Keeyask Generation Project

Terrestrial Effects Monitoring Plan

Bear and Wolf Den Surveys Report

TEMP-2016-11

KEEYASK

Manitoba Conservation and Water Stewardship Client File 5550.00
Manitoba Environment Act Licence No. 3107

2015 - 2016

KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2016-11

BEAR AND WOLF DEN SURVEYS REPORT

Prepared for

Manitoba Hydro

By

Wildlife Resource Consulting Services MB Inc.

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SUMMARY

BACKGROUND

Construction of the Keeyask Generation Project (KGP or the Project) at Gull Rapids began in July 2014. The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the generating station on the terrestrial environment. Monitoring results will help the KHLP, government regulators, members of local First Nation communities, and the general public understand how construction and operation of the generating station will affect the environment, and whether or not more needs to be done to reduce harmful effects.

This study is described in the KGP Terrestrial Effects Monitoring Plan (KHLP 2015), in Section 6.6.2 Den Surveys, under the Gray Wolf, Black Bear and Other Wildlife effects monitoring. This report describes the results of black bear and gray wolf den surveys conducted during the second year of Project construction, in spring 2015 and the winter of 2015/16.

WHY IS THE STUDY BEING DONE?

Black bear and gray wolf are common species found in the Keeyask Region. Both species require dens for the birthing and rearing of young. Black bears also require dens for hibernating over winter.

Black bears and gray wolves are sensitive to human disturbance near active den sites. To avoid potential impacts such as abandonment or possible deaths of animals in dens, the objective of this survey was to identify any black bear and gray wolf dens in the areas of the Project footprint planned for clearing, and to protect any bears and wolves in these areas from harm. If any bear or wolf dens are found during pre-clearing surveys, a setback distance of 100 m is placed around the den for protection.

WHAT WAS DONE?

Systematic ground surveys were conducted in April and October, 2015 in areas within the Project footprint that were planned for clearing. Fieldwork was focused in habitat types where dens were most likely to occur. Up to 14 surveyors walked along parallel transects within the search area, 10 to 20 metres apart, and looked for black bear or gray wolf signs. Remote trail cameras were placed near any potential black bear dens to monitor use. In April, roughly 96 ha of potential den habitat was searched within the North Dyke construction footprint, and in the N5 and G3 borrow areas. In October, about 684 ha were searched with the reservoir clearing area on the north side of Gull Lake, the South Dyke excavated material placement areas, and the proposed clearing areas and borrow areas along the South Access Road.

Survey crew lining up and starting to search for wolf dens in April 2015

WHAT WAS FOUND?

No gray wolf dens were found in the Project footprint during April surveys. However, signs of gray wolf were observed, as well as an inactive den outside the Project footprint. This den could be re-used in future years.

Black bear activity, including excavations, scat, and tracks were observed throughout the Project footprint, but no active black bear dens were found during the October surveys. Three potential black bear dens and one inactive black bear den were found within the surveyed Project footprints (Maps on pages v and vi). Another inactive black bear den was located, incidentally, outside of the Project footprint area. The three potential black bear dens were located on the north side of Gull Lake within the reservoir clearing area and near the South Access Road in a borrow area. Periodic checks of trail cameras installed near the three potential den sites showed no activity during mid--winter and spring 2016.

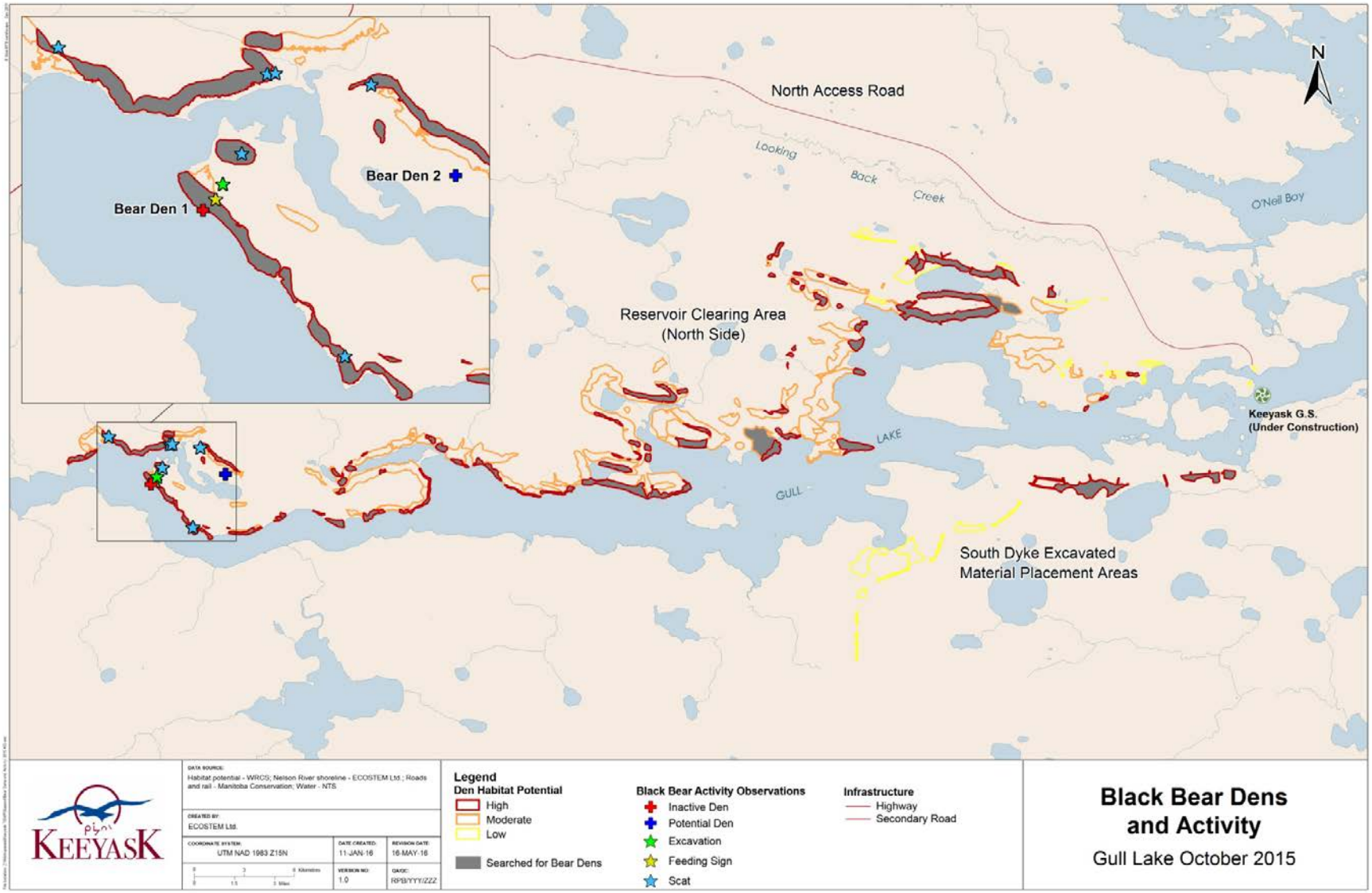
Entrance of recently excavated black bear den in a future borrow area

WHAT DOES IT MEAN?

