

**TERRESTRIAL ECOSYSTEMS AND VEGETATION ASSESSMENT OF THE
BIPOLE III TRANSMISSION PROJECT**

Prepared for:

Manitoba Hydro

Prepared by:

**Szwaluk Environmental Consulting Ltd.
Calyx Consulting
MMM Group Limited**

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SUMMARY

An assessment of terrestrial ecosystems and vegetation was completed for the Bipole III Transmission Project as a component of the Site Selection and Environmental Assessment Process.

Initially, vegetation constraints were identified to assist with the selection of alternative routes for the transmission line. These included protected areas, Areas of Special Interest and species of conservation concern. Three alternative routes were proposed for the Project that consisted of several segments as well as sub-segments occurring between routing options. All segments were evaluated based on initial valued environmental components (VEC) identified (i.e., species of concern and grassland habitats) and vegetation constraints (i.e., protected areas). In the spring and summer of 2010, additional route segments were identified and evaluated as part of the site selection process.

Prior to the assessment of the preliminary preferred route, three VECs were determined for terrestrial ecosystems and vegetation. These included the following:

- Plant species and communities of conservation concern.
- Native grassland/prairie areas.
- Plant species/communities important to Aboriginal people as identified through the Aboriginal Traditional Knowledge (ATK) process.

In the summer of 2010, a preliminary preferred route with a 66 m right-of-way (RoW) within a local study area (3-mile wide corridor for the Bipole III transmission lines and area surrounding the Project components) was selected for assessment. Early in 2011, adjustments were made to the preliminary preferred route and a preferred route was selected which extends 1,386 km. The local study area was used for the comparison and analysis of vegetation between the preferred route and the local study area. Five ecozones, eight ecoregions and 29 ecodistricts are intersected by the local study area. Within the local study area, 21 vegetation cover types occurred based on information from the Land Cover Classification Enhanced for Bipole data source. Common types (>3% cover) included annual cropland, wetland shrub, coniferous dense, coniferous open, grassland, shrub tall, wetland herb, wetland treed, broadleaf open, and broadleaf dense.

One hundred and nineteen plots were sampled along the preliminary preferred route to describe the vegetation community types. The number of community types identified by ecoregion included: four for the Hudson Bay Lowland, three for the Selwyn Lake Upland, seven for the Churchill River Upland, 13 for the Hayes River Upland, nine for the Mid-Boreal Lowland, four for the Interlake Plain and seven for the Lake Manitoba Plain.

The total amount of riparian habitat that occurs along the local study area is approximately 103,463 ha while 957 ha is estimated to occur along the 66 m right-of-

way. The Lake Manitoba Plain has the largest area of riparian habitat that will be potentially affected along the preferred route.

The total area of all wetlands (bog, fen and marsh) along the local study area is approximately 137,701 ha, while 1,456 ha occurred along the preferred route. Fen wetlands occupied the largest area in both the local study area and right-of-way.

A total of 457 plant taxa were observed in the Project area. Botanical surveys identified 14 species of conservation concern at 26 locations along the local study area for the preferred route. Based on information from the Manitoba Conservation Data Centre (MBCDC), seven species are ranked rare throughout their range (*Vaccinium caespitosum*, *Dalea villosa*, *Circaea lutetiana*, *Cyperus schweinitzii*, *Drosera linearis*, *Danthonia intermedia* and *Impatiens noli-tangere*), one is rare to uncommon (*Corispermum americanum*), five are uncommon (*Lithospermum incisum*, *Phryma leptostachya*, *Drosera anglica*, *Salix vestita* and *Hypoxis hirsuta*) and one is uncommon to widespread (*Pyrola minor*). One of these species (*Dalea villosa*) is listed as threatened by the Committee on the Status of Endangered Wildlife in Canada and is protected by the *Species at Risk Act* and the *Manitoba Endangered Species Act*. After route adjustments were completed in 2011, none of these plant locations were found to occur on the preferred route.

Other Project components include the Keewatinoow and Riel converter stations, construction power station and transmission line, construction camp, northern collector lines, northern and southern ground electrodes sites, northern and southern ground electrode distribution lines, borrow sites, excavated material placement sites and access roads/trails.

Thirteen vegetation cover types, based on information from the Land Cover Classification Enhanced for Bipole data source occur for the other Project components, with wetland shrub comprising the greatest area (457 ha) followed by coniferous sparse (364 ha). The total amount of bog and fen wetlands that occur is 777 ha. Riparian habitat found at the other Project components is 310 ha, with the northern collector lines representing the greatest proportion of this total (193 ha).

The Keewatinoow converter station, construction power station, and potential northern and southern ground electrode sites were assessed in the field for species of conservation concern in 2010. During these field assessments, species of concern were observed at the construction power station (*Salix vestita*), alternate northern ground electrode site (*Salix vestita*), and alternate southern ground electrode site (*Cypripedium reginae*). These species are ranked as uncommon by the Manitoba Conservation Data Centre.

Aboriginal Traditional Knowledge was provided for the Project. Community Councils and First Nations shared their knowledge through interviews and questionnaires conducted through the ATK process, as well as through self-directed studies completed for the Project. Several plant species used for medicinal, cultural and traditional purposes, including species of concern, were identified.

Environmentally sensitive sites for the Project included salt marshes/flats, dry upland prairies, patterned fen wetlands, species of conservation concern locations, and botanical resource areas identified through ATK.

Fifteen potential environmental effects were identified as a result of the Project and include the following:

- Potential loss of plants of conservation concern.
- Environmentally sensitive sites may be affected.
- Potential loss of habitat and plants used by Aboriginal people as identified through the ATK process.
- Loss of native forest vegetation.
- Riparian areas may be disrupted.
- Vegetation diversity will be temporarily reduced on the Project site.
- Abundance of non-native species may increase.
- Vegetation composition and structure may be modified adjacent to the disturbance zone.
- Fragmentation of vegetation communities will occur.
- Wetlands may be affected.
- Potential effect to vegetation from the release of fuels and hazardous substances.
- Potential effect of dust from project activities on the health of plants.
- Use of herbicides may affect desirable vegetation.
- Increased risk of wildfire.
- Potential for increased access by non-Aboriginal people to vegetation resources used by Aboriginal people as identified through the ATK process.

Mitigative measures were identified to eliminate or lessen the potential environmental effects and are detailed in the report. The primary mitigative measure to offset the fifteen environmental effects is winter clearing, construction and maintenance. Wherever possible, minimizing soil and vegetation disturbance was also suggested for locations that occupy species of conservation concern and for other environmentally sensitive sites. Overall, it is expected that the Project will have nine different residual effects on vegetation after the application of mitigation for one or more of following Project components: transmission lines; converter stations; construction power station; construction camp, borrow sites (including excavated material placement sites); ground electrodes and associated lines, and access roads/trails. These residual effects include the loss of plants (from one species) of conservation concern from the construction power station site, the removal of trees in prairie areas, loss of plant communities important to Aboriginal people, loss of native forest vegetation, disruption of riparian habitat, temporary loss of vegetation diversity, modification of vegetation adjacent to the disturbance zone, fragmentation of vegetation communities and introduction of invasive and non-native species. These residual effects can also occur during one or more of the Project activity phases (i.e. construction, maintenance and site decommissioning). All potential effects are considered non-permanent and are reversible within the life of the Project except for the loss of uncommon plants at the construction power station.

However, this species is well represented in the area surrounding the construction power station.

The terrestrial ecosystem and vegetation monitoring program will involve verifying the predications made in the environmental assessment, determining the effectiveness of the mitigation measures implemented, and detecting and addressing any unforeseen environmental effects. Manitoba Hydro will determine which project activities (i.e. construction) will be monitored.

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List of Abbreviations

ASI	Area of Special Interest
CEA.....	Cumulative Effects Assessment
COSEWIC.....	Committee on the Status of Endangered Wildlife in Canada
EIS.....	Environmental Impact Statement
EnvPP.....	Environmental Protection Plan
ESS.....	Environmentally Sensitive Site
FRI	Forest Resource Inventory
GIS	Geographical Information System
GPS	Global Positioning System
LCC.....	Land Cover Classification
LCCEB.....	Land Cover Classification Enhanced for Bipole
MAFRI.....	Manitoba Agriculture, Food and Rural Initiatives
MBCDC	Manitoba Conservation Data Centre
MBESA.....	Manitoba <i>Endangered Species Act</i>
MMF	Manitoba Metis Federation
RoW	Right-of-Way
SARA.....	<i>Species At Risk Act</i>
SSEA.....	Site Selection and Environmental Assessment Process
VEC.....	Valued Environmental Component

Units of Measure

ha.....	hectares
km	kilometers
m	meters

1 INTRODUCTION

1.1 Background

The Manitoba Hydro Bipole III Project has been proposed to improve the existing hydroelectric transmission system in the province. Presently, Bipoles I and II deliver approximately 75% of the generating capacity to southern Manitoba, where Bipole III would provide additional transmission line capacity to transfer northern hydroelectric generation to the south. As Bipole III will improve system reliability, the primary function is to provide transmission capacity to counter the risk of outages to the existing high voltage direct current transmission system.

1.2 Scope

The proposed 500 kV HVdc Bipole III transmission line will originate at a new northern converter station (Keewatinoow) located near the proposed Conawapa generating station and traverse approximately 1,386 km terminating at a proposed new southern converter station (Riel), just east of the City of Winnipeg. More detailed project description information on the Bipole III transmission line and associated Project components (MMM Group 2011a) is provided in Section 2.3.

This technical report describes the environmental assessment that was conducted for terrestrial ecosystems and vegetation for the Bipole III transmission line and associated Project components. The environmental assessment was carried out using existing information and field studies that were conducted in 2010. The following technical report provides information on the following:

- Valued environmental components.
- Ecological land classification descriptions at the ecozone, ecoregion and ecodistrict levels.
- Vegetation cover types.
- Classification of land and vegetation cover.
- Vegetation community types.
- Riparian habitat and wetland vegetation.
- Plants and distribution of species.
- Plant species in the assessment areas listed by the Manitoba *Endangered Species Act*, the Committee on the Status of Endangered Wildlife in Canada, and the *Species at Risk Act*.
- Aboriginal Traditional Knowledge and vegetation.
- Fire history, frequency, successional trends, and risk of fire in the boreal forest.
- Environmentally sensitive sites.

1.3 Definition of Assessment Areas

Within this report, the “Project study area” refers to the initial study area (yellow shaded area on maps) that was defined for the identification of constraints and selection of

alternative routes for the Bipole III Transmission Project. The “local study area” refers to the 3-mile wide corridor used for the comparison and analysis of terrestrial habitats and vegetation between the 66 m preferred route RoW and local study area.

1.4 Purpose

As the need exists for a complete environmental assessment for the Bipole III Project, part of the assessment requires an understanding of existing terrestrial ecosystems and vegetation within the local study area and preferred route RoW in order to determine potential environmental effects. Terrestrial ecosystems are a complex interacting system that includes all land plants, animals, and their environment within a particular area while vegetation is defined as the general cover of plants growing on the landscape (Cauboue et al. 1996). This technical report identifies the potential environmental effects to terrestrial ecosystems and vegetation as a result of the Project, recommended mitigation measures, monitoring and follow-up actions.

1.5 Report Outline

This report discusses the alternative routes evaluation; the high level assessment of potential sites for the proposed Keewatinooow converter station, and northern and southern ground electrodes; and the detailed assessment of terrestrial ecosystems and vegetation for all known Project components.

Results of the desktop studies, inventories and analyses were used to assess potential environmental effects on the terrestrial ecosystems and vegetation for the Project. This report also describes mitigation measures to avoid or minimize environmental effects, and residual environmental effects of the proposed Project. Recommended monitoring requirements of environmental effects are also identified.

2 STUDY AREA

2.1 Overview

The Project study area identified for the Bipole III Transmission Project covers approximately twenty percent of the landmass of Manitoba (Map 1) and extends over approximately 1,386 linear kilometers. Originating in the northeastern portion of the province near the proposed Keewatinoow converter station, the study area extends in a southwest direction, passing through the City of Thompson and Town of The Pas. Further south, it passes west of Lakes Winnipegosis and Manitoba. South of Lake Manitoba, the study area turns east towards the City of Winnipeg and terminates near the proposed Riel converter station immediately east of the Red River Floodway.

2.2 Regional Vegetation Description

Rowe (1959) has classified the vegetation in terms of forest regions that were used to describe the Project study area. From the northeastern Hudson Bay Lowlands, the Project study area crosses a large portion of the boreal forest including the Northern Coniferous and Nelson River Sections to the western side of the province. The boreal forest in these sections of the Project study area is characterized by white and black spruce, jack pine, tamarack, trembling aspen and birch. Forest cover in the most northerly locations of the Project study area are limited by colder summers and a shorter growing season resulting in the growth of predominately stunted black spruce. Moving south into the west central region, the Project study area includes the transition from boreal forest in the Manitoba Lowlands to the mixed woods of the Mixedwood and Aspen-Oak Sections. Dominant vegetative species in these sections consist of trembling aspen, birch and white spruce, with elm, ash, Manitoba maple and oak species inhabiting stream courses. The most southerly portion contains non-forested prairie and agricultural lands. Historically, this section consisted of extensive areas of tall-grass and mixed-grass plant communities before settlement. The Project study area terminates towards the eastern edge of the prairie at the southern portion of the boreal forest in Manitoba.

2.3 Specific Descriptions of Project Components

The Bipole III Project components include the following:

- A 500 kV HVdc transmission line.
- A new northern converter station, the Keewatinoow converter station, including a construction camp and construction power.
- A new southern converter station located at the Riel site in the Rural Municipality of Springfield.
- New 230 kV transmission lines linking the Keewatinoow converter station to the northern collector system at the existing 230 kV switchyards at Henday converter station and Long Spruce generating stations.

- New ground electrode sites for each converter station, connected to the station by a low voltage feeder line.
- Borrow sites and excavated material placement sites.
- Access roads/trails.

Additional information on each of the above listed Project components can be found in Chapter 3 of the Bipole III Transmission Project Environmental Impact Statement.

2.3.1 Bipole III HVdc Transmission Line

The proposed Bipole III 500 kV HVdc transmission line will be located within the Project study area (Map 2), as described in Section 2.1. The transmission line will occupy a right-of-way (RoW) width of 66 m (217 ft.) and have a length of 1,386 km. The proposed route for the line will travel southwest from the proposed Keewatinooow converter station. Travelling south of Thompson and The Pas, the line runs east of the Porcupine Forest Reserve and Duck Mountain Provincial Park and then near the western shores of Lake Manitoba, passing the towns of Alonsa, Amaranth, and Langruth. Near the town of St. Claude, the line turns east and travels south of Niverville to terminate at the proposed Riel converter station, east of the city of Winnipeg.

Two basic tower types will be used for the transmission line. In northern Manitoba and forested/pasture areas in the south, the conductors will be suspended from guyed lattice steel towers. In the more densely developed areas of southern Manitoba, self-supporting lattice steel towers will be used to minimize potential effects on farming practice (i.e., to reduce the tower footprint). Typical tower dimensions will be 45 m high with a 7.8 m square base footprint for self-supporting towers. Towers will be spaced approximately 480 metres apart in most areas.

Prior to construction, the RoW and required easements will first be surveyed and flagged to establish the line alignment. Clearing and disposal of trees on the proposed RoW will be undertaken in advance to facilitate construction activities. Clearing requirements for the new transmission line RoW will also require selective clearing of “danger trees” beyond the RoW. Such trees could potentially affect the function of the transmission line or result in safety concerns, and are normally identified during initial RoW clearing activities and removed.

A variety of methods are available for RoW clearing. Typically, these include conventional clearing done by tracked bulldozers, mulching by rotary drums, selective tree removal by feller bunchers (e.g., for removal of danger trees with minimal adverse effect to adjacent vegetation and trees) and hand clearing with chain saws in environmentally sensitive sites. Grubbing (removal of root systems) is not required except at tower sites, where the foundation area requires unencumbered access for equipment and safe walking areas for workers and possibly along access trails required for the Project.

2.3.2 Proposed Keewatinoow Converter Station, Construction Camp and Construction Power

The proposed Keewatinoow converter station will be located approximately 5 km southwest of the Conawapa generating station site on the Nelson River (Map 3). The principal components of the converter station are a converter building, a high-voltage ac switchyard and a high voltage dc switchyard required to terminate the 230 kV transmission line connections to the northern collector system, to convert the ac power from the collector system to dc power, and to provide the HVdc switching facilities necessary for termination of the new Bipole III transmission line. The converter station site is estimated to require a roughly rectangular site area, approximately 500 x 600 m in dimension for a total area of 24.5 ha.

Initially, five potential sites were under consideration for the proposed Keewatinoow converter station that required further study (Map 4). These included the following:

- | | |
|-------|---|
| NCS1a | North of Conawapa access road and north of Creek No. 16, approximately 1.5 km southwest from the proposed Conawapa site |
| NCS1b | North of Conawapa access road and north of Creek No. 16, approximately 1.5 km southwest from the proposed Conawapa site |
| NCS3 | North of Goose Creek, approximately 5 km southwest from the proposed Conawapa site |
| NCS4a | South of Goose Creek site, approximately 5 km southwest from the proposed Conawapa site |
| NCS4b | South of Goose Creek site, approximately 5 km southwest from the proposed Conawapa site |

Construction activities for the converter station development will typically involve site preparation (e.g., removal of existing vegetation and organic topsoil from the site; addition and compaction of inorganic fill material, installation of station surface material) and initial infrastructure development (e.g., installation of station access roads and associated drainage, followed by installation of perimeter fencing and gates). Once general site improvements have been completed, other necessary civil works and systems will be installed (e.g., foundations for building and equipment, grounding arrangements, water supply, oil spill containment, site services and buildings). Station apparatus and equipment installation will follow, including filling of equipment with insulating oil, construction clean-up and commissioning.

Temporary construction camps and mobile camps will be established to house workers involved in clearing and construction activities for the Keewatinoow converter station and other northern Project components. Construction power for the construction camp (see Map 3), converter station and electrode site (see Section 2.3.5) will be provided by extending the existing 138 kV transmission line that runs from Kelsey generating station to the Limestone construction power substation, about 31 km, to a new construction power station located near the Keewatinoow converter station site.

2.3.3 Riel Converter Station

The proposed Riel converter station will be located at the existing Riel station site in the RM of Springfield, just east of the City of Winnipeg, which is now under construction for sectionalization purposes (Map 5). Site development under the Sectionalization Project will include the portion required for the converter station site.

The new southern converter station will include the HVdc switchyard facilities necessary to terminate the new Bipole III transmission line, together with the converters and the ancillary facilities required to convert the dc power from the Bipole III transmission line to ac power at the 230 kV level necessary for injection into the southern receiving system.

Construction activities for the converter station development will involve necessary civil works and installation of systems (e.g., foundations for building and equipment, grounding arrangements, water supply, oil spill containment, site services and buildings). Station apparatus and equipment installation will follow, including filling of equipment with insulating oil, construction clean-up and commissioning.

The Bipole III transmission line terminates at the Riel Station converter station, where the connections to the southern receiver system occur. The southern receiver system, serving Winnipeg and southern Manitoba, is fed from a network of 230 kV transmission lines originating at Dorsey station and at a number of existing substations in the Winnipeg area. The Riel Sectionalization Project includes sectionalization of several of these existing transmission lines, in order to enable injection of power from the sectionalized D602F at Riel. Although the resultant capacity of the 230 kV connections at Riel facilitates injection of power from Bipole III, additional transmission capacity will be required. The additional capacity will be provided by sectionalization of the existing Ridgeway-Richer 230 kV transmission line R49R at Riel Station.

2.3.4 Northern Collector Lines

In order for power to flow effectively from northern to southern Manitoba, the Keewatinoow converter station will require additional transmission lines to the existing collector system in the northern portion of the study area. The proposed connections include one 230 kV transmission line, about 55 km in length, from the existing 230 kV switchyard at Long Spruce generating station to a new 230 kV switchyard to be developed at the site of the proposed Keewatinoow converter station. In addition, four 230 kV transmission lines, each about 27 km in length, will be constructed from the existing 230 kV switchyard at Henday converter station to the 230 kV switchyard at the proposed Keewatinoow converter station. Map 3 displays the northern collector lines. The lines will share a common right-of-way that is 310 m in width, and guyed lattice steel towers will be used.

2.3.5 Northern Ground Electrode Facility

The proposed site for the northern ground electrode will be located, approximately 10 km south of the proposed Keewatinoow converter station site on the west side of the Conawapa access road. Thirteen potential sites were originally identified for the Project. These included the following:

NES1	Southwest of proposed Keewatinoow converter station
NES2	Southwest of proposed Keewatinoow converter station
NES3	Along Conawapa access road, mid way between Limestone generating station and proposed Keewatinoow converter station
NES4	Along Conawapa access road, mid way between Limestone generating station and proposed Keewatinoow converter station
NES5	Along Conawapa access road, mid way between Limestone generating station and proposed Keewatinoow converter station
NES6	Along Conawapa access road, mid way between Limestone generating station and proposed Keewatinoow converter station
NES7	Along Conawapa access road, mid way between Limestone generating station and proposed Keewatinoow converter station
NES8	Northeast of Limestone generating station
NES9	Northeast of Limestone generating station
NES10	Northeast of proposed Keewatinoow converter station on route to Gillam Island generating station
NES11	Near the Wier River along the Hudson Bay railway
NES12	South of the town of Gillam
NES13	Northeast of Limestone generating station

Ground electrode sites that were removed from further technical study included NES1, NES2, NES3, NES8, NES9 and NES13. In the spring of 2010, two additional northern ground electrode sites were identified (see below). Map 4 identifies the potential locations for the northern ground electrode site.

HES3a	Southwest of Henday electrode site
HES3b	Southwest of Henday electrode site

On the assumption of a shallow land ring electrode (similar to the electrodes used at the existing Henday and Radisson converter stations), the electrode will be a buried iron ring approximately 500 m in diameter and will require a site area in the order of one mile square, together with an access road for construction and ongoing maintenance. There will also be a low voltage distribution line connection between the ground electrode site and the converter station switchyard (see Map 3).

