Keeyask Generation Project

Terrestrial Effects Monitoring Plan

Bear Den Survey Report

TEMP-2015-01

Manitoba Hydro

KEEYASK

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KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING REPORT

Report #TEMP–2015–01

2014 BEAR DEN SURVEY

Prepared for

Manitoba Hydro

By

Wildlife Resource Consulting Services MB Inc.

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SUMMARY

BACKGROUND

Construction of the Keeyask Generation Project (the Project) at Gull Rapids began in July 2014. Before the government issued a licence to construct the Project, 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.

The objective of this survey was to identify black bear dens in the areas of the Project footprint planned for clearing in order to protect bears from harm.

This report describes the results of bear den surveys conducted during the first summer of Project construction. Surveys were carried out in and around the areas planned to be cleared for the Project in the winter of 2014/15, and were focused in areas where bear dens were most likely to occur.

WHY IS THE STUDY BEING DONE?

As most clearing for the Project occurs during the fall and winter months, there is a chance that some bear dens may be present in areas that are planned for clearing. To check whether there are any bear dens in the areas of the Project footprint to be cleared, and to protect hibernating bears from harm, bear den surveys are done prior to clearing. If any bear dens are found during the pre-clearing surveys, a setback distance of 100 m is placed around the dens for protection.

WHAT WAS DONE?

In late-October and early-November 2014, portions of the Project footprint that were planned for clearing in winter 2014/15 were searched for bear dens, to help avoid the disturbance or destruction of black bear dens. Surveys were focused on the areas with a high potential for bear dens to occur, based on the habitat type (soils and vegetation) present.

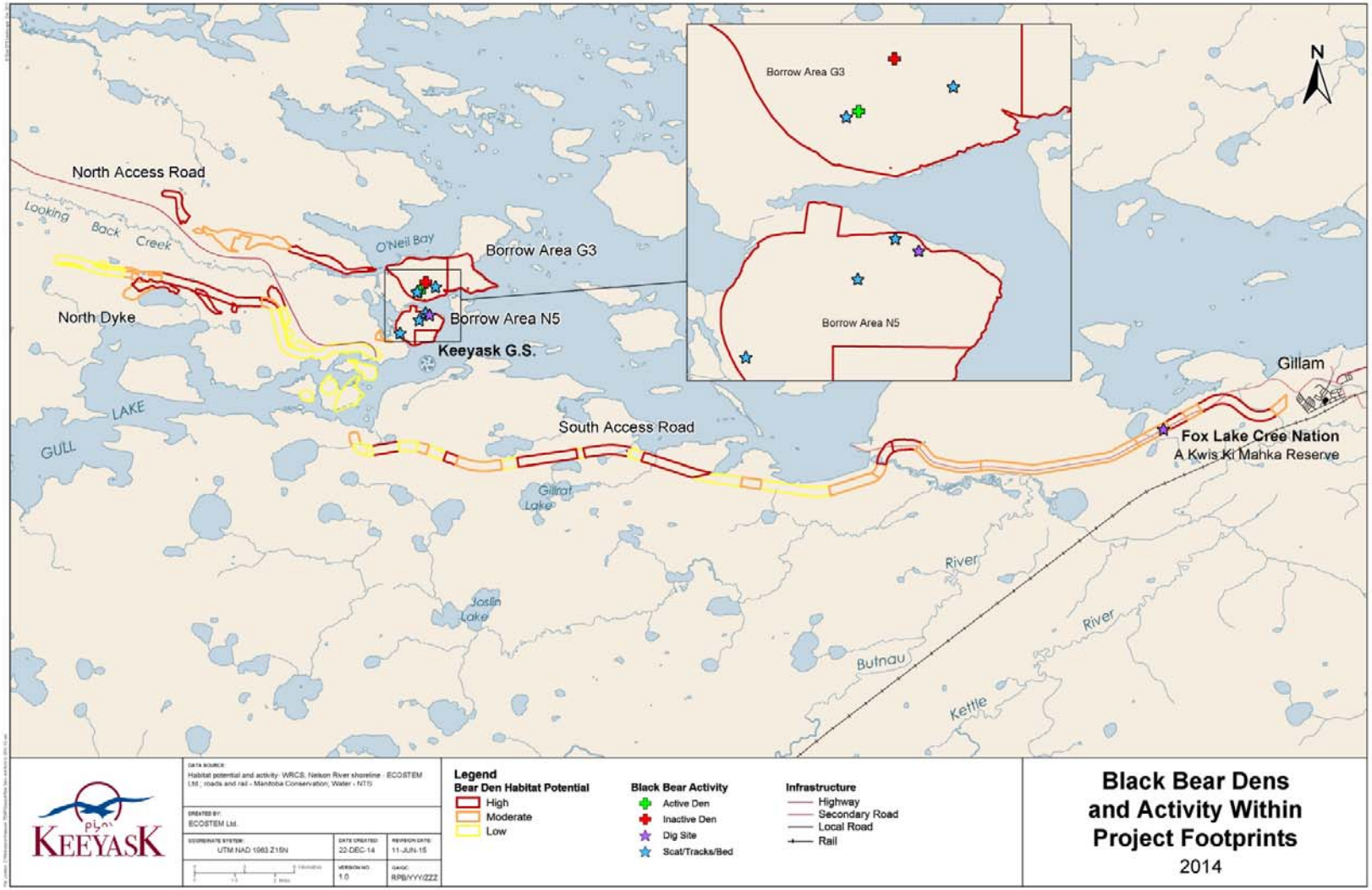
For the ground survey, 4 to 6 surveyors walked along parallel transects within the search area, 10-20 metres apart, and carefully searched the ground for bear dens and other signs of bear.