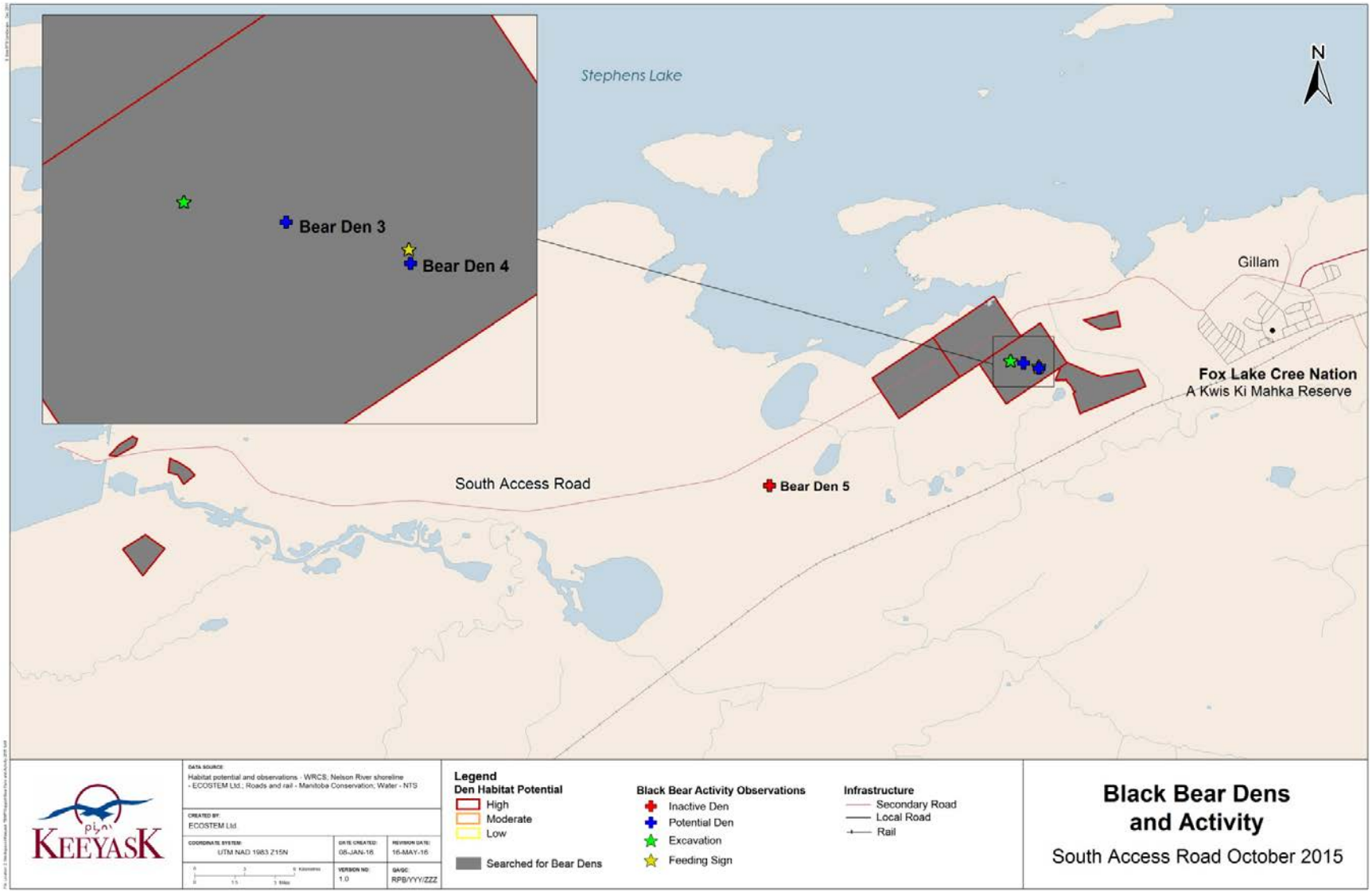
As described in the Project's Environmental Protection Plan, a 100-m distance buffer was established and marked around the three potential and one inactive black bear dens to avoid disturbing any hibernating black bears. Although the dens appeared to be unoccupied at the time of the survey, they could have potentially been used after the survey period. Dens were confirmed to be unoccupied in the spring when the trail cameras were removed.

WHAT WILL BE DONE NEXT?

More black bear and gray wolf pre-clearing den surveys will be done in fall 2016 and spring 2016/17 (Year 3 of construction), if needed, in areas that are planned for clearing. Results of the den monitoring conducted in 2016 will be presented in the Year 3 construction report.



Black bear dens and activity in the Project Footprint areas searched in 2015



Black bear dens and activity in the South Access Road area searched in 2015

STUDY TEAM

Biologists and other personnel who designed, participated in, and drafted the survey results included:

- Robert Berger (M.N.R.M) – Design, analysis, and reporting
- Mark Baschuk (M.Sc.) – Design, analysis, and reporting
- Gordon Macdonald (B.Env.Sc.) – Crew leader
- Morgan Scharf (B.Env.Sc.) – Survey personnel
- Nicholas LaPorte (M.N.R.M) – Survey personnel
- Samantha MacFarlane (M.N.R.M) – Survey personnel
- Jenny Yoo (M.N.R.M) – Survey Personnel
- Kevin Methuen (B.Sc.) – Survey Personnel
- Kate McCormick (B.Sc.) – Survey Personnel
- Eugene Spence (TCN) – Survey personnel
- Kenneth Ouskan (TCN) – Survey Personnel
- Jonathan Kitchekeesik (TCN) – Survey Personnel
- Justin Spence (WLFN) – Survey Personnel
- Jeff Laliberty (WLFN) – Survey Personnel
- Nathanael Beardy (YFFN) – Survey Personnel
- Jared Wastesicoot (YFFN) – Survey Personnel
- Clayton Flett (TCN) - Co-ordinator
- Darcy Wastesicoot (YFFN) - Co-ordinator
- Tim Flett (WLFN) - Co-ordinator

We would like to thank Sherrie Mason and Rachel Boone of Manitoba Hydro for editorial comments, and Caroline Walmsley and Megan Anger of Manitoba Hydro, Ben Hofer of Custom Helicopters, and Ron Bretecher of North/South Consultants Inc., for logistical assistance in the field. We would also like to thank Dr. James Ehnes, ECOSTEM Ltd., for GIS supported study design and cartography.

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1.0 INTRODUCTION

Construction of the Keeyask Generation Project (the Project), a 695 megawatt hydroelectric generating station (GS) and associated facilities, began in July 2014. The Project is located at Gull Rapids on the lower Nelson River in northern Manitoba where Gull Lake flows into Stephens Lake, 35 km upstream of the existing Kettle GS.

The *Keeyask Generation Project: Response to EIS Guidelines* (the EIS), completed in June 2012, provides a summary of predicted effects and planned mitigation for the Project. Technical supporting information for the terrestrial environment, including a description of the environmental setting, effects and mitigation, and a summary of proposed monitoring and follow-up programs is provided in the *Keeyask Generation Project Environmental Impact Statement: Terrestrial Environment Supporting Volume* (TE SV). The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the generating station on the terrestrial environment. The *Keeyask Generation Project Terrestrial Effects Monitoring Plan* (TEMP; KHLP 2015) was developed, detailing the monitoring activities of various components of the terrestrial environment including the focus of this report, black bear and gray wolf den surveys, for the construction and operation phases of the Project.

This study was conducted to meet the requirements of Environment Act Licence No. 3107 to complete monitoring as described in the TEMP. The clearing and development of portions of the Project construction footprint were scheduled for the winter of 2015/2016. These developments included vegetation clearing in the future reservoir area on the north side of Gull Lake, continued clearing and construction of the North and South dykes along the respective shores of Gull Lake, and clearing within several borrow areas near the main camp and along the South Access Road. Prior to clearing and development, these areas were searched in an attempt to prevent the disturbance or destruction of black bear (*Ursus americanus*) and gray wolf (*Canis lupus*) dens.

The objective of these surveys was to identify black bear and gray wolf dens in areas of the Project footprint to be cleared, and if found, protect bears and wolves from harm. In accordance with the Project's Environmental Protection Plans (KHLP 2014a,b), if a black bear or gray wolf den is found, a setback distance of 100 m is put in place to prevent disturbance.

2.0 METHODS

2.1 DEN HABITAT SELECTION

In April 2015, several areas along the north side of Gull Lake were identified for clearing and development. As clearing was to occur in the early spring when black bears may still be hibernating or gray wolves may be birthing and raising pups, surveys were done to verify whether black bear or gray wolf dens were present. Proposed construction areas included the North Dyke and portions of borrow pits N5 and G3 near the main camp (Map 3-1).

