



Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest

Mackenzie Valley Highway Project Aerial Bear Den Survey Report

Wildlife Research Permit # WL500993
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Department of Environment and Natural Resource, Wildlife Division
Government of the Northwest Territories

Purpose:

The Mackenzie Valley Review Board Terms of Reference for the Mackenzie Valley Highway Extension Project (2015) mandates that “the potential impacts of the proposed highway on valued components related to wildlife and wildlife habitat, include a consideration of: 1) direct and indirect alteration of habitat including highway footprint impact, 2) wildlife movement patterns, home ranges, distribution and abundance, and 3) sensitive or important areas or habitat.

Grizzly bears (*Ursus arctos*) have low tolerance to human disturbance and are likely to be affected by construction work associated to the development of the Mackenzie Valley All-Season Road. These animals can be easily stressed by construction induced noise pollution which can cause them to abandon dens well into hibernation (Pigeon et al 2014), accidental collision with work vehicles, and increased harvester access to key areas utilized by these species. Black bears (*Ursus americanus*) may also be impacted by these factors but are not as sensitive to the disturbances and are more susceptible to habituation.

Grizzly bears commonly excavate dens on steep alpine slopes or in subalpine terrain between mid to high levels of elevation (Ciarniello et al 2005), and far from road infrastructures (Pigeon et al 2014). Male grizzly bears are more likely to den in large contiguous forest patches and female grizzly bears can be found in both forest patches and wet terrain microsites. Both Grizzly and Black bears avoid wet areas when selecting den sites. Black bears, depending on sex, may select dens far from human activities and other anthropogenic features (Pigeon et al 2014). They often select den sites that form natural shelters, such as overturned trees, piles of branches, crevices, caves and large rocks, and access to ample bedding materials (branches, moss, bark chips) (Porter et al 2012).

The home ranges and den sites of both the Grizzly and Black bear are considered sensitive and important habitat areas. Moreover, it is prohibited under sub-section 51(2) 2 of the Northwest Territories *Wildlife Act* to damage or destroy a den without a permit, or under section 52, engage in any activity that is likely to result in significant disturbance to big game or other prescribed wildlife.

The purpose of this survey was to document any potential or active bear dens, which would be considered important and sensitive habitat, within 800 m of the road alignment, including all borrow sources, and borrow source access roads.

Method:

The study area for the aerial bear den survey was defined by an 800 m buffer around the proposed MVH right of way (ROW) and identified borrow sources and their associated access roads. The buffer was selected based on the recommended setback for bear dens described in the Sahtu Land Use Plan and Norther Land Use Guidelines – Northwest Territories Seismic Operations (<http://www.lands.gov.nt.ca/en/northern-land-use-guidelines>).

The aerial survey was conducted by helicopter along survey transects spaced at 250 m, 500 m, and 750 m away from the ROW within the buffer area around the project footprint, with the central transect following the road alignment (Figure 1).

The survey was conducted using an A-star helicopter (A-star 350B-2) hired from Canadian helicopters piloted by K. Peter. The survey crew consisted of the MVH project biologist (H. Pathmanathan) who served as an observer and data recorder, ENR staff (E. Lamontagne) who served as another observer, and community from Tulita (J. Yakeleya). The helicopter was flown at an altitude of 100-200 ft and at a speed of 40-60 km/hour. Observers sought to identify tracks from the air and signs of activity around features that looked like bear dens. Given the time period of the survey, it is likely that the bears had already entered their den site, and any subsequent snowfall would have covered any tracks. All suspected den sites, wildlife observations and other notable features were recorded with GPS waypoints (Figure 2). Photos were taken where possible.

The aerial survey was conducted over a 5-day period from 18 October to 23 October 2021. Aerial bear den surveys are most effective when they are conducted after a recent snowfall, which makes it easier to detect bear tracks as well as any signs of den excavation. At the time of the survey, there was approximately 90% snow cover within the study area. The first two days of the survey had overcast skies with ice fog conditions that cleared up in the late afternoon. The final 3 days of the survey were sunny with clear skies.

The survey area is found within the taiga plains low subarctic (LS) ecoregion which occupies the central third of the Taiga Plains (GNWT 2009). This ecoregion is characterized by extensive low-lying plains, uplands, hilly systems, polygonal peat plateaus and runnels. These permafrost features are associated with bogs, collapse scar fens, treeless lichen, and peat moss communities. The landscape constitutes of slow growing open conifer stands, mostly black and white spruce trees, and poplars with an understory of birch.