2.3.6 Southern Ground Electrode Facility

The proposed southern ground electrode, that is required for the Riel converter station, will be located in the southeastern portion of the Project study area, east of Winnipeg,

approximately 20 km from the Riel station site. Initially, four potential sites were selected for the Project. These included the following:

- | | |
|------|--|
| SES1 | At or near intersection of Sections 14, 15, 22 and 23, Township 11, Range 6 East of the Prime Meridian (3 miles north and 2 miles west of Anola) |
| SES2 | At or within East ½ of Section 26 or West ½ of Section 25, Township 11, Range 7 East of the Prime Meridian (4.5 miles north and 5 miles east of Anola) |
| SES3 | Within Section 13, Township 11, Range 7 East of the Prime Meridian (2.5 miles north and 5.5 miles east of Anola) |
| SES4 | Within Township 14, Range 6 and 7 East of the Prime Meridian |

Ground electrode site SES4 was removed from further study and in the spring of 2010, four additional sites were added (see below). Map 6 identifies the potential locations for the southern ground electrode site.

- | | |
|-------|--|
| SES8 | Within Section 24, Township 10, Range 7 East of the Prime Meridian (2 miles south and 5 miles east of Anola) |
| SES9 | Within Section 20, Township 11, Range 8 East of the Prime Meridian (3 miles north and 7 miles east of Anola) |
| SES10 | Within Section 8, Township 11, Range 8 East of the Prime Meridian (1 mile north and 7 miles east of Anola) |
| SES11 | Within Section 9, Township 10, Range 7 East of the Prime Meridian (4 miles south and 2 miles east of Anola) |

Sites SES8, SES9 and SES11 were removed from further consideration prior to detailed field assessment.

In the winter of 2010, an additional site, SES1c, was identified as a potential location for the southern ground electrode. This site is located in Section 21, Township 11, Range 6 East of the Prime Meridian, northwest of Anola (see Map 5).

On the assumption of a shallow land ring electrode (similar to the electrodes used at the existing Henday and Radisson converter stations), the electrode will be a buried iron ring approximately 500 m in diameter and will require a site area in the order of one mile square, together with an access road for construction and ongoing maintenance. There will also be a low voltage line connecting between the ground electrode site and the converter station. The line will be an overhead line routed on a right-of-way on Manitoba Hydro property or within existing road allowances.

2.3.7 Borrow and Excavated Material Placement Sites

Aggregate material that is required for both foundation construction for the transmission line towers and construction of the stations (i.e., converter and construction power) generally will be transported from established and licensed off-site borrow sources. Currently the only borrow sources identified for the Project are located in the vicinity of

the northern components (Map 3). Borrow pit locations will be located along the RoW wherever possible in order to minimize environmental effects, haul distances and cost. If suitable sources are not available in close proximity to the RoW, nearby deposits will be identified and utilized.

2.3.8 Access Roads/Trails

For construction and maintenance purposes, Manitoba Hydro proposes to use existing highways, municipal and forestry roads, trails and man-made linear features where possible to minimize the need to develop new access routes to the transmission line RoWs. Access along the RoW will be restricted to the RoW as much as possible, with off-RoW deviations limited to circumvent natural terrain features such as rock outcrops, excessively steep slopes, and where ingress and egress to stream crossings are logistically challenging and/or a risk to the environment.

Manitoba Hydro will limit all weather access development to spur roads extending from existing roads at the converter station sites, for the northern work camp, construction power station site and ground electrode sites. Access related to the construction and maintenance of the ground electrode lines, the construction power line, collector lines and the Bipole III transmission line is limited to existing infrastructure and, where required, the development of seasonal trails for winter work.

3 EXISTING ENVIRONMENT

3.1 Data/Information Sources

Within the Bipole III Project study area, plant species, vegetation cover types, and species of conservation concern were initially assessed through the use of pre-existing data and information available from provincial and federal databases, historical resources and websites. Much of the available data and information for the Project study area is general in nature and exists on a broad (regional) basis.

3.1.1 Land Cover Classification

Cover classes from the Land Cover Classification Enhanced for Bipole (LCCEB) (Joro Consultants Inc. 2011a) were used to represent the communities and habitats within the Bipole III Project study area. This data source provides complete coverage of the Project study area. The LCCEB represents an enhancement of the national landcover spatial database developed by the federal government Land Cover Classification (LCC). The LCC is a mapping layer that has been harmonized across the major federal departments involved in land management or land change detection that includes Agriculture and Agri-Foods Canada, Canadian Forest Service, and Canadian Centre for Remote Sensing. The LCCEB also includes an integration of the National Stratification Working Group ecological framework database. In Manitoba, there is no other source GIS layer covering the entire preferred route that can provide a base layer with the same level of consistency as the LCCEB, nor does any other layer provide statistical facilities to gauge its error, and few if any data sets follow or fit within a national standards framework (Joro Consultants Inc. 2009).

Within the Manitoba Hydro Bipole III Transmission Project study area, five broad cover classes were identified from the LCCEB that represent the native vegetation. These classes included grasslands, wetlands, coniferous, deciduous and mixed forest. The grassland class is comprised predominantly of native grasses with herbaceous vegetation that may include shrubland cover. In this class, land used for range or unimproved pasture may also appear. The wetland class includes land with a high water table, that is inundated with water long enough to promote aquatic processes. Fens, bogs, swamps and marshes are included in the wetland cover class. Coniferous, deciduous and mixed forests are the remaining broad classes. Each forest class is separated into dense, open, and sparse forests or treed areas. Dense includes a crown closure of greater than 60%, open has 26 to 60% crown closure, while sparse has 10 to 25% crown closure.

The distribution of the cover classes differs between northern and southern portions of the Project study area. The 53rd parallel was used as the approximate mid latitude for the Project study area. North of the 53rd parallel, coniferous forest, wetland and mixed forest cover classes characterize the majority of the landscape. South of the 53rd parallel, grassland and deciduous forest represent the dominant native vegetation cover classes.

The southern portion of the Project study area also consists largely of agricultural land. Agricultural cover classes (LCCEB) present in the Project study area include annual cropland, perennial cropland and pasture. These classes represent non-native vegetation. The annual cropland cover class includes lands that change from bare cover to vegetated during the growing season. Perennial cropland and pasture are lands covered with tame grasses or perennial crops such as alfalfa or clover for hay, pasture or seed. A total of 23 physiognomic cover classes were identified from the LCCEB in the Project study area (Table 1).

3.1.2 Forest Resource Inventory

Forest Resource Inventory (FRI) is an additional data source that provides spatial and attribute information for vegetation and habitats within the Project study area. FRI is produced by the provincial government at a scale of 1:15,840 and provides detailed stand level inventories of productive and non-productive forested land as well as non-forested land in Manitoba. The FRI provides coverage for the Project study area with the exception of approximately 160 linear km of the most northern portion of the Project study area.

Four broad cover types are recognized for productive forested land. These are Softwood, Softwood-Hardwood Mixedwood, Hardwood-Softwood Mixedwood, and Hardwood. Common softwood (coniferous) species in the Project study area include jack pine, white and black spruce, balsam fir and tamarack. Trembling aspen and white birch are common hardwood (deciduous) species. Other hardwoods in the Project study area include ash, oak, Manitoba maple and balsam poplar.

Non-productive forested lands represented are treed muskeg, treed rock, shrublands (willow/alder) and protection forests. Non-forested areas include barren-bare rock, agricultural fields, marsh-muskeg, and meadows. Selected habitats can be further delineated where additional information is available. As an example, meadow habitats are further delineated into wet meadow, sand prairie, moist prairie, and dry upland ridge prairie habitats.

3.1.3 Limitations to and Gaps in Available Data Sources

The following limitations and gaps were identified for the data sources utilized to assess terrestrial ecosystems and vegetation in the Bipole III Project study area:

1. Information regarding types and distribution of native vegetation species has primarily been developed based on assessing vegetation resources in the more southern portion of Manitoba with the result of a lack of detail in vegetation cover classes for a portion of the northern Project study area (approximately 160 linear km).
2. Much of the existing cover data that has been developed and used for the Project study area is based on remote sensing or aerial photography interpretation with

limited confirmation sampling/assessments. Also, some of the data (FRI) used for analysis originated in the 1970s.

Table 1. Description of LCCEB cover classes in the Bipole III study area.

Cover Class	Description
Barren/Non-vegetated	Predominately non-vegetated and non-developed. Includes exposed lands, snow, rock, sediments, burned areas, rubble, mines, and other naturally occurring non-vegetated surfaces.
Exposed Land	River sediments, exposed soils, ponds or lake sediments, reservoir margins, beaches, landings, burned areas, road surfaces, mudflat sediments, cutbanks, moraines, gravel pits, tailings, railway surfaces, buildings and parking, or other non-vegetated surfaces.
Developed	Land that is predominantly built-up or developed and vegetation associated with these land covers. This includes road surfaces, railway surfaces, buildings and paved surfaces, urban areas, industrial sites, mine structures and farmsteads.
Bryoids	Bryophytes (mosses, liverworts, and hornworts) and lichen (foliose or fruticose; not crustose); minimum of 20% ground cover or one-third of total vegetation must be a bryophyte or lichen.
Shrubland	Predominantly woody vegetation of relatively low height (generally ± 2 meters). Comments: May include grass or grassland wetlands with woody vegetation, regenerating forest.
Shrub Tall	At least 20% ground cover which is at least one-third shrub; average shrub height greater than or equal to 2 m. In the north, moist to wet erect tall shrub > 40 cm forming more than 25% of the vegetated cover, consisting mainly of dwarf birch (<i>Betula</i>), willow (<i>Salix</i>) and/or alder (<i>Alnus</i>). Remaining cover consists of graminoids, lichen and may contain < 10% prostrate dwarf shrubs and bare soil.
Wetland	Land with a water table near/at/above soil surface for enough time to promote wetland or aquatic processes (semi-permanent or permanent wetland vegetation, including fens, bogs, swamps, sloughs, marshes, etc.). Comments: This class is mapped based on cover properties corresponding with image date(s) conditions.
Wetland – Treed	Land with a water table near/at/above soil surface for enough time to promote wetland or aquatic processes; the majority of vegetation is coniferous, broadleaf, or mixed wood.
Wetland – Shrub	Land with a water table near/at/above soil surface for enough time to promote wetland or aquatic processes; the majority of vegetation is tall, low, or a mixture of tall and low shrub.
Wetland – Herb	Land with a water table near/at/above soil surface for enough time to promote wetland or aquatic processes; the majority of vegetation is herb.
Herb	Vascular plant without woody stem (grasses, crops, forbs,

Cover Class	Description
	graminoids); minimum of 20% ground cover or one-third of total vegetation must be herb.
Grassland	Predominantly native grasses and other herbaceous vegetation may include some shrubland cover. Land used for range or native unimproved pasture may appear in this class.
Annual Cropland	Annually cultivated cropland and woody perennial crops. Includes annual field crops, vegetables, summer fallow, orchards and vineyards. Comments: Classification process primarily detects and delineates lands that change from bare cover to green/vegetated cover during the growing season.
Perennial Cropland and Pasture	Periodically cultivated cropland. Includes tame grasses and other perennial crops such as alfalfa and clover grown alone or as mixtures for hay, pasture or seed. Comments: Fall seeded crops such as winter wheat may be erroneously identified in this class. Grassland and shrubland may be delineated within in this class.
Coniferous Dense	Greater than 60% crown closure; coniferous trees are 75% or more of total basal area.
Coniferous Open	26-60% crown closure; coniferous trees are 75% or more of total basal area.
Coniferous Sparse	10-25% crown closure; coniferous trees are 75% or more of total basal area.
Deciduous Forest	Predominantly broadleaf/deciduous forests or treed areas. May include mixed forests and shrubland areas.
Broadleaf Dense	Greater than 60% crown closure; broadleaf trees are 75% or more of total basal area.
Broadleaf Open	26-60% crown closure; broadleaf trees are 75% or more of total basal area.
Broadleaf Sparse	10-25% crown closure; broadleaf trees are 75% or more of total basal area.
Mixedwood Dense	Greater than 60% crown closure; neither coniferous nor broadleaf tree account for 75% or more of total basal area.
Mixedwood Open	26-60% crown closure; neither coniferous nor broadleaf tree account for 75% or more of total basal area.

Source: Geobase 2009.

- Although complete geographical information system data coverage existed for the Project study area, only 23 cover types (vegetation/land cover) were delineated from the Land Cover Classification Enhanced for Bipole. These types are broadly identified and do not provide information on species composition and vegetation structure.
- As a result of the size of the preferred route (i.e., 66 m RoW), the accuracy of area calculations for cover types are uncertain and may include error due to the nature of available data sources used (digital) and the processing of information in a computerized environment (GIS). In addition, the information developed and

presented in the Land Cover Classification Enhanced for Bipole is coarse and unable to provide concise detail.

5. A portion of the available data/information for species of conservation concern and legislated protected species within the Bipole III Transmission Project study area are based on single data points; confirmation sampling/assessment to determine the current aerial extent and existence of these species is limited.
6. Information on species of conservation concern from the Manitoba Conservation Data Centre exists as point and polygon records. Point records provide precise information as to the location of the species while polygon records show a larger area due to an uncertain species location. The larger the polygon the greater the uncertainty for the location of the species. Also, some records are historical, dating back to the 1920s.

3.2 Existing Environment Description

3.2.1 Ecological Land Classification System

Manitoba's landscape classification system (An Ecological Stratification of Manitoba's Landscapes) provides information at the levels of ecozones, ecoregions and ecodistricts (Smith et al. 1998). An ecological land classification is a classification of the land from an ecological perspective. Within the classification, the information is presented in a hierarchy from very generalized to more specific ecological units. The classification results from an interaction of geologic, landform, soil, vegetation, climate, wildlife, water, and human factors (Ecological Stratification Working Group 1996). Ecozones are at the top of the hierarchy. They represent large and very generalized ecological units. Ecozones are subdivided into ecoregions that are characterized by regional factors such as climate, physiography, soil, vegetation, fauna and water. Ecodistricts are a subdivision of an ecoregion characterized by distinct combinations of landform, relief, geology, soil, vegetation, fauna and water (Marshall and Schut 1999).

The Bipole III Project study area encompasses five ecozones that include the Hudson Plains, Taiga Shield, Boreal Shield, Boreal Plains, and Prairies (Map 7). Within these five ecozones, twelve ecoregions are classified in the Project study area. They include the Hudson Bay Lowland, Selwyn Lake Upland, Churchill River Upland, Hayes River Upland, Lake of the Woods, Mid-Boreal Lowland, Boreal Transition, Mid-Boreal Uplands, Interlake Plain, Aspen Parkland, Lake Manitoba Plain, and Southwest Manitoba Uplands (Map 8). Within these twelve ecoregions, fifty ecodistricts occur in the Project study area. Table 2, identifies ecoregions and ecodistricts of the five ecozones in the Bipole III Project study area.

Detailed descriptions of vegetation within the ecozones, ecoregions, and ecodistricts of the Bipole III Project study area, have been referenced from Smith et al. (1998) and are presented in Appendix B.

Table 2. Ecozones, ecoregions and ecodistricts of the Bipole III Project study area.

Ecozone	Ecoregion	Ecodistrict
Hudson Plains	Hudson Bay Lowland	Winisk River Lowland
Taiga Shield	Selwyn Lake Upland	Embelton Lake
Boreal Shield	Churchill River Upland	Northern Indian Lake Waskaiowaka Lake Granville Lake Orr Lake Three Point Lake Weskusko Lake Flin Flon Reed Lake
	Hayes River Upland	Knee Lake Pikwitonei Sipiwek Lake Norway House
	Lake of the Woods	Stead
Boreal Plains	Mid-Boreal Lowland	Playgreen Lake Cormorant Lake Namew Lake Cedar Lake Summerberry The Pas Moraine Saskatchewan Delta Overflowing River Pelican Lake
	Boreal Transition	Swan River
	Mid-Boreal Uplands	Porcupine Hills Riding Mountain Duck Mountain
	Interlake Plain	Gimli Swan Lake Waterhen Steinbach
Prairies	Aspen Parkland	Grandview St. Lazare Hamiota Shilo Stockton Carberry Manitou
	Lake Manitoba Plain	Dauphin Alonsa Ste. Rose McCreary Gladstone Langruth Winnipeg McGregor Portage Winkler
	Southwest Manitoba Uplands	Pembina Hills

Source: Smith et al. (1998)

3.2.2 Important Communities and Habitats

3.2.2.1 Manitoba Conservation Listed Communities

Terrestrial communities of conservation concern in the province are listed by the Manitoba Conservation Data Centre (MBCDC). In the Project study area, six ecoregions support vegetation communities of concern listed by the MBCDC. These ecoregions include the Lake Manitoba Plain, Interlake Plain, Boreal Transition, Aspen Parkland, Mid-Boreal Lowland and Mid-Boreal Upland. Twelve communities of concern are listed in the six ecoregions and all have the potential to occur in the Project study area. These communities are dominantly forest and grassland types (see Section 3.2.9 on Communities of Conservation Concern).

3.2.2.2 Grasslands and Prairie Areas

Grassland and prairie areas represent an important cover type in the Project study area as they have the potential to support federally and provincially protected species. Protected species are listed federally by the *Species at Risk Act* (SARA) and provincially by the Manitoba *Endangered Species Act* (MBESA). In Manitoba, 13 plant species are listed as protected (see Section 3.2.7 on protected species below for further information). These species have the potential to occur in the southern portion of the Project study area. Preferred habitat for these species generally ranges from dry sandy areas to moist prairies.

Historically, grassland ecosystems existed over large areas but only few undisturbed natural areas remain today. The Critical Wildlife Habitat Program, Manitoba Conservation and Prairie Farm and Rehabilitation Administration compiled information on mixed-grass prairies from 1989 through 2007. Figure 1 illustrates mixed-grass prairies in southern Manitoba.

3.2.2.3 Salt Marshes

Salt marshes are areas with high salt concentrations. These areas are important habitats as they may support a unique community of invertebrates or epiphytic algae adapted to these conditions (Londry et al. 2005). As vegetation composition and structure are regulated by the saline conditions, a limited number of plants, including threatened species, can tolerate the high salt levels (Albert 2010). Saline areas are found within the Project study area and are known to occur in the Mid-Boreal Lowland and the Interlake Plain Ecoregions (Ducks Unlimited Canada 2009). Forest Resource Inventory recognizes mud/salt flats in the Project study area and these are found in the Churchill River Upland, Hayes River Upland, Mid-Boreal Upland, Mid-Boreal Lowland, Boreal Transition, Interlake Plain, Aspen Parkland and Lake Manitoba Plain Ecoregions (see Map 8).

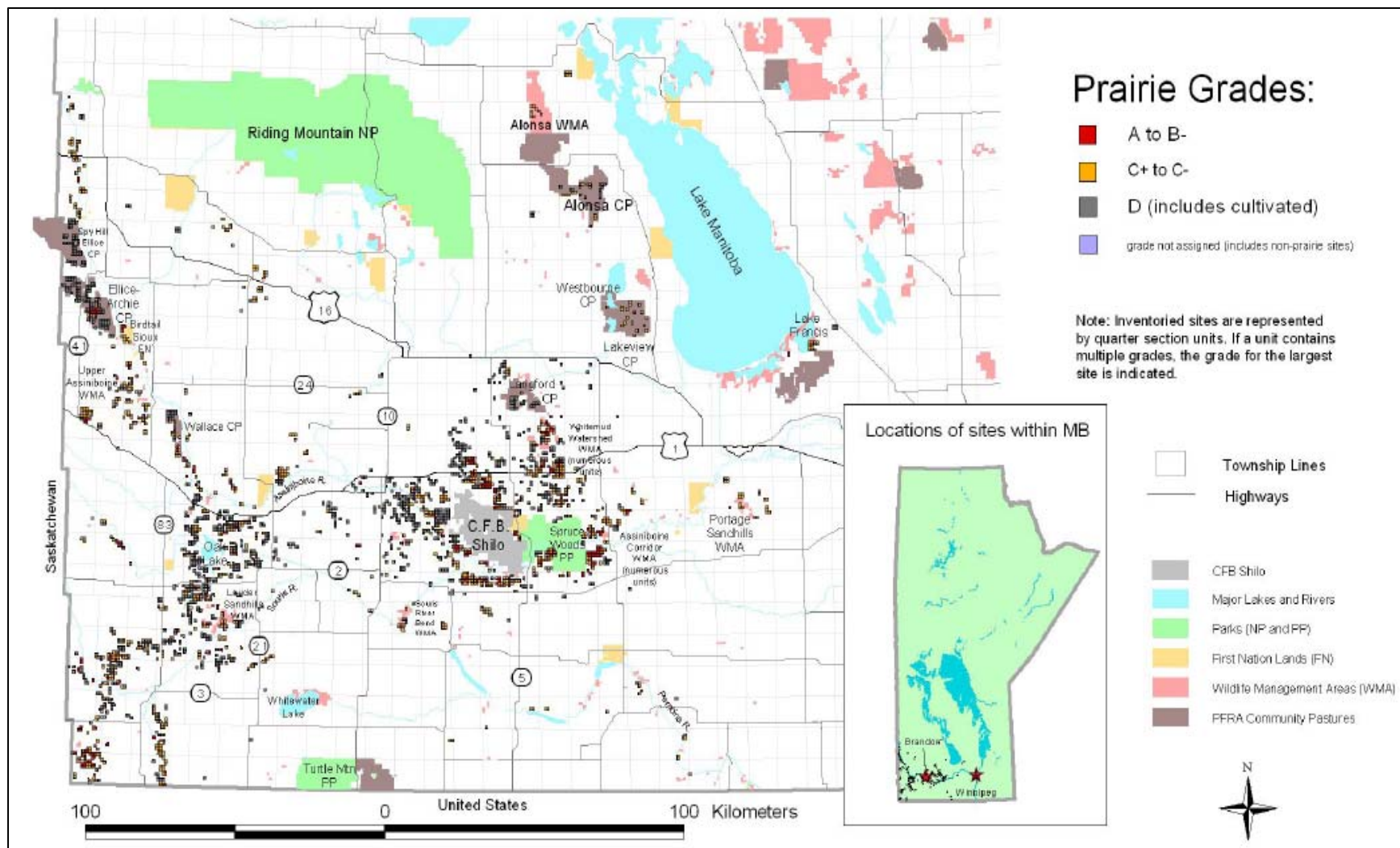


Figure 1. Locations of grades of native grassland and cultivated sites included in the Mixed-Grass Prairie inventory for Manitoba (1989 to 2007) (Source: Critical Wildlife Habitat Program, Manitoba Conservation, Prairie Farm Rehabilitation Administration).