In October 2015, three other areas were identified for clearing and development. These areas included the reservoir clearing area on the north side of Gull Lake, the South Dyke excavated material placement areas on the south side of Gull Lake, and proposed clearing within borrow areas along the South Access Road near the town of Gillam (Map 3-2). As clearing was to occur in the fall and winter when black bears are hibernating, surveys were required to verify whether active black bear dens were present.

Due to the relatively large size of the proposed clearing footprints, remotely-sensed data were used to identify habitat with a greater probability of supporting large mammal dens and improve the efficiency of ground searches. Using a Geographic Information System (GIS), habitat data from the Project's EIS (provided by ECOSTEM Ltd.) were extracted from Project footprint shapefiles. A predictive model that used soil and vegetation data was applied to the Project footprint areas, which were divided into three classes (high, medium, low) based on their potential to support black bear and gray wolf dens. High potential den habitat was defined as areas of dry mineral soils and dense overstorey vegetation cover. Moderate potential den habitat contained thin peatland and some overstorey vegetation cover. Low potential den habitat was defined by deep peatlands, and wet areas lacking overstorey vegetation cover, and existing disturbed areas located near active construction (Tietje and Ruff 1980; Hodder et al. 2014). High-resolution satellite imagery was used to support selected categories of den habitat by visually inspecting the habitat within the Project footprints.

2.2 DEN SURVEYS

From April 12-13, 2015, den searches were conducted in portions of the North Dyke construction footprint, and within the N5 and G3 borrow pits near the main camp. All high potential and moderate potential den habitat areas was searched for dens; areas of low potential den habitat was not searched (Map 3-1).

From October 13-31, 2015, den searches were conducted in the reservoir clearing area on the north side of Gull Lake, the South Dyke excavated material placement areas, and proposed

clearing areas within borrow areas along the South Access Road. Areas identified to have high potential to support bear dens were searched initially along the north and south shores of Gull Lake. Several areas of moderate potential bear den habitat were also searched along the north side of Gull Lake (Map 3-2).

Up to 14 survey personnel conducted systematic ground searches in April and October of 2015. Surveyors walked slowly and intensively searched the ground for dens and other signs of black bear and gray wolf (*i.e.*, tracks, scat, and evidence of digging), paying close attention to features such as hummocks, brush piles, uprooted tree-root mats, and areas with topographic relief. Surveyors followed transect lines spaced approximately 10 m apart, uploaded to handheld Garmin Global Positioning System (GPS) 60Cs and 60Csx receivers. Spacing of transects varied from 10-20 m depending on vegetation density and other topographic features.

Upon observation of a den, survey personnel attempted to determine if it was occupied by searching the immediate area for signs, such as tracks, scat, hair, or claw marks on trees. The potential den was then geo-referenced, photographed, and marked with flagging tape. If the den appeared to be occupied by a black bear, as indicated by the presence of fresh bear sign, personnel returned with a pole-mounted camera. The pole-mounted camera consisted of an Aqua View Micro 5 underwater camera with built in digital video recording and infrared light source (Figure 2-1) that was attached to a 4 m (12 foot) extendable, aluminum pole. This apparatus allowed personnel to confirm if the den was occupied and identify the potential species, while remaining at a safe distance from the den entrance. The pole-mounted camera was manoeuvred into the den by one crew member while the video monitor was observed by another, and the den was searched.

If the den was occupied by a black bear or it appeared to be recently constructed and have the potential to support a black bear, two Reconyx™ PM35C31 trail cameras (remote-cameras) were mounted on nearby trees to monitor bear activity at each potential den site. Trail cameras were inspected in mid-winter and spring to check for activity.

Potential black bear and gray wolf dens observed incidentally during other field studies in 2015 are also presented in this report.

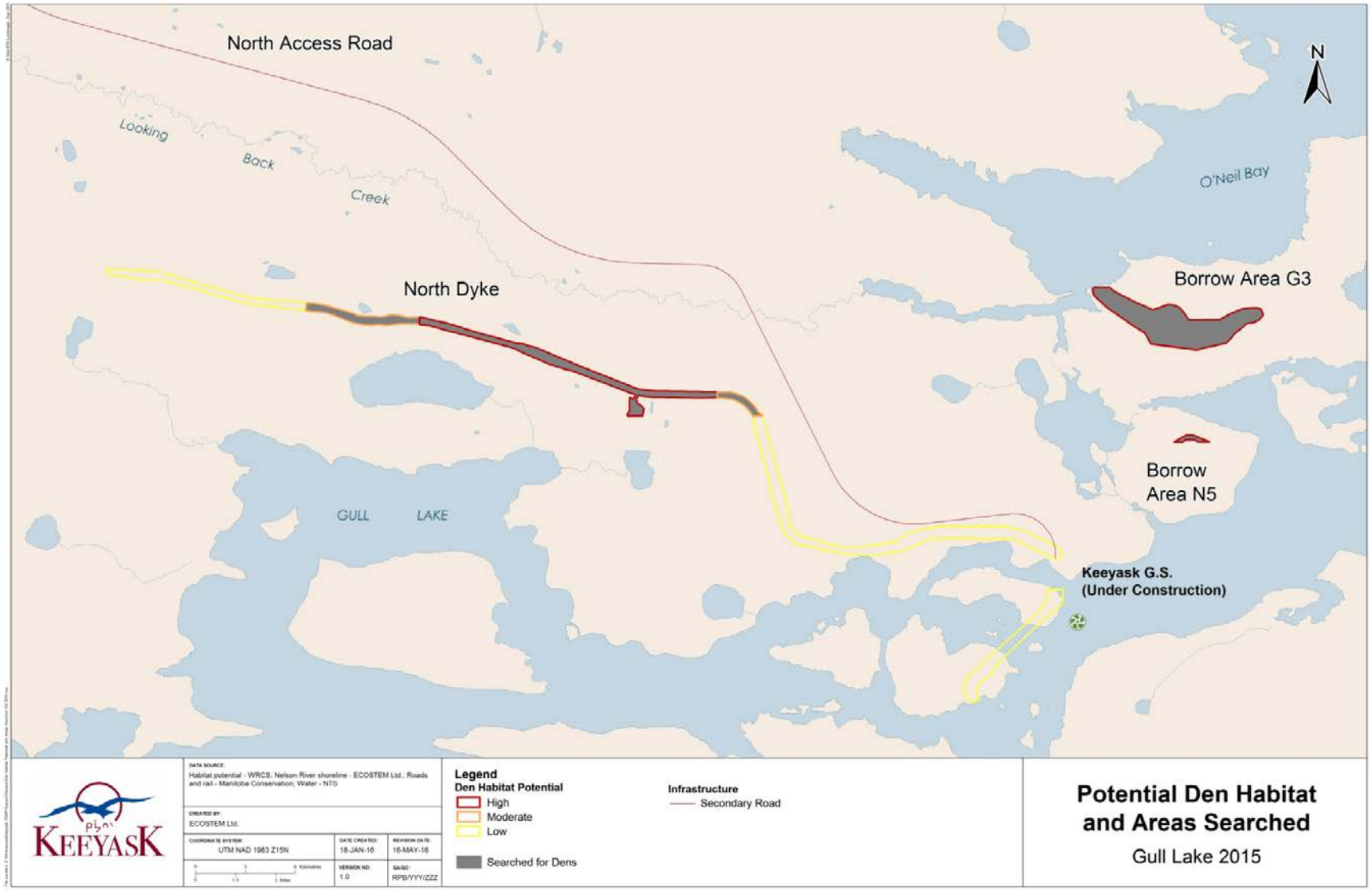
Figure 2-1: Aqua View Micro 5 camera with built in digital video recording and infrared light source, used to confirm den occupation