Survey staff lining up, starting to search for bear dens.

WHAT WAS FOUND?

An active bear den and an old, unoccupied den were found in borrow area G3. A trail camera was put up and used to confirm that the active den was occupied by a single black bear. Black bear signs were also observed in borrow area N5 and along the south access road. Other mammal species' signs were also observed throughout the Project footprint areas that were surveyed.

Entrance of occupied bear den in borrow area G3.



Black bear dens and activity in the Project Footprint areas searched in 2014.

WHAT DOES IT MEAN?

The one active bear den that was found in borrow area G3 was flagged in the field, and a 100 metre buffer was established and marked to help protect the den from construction-related disturbance. By following these buffer guidelines, as outlined in the Project's Environmental Protection Plan, the risk of disturbing the hibernating black bear was greatly reduced.

WHAT WILL BE DONE NEXT?

The trail cameras remained in place until spring 2015 to monitor potential bear activity during construction activities and capture emergence from the den in spring. Photos from the cameras recorded a bear in early April, which was likely the bear from the den (although the actual emergence from the den was not shown in the photos).

More bear den surveys will be done in fall 2015 (Year 2 of construction), if needed, within the Project areas that are planned for clearing in winter 2015/16. Results of any bear den monitoring conducted in 2015 will be presented in the Year 2 construction report.

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.St.) – Crew leader
- Morgan Scharf (B.Env.St.) – Survey personnel
- Nicholas LaPorte (M.N.R.M) – Survey personnel
- Pete Hettinga (M.N.R.M) – Survey personnel
- Samantha McFarlane (M.N.R.M pending) – Survey personnel
- Cory Beardy (WLFN) – Survey personnel
- Eldon Spence (FLCN) – Survey personnel
- Donovan Flett (YFFN) – Survey personnel
- Kenneth Ouskan (TCN) – Survey personnel
- Jonathan Kitchikeesik (TCN) – Survey personnel
- Josh Spence (TCN) – Survey personnel

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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*, 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). As part of the licencing process for the Project, a Terrestrial Effects Monitoring Plan (TEMP) was developed detailing the monitoring activities of various components of the terrestrial environment including the focus of this report, bear 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 2014/2015. Prior to clearing and development, these areas were searched in an attempt to avoid the disturbance or destruction of black bear (*Ursus americanus*) dens.

The objective of this survey was to identify black bear dens in the areas of the Project footprint to be cleared and protect bears from harm. In accordance with the Keeyask Environmental Protection Plans, if a black bear den is found, a setback distance of 100 m is put in place (KHLP 2014).

