="list-style-type: none"> <li>▪ Industry standards (i.e., GNWT dust suppression guidelines, Northern Land Use Guidelines for roads and pits/quarries, and spill contingency planning guidelines) to be applied</li> <li>▪ Measures to avoid contaminant loading identified in the Contaminant Loading Management Plan to be applied</li> <li>▪ Section 9 of the DAR outlines spill response procedures</li> </ul>	
Disturbance Timing	
<ul style="list-style-type: none"> <li>▪ If blasting is required within Boreal Caribou range, blasting prohibited from May 1 to July 15 and minimized from December to April should it be deemed necessary for construction</li> </ul>	
Access Management (prevention of additional disturbance in opened areas)	
<ul style="list-style-type: none"> <li>▪ Operation of a private barge on the Liard River for truck traffic, and this would not be available to non-residents</li> <li>▪ Install signage before the Liard River advising the barge is operated as a private crossing to discourage non-mine related traffic</li> <li>▪ Restrict the use of the Prairie Creek Mine access road by non-mine related traffic to the extent possible using a check-point station</li> </ul>	

(manned by NDDDB members) after the Liard River crossing <ul style="list-style-type: none"> <li>Manage the small portion of the winter road not used for the all season access to exclude non-Project related travel of the corridor, if necessary</li> <li>Maintain and or manage disturbed areas to facilitate natural encroachment of native species</li> </ul>	
Prevent corridor use by predators	
<ul style="list-style-type: none"> <li>Manage the small portion of the winter road not used for the all season access to minimize predator travel and exclude non-Project related travel of the corridor, if necessary</li> <li>Maintain and or manage disturbed areas to facilitate natural encroachment of native species</li> </ul>	
Mortality management techniques (habitat restoration, killing of predators)	
<ul style="list-style-type: none"> <li>Not considered for the proposed all season road</li> </ul>	
<b>Updated Commitments Pertaining to Wildlife and Caribou – October, 2016 (in <a href="#">PR#370</a>)</b>	
A no hunting policy for all Project employees and contractors while working and/or at the Mine site.	
A wildlife and wildlife habitat mitigation and monitoring plan that includes annual engagement with members of the Naha Dehe Dene Band to monitor measurable parameters of effects.	As committed to in EA0809-002 <sup>5</sup> , such a plan will be updated during the permitting process and considered a 'living' document, and further changes will be considered as necessary during operations. Such changes will be discussed in the forum of the Technical Advisory Committee (TAC). CZN also committed in EA0809-002 to include LKFN and other First Nation representation on the TAC, and as such as follow up to Round 2-DFN-IR-1, <a href="#">PR#370</a> , DFN would like to request formal inclusion on the TAC. DFN also recommends that the next iteration of the WMMP continue to be broadened to ensure the inclusion of proactive, science and TK-based monitoring practices, with

<sup>5</sup> CZN have indicated that they will adopt those commitments made for EA0909-002 as appropriate. These commitments are summarized in Table 3-1 of the Consolidated Project Description dated February 12 (included in [PR#370](#) EA1415-01 Round 2 Information Requests Review Comment Table).

	less emphasis on incident and sighting documentation alone.
Policy giving wildlife the right-of-way, obligating drivers to stop (when safe to do so) for wildlife seen on or immediately adjacent to the road, to allow them to move away.	
Policy that all Project-related transportation activities are to give the right-of-way to any wildlife that such activity may encounter	
Develop standard aircraft procedures for flying into and departing from the proposed airstrip to accommodate wildlife, if present on or near the airstrip.	As committed to in EA0809-002, the Flight Impact Management Plan will be reviewed and updated during the permitting process, including flight paths to and from the mine considered according to the recommended guidelines for flying in caribou and sheep country. A procedure was also committed to so that caribou observations made by aircraft pilots during transport of crews and materials will be reported to the Wildlife Monitor.
Maintain a minimum flight altitude of 600 m except during take-off and landings.	
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.	
Follow the existing draft Contaminant Loading Management Plan and soil sampling along the road bed both before and during haul operations.	
An education program of wildlife related policies and mitigation to all Project employees and contractors, including a bear awareness program to ensure employees and contractors are informed of bears and other potentially dangerous wildlife and the level of risk.	
An alert system to warn personnel of Woodland Caribou and other sensitive wildlife in the local area by relaying sighting information to vehicles/aircraft and equipment operators and on-site personnel.	
Wildlife sighting logs to be completed by all Project employees and contractors for wildlife sightings (e.g., Dall's Sheep, caribou, Wood Bison) with respect to species, location along the access road/ airstrip, numbers, and reaction to Project activity. If a problem area is identified, corrective measures will be considered.	