Results:

Wildlife sightings and tracks recorded during the survey are summarized in Table 1 and illustrated in Figure 3.

No active or potential bear dens were detected during the aerial survey along the proposed road alignment, borrow source access roads, or around the borrow sources themselves. We did observe potential bear tracks along the survey route but were unable to confirm as the tracks were obscured by snow. We did not take any photos as the helicopter was unable to land at that location. The crew was provided with coordinates for a potential den site close to Tulita airport. The team landed close to the location and investigated the potential den site by foot. There was no bear den sighted.

There were 12 moose, 3 muskox, and 1 wolf sighting along the transect lines (Figure 4-6). A sighting can be considered as an individual animal or a cluster of animals.

Table 1. Wildlife incidental sightings and tracks recorded during the aerial den survey conducted along the Mackenzie Valley Highway proposed route between October 18 and 23, 2021.

Wpt	Date	Observation	Group Size	Sex	Notes	Latitude	Longitude
1	2021-10-18	Fox tracks	-	-		65.29218801	-126.711387
3	2021-10-18	Bear tracks	-	-	Potential	65.149985	-126.294324
4	2021-10-18	Moose tracks	-	-		65.09696703	-126.125027
5	2021-10-18	Moose	1	M		64.98992502	-125.802484
6	2021-10-18	Moose tracks	-	-		64.99102497	-125.74864
7	2021-10-18	Muskox tracks	-	-		64.99129504	-125.74302
8	2021-10-18	Muskox tracks	-	-		64.99172403	-125.737565
11	2021-10-19	Muskox	30	-		65.28701697	-126.749714
13	2021-10-19	Bear tracks	-	-	Potential	64.65158899	-124.847521
14	2021-10-19	Wolves	4	-	On a kill site	64.01330296	-124.25948
15	2021-10-19	Moose	1	M		64.45763896	-124.752063
17	2021-10-19	Moose	1	F		64.35425598	-124.600239
18	2021-10-19	Moose	1	M		64.35784704	-124.597427
20	2021-10-20	Falcon	1	-	Peregrine falcon?	64.14504301	-124.350826
21	2021-10-20	Moose	1	F		64.951827	-125.663495
22	2021-10-20	Falcon	1	-	Grey/black tips; Peregrine falcon?	64.655404	-124.851305
23	2021-10-20	Moose	1			64.951827	-125.663495
24	2021-10-20	Moose	3	F	2 calves	64.98462397	-125.791586
25	2021-10-20	Moose	1	M		64.950934	-125.667717
27	2021-10-22	Moose	1	M		64.55726199	-124.747516
28	2021-10-22	Moose	3	M	Young bulls	64.45872098	-124.762184
29	2021-10-22	Falcon	1	-	Peregrine falcon?	64.28707796	-124.515311
30	2021-10-22	Falcon	1	-	Peregrine falcon?	64.90162401	-125.48441
31	2021-10-22	Bald eagle	1	-		64.59342697	-124.805889
32	2021-10-22	Moose	2	F	1 calf	64.59342697	-124.805889
33	2021-10-23	Moose	1	M		64.780848	-124.985895
34	2021-10-23	Muskox	15	-	Along Prohibition Creek access road	65.14984502	-126.095993
35	2021-10-23	Muskox	10	-	Along Prohibition Creek access road	65.13802403	-126.124233

