Annex VI

Lines and Roads

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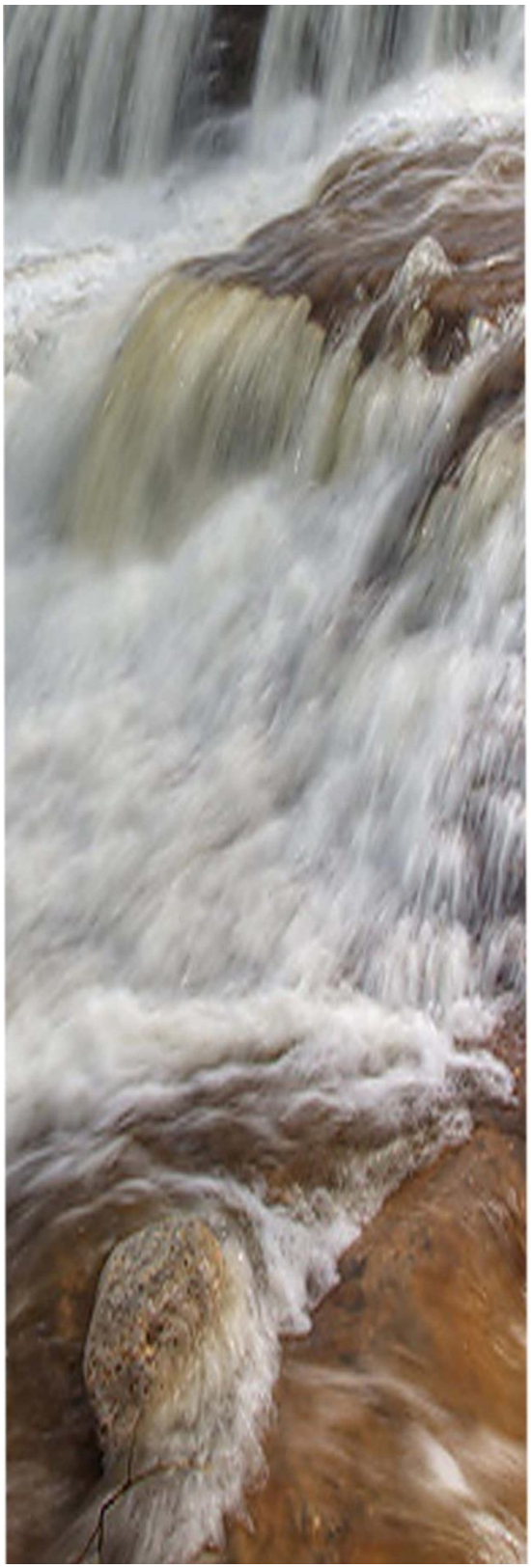
1. Power Lines and Roads Summary for Wanatango Falls Hydroelectric Project (Frederick House River) – April 10, 2014; *KBM Resource Group*.



Power Lines and Roads Summary for Wanatango Falls Hydroelectric Project (Frederick House River)

A Summary Report for:

Xeneca Power Development Inc.

April 10th, 2014

KBM RESOURCES GROUP

349 Mooney Avenue
Thunder Bay, Ontario
P7B 5L5

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Power Line and Access Road Route Investigation, Analysis and Verification

KBM Resources Group was retained by Xeneca Power Development Inc. (Xeneca) to undertake a route investigation for the proposed power line and access road routes of 18 proposed hydroelectric projects. The 18 proposed Xeneca projects have been awarded conditional approval by the Ontario Power Authority under the Feed in Tariff (FIT) program. For each project, the site of the generator, point of common coupling (PCC) and point of connection (PC) are identified in the conditionally approved FIT application. Based on these approved points of connection, this exercise was undertaken to refine power line routes for each project. KBM was later asked to include discussion of considerations as the power line and road access routes evolved over time to the present preferred option.

The Wanatango Falls hydroelectric project consists of a proposed 4.7 MW generator on the Frederick House River located approximately 21 km south west of the town of Cochrane. This report is a project-specific report that describes the process used to refine power line routes and road access routes for the Wanatango project. The report includes documentation of inputs to route iterations, analyses that were conducted, input that was gathered, and assessments that were carried out. The report is comprised of a detailed description of the methodology used to locate and assess the power line and road options. The information will ultimately be used to choose a preferred routing option that has the least amount of environmental impact.

Assessment Framework for Power Lines and Roads

This report provides details of the assessment work that was carried out for power lines and new access roads. The assessment work has been combined into one report due to the similarities in the work conducted on each of these types of corridors. There is, however, a significant difference in the legislative framework used to evaluate each type of corridor.

New access roads that are constructed as part of waterpower projects are covered within the scope of the Class EA for Waterpower Projects. The access road information provided in this report should therefore be considered a component of the Class EA for the project.

MNR's Decision Making Framework

The following are the steps that the MNR will be carrying out as part of the decision making process prior to disposition of land for the proposed power lines. Results of the work referenced in this report are intended to help support MNR's decisions.

1. Screening Process
    a. Prepare the project description
    b. Apply screening criteria
        i. Include mitigation measures
        ii. Assign high, medium and low effects in the screening process
    c. Determine the disposition's potential environmental effects (nil/low or moderate/high)
2. Projects with moderate to high potential net environmental effects also require:
    a. Public notice

    b. Project evaluation (technical aspects)
3. Mitigation
4. Monitoring of project

Methodology: Detailed Line Location and Assessment

KBM was provided with preliminary power line routings in 2010. These line routings were developed by Xeneca staff and mapped by Natural Resource Solutions Inc. These preliminary routes were created based on data found on publicly available mapping websites such as Google maps, Google Earth and Land Information Ontario (LIO) data sets (water, roads, streams, etc). Detailed information about values and land tenure affected by the proposed power lines was not available during this phase.

KBM extended the scope of the 2010 review to further optimize the routes by maximizing the use of existing roads, minimizing the number of water crossings, and avoiding wetlands where possible.

Draft Report on Proposed Power Lines and Access Roads

Further review of the attributes of the proposed route was undertaken by KBM. KBM began assembling a database of pertinent values information and land tenure designations for the proposed power line routes. The proposed line locations were then overlaid with assembled values layers, and a summary of the potentially impacted values was compiled and summarized. The analysis focused on impacted values within 2km of the proposed power line. Proposed values included: moose calving sites, aquatic resource areas, fish spawning zones, natural heritage areas and bird nesting sites. Data layers used for this exercise included:

- Land Information Ontario dataset
- NRCan Topographic data
- 2008 Forest Resource Inventory data
- Medium resolution SPOT panchromatic orthoimagery from Natural Resources Canada
- NRVIS Data Layers (circa Feb 2011)

A linear breakdown of the proposed lines following existing roads, new access roads and new line corridors was also compiled and summarized. Minor changes were made to the proposed routes by aligning them with existing roads and by avoiding water crossings and other sensitive areas to minimize potential impacts to the environment.

At this time, where appropriate, additional line route options were proposed. These were presented and explained in the draft report as alternatives with a primary goal of following existing roads and reducing impact to sensitive areas and identified values.

A draft report summarizing the above desktop exercise was completed in March, 2011. This report was distributed by Xeneca/KBM to all of the involved government agencies with the primary

purpose of soliciting feedback on the identified (and quantified) proposed line routes to determine if sensitive values were missed during the preliminary analysis.

Revised Power Line and Access Road Report

Following submission of the draft report in March, 2011, a high resolution leaf-off aerial photography program was undertaken for all route options. This resulted in 20 cm resolution, digital, true color ortho-photography to aid in habitat characterization and the identification of important environmental values.

KBM also undertook extensive consultation with the Sustainable Forestry License (SFL) holders linked to the 18 projects. The consultation was constructive and most of the SFL holders provided GIS datasets including all road networks, planned harvest block locations and aggregate pit locations. Many of the managing foresters were able to provide location-specific information based on their extensive knowledge of the land base. This information was used to complete further improvements/revisions to the power line routes and roads and was presented in a revised report in July, 2011.

Ground-truthing of the proposed power line and road access routes was completed subsequent to the post processing of digital aerial photography in June, 2011. Existing roads and water crossings were assessed to determine their current condition, structural integrity and upgrade requirements, including:

- Current condition and classification (primary, secondary & tertiary) of existing forestry access roads.
- Current condition of existing water crossing structures and drainage culverts.
- Requirements for upgrade; water crossing structures, road surface, road base, drainage culverts & ditching, road slope reduction.
- General classification of pre-existing road base and aggregate quality and quantity.
- Location of existing aggregate pits in proximity to the project site.

Further revised reports for power line and access routes were completed in November, 2011 for inclusion in the draft EA for each site. Power line and road access routes presented in the revised reports were designed to:

- avoid impacts on known values;
- reduce environmental impact (i.e. streams & wetland crossings);
- minimize landscape footprint and fragmentation;
- dovetail with existing road corridors; and
- reduce total line length.

Road access strategies for all sites focused on the use of existing SFL roads and trails for the majority of project access. Where required, small sections of new road were adjusted to avoid impacts, and were located using high resolution imagery and best available data, including current Forest Management Plan (FMP) information. Road routes were reviewed during the ground-truthing exercise in June and July, 2011.

Rapid Assessment (RAT) of potential PSWs*

Where power line or new road corridors could impact adjacent wetlands, a Rapid Assessment Technique was used to determine if the wetland was likely to be scored as a Provincially Significant Wetland (PSW).

Northern Bioscience completed this modeling exercise based on methods outlined in NEST Technical Report TR-025, Wetlands Evaluation in Ontario: Models for Predicting Wetland Score (OMNR, 1995). Where potential PSWs were identified in proximity to a route, the corridor was realigned with sufficient setback to avoid impacts to the feature.

Coarse Filter Assessment – to Avoid Known District-Specific Values

In the fall of 2012, prior to detailed assessments for significant wildlife habitat, Xeneca provided the MNR with maps of the most recent preferred new power line and access road options, buffered to a 100m corridor width. The MNR then assessed the proposed road and line locations to identify any conflicts with existing district-specific values including:

- Moose Emphasis Areas
- Marten Core Areas (from FMPs)
- Quality Fishing Zones
- Moose Wintering Habitat
- Significant wetlands
- SAR observations
- Natural Lake Trout Lakes
- Tourism values (including remote operations)
- Locally known sensitive cultural heritage or archaeological values
- Current or historic landfill or waste disposal sites
- Any known natural hazard areas or other liabilities
- Any areas that are subject to land claim negotiations or other known Aboriginal interests
- Any areas subject to pending dispositions (aggregate permits, forestry roads, etc.)
- Areas covered by mining tenure under the Mining Act.
- Land use policy areas that restrict or influence such development (e.g. parks and conservation reserves)
- Private land
- Federal land
- Existing Crown tenure (leases, land use permits, easements)
- Aggregate license areas, including “greenfield” sites under a first right of refusal (MTO)
- Trap cabins
- Existing utility lines and communications towers
- OFSC snowmobile trail network

Identified conflicts were then assessed by Xeneca and roads and lines were either re-located accordingly to avoid known values and/or mitigation measures were identified and documented to

ensure minimal impact. At this point, final preferred routes were chosen and subjected to a fine-filter assessment to predict the presence of significant wildlife habitat.

Ecological Land Classification (ELC) Interpretation from High Resolution Aerial Imagery

All of the interpretation work discussed below was completed by an Ontario certified interpreter.

ELC classification was conducted on a 600m wide corridor around the centre line of all proposed power lines and new road access route options. Shapefiles for areas of interest (project areas) were created by KBMs GIS support group, and provided to the interpreter. The interpreter obtained and reviewed background inventory data for the project areas, including the current MNR Forest Resource Inventory (FRI) dataset as obtained through MNR's information portal.

Using one of KBMs softcopy systems, the interpreter delineated a polygon for each unique forested and non-forested type encountered in the project area. Ontario's Forest Information Manual (FIM) specifications regarding minimum polygon sizes were followed. The polygon layer was checked for topology errors and revised as necessary.

Each of the polygons was then assigned attributes by the interpreter. MNRs eFRI data entry tool was used to enter the attributes including tree species, tree average age, tree average height, ecosite, etc. Ontario's harmonized ecosystem classification system was used.