3.0 RESULTS

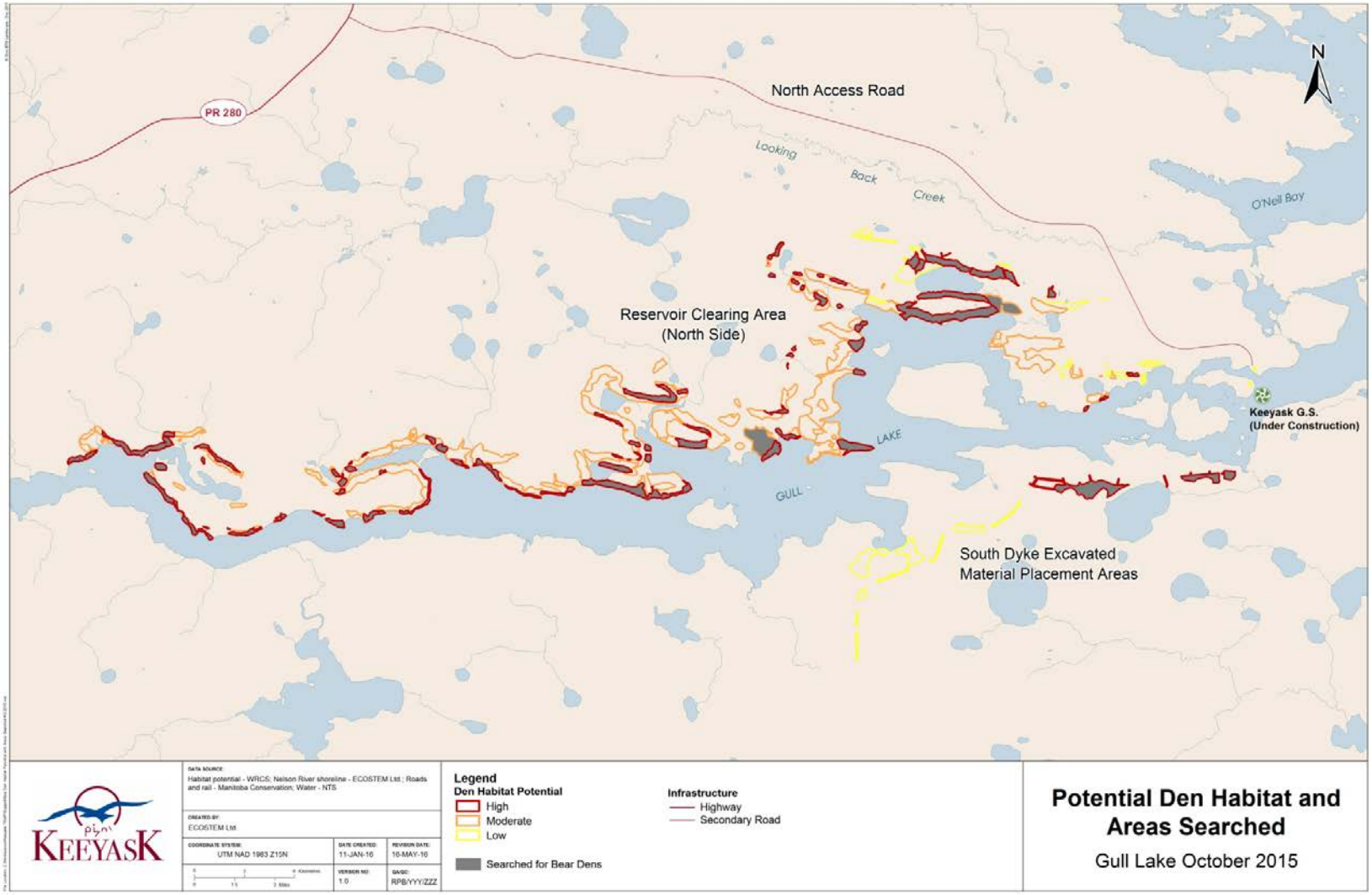
3.1 DEN HABITAT SELECTION

Within the areas proposed for clearing in April (North Dyke construction footprint and portions of borrow pits N5 and G3), the remote-sensing exercise of potential den habitat yielded 81 ha of high potential den habitat, 15 ha of moderate potential den habitat, and 86 ha of low potential den habitat. All high and moderate potential den habitat was searched (Map 3-1).

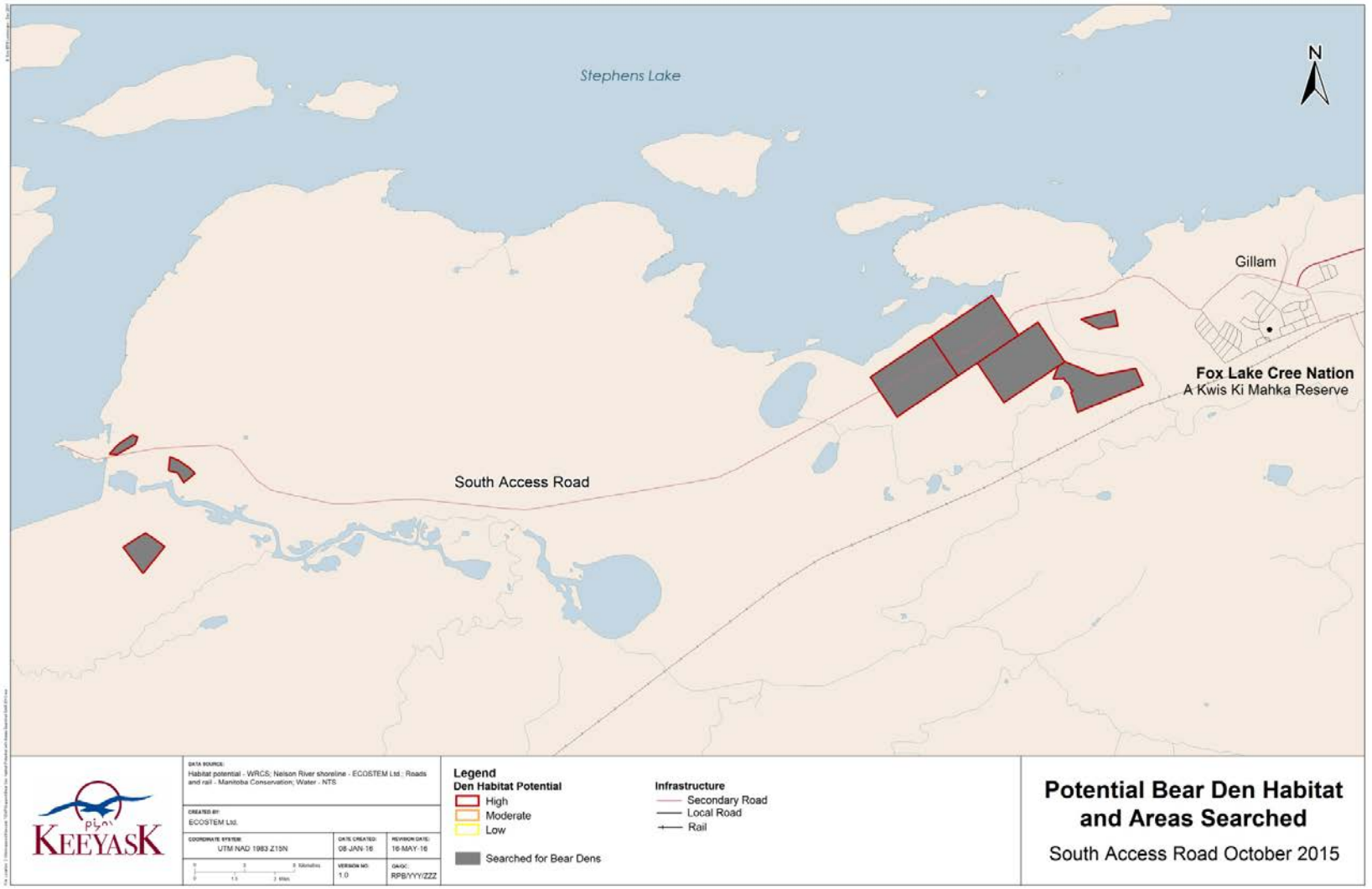
Within the areas proposed for clearing in October, the remote-sensing exercise of potential den habitat yielded 638 ha of high potential den habitat, 748 ha of moderate potential den habitat, and 117 ha of low potential den habitat. All 638 ha of high potential den habitat was searched, as well as 46 ha of moderate potential den habitat. No low potential den habitat was searched due to the low probability of dens being located in these areas (Map 3-2; Map 3-3).