2.0 METHODS

Shapefiles of areas selected for clearing and development, including the north dyke, south access road, quarries, and other proposed areas of development were provided by Manitoba Hydro. Using a Geographic Information System (GIS), habitat data from the environmental assessment was extracted from the Project Footprint. Areas to be cleared within the Project Footprint were then divided into sections of potential bear den habitat using a simple predictive model. The predictive model was developed using soil and vegetation overstorey data. High potential bear den habitat was defined by identifying areas of dry mineral soils and dense overstorey cover; moderate potential habitat contained thin peatland and some overstorey cover; and low potential habitat was defined by deep peatlands, wet areas lacking overstorey cover, and disturbed areas located near active construction (Tietje and Ruff 1980; Hodder *et al.* 2014). High-resolution satellite imagery was used to support the selected categories of bear den habitat by visually inspecting the habitat within the Project footprints.

On October 21, 2014, prior to conducting the ground survey, a technician performed a brief aerial survey of the areas to be cleared to verify the potential den habitat in the sections created by the remote-sensing exercise. The goal of the aerial survey was to increase the efficiency of the ground search crew by ground-truthing the remotely selected areas and identifying areas that may have been overlooked during the remote-sensing exercise. The technician confirmed the potential of bear den habitat within each section based on vegetation and topographic features and changed the den potential category if deemed necessary.

To increase efficiency and the probability of locating bear dens, areas identified to have high potential to support bear dens were searched initially. At the request of Manitoba Hydro, several small sections of low potential bear den habitat were also searched on the William Smith Islands (east and west portions) due to immediate pending work. Portions of borrow area N5 and borrow area G3 were not searched as these portions were outside of the planned areas to be cleared and potential bear dens were less likely to be disturbed in these areas.

The bear den search was divided into two separate trips. During the first trip from October 22-November 5, 2014, the north dyke, south access road, two borrow areas, and one haul road were searched. During the second trip, from November 12-17, 2014, one proposed borrow area, two haul roads, and four other areas proposed for development were searched. This study was conducted concurrently with bear den searches within the Keeyask Transmission Project footprints, which are presented in a separate report.

Four to six people, depending on the survey day, conducted a systematic ground search for bear dens. Personnel walked slowly and intensively searched the ground for den entrances and other signs of black bear (i.e., tracks, scat, evidence of digging), paying close attention to features such as hummocks, brush piles, uprooted tree root mats and areas with topographic relief (Tietje and Ruff 1980; Hodder *et al.* 2014). Observers followed transect lines spaced approximately 10 m apart, uploaded to a handheld Garmin Global Positioning System (GPS)

60Cs and 60Csx receivers. Spacing varied from 10-20 m depending on vegetation density and other topographic features.

For the searches of the north dyke and south access road footprints, personnel spaced evenly from the centre of the linear feature and searched the area in a single pass, covering a width of approximately 100 m. The 100-m wide search path represents the maximum area in which physical disturbance is anticipated to occur. For searches conducted on low potential habitat sections that were requested to be searched by Manitoba Hydro (i.e., William Smith Islands), a single pass was used as an initial check for any signs of bear presence. If bear activity was observed during the single pass, the entire section would be searched. This technique was used to increase search efficiency in areas that had a very low probability of containing a bear den.

Upon observation of a den, personnel attempted to determine if it was occupied by a black bear by searching the immediate area for signs, such as tracks, scat, hair, or claw marks on trees, and observing the den entrance for signs of heat escaping (steam). The potential den was then geo-referenced, photographed, and marked with flagging tape. If the den appeared to be occupied, 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 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, and causing minimal disturbance. The pole-mounted camera was maneuvered into the den by one crew member and the video monitor was observed by another while the den was searched. If the den was determined to be occupied by a black bear, two Reconyx™ PM35C31 cameras (remote-cameras) were mounted on nearby trees to monitor bear activity throughout the winter construction period and to capture den emergence in the spring.

Figure 2-1: Aqua View Micro 5 Underwater Camera with Built in Digital Video Recording and Infrared Light Source Used to Confirm Den Occupation