ENR's Woodland Caribou Best Management Practices for Industrial and Commercial Activities (once developed) to be incorporated into the wildlife monitoring program, where feasible, to manage or mitigate habitat impacts and sensory disturbances on Woodland Caribou.

In its 2016 Updated Draft WMMP, CZN also committed to implementing the following specific caribou monitoring activities to provide the following real-time information during year-round mine operations and hauling activities, from the Golder 2012 Draft WMMP (both drafts of the WMMP in [PR#267](#)):

- Information on caribou numbers, frequency of occurrence, and distribution in the Project area;
- Location of caribou and caribou aggregations in close proximity to mine infrastructure and the airstrip;
- Response of caribou to aircraft traffic in the vicinity of the Mine site; and
- Location of caribou and caribou aggregations in close proximity to the access road during winter concentrate hauling operations.
- Wildlife Monitors will conduct ground-based surveys of the access road, mine infrastructure sites, and the airstrip to identify caribou aggregations in the Project area and assess behaviour;
- A radio call-in procedure will be implemented so that observations of caribou along the access road can immediately be relayed to the Road Operations Supervisor so that traffic alerts can be issued. Observations recorded by drivers during hauling will provide information about caribou crossing patterns and movement corridors along the access road; and
- A procedure will be implemented so that caribou observations made by aircraft pilots during transport of crews and materials will be reported to the Wildlife Monitors. Observations recorded during air transport will provide additional information about presence of caribou in the vicinity of the mine site and access road.

CZN also committed that as part of an adaptive management strategy, if the above-noted caribou monitoring indicates a lack of success of mitigation actions, then mitigation actions will be reassessed and modified following

	consultation with First Nations, GNWT ENR, and Parks Canada.
Snow removal practices along the access road and airstrip to manage high snow banks, so that wildlife can readily move off as vehicles/aircraft approach.	
A structure for reporting human-dangerous wildlife encounters at the TTF and resulting incidents to inform Mine management and ENR staff.	
A Waste Management Plan that prohibits littering, purposely feeding wildlife, and storing attractants accessible to wildlife. Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize wildlife attraction to the local area. Adaptive management will be applied to waste management practices. If wildlife are found to be attracted to the site (i.e., problem wildlife) additional management practices, if required, will be adopted.	
Fuel storage facilities that meet industry standards for tank construction, location and spill containment	
Appropriate materials management systems will minimize the risk of accidental spills or leakage of concentrate, diesel fuel/ hydrocarbons, and other hazardous materials being shipped to the mine site. This includes ensuring hydrocarbon and chemicals that are hauled along the access road or stored at the TTF are in industry standard containers with appropriate spill containment and management measures in place.	
Staff trained on the existing spill management plan and procedures to quickly respond to an accidental spill. The plan will include provision for rapid deployment of cleanup crews and for contaminant and cleanup of spilled material and contaminated surfaces.	
Managing the small portion of the winter road not used for all season access to prevent predator and non-Project related travel of the corridor, if necessary.	
Preservation of natural drainage patterns along the haul road to maintain the natural function and processes of peatland habitats adjacent to the haul road.	
Non-mine vehicles, including all-terrain vehicles (ATVs) and snowmobiles will be prohibited on site.	