Map 3-1: Potential den habitat and areas searched within the North Dyke and N5 and G3 borrow areas in April 2015



Map 3-2: Den habitat potential and footprints searched within the reservoir clearing area (north side) and South Dyke excavated material placement areas along Gull Lake in October 2015



Map 3-3: Den habitat potential and footprints searched within the Reservoir Vegetation Clearing Areas and Quarry Expansion Areas along the South Access Road in October 2015

3.2 DEN SURVEYS

No active black bear or gray wolf dens or sign were observed during the April 2015 survey. Numerous signs of moose (*Alces alces*) were observed, as well as signs of American marten (*Martes americana*) and red fox (*Vulpes vulpes*) (Map 3-4).

No occupied black bear or gray wolf dens were located during the searches in October 2015. Three potential and one inactive black bear den were found within the Project footprints. Inactive dens were fully constructed and contained signs that they were used in the past. Potential dens were not fully constructed and did not contain signs of being used in the past, but could have been used with additional excavation. Another inactive black bear den was located, incidentally, outside of the proposed clearing areas. Of these dens, one potential black bear den (Bear Den 1) was located on the north shore of Gull Lake within the reservoir clearing area (Map 3-5). The potential den consisted of a relatively deep excavation, approximately 2 m, into the side of a raised peat area (Photo 3-1). Some recent excavation had occurred at the site, but it could not be confirmed that a black bear was responsible. The den was unoccupied at the time of observation, and two remote-cameras were placed near the potential den to monitor use after the search had concluded. However, due to the presence of water in the bottom of the den, the probability of the den being used was low. Trail cameras were inspected on January 12, and on April 12, 2016 respectively. The photographs did not show sign of denning activity

An inactive black bear den (Bear Den 2) was also located approximately 1.5 km from the potential den as described above (Map 3-5). This den consisted of an excavation, approximately 2 m deep, in the side of a sandy cliff (Photo 3-2). The den was unoccupied and may have been used during the previous year. An additional shallow excavation site in the side of a peat bank (Photo 3-3) and numerous black bear signs, including scat and signs of feeding, were also observed near the potential den (Map 3-5; Appendix 1).

The two other potential bear dens (Bear Den 3 and 4) were located south of the South Access Road in a borrow area near Gillam (Map 3-6). The potential dens were approximately 200 m apart and constructed in a similar manner. Both potential dens consisted of relatively large excavations into the sides of raised peat areas and appeared to be freshly constructed (Photo 3-4; Photo 3-5). Both dens were unoccupied at the time of observation; consequently, two remote-cameras were placed at each potential den site to monitor use after the search had concluded. An additional black bear excavation site, consisting of a relatively small, shallow dig into the side of a peat mound was also found near the potential dens (Photo 3-6; Map 3-6). Additional black bear signs, including scat and signs of feeding, were also observed near the potential dens (Map 3-6; Appendix 1). Trail cameras were inspected on January 12, and on April 12, 2016 respectively. The photographs did not show sign of denning activity.

An inactive black bear den (Bear Den 5) was located on August 2, 2015, during TEMP mammal tracking surveys. The den was located along the South Access Road and consisted of a large excavation dug into the side of a peat mound (Photo 3-7). The den appeared old and unkempt,

but had the potential to have been used in the past by a black bear. The inactive den was not located within the Project footprint (Map 3-6).

Four inactive large mammal dens were located along the South Access Road near Gillam. These dens were large enough to support a bear or wolf, but due to being relatively old and unkempt, no sign was detected to indicate the species by which it was used (Map 3.5; Appendix 1).

Additional dens observed include 11 red fox dens, six American marten dens, five unknown medium-sized mammal (red fox or American marten) dens, and six unknown small-sized mammal dens (Map 3-7; Map 3-8; Appendix 1). The majority of red fox dens (seven) and unknown medium-sized mammal dens (three) were located along the South Access Road near Gillam. Three natural cavities that could support a large or medium-sized mammal were found along the north shore of Gull Lake (Map 3-8; Appendix 1). Signs of gray wolf, and other wildlife, including caribou (*Rangifer tarandus*) and moose were also observed throughout the Project footprint.

On April 23, 2015, an inactive gray wolf den was observed incidentally during TEMP mammal tracking surveys. The den was located in an area south of the South Access Road and consisted of a large excavation into the side of a raised sandy area (Map 3-9; Appendix 1). At the time of observation the den was filled with snow, with no obvious signs of recent use. However, a large number of gray wolf tracks were observed in the immediate area around the den and leading up to the entrance. This inactive den was not located in the Project footprint.

Photo 3-1: Entrance of potential black bear den (Bear Den 1) located in the reservoir clearing area on the north side of Gull Lake

Photo 3-2: Entrance of inactive black bear den (Bear Den 2) located in the reservoir clearing area on the north side of Gull Lake, near the potential den

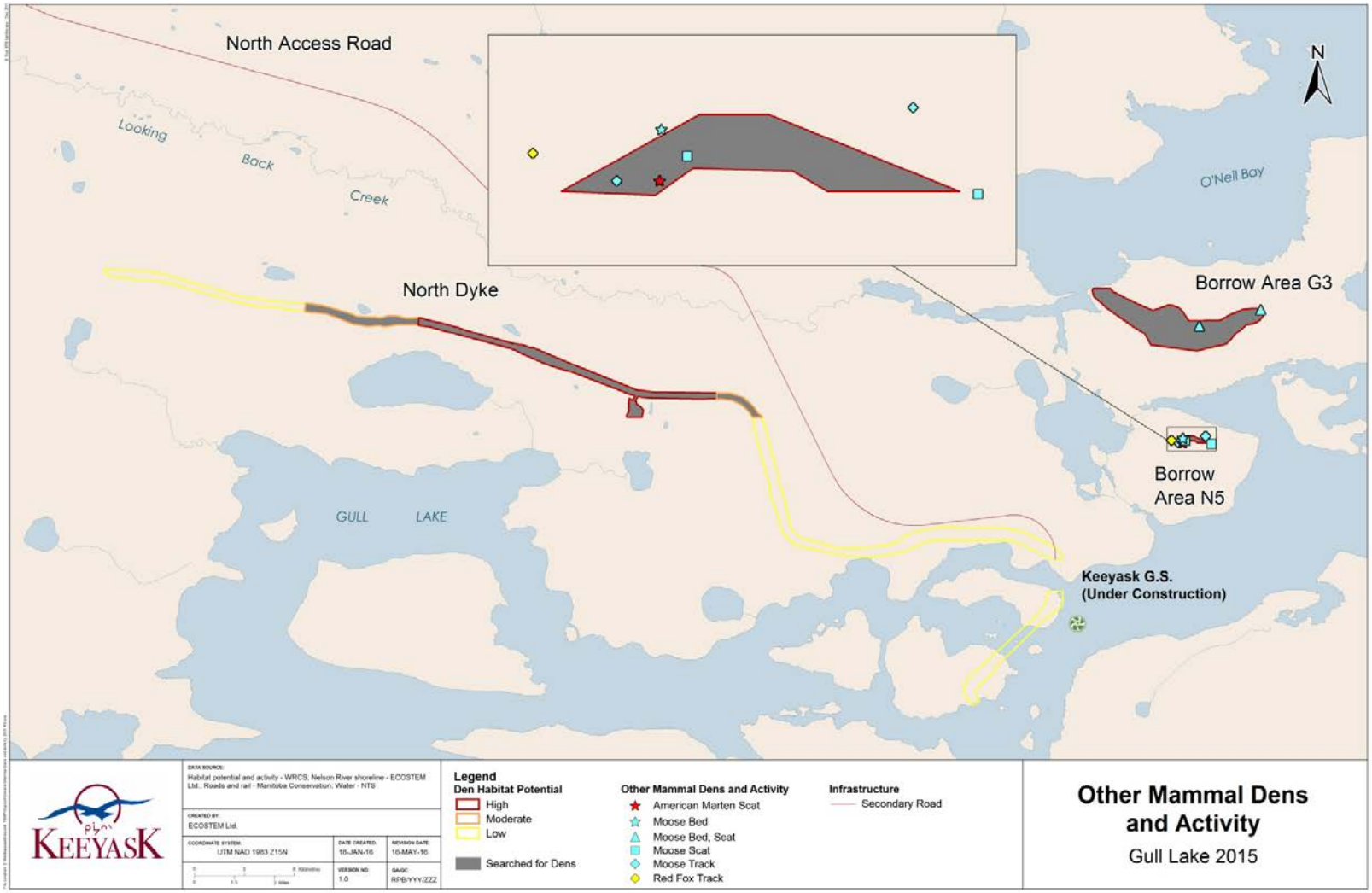
Photo 3-3: Black bear excavation located in the reservoir clearing area on the north side of Gull Lake, near the potential den (Bear Den 1)