3.2.2.4 Areas of Special Interest

Areas of Special Interest are selected to represent enduring features found within a natural region that still need to be set aside from development to obtain an adequate representation of that feature in Manitoba. These areas are identified by the Protected Areas Initiative which is a provincial government program. Areas of Special Interest are designated due to the presence of rare or endangered species, unusually high biodiversity, extremely sensitive sites or unique landscapes (Manitoba Conservation 2009a). Map 9 identifies Areas of Special Interest in the Project study area.

3.2.2.5 Wetland Communities

In Manitoba, Halsey et al. (1997) estimates that wetlands cover 233,340 km² or 43% of the terrestrial landscape, with peatlands representing 90% of all wetlands. It is well documented that wetlands are ecologically important (Bond et al. 1992, Smith 1992, Environment Canada 2010). Foster et al. (2004) noted the importance of calcareous wetlands and their potential to support species of conservation concern. There are several threats to wetlands that include agricultural runoff, drainage, forestry activities, off-road vehicles, peat extraction, and right-of-way activities (Foster et al. 2004).

Four wetland classes, as described in the Canadian Wetland Classification System (National Wetlands Working Group 1997), occur within the Bipole III Project study area including bog, fen, marsh and swamp. Definitions for these wetland classes are included below.

Bogs

A bog is a landform characterized by an accumulation of peat with the bog surface that is raised or level with the surrounding terrain. The water table is generally at or slightly below that of the surrounding terrain. Precipitation is the primary water source and as a result bog waters are low in dissolved minerals and acidic in nature. Vegetation largely consists of peat mosses with or without the presence of trees and shrubs. Trees are typically black spruce when present. Common ericaceous shrubs include Labrador tea, leather leaf and bog cranberry.

Fens

Fens are peatlands with a fluctuating water table that are rich in dissolved minerals due to ground and surface water movement. The water table may be at or just below the surface. A greater nutrient availability in fens supports vegetation that is different from that of bogs. Vegetation composition generally includes graminoids (such as sedges) and brown mosses in wetter sites. Drier fens are occupied by shrubs and trees. Characteristic shrub vegetation includes birch, willow and tamarack. Black spruce often comprises the tree layer if present.

Marshes

Marshes are the most common wetlands in North America. Marshes are shallow surface water wetlands of fresh or saline source, that have fluctuating water levels usually due to tidal activity, flooding, stream inflow, precipitation, evapotranspiration or groundwater discharges. The water table in marshes exists at or below the soil's surface with water saturation in the soil zone for most of the growing season. Dissolved mineral concentrations result in alkaline freshwater marshes. Vegetative growth in highly saline marshes is often restricted due to salt toxicity. Marsh vegetation typically consists of aquatic species including emergent macrophytes, graminoid species such as rushes, reeds, grasses and sedges, shrubs, floating-leaved and submergent species and non-vascular plants including brown mosses and algae. Marsh vegetation is organized into distinct zones based on water depths, chemistry and disturbance.

Swamps

Swamps are associated with various waterways including rivers and lakes and can be distinguished from marshes by the predominance of trees or tall shrubs that comprise over 30% of the vegetative cover. Swamps may be permanently or seasonally flooded, and although they are not as wet as marshes, fens and open bogs, they act as significant water reservoirs. Swamps are able to support tree and shrub growth due to a substrate zone that occurs above water level that provides aeration for plant roots. Swamps are found to occur on both mineral and peat soils. Swamps can be divided into three types based on physiognomic characteristics and include; shrub (thicket) swamps, coniferous swamps, and hardwood (deciduous) swamps.

Of the ecozones in the Project study area, wetlands are abundant in the Hudson Plains and Boreal Plains. The Hudson Plains is dominated by wetlands in the form of bogs and fens, while wetlands cover up to 50% of the Boreal Plains. Wetlands appear as bog and fen complexes in the lowland areas of the Taiga Shield. As a result of the hummocky nature of the till plains in the Prairies Ecozone, numerous wetlands were once an integral landscape component. Over the years agricultural activities have largely reduced the presence of wetlands (Smith et al. 1998).

3.2.3 Fire in the Boreal Forest

3.2.3.1 Fire History and Frequency

Fires have always been an integral part of the boreal forest system, started either naturally or by native populations (Natural Resources Canada 2009). Prior to European settlement, indigenous people started forest fires to manage and control their environment. These fires, along with lightning fires, would have burned without control (Weber and Flannigan 1997). Fires set by Aboriginals were to maintain stages of vegetation development, prevent certain successional stages, and open meadow areas for hunting, trapping, traveling and visibility (Weber and Flannigan 1997).

In Canada, the boreal forest is the largest forest region making up 325 million ha (Weber and Stocks, 1998). Annually, forest fires burn 1.3 million ha of boreal forest (Weber and Stocks 1998). Forest fire history has been documented since the 1920's, although fires in northern regions of provinces were not documented prior to the 1950's/60's (Stocks et al. 2003). Fires have increased since the 1920's although documented burn areas decreased from the 1920's to 50's and has since started to increase (Stocks et al. 2003). The increase in area may not be a sign of increasing fire levels, but could be due to the development of enhanced monitoring and recording capabilities (Stocks et al. 2003).

In the Boreal Shield Ecozone, wildfire is a frequent event that has a large effect on the vegetation composition and age distribution of forest stands. Due to the common occurrence of fire, the landscape of the ecozone consists of a mosaic of stands of varying ages, wetlands and bedrock outcrops. Upland forests are often younger than 150 years (Smith et al. 1998).

3.2.3.2 Importance of Fire in the Boreal Forest

In the boreal forest, fire is considered to be the keystone ecosystem process that affects forest composition and succession at both local and regional levels (Weber and Flannigan 1997). High intensity forest fires are essential in the ecology of the boreal forest (Stocks et al. 2003). Fire frequency and intensity affects stand life cycles, patchiness and regeneration (Stocks et al. 2003). A mosaic of vegetation at different stages of succession from fire in the ecosystem results in greater landscape diversity and provides an array of habitats for flora and fauna (Perry 1994). Seasons play a role in fire frequency and intensity and can affect re-growth of the ecosystem. Temperature changes and soil moisture content also effect fire intensity (Weber and Flannigan 1997).

3.2.3.3 Risk of Forest Fires in the Boreal Forest

In Canada, the forest fire season generally starts in April until mid-October (Stocks et al. 2003). Weather and climate play a major role in the occurrence and spread of fires in the boreal forest (Johnson 1992). According to Natural Resources Canada (2008) lightning fires represent 45% of all fires and 81% of the area burned. The majority of human-caused fires are in southern regions of Canada that are heavily populated (Natural Resources Canada 2009). Lightning fires cause the majority of large fires in northern ecozones (Stocks et al. 2003). Most of the human-caused fires tend to occur in April and May with lightning fires dominating in the late spring/summer (Stocks et al. 2003). According to the large fire database developed by Stocks et al. (2003), 31% of fires in Canada are 200 to 500 ha (1.4% of area burned) and 2.5% of fires are 50,000 ha (44% of area burned). Figure 2 shows the distribution of fires greater than 900 ha in the boreal forest (Stocks et al. 2003).

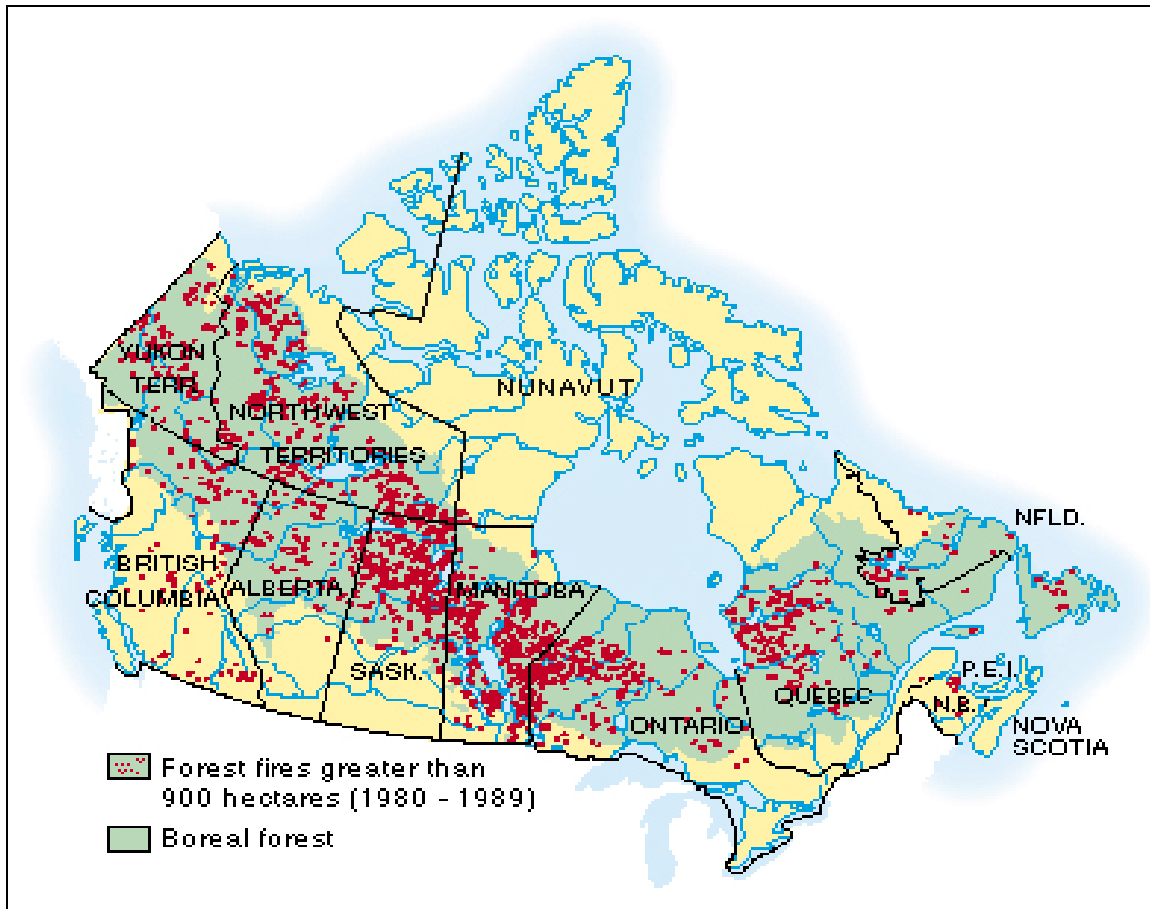


Figure 2. Distribution of fires greater than 900 hectares in the Boreal Forest of Canada (Source: Natural Resources Canada 2009).

3.2.3.4 Successional Trends of Boreal Forests after Fire

The boreal forest is dominated by coniferous trees (Natural Resources Canada 2009) including jack pine, black and white spruce, balsam fir and tamarack. Species such as jack pine, black spruce, paper birch and trembling aspen immediately regrow in the area that was affected by forest fires (Weber and Stocks 1998). Jack pine and black spruce have serotinous cones, which require the heat from fires to regenerate (Weber and Stocks 1998). Millions of seeds per hectare can be stored in serotinous cones that accumulate for decades until released by fire (Perry 1994). Other coniferous trees (e.g., white spruce) do not require fire to regenerate. Deciduous trees such as paper birch regenerate from stem sprouts and trembling aspen from root suckers, while other species (e.g., poplar) readily disperse seeds.

The boreal forest tends to burn at different intervals; jack pine tends to burn every 15 to 35 years while spruce stands are between 50 to 100 years (Natural Resources Canada 2009). Stand-destroying crown fires occur at approximately 50 to 200 year intervals and

can reach 500 years on very moist sites. Coniferous forests (e.g., pine and spruce) experience more frequent crown fires than deciduous dominated forests (Perry 1994).

3.2.4 Plants and Resource Use

There are approximately 1,075 plant species that have the potential to occur in the Bipole III Transmission Project study area (Appendix C). Many of these plant species are considered botanical resources and are used by Aboriginals and local people. Below is a description of some of these resource uses.

3.2.4.1 Wild Berry Harvest in Manitoba

Traditionally, Aboriginal peoples have used plants and plant materials throughout the Project study area for food as well as medicine. Although some traditional foods are no longer used, wild berries are still collected in great quantities (Johnson et al. 1995). A variety of wild fruits are used in season, or preserved by canning, drying or freezing and include chokecherries, pincherries, strawberries, raspberries, saskatoons, rosehips, cloudberry, currants, gooseberries, crowberries, cranberries (high-bush, mountain and bog), hazelnuts, and blueberries (Marles 2000). Many species of plants were also once used for teas; today wild mint is still used for flavoring store-bought teas (Johnson et al. 1995).

Currently, there are no commercial operations for wild berry production or harvest in Manitoba, however, small-scale harvesting of wild blueberries by a few Aboriginal groups does occur with berries sold in local markets only (Manitoba Government 2010a). Wild blueberry harvesting is not regulated by the Province of Manitoba and therefore annual volumes of berries harvested is unknown.

For good berry production, blueberries require occasional occurrence of fire. Fire suppression results in less fruit production due to aging of the plants and competition from other plant species, especially trembling aspen. A study completed by MAFRI in 2002 compared mowing versus burning as a means to rejuvenate wild blueberry stands in the Cowan area of Manitoba. In 1989 a forest fire burned through the Cowan area with the result of rejuvenation of local blueberry stands. Reportedly, for several years after the fire, blueberry production from the area was approximately 35,000 to 40,000 pounds. By 2002 blueberry production had decreased to approximately 3,000 pounds harvested (MAFRI 2010).

The study completed by MAFRI revealed that mowing (mechanical disturbance) was comparable to the burning process in that it stimulated blueberry rejuvenation the year following the disturbance with good berry harvesting resulting for three to eight years post-mowing. Competition from trembling aspen sprouts ultimately resulted in reduced berry production (MAFRI 2010). Mowing is a feasible alternative to fire for blueberry rejuvenation, and maintenance mowing to reduce brush/tree cover under hydro lines would provide good blueberry habitat (Personal Communication, Watson 2010).

3.2.4.2 Wild Rice Harvest in Manitoba

In Manitoba, wild rice is harvested from natural water bodies including lakes and rivers from two primary growing areas: the Whiteshell area in eastern Manitoba and in northwest Manitoba near The Pas and Flin Flon. Manitoba generally produces approximately 25% of Canada's annual wild rice harvest (Manitoba Government, 2010b). A large portion of the wild rice harvest in Manitoba is completed by native pickers who own wild rice leases. The highest concentration of wild rice leases in the province is located between the 53rd and 56th parallels (Derksen 2000). Eight lakes in the Project study area are licensed for commercial wild rice harvest, which include Dyce, Cormorant, Dolomite, Hargrave, North Moose, South Moose, Reed and Wekusko.

3.2.4.3 Medicinal Plants

Although, a low number of plants were used traditionally for foods, many plants were used for medicine to treat ailments and illnesses (Johnson et al. 1995). Uses for particular medicinal plants reflect independent discovery or shared knowledge. Traditional medicine of Aboriginal people is based on oral traditions and spiritual power, and Marles (2000) also noted that the spiritual aspect of healing from plants can be as important as the plant used. As the use of plant medicines is so closely related to spiritual powers, information on herbal remedies is often complex or not well understood (Johnson et al. 1995). Marles (2000) discusses the traditional use of plants by Aboriginal peoples and 33 species of plants are specifically identified as being used by Manitoba First Nations, many for medicinal purposes. Some of these plants include: cow parsnip, wild sarsaparilla, yarrow, Labrador tea, blueberry, mint, raspberry, smooth wild strawberry, sweet flag, and low-bush cranberry. Plants are used to treat headaches, colds, heart problems, aches and pains, arthritis, migraines, sore throats, infections, toothaches, upset stomachs, sinus congestion and are used to contribute to general well being.

3.2.5 Federal and Provincial Legislation

In recognition of the aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific values provided by our natural resources including wildlife and plants, the Manitoba provincial and Canadian federal governments have enacted legislation that includes the protection of individual plant species as well as entire native plant communities. The federal and provincial legislation applicable to the Bipole III Transmission Project includes:

- *Endangered Species Act* C.C.S.M. c. E111 (Assented to March 15, 1990) of Manitoba.
- *Species at Risk Act* 2002, c. 29 (Assented to December 12, 2002) of Canada.

The following Sections (3.2.6 to 3.2.9) provide further details regarding protected plant species and communities within the Project study area.

3.2.6 Conservation Status

The term “species of conservation concern” includes species that are rare, disjunct, or at risk throughout their range in Manitoba and require further research. Species that are listed under the Manitoba *Endangered Species Act* (MBESA), *Species at Risk Act* (SARA) or have special designation by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are included under this term (Manitoba Conservation 2010).

The Manitoba Conservation Data Centre (MBCDC) ranks species on the basis of their global (G) and provincial (S) status according to a standardized procedure used by all Conservation Data Centres and Natural Heritage Programs. These ranks are used to determine species protection and are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure) for each species. Table 3 shows the ranking system for the MBCDC. This reflects the species’ relative endangerment and is based on the number of occurrences of that species globally or within the province (Manitoba Conservation 2010).

Table 3. Manitoba Conservation Data Centre ranking system.

Rank	Definition
1	Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.
2	Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.
3	Uncommon throughout its range or in the province (21 to 100 occurrences).
4	Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (> 100 occurrences).
5	Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially impossible to eradicate under present conditions.
U	Possibly in peril, but status uncertain; more information needed.
H	Historically known; may be rediscovered.
X	Believed to be extinct; historical records only, continue search.
SNR	A species not ranked. A rank has not yet assigned or the species has not been evaluated.
SNA	A conservation status rank is not applicable to the element.
?	Inexact or uncertain.

Source: Manitoba Conservation 2010.

Proclaimed in 1990, MBESA was enacted to ensure the protection and survival of endangered and threatened species in the province; enable the reintroduction of extirpated species into the province; and designate species as endangered, threatened, extinct or

extirpated (Manitoba Conservation 2010). Table 4 shows the conservation status categories for the MBESA.

Table 4. Manitoba *Endangered Species Act* conservation status categories.

Category	Definition
Threatened	A species indigenous to Manitoba, which is likely to become endangered; or is, because of low or declining numbers in Manitoba, particularly at risk if the factors affecting its vulnerability do not become reversed.
Endangered	A species indigenous to Manitoba, which is threatened with imminent extinction or with extirpation throughout all or a significant portion of its Manitoba range.
Extirpated	A species formerly indigenous to Manitoba, which no longer exists in the wild in Manitoba but exists elsewhere.
Extinct	A species formerly indigenous to Manitoba, which no longer exists in Manitoba or elsewhere.

Source: Manitoba Conservation 2010.

The Committee on the Status of Endangered Wildlife in Canada is a national listing of species at risk. Species are listed in the following categories: extinct, extirpated, endangered, threatened and special concern. Proclaimed in 2003, the national *Species at Risk Act* provides legal protection to species and the conservation of their biological diversity. The purposes of the Act are to prevent species from becoming extirpated or extinct, to provide for the recovery of endangered or threatened species, and encourage the management of other species to prevent them from becoming at risk (Committee On the Status of Endangered Wildlife In Canada 2010). Table 5 shows the conservation status categories for the COSEWIC and SARA.

Table 5. Committee On the Status of Endangered Wildlife In Canada and *Species at Risk Act* conservation status categories.

Category	Definition
Special Concern	A species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Threatened	A species likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Endangered	A species facing imminent extirpation or extinction.
Extirpated	A species no longer existing in the wild in Canada but exists elsewhere.
Extinct	A species that no longer exists.

Source: Committee On the Status of Endangered Wildlife In Canada 2010.

3.2.7 Protected Species

In Manitoba, 13 plant species are listed as protected. These include rough purple false-foxglove (*Agalinis aspera*), Gattinger's agalinis (*Agalinis gattingeri*), buffalo grass (*Buchloë dactyloides*), hackberry (*Celtis occidentalis*), smooth goosefoot (*Chenopodium subglabrum*), small white lady's-slipper (*Cypripedium candidum*), hairy prairie-clover (*Dalea villosa*), western prairie fringed orchid (*Platanthera praeclara*), Riddell's goldenrod (*Solidago riddellii*), great plains ladies'-tresses (*Spiranthes magnicamporum*), western silvery aster (*Symphotrichum sericeum*), western spiderwort (*Tradescantia occidentalis*) and Culver's-root (*Veronicastrum virginicum*). Appendix D identifies the conservation status for these plants, habitat, and range in Manitoba. Seven plants are listed as threatened, five are listed as endangered, and one is listed as threatened/special concern.

Three ecoregions that are part of the Project study area have protected species which are listed by the SARA and the MBESA. These include the Aspen Parkland, Lake Manitoba Plain and Interlake Plain Ecoregions. The Lake Manitoba Plain represents the largest area coverage of the three ecoregions in the Project study area and includes seven plant species listed as protected. The Aspen Parkland and the Interlake Plain Ecoregions both include records for six protected species.

Seven vascular species that are protected are known to occur within the Bipole III Project study area. These include rough purple false-foxglove (*Agalinis aspera*), small white lady's-slipper (*Cypripedium candidum*), smooth goosefoot (*Chenopodium subglabrum*), hackberry (*Celtis occidentalis*), hairy prairie-clover (*Dalea villosa*), Riddell's goldenrod (*Solidago riddellii*), and Culver's-root (*Veronicastrum virginicum*). One non-vascular species (a lichen) is also known to occur in the Project study area. This species is flooded jellyskin (*Leptogium rivulare*) and is listed as threatened by the COSEWIC. A brief description of the characteristics, habitat and distribution is provided for the protected species, below. Appendix D contains maps that show the locations of these species in Manitoba.