The MNR's error-checking validation tool was run on completed sections and revisions were made as necessary. The resulting ELC were used as a component of the fine-filter habitat assessment (see below).

Fine Filter – to Predict Significant Habitats

The objective of the fine filter exercise was to determine areas upon which to focus field surveys for species at risk, provincially tracked species and significant wildlife habitat along Xeneca's proposed power corridors and access roads. In August, 2012, the methodology was presented to MNR to garner support for the proposed approach. MNR proposed some updates to the approach, and it was adapted accordingly to accommodate two opportunities for MNR district level review of the results/progress.

The exercise began by working with MNR and Northern Bioscience to compile a preliminary list of species of interest for each proposed corridor. In so doing, the following data sources were used:

- Atlas of the Breeding Birds of Ontario: www.birdsontario.org
- Natural Heritage Information Centre: nhic.mnr.gov.ca/MNR.nhic/nhic.cfm
- Royal Ontario Museum-MNR: www.rom.on.ca/ontario/risk.php
- NatureServe: www.natureserve.org
- OMNR Significant Wildlife Habitat Technical Guide-Appendix G
- Ontario Species at Risk: www.mnr.gov.on/en/Business/Species/index.html

- Oldham, M .J. and S.R. Brinker. 2009. Rare Vascular Plants of Ontario. Fourth Edition. Natural Heritage Information Centre. Ontario Ministry of Natural Resources, Peterborough, Ontario. 188 pp.

The preliminary species lists were then provided to MNR district staff for review and input. Final species lists were created and formed the basis for the remainder of the exercise.

KBM and Northern Bioscience then worked together to identify characteristics of the habitat for each species that could be used to assess the presence of each type of habitat along the length of the proposed corridors. The habitat characteristic identification was carried out using a variety of data sources.

To streamline the habitat assessment, key species were then grouped together based on similar habitat requirements. Habitat classifications for generalists and species whose habitat is complex and very specific at the microsite level, were excluded from this analysis. Notable exclusions to the GIS habitat query were the Eastern Massassauga Rattlesnake, Wood Turtle, Blanding's Turtle, and Milksnake. Consultation with District OMNR Species at Risk Biologists will be completed as a more reliable and preferred alternative.

KBM had previously compiled a comprehensive set of GIS data layers for the project, as well as acquiring 20 cm resolution digital true color ortho-photography. Habitat requirements for each group of species were "translated" into ELC ecosite codes and other parameters such as percent canopy closure, tree age, and species composition (see appendix I for an example of parameters used in the fine filter assessment). Minimum area requirements were noted in the parameters but were not included within the context of the GIS analysis due to the relatively narrow width of the corridor delineated into ecosites (600m), and since adjacent habitat types were unknown.

The translation of habitat requirements into Ecological Land Classification (ecosites) was completed by biologists at KBM and Northern Bioscience, and was based on their interpretation, unless otherwise noted in the sources.

Finally, KBM implemented the methodology by conducting GIS analysis on each of the proposed lines and new access roads to identify the likelihood of significant wildlife habitat along each corridor for each set of parameters. Results of the analysis were presented to MNR for review and to seek concurrence on the identification of priority sites for field verification in the spring of 2013 to support permitting applications expected in the fall of 2013.

Field data has been summarized in habitat reports and used to revise line and road routes to avoid impacts to significant habitats.

Species At Risk

Where a contravention of the Endangered Species Act (ESA) is identified and confirmed, Xeneca may require overall benefit permits in order to proceed with new access road and power line construction. MNR has committed to reviewing proposed new power lines and access roads to determine the risks of contravening the ESA. MNR can then provide guidance as to what surveys

may be required in what areas to support permitting. It is anticipated that many impacts can be avoided by implementing timing restrictions to ensure work avoids sensitive times for species. In other cases, a minor or major road/line re-routing would be needed.

Results – MNR "Coarse Filter" Analysis for Proposed Roads and Lines

The following summarizes comments received from MNR as a result of the coarse filter analysis.

Table 1. MNR comments on proposed roads – coarse filter analysis.

Value	**Quantity**	**Desription (OGF ID, identifier, license #))**
ARF **2012_13**	Martencore	Nearest is approx. 5 &1/2 km south
	Cultural Heritage AOC	Proposed corridors lie within 100 m AOC on Frederick House River
	Contingency harvest	Nearest lies within 100 m of proposed corridor, north of Reaume Esker Road, west side of Frederick House River.
Aggregate sites unrehabilitated	2, nearest is approx. 3 & ½ km west of proposed corridor	67497484, 67497472
BMA	3	CC-27-024, CC-30-011, CC-30-016
Traplines	3	CC044, CC033, TI043
Trapcabin	1	CC033-1, 600+ metres north of proposed corridor
BHA	6 areas (4 licensed areas)	200665, 200688, 203810, 204106
Restricted Commercial Outpost Camp	1 (within 100 m of the proposed corridor) east side of Frederick House River south of Zeverly Rapids/bridge, west side of Connaught Evelyn Road	
Drill Holes	2, within proposed corridor, 5 just beyond)	2- OGF Id: 135110837 (1991), 1351110048 (1996) 5- OGF Id: 1351027316-18(1988), 1351027319-20 (1987)

Value	Quantity	Desription (OGF ID, identifier, license #))
ARA	Frederick House River	northern pike, yellow perch, spottail shiner, johnny darter, shorthead redhorse, burbot, lake sturgeon, mooneye, logperch, mottled sculpin, walleye, longnose sucker, lake whitefish, rock bass, goldeye, northern redbelly dace, cisco, white sucker, sauger
Trails	2	Frederick House River Canoe Route TOPS – A106C, Polar Bear Riders Snowmobile Club
Disposition	1	WPR 29593
Claims	7	Claim #: 1154612-13, 11546616-18, 1154620-21
Moose Late Wintering Habitat	proposed corridor lies between two wintering areas	
Spawning area	Downstream of Zeverly Rapids	100 m from proposed corridor

Values Check: within **1 km** buffer of proposed primary powerline ROW – No low or medium sensitivity sites found for either district for either primary route or secondary options.

MNR Comments on Proposed Lines:

COCHRANE DISTRICT

Non-sensitive

- Resource Allocation:
  - BMAs: 3
  - Traplines 3 (1 cabin)
  - Baitfish (3 licensees)
- Public access point : Frederick House River bridge
- Moose aquatic feeding areas: 2
  - Pickerel Lake
  - an east tributary of Frederick House River south of Frederick House Lake Dam

  Water Monitoring Station (Frederick House Lake dam):Water survey of Canada
- Potential tourism site south of Zeverly (former Tourism Establishment)
- Great Blue Heron colony nesting site:
  - Frederick House River, just north of High Falls Dam, Lat: 48º48’20” Long 81º01’73” status unknown, recorded 1996
- Sturgeon spawning area: Zeverly Rapids
- Moose late wintering habitat: Mann-Hanna Twp. north and south of Pickeral Lake’

- ARA:Cool water fisheries: Frederick House River: cool water fishery: northern pike, yellow perch, burbot, lake sturgeon, mooneye, logperch, walleye, lake whitefish, rock bass, goldeye, cisco, long-nose and white suckers, sauger, Pickerel Lake: white sucker, lake whitefish, northern pike, yellow perch, walleye
- Caribou Collection Area: satellite Collaring and caribou surveys

Value	Detail	License/ID	FMF Obj ID
BMA	CC-30-011		1000438050
	CC-27-024		54842609
	CC-30-016		1000438053
Traplines	CC044		1000439498
	CC033		1000439497
	TI039		950322096
Trapcabin	CC033		1000439602
Baitfish		200665	67516121
		203810	68423862
		200688	67516122

TIMMINS DISTRICT

Non-sensitive

- Resource Allocation:
  - BMAs: 2
  - Traplines 6
  - Baitfish (2 licensees)
  - Waterwells : 2 near Ice Chest Lake, 13 along Carrigan Road, Ice Chest Lake Road, and Dugall/Hwy 610
- Research Plots: 5 1 WL RP 5 km northeast of Sawmill Lake, 4 Forestry Trial plots along the Ice Chest Lake Rd near Roy Lake
- Wild Rice: 7 areas along Moose Creek (Matheson Twp.)
- Nesting site: raptor nesting site (Matheson Twp. south of Dugall Rd/Hwy. 610)
- Moose Aquatic Feeding areas: creek system including Moose Creek in Little, Evelyn, and Matheson Twps. Between Frederick House River and Nighthawk Lake
- ARAs: Coldwater fisheries: Lizard, Partridge, Clearwater, Evelyn, and Pick Lakes Coolwater fisheries: Frederick House River, Moose Creek and tributaries, Sawmill, Ice Chest, Moon and Dipper Lakes
- Aggregates: authorized pits in Little Twp. west of Roy Lake, and Dugwall Pit, Matheson Twp.
- Waste Disposal Site: Evelyn Twp. Ice Chest Lake WDS
- Work Camp: Fuelwood yard, Matheson Twp. east of Dugwall Pit
- Access Points: Ice Chest and Lizard Lake
- Monitoring Stations: Frederick House River Dam, Frederick House River at Connaught
- Cottage Residential Areas: 3 @ Ice Chest Lake
- Cottage Residential Sites: 71 on Ice Chest Lake
- Recreation Camp: 1 on Ice Chest Lake
- Leased Land: Frederick House Lake Dam

- Caribou Collection Area: satellite collaring and caribou surveys

Value	Detail	License/ID	FMF Obj ID
BMA	TI-30-050		950622474
	CC-27-024		54842609
Traplines	CC044		1000439498
	CC033		1000439497
	TI039		950322096
	TI036		950322101
	TI045		950322105
	TI043		1000439510
Baitfish		200665	67516121
		200688	67516122

Alternative powerline route: both districts

- BMAs: 3
- Traplines: 4
- Licensed Baitfish areas: 2
- Authorized Aggregate Site: Little Twp. south of Little Lake
- Cold water fisheries: Little Lake, Cool water fisheries: Frederick House River , Sawmill and Pickeral Lakes, creek and pond system north of Little Lake, Little Twp.
- Moose aquatic feeding areas: Little Twp.

Value	Detail	License/ID	FMF Obj ID
BMA	TI-30-050		950622474
	CC-27-024		54842609
	CC-30-016		1000438053
Traplines	CC044		1000439498
	CC033		1000439497
	TI039		950322096
	TI043		1000439510
Baitfish		200665	67516121
		203810	67516122