3.0 RESULTS

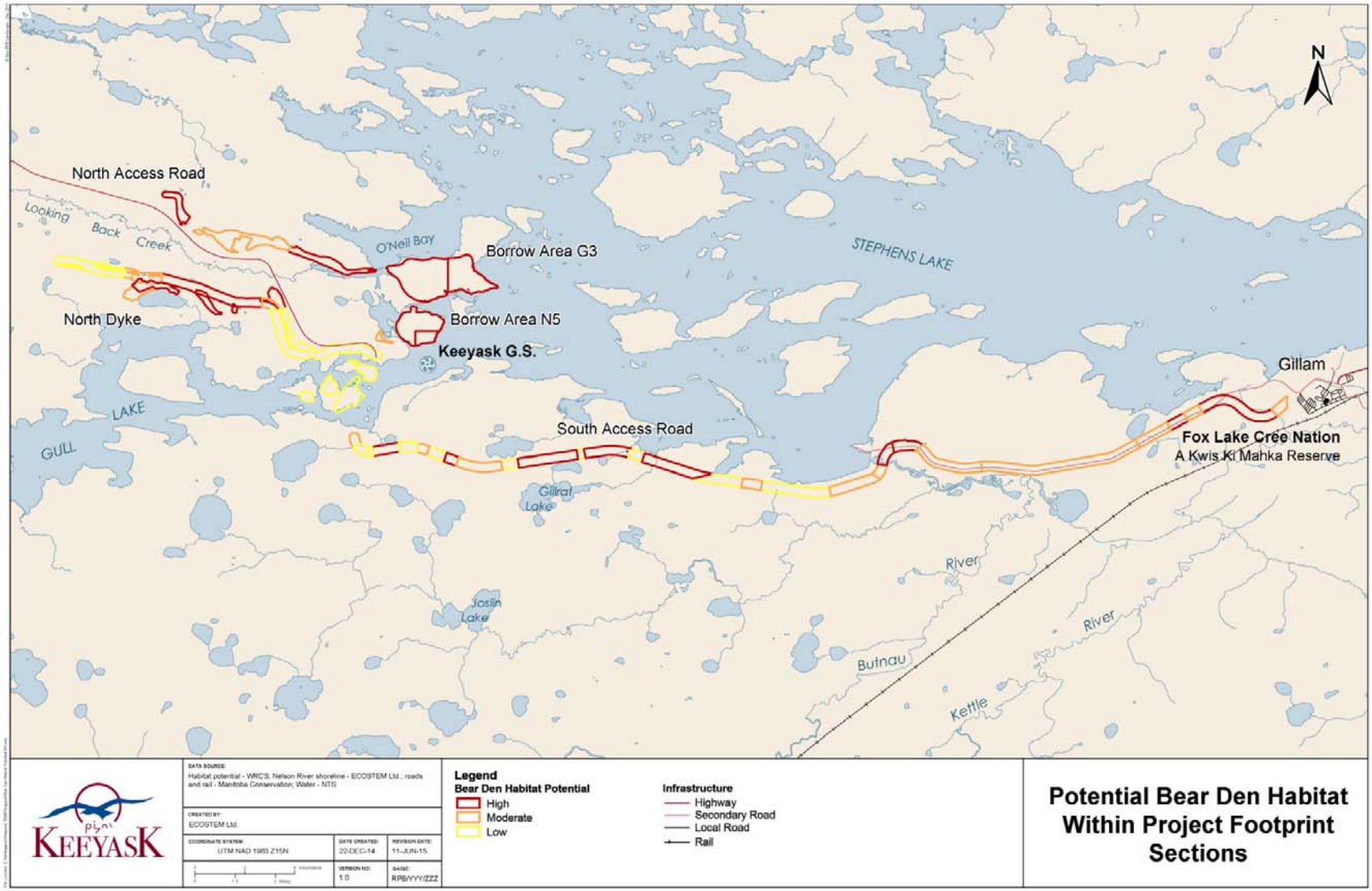
Project Footprint areas scheduled to be cleared covered a total area of 1,316 ha. Within the Project footprints, the remote-sensing exercise yielded 761 ha of high potential black bear den habitat, 277 ha of moderate potential habitat, and 278 ha of low potential habitat areas (Map 3.1). Approximately 59% of all high potential habitat areas to be cleared was located in borrow area G3 and borrow area N5, north of the generating station site.

Along with the approximately 607 ha (46% of all habitat) of high potential habitat searched, an additional 63 ha of moderate (5% of all habitat) and 2 ha of low (0.2% of all habitat) potential habitat were also searched during the ground surveys. The previously delineated moderate habitats searched were distributed throughout the north dyke and south access road. The low potential habitat searched consisted of a portion of a single section (Map 3.2). A 7 ha portion (0.5% of all habitat) of high potential habitat section was determined to be too wet to support bear dens and was removed from the ground search (Map 3.2). An additional 147 ha of high potential habitat in borrow area G3 and borrow area N5 was not searched as these areas were not scheduled for clearing (Map 3.2).