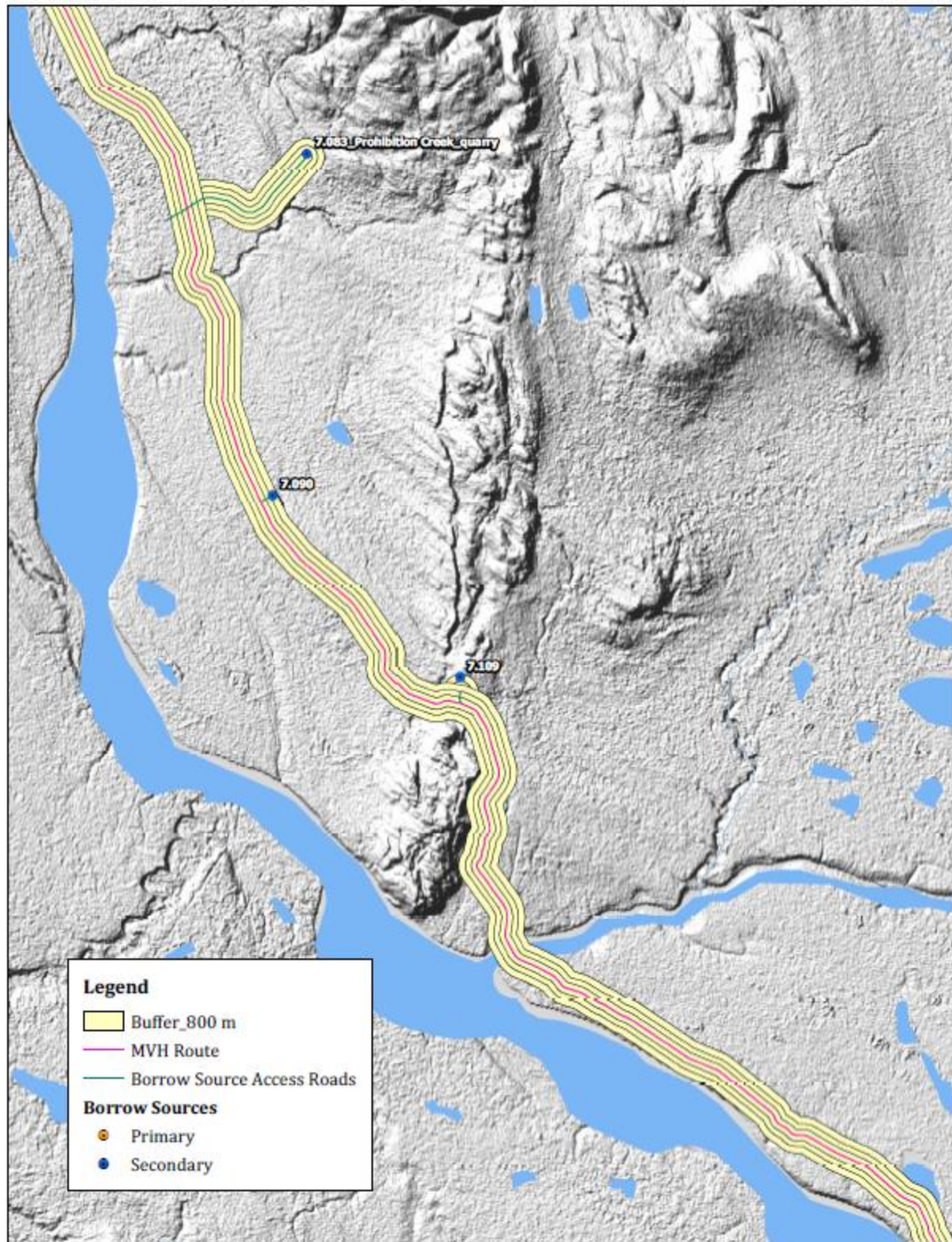


Figure 1. Example of bear den transects from Sahtu border to Norman Wells and confirmed borrow sources and access roads along the proposed highway alignment