Results – Final Routes for "Fine Filter" Analysis

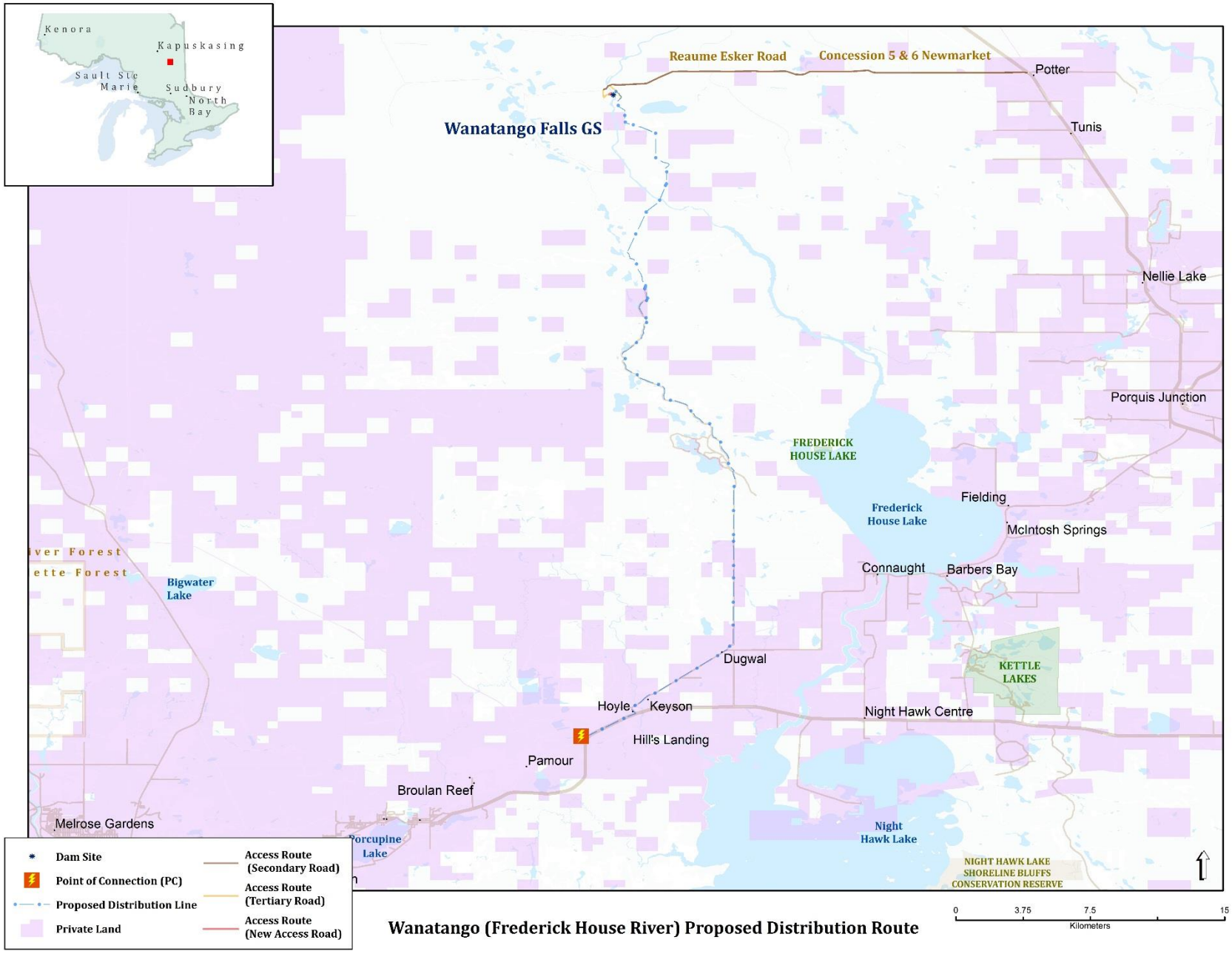
Description of Proposed Power Line Route Options

There is one line route being proposed for the Wanatango site (Figure 2). This runs SSW from the Wanatango River Crossing to link up with Ice Chest road near Little Lake and continue southward along the road (Figure 2). Upon reaching patent land, the route will run along the eastern edge of the land and then reconnect with Ice Chest road south to the rail crossing at Dugwal. Upon reaching the crossing at Dugwal, the proposed line would run SW along the road easement to Hoyle and the Hoyle DS.

The total line distance of this route from the generating station to the point of common coupling is 43.6 km. Details on lengths, land tenure and water crossings associated with this route can be found in Table 2 below.

Table 2. Statistics for Wanatango proposed power lines.

			Length (m)	Water Crossing			Wetlands	
Route	Owneship	RoadType		Highway	Existing	New	Edge	Crossing
	Crown	Existing Road	30,002	1	16	-	1	-
	Crown	New Corridor	8,287	-	-	4	-	-
	Private	Existing Road	5,265	-	1	-	-	-
		Total	**43,555**					



Wanatango (Frederick House River) Proposed Distribution Route

Figure 1 - Proposed power line distribution route for the Wanatango project

Description of Proposed Access Route

Statistics on road lengths and water crossings are shown in Table 3 below. Please note that the MNR provided statistics on wetland and water crossing's along this route during the initial route selection. Small areas of wetlands that cross existing roads are not included in table 3. For a more detailed description of water features found along this route please see Northern Bioscience's Wanatango Wetland Assessment.

Table 3 - Statistics for proposed road access for Wanatango.

Road Type	Length (m)	Water Crossing			Wetlands	
		Highway	Existing	New	Edge	Crossing
Newmarket Concession 5/6	16,106	-	-	-	-	-
Existing Road (East side)	950.0	-	-	-	-	-
Temporary Road (East Side)	102.8	-	-	-	-	-
Existing Road (West Side)	793.2	-	-	2	-	-
New Road (West Side)	149.6	-	-	-	-	-
Temporary Road (West Side)	303.0	-	-	-	-	-

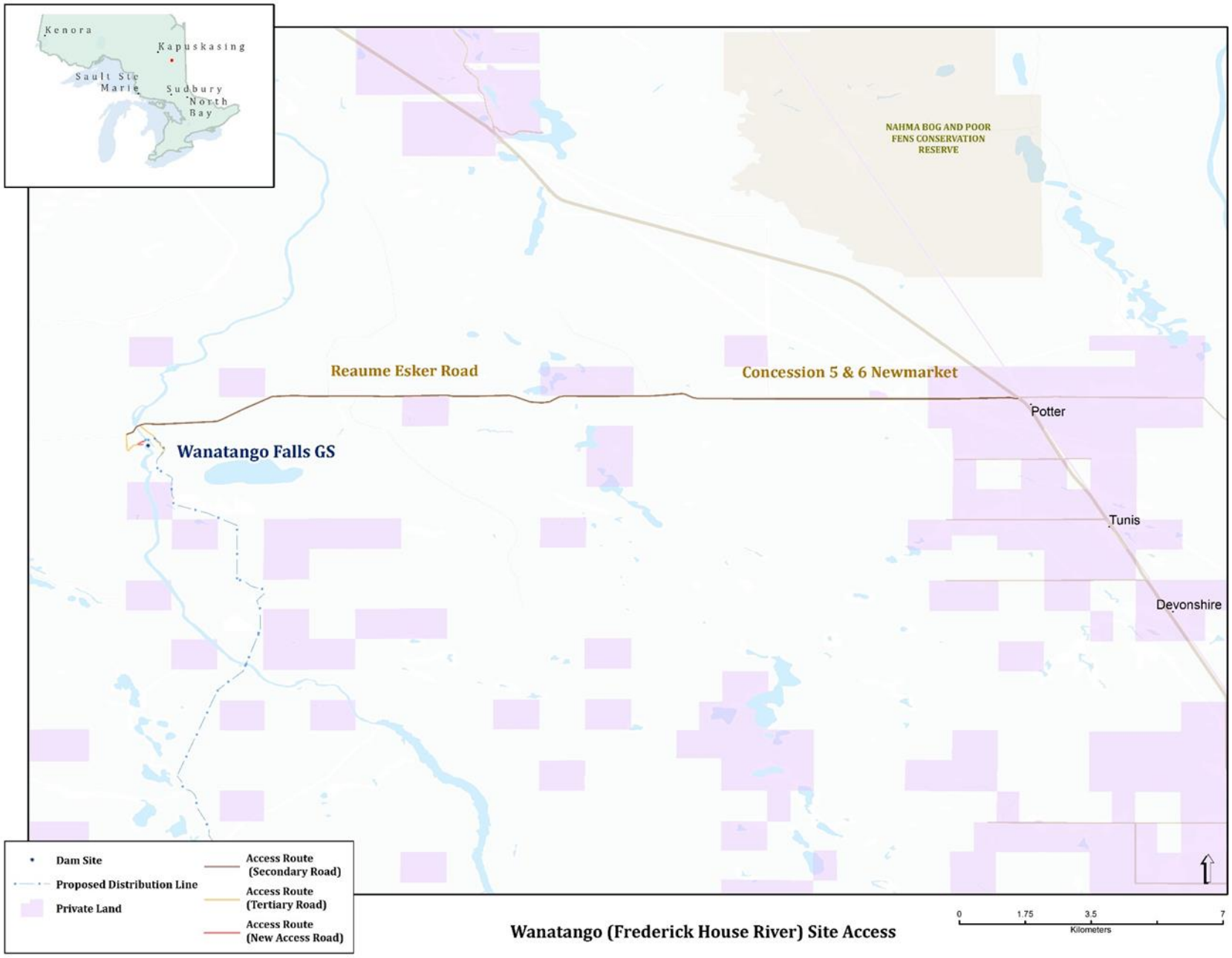


Figure 2 - Proposed site access route for the Wanatango project.

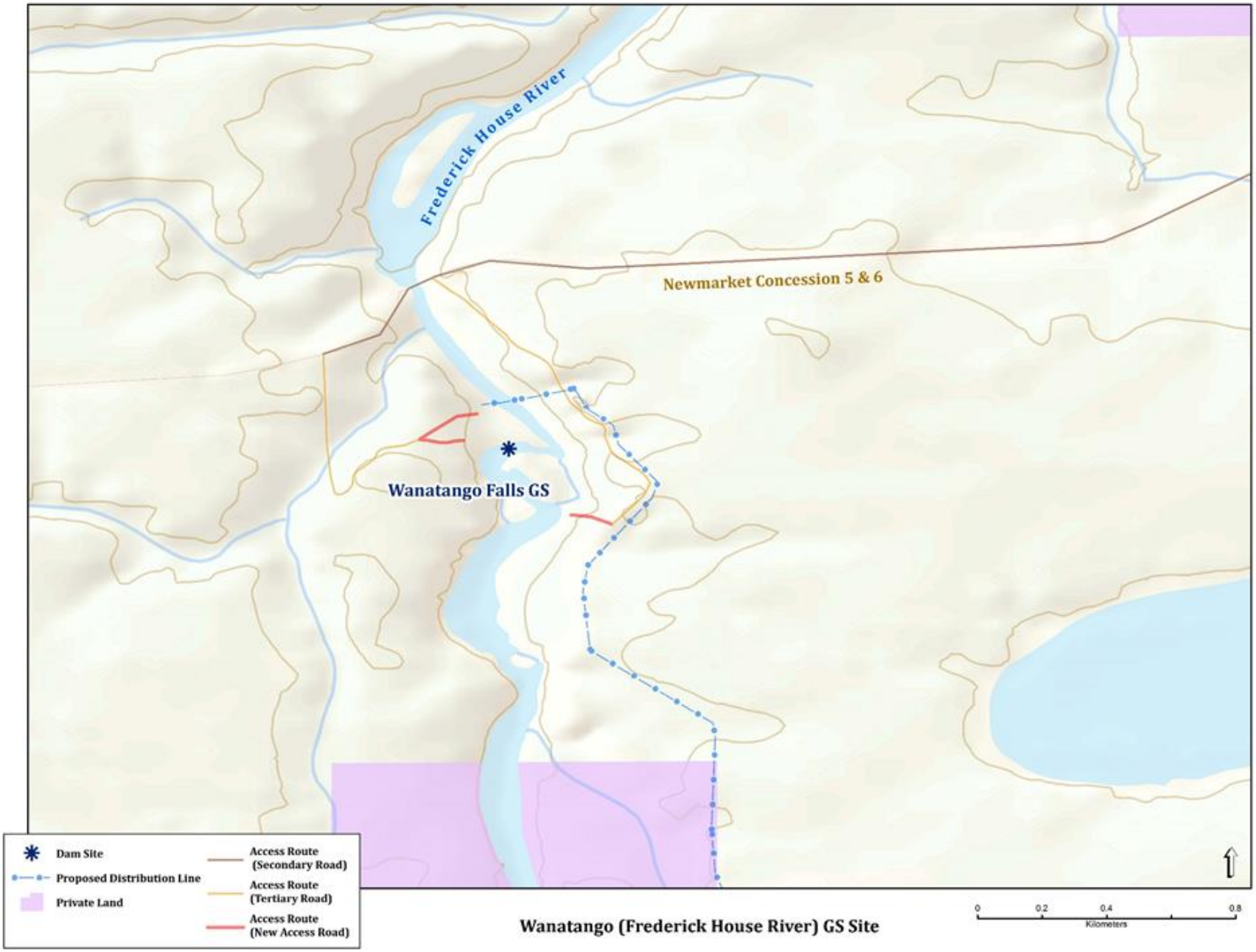


Figure 3 - Wanatango Site Level Map

The proposed dam site is accessed via Newmarket Concession Rd. 5/6 (Reaume Esker Rd.) a secondary year-round road extending west from highway 11 (Figure 2). The Newmarket Concession Rd. 5/6 consists of an adequate clay/aggregate base with drainage ditching in low-lying wet sections. The road does require maintenance and upgrades throughout, particularly where water crossing and drainage culverts have failed and portions of the roads have washed out (Figure 4).