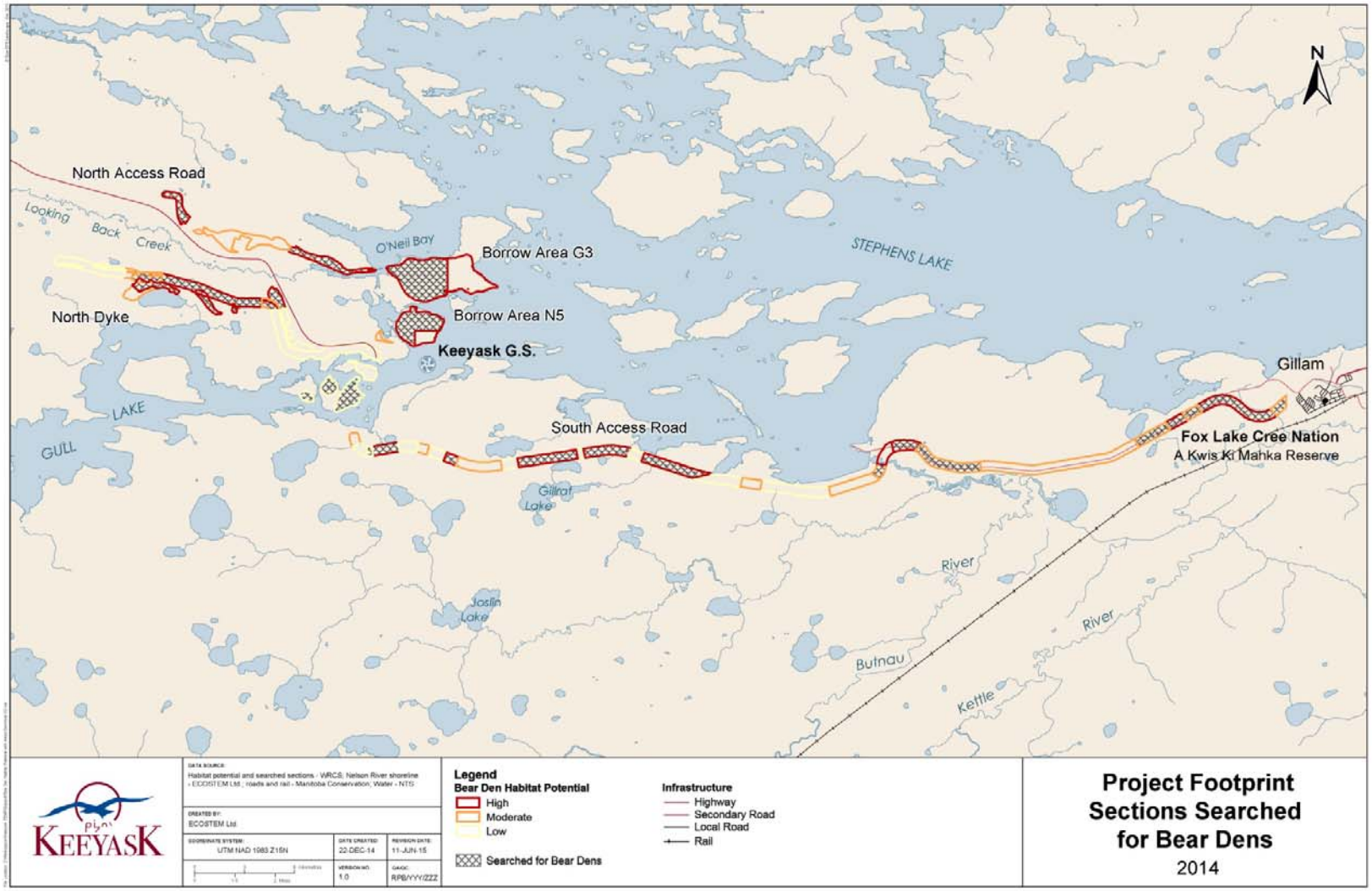
A single occupied bear den and an old, unoccupied den were found in borrow area G3 (Map 3.3; Photo 3-1). The occupied bear den was located within previously delineated high potential habitat, with thin peatland soil. The den was dug within a small rise within a burned black spruce (*Picea mariana*) forest with small patches of shrubs and deadfall (Appendix 1). The den check revealed a single black bear occupying the den. The bear was awake but lethargic at the time of the check, and it reacted very little to the presence of the camera (Photo 3-2). The age or sex of the bear could not be determined from the video.