Rough Purple False-foxglove

Rough purple false-foxglove is listed as endangered by SARA and COSEWIC, and is ranked as very rare to rare throughout its range by the MBCDC. This plant is an annual herb that is 10 to 30 cm high with narrowly-linear leaves; the tubular flowers are pink in color (Looman and Best 1979). Dry prairies and sandy or rocky slopes were noted as preferred habitat for this species (Scoggan 1978), while Looman and Best (1979) and Friesen and Murray (2010) identify moist, calcareous grasslands as favorable growing conditions. In Manitoba, populations have been previously recorded in the south Interlake, Brandon area, and south of Bird's Hill Provincial Park which was the first known occurrence east of the Red River (Friesen and Murray 2010). In Canada, this plant also occurs in Saskatchewan (Scoggan 1978).

Small White Lady's-slipper

Small white lady's-slipper is listed as endangered by SARA, MBESA, and by COSEWIC. The MBCDC ranks the conservation status of this orchid as very rare throughout its range or in the province. The small white lady's-slipper is a perennial orchid 10 to 30 cm tall. The flower has yellow to greenish sepals and petals with a glossy, white, egg-shaped lip. Plants often form clonal clumps that can include greater than 50 individuals. The short blooming period is usually late May to early June in Manitoba (Ames et al. 2005). In Manitoba the small white lady's-slipper is found in calcareous prairies and in wooded grasslands. It is most often found in undisturbed locations but can also occur in disturbed sites such as roadside ditches (Reimer and Hamel 2003). This prairie orchid is at the northern edge of its North American range in Manitoba. Populations have been recorded at Brandon, in the Interlake near St. Laurent, near Steinbach and at the Tall Grass Prairie Preserve in the Stuartburn-Vita area. In Canada, this plant is also found in Ontario and Saskatchewan (Scoggan 1978).

Smooth Goosefoot

Smooth goosefoot is listed as threatened by SARA, endangered by COSEWIC, and the MBCDC conservation status for this plant is very rare throughout its range. This plant is an erect annual that grows to a height of 20 to 80 cm (Looman and Best 1979). The leaves are linear, entire, glabrous, and are alternately arranged on ascending branches. The inflorescence consists of small greenish or redish flowers that develop from June to July (Hamel and Foster 2005). Smooth goosefoot is commonly found on active sand dunes, dune blowouts and occasionally on sand plains that are bare or recently disturbed (Robson 2006). In Manitoba, the species is known to occur in the area of the Routledge Sandhills (Hamel and Foster 2005). In Canada, Saskatchewan is the only other province where smooth goosefoot occurs (Scoggan 1978).

Hackberry

Hackberry is listed as threatened by MBESA and is listed as very rare by the MBCDC. Hackberry is a small deciduous tree with arching branches that forms a broad crown and can achieve a height of 15 m (Farrar 1995). The tree bark is gray to yellowish-brown and has irregular ridges with wart-like projections. The leaves are alternate and are variable in shape, with an asymmetrical base and tapering tip. This shade tolerant tree reproduces vegetatively by stump sprouts and grows on a variety of soil conditions (Farrar 1995). In Manitoba, hackberry is found on beach ridges at the south end of Lake Manitoba and in dry prairie habitats in the southwestern portion of the province (Reimer and Hamel 2003). In Canada, this species also occurs in Quebec and Ontario (Scoggan 1978).

Hairy prairie-clover

Hairy prairie clover is listed as threatened by the SARA, MBESA, and COSEWIC. The MBCDC ranks the conservation status of this plant as rare throughout its range or in the province. Hairy prairie-clover is a perennial that is 20 to 50 cm high. The plant branches

from the base and its leaves are compound with seven to 17 leaflets that are densely covered with fine hairs. The flower spikes are two to 10 cm long which can be reddish, purple or pink (Looman and Best 1979). This plant grows in the prairie region on open to partially vegetated sand dunes and prefers south to south west facing slopes (Reimer and Hamel 2002). In Canada, the range of hairy prairie-clover is from south Saskatchewan to southwestern Manitoba (Scoggan 1978). In Manitoba, this plant has been observed south of Portage la Prairie, southwest of Carberry and west of Souris (Reimer and Hamel 2002).

Riddell's Goldenrod

Riddell's Goldenrod is listed as threatened by MBESA, and is listed as a species of concern by SARA and COSEWIC. The MBCDC ranks this plant as rare in the province. Riddell's goldenrod is a perennial with an erect stem that grows to a height of 40 to 100 cm. The leaves are linear, recurved and are usually three veined. The inflorescence is flat-topped to rounded and flowering occurs from August to September (Reimer and Hamel 2003). The plant occurs in swamps and wet meadows (Looman and Best 1979) as well as in undisturbed roadsides, tall grass prairies and open fens (Reimer and Hamel 2003). In Manitoba, populations occur in the southeastern portion of the province at Kleefeld, Gardenton and Green Ridge (Reimer and Hamel 2003). In Canada, Riddell's goldenrod is also found in Ontario (Scoggan 1978).

Culver's-root

Culver's-root is listed as threatened under MBESA and is ranked as very rare by the MBCDC. This plant is a tall perennial, which can achieve a height of 2 m. The sharply toothed leaves are spaced along the stem in whorls of three to nine. The tubular flowers are white to pinkish in color and bloom from July to August. In Manitoba, populations of culver's-root occur in tall grass prairie, ditches along roadsides, edges of thickets, and trembling aspen/bur oak woods. Preferred habitat includes moist, calcareous, sandy loam soils (Hamel and Foster 2005). In Manitoba, populations of Culver's-root occur around the Tall Grass Prairie Preserve and in the Rural Municipality of Franklin in southern Manitoba. One disjunct population was known to occur along the southern portion of the Project study area near Kleefeld (Hamel and Foster 2005).

3.2.8 Plant Species of Conservation Concern

The search for all species of conservation concern in the Project study area involved the review of a comprehensive species list that was compiled by Manitoba Conservation in 2009 for the Project (Appendix E). Two hundred and four species of conservation concern are known to occur in the Project study area. These included 125 species ranked by the MBCDC as very rare to rare (S1, S1S2, or S2) throughout their range or in the province. Forty eight species are listed as rare to uncommon (S2S3 to S3), eight are listed as uncommon to widespread (S3S4) while 22 species are listed as either historical, possibly in peril, or with a rank not applicable. Map 10 shows locations for plants of conservation concern in the Bipole III Project study area.

3.2.9 Communities of Conservation Concern

Twelve terrestrial communities of conservation concern are known to occur in the Project study area (Map 11). Ranked by the MBCDC, these included two very rare communities (S1), two rare communities (S2), five uncommon communities (S3), and three communities ranked as uncommon to widespread (S3S4). Ecoregions that support terrestrial communities of concern are Lake Manitoba Plain, Interlake Plain, Boreal Transition, Aspen Parkland, Mid-Boreal Lowland and Mid-Boreal Upland. The communities of conservation concern are identified below.

- Big Bluestem-Prairie Dropseed-little Bluestem herbaceous vegetation (S1)
- Plains Rough Fescue-(Spear Grass) herbaceous vegetation (S1)
- Alkali Grass-Wild Barley-Nuttall's Salt Meadow Grass-Seaside Plantain saline herbaceous vegetation (S2)
- Green Ash-American Elm-(Hackberry, Basswood) forest (S2)
- Little Bluestem-Grama Grass (Blue, Side-oats)-Thread-leaved Sedge herbaceous vegetation (S3)
- Green Ash-(American Elm)-Manitoba Maple forest (S3)
- Needle-and-thread-Blue Grama-Thread-leaved Sedge herbaceous vegetation (S3)
- Common Reed herbaceous vegetation (S3?)
- Bur Oak/Saskatoon Serviceberry/Sarsaparilla-Assiniboia Sedge forest (S3?)
- Trembling Aspen-Bur Oak/Sarsaparilla forest (S3S4)
- Sandbar Willow shrubland (S3S4)
- Sprangletop herbaceous vegetation (S3S4)

3.2.10 Species and Communities of Conservation Concern by Ecoregion

The MBCDC lists information on species and terrestrial communities of conservation concern by ecoregion. The greatest number of records for species of concern in the Project study area occurs in the Lake of the Woods Ecoregion. This area has 111 known species of concern of which 20 are ranked as very rare (S1) (Table 6). Even though the Lake of the Woods Ecoregion has the greatest number of species of concern, it must be noted that this ecoregion makes up a very small portion of the Project study area (located in the southeast portion of the study area). One-hundred and seven vascular plants and five terrestrial communities of concern have been recorded in the Aspen Parkland Ecoregion. A significant portion of this ecoregion falls within the Project study area. This ecoregion also had the greatest number of S1 plants.

The Interlake Plain and the Lake Manitoba Plain Ecoregions have the third greatest number of species of concern with 89 plants, and have records for five and eight terrestrial communities of concern, respectively. Similar to the Aspen Parkland Ecoregion, a large portion of these ecoregions are located in the Project study area. The Interlake Plain has the second greatest number of S1 plant records with 24.

The ecoregion that has the least number of records for species of concern is the Hudson Bay Lowland followed by the Selwyn Lake Upland with four and nine species respectively. Ecoregions with the greatest to least amount of species of concern are as follows: Lake of the Woods, Aspen Parkland, Lake Manitoba Plain, Interlake Plain, Mid Boreal Uplands, Mid Boreal Lowlands, Boreal Transition, Hayes River Upland, Churchill River Upland, Selwyn Lake Upland, and Hudson Bay Lowland.

Table 6. Terrestrial communities and plant species of conservation concern by ecoregion.

Ecoregion	Terrestrial Communities	Vascular Plants	Terrestrial Communities and Vascular Plants					
			S1	S1S2	S2	S2S3	S3	Other*
Aspen Parkland	5	107	25	4	41	5	26	11
Boreal Transition	1	13	3	1	5	-	5	-
Churchill River Upland	-	13	4	-	3	-	4	2
Hayes River Upland	-	14	3	-	6	1	3	1
Hudson Bay Lowland	-	4	1	-	2	-	-	1
Interlake Plain	5	89	24	4	27	6	24	9
Lake Manitoba Plain	8	89	16	7	30	3	25	16
Lake of the Woods	-	111	20	3	45	6	26	11
Mid Boreal Lowlands	4	41	4	-	22	3	11	5
Mid Boreal Uplands	1	60	7	2	17	2	18	15
Selwyn Lake Upland	-	9	1	1	3	-	4	-

Note: Plant information obtained from Manitoba Conservation; plants that have ranks with question marks are grouped together for that rank; other* represents SNA (rank not applicable), SH (historically known), SU (possibly in peril), S3S4 (uncommon to widespread).

4 ALTERNATIVE ROUTES EVALUATION

The following outlines the steps that were undertaken to identify alternative routes for the Bipole III transmission line, with consideration of terrestrial ecosystems and vegetation.

4.1 Constraints Identification

Initially, vegetation constraints for the Project were identified to assist with the selection of alternate routes for the Bipole III transmission line. The process used to select constraints consisted of identifying areas or features of high ecological importance. These included; protected areas, Areas of Special Interest and species of conservation concern (provincial and federal).

4.1.1 Protected Areas

Protected areas such as National Parks, Provincial Parks, Ecological Reserves, Park Reserves, Wildlife Management Areas and Provincial Forests are important as they provide ecological benefits such as conserving biological diversity and allowing the environment to maintain its natural cycles and processes (Manitoba Conservation 2009a) (see Map 9).

4.1.2 Areas of Special Interest

Areas of Special Interest (ASI) include rare and enduring features that are identified as unique combinations of soils and surficial geology. These areas are important as they may support unique plants or terrestrial communities (see Map 9).

4.1.3 Species of Conservation Concern

Species of conservation concern includes species that are rare, disjunct, or at risk throughout their range or in Manitoba and require further research. Species that are listed by SARA, MBESA, COSEWIC or by the MBCDC (as very rare, rare or uncommon) are included under this term (see Map 10).

4.2 Initial Identification of Valued Environmental Components

Valued environmental components (VEC's) were identified to assist with the evaluation of the alternative routes. Initially, two VEC's were identified for the evaluation of alternative routes, which included:

- Species of conservation concern
- Grassland and prairie areas

Species of conservation concern were considered important along the alternative routes as the potential exists for a species or community to be affected negatively during

clearing, construction, maintenance and decommissioning activities of the transmission line.

Grassland and prairie areas have the potential to support protected vascular species listed nationally and provincially. Only a few natural grasslands remain in Manitoba today. The potential also exists for grassland and prairie areas to be affected negatively during clearing, construction, maintenance and decommissioning activities of the transmission line.

4.3 Evaluation of Alternative Route Segments

As part of the Site Selection and Environmental Assessment (SSEA) process, an evaluation of alternative routes was conducted for the Bipole III Project. Through the SSEA process, three alternative route corridors were identified (Map 12). The alternative routes selected avoided significant sensitivities where possible, and sought to minimize potential effects where avoidance was not possible or practical. A route selection matrix was developed to facilitate the evaluation of alternative routes on a segment-by-segment basis. The alternate routes were separated into 13 segments and evaluated and compared, by segment, considering geographic features, potential opportunities, technical considerations and professional judgement. Routing options for the proposed transmission line also included segments that connected alternative routes together (i.e., a segment that connects routes A and B). Each of the segments identified, consisted of linear features centered in a local corridor. During the course of the route selection process, several adjustments were made to the original alternative route segments based on additional input provided by the Environmental Assessment study team and various stakeholders (e.g., mining and agricultural interests).

A total of 28 factors were identified to evaluate the alternative routes. These factors included a full range of biophysical, socio-economic, land use, technical and stakeholder considerations. Evaluation criteria were identified for each factor that would facilitate three-tier (high, medium and low) ranking. Biophysical, socio-economic and land use rankings were based on the degree to which the factor is affected. Technical rankings were based on the degree to which the factor is a constraint while stakeholder rankings were based on the nature and degree of response. A four-tier ranking (very high, high, medium and low) was used for several biophysical factors where potentially significant implications on protected species and habitats were identified.

Stakeholder factors were applied to the segment rankings after the ratings were determined. Stakeholder response criteria were based on both a numeric count and a general expert assessment of the negative or positive commentary provided for certain segments. General commentary provided (e.g., diagonal routes are not preferred) was considered in the evaluation of relevant segments. The objective of the stakeholder evaluation was to select route segments with the lowest level of concerns or most favoured as expressed by Aboriginal groups, municipal governments, stakeholder groups, and the general public. A three tiered ranking system (fair, good, or poor) was based on

numeric counts of comments provided plus expert assessment of feedback from all sources.

Aboriginal Traditional Knowledge (ATK) was considered separately under the various applicable biophysical, socio-economic, land use and stakeholder factors. Where ATK confirmed a scientific finding, no change in ranking was made, but a note to that effect was included for that particular segment. Where ATK provided additional information about any of the 28 factors, it resulted in a higher ranking than what was determined previously.

The conclusion of the route evaluation and analysis process resulted in the selection of a preliminary preferred route (PPR) for the Bipole III transmission line.

4.3.1 Evaluation Methods

A desktop study of valued environmental components (species of conservation concern and grasslands) and constraints (protected areas) were used to evaluate the alternative routes. The Land Cover Classification Enhanced for Bipole (LCCEB) was used to evaluate vegetation cover classes in the Project study area. Five broad cover classes were identified along the routing options including grassland, wetland, coniferous, broadleaf and mixedwood. A comprehensive species list of plants and communities of conservation concern (Manitoba Conservation 2009b) was reviewed for the Project study area.

To evaluate the potential effect of the Project on vegetation, a rating system that consisted of three levels (high, medium, low) was used with each level defined as follows:

- High – High effect on biological or physical environment.
- Medium – Moderate effect on biological or physical environment.
- Low – Low effect on biological or physical environment.

Each segment was rated for the evaluation. A high rating was applied for segments that contained plants listed as very rare (S1) or very rare/rare (S1S2) by the MBCDC. Also rated as high were segments with high grassland/prairie area (greater than 30,000 hectares) and proportion (greater than 50 percent). A rating of medium was applied for segments that historically contained very rare (S1) and rare/very rare (S1S2) species, greater than three rare (S2) species, greater than six species of conservation concern (very rare (S1) to uncommon (S3)), Areas of Special Interest, protected areas, and salt marshes. Also rated as medium were segments of moderate grassland/prairie area (between 10,000 to 30,000 hectares) and proportion (25 to 50 percent). All other segments and nodes were ranked low.

4.3.2 Evaluation Results

Seventy-four species of conservation concern, including both plants and terrestrial communities, were reported to occur along the routing options. Species were assessed based on their provincial rank, which ranges from very rare (S1) to demonstrably secure (S5). No known species listed by COSEWIC, SARA or MBESA were reported to occur along the routes.

Four segments of the routing options were ranked as high for species of conservation concern. Species on these routing options included western ironweed (*Vernonia fasciculata* ssp. *corymbosa*) on segment A21, two occurrences of western ironweed (*Vernonia fasciculata* ssp. *corymbosa*) on segment AC3, false indigo (*Amorpha fruticosa*) and red-root flatsedge (*Cyperus erythrorhizos*) on segment B28, and limestone oak fern (*Gymnocarpium robertianum*) and smooth woodsia (*Woodsia alpina*) on segment C10.

Habitats recognized as important for protected species (i.e., SARA and MBESA) were the grassland and prairie areas. Two segments of the routing options were ranked as high from the evaluation for grassland and prairie areas. These included segments A15 and C21.

Forty-three segments on routes A, B, and C were ranked medium due to the presence of protected areas, Areas of Special Interest, salt marshes, grasslands, and the presence of species of conservation concern (historical species and those species not ranked as rare or rare/very rare). The remaining segments were ranked as low.

4.4 Evaluation of New Route Segments

As part of the SSEA process, sixteen new alternative route segments were identified in the spring 2010 for the Bipole III Transmission Project. All of these new segments were subsequently evaluated for VEC's, vegetation concerns and issues. The new alternative route segments were analyzed and rated following the methods used in the report "Vegetation Evaluation of the Alternative Routes for the Bipole III Transmission Project" (Szwaluk Environmental Consulting Ltd. et al. 2010).

Seventeen locations for species of conservation concern (15 species) were known to occur along the routing options. Species were assessed based on their provincial rank, which ranges from very rare (S1) to demonstrably secure (S5). Only one non-historical species (western ironweed) ranked as very rare (S1) occurred on new route segment (A21_1). Segment A21_1 was the only segment rated as high for species of conservation concern. No known species listed by COSEWIC, SARA or MBESA were reported to occur along the routes.

No new segments for grassland areas were ranked as high from the evaluation. In total, six segments were ranked as medium due to the presence of protected areas, Areas of Special Interest, grasslands, and the presence of species of conservation concern

(historical species and those species not ranked as rare or rare/very rare). Segments ranked as medium include: B18_1, B22_1, B23_1, B24_1, C22BA4_1 and C22BA4_2. The remaining segments were ranked as low.

In the summer of 2010, four new route segments were identified for the Bipole III Transmission Project. The new segments included: P1, P2, P3 and P4. Segments P1, P2 and P3 are portions of the preliminary preferred route while segment P4 is the connection to the proposed converter station for Bipole III. As part of the Site Selection and Environmental Assessment process, all new segments were evaluated for vegetation concerns and issues as a result of their centerline being located outside of the previously evaluated local study area.

The new route segments were analyzed and rated following the methods used in Vegetation Evaluation of the Alternative Routes for the Bipole III Transmission Project report (prepared by Szwaluk Environmental Consulting et al. 2010).

Two species of conservation concern, listed by the MBCDC, were known to occur along these segments. These species included cleavers (*Galium aparine*) and long-spurred violet (*Viola selkirkii*), both of which were previously observed at segment P3, near the town of The Pas. Cleavers is ranked as SU, meaning possibly in peril, but the plant is considered introduced (Scoggan 1978). This plant was observed in 1986. Long-spurred violet is ranked as S2, which is rare throughout its range or in the province and may be vulnerable to extinction. This plant was observed in 1950 and is listed as historical by the MBCDC. No known species listed by COSEWIC, SARA or MBESA were reported to occur along the new segments.

All new route segments avoided Areas of Special Interest, national parks, ecological reserves, provincial forests and do not appear to be located along areas of salt marshes. All new segments were ranked low for vegetation concerns and issues.

5 HIGH LEVEL ASSESSMENT OF THE PROPOSED NORTHERN CONVERTER STATION, AND NORTHERN AND SOUTHERN GROUND ELECTRODE SITES

5.1 Identification of Concerns and Issues

As part of the SSEA process, proposed sites for the Keewatinoow converter station, as well as the northern and southern ground electrode sites were reviewed for vegetation concerns and issues. A high level assessment was completed in 2009 for the proposed sites, which involved a search for species and terrestrial communities of conservation concern listed as S1 to S3 by the MBCDC (Manitoba Conservation 2009b). This search also included plant species listed by the SARA, the COSEWIC, and the MBESA.

5.2 Northern Converter Station Sites

Potential sites for the Keewatinoow converter station are located in the northeastern portion of the Project study area. Five sites (NCS1a, NCS1b, NCS3, NCS4a, NCS4b) were selected for assessment by Manitoba Hydro (see Map 4). No records for species of conservation concern (including protected species) were known to occur from the high-level assessment. No vegetation concerns or issues occurred at these potential sites. In late summer of 2010, Manitoba Hydro selected a preferred site (NCS4a) based on desk-top studies and geotechnical investigations.

5.3 Northern Ground Electrode Sites

In the fall of 2009, 13 potential sites for the northern ground electrodes were identified for assessment by Manitoba Hydro and are located in the northeastern portion of the Project study area. Potential ground electrode sites were selected based on work completed by J.D. Mollard and Associates Ltd. (2009). Results from the high-level assessment identified two species of concern previously observed in the vicinity of the ground electrode sites. These plants included Herriot's sage (*Artemisia tilesii*) and arctic bluegrass (*Poa arctica* ssp. *caespitans*). No protected species were known to be located at these sites.