Figure 4 - Various areas requiring repair along the Newmarket Concession Road 5/6.

The Wanatango Falls site is accessed from the east side of the Frederick House River via predominantly existing roads. A well-used former logging road (off Newmarket Concession Rd. 5/6) will provide access to the site from the east side of the river. This logging road will require 950m of upgrading and the construction of an additional 150m of temporary access road to reach the edge of the river (Figure 3 and 5).

Figure 5 - Proposed line route along old logging road on east side of the Frederick House River.

Access to the west side of the Frederick House River will be via a permanent bridge structure that spans the Frederick House River (along Newmarket Concession Rd. 5/6) roughly 500m north of the proposed dam site (Figure 6). The bridge spans 40m (131.2 ft) and has a width of 3.35m (11 ft.). The current condition of the bridge decking was good and the bridge is rated to a maximum weight capacity of 35 tons.

Figure 6 - Bridge crossing the Frederick House River.

Access to the site from the west side of the Frederick House River will also utilize former logging roads. The logging road on the west side of the river is largely grown over (see figure 7) and will need 793.2m of upgrades, two stream crossings, and an additional 149.6m of new access to reach the dam site. A temporary access road (303.0m) will also be constructed at the end of the existing road to access the site further downstream (see figure 3).

Figure 7 - Access route to the west side of the proposed generator site.

The remainder of the proposed power line route south of the Frederick House River was accessed via the Ice Chest road off of hwy 101 approximately 4 km east of the town of Hoyle. The first 13 km of the Ice Chest Road are classified as a primary road with the remainder consisting of well-maintained secondary roads (see Figure 8).

Figure 8 - Primary and Secondary roads sections along the Ice Chest road.

A locked gate has been put in place approximately 1 km south of the dam to limit access to the OPG site (see Figure 9).

Figure 9 - Gate south of the OPG water control dam.

Results – Rapid Assessment (RAT*) of Potential Provincially Significant Wetlands

Please see Northern Bioscience's Wanatango Wetland Assessment.

Results – Ecological Land Classification

The results of the habitat delineation completed in accordance with Ecological Land Classification methodology are summarized in the tables below. The first set of tables summarizes the ELC for the proposed powerline location, the second set summarizes the ELC for areas where the proposed powerline and new access roads follow the same path (and does not include the areas where they don't follow the same path). The third set summarizes the ELC for areas where new access occurs. There are tables that summarize the area and percentage by polytype, and tables that summarize area and percentage by ecosite group and label. Specific individual ecosite classifications are available upon request.

ELC Results by Polytype

Table 4. Ecological land classification of proposed single corridor power line options – by polytype.

	Route Option

POLYTYPE	AREA (ha)	%
Brush and Alder	70.66	2.70
Developed Agricultural Land	47.66	1.82
Forest	2184.81	83.36
Grass and Meadow	39.92	1.52
Island	1.19	0.05
Open Muskeg	7.04	0.27
Treed Muskeg	17.97	0.69
Unclassifed	193.31	7.38
Water	58.34	2.23
Total	**2620.89**	

Table 5. Ecological land classification of combined power line and road access corridor – by polytype.

	Route Option	
POLYTYPE	**AREA (ha)**	**%**
Brush and Alder	72.41	2.72
Developed Agricultural Land	47.66	1.79
Forest	2221.85	83.47
Grass and Meadow	39.92	1.50
Island	1.19	0.04
Open Muskeg	7.04	0.26
Treed Muskeg	17.97	0.67
Unclassified	194.76	7.32
Water	59.11	2.22
Total	**2661.90**	

Table 6. Ecological land classification of proposed road access corridor – by polytype.

POLYTYPE	AREA (ha)	%
Brush and Alder	2.39	2.52
Forest	81.49	86.15
Island	1.06	1.12
Unclassified	1.48	1.56
Water	8.18	8.65
Total	**94.59**	

ELC Results by Ecosite Group and Label

Table 7 - Ecological land classification of proposed powerline option – by ecosite group and label.

		Primary Ecosite		Secondary Ecosite	
Ecosite Group	**Ecosite Label**	**AREA (ha)**	**%**	**AREA (ha)**	**%**
Anthropogenic Ecosites	191) Active Waste Disposal/Landfill	1.79	0.07	0.00	0.00
Anthropogenic Ecosites	193) Active Coarse Clean Fill	17.58	0.67	0.00	0.00
Anthropogenic Ecosites	197) Pavement/Concrete	22.01	0.84	0.00	0.00
Anthropogenic Ecosites	198) Compact Graveled Surface	104.40	3.98	0.00	0.00
Anthropogenic Ecosites	998) Utilities Unclassified	18.02	0.69	0.00	0.00
Anthropogenic Ecosites	999) Residential Unclassified	29.50	1.13	0.00	0.00
Dry or Sandy Ecosites	34) Dry or Sandy: Jack Pine - Black Spruce Dominated	189.63	7.24	0.00	0.00
Dry or Sandy Ecosites	35) Dry or Sandy: Pine - Black Spruce Conifer	77.05	2.94	0.00	0.00
Dry or Sandy Ecosites	40) Dry or Sandy: Aspen - Birch Hardwood	43.46	1.66	0.00	0.00
Dry to Fresh Silty to Fine Loamy Ecosites	104) Fresh or Silty to Fine Loamy: Aspen - Birch Hardwood	151.32	5.77	38.19	4.49
Dry to Fresh Silty to Fine Loamy Ecosites	93) Fresh or Silty to Fine Loamy: Field	34.77	1.33	0.00	0.00
Dry to Fresh Silty to Fine Loamy Ecosites	95) Fresh or Silty to Fine Loamy: Sparse Shrub	4.73	0.18	0.00	0.00
Dry to Fresh Silty to Fine Loamy Ecosites	99) Fresh or Silty to Fine Loamy: Pine - Black Spruce Conifer	49.01	1.87	6.27	0.74
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	44) Dry to Fresh or Coarse: Field	12.89	0.49	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	46) Dry to Fresh or Coarse: Sparse Shrub	33.90	1.29	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	47) Dry to Fresh or Coarse: Shrub	1.28	0.05	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	49) Dry to Fresh or Coarse: Jack Pine - Black Spruce Dominated	79.69	3.04	67.22	7.91
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	50) Dry to Fresh or Coarse: Pine - Black Spruce Conifer	394.96	15.07	45.15	5.31

		Primary Ecosite		Secondary Ecosite	
Ecosite Group	**Ecosite Label**	**AREA (ha)**	**%**	**AREA (ha)**	**%**
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	52) Dry to Fresh or Coarse: Spruce - Fir Conifer	25.15	0.96	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	55) Dry to Fresh or Coarse: Aspen - Birch Hardwood	389.21	14.85	69.96	8.23
Island	00) Island	1.19	0.05	0.00	0.00
Moist or Sandy to Coarse Loamy Ecosites	65) Moist or Coarse: Pine - Black Spruce Conifer	160.88	6.14	0.00	0.00
Moist or Sandy to Coarse Loamy Ecosites	67) Moist or Coarse: Spruce - Fir Conifer	0.00	4.03	7.38	0.87
Moist or Sandy to Coarse Loamy Ecosites	68) Moist or Coarse: Conifer	0.00	2.41	13.32	1.57
Moist or Sandy to Coarse Loamy Ecosites	70) Moist or Coarse: Aspen - Birch Hardwood	105.51	0.48	110.09	12.95
Moist or Silty to Fine Loamy to Clayey Ecosites	114) Moist or Fine: Pine - Black Spruce Conifer	63.16	2.12	107.11	12.60
Moist or Silty to Fine Loamy to Clayey Ecosites	116) Moist or Fine: Spruce - Fir Conifer	12.56	0.07	0.00	0.00
Moist or Silty to Fine Loamy to Clayey Ecosites	117) Moist or Fine: Conifer	0.00	10.24	38.52	4.53
Moist or Silty to Fine Loamy to Clayey Ecosites	119) Moist or Fine: Aspen - Birch Hardwood	55.56	4.16	113.67	13.37
Permanently Flooded or Hydric Ecosites	127) Poor Conifer Swamp	1.95	2.70	4.07	0.48
Permanently Flooded or Hydric Ecosites	128) Intermediate Conifer Swamp	268.32	1.00	164.95	19.40
Permanently Flooded or Hydric Ecosites	129) Rich Conifer Swamp	109.01	0.27	0.00	0.00
Permanently Flooded or Hydric Ecosites	130) Intolerant Hardwood Swamp	0.00	2.23	17.93	2.11
Permanently Flooded or Hydric Ecosites	135) Organic Thicket Swamp	70.66	0.07	1.91	0.23
Permanently Flooded or Hydric Ecosites	136) Sparse Treed Fen	26.33	0.67	0.00	0.00
Permanently Flooded or Hydric Ecosites	140) Open Moderately Rich Fen	0.00	0.84	3.78	0.44
Permanently Flooded or Hydric Ecosites	142) Mineral Meadow Marsh	7.04	3.98	37.65	4.43
Very Shallow Ecosites	16) Very Shallow or Dry to Fresh: Aspen - Birch Hardwood	0.00	0.69	3.10	0.36
Water	0) Water	58.34	1.13	0.00	0.00
Total		**2620.89**		**850.27**	

Table 8 - Ecological land classification of proposed powerline and access corridor option – by ecosite group and label.

		Primary Ecosite		Secondary Ecosite	
Ecosite Group	**Ecosite Label**	**AREA (ha)**	**%**	**AREA (ha)**	**%**
Anthropogenic Ecosites	191) Active Waste Disposal/Landfill	1.79	0.07	0.00	0.00
Anthropogenic Ecosites	193) Active Coarse Clean Fill	17.58	0.66	0.00	0.00
Anthropogenic Ecosites	197) Pavement/Concrete	22.01	0.83	0.00	0.00
Anthropogenic Ecosites	198) Compact Graveled Surface	105.85	3.98	0.00	0.00
Anthropogenic Ecosites	998) Utilities Unclassified	18.02	0.68	0.00	0.00
Anthropogenic Ecosites	999) Residential Unclassified	29.50	1.11	0.00	0.00
Dry or Sandy Ecosites	34) Dry or Sandy: Jack Pine - Black Spruce Dominated	189.63	7.12	0.00	0.00
Dry or Sandy Ecosites	35) Dry or Sandy: Pine - Black Spruce Conifer	77.05	2.89	0.00	0.00
Dry or Sandy Ecosites	40) Dry or Sandy: Aspen - Birch Hardwood	43.46	1.63	0.00	0.00
Dry to Fresh Silty to Fine Loamy Ecosites	104) Fresh or Silty to Fine Loamy: Aspen - Birch Hardwood	151.32	5.68	38.19	3.52
Dry to Fresh Silty to Fine Loamy Ecosites	93) Fresh or Silty to Fine Loamy: Field	34.77	1.31	0.00	0.00
Dry to Fresh Silty to Fine Loamy Ecosites	95) Fresh or Silty to Fine Loamy: Sparse Shrub	4.73	0.18	0.00	0.00
Dry to Fresh Silty to Fine Loamy Ecosites	99) Fresh or Silty to Fine Loamy: Pine - Black Spruce Conifer	49.01	1.84	6.27	0.58
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	44) Dry to Fresh or Coarse: Field	12.89	0.48	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	46) Dry to Fresh or Coarse: Sparse Shrub	33.90	1.27	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	47) Dry to Fresh or Coarse: Shrub	1.28	0.05	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	49) Dry to Fresh or Coarse: Jack Pine - Black Spruce Dominated	79.69	2.99	67.22	6.19
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	50) Dry to Fresh or Coarse: Pine - Black Spruce Conifer	395.60	14.86	45.15	4.16
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	52) Dry to Fresh or Coarse: Spruce - Fir Conifer	25.15	0.94	0.00	0.00