Two remote, Reconyx™ PM35C31 cameras were set up near the active den to monitor potential bear activity during winter construction activities and capture emergence from the den in spring. The cameras will remain in place until spring 2015.

Photo 3-1: Entrance of Occupied Bear Den Located in Borrow Area G3



Map 3.1: Bear Den Habitat (High, Medium and Low Potential) Within the Project Footprint Sections Determined with Remote Sensing



Map 3.2: Project Footprint Sections Searched for Bear Dens in 2014

Photo 3-2: Screen-shot of Video Captured During the Den Check Showing a Black Bear Occupying the Den in Borrow Area G3

The unoccupied den was found in similar habitat as the occupied den near the centre of borrow area G3 (Map 3.3; Photo 3-3). The den appeared old and unkempt, but was likely used in the past by a black bear.

Two remote, Reconyx™ PM35C31 cameras were set up to monitor the unoccupied den and monitor if the den is used as an alternative site during winter or spring. These cameras remained in place until spring 2015.

Other signs of black bear activity were also present in the G3 borrow area, including scat, beds, and claw marks on trees (Appendix 1).

Photo 3-3: Old Den Found in Borrow Area G3

Black bear sign was also observed in borrow area N5 (Map 3.3). A large dug out area within a mound of moss was observed and was likely created by a black bear (Appendix 1). The dug out area did not progress far into the moss mound, but it may provide a potential den site for a black bear. Black bear scat and tracks were also observed in borrow area N5 (Appendix 1). Other notable features found in the borrow area include three areas in the northwest part of the borrow area where large, natural cavities in the peat layer occurred, potentially as a result of the thawing of permafrost and slumping of the ground (Appendix 1). No evidence of bear denning occurred at these areas, but these natural cavities may provide potential den habitat.

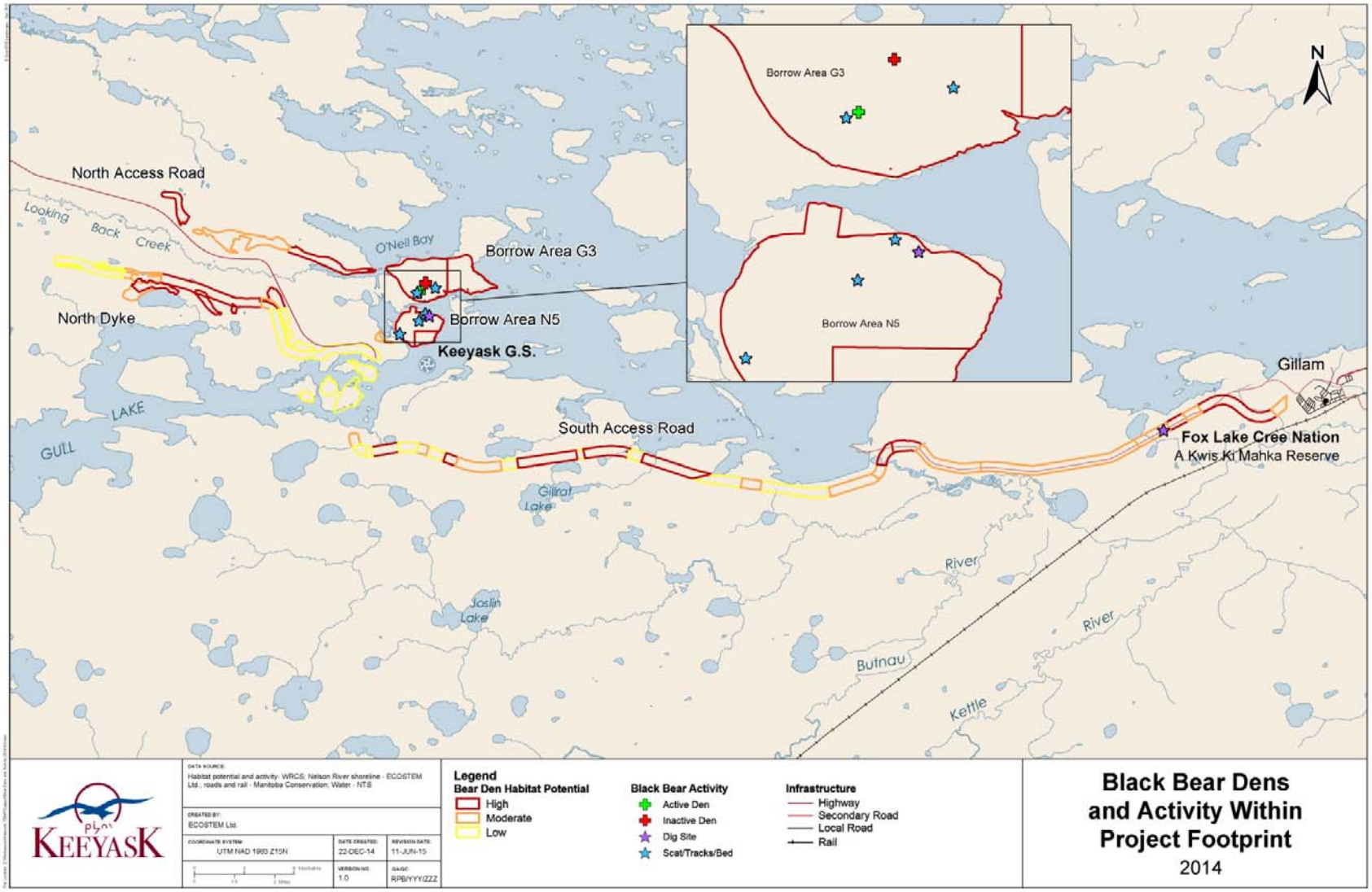
Two remote, Reconyx™ PM35C31 cameras were set up to monitor the dig and determine if it was used once the search had concluded. These cameras remained in place until spring 2015.