Herriot's sage is ranked as S2, which is defined as being rare throughout its range or in the province (6 to 20 occurrences) and may be vulnerable to extinction. This species was found to be located near the converter station at Angling River junction with the Nelson River.

Arctic bluegrass is ranked as S1? which is defined as being very rare throughout its range or in the province with five or fewer occurrences or very few remaining individuals. This plant may be especially vulnerable to extirpation. The question mark (?) indicated inexact or uncertain numeric rank of this species. This species was found near Henday at the Nelson River near Sundance, close to the proposed ground electrode Site 10. No other vegetation concerns or issues were found to occur at these potential sites.

HES3a and HES3b were two electrode sites added for further assessment after this desk-top study was completed. In the spring of 2010, Manitoba Hydro narrowed down the number of northern ground electrode sites to nine based on desk-top studies and geotechnical investigations. Electrode sites selected for further study included: NES4, NES5, NES6, NES7, NES10, NES11, NES12, HES3a and HES3b (see Map 4).

5.4 Southern Ground Electrode Sites

In the fall of 2009, four potential southern ground electrode sites (SES1, SES2, SES3 and SES4) were identified for assessment by Manitoba Hydro and are located in the southeastern portion of the Project study area, east of the City Winnipeg. The southern electrode sites were originally identified by Teshmont Consultants Inc. in 1988. Results from the high-level assessment identified several species of conservation concern previously observed in the vicinity of the ground electrode sites. No protected species were known to be located at these sites.

Plants of conservation concern included: false indigobush (*Amorpha fruticosa*), arethusa (*Arethusa bulbosa*), Canada wild ginger (*Asarum canadense*), leathery grapefern (*Botrychium multifidum*), swamp-pink (*Calopogon tuberosus*), prairie redroot (*Ceanothus herbaceus*), red-root flatsedge (*Cyperus erythrorhizos*), Houghton's umbrella-sedge (*Cyperus houghtonii*), creeping whitlow-grass (*Draba reptans*), closed gentian (*Gentiana rubricaulis*), narrowleaf pinweed (*Lechea intermedia*), large-flowered ground-cherry (*Leucophysalis grandiflora*), sensitive fern (*Onoclea sensibilis*), interrupted fern (*Osmunda claytoniana*), prairie blue-eyed-grass (*Sisyrinchium campestre*), waxleaf meadowrue (*Thalictrum revolutum*), and American bog violet (*Viola conspersa*).

Creeping whitlow-grass was located in the general area of ground electrode site SES1. It is ranked as SU by the MBCDC, which is defined as possibly in peril, but the status is uncertain and further information is needed.

Houghton's umbrella-sedge, arethusa and two occurrences of swamp-pink were species found in the area of ground electrode sites SES2 and SES3. These species are all ranked as S2, which is defined as being rare throughout its range or in the province (6 to 20 occurrences) and may be vulnerable to extinction.

Fifteen species (19 occurrences) were identified in the area of ground electrode site SES4. Waxleaf meadowrue, narrowleaf pinweed and red-root flatsedge are ranked as very rare (S1) throughout their range or in the province and may be especially vulnerable to extirpation. False indigobush is ranked as very rare to rare (S1S2) in the province. Species ranked as rare (S2) included arethusa and Houghton's umbrella-sedge (three occurrences). Closed gentian is ranked as rare to uncommon in the province (S2S3). Other uncommon species (S3) included interrupted fern (two occurrences), large-flowered ground-cherry, prairie redroot, leathery grapefern, with Canada wild ginger (two occurrences) and American bog violet ranked as uncertain (S3?). Sensitive fern was ranked as uncommon to widespread (S3S4) while prairie blue-eyed-grass is listed as

possibly in peril, but status is uncertain. No other vegetation concerns or issues were found to occur at these potential sites.

In the spring of 2010, potential electrode site SES4 was no longer considered for evaluation. See Map 6 for the locations of sites which were selected for further study by Manitoba Hydro.

6 PREFERRED ROUTE AND OTHER PROJECT COMPONENTS ASSESSMENT

6.1 Methodology

6.1.1 Preferred Route and Other Project Components

The Land Cover Classification Enhanced for Bipole (LCCEB) was the primary data used in the assessment of vegetation. The LCCEB represents an enhancement of the national landcover spatial database developed by the federal government Land Cover Classification (LCC). The LCC is a mapping layer that has been harmonized across the major federal departments involved in land management or land change detection that includes Agriculture and Agri-Foods Canada, Canadian Forest Service, and Canadian Centre for Remote Sensing. The LCCEB also includes an integration of the National Stratification Working Group ecological framework database.

Additional data sources that provide spatial and attribute information were also utilized. These included Forest Resource Inventory (FRI) (Manitoba Conservation), Terrestrial Ecozones, Ecoregions and Ecodistricts of Manitoba (Smith et al. 1998), Wetlands of Manitoba (Halsey et al. 1997), salt marshes for the Red Deer Lake area (Ducks Unlimited Canada 2009), provincial fire data (Manitoba Land Initiative and Manitoba Conservation 2011), and species of conservation concern (Manitoba Conservation 2009b).

In a Geographical Information System (GIS), spatial queries were conducted using the available data sources. The purpose of the spatial queries were to identify vegetation types; and determine ecologically important areas, locations for species of concern and calculations on vegetation cover types existing in the local study area, transmission line right of way (66 m), and footprints for other Project components. Values for vegetation cover represent an estimate along the preferred route.

To identify known locations for species and terrestrial communities of conservation concern, a GIS analysis of existing plant locations was conducted in the study area. Unique records were used in a spatial analysis to indicate occurrence data intersecting the preferred route and other Project components. Where multiple plant species intersect the same location, a unique record was produced for each of those occurrences.

6.1.2 Native Vegetation Survey

Spatial information from LCCEB and FRI vegetation cover types were overlaid on 1:50,000 orthoimagery. Interpretation of orthoimagery and aerial reconnaissance were used for the selection of field assessment sites. The initial plan was to attempt to sample the broad vegetation types among the ecoregions intersected by the transmission line preferred route using a stratified approach. Vegetation cover types identified from the LCCEB and FRI data sources were sampled along the preliminary preferred route and as close as possible to the 66 m RoW. The intent of the sampling was to provide a

description of the vegetation as well as record botanical information. Queries that were conducted for field assessment mapping included:

- FRI productive forested land, softwood dominated stands greater than age 60 years.
- FRI productive forested land, hardwood dominated stands.
- FRI non-productive forested land (LCCEB shrub layer utilized).
- FRI non-forested land (LCCEB agricultural layer removed for prairies, meadow and pasture).
- LCCEB forested and non-forested land where FRI does not occur.
- Riparian areas buffered at 100 m (50 m on either side of a water course crossing).

The native vegetation survey consisted of establishing temporary sample plots on sites with relatively homogeneous vegetation. The sampling of vegetation composition was based on the methods outlined in Redburn and Strong (2008). A 30 m transect was used with five 2.5 m by 2.5 m quadrats with a 1 m by 1 m nested quadrat spaced at 5 m increments along the transect for shrubs 1-2.5 m tall and herbs and low shrubs ≤ 1 m tall, respectively. The composition of tree cover >2.5 m tall was estimated using a 20 m by 30 m plot centered on each transect. Plant cover was estimated to the nearest 1% for species $<15\%$ cover and nearest 5% for those with higher cover. Field sampling was conducted between May 25 and August 27, 2010.

Data collected from the botanical field assessments were entered, and the means for vegetation percent cover values were calculated for each plot. Mean values were arc-sine transformed to approximate a normal distribution. To more succinctly describe the vegetation communities, all plots were classified into community types based on their plant species composition and abundances, using a hierarchical cluster analysis (Norusis 2000). Ward's method was used as the clustering algorithm, with squared Euclidean distance as the dissimilarity measure.

Where vegetation community types are listed, naming was based on their structure and species dominance by stratum. Species separated by a slash (/) indicates a change in stratum, while co-dominant species are separated by a dash (-) indicating similar abundance within the same stratum. As an example, a Trembling Aspen/Green Alder/Wild Sarsaparilla-Bunch Berry community type would consist of a trembling aspen (*Populus tremuloides*) overstory with a green alder (*Alnus viridis*) shrub layer and an understory co-dominated by wild sarsaparilla (*Aralia nudicaulis*) and bunchberry (*Cornus canadensis*). The National Vegetation Working Group of Canada (1990) recommends this approach for the classification of vegetation. Canopy cover of community types were estimated using the Canadian System of Vegetation Classification (National Vegetation Working Group of Canada 1990).

The communities described in the results are for the purpose of representing the vegetation existing along the preliminary preferred route. It should be appreciated that

not all communities are represented as a result of the study area size, time allowed for sampling, and denied access to private lands for field studies in some areas.

6.1.3 Survey for Plant Species of Conservation Concern

The search for species of conservation concern initially involved the review of a comprehensive plant list that was compiled by Manitoba Conservation (2009b) for the Project study area as well as reviewing their online database for species listed in the province by ecoregion. Species of conservation concern included plants and communities that have special designation by COSEWIC, species listed under SARA, and MBESA, or those that are very rare to uncommon throughout their range in Manitoba, listed by the MBCDC. Refer to Tables 3, 4, and 5 for the ranking system and status categories used by COSEWIC, SARA, MBESA, and the MBCDC.

Flowering times and preferred habitat for species of conservation concern known in the local study area were identified. Prior to field surveys, areas with high potential for species of concern and high diversity were identified as locations to investigate. The interpretation of 1:50,000 orthoimagery field maps developed from LCCEB and FRI data sources assisted with this process. Representative or dominant habitat that were included in the native plant surveys were also investigated for species of concern.

Surveys were conducted using patterned and meander searches. Patterned searches involved walking roughly parallel transects in a search unit, while meander searches involved walking randomly through a site (Nelson 1986). A combination of these two methods is often effective (Alberta Native Plant Council 2000). Parallel transects were favored in more open landscapes such as grasslands, while meander searches were conducted in areas of difficult terrain, unique habitats, and often where unusual landscape features were observed.

Rare plant locations were recorded using a global positioning system (GPS) receiver, and data collected for species of concern included a general description of the surrounding vegetation and site conditions. Specimens were collected only if field identifications were unable to be made. Plant nomenclature was based on the Flora of North America (1993+). The Flora of Canada (Scoggan 1978) was used for those specimens not listed in the Flora of North America. Where unknown specimens were difficult to key, herbarium specimens were used to help ensure their correct identification. Surveys for species of conservation concern were conducted between May 11 and September 3, 2010. A total of forty-four field days occurred for vegetation sampling and species of concern surveys.

6.2 Valued Environmental Components

Valued environmental components (VECs) are elements of the biophysical or socio-economic environment that are considered to be important. Importance may be determined on the basis of societal, cultural or economic values; scientific or aboriginal interest; or public concern.

Based on the initial review of available sources of data and information for the Project study area, two VECs were identified. A third VEC was identified later in the process as a result of Aboriginal Traditional Knowledge (ATK) information becoming available for the Project. The three VECs determined for terrestrial ecosystems and vegetation for the Bipole III preferred route assessment included:

- Plant species and communities of conservation concern.
- Native grassland/prairie areas.
- Plant species/communities important to Aboriginal people as identified through the ATK process.

Additional information on the justification and utilization of the VEC's for the environmental effects assessment for the Bipole III Transmission Project can be found in Section 7.4.1.

7 ENVIRONMENTAL EFFECTS ASSESSMENT

The following section discusses results from 2010 field assessments and desktop analysis for the Project (transmission line and other components) as well as the identification of environmental effects and mitigation. Information found in this section includes the local study area, 66 m RoW for the preferred route, and footprints for other Project components for comparison and analysis.

7.1 Bipole III Preferred Route

During the summer of 2010, a preliminary preferred route was selected through the Site Selection and Environmental Assessment Process which was the basis for the field assessment conducted in 2010; a preferred route was not identified until early 2011 (see Map 2).

Several privately owned lands identified for vegetation assessments were unable to be accessed as a result of denied landowner permission. In some areas, limited access to private lands resulted in roadside surveys to assess the vegetation during the field season. Other areas of interest to survey were either inaccessible, or were unable to be assessed due to time constraints (i.e., Project components identified after the field season).

7.1.1 Ecological Land Classification

The ecological stratification of Manitoba's landscapes (Smith et al. 1998) was utilized for classification and assessment of the local study area and 66 m RoW. Five ecozones, eight ecoregions and 29 ecodistricts are intersected by the local study area. The 66 m RoW, intersects five ecozones, eight ecoregions and 23 ecodistricts.

Ecozones, which are the broadest level of classification, include the Hudson Plains, Taiga Shield, Boreal Shield, Boreal Plains and Prairies within the local study area. The local study area occupies the greatest area in the Boreal Plains and the Prairies Ecozones with 221,463 ha and 217,390 ha, respectively (Table 7). Each of these ecozones represents 31% of the entire local study area. The Boreal Shield occupies an area of 193,801 ha and represents a proportion of 27% within the study area. The Taiga Shield has the least area with 4,308 ha and makes up only less than 1% of the entire local study area. Within the 66 m RoW, the Prairies and the Boreal Plains occupy areas of 3,003 ha and 3,018 ha, respectively, and both have a proportion of 33%. Areas and proportions for the remaining ecozones within the RoW include 2,693 ha (29%) for the Boreal Shield, 350 ha (3%) for the Hudson Plains, and 52 ha (<1%) for the Taiga Shield.

The ecoregions (division of ecozones) found within the local study area include the Hudson Bay Lowland, Selwyn Lake Upland, Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland, Interlake Plain, Aspen Parkland, and Lake Manitoba Plain. The ecoregion with the largest area found within the local study area is the Lake Manitoba Plain with 215,619 ha and occupies a proportion of 31% of the land. The

Table 7. Area and proportion of ecozones, ecoregions and ecodistricts within the local study area and 66 m right-of-way.

Ecozone	Ecoregion		Ecodistrict	Area (ha) within Local Study Area	Proportion within Local Study Area	Area (ha) within RoW	Proportion within RoW
Hudson Plains	Hudson Bay Lowland		Winisk River Lowland	56191.93	0.08	350.25	0.03
	Hudson Bay Lowland Total			56191.93	0.08	350.25	0.03
Hudson Plains Total				56191.93	0.08	350.25	0.03
Taiga Shield	Selwyn Lake Upland	Embleton Lake	4308.36	<0.01	51.69	<0.01	
	Selwyn Lake Upland Total			4308.36	<0.01	51.69	<0.01
Taiga Shield Total				4308.36	<0.01	51.69	<0.01
Boreal Shield	Churchill River Upland	Waskaiowaka Lake	4300.52	<0.01	70.25	<0.01	
		Orr Lake	38635.48	0.05	536.73	<0.01	
		Three Point Lake	9882.95	0.01	138.57	0.01	
	Churchill River Upland Total			52818.95	0.07	745.55	0.08
	Hayes River Upland	Knee Lake	39018.52	0.05	526.67	0.05	
		Pikwitonei Lake	23943.96	0.03	341.50	0.03	
		Sipiwesk Lake	73749.71	0.10	1020.63	0.11	
		Norway House	4270.24	<0.01	59.00	<0.01	
	Hayes River Upland Total			140982.43	0.02	1947.80	0.21
Boreal Shield Total				193801.38	0.27	2693.35	0.29
Boreal Plains	Mid-Boreal Lowland	Playgreen Lake	10818.73	0.01	144.39	0.01	
		Cormorant Lake	34906.50	0.05	495.59	0.05	
		Summerberry	29101.86	0.04	397.93	0.04	
		The Pas Moraine	29258.27	0.04	407.46	0.04	
		Overflowing River	22629.01	0.03	321.58	0.03	
	Mid-Boreal Lowland Total			126714.37	0.18	1766.95	0.19
	Interlake Plain	Swan Lake	81772.96	0.11	1134.76	0.12	
		Waterhen	8465.50	0.01	116.75	0.01	
		Gimli	1122.54	<0.01	0.00	0.00	
Steinbach		3387.88	<0.01	0.00	0.00		

Ecozone	Ecoregion	Ecodistrict	Area (ha) within Local Study Area	Proportion within Local Study Area	Area (ha) within RoW	Proportion within RoW
	Interlake Plain Total		94748.88	0.13	1251.51	0.13
Boreal Plains Total			221463.28	0.31	3018.49	0.33
Prairies	Aspen Parkland	Shilo	225.09	<0.01	0.00	0.00
		Stockton	1546.26	<0.01	8.69	<0.01
	Aspen Parkland Total		1771.35	<0.01	8.69	<0.01
	Lake Manitoba Plain	Dauphin	1547.26	<0.01	21.29	<0.01
		Alonsa	84871.59	0.12	1216.98	0.13
		Ste. Rose	86.82	<0.01	0.00	0.00
		Gladstone	14717.92	0.02	219.03	0.02
		Langruth	2760.79	<0.01	0.00	0.00
		Winnipeg	74297.79	0.10	1001.68	0.10
		MacGregor	33648.53	0.04	492.66	0.05
		Portage	635.85	<0.01	0.00	0.00
		Winkler	3052.08	<0.01	42.47	<0.01
	Lake Manitoba Plain Total		215618.63	0.31	2994.11	0.32
Prairies Total			217389.98	0.31	3002.80	0.33

Aspen Parkland has the smallest area (1,771 ha) of the ecoregions within the local study area and proportionally occupies less than 1%. Similar to the local study area, the Lake Manitoba Plain occupies the largest area (2,994 ha) within the 66 m RoW. The Hayes River Upland and the Mid-Boreal Lowland have the next highest areas within the RoW with 1,948 ha and 1,767 ha, respectively. The Aspen Parkland is the smallest ecoregion with less than nine hectares along the RoW. Information on area and proportion of ecodistricts within the local study area and RoW is provided also in Table 7. For the assessment of terrestrial vegetation and ecological resources within the local study area, ecoregions will be the primary level of landscape classification reported on below.

7.1.2 Vegetation Cover Types

Twenty-one cover types from the Land Cover Classification Enhanced for Bipole occur within the local study area of the preferred route. Only exposed land and developed land are predominantly non-vegetated classes. The distribution of cover types within the local study area are illustrated in Map Series 100. Both perennial cropland and pasture, and annual cropland cover types are represented by agricultural land.

Table 8 displays the area and proportion of cover types for the local study area and 66 m RoW by ecoregion. In the Hudson Bay Lowland, the wetland shrub cover type represents the greatest area within the local study area (14,583 ha). Shrub tall, coniferous open, and coniferous sparse were other dominant cover types within the study area, each occupying an area greater than 7,500 ha. Within the RoW, shrub tall was the dominant cover type occupying an area of 158 ha. Coniferous open had the second largest area with 63 ha. The Selwyn Lake Upland has shrub tall as the dominant cover type within the local study area (3,630 ha) and RoW (50 ha). In the Churchill River Upland, the coniferous open cover type occupied the greatest area in the local study area (14,430 ha) and RoW (240 ha). Also dominant along the RoW are the coniferous dense (143 ha) and shrub tall (96 ha) cover types.

The Hayes River Upland is dominated by coniferous dense (31,077 ha), coniferous open (31,015 ha), and shrub tall (21,139 ha) cover types within the local study area. Within the RoW, the coniferous open type represents the greatest area with 480 ha, followed by 432 ha for coniferous dense and 340 ha for shrub tall. Wetland herb and wetland shrub were dominant cover types within the study area of the Mid-Boreal Lowland. Both types occupied nearly the same area with slightly greater than 26,000 ha. Wetland treed and coniferous dense also represented a large portion of the local study area with 23,592 ha and 20,881 ha respectively. Within the RoW, coniferous dense (372 ha), wetland herb (346 ha), and wetland shrub (345 ha) were the dominant cover types.

Approximately 13,873 ha of broadleaf open and 11,828 ha of herb comprised the greatest area for cover types within the Interlake Plain study area. These same cover types dominate the RoW with 181 ha for broadleaf open and 154 ha for herb. Annual cropland had the greatest cover within the local study area of the Aspen Parkland with

Table 8. Area and proportion of vegetation cover types within the local study area and 66 m right-of-way by ecoregion.