		Primary Ecosite		Secondary Ecosite	
Ecosite Group	**Ecosite Label**	**AREA (ha)**	**%**	**AREA (ha)**	**%**
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	55) Dry to Fresh or Coarse: Aspen - Birch Hardwood	421.23	15.82	69.96	6.44
Island	00) Island	1.19	0.04	0.00	0.00
Moist or Sandy to Coarse Loamy Ecosites	65) Moist or Coarse: Pine - Black Spruce Conifer	160.88	6.04	235.41	21.68
Moist or Sandy to Coarse Loamy Ecosites	67) Moist or Coarse: Spruce - Fir Conifer	0.00	0.00	7.38	0.68
Moist or Sandy to Coarse Loamy Ecosites	68) Moist or Coarse: Conifer	0.00	0.00	13.32	1.23
Moist or Sandy to Coarse Loamy Ecosites	70) Moist or Coarse: Aspen - Birch Hardwood	108.53	4.08	110.09	10.14
Moist or Silty to Fine Loamy to Clayey Ecosites	114) Moist or Fine: Pine - Black Spruce Conifer	63.16	2.37	107.11	9.87
Moist or Silty to Fine Loamy to Clayey Ecosites	116) Moist or Fine: Spruce - Fir Conifer	12.56	0.47	0.00	0.00
Moist or Silty to Fine Loamy to Clayey Ecosites	117) Moist or Fine: Conifer	0.00	0.00	38.52	3.55
Moist or Silty to Fine Loamy to Clayey Ecosites	119) Moist or Fine: Aspen - Birch Hardwood	55.56	2.09	113.67	10.47
Permanently Flooded or Hydric Ecosites	127) Poor Conifer Swamp	1.95	0.07	4.07	0.37
Permanently Flooded or Hydric Ecosites	128) Intermediate Conifer Swamp	269.67	10.13	164.95	15.19
Permanently Flooded or Hydric Ecosites	129) Rich Conifer Swamp	109.01	4.10	0.00	0.00
Permanently Flooded or Hydric Ecosites	130) Intolerant Hardwood Swamp	0.00	0.00	17.93	1.65
Permanently Flooded or Hydric Ecosites	135) Organic Thicket Swamp	72.41	2.72	1.91	0.18
Permanently Flooded or Hydric Ecosites	136) Sparse Treed Fen	26.33	0.99	0.00	0.00
Permanently Flooded or Hydric Ecosites	140) Open Moderately Rich Fen	0.00	0.00	3.78	0.35
Permanently Flooded or Hydric Ecosites	142) Mineral Meadow Marsh	7.04	0.26	37.65	3.47
Very Shallow Ecosites	16) Very Shallow or Dry to Fresh: Aspen - Birch Hardwood	0.00	0.00	3.10	0.29
Water	0) Water	59.11	2.22	0.00	0.00
Total		**2661.90**		**1085.68**	

Table 9 - Ecological land classification of proposed single corridor access route – by ecosite group and label.

		Primary Ecosite		Secondary Ecosite	
Ecosite Group	**Ecosite Label**	**AREA (ha)**	**%**	**AREA (ha)**	**%**
Anthropogenic Ecosites	198) Compact Graveled Surface	1.48	1.56	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	50) Dry to Fresh or Coarse: Pine - Black Spruce Conifer	17.80	18.82	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	52) Dry to Fresh or Coarse: Spruce - Fir Conifer	1.35	1.42	0.00	0.00
Fresh or Sandy or Dry to Fresh Coarse Loamy Ecosites	55) Dry to Fresh or Coarse: Aspen - Birch Hardwood	51.96	54.93	0.00	0.00
Island	00) Island	1.06	1.12	0.00	0.00
Moist or Sandy to Coarse Loamy Ecosites	65) Moist or Coarse: Pine - Black Spruce Conifer	0.00	0.00	14.55	91.52
Moist or Sandy to Coarse Loamy Ecosites	67) Moist or Coarse: Spruce - Fir Conifer	0.00	0.00	1.35	8.48
Moist or Sandy to Coarse Loamy Ecosites	70) Moist or Coarse: Aspen - Birch Hardwood	3.02	3.20	0.00	0.00
Permanently Flooded or Hydric Ecosites	128) Intermediate Conifer Swamp	7.35	7.78	0.00	0.00
Permanently Flooded or Hydric Ecosites	135) Organic Thicket Swamp	2.39	2.52	0.00	0.00
Water	0) Water	8.18	8.65	0.00	0.00
Total		**94.59**		**15.89**	

Results – "Fine Filter" Habitat Assessment

Please note that the following area values for potentially significant habitat include polygon areas for which the primary ecosite has been deemed to be potential habitat, as well as polygons for which the secondary ecosite has been deemed to be potential habitat. A secondary ecosite by definition is: "A complex of two forested ecosites is allowed to be recorded when more than one ecosite is present as long as the secondary ecosite represents at least 20% of the area of the polygon and the area associated with the secondary ecosite does not exist in a manner suitable for meeting the minimum polygon size for creating a new polygon." (OMNR 2009[1]). As such, it is likely that total areas (ha) of potential wildlife habitat have been slightly over-estimated.

There were no areas of significant habitat identified for Peregrine Falcon or overwintering turtles. In addition, in terms of Whip-poor-will and Blanding's Turtle, Northern Bioscience conducted their field surveys in consultation with MNR district staff and the results can be viewed in their final field report for the site.

Final field results for all species can be found in the final field report prepared by Northern Bioscience.

Table 10. Area of significant habitat by species for proposed power line.

		Route
Species	**Habitat**	**Area (ha)**
Bobolink	Hayfields and Pastures	92.35
Barn Swallow	Birds Associated with Buildings	154.84
Black Tern	Open wetland primarily marsh	92.35
Common Nighthawk	Open Rock Outcrops	50.76
Chimney Swift	Birds Associated with Buildings	154.84
Eastern Meadowlark	Hayfields and Pastures	47.66
Least Bittern	Open wetland primarily marsh	44.69
Plant Alvars	Alvars	3.10
Short-eared Owl	Open wetland primarily marsh	134.76
Whip-poor-will	Open Rock Outcrops	61.04
Yellow Rail	Open wetland primarily marsh	44.69

[1]Ontario Ministry of Natural Resources. 2009. Forest Resources Inventory Technical Specifications 2009. Queens' Printer.

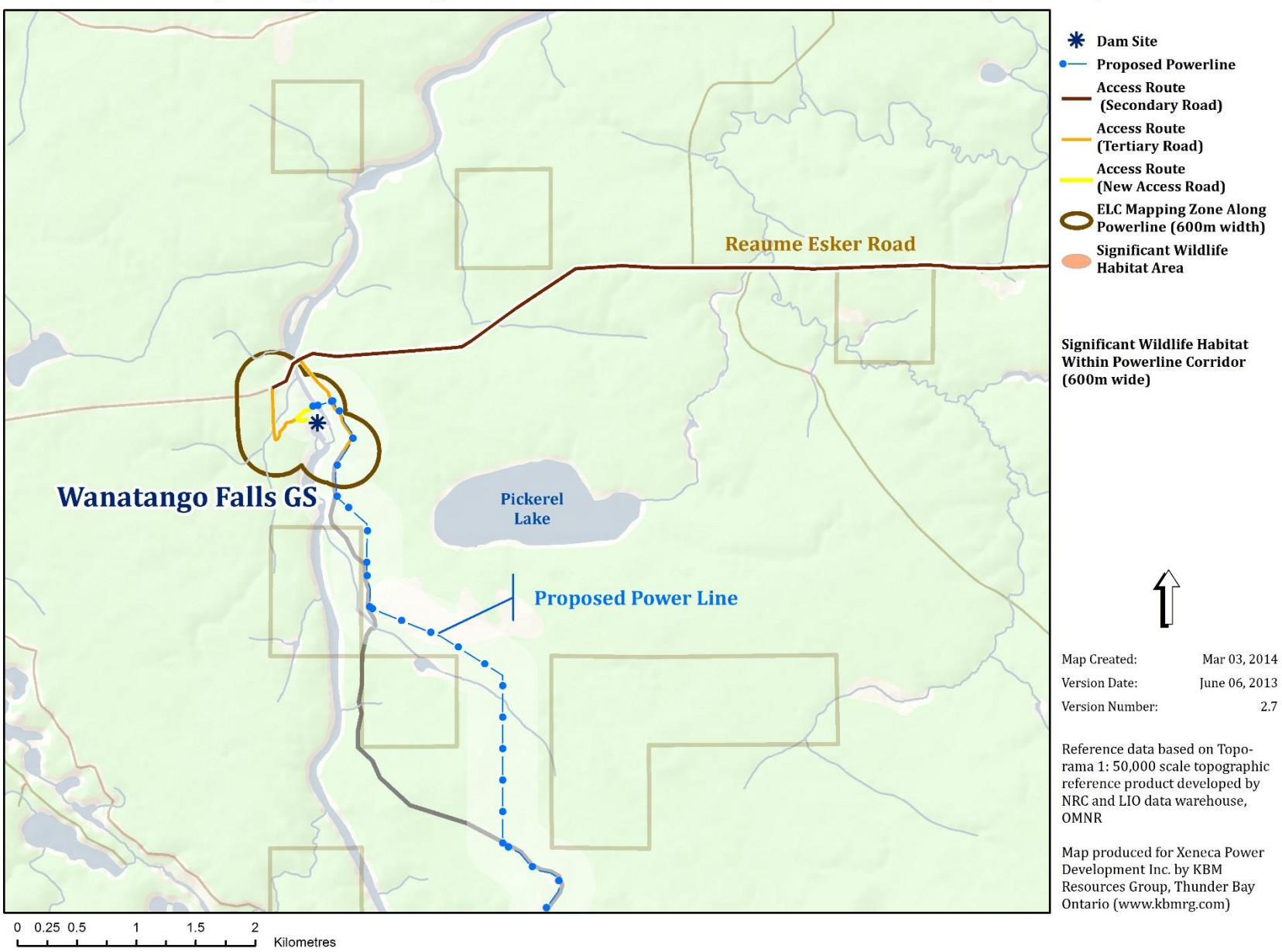
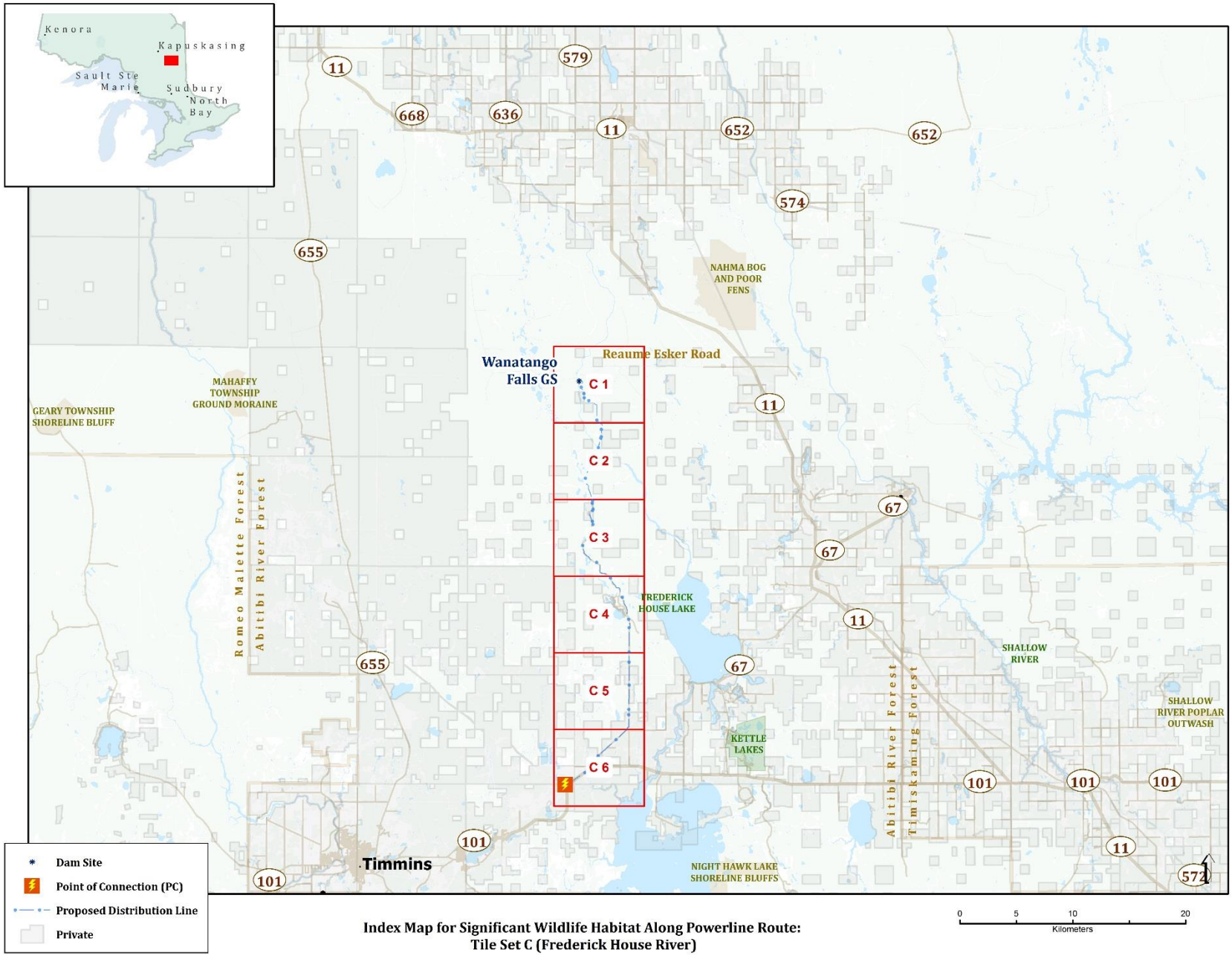