Photo 3-4: Entrance of a potential black bear den (Bear Den 3) located in a proposed borrow area near Gillam

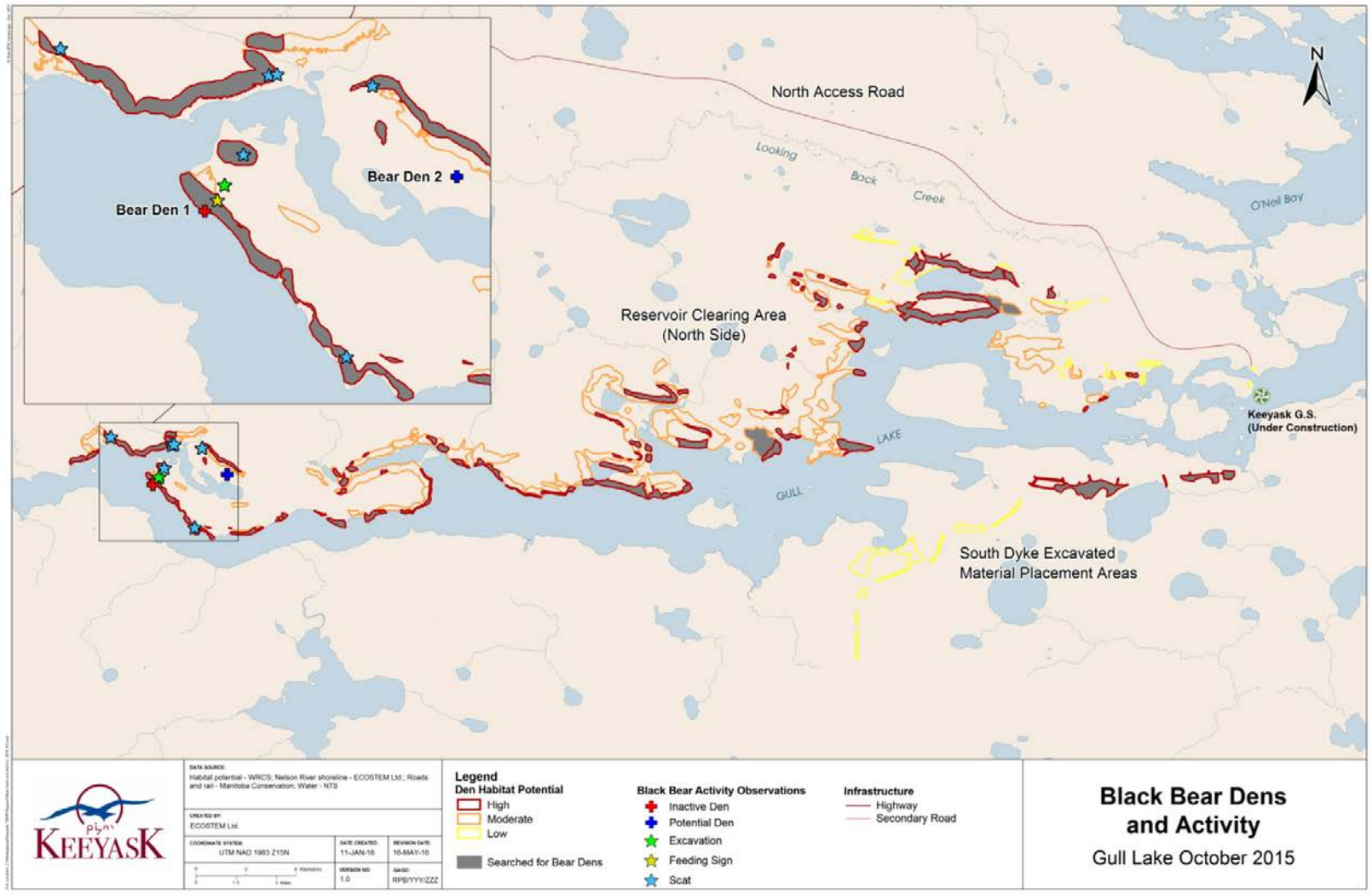
Photo 3-5: Entrance of the second potential black bear den (Bear Den 4) located in a borrow area near Gillam

Photo 3-6: Black bear excavation in a borrow area near the potential black bear dens (Bear Dens 3 and 4)

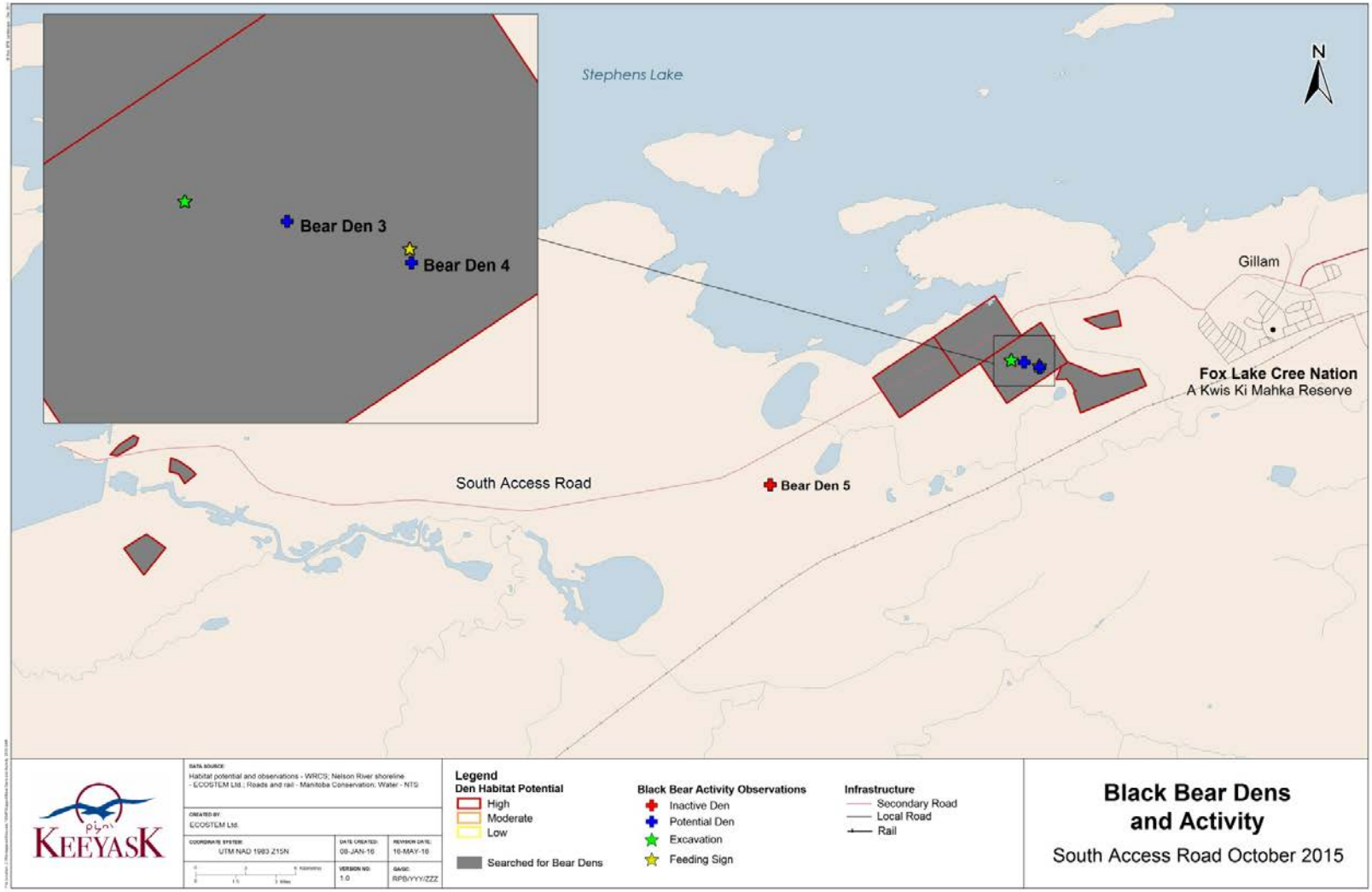
Photo 3-7: Inactive black bear den (Bear Den 5) found incidentally near the South Access Road during mammal tracking surveys