Cover Type ¹	Area (ha) and Proportion ²	Ecoregion								Total Area (ha) and Proportion ²
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
Exposed Land	Local Study Area	1816.21	0.00	816.19	1809.21	1076.13	855.57	0.00	135.95	6509.28
	RoW Area	0.98	0.00	11.91	30.56	16.07	42.68	0.00	1.17	103.39
	Proportion	<0.01	0.00	0.01	0.01	0.01	0.05	0.00	<0.01	0.01
Developed Land	Local Study Area	0.00	0.00	0.00	0.00	392.90	346.01	50.63	5508.91	6298.47
	RoW Area	0.00	0.00	0.00	0.00	1.33	3.98	0.00	76.11	81.43
	Proportion	0.00	0.00	0.00	0.00	<0.01	0.01	0.00	0.01	0.01
Shrubland	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.97	77.97
	RoW Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shrub Tall	Local Study Area	13263.48	3629.69	6594.07	21139.03	8717.92	184.64	0.00	147.53	53676.39
	RoW Area	157.85	49.72	95.75	340.40	158.87	4.26	0.00	<0.01	806.87
	Proportion	0.01	0.01	0.01	0.01	0.01	0.02	0.00	<0.01	0.01
Wetland	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	1.28	261.23	262.51
	RoW Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01
Wetland Treed	Local Study Area	807.20	3.94	4515.95	9177.65	23592.08	9259.19	0.00	30.82	47386.86
	RoW Area	0.27	0.00	52.27	158.55	328.20	128.69	0.00	1.69	669.69
	Proportion	<0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.05	0.01
Wetland Shrub	Local Study Area	14583.02	95.94	4158.80	11614.91	26229.53	10006.39	0.00	6289.36	72977.98
	RoW Area	54.12	0.50	43.32	145.73	344.54	110.29	0.00	90.39	788.92
	Proportion	<0.01	<0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
Wetland Herb	Local Study Area	2007.60	343.36	1680.89	7257.69	26831.83	3785.97	0.00	7544.24	49451.61
	RoW Area	18.03	1.46	12.41	82.43	345.94	57.93	0.00	85.30	603.53
	Proportion	<0.01	<0.01	<0.01	0.01	0.01	0.01	0.00	0.01	0.01

Cover Type ¹	Area (ha) and Proportion ²	Ecoregion								Total Area (ha) and Proportion ²
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
Herb	Local Study Area	0.00	0.00	0.00	0.00	632.45	11828.26	0.00	2251.84	14712.56
	RoW Area	0.00	0.00	0.00	0.00	9.96	154.29	0.00	26.47	190.73
	Proportion	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Grassland	Local Study Area	0.00	0.00	0.00	0.00	415.50	7494.23	242.75	47026.63	55179.13
	RoW Area	0.00	0.00	0.00	0.00	5.71	79.85	3.51	666.67	755.75
	Proportion	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
Annual Cropland	Local Study Area	0.00	0.00	0.00	0.00	149.29	7446.54	858.91	104108.61	112563.37
	RoW Area	0.00	0.00	0.00	0.00	0.00	94.58	0.00	1396.96	1491.55
	Proportion	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01
Perennial Cropland and Pasture	Local Study Area	0.00	0.00	0.00	0.00	606.81	7399.93	153.55	7479.74	15640.05
	RoW Area	0.00	0.00	0.00	0.00	12.72	110.21	0.00	106.92	229.86
	Proportion	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.01
Coniferous Dense	Local Study Area	3955.41	7.72	8466.34	31076.53	20881.15	4566.92	0.00	0.00	68954.09
	RoW Area	11.13	0.00	142.87	431.98	371.88	63.46	0.00	0.00	1021.33
	Proportion	<0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01
Coniferous Open	Local Study Area	7588.84	23.79	14430.09	31015.47	7331.37	2013.84	0.00	5.69	62409.13
	RoW Area	63.05	0.00	239.78	479.75	106.49	23.58	0.00	0.00	912.67
	Proportion	<0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01
Coniferous Sparse	Local Study Area	8608.04	7.06	5188.93	3003.76	273.85	1.73	0.00	0.00	17083.39
	RoW Area	43.20	0.00	84.14	29.10	2.87	0.00	0.00	0.00	159.34
	Proportion	<0.01	0.00	0.01	<0.01	<0.01	0.00	0.00	0.00	<0.01
Broadleaf Forest	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	436.84	4882.44	5319.28
	RoW Area	0.00	0.00	0.00	0.00	0.00	0.00	5.17	89.54	94.72
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01

Cover Type ¹	Area (ha) and Proportion ²	Ecoregion								Total Area (ha) and Proportion ²
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
Broadleaf Dense	Local Study Area	0.00	0.00	538.23	6628.66	3706.92	10842.85	0.00	4834.89	26551.57
	RoW Area	0.00	0.00	4.60	91.39	32.63	137.52	0.00	62.90	329.06
	Proportion	0.00	0.00	<0.01	0.01	<0.01	0.01	0.00	0.01	0.01
Broadleaf Open	Local Study Area	0.00	0.00	0.00	0.00	0.00	13872.92	0.00	26476.79	40349.72
	RoW Area	0.00	0.00	0.00	0.00	0.00	180.81	0.00	378.08	558.90
	Proportion	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01
Broadleaf Sparse	Local Study Area	0.00	0.00	0.00	0.00	0.30	3.96	0.00	1.59	5.86
	RoW Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mixedwood Dense	Local Study Area	111.73	0.00	3938.47	11383.13	1671.89	4707.92	0.00	24.12	21837.29
	RoW Area	0.00	0.00	52.23	149.41	22.74	54.48	0.00	0.00	278.87
	Proportion	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01
Mixedwood Open	Local Study Area	0.00	0.00	0.00	0.00	0.00	4.26	0.00	0.00	4.26
	RoW Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1 Land Cover Classification Enhanced for Bipole cover types.

2 Proportion is the area of the cover type that occupies the right-of-way compared to the local study area.

859 ha while broadleaf forest was greatest in the RoW with 5 ha. In the Lake Manitoba Plain, the annual cropland cover type represents the greatest area within the local study area (104,109 ha) and RoW (1,397 ha).

In comparison between the RoW and study area, only the exposed land cover type of the Interlake Plain and the wetland tree cover type of the Lake Manitoba Plain had the greatest proportions potentially affected with 5%. The remaining cover types for each ecoregion had proportions of 2% or less. No vegetation cover type exceeds a proportion of 1% when the area of the RoW is compared to the local study area for ecoregions combined.

7.1.3 Classification of Land and Vegetation Cover

Cover types of the Land Cover Classification Enhanced for Bipole were classified according to land area along the local study area of the preferred route. Results show that within the local study area, the annual cropland cover type occupies the greatest area with 112,563 ha and represents 16% of the total land area (Table 9).

Table 9. Vegetation cover types rank-ordered by land area within the local study area.

Cover Type¹	Area (ha) within Local Study Area	Proportion of Cover Type compared to Total Land Area
Mixedwood Open	4.26	<0.01
Broadleaf Sparse	5.86	<0.01
Shrubland	77.97	<0.01
Wetland	262.51	<0.01
Broadleaf Forest	5319.28	<0.01
Developed Land	6298.47	<0.01
Exposed Land	6509.28	<0.01
Herb	14712.56	0.02
Perennial Cropland and Pasture	15640.05	0.02
Coniferous Sparse	17083.39	0.02
Mixedwood Dense	21837.29	0.03
Broadleaf Dense	26551.57	0.04
Broadleaf Open	40349.72	0.06
Wetland Treed	47386.86	0.07
Wetland Herb	49451.61	0.07
Shrub Tall	53676.39	0.08
Grassland	55179.13	0.08
Coniferous Open	62409.13	0.09
Coniferous Dense	68954.09	0.10
Wetland Shrub	72977.98	0.10
Annual Cropland	112563.37	0.16

¹ Land Cover Classification Enhanced for Bipole cover types.

The majority of this land area occurs in the Lake Manitoba Plain Ecoregion with 104,109 ha (see Table 8). Nine other extensive cover types (>3%) occur within the local study area. Cover types that individually represent 10% of the total land area include wetland shrub (72,978 ha) and coniferous dense (68,954 ha). Nine percent of the total land area is represented by coniferous open (62,409 ha), while grassland (55,179 ha) and shrub tall (53,676 ha) individually make up 8%. Wetland herb (49,452 ha) and wetland treed (47,387 ha) each make up 7% of the land area. Broadleaf open (40,350 ha) represents 6% and broadleaf dense (26,552 ha) makes up a total land area proportion of 4%. The remaining 11 cover types individually occupy 3% or less of the total land area with the broadleaf sparse (6 ha) and mixedwood open (4 ha) occupying the lowest areas in the local study area.

Vegetation cover types rank-ordered by land area for the 66 m RoW were similar to the local study area where the greatest land area was occupied by annual cropland with 1,492 ha and a total land area proportion of 16% (Table 10).

Table 10. Vegetation cover types rank-ordered by land area within the 66 m right-of-way.

Cover Type¹	Area (ha) within RoW	Proportion of Cover Type compared to Total Land Area
Shrubland	0.00	0.00
Broadleaf Sparse	0.00	0.00
Mixedwood Open	0.00	0.00
Wetland	<0.01	<0.01
Developed Land	81.43	<0.01
Broadleaf Forest	94.72	0.01
Exposed Land	103.39	0.01
Coniferous Sparse	159.34	0.01
Herb	190.73	0.02
Perennial Cropland and Pasture	229.86	0.02
Mixedwood Dense	278.87	0.03
Broadleaf Dense	329.06	0.03
Broadleaf Open	558.90	0.06
Wetland Herb	603.53	0.06
Wetland Treed	669.69	0.07
Grassland	755.75	0.08
Wetland Shrub	788.92	0.08
Shrub Tall	806.87	0.08
Coniferous Open	912.67	0.10
Coniferous Dense	1021.33	0.11
Annual Cropland	1491.55	0.16

¹ Land Cover Classification Enhanced for Bipole cover types.

The eight extensive cover types (>3%) within the RoW included coniferous dense (1,021 ha), coniferous open (913 ha), shrub tall (807 ha), wetland shrub (789 ha), grassland (756 ha), wetland treed (670 ha), wetland herb (604 ha) and broadleaf open (559 ha). Nine cover types individually occupied 3% or less of the total land area. These included broadleaf dense (329 ha), mixedwood dense (279 ha), perennial cropland and pasture (230 ha), herb (191 ha), coniferous sparse (159 ha), exposed land (103 ha), broadleaf forest (95 ha), developed land (81 ha), and wetland (<1 ha). The RoW avoided the three cover types of mixedwood open, broadleaf sparse and shrubland.

7.1.4 Vegetation Community Types

One hundred and nineteen plots were sampled along the preliminary preferred route to describe the vegetation community types (Appendix F). Map 13 shows the distribution of plots along the preferred route. Community types are defined based on plant species composition and abundance, as sampled in plots. The communities described are grouped broadly by vegetation type, based on the LCCEB, including coniferous forests, mixed forests, deciduous forests, grasslands, and wetland areas. These plots were generally assessed using available road access in the south and helicopter support in the north. Sampling occurred as close as possible to the RoW.

Many plots grouped together partially due to the distribution and composition of the tree canopy. The terms used here for forested plots are taken from the Canadian Vegetation Classification System (National Vegetation Working Group 1990), and are defined as: sparse 10-25%; open >25-60%; and closed >60% canopy cover. The following descriptions provide details of the species compositions and structure from the vegetation layers, or strata, at each site. Namely, the tree stratum (>2.5m), the tall shrub stratum (1-2.5m), the herb and low shrub stratum (≤1m), and the non-vascular ground stratum with inanimate cover. A full species list of all plant taxa identified in all plots is found in Appendix G.

Cluster analysis in this study is used as a means of grouping ecologically similar plots together into hierarchical groups, or in this case, vegetation community types. The analysis by ecoregion led, at times, to community types containing a single plot. As single plots cannot encompass the range of variation within a given community, this is not considered a true summary. Nevertheless, these single-plot community types remain of interest, and are included here for discussion purposes. Ecological information from each plot and community type contributes to the overall description of the diversity of sites encountered across every ecoregion.

In rare cases during the analysis, a plot could not be grouped in an ecologically meaningful way, either because it was unique, or extremely different from other plots in its ecoregion. When one plot is extremely different from the others, yet is included in the analysis, it can lead to skewed data results, with weaker group affiliations. The removal of such an outlying plot, and subsequent re-analysis, resulted in stronger more

meaningful groups formed in the remaining data. A single outlying plot was removed during the analysis: plot IP24, the lone wetland sampled in the Interlake Plain Ecoregion. The plot description, however, is included along with other community type descriptions for this ecoregion.

Hudson Bay Lowland Ecoregion Community Types

Ten plots were visited within this ecoregion, and classified into four community types based on vegetation cover and composition, detailed below. Community types are grouped here into two broad types of vegetation communities, coniferous forest and wetlands.

There were a total of 60 plant taxa observed within the sample plots of the Hudson Bay Lowland Ecoregion, and two species observed incidentally, between plots. Table 11 shows the number of plots sampled from each community type, as well as total cumulative species count and mean number of species recorded for each community type. A full species list of all plant taxa observed with mean percent cover by community type can be found in Appendix G. Appendix F identifies community types and locations of plots in the Hudson Bay Lowland Ecoregion.

Table 11. Four community types of the Hudson Bay Lowland Ecoregion.

Community Types	Plots	Total Species	Mean Species
Coniferous Forest			
1. Open Black Spruce—Coniferous/ Schreber's Moss	3	58	34.0
2. Open Black Spruce—Coniferous/ Reindeer Lichen—Peat Moss	3	42	28.0
3. Regenerating Open Jack Pine—Black Spruce/ Labrador Tea	2	33	22.0
Wetland			
4. Treed Black Spruce Bog	2	17	12.0

Coniferous Forest Community Types

1. Open Black Spruce—Coniferous/ Schreber's Moss

This community type has an open canopy of black spruce (*Picea mariana*) with tamarack (*Larix laricina*). Jack pine (*Pinus banksiana*) or trembling aspen (*Populus tremuloides*) may also be present in the tree stratum. Tall shrub cover was moderately well developed (21% cover overall), with ten species present. Shrub cover consisted mainly of black spruce saplings. Other frequently occurring tall shrubs included common juniper (*Juniperus communis*), tamarack saplings, and speckled alder (*Alnus viridis*). Thirty-eight

species were recorded in the herb and low shrub stratum, including Labrador tea (*Rhododendron groenlandicum*), tall sweet blueberry (*Vaccinium uliginosum*), sedges (*Carex* spp), alpine bearberry (*Arctous alpina*), snow willow (*Salix vestita*) and myrtle-leaved willow (*Salix myrtillifolia*). Total ground cover by mosses and lichens was high (62%) in plots overall, dominated by Schreber's moss (*Pleurozium schreberi*), with a presence of reindeer lichens (*Cladina* spp). Plots were characterized with low ground litter cover (11%).

2. Open Black Spruce—Coniferous/ Reindeer Lichen/ Peat Moss

This community type is characterized by an open canopy cover dominated by black spruce (*Picea mariana*), with subdominant tamarack (*Larix laricina*). The tall shrub layer was well developed (43%) with four species observed, of which the dominant was black spruce saplings, while dwarf birch (*Betula pumila*) and tamarack saplings were also common. Twenty-nine species were observed in the ground layer vegetation, dominated by Labrador tea (*Rhododendron groenlandicum*), crowberry (*Empetrum nigrum*), tall sweet blueberry (*Vaccinium uliginosum*) and sedges (*Carex* spp). Total ground cover by mosses and lichens was high (78%) in plots overall, and dominated by reindeer lichens (*Cladina* spp.), with subdominant peat mosses (*Sphagnum* spp.). Plots were characterized by a low ground litter cover (13%), with the occasional presence of standing water.

3. Regenerating Open Jack Pine—Black Spruce/ Labrador Tea

This community type was made up of two plots that have recently undergone wildfire. An open canopy of jack pine (*Pinus banksiana*) with black spruce (*Picea mariana*) is characteristic of this community type. The tall shrub layer was well-developed and consisted of six species, including tree saplings from the canopy, willows (*Salix* spp.), speckled alder (*Alnus incana*), and dwarf birch (*Betula pumila*). The ground layer vegetation was made up of twenty species, dominated by Labrador tea (*Rhododendron groenlandicum*), and included myrtle-leaved willow (*Salix myrtillifolia*), prickly rose (*Rosa acicularis*), and fireweed (*Chamerion angustifolium*). Moss and lichen cover values were extremely low (<10%) overall, made up primarily of *Cladonia* lichens (*Cladonia* spp.); ground litter cover was moderate (31%).

Wetland Community Type

4. Treed Black Spruce Bog

This community type is characterized by a general lack of tree and tall shrub cover, although scattered black spruce (*Picea mariana*) tree or sapling individuals may be present. Eleven species were noted in the ground vegetation layer, dominated by Labrador tea (*Rhododendron groenlandicum*). Other commonly occurring species include pale laurel (*Kalmia polifolia*), leatherleaf (*Chamaedaphne calyculata*), and cloud berry (*Rubus chamaemorus*). Ground moss and lichen cover was high, dominated (70%) by peat mosses (*Sphagnum* spp), with a presence of reindeer lichens (*Cladina* spp.) and *Cladonia* species. Standing water cover was occasionally present, while litter cover was low (15%).

Selwyn Lake Upland Ecoregion Community Types

This ecoregion accounts for the smallest area along the proposed transmission route (with the exception of the Aspen Parkland), and consequently represented the smallest sample effort. While the plots from Selwyn Lake Upland were not included in the analysis, each is detailed here for discussion purposes. Three plots were visited within this ecoregion and classified into three community types based on vegetation cover and composition. These plots are presented here under two broad types of vegetation communities that include coniferous forests and wetlands.

There were a total of 38 plant taxa observed within sample plots of the Selwyn Lake Upland Ecoregion. Table 12 shows the community types as well as the total number of species recorded. A full species list of all plant taxa identified including percent cover in the community types can be found in Appendix G. Appendix F shows the plot location for each vegetation community.

Table 12. Three community types of the Selwyn Lake Upland Ecoregion.

Community Types	Plots	Species
Coniferous Forest		
1. Open Black Spruce—Coniferous/ Splendid Feather Moss	1	29
2. Regenerating Jack Pine/ Tall Shrub	1	28
Wetland		
3. Sedge Fen	1	7

Coniferous Forest Community Types

1. Open Black Spruce—Coniferous/ Splendid Feather moss

This plot has an open canopy of black spruce (*Picea mariana*), with an occasional presence of tamarack (*Larix laricina*). Tall shrub cover was moderate (23%), with three species recorded. Black spruce saplings and willows (*Salix* spp.) dominated, while dwarf birch (*Betula pumila*) was also present. Eighteen species were observed in the herb and low shrub stratum. Most prominent were black spruce seedlings and Labrador tea (*Rhododendron groenlandicum*). Also notably present were alpine bearberry (*Arctous alpina*), myrtle-leaved willow (*Salix myrtillifolia*), sedges (*Carex* spp.) and dry-ground cranberry (*Vaccinium vitis-idaea*). Total ground cover by mosses was high (89%), co-dominated by reindeer lichens (*Cladina* spp.), splendid feather moss (*Hylocomium splendens*), and other mosses. Plots were characterized by a moderately low ground litter cover (12%).

2. Regenerating Jack Pine–Coniferous/Tall Shrub

This plot had recently undergone a wildfire. There were no live trees in the canopy. The tall shrub stratum was very dense (79% cover) dominated by jack pine (*Pinus banksiana*), with subdominant green alder (*Alnus viridis*), and a presence of white spruce (*Picea glauca*) saplings and dwarf birch (*Betula pumila*). Twenty-one species were observed in the herb and low shrub stratum, notably white spruce seedlings, alpine bearberry (*Arctous alpina*), snow willow (*Salix vestita*), prickly rose (*Rosa acicularis*), jack pine seedlings, twinflower (*Linnaea borealis*), green alder seedlings and myrtle-leaved willow (*Salix myrtillifolia*). Total ground cover by lichens was low (9%) overall, made up primarily of *Cladonia* species. Ground litter cover was moderately high (52%) overall.

Wetland Community Type

3. Sedge Fen

This wetland plot had no trees or tall shrubs, with very low diversity (six species) noted in the herb and low shrub stratum. Ground herb cover was primarily made up of beaked sedge (*Carex utriculata*), marsh cinquefoil (*Comarum palustre*), and swamp horsetail (*Equisetum fluvatile*). Bog bean (*Menyanthes trifoliata*), northern bog aster (*Symphotrichum boreale*) and other sedges (*Carex* spp.) were also present. Cover by ground mosses was moderate (21%). Ground litter cover was also moderate (30%) across the plot.

Churchill River Upland Ecoregion Community Types

Sixteen plots were visited within this ecoregion, and classified into seven community types based on vegetation cover and composition, detailed below. For clarity, community types are grouped here into three broad types of vegetation communities, coniferous forests, mixed forests, and wetlands.

There were a total of 96 plant taxa noted within the sample plots of the Churchill River Upland Ecoregion, and 6 species observed incidentally, between plots. Table 13 shows the number of plots sampled as well as total cumulative species and mean number of species recorded for each community type. A full species list of all plant taxa identified with mean percent cover in the community types of this ecoregion can be found in Appendix G. Appendix F identifies community types and location of plots in the Churchill River Upland Ecoregion.

Coniferous Forest Community Types

1. Open Black Spruce/ Schreber's Moss

This community type has an open canopy of black spruce (*Picea mariana*), with an occasional presence of white spruce (*Picea glauca*) or white birch (*Betula papyrifera*). Tall shrub cover was very sparse (7%), with eight species recorded, frequently black spruce saplings, or green alder (*Alnus viridis*). Thirty-three species were observed in the herb and low shrub layer, including Labrador tea (*Rhododendron groenlandicum*),

Table 13. Seven community types of the Churchill River Upland Ecoregion.

Community Type	Plots	Total Species	Mean Species
Coniferous Forest			
1. Open Black Spruce/ Schreber's Moss	5	57	20.2
2. Open Jack Pine –Black Spruce/ Splendid Feather Moss	2	36	22.5
3. Sparse Black Spruce/ Labrador Tea	4	51	23.8
Mixed Forest			
4. Open Trembling Aspen Mixed/ Green Reindeer Lichen	1	31	-
Wetland			
5. Treed Black Spruce Bog	2	20	12.5
6. Willow Riparian	1	14	-
7. Sedge Fen	1	13	-

dry-ground cranberry (*Vaccinium vitis-idaea*), black spruce seedlings and common horsetail (*Equisetum arvense*). Total ground cover by mosses was high (74%) in plots overall, dominated by splendid feather moss (*Hylocomium splendens*), with subdominant Schreber's moss (*Pleurozium schreberi*). Plots were characterized by a moderately low ground litter cover (17%).

2. Open Jack Pine–Black Spruce/ Splendid Feather Moss

This community type is characterized by an open canopy cover dominated by jack pine (*Pinus banksiana*), with subdominant black spruce (*Picea mariana*). The tall shrub layer was sparse (12%), made up of green alder (*Alnus viridis*) with a slight presence of black spruce saplings. Twenty-four species were observed in the ground layer vegetation, notably common juniper (*Juniperus communis*), black spruce seedlings, twinflower (*Linnaea borealis*), and one-sided wintergreen (*Orthilla secunda*). Total ground cover by mosses was high (49%) in plots overall, which was dominated by splendid feather moss (*Hylocomium splendens*), with subdominant Schreber's moss (*Pleurozium schreberi*). Ground litter cover was moderately low (24%) in plots overall.