Figure 10 - Significant wildlife habitat within new road access corridor



Index Map for Significant Wildlife Habitat Along Powerline Route: Tile Set C (Frederick House River)

Figure 11 - Index Map for Significant Wildlife

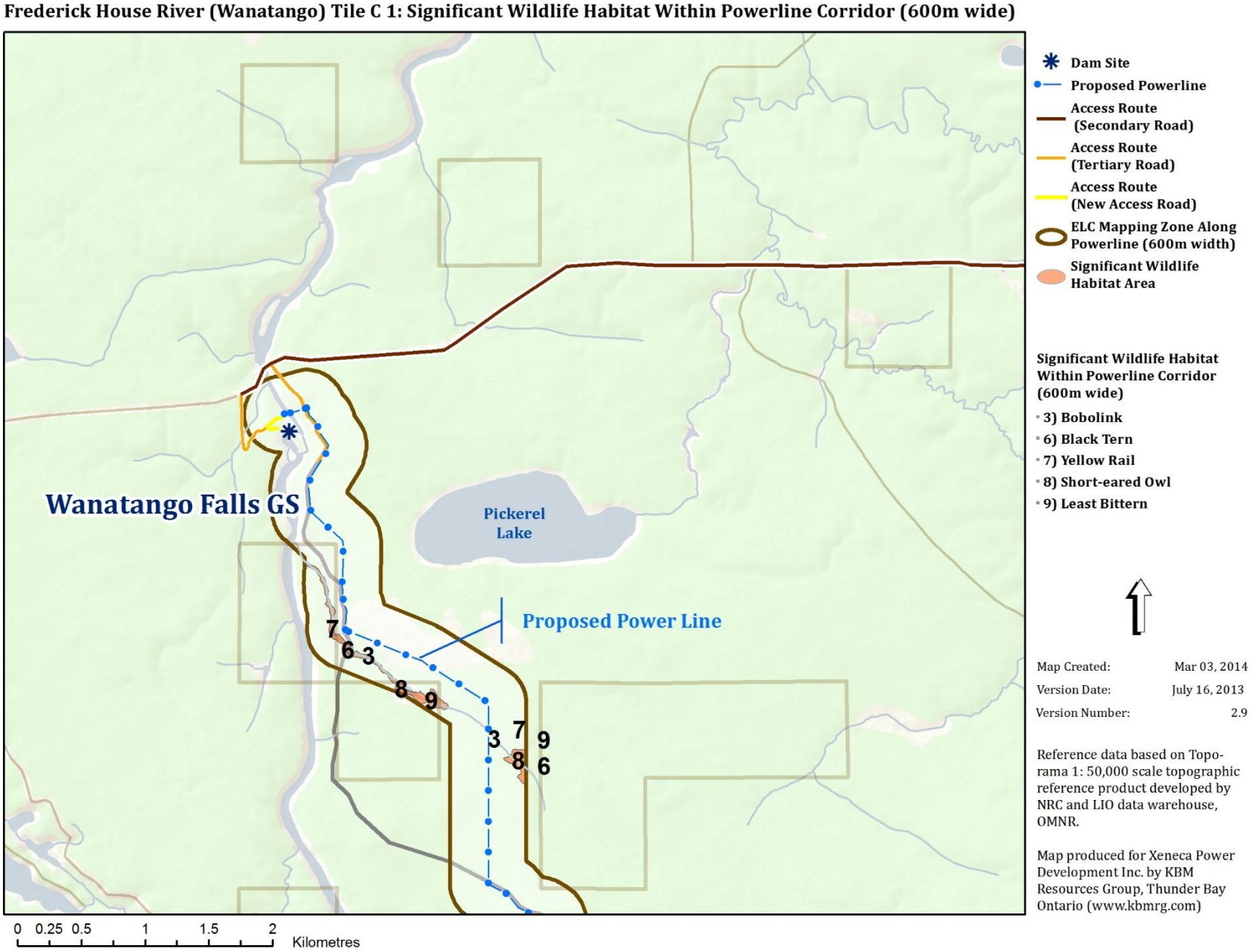


Figure 12 - Tile C1: Significant wildlife habitat within proposed power line corridors.

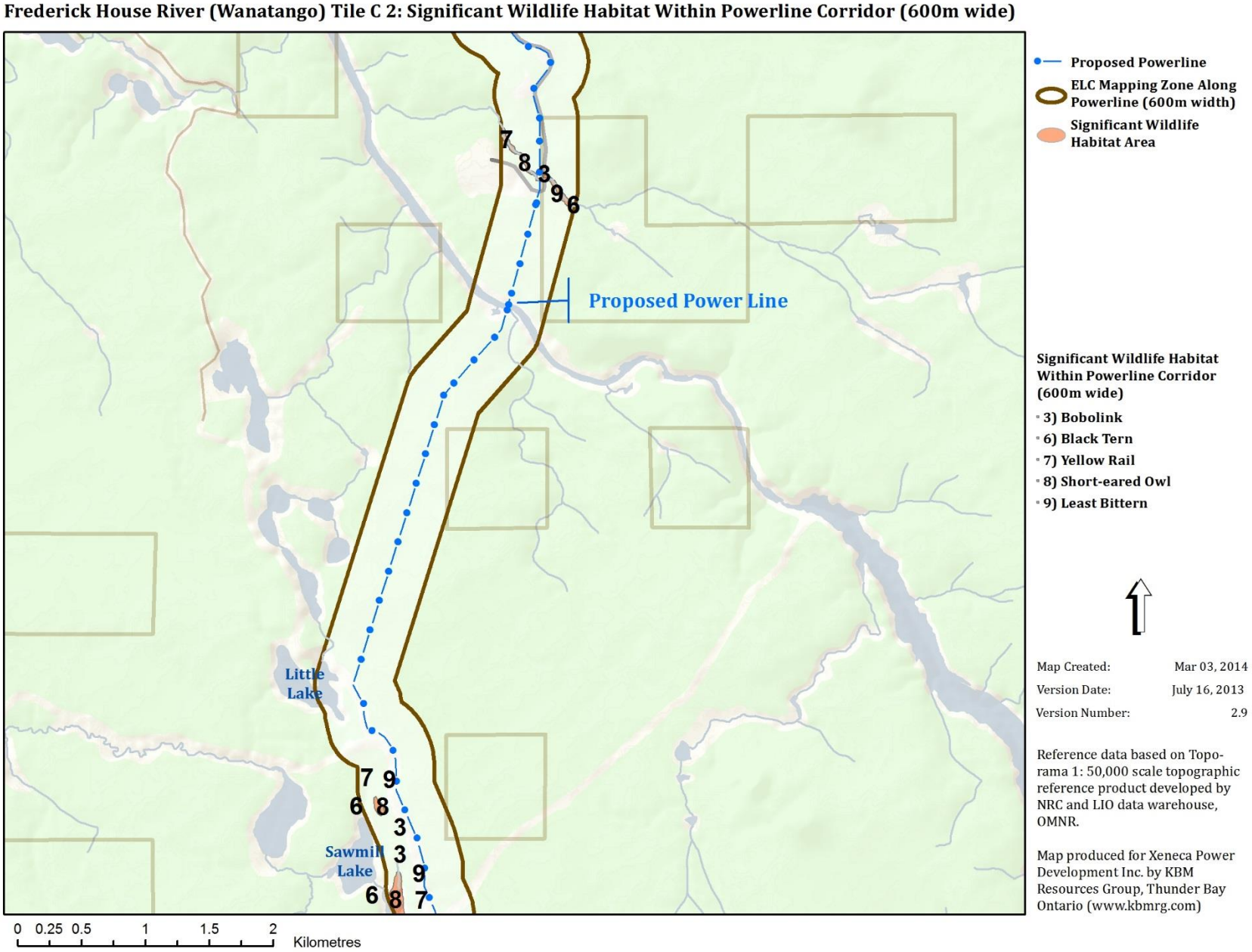


Figure 13 - Tile C2: Significant wildlife habitat within power line corridor option 3.

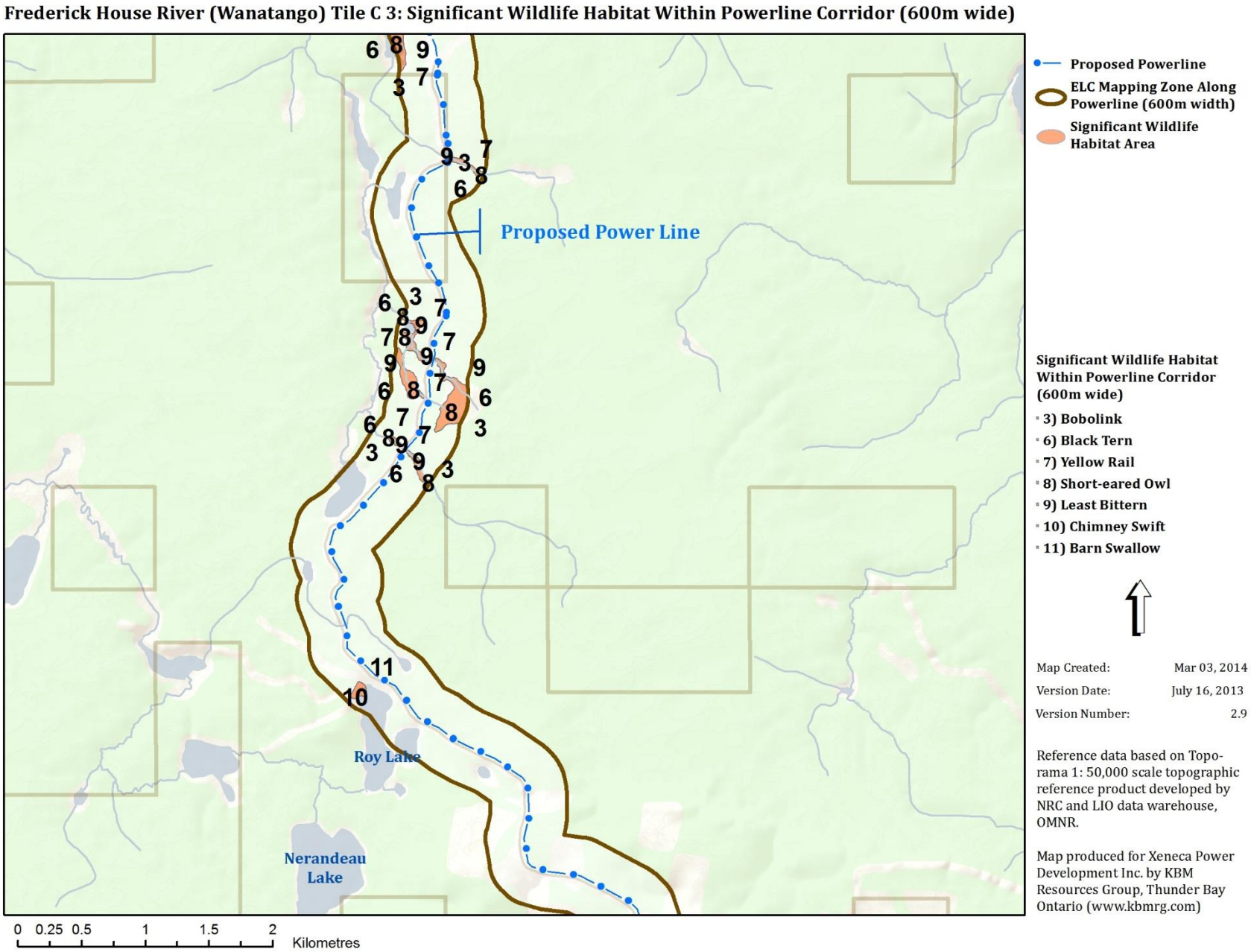


Figure 14 - Tile C3: Significant wildlife habitat within power line option 3.