Two other shallow dig sites were also found in the south access road footprint to the east of Gillam (Map 3.3; Appendix 1). This site was large and presumably dug by a black bear. The site was old and showed no signs of den activity. Due to the shallow depth of the hole, it would not provide sufficient cover for a den.

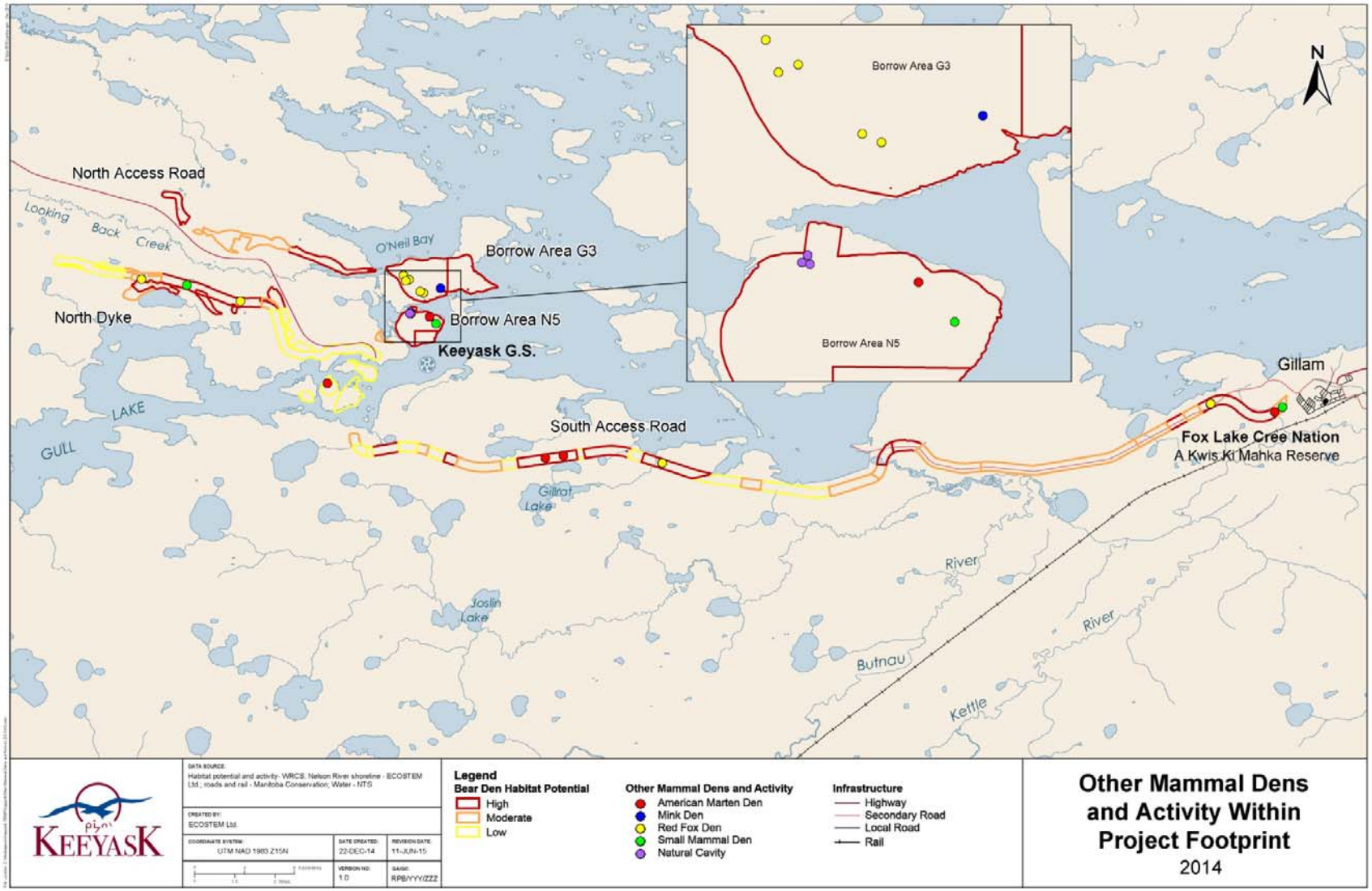
A total of 12 red fox (*Vulpes vulpes*) dens were found during the black bear den surveys. Five of the red fox dens were located in borrow area G3, five were located in the south access road footprint just east of Gillam, and two were located in the north dyke footprint (Map 3.4; Appendix 1).