3. Sparse Black Spruce/ Labrador Tea

This community type has a sparse canopy of black spruce (*Picea mariana*), although occasional white birch (*Betula papyrifera*), jack pine (*Pinus banksiana*) or tamarack (*Larix laricina*) may be present. The tall shrub stratum was moderately well-developed and consisted of nine species, notably black spruce saplings, with a presence of willows (*Salix* spp.), dwarf birch (*Betula pumila*) or green alder (*Alnus viridis*). Thirty-one species were recorded in the herb and low shrub stratum, dominated (37%) by Labrador tea (*Rhododendron groenlandicum*), with black spruce seedlings. Also common was dry-ground cranberry (*Vaccinium vitis-idaea*), common horsetail (*Equisetum arvense*) and tall sweet blueberry (*Vaccinium uliginosum*). The ground lichen and moss cover was

moderate (47%) overall, dominated by reindeer lichens (*Cladina* spp.), with peat mosses (*Sphagnum* spp.) subdominant. Ground litter cover values were low overall (12%).

Mixed Forest Community Type

4. Open Trembling Aspen Mixed/ Green Reindeer Lichen

This community type is represented by a single plot with an open canopy of trembling aspen (*Populus tremuloides*) with a presence of white spruce (*Picea glauca*). The tall shrub layer was generally absent, with three extremely sparse species recorded: Canada buffaloberry (*Shepherdia canadensis*), Saskatoon (*Amelanchier alnifolia*) and white spruce saplings. There were 24 species recorded in the herb and low shrub layer, dominated by Canada buffaloberry, bunchberry (*Cornus canadensis*), and tall lungwort (*Mertensia paniculata*). Ground lichens and mosses were generally absent, while litter cover was moderately high (43%).

Wetland Community Types

5. Treed Black Spruce Bog

This community type is characterized by extremely sparse tree and tall shrub cover, with occasional black spruce (*Picea mariana*) trees or saplings present. Eleven species were noted in the herb and low shrub stratum, dominated by leatherleaf (*Chamaedaphne calyculata*), Labrador tea (*Rhododendron groenlandicum*), and sedges (*Carex* spp.). Ground moss cover was high and consisted of mainly (61%) peat mosses (*Sphagnum* spp.), subdominant (20%) green reindeer lichen (*Cladina mitis*), and a presence of Schreber's moss (*Pleurozium schreberi*). Standing water cover was occasionally present but very sparse, and litter cover was very low (7%).

6. Willow Riparian

This community type was represented by a single plot located adjacent to Wapisew Lake and edged by the Missewaitay River. This plot was treeless, although had a well-developed tall shrub layer made up of four species. Tea-leaved willow (*Salix planifolia*) was the dominant tall shrub, with subdominant cover of dwarf birch (*Betula pumila*). The herb and low shrub stratum was made up of leatherleaf (*Chamaedaphne calyculata*), while sedges (*Carex* spp.) and seedlings from the tall shrub layer were sub-dominant. Tall sweet blueberry (*Vaccinium uliginosum*) and grasses were also present. Ground mosses present were unidentified, and ground litter cover was moderate (32%).

7. Sedge Fen

This community type, represented by a single plot, had no trees or tall shrubs. Ground vegetation cover was made up primarily of hair-like sedge (*Carex capillaris*), bog bean (*Menyanthes trifoliata*), dwarf birch (*Betula pumila*) seedlings and bog willow (*Salix pedicellaris*). Ground litter cover was moderately high, as was ground moss cover. There was a sparse presence of standing water across the plot.

Hayes River Upland Ecoregion Community Types

Twenty-seven plots were visited within this ecoregion, and classified into thirteen community type groups based on vegetation cover and composition, detailed below. This ecoregion had the greatest diversity of plots chosen for sampling. Consequently, there are several type groups made up of lone plots. While these lone plot groups do not clearly represent a definitive description of a community type, they are presented here for discussion purposes, as a contribution to the description of this region. The community types are presented here in four broad types of vegetation communities; coniferous forests, mixed forests, deciduous forests and wetland areas.

A total of 140 plant taxa were observed within the sample plots of the Hayes River Upland Ecoregion, including seven incidental species noted between plots. The number of plots sampled, the cumulative total number of species, and the mean number of species recorded in each community type is shown in Table 14. Appendix G provides the species composition and mean percent cover for the community types. Appendix F identifies community types and locations of plots in the Hayes River Upland Ecoregion.

Coniferous Forest Community Types

1. Open Black Spruce/ Labrador Tea/ Schreber's Moss

This community type has an open canopy of black spruce (*Picea mariana*), with a presence of jack pine (*Pinus banksiana*) and tamarack (*Larix laricina*). Tall shrub cover was very sparse (>4%) overall, with two species present, black spruce saplings and green alder (*Alnus viridis*). Twenty-two species were noted in the herb and low shrub stratum, which was dominated by Labrador tea (*Rhododendron groenlandicum*), and included black spruce seedlings, cloud berry (*Rubus chamaemorus*) and dry-ground cranberry (*Vaccinium vitis-idaea*). Total ground cover by mosses was high (85%) in plots overall, dominated by Schreber's moss (*Pleurozium schreberi*), with a presence of splendid feather moss (*Hylocomium splendens*). Lichen and ground litter cover values were low throughout.

2. Open Black Spruce/ Labrador Tea/ Reindeer Lichen

This community type has an open canopy of black spruce (*Picea mariana*) with occasional tamarack (*Larix laricina*). The tall shrub layer was sparse (11%), composed of three shrubs, predominantly black spruce saplings. Twenty-four species were observed in the ground layer vegetation, which was dominated by Labrador tea (*Rhododendron groenlandicum*), with dry-ground cranberry (*Vaccinium vitis-idaea*), black spruce seedlings and cloud berry (*Rubus chamaemorus*). Ground moss and lichen cover was high (69%), composed mainly of mosses and reindeer lichens (*Cladina* spp.), with a presence of peat mosses (*Sphagnum* spp.). Ground litter cover values were low throughout.

3. Sparse Black Spruce/ Reindeer Lichen

This community type has a sparse canopy of black spruce (*Picea mariana*) with a presence of white birch (*Betula papyrifera*), and occasional tamarack (*Larix laricina*) or

Table 14. Thirteen community types of the Hayes River Upland Ecoregion.

Community Types	Plots	Total Species	Mean Species
Coniferous Forest			
1. Open Black Spruce/ Labrador Tea/ Schreber's Moss	3	38	19.0
2. Open Black Spruce/ Labrador Tea/ Reindeer Lichen	2	33	21.0
3. Sparse Black Spruce/ Reindeer Lichen	2	46	35.0
4. Sparse Black Spruce—Jack Pine/ Green Reindeer Lichen	3	24	17.3
5. Open Tamarack—Black Spruce/ Peat Moss	1	33	-
6. Regenerating Open Conifer	3	50	30.0
Mixed Forest			
7. Closed Trembling Aspen Mixed	2	57	33.5
8. Trembling Aspen Mixed/ Green Alder	2	34	24.5
9. Closed White Spruce—Balsam Poplar	1	43	-
10. Treeless Regenerating Jack Pine Mixed	1	28	-
Deciduous Forest			
11. Closed White Birch	1	14	-
Wetland			
12. Graminoid Wetland	2	38	21.5
13. Treed Black Spruce/ Peat Moss Bog	4	41	17.5

trembling aspen (*Populus tremuloides*). The tall shrub stratum was dense (65%), composed of six species, and dominated by black spruce saplings, Canada buffaloberry (*Shepherdia canadensis*) and willows (*Salix* spp.). Twenty-eight species were recorded in the herb and low shrub stratum. While black spruce seedlings were dominant, Labrador tea (*Rhododendron groenlandicum*), Canada buffaloberry and twinflower (*Linnaea borealis*) were also prominent. Other common species included dry-ground cranberry (*Vaccinium vitis-idaea*), prickly rose (*Rosa acicularis*) and willows (*Salix* spp.). Cover of non-vascular species was moderately high (56%) and made up of *Cladonia* lichens (*Cladonia* spp.) with ground mosses. Ground litter cover was low.

4. Sparse Black Spruce—Jack Pine/ Green Reindeer Lichen

This community type had a very sparse tree canopy of scattered black spruce (*Picea mariana*) and jack pine (*Pinus banksiana*). White birch (*Betula papyrifera*) was occasionally present with an extremely low abundance. The very sparse tall shrub layer consisted mainly of scattered black spruce saplings. Cover was also sparse in the herb and low shrub layer. Five species were observed in plots, including velvetleaf blueberry (*Vaccinium myrtilloides*), dry-ground cranberry (*Vaccinium vitis-idaea*), Labrador tea (*Rhododendron groenlandicum*), and black spruce seedlings. Ground moss and lichen cover was well developed, dominated by green reindeer lichen (*Cladina mitis*, 40%), and also included northern reindeer lichen (*Cladina stellaris*, 11%) and Schreber's moss (*Pleurozium schreberi*, 10%). Litter cover was low (8%) throughout the plot.

5. Open Tamarack—Black Spruce/ Peat Moss

This community type was made up of a single plot, with an open canopy of dominant tamarack (*Larix laricina*) and subdominant black spruce (*Picea mariana*). Tall shrub cover was moderate (37%) consisting of six species. Speckled alder (*Alnus incana*) was dominant, with willows (*Salix* spp.), dwarf birch (*Betula pumila*), and tree saplings from the canopy also present. The herb and low shrub stratum consisted of 19 species, dominated by Labrador tea (*Rhododendron groenlandicum*). Speckled alder, dwarf birch, Canada may flower (*Maianthemum canadense*), bog willow (*Salix pedicellaris*), and other willows (*Salix* spp.) were also abundant. Peat moss (*Sphagnum* spp.) was the dominant ground cover (26%), while litter cover was moderately low throughout the plot.

6. Regenerating Open Conifer

This community type is generally characterized by an open canopy of jack pine (*Pinus banksiana*). However, one plot in this group is a regenerating black spruce (*Picea mariana*) forest, post cut, with very sparse regenerating tree cover (8%). Aside from differing tree cover values (open to very sparse), plots are very similar in vegetation composition and structure. The tall shrub layer was moderately well developed with seven species, dominated by black spruce saplings, jack pine saplings and green alder (*Alnus viridis*), with a presence of Bebb's willow (*Salix bebbiana*). Twenty-nine species occurred in the ground vegetation layer, which was dominated by bunchberry (*Cornus canadensis*), fireweed (*Chamerion angustifolium*), prickly rose (*Rosa acicularis*) and velvetleaf blueberry (*Vaccinium myrtilloides*). Ground moss and lichen cover was low throughout plots, primarily composed of Dicranum mosses (*Dicranum* spp.) and Cladonia lichens (*Cladonia* spp.). Litter cover was moderate (44%) overall.

Mixed Forest Community Types

7. Closed Trembling Aspen Mixed

This community type has a closed canopy of trembling aspen (*Populus tremuloides*), with a presence of black spruce (*Picea mariana*). Other tree species present included balsam poplar (*Populus balsamifera*) or jack pine (*Pinus banksiana*). The tall shrub stratum was sparse, with ten species occurring overall, dominated by green alder (*Alnus viridis*), Bebb's willow (*Salix bebbiana*) and low-bush cranberry (*Viburnum edule*). The herb and low shrub stratum was composed of thirty-seven species. Most notable were pink wintergreen (*Pyrola asarifolia*), Canada may flower (*Maianthemum canadense*), prickly rose (*Rosa acicularis*), wood horsetail (*Equisetum sylvaticum*), tall lungwort (*Mertensia paniculata*) and wild sarsaparilla (*Aralia nudicaulis*). Ground mosses and lichens were generally absent. Ground litter cover was 65% in plots overall.

8. Trembling Aspen Mixed/ Green Alder

This community type is made up of two plots, one with an open canopy of trembling aspen (*Populus tremuloides*), with white and black spruces (*Picea glauca* and *P. mariana*, respectively). The other plot is a treeless burned site. Although the tree canopies among plots in this group are quite different, the tall shrub, and the herb and low shrub strata are very similar. Both plots share a dense tall shrub layer of green alder (*Alnus viridis*). The herb and low shrub stratum consisted of eighteen species. Fireweed

(*Chamerion angustifolium*), prickly rose (*Rosa acicularis*), bunchberry (*Cornus canadensis*), trailing dewberry (*Rubus pubescens*) and tall lungwort (*Mertensia paniculata*) all were commonly occurring. In addition, the regenerating plot had trembling aspen saplings and white spruce seedlings present. Ground mosses and lichens were generally absent. Ground litter cover was 38% in plots overall.

9. Closed White Spruce- Balsam Poplar

This community type is represented by a single plot with a closed canopy cover co-dominated by white spruce (*Picea glauca*) and balsam poplar (*Populus balsamifera*). The tall shrub layer was dense (53%) with seven species observed. White spruce saplings were dominant, with Canada buffaloberry (*Shepherdia canadensis*) and balsam poplar saplings as co-subdominants. Thirty species were recorded in the herb and low shrub stratum, most abundantly alpine bearberry (*Arctous alpina*) and common juniper (*Juniperus communis*). Also commonly occurring were prickly rose (*Rosa acicularis*), involucrate honeysuckle (*Lonicera involucrata*), smooth wild strawberry (*Fragaria virginiana*), and Canada buffaloberry. Ground lichen cover was moderate (31%) consisting of foliose lichens, while mosses were generally absent. Litter cover was also moderate throughout the plot.

10. Treeless Regenerating Jack Pine

This community type was made up of a single burned plot with no trees. The tall shrub stratum was composed of six species. Tall shrub cover was sparse, dominated by jack pine (*Pinus banksiana*) saplings, with balsam poplar (*Populus balsamifera*), white birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*) also present as saplings. Twenty species were recorded in the herb and low shrub stratum. Most abundant were prickly rose (*Rosa acicularis*), jack pine seedlings, fireweed (*Chamerion angustifolium*), white birch seedlings and willows (*Salix* spp.). Ground mosses were primarily wire mosses (*Pohlia* spp.), and ground litter cover was low.

Deciduous Forest Community Type

11. Closed White Birch

This community type is represented by a single plot with a closed canopy of white birch (*Betula papyrifera*); no other tree species were present. The tall shrub canopy was sparse with four species present, dominated by raspberry (*Rubus idaeus*). Other tall shrubs present were prickly rose (*Rosa acicularis*), nannyberry (*Viburnum lentago*) and white birch saplings. The herb and low shrub stratum was dense, and composed of eight species, dominated by both common horsetail (*Equisetum arvense*) and raspberry. Moss and lichen cover was generally absent, and litter cover was moderate throughout the plot.

Wetland Community Types

12. Graminoid Wetland

This community type is made up of two plots, which are loosely affiliated, one a riparian plot, the other a graminoid fen. Both plots were treeless except for an occasional and rare

tamarack (*Larix laricina*) individual. Tall shrubs were similarly absent, although rare tamarack saplings and dwarf birch (*Betula pumila*) individuals were occasionally present. Thirty-three species were noted in the herb and low shrub stratum, generally dominated by graminoids, e.g., reed grasses (*Calamagrostis* spp.), woolly sedge (*Carex pellita*), awned sedge (*Carex atherodes*), and prostrate sedge (*Carex chordorrhiza*). Plots had a moderate cover of ground mosses (17%), while standing water accounted for an average of 50% ground cover overall.

13. Very Sparsely Treed Black Spruce/ Peat Moss Bog

This community type was characterized by absent to extremely sparse tree, and tall shrub strata. Tree stratum cover (4%) consisted of black spruce (*Picea mariana*) with a presence of tamarack (*Larix laricina*). The very sparse (4%) tall shrub stratum was made up of tree saplings from the canopy. Twenty-eight species were observed in the herb and low shrub stratum. Most abundant were sedges (*Carex* spp.), Labrador tea (*Rhododendron groenlandicum*), bog bean (*Menyanthes trifoliata*), pale laurel (*Kalmia polifolia*), and leatherleaf (*Chamaedaphne calyculata*). The ground moss cover (79%) was predominantly peat mosses (*Sphagnum* spp.). Plots had a low ground litter cover overall, and standing water occurred occasionally.

Mid-Boreal Lowland Ecoregion Community Types

Twenty plots were visited within this ecoregion, and classified into nine community types based on vegetation cover and composition, detailed below. Community types are grouped here into three broad types of vegetation communities including coniferous forests, mixed forests and wetland areas.

There were a total of 146 plant taxa noted within the sample plots of the Mid-Boreal Lowland Ecoregion, and 13 incidental species observed between plots. Table 15 shows the number of plots sampled from each community type, as well as total cumulative species count and mean number of species recorded for each community type. A full species list of all plant taxa identified with mean percent cover by community type for this ecoregion can be found in Appendix G. Appendix F identifies community types and location of plots in the Mid-Boreal Lowland Ecoregion.

Coniferous Forest Community Type

1. Jack Pine/Green Reindeer Lichen

This community type has a sparse to open canopy of jack pine (*Pinus banksiana*). Presence of any other species in the tree canopy was sparse, occasionally including white birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*), black spruce (*Picea mariana*) or Bebb's willow (*Salix bebbiana*). Tall shrub cover values were low (>4%) overall, with eight species present. Shrub cover consisted mainly of tree species, white birch (*Betula papyrifera*), and spruce saplings, as well as Canada buffaloberry (*Shepherdia canadensis*). Thirty-five species were noted in the herb and low shrub layer, including prickly rose (*Rosa acicularis*), bearberry (*Arctostaphylos uva-ursi*), shrubby cinquefoil (*Dasiphora fruticosa*), Indian hemp (*Apocynum cannabinum*) and boreal wild

Table 15. Nine community types of the Mid-Boreal Lowland Ecoregion.

Community Type	Plots	Total Species	Mean Species
Coniferous Forest			
1. Jack Pine/ Green Reindeer Lichen	3	48	27
2. Regenerating Jack Pine	2	45	32
3. Black Spruce-Tamarack/Labrador Tea-Common Horsetail/Feathermoss	1	24	-
4. Black Spruce/Splendid Feathermoss	1	21	-
5. Tamarack/Speckled Alder/Peat Moss	1	31	-
Mixed Forest			
6. Jack Pine-White Spruce-Trembling Aspen/Common Juniper/Feathermoss	3	59	33
Wetland			
7. Wet Sedge Meadow	3	33	14
8. Treed Black Spruce-Tamarack/Peat Moss Bog	2	25	18
9. Sparse Black Spruce/Labrador Tea/Peat Moss-Feathermoss	4	61	31

rye (*Leymus innovatus*). Total ground cover by lichens and mosses was moderately high (27%) in plots overall, although green reindeer lichen (*Cladina mitis*) was dominant. Plots were characterized by a high ground litter cover (69%).

2. Regenerating Jack Pine

This community type has an open to closed canopy of jack pine (*Pinus banksiana*), with a presence of trembling aspen (*Populus tremuloides*). The tall shrub layer was sparse, composed of six shrub species including green alder (*Alnus viridis*) and Bebb's willow (*Salix bebbiana*), but was dominated by saplings of jack pine and trembling aspen. Thirty-seven species were observed in the ground layer vegetation, most notably prickly rose (*Rosa acicularis*), bunchberry (*Cornus canadensis*), fireweed (*Charmerion angustifolium*), black spruce seedlings, and trailing dewberry (*Rubus pubescens*). Plots were characterized by a low cover of ground mosses and lichens (2%), as well as an extremely high litter cover (92%).

3. Black Spruce-Tamarack/Labrador Tea-Common Horsetail/Feathermoss

This community type is represented by a single plot. It has an open canopy of black spruce (*Picea mariana*), with a subdominant cover of tamarack (*Larix laricina*). The shrub layer was poorly developed, and dominated by black spruce saplings, with sparse, scattered speckled alder (*Alnus incana*). Twenty species occurred in the ground vegetation, which was dominated by Labrador tea (*Rhododendron groenlandicum*) and common horsetail (*Equisetum arvense*), and included speckled alder, black spruce seedlings, and blue fly honeysuckle (*Lonicera villosa*). Ground moss cover was very high (82%), primarily composed of Schreber's moss (*Pleurogium schreberi*), with

subdominant cover of splendid feathermoss (*Hylocomium splendens*). Litter cover was very low (3%), while standing water occurred with 12% cover overall.

4. Black Spruce/Splendid Feathermoss

This community type is represented by a single plot. It has an open canopy of black spruce (*Picea mariana*) with a presence of jack pine (*Pinus banksiana*). The sparse shrub layer consisted of scattered black spruce saplings. Cover was also very sparse in the ground vegetation layer. Eighteen species were observed, including common juniper (*Juniperus communis*), twinflower (*Linnaea boreale*), northern bedstraw (*Gallium boreale*), prickly rose (*Rosa acicularis*), and black spruce seedlings. The ground moss cover was extremely high (93%), and composed almost entirely of splendid feathermoss (*Hylocomium splendens*). There was very low litter cover (5%) throughout the plot.

5. Tamarack/Speckled Alder/Peat Moss

This community type is represented by a single plot, characterized by open tree canopy of dominant tamarack (*Larix laricina*), with a presence of black spruce (*Picea mariana*). The moderately developed shrub layer was made up of speckled alder (*Alnus incana*) with white birch (*Betula papyrifera*). The ground cover was a mix of 27 species including two-seeded sedge (*Carex disperma*), twinflower (*Linnaea boreale*), violets (*Viola* spp.), common horsetail (*Equisetum arvense*), and speckled alder seedlings. Sphagnum moss accounted for 40% of the ground cover, and litter cover was also moderate.

Mixed Forest Community Type

6. Jack Pine-White Spruce-Trembling Aspen/Common Juniper/Feathermoss

This community type is characterized by a sparse to open canopy cover dominated by jack pine (*Pinus banksiana*) or white spruce (*Picea glauca*). Trembling aspen (*Populus tremuloides*) was subdominant, while black spruce (*Picea mariana*) was also present. The tall shrub layer had sparse cover (>7%) with eight species observed, commonly including saplings of black and white spruces (*Picea mariana* and *P. glauca*), as well as common juniper (*Juniperus communis*). Forty-seven species were observed in the ground layer vegetation, notably, common juniper (*Juniperus communis*), bearberry (*Arctostaphylos uva-ursi*), prickly rose (*Rosa acicularis*), twinflower (*Linnaea boreale*), spruce seedlings and smooth wild strawberry (*Fragaria virginiana*). The non-vascular ground layer was well developed (51% of ground cover) and made up primarily of Schreber's moss (*Pleurozium schreberi*, 28%), with subdominant green reindeer lichen (*Cladonia mitis*, 13%). Ground litter cover was also high (45%) in plots overall.