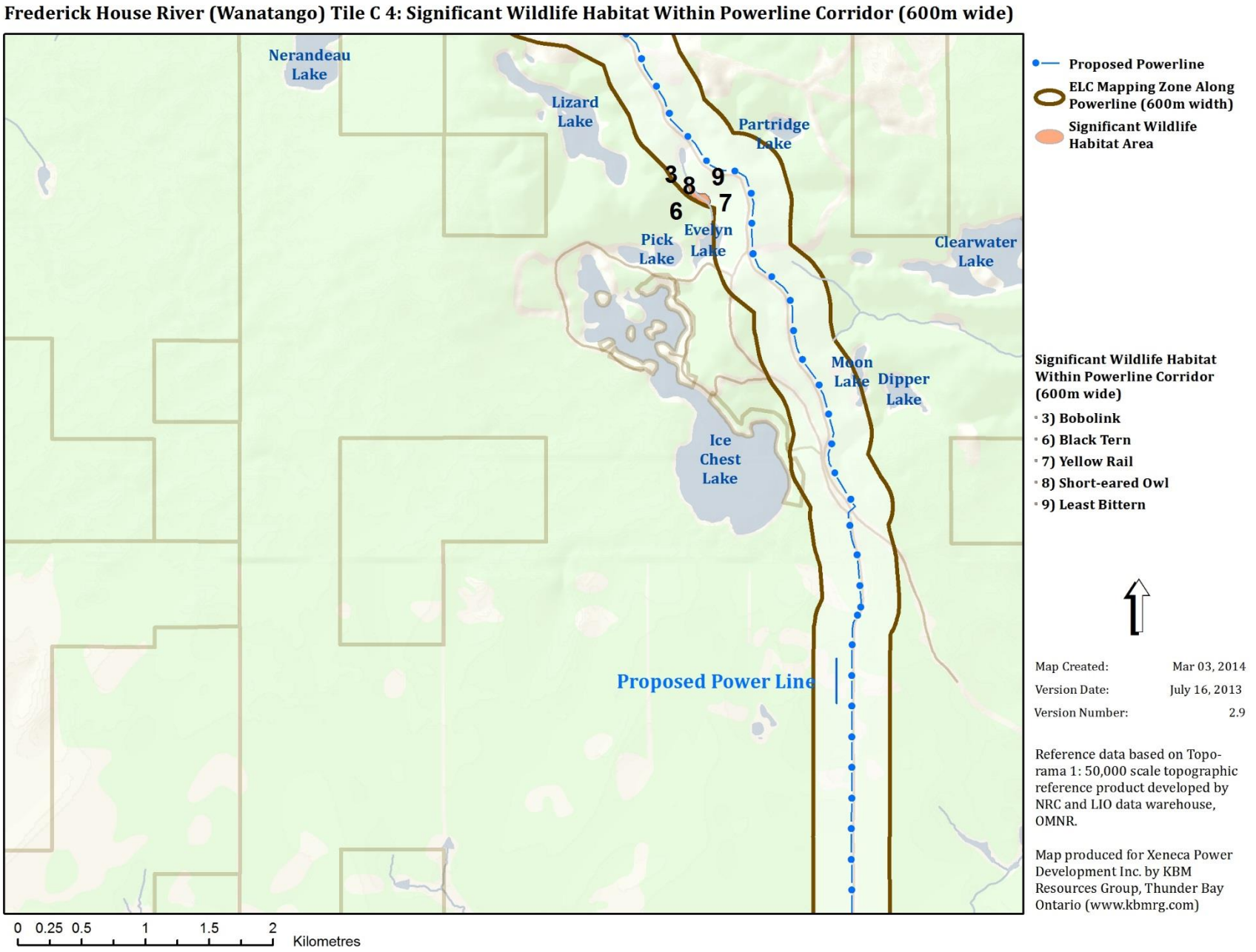


Figure 15 - Tile C4: Significant wildlife habitat within power line option 3.

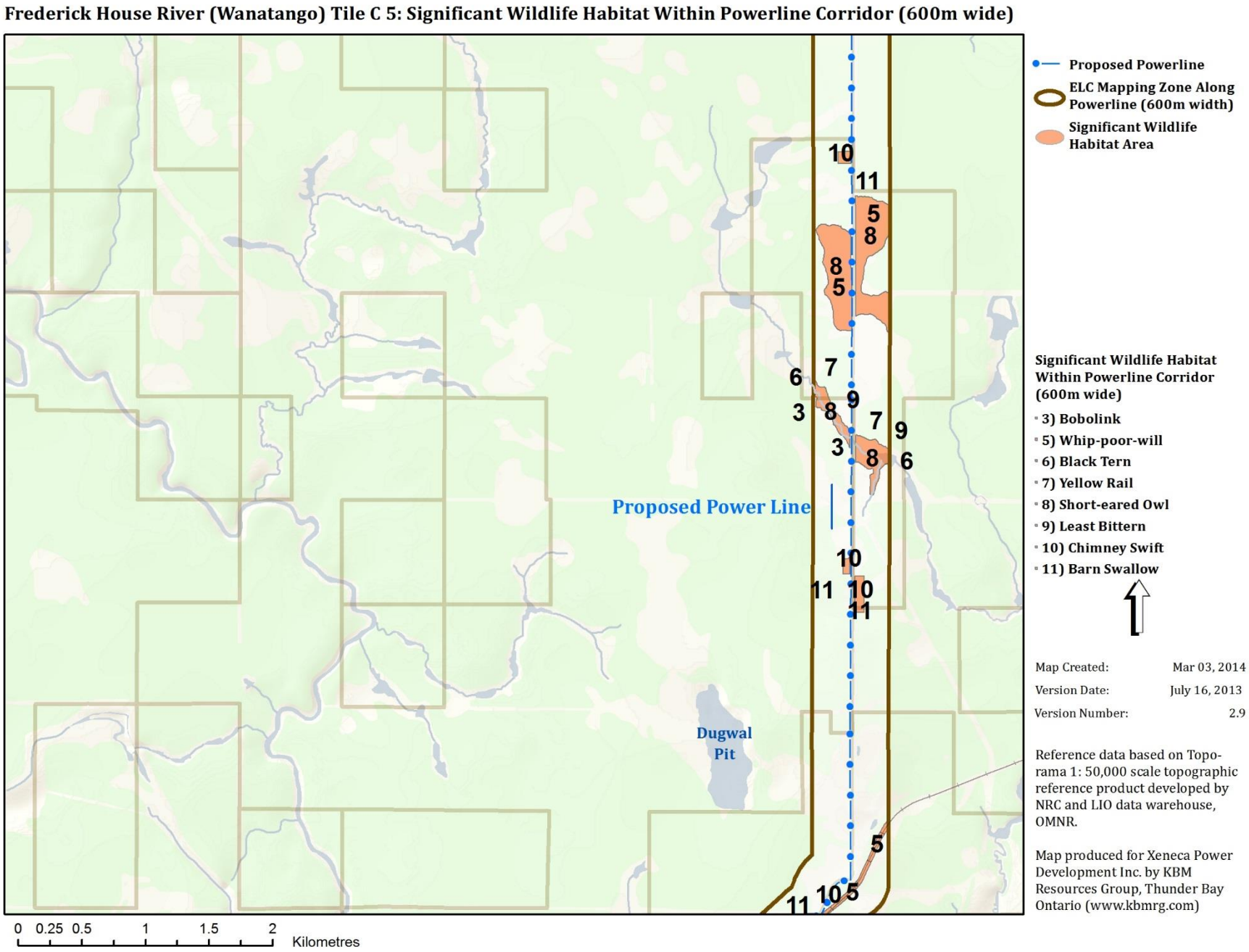


Figure 16 - Tile C5: Significant wildlife habitat for power line option 3.

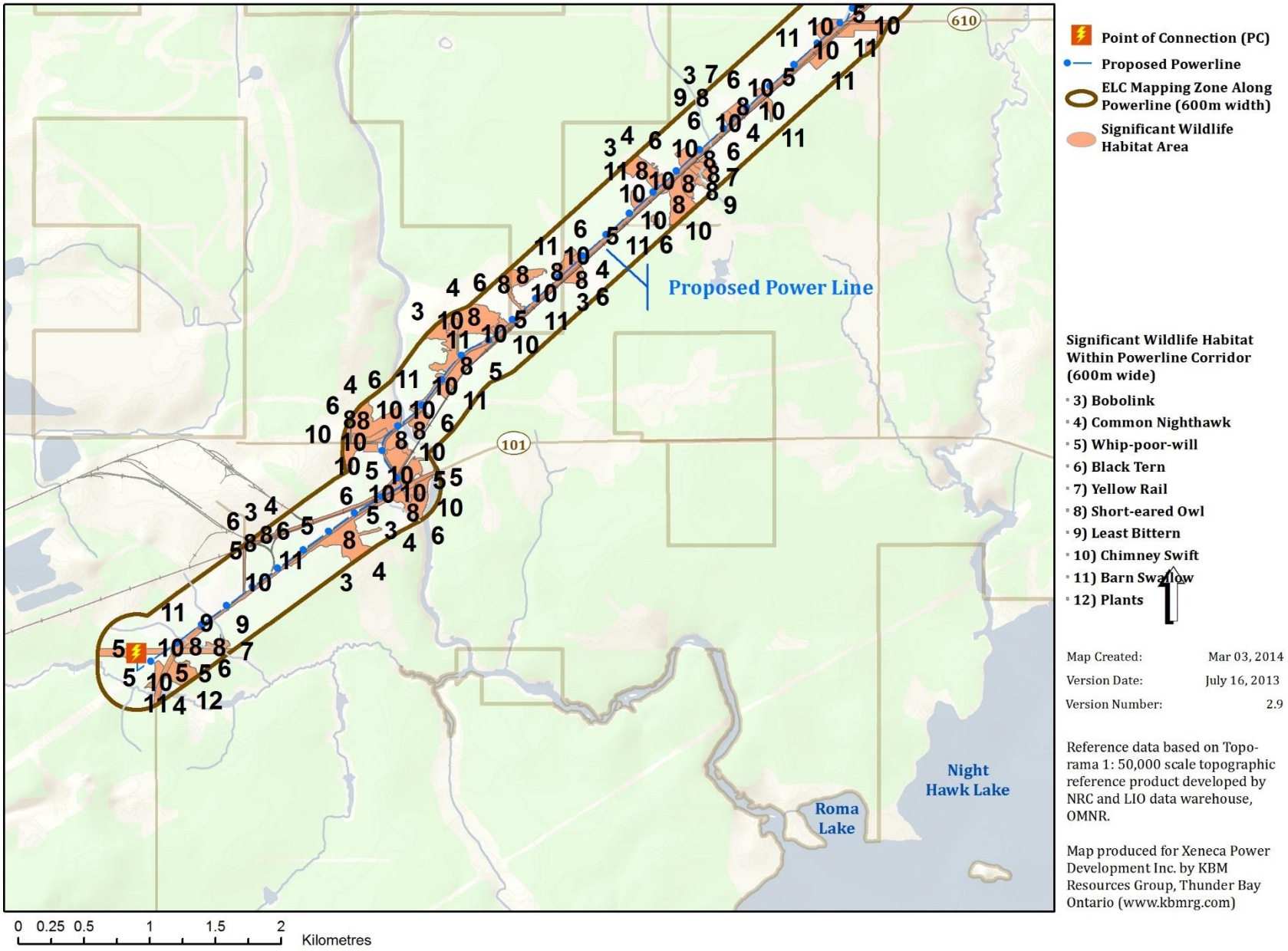


Figure 17 - Tile C6: Significant wildlife habitat for power line option 3.