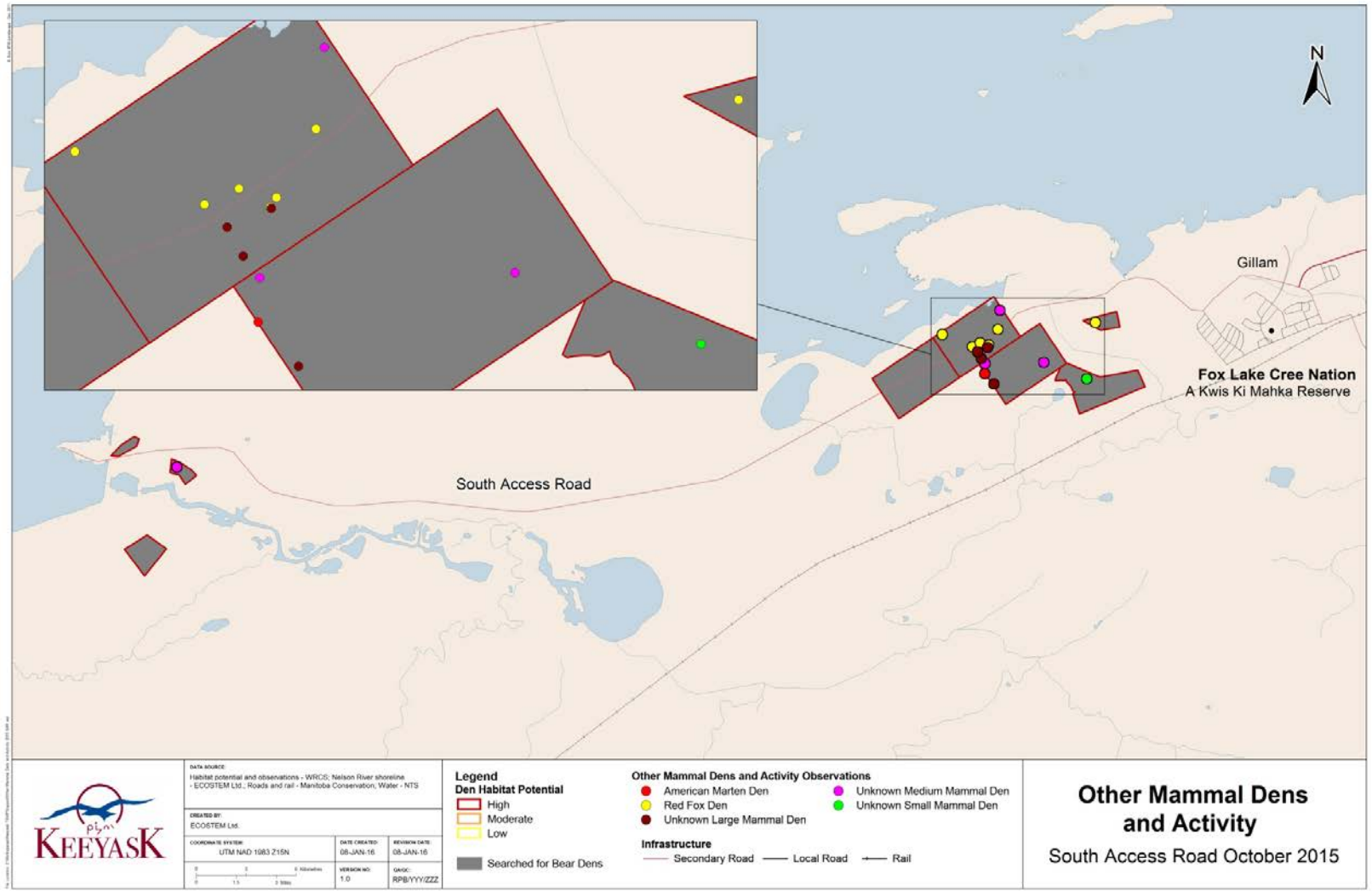
Map 3-4: Other mammal activity within the North Dyke and N5 and G3 borrow area footprints in April 2015



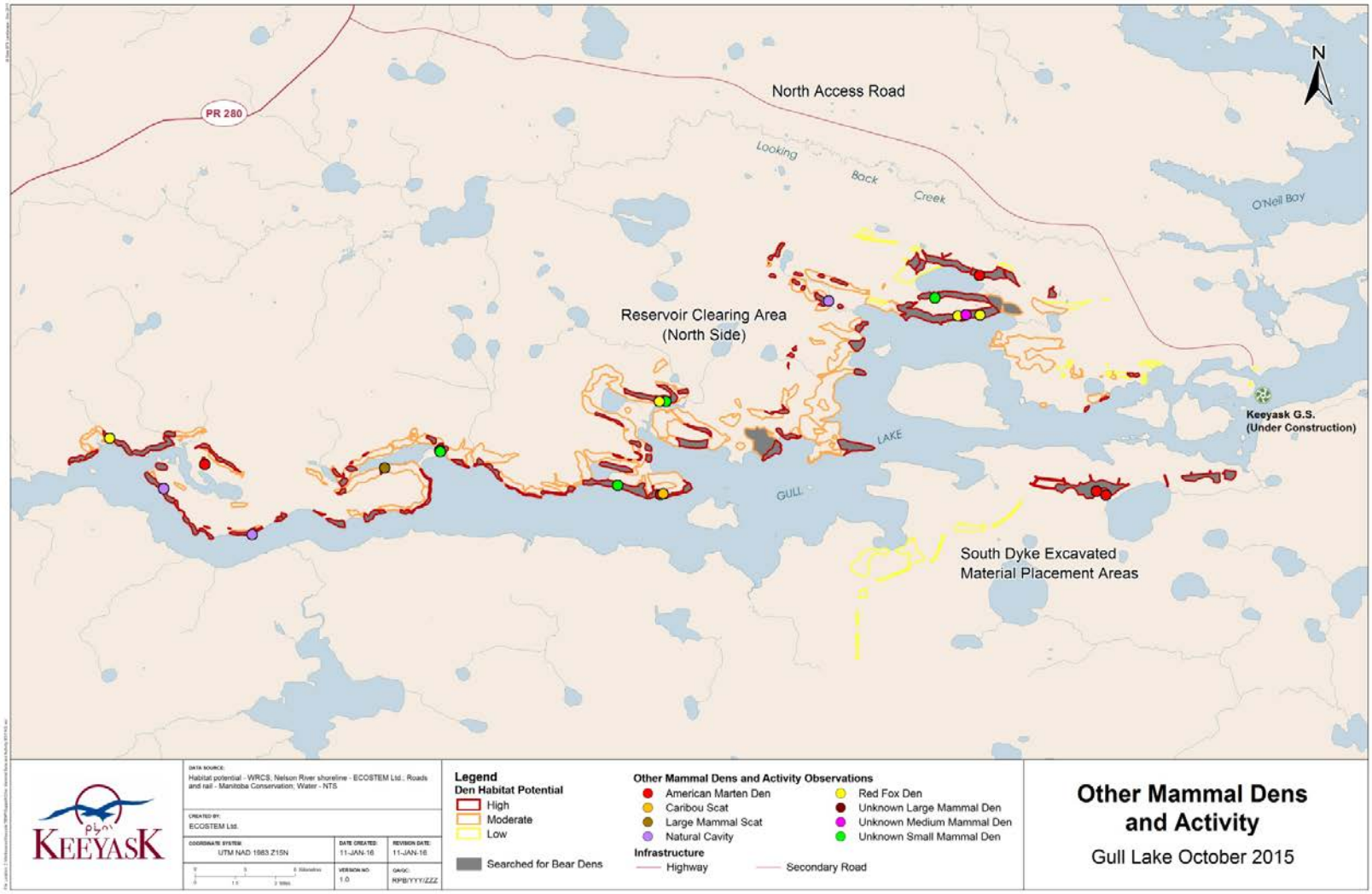
Map 3-5: Black bear dens and activity within reservoir clearing area (north side) and South Dyke excavated material placement areas in October 2015