Additional dens observed included four American marten dens; three were located on the south access road (Appendix 1) and one on William Smith Island (Map 3.4). Another furbearer den, potentially an American marten den, was found in borrow area N5. Three unknown small

mammal dens and a mink den were also found (Map 3.3). Signs of other wildlife, including caribou (*Rangifer tarandus*), moose (*Alces alces*), and gray wolf (*Canis lupus*) were also observed throughout the Project Footprint areas surveyed.



Map 3.3: Black Bear Dens and Activity in the Searched Project Footprint Areas



Map 3.4: Other Mammal Dens and Activity in the Searched Project Footprint Areas

4.0 DISCUSSION AND RECOMMENDATIONS

The remote sensing of potential bear den habitat, combined with the aerial ground-truthing, was a reliable method for determining potential bear den habitat within the Project Footprint. The delineation of bear den habitat prior to performing the ground searches increased the efficiency of search crews and allowed the highest potential bear den habitat to be searched, while avoiding areas that were unlikely to contain dens (*i.e.* wet areas). One active and one inactive black den were found using this technique.

For the one active black bear den observed, a 100-m distance buffer, as outlined in the Environmental Protection Plans (KHLP 2014) was followed. By following these buffer guidelines, the risk of disturbing the hibernating black bear was greatly reduced.

The remote cameras near the active den remained in place until spring to monitor the effectiveness of the buffer during the construction period. Although the bear was not caught on the trail cameras emerging from the den, on April 10 and 11, 2015, photos of a bear were captured on the trail cameras. It is highly likely that this was the bear from the den.

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

5.0 LITERATURE CITED

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6.0 APPENDIX 1

Photo 6-1: Habitat Near Active Black Bear Den in Borrow Area G3

Photo 6-2: Black Bear Scratches on Tree in Borrow Area G3

Photo 6-3: Black Bear Bed and Scat in Borrow Area G3

Photo 6-4: Dug-out Area in Moss Mound in Borrow Area N5, Presumably Constructed by a Black Bear

Photo 6-5: Black Bear Tracks Observed in Borrow Area N5

Photo 6-6: Natural Cavity in Peat in Borrow Area N5

Photo 6-7: Large Dig Site Located in the South access road Footprint, East of Gillam

Photo 6-8: Red Fox Den Found in the North dyke Footprint

Photo 6-9: Furbearer Den Found in Borrow Area N5

Photo 6-10: Survey Personnel Lining up to Begin Searching for Dens