Appendix I – Fine Filter Habitat Assessment Parameters

Parameters used for fine-filter habitat assessment analysis (GIS query exercise).

Habitat Type	Common Name	Latin Name	OMNR status or S-rank	Habitat Characteristics/Requirements	Wetlands e.g Marshes, Swamps	Open Water (Lakes, ponds, rivers, streams)	Riparian Shores or nearshore areas	Grasslands	Parklands, Suburban areas	Thickets, Second growth	Old growth, mature stands	Forest edges	Downed woody debris	Seeps	Cliffs, Talus slopes, ravines	Colonial (birs)/ Seasonally concentrated (all other taxa)	Cavity user	Provincially Rare	Area Sensitive	Sources		Corresponding Ecosite Descriptor	Sources
Dunes	Numerous Plants																					005, 006	
Alvars	Numerous Plants																					171, 172 [Need to be calcareous (modifier K) or associated with limestone or dolostone] and tree cover <60%.	Lee et al. 1998
Cliffs	Peregrine Falcon	*Falco peregrinus*	Threatened	rock cliffs, crags, especially situated near water; tall buildings in urban centres; threatened by chemical contamination; reintroduction efforts have been attempted in numerous locations throughout Ontario		X									X			X		SWHTG (2000) Appendix G, Ratcliff and Foster 2005	Potentially suitable nesting habitat includes cliffs with suitable ledges and a vertical drop of at least 15 m and a linear cliff length of at least 100 m. "Good" habitat has a vertical cliff face of at least 30 m and a minimum cliff length of 250 m. "Marginal" habitat has a vertical cliff face of 15 to 30 m and a minimum cliff length of 100 m.	158, 159N, 174, 175N	
Hayfields, Pastures	Eastern Meadolark	*Sturnella magna*	Threatened	open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size				X											X	SWHTG (2000) Appendix G	10 ha open grassy areas	008N, 020N, 029N, 044N, 060N, 077N, 93N, 109N,	
	Bobolink	*Dolichonyx oryzivorus*	Threatened	large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha	X			X											X	SWHTG (2000) Appendix G	50 ha grassland	142(143),144,109N,060N,093N, 008N,020N,029N,044N	
Open Rock Outcrops	Common Nighthawk	*Chordeiles minor*	Special Concern	open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs				X	X	X		X								SWHTG (2000) Appendix G		180, 181N, 161, 162, 164, 165, 167, 168, 171, 172, , 177, 178, 180, 181, 183, 184, 187, 188, 109N, 093N, 060N, 044N, 029N, 008-028. Additionally, young cutovers and burns <20 years.	Wilson and Watts (2008)
	Whip-poor-will	*Caprimulgus vociferus*	Threatened	dry, open, deciduous woodlands of small to medium trees; oak or beech with lots of clearings and shaded leaflitter; wooded edges, forest clearings with little herbaceous growth; pine plantations; associated with >100 ha forests; may require 500 to 1000 ha to maintain population				X		X	X	X	X						X	SWHTG (2000) Appendix G	100 ha forest size	Early successional stands(<20 yrs). Coniferous plantations (Dev stage=FTG plant, new plant and >80% conifer), 005, 006, 008-028. 031, 032, 046, 047, 062, 063, 095, 096, 161, 162, 164, 165, 167, 168, 171, 172, U998.	Sandilands (2005)
Open wetland, primarily marsh	Black Tern	*Chilidonias niger*	Special Concern	wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1 m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands for insects; also feeds on fish, crayfish and frogs	X	X	X	X							X		X	X		SWHTG (2000) Appendix G	20 ha marshes (lit), cumulative area >20ha (Al Harris)	008N, 020N, 029N, 044N, 060N, 077N, 093N, 109N, 110N, B142-153	
	Yellow Rail	*Coturnicops noveboracensis*	Special Concern	large, freshwater or brackish grass and sedge marshes with dense vegetation including bulrushes, horsetails, grasses; loss of wintering habitat and southern wetlands is limiting to this species	X														X	SWHTG (2000) Appendix G	cumulative area >20ha (Al Harris)	B 141-152	
	Short-eared Owl	*Asio flammeus*	Special Concern	grasslands, open areas or meadows that are grassy or bushy; marshes, bogs or tundra; both diurnal and nocturnal habits; ground nester; destruction of wetlands by drainage for agriculture is an important factor in the decline of this species; home range 25 -125 ha; requires 75-100 ha of contiguous open habitat	X			X							X		X	X		SWHTG (2000) Appendix G	75-100 ha contiguous open habitat (lit), cumulative area >20ha (Al Harris)	08, 09, 20, 21, 29, 30, 31, 44, 45, 46, 60, 61, 62, 77, 78, 79, 93, 94, 95, 109, 110, 111 138-152	
	Least Bittern	*Ixobrychus exilis*	Threatened	deep marshes, swamps, bogs; marshy borders of lakes, ponds, streams, ditches; dense emergent vegetation of cattail, bulrush, sedge; nests in cattails; intolerant of loss of habitat and human disturbance	X	X	X								X		X	X		SWHTG (2000) Appendix G	cumulative area >20ha (Al Harris)	142-152	
Birds Associated with Buildings	Chimney Swift	*Chaetura pelagica*	Threatened	commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water		X		X	X		X	X			X	X	X			SWHTG (2000) Appendix G		U999-197,189X,158,159 (omited other habitats for this analysis)	
	Barn Swallow	*Riparia rustica*	Threatened (COSSARO)	farmlands or rural areas;cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water	X	X	X	X				X			X	X				SWHTG (2000) Appendix G		U999-197,189X,158,159 (omited other habitats for this analysis)	
Turtle Habitat (overwintering)	Snapping Turtle	*Chelydra serpentina*	Special Concern																			148-152	Northern Bioscience (Al Harris)
Turtle Habitat (overwintering)	Northern Map Turtle	*Graptemys geographica*	Special Concern																			Open water areas (deeper lakes, rivers and streams)	SWHTG 5e Criterion Schedule
Turtle Habitat (nesting)	Snapping Turtle	*Chelydra serpentina*	Special Concern																			1600m adjacent to: 138, 140-149	SWHTG 5e Criterion Schedule
Turtle Habitat (nesting)	Northern Map Turtle	*Graptemys geographica*	Special Concern																			adjacent to: 138, 140-150	SWHTG 5e Criterion Schedule

Appendix II

Wanatango GS Lines and Roads Map Tiles

500000

520000

5420000

5400000

5380000

Wanatango Falls GS

C 1

C 2

C 3

C 4

C 5

C 6

C 7

Proposed Distribution Route

Site Access and Powerline Route Index Map
Tile Set C (Frederick House River)

N

1 : 170,000

0 5 10

Kilometres

Reference data based on the Toporama 1: 50,000 scale topographic reference product developed by Natural Resources Canada (NRCan) and the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.
Map produced by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).

495000

500000

5415000

5415000

Reaume Esker Road

Wanatango Falls GS

Two Stream Crossings
Washed Out

Proposed Distribution
Route

Pickerel Creek

Devonshire Creek

Frederick House River

Wanatango Falls

Pickerel Lake

5410000

5410000

495000

500000

0 0.5 1 2
Kilometers

Lines and Roads Map - Frederick House River (Wanatango) Tile C 1

- Dam Site
- Proposed Powerline
- Access Route (Primary Road)
- Access Route (Secondary Road)
- Access Route (Tertiary Road)
- Access Route (New Access Road)

Map Created: March 18, 2014
Version Date: July 16, 2013
Version Number: 2.5
Map Scale: 1 : 32,000

Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.

Map created by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).

505000

5415000

5410000

NAHMA BOG AND POOR FENS

Warrick Lake

Trans-Canada Highway

Concession 5 & 6 Newmarket

Reaume Esker Road

Devonshire Creek

Frontier Lake

900ft

950ft

1000ft

0 0.5 1 2
Kilometers

Lines and Roads Map - Frederick House River (Wanatango) Tile C 2

- Access Route (Primary Road)
- Access Route (Secondary Road)
- Access Route (Tertiary Road)
- Access Route (New Access Road)
- Conservation Reserve

Map Created:	March 18, 2014
Version Date:	July 16, 2013
Version Number:	2.5
Map Scale:	1 : 32,000

Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.

Map created by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).

510000

515000

5415000

5410000

NAHMA BOG AND POOR FENS

Concession 5 & 6 Newmarket

Joseph Lake

Tom Lake

Mary Lake

Jeannie Lake

Domestic Waste

Alpine Lake

Potter

Wicklow River

Tunis

Cole Lake

900ft

1000ft

0 0.5 1 2
Kilometers

Lines and Roads Map - Frederick House River (Wanatango) Tile C 3

- Access Route (Primary Road)
- Access Route (Secondary Road)
- Access Route (Tertiary Road)
- Access Route (New Access Road)
- Conservation Reserve

Map Created: March 18, 2014
Version Date: July 16, 2013
Version Number: 2.5
Map Scale: 1 : 32,000

Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.

Map created by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).

495000

500000

5405000

5400000

Proposed Distribution Route

Flint Creek

Flint Creek

Little Lake

Sawmill Lake

950ft

1000ft

1050ft

Lines and Roads Map - Frederick House River (Wanatango) Tile C 4

- Proposed Powerline
- Access Route (Primary Road)
- Access Route (Secondary Road)
- Access Route (Tertiary Road)
- Access Route (New Access Road)
- Aggregate Site

Map Created: March 18, 2014
Version Date: July 16, 2013
Version Number: 2.5
Map Scale: 1 : 32,000

Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.

Map created by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).

495000

500000

5400000

5395000

Proposed Distribution Route

Roy Lake

Nerandeau Lake

Lizard Lake

Partridge Lake

Pick Lake

Evelyn Lake

Clearwater Lake

Moon Lake

Dipper Lake

Ice Chest Lake

Camp

950ft

1000ft

1050ft

1100ft

1150ft

Lines and Roads Map - Frederick House River (Wanatango) Tile C 5

- Proposed Powerline
- Access Route (Primary Road)
- Access Route (Secondary Road)
- Access Route (Tertiary Road)
- Access Route (New Access Road)

Map Created: March 18, 2014
Version Date: July 16, 2013
Version Number: 2.5
Map Scale: 1 : 32,000

Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.

Map created by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).

495000

500000

5390000

5385000

Proposed Distribution Route

Ice Chest Lake

Camp

Moon Lake

Dipper Lake

1050ft

1150ft

1000ft

1050ft

1000ft

Moose Creek

0 0.5 1 2
Kilometers

Lines and Roads Map - Frederick House River (Wanatango) Tile C 6

- Proposed Powerline
- Access Route (Primary Road)
- Access Route (Secondary Road)
- Access Route (Tertiary Road)
- Access Route (New Access Road)
- Aggregate Site

Map Created: March 18, 2014
Version Date: July 16, 2013
Version Number: 2.5
Map Scale: 1 : 32,000

Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.

Map created by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).

495000

500000

5380000

5375000

Proposed Distribution Route

Dugway

Moose Creek

Matheson Creek

Domestic Waste

Community Centre

Hoyle

Keyson

Industrial Solid Depot

Hill's Landing

Industrial Solid Depot

Roma Lake

Squaw Island

Night Hawk Lake

0 0.5 1 2
Kilometers

Lines and Roads Map - Frederick House River (Wanatango) Tile C 7

- Point of Connection (PC)
- Proposed Powerline
- Access Route (Primary Road)
- Access Route (Secondary Road)
- Access Route (Tertiary Road)
- Access Route (New Access Road)
- Aggregate Site

Map Created: March 18, 2014
Version Date: July 16, 2013
Version Number: 2.5
Map Scale: 1 : 32,000

Reference data from the Land Information Ontario data warehouse, Ontario Ministry of Natural Resources.

Map created by KBM Resources Group, Thunder Bay Ontario (www.kbmrg.com).