Adherence to standard industry best practices during construction.	
Discuss issues and considerations regarding wildlife populations and effects during the Technical Advisory Committee meetings proposed by CZN in EA0809-002.	
Report annual updates and results of the Wildlife Mitigation and Management Plan, Controlled Road Use Plan, and inspections and enforcements.	
Reporting and evaluating wildlife sightings along the access road and airstrip, and if a problem area is identified, corrective management options for traffic and Project-related activities will be considered.	
Prohibit hunting, trapping, harvesting, and fishing by site employees and contractors.	
The appropriate regulatory agencies (i.e., GNWT ENR and Parks Canada) will be contacted to receive additional direction regarding new issues that arise.	
Provide the Dehcho Land Use Planning Committee (and others as requested) the post-construction digital footprint of the all season access road and associated facilities to incorporate into ongoing cumulative effects monitoring across the Dehcho.	DFN request that CZN provide it with the post-construction digital footprint also.
Amend the existing draft Wildlife Mitigation and Monitoring Plan, as necessary, to include the monitoring of measurable parameters of effects.	
Blasting is prohibited if caribou are observed within 1 km of blast site until animal moves out of the area.	CZN has committed to a wildlife reconnaissance (to be completed by the CZN Environmental Monitor) by scanning adjacent slopes, ponds, and surrounding areas with binoculars prior to blasting, if blasting should occur (TetraTech EBA Wildlife Veg IR1 responses, <a href="#">PR#186</a> ).
If caribou are reported on the road or within 500 m of it, traffic or activity will cease at least 500 m from (or at first observation of) the animal(s) and all headlights turned off until the animal moves off at least 100 m away from the road or 5 minutes after last visual. Once traffic resumes, speed reduced to half the posted speed limit, 30 km/hr, within 1 km of the sighting.	As noted in the CanZinc Commitments Table ( <a href="#">PR#296</a> ), the 500 m buffer extends to the mountain range due west of the Prairie Creek Mine site where caribou tracks and cratering were reported by Parks Canada. The 500 m buffer is also to apply to the entire Project footprint, and not just the road.
If caribou are reported beyond 500 m of the road, traffic speeds are to be reduced to half the posted speed limit, 30 km/hr, within 1 km of the sighting.	

**Additional commitments from EA0809-002 Consolidated Project Description – February 2012<sup>6</sup> (in [PR#370](#))**

For caribou, wood bison, grizzly bear, wolverine, peregrine falcon, shorteared owl, horned grebe, rusty blackbird, olive-sided flycatcher, and common nighthawk, any mortality directly relating to the operation of the mine site or access road will trigger a review of mitigation strategies.	
Dead wildlife encountered in proximity to the mine site and access road will be recorded and geo-referenced.	
Appropriate collaborative monitoring initiatives with First Nations, Parks Canada and other regulatory agencies will be supported.	
All relevant observations of wildlife (particularly of Dall's sheep, caribou, grey wolf, wolverine and grizzly bear) will be reported to mine environmental staff.	
All vehicles will be equipped with two-way radios. Wildlife sightings along the access road will be geo-referenced and reported to road supervisors.	
A radio call-in procedure will be implemented so that observations of caribou along the access road can immediately be relayed to the Road Operations Supervisor.	
A procedure will be implemented so that caribou observations made by aircraft pilots during transport of crews and materials will be reported to the Wildlife Monitor.	
Wildlife monitors will conduct ground surveillance during the initial mine start up and production period.	
Wildlife Monitors will conduct ground-based surveys of the access road, mine infrastructure sites, and the airstrip to assess caribou presence and identify caribou aggregations in the Project area.	
Summer maintenance work on the all season road will be voluntarily restricted to the period July-September.	
Wildlife Monitors will contribute to a detailed quarterly report of wildlife observations and incidents that occurred during the monitoring period. Reports will be submitted to First Nations,	

<sup>6</sup> CZN have indicated that they will adopt those commitments made for EA0909-002 as appropriate.

GNWT ENR, Environment Canada and Parks Canada.	
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