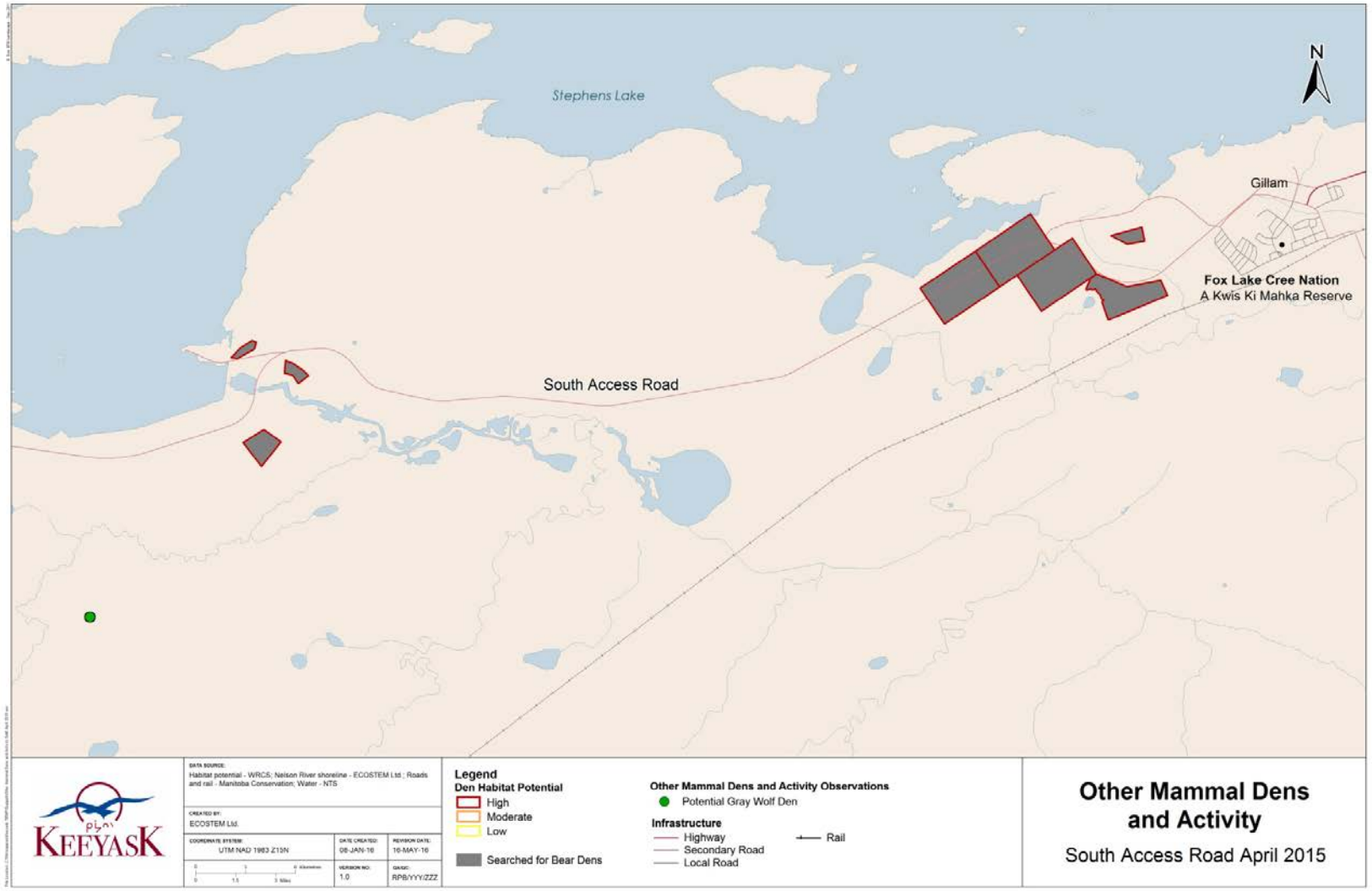
Map 3-6: Black bear dens and activity within borrow areas along the South Access Road near Gillam in October 2015



Map 3-7: Other mammal dens and activity within borrow areas along the South Access Road near Gillam in October 2015



Map 3-8: Other mammal dens and activity in the reservoir clearing area (north side) and South Dyke excavated material placement areas in October 2015



Map 3-9: Potential gray wolf den found outside of Project footprint in April 2015

4.0 SUMMARY AND CONCLUSIONS

The approach of using remotely sensed imagery to identify potential bear and wolf den habitat was a reliable method for determining potential denning habitat within the Project footprint. The delineation of potential denning habitat prior to performing the ground searches increased the efficiency of search crews over large areas and allowed the highest potential den habitat to be searched, while avoiding areas that were unlikely to contain dens (*i.e.,* wet areas). Several dens were found using this technique.

For the three potential black bear dens and one inactive black bear den observed, it was recommended that the 100 m setback distance buffer be applied (KHLP 2014). Although the dens observed were unoccupied at the time of observation, these potential dens were freshly constructed and offered suitable hibernation sites. By using a precautionary approach and following these buffer guidelines, the risk of disturbing any hibernating black bear was reduced.

The remote cameras installed near the potential bear dens remained in place until spring to monitor for the presence of black bears and to monitor the effectiveness of the buffer during the construction period. Photographs taken by trail cameras that were inspected on January 12 and April 12, 2016 did not show any signs of denning activity.

For the other mammal dens observed (e.g., American marten and red fox), a distance buffer is not applicable as these species are active and mobile during the winter and can relocate if disturbed.

There is a small possibility that a den could have been missed within a searched area or occurred in a Project footprint area not searched. As such, the Keeyask Hydropower Limited Partnership proceeded with caution for all clearing activities.

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6.0 APPENDIX 1

Photo 6-1: Signs of a black bear feeding on insects in a rotten tree on the north side of Gull Lake

Photo 6-2: Signs of a black bear feeding in a proposed borrow area near Gillam

Photo 6-3: Inactive, unknown large mammal den found near the South Access Road

Photo 6-4: Inactive, unknown large mammal den found near the South Access Road

Photo 6-5: Red fox den located on the north side of Gull Lake

Photo 6-6: American marten den located on the north side of Gull Lake

Photo 6-7: Unknown, medium mammal den located on the north side of Gull Lake

Photo 6-8: Natural cavity located on the north side of Gull Lake

Photo 6-9: Potential wolf den found incidentally outside of the Project footprint with wolf tracks leading up to den

Photo 6-10: Survey crew being dropped off near bear den survey location

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