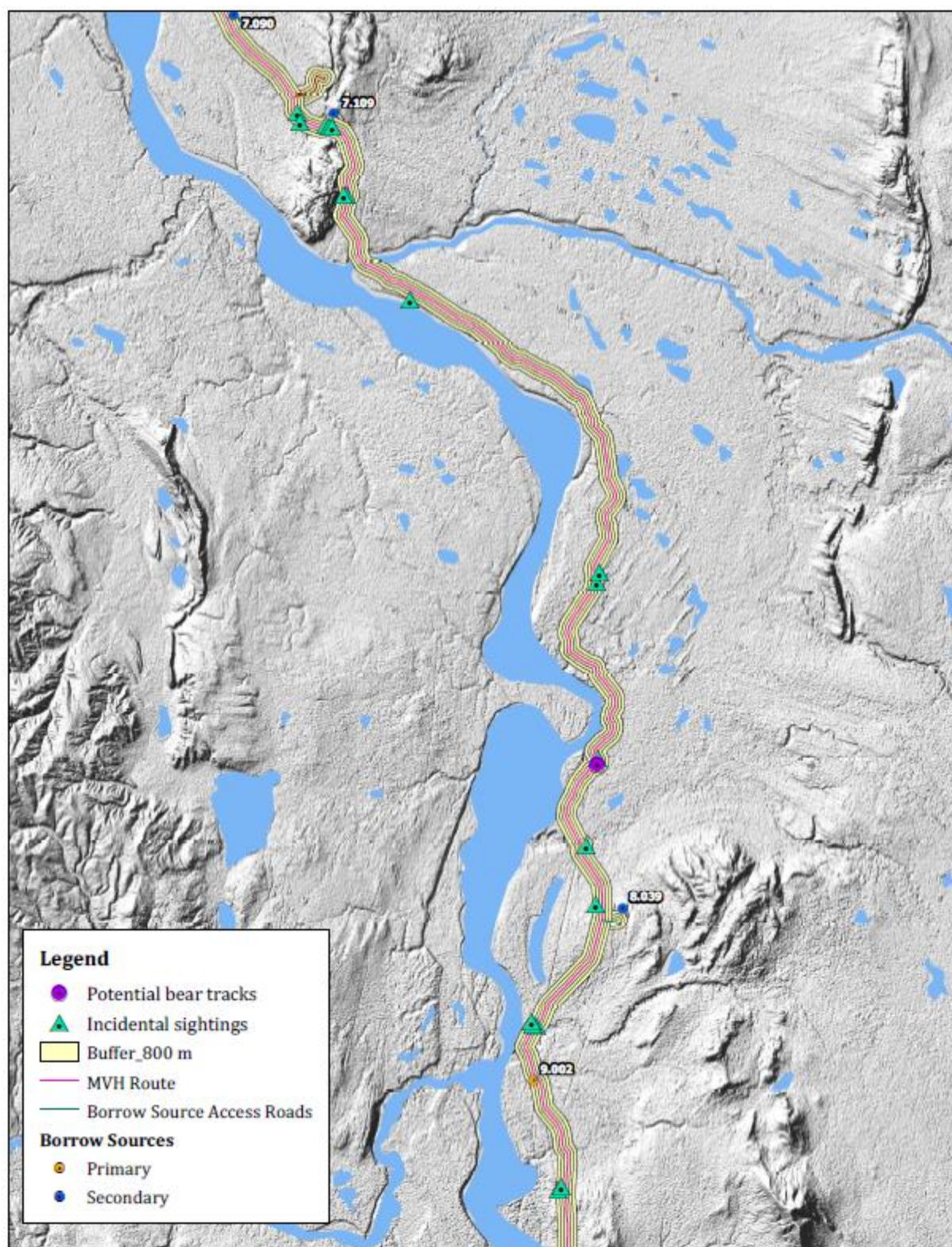


Figure 2. Aerial bear den survey incidental sighting and bear tracks along survey transect lines close to the Mackenzie Valley Proposed route (Table 1 provides coordinates).

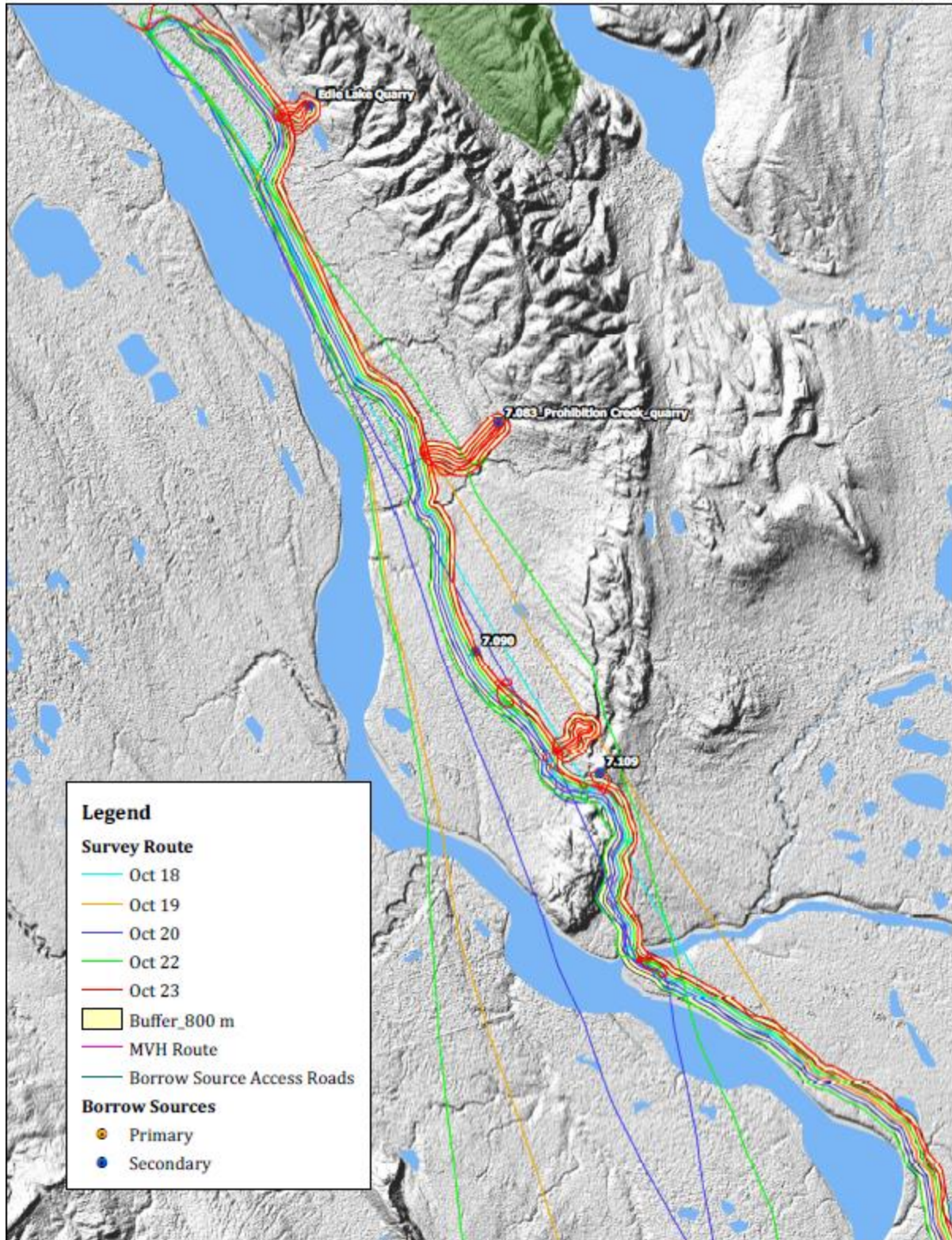


Figure 3. Aerial bear den survey flight lines between October 18 and 23 and confirmed borrow sources along the highway route



Figure 4. Group of 30 muskox (waypoint 11) along the proposed Mackenzie Valley Highway right of way



Figure 5. Cow moose and 2 calves (waypoint 24) along the aerial bear den survey transect lines



Figure 6. Three bull moose (waypoint 28) along the aerial bear den survey transect lines

Conclusions and Recommendations:

Despite sufficient snow cover in the study area, the crew was unable to detect any bear dens throughout the duration of the survey period. Given the surveyed terrain, we can conclusively state that the MVH project area is highly unlikely to contain grizzly bear dens, however, quarry sites may have suitable grizzly den sites given the species preference towards denning in rock caves at high elevation, and around dry conifer stands. However, the same cannot be indicated for Black bears. Moving forward, all bear surveys should be concentrated in areas that are suitable for Black bear dens, such as continuous forest patches in dry terrains that would have an abundance of bedding materials. Based on this conclusion, ENR recommends the following:

- The Proponent should conduct pre-activity surveys within 800m of the project footprint to identify active bear dens between September 30 and March 30. Surveys should be conducted in the fall shortly after the first snow fall to detect freshly dug dens.
- If an active bear den is detected, or suspected, INF should implement and maintain an 800 m buffer zone (or a 1.5 km buffer zone if blasting will occur in that area) until the bear emerges in spring.
- If the bear den and exclusion zone would result in the halt of part or the entire program, the Proponent should contact ENR to discuss alternative mitigation options. The location of active bear dens should be kept confidential between the developer and ENR.
- A trail camera should be installed near any potential den sits to record if any bear emerges from the den during winter construction activities or in the spring.

Literature Cited:

- Ciarniello, Lana M., et al. "Denning Behavior and Den Site Selection of Grizzly Bears along the Parsnip River, British Columbia, Canada." *Ursus*, vol. 16, no. 1, 2005, pp. 47–58, <http://www.jstor.org/stable/3873058>. Accessed 11 May 2022.
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- Karine E. Pigeon, Scott E. Nielsen, Gordon B. Stenhouse, Steeve D. Côté, Den selection by grizzly bears on a managed landscape, *Journal of Mammalogy*, Volume 95, Issue 3, 26 June 2014, Pages 559–571, <https://doi.org/10.1644/13-MAMM-A-137>
- Porter, B., Gregovich, D. and Stephen, B., 2012. *Denning Ecology of Black Bears on Intensively Logged Prince of Wales Island, Southeast Alaska*. [online] Alaska Department of Fish and Game. https://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/research_pdfs/porter_et_al_pow_black_bear_dens.pdf. Accessed 12 May 2022.