Wetland Community Type

7. Wet Sedge Meadow

The plots of this community type are treeless, with no tall shrubs. Thirty-three species were noted in the ground cover. The vegetation was dominated by sedges, particularly woolly sedge (*Carex pellita*), water sedge (*Carex aquatilis*), as well as Canada reed grass (*Calamagrostis canadensis*). Dominant forbs included flat-leaved bladderwort (*Utricularia intermedia*), bog bean (*Menyanthes trifoliata*) and swamp horsetail

(*Equisetum fluviatile*). Plots had a moderate cover of ground mosses (17%), while standing water accounted for an average of 50% ground cover overall.

8. Very Sparse Black Spruce-Tamarack/Peat Moss Bog

This community type is characterized by very sparse tree canopy (3%) of black spruce (*Picea mariana*) and tamarack (*Larix laricina*). Tall shrub cover, also sparse (3%), consisted of dwarf birch (*Betula pumila*) as well as tree saplings from the canopy. Twenty species were observed in the ground vegetation, which was commonly made up of seedlings from the shrub and tree canopy, and included forbs, three-leaved Solomon's seal (*Maianthemum trifolium*) and marsh cinquefoil (*Comarum palustre*), as well as sheathed sedge (*Carex vaginata*), and northern bog sedge (*C. gynocrates*). Ground moss cover was high (67%), dominated by peat mosses (*Sphagnum* spp). Plots within this community type had low cover values for standing water and litter.

9. Sparse Black Spruce/Labrador Tea/Peat Moss-Feathermoss

The tree canopy in this community type was sparse (<10%) made up of black spruce (*Picea mariana*), with a presence of tamarack (*Larix laricina*). The shrub layer was also sparse (10%), dominated by black spruce saplings, with a presence of flat-leaved willow (*Salix planifolia*). Ground vegetation was dominated by Labrador tea (*Rhododendron groenlandicum*), dry-ground cranberry (*Vaccinium vitis-idaea*), black spruce seedlings, and three-leaved Solomon's seal (*Maianthemum trifolium*). Non-vascular plant cover was very high, dominated by mosses (75%), including peat moss (*Sphagnum* spp.) and Schreber's moss (*Pleurozium schreberi*). Lichen cover was dominated by grey reindeer lichen (*Cladina rangiferina*), which accounted for 15% of the ground cover overall. Plots within this community type had almost no standing water, and low litter cover.

Interlake Plain Ecoregion Community Types

Twenty plots were visited within this ecoregion, and classified into four community types based on vegetation cover and composition. Community types are grouped into three broad types of forested communities including coniferous, mixed and deciduous. A single plot was visited from a fourth vegetation community, wetlands. This plot is included for discussion, although it was not included in the analysis.

There were a total of 128 plant taxa noted within the sample plots of the Interlake Plain Ecoregion, and 78 incidental species observed between plots. Table 16 shows the number of plots sampled from each community type, as well as total cumulative species count and mean number of species recorded for each community type. A full species list of all plant taxa identified including mean percent cover by community type for this ecoregion can be found in Appendix G. Community types and location of plots in the Interlake Plain Ecoregion are shown in Appendix F.

Table 16. Five community types of the Interlake Plain Ecoregion.

Community Types	Plots	Total Species	Mean Species
Coniferous Forest			
1. Closed Black Spruce-Coniferous	6	88	28.7
Mixed Forest			
2. Open Trembling Aspen-Mixed /Tall Shrub	5	96	46.4
3. Closed Deciduous-Mixed	5	81	33.2
Deciduous Forest			
4. Closed Deciduous/Tall Shrub	3	60	28.7
Wetland Type			
5. Salt Marsh	1	10	-

Coniferous Forest Community Type

1. Closed Black Spruce Coniferous

This community type has a closed canopy of black spruce (*Picea mariana*), with a presence of tamarack (*Larix laricina*), trembling aspen (*Populus tremuloides*) or jack pine (*Pinus banksiana*). A sparse subdominant canopy of speckled alder (*Alnus incana*) and willows (*Salix* spp.) was also present. Tall shrub cover values were moderate (18%) overall, with 17 species present. Shrub cover consisted mainly of shrubby cinquefoil (*Dasiphora fruticosa*), saplings of the dominant tree canopy species, as well as Canada buffaloberry (*Shepherdia canadensis*). Fifty-six species were noted in the herb and low shrub stratum, including Labrador tea (*Rhododendron groenlandicum*), twinflower (*Linnaea boreale*), sedges (*Carex* spp.), shrubby cinquefoil, and bunchberry (*Cornus canadensis*). Total ground cover by mosses was high (66%) in plots overall, the dominants were Schreber's moss (*Pleurozium schreberi*) and splendid feathermoss (*Hylocomium splendens*). Lichen cover was low (4%), dominated by reindeer lichens (*Cladina* spp.). Plots were characterized by a low moderate ground litter cover (16%).

Mixed Forest Community Type

2. Open Trembling Aspen-Mixed/Tall Shrub

This community type is characterized by an open canopy cover dominated by trembling aspen (*Populus tremuloides*), with subdominant cover of white spruce (*Picea glauca*). Willows (*Salix* spp.), white birch (*Betula papyrifera*) or balsam poplar (*Populus balsamifera*) were also present occasionally. The tall shrub layer had a dense cover (76%) with 20 species observed, dominated by beaked hazelnut (*Corylus cornuta*), but also including Saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*), downy arrowwood (*Viburnum rafinesquianum*), and shrubby cinquefoil (*Dasiphora fruticosa*). Seventy species were observed in the ground layer vegetation overall, including beaked hazelnut, bunchberry (*Cornus canadensis*), trailing dewberry (*Rubus pubescens*), smooth wild strawberry (*Fragaria virginiana*), prickly rose (*Rosa acicularis*)

and sedges (*Carex* spp.). Ground litter cover was also high (48%) in plots overall. Ground moss cover was extremely sparse, and no lichen species were recorded.

3. Closed Deciduous-Mixed

This community type has a closed canopy co-dominated by balsam poplar (*Populus balsamifera*), white spruce (*Picea glauca*), white birch (*Betula papyrifera*) and trembling aspen (*Populus tremuloides*), with subdominant black spruce (*Picea mariana*). There was an occasional presence of jack pine (*Pinus banksiana*), balsam fir (*Abies balsamifera*) or tamarack (*Larix laricina*), while speckled alder (*Alnus incana*) and willows (*Salix* spp.) often grew into the tree stratum. The tall shrub layer consisted of 13 species, most commonly red-osier dogwood (*Cornus sericea*), speckled alder, and prickly rose (*Rosa acicularis*). Fifty-two taxa were recorded in the herb and low shrub stratum. Dominant species were trailing dewberry (*Rubus pubescens*), sedges (*Carex* spp.), wild sarsaparilla (*Aralia nudicaulis*), prickly rose (*Rosa acicularis*), twinflower (*Linnaea boreale*), bunchberry (*Cornus canadensis*) and bearberry (*Arctostaphylos uva-ursi*). Ground moss cover was low, dominated by Schreber's moss (*Pleurozium schreberi*) and splendid feathermoss (*Hylocomium splendens*). Litter cover in plots was moderately high (56%) overall.

Deciduous Forest Community Type

4. Closed Deciduous/Tall Shrub

This community type is characterized by a closed canopy of trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), and willows (*Salix* spp.). Manitoba maple (*Acer negundo*) or chokecherry (*Prunus virginiana*) is occasionally present. Tall shrub cover is moderate (38%), dominated by raspberry (*Rubus idaeus*), with other notable shrubs including prickly rose (*Rosa acicularis*), trembling aspen saplings, willows, and red-osier dogwood (*Cornus sericea*). There were 42 taxa recorded in the herb and low shrub stratum, dominated by raspberry. Grasses and sedges were prominent, as well as Canada anemone (*Anemone canadensis*) and prickly rose. Ground moss and lichen cover was generally absent. Standing water occurred in some plots, while litter cover was moderately high overall.

Wetland Community Type

5. Salt marsh

One single plot was visited in this category, and presented here as an example of a wetland of this ecoregion. This wetland plot is treeless, with no tall shrubs. Ten species were noted in the ground cover. The vegetation was dominated by arctic rush (*Juncus arcticus*), with common spike-rush (*Eleocharis palustris*), reed grasses (*Calamagrostis* spp.) and northern waterhorehound (*Lycopus uniflorus*) also prominent. Ground litter cover was 50%, while standing water accounted for an average of 28% ground cover over the plot area.

Lake Manitoba Plain Ecoregion Community Types

Twenty-three sites were sampled in the Lake Manitoba Plain to assess the vegetation with seven community types being identified. The communities described here are grouped broadly by vegetation type, including deciduous forests, grasslands, and wetland areas.

There were a total of 157 plant taxa noted within the sample plots of the Lake Manitoba Plain Ecoregion and 116 incidental species observed between plots. The number of sample plots, the total cumulative number of species and the mean number of species recorded in each community type is shown in Table 17. Appendix G provides the species composition and mean percent cover for the community types. Appendix F shows the community types and locations of the 23 plots in the Lake Manitoba Plain Ecoregion.

Table 17. Seven community types of the Lake Manitoba Plain Ecoregion.

Community Type	Plots	Total Species	Mean Species
Deciduous Forest			
1. Sparse Trembling Aspen-Balsam Poplar	3	78	41.7
2. Closed Trembling Aspen/Bluegrass	3	55	28.7
3. Open Trembling Aspen-Bur Oak/Tall Shrub	2	36	27.0
4. Closed Bur Oak	2	42	29.5
Grassland			
5. Mixed Grass	6	89	25.5
Wetland			
6. Sedge Wetland	5	37	10.4
7. Cattail or Reed Canary Wetland	2	11	6.5

Deciduous Forest Community Types

1. Sparse Trembling Aspen-Balsam Poplar

This community type has a sparse canopy dominated by trembling aspen (*Populus tremuloides*) with subdominant balsam poplar (*Populus balsamifera*). The tall shrub layer is moderately developed, and diverse (12 species), dominated by trembling aspen and birch (*Betula* sp.) saplings. Other notable tall shrubs are green alder (*Alnus viridis*) high-bush cranberry (*Viburnum opulus*) and willows (*Salix* spp.). There were 63 species recorded in the herb and low shrub layer, which was dominated by trailing dewberry (*Rubus pubescens*), red-osier dogwood (*Cornus sericea*), bluegrasses (*Poa* spp.) and smooth wild strawberry (*Fragaria virginiana*). Ground litter cover was high in plots.

2. Closed Trembling Aspen/Bluegrass

This community type has a closed canopy dominated by trembling aspen (*Populus tremuloides*). Six shrub species were present in the tall shrub stratum. Shrub cover values

were low overall, with Saskatoon (*Amelanchier alnifolia*) dominating. There were 46 species noted in the herb and low shrub stratum (< 1m). The graminoid cover was pronounced, dominated by bluegrasses (*Poa* spp.) and sedges (*Carex* spp.). Other notable species include woody species Saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*) western snowberry (*Symphoricarpos occidentalis*) and prickly rose (*Rosa acicularis*). Litter cover was high, with occasional standing water in plots. Sites of this community type are either previously or currently grazed by cattle, or ungrazed.

3. Open Trembling Aspen-Bur Oak/Tall Shrub

This community has an open canopy of mature trembling aspen (*Populus tremuloides*), with Bur oak (*Quercus macrocarpa*) as a sub-dominant species. The tall shrub stratum was dense and consisted of six species. Cover was dominated by American hazelnut (*Corylus americana*) and Saskatoon (*Amelanchier alnifolia*), along with high-bush cranberry (*Viburnum opulus*). Twenty-seven species were noted in the herb and low shrub stratum. Wild sarsaparilla (*Aralia nudicaulis*) was the principle forb in the understory, along with trailing dewberry (*Rubus pubescens*) and Canada may flower (*Maianthemum canadense*). The understory was also made up of numerous woody species from the shrub canopy including Saskatoon, American hazelnut and raspberry (*Rubus idaeus*). Litter cover was moderately high.

4. Closed Bur Oak

This community type has a closed canopy consisting of five tree species. The dominant species is bur oak (*Quercus macrocarpus*), with a presence of Manitoba maple (*Acer negundo*), Saskatoon (*Amelanchier alnifolia*) and trembling aspen (*Populus tremuloides*). The tall shrub stratum was prominent and consisted of nine woody species dominated by American hazelnut (*Corylus americana*), with subdominant cover of high-bush cranberry (*Viburnum opulus*) and chokecherry (*Prunus virginiana*). Saskatoon and low-bush cranberry (*Viburnum edule*) were also present. The understory consisted of 30 species and was dominated by wild sarsaparilla (*Aralia nudicaulis*), sedges (*Carex* spp.) and baneberry (*Actaea rubra*). Other common forbs include trailing dewberry (*Rubus pubescens*), Canada may flower (*Maianthemum canadensis*), and poison ivy (*Toxicodendron rydbergii*). Ground litter cover was moderately high.

Grassland Community Type

5. Mixed Grass

This community type is characterized by virtually no tree cover, although there were a few bur oak (*Quercus macrocarpus*) individuals in one plot only. The tall shrub layer was extremely sparse, and consisted of five species, most commonly wolf-willow (*Elaeagnus commutata*), Bebb's willow (*Salix bebbiana*) or trembling aspen (*Populus tremuloides*). The herb and low shrub layer was diverse, with 81 species recorded in plots overall. Graminoids dominated with a total of 20 grass species overall, most commonly big bluestem (*Andropogon gerardii*), bluegrasses (*Poa* spp.), sedges (*Carex* spp.) and blue grama grass (*Bouteloua gracilis*). Within the diversity of forbs and low shrubs, the most widespread were trembling aspen seedlings, field sow-thistle (*Sonchus arvensis*), yarrow (*Achillea millefolium*), wolf-willow seedlings, smooth wild strawberry

(*Fragaria virginiana*) and northern bedstraw (*Galium boreale*). Ground litter cover was moderately high in plots overall. This community is considered agricultural pastureland, as current or past cattle grazing activity was visible in all plots.

Wetland Community Type

6. Sedge Wetland

This community is characterized by an absence of tree cover, and an absent or extremely sparse tall shrub cover. There were 35 plant taxa recorded in the herb and low shrub layer. Plots were dominated by sedges (*Carex* spp.) and arctic rush (*Juncus arcticus*), while subdominants were reed grasses (*Calamagrostis* spp.), soft-stem bulrush (*Schoenoplectus tabernaemontani*) and sandbar willow (*Salix exigua*). The water regime is semi-permanently to seasonally flooded, as standing water covered a high proportion of the ground area (70%).

7. Cattail or Reed Canary Wetland

This community type was represented by two plots, which, while they shared more in common with each other than with any other group of plots, were actually quite distinct. One site was dominated by reed canary grass (*Phalaris arundinaceae*) with extremely low species diversity (three species); the other was a narrow-leaved cattail (*Typha angustifolia*) stand, also with low species diversity (nine species).

This community type is characterized by the absence of all tree and tall shrub cover. Total ground vegetation cover was high, but with low diversity overall (11 species). Standing water covered all plots (100%), with abundant duckweed (*Lemna minor*). Dominant species were either narrow-leaved cattail (*Typha angustifolia*) or reed canarygrass (*Phalaris arundinaceae*), with sedges (*Carex* spp), soft-stem bulrush (*Schoenoplectus tabernaemontani*) and wheatgrasses (*Agropyron* spp.) as subdominants.

7.1.5 Riparian Habitat

The total amount of riparian habitat found along the local study area is approximately 103,463 ha over all eight ecoregions (Table 18). Of this total, the ecoregion with the largest area of riparian habitat is the Hayes River Upland with 29,734 ha. The smallest amount of riparian habitat is found in the Aspen Parkland Ecoregion with only 264 ha. Along the preferred route RoW, only seven of the eight ecoregions have riparian habitat that may be potentially affected with the total area being 957 ha. The Lake Manitoba Plain Ecoregion has the largest area of riparian habitat potentially affected along the RoW with 361 ha; the Selwyn Lake Upland has the smallest amount affected with 1 ha. The proportion of riparian habitat occurring in the RoW compared to the local study area is 2% or less for the ecoregions individually and less than 1% combined.

There are 317 watercourse crossings on the preferred route and although most are predominantly small ephemeral streams, some have also been classified as being moderate and large creeks and rivers (North/South Consultants Inc. 2011).

Table 18. Area and proportion of riparian habitat within the local study area and 66 m right-of-way by ecoregion.

Ecoregion	Area (ha) of Riparian Habitat within Local Study Area	Area (ha) of Riparian Habitat within RoW	Proportion of RoW within Local Study Area
Hudson Bay Lowland	17250.51	46.51	<0.01
Selwyn Lake Upland	1242.85	0.80	<0.01
Churchill River Upland	12471.36	94.58	<0.01
Hayes River Upland	29733.98	211.49	<0.01
Mid-Boreal Lowland	13507.08	90.72	<0.01
Interlake Plain	11395.39	152.01	0.01
Aspen Parkland	263.83	0.00	0.00
Lake Manitoba Plain	17597.67	360.74	0.02
Total	103462.69	956.87	<0.01

A total of sixteen riparian areas were visited in the Bipole III local study area. It should be noted that not all sixteen sites were accessible and therefore several were assessed from the roadside as landowner permission was not provided. The riparian areas assessed were generally composed of hardwoods or areas of mixed hardwoods. Some riparian areas were treeless and consisted dominantly of shrubs while others consisted of herbaceous vegetation abundant in graminoids. Agricultural practices have heavily altered some riparian areas. Generally, treed hardwood riparian areas were more prominent in the southern portion of the preferred route. Riparian areas were visited in the Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland, Interlake Plain and Lake Manitoba Plain Ecoregions.

Churchill River Upland Ecoregion Riparian Area

In the Churchill River Upland Ecoregion, a shrub riparian area along the Misewaitay River was assessed adjacent to Wapisu Lake (650691 E 6242342). The tall shrub stratum was prominent and consisted mainly of willows (*Salix* spp.) and dwarf birch (*Betula pumila*). Leatherleaf (*Chamaedaphne calyculata*) and flat-leaved willow (*Salix planifolia*) dominated the low shrub layer. Sedges and grasses were the principle herbs species. This riparian area was surrounded by a stand of black spruce (*Picea mariana*) and white spruce (*Picea glauca*).

Hayes River Upland Ecoregion Riparian Area

The riparian area along an unnamed tributary of Wintering Lake visited in the Hayes River Upland Ecoregion (562125 E 6132846 N) was characterized by graminoid species. Northern reed grass (*Calamagrostis stricta*), awned sedge (*Carex atherodes*) and boreal mannagrass (*Glyceria borealis*) were prominent species. The most common forbs were marsh cinquefoil (*Comarum palustre*) and wild calla (*Calla palustris*). This site was approximately 30 m wide and was bordered by a black spruce (*Picea mariana*) forest.

Mid-Boreal Lowland Ecoregion Riparian Area

A graminoid riparian area was assessed at Frog Creek in the Mid-Boreal Lowland Ecoregion (399767 E 6003652 N). The site occupied a gentle sloping (1%) 30 m flood plain on either side consisting of mainly of water sedge (*Carex aquatilis*) and Canada reed grass (*Calamagrostis canadensis*). Swamp horsetail (*Equisetum fluviatile*) was persistent in the area and common cattail (*Typha latifolia*) was abundant near the waters edge. The graminoid flood plain transitioned into a narrow riparian hardwood forest dominated by balsam poplar (*Populus balsamifera*). Common shrubs and herbs included speckled alder (*Alnus incana*), red osier dogwood (*Cornus sericea*), Bebb's willow (*Salix bebbiana*), raspberry (*Rubus idaeus*), swamp red currant (*Ribes triste*), marsh skullcap (*Scutellaria galericulata*), fringed loosestrife (*Lysimachia ciliata*) and Canada anemone (*Anemone canadensis*).

Interlake Plain Ecoregion Riparian Areas

Three riparian areas were assessed in the Interlake Plain Ecoregion. These areas all have a tree canopy composed of mixed hardwoods. In the northern portion of the ecoregion, a riparian area along the North Duck River located at 397903 E 5761869 N was visited and assessed from the roadside due to no landowner permission. Balsam poplar (*Populus balsamifera*), trembling aspen (*Populus tremuloides*), bur oak (*Quercus macrocarpa*) and green ash (*Fraxinus pensylvanica*) all occurred in the canopy. The herb and low shrub stratum was dominated by Canada thistle (*Cirsium arvense*), while other species included raspberry (*Rubus idaeus*), lesser burdock (*Arctium minus*), Canada anemone (*Anemone canadensis*), Canada goldenrod (*Solidago canadensis*) and field sow-thistle (*Sonchus arvensis*).

The riparian area of an unnamed tributary of the North Duck River located at 401561 E 5759207 N, contained a tree canopy that consisted of Manitoba maple (*Acer negundo*), trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*) while chokecherry (*Prunus virginiana*), Manitoba maple, raspberry (*Rubus idaeus*) and willows (*Salix* spp.) occupied the tall shrub layer. The understory layer of low shrubs and herbs included speckled alder (*Alnus incana*), and high cover of raspberry and Canada anemone (*Anemone canadensis*). Other herbs were sweet-scented bedstraw (*Galium triflorum*), common hop (*Humulus lupulus*), common grape-fern (*Botrychium virginianum*), quackgrass (*Elytrigia repens*), common horsetail (*Equisetum arvense*), northern starwort

(*Stellaria calycantha*), giant hyssop (*Agastache foeniculum*), hairy meadowrue (*Thalictrum dasycarpum*), and Canada thistle (*Cirsium arvense*).

Another riparian site (434769 E 5718100 N) consisted of a narrow forest about 20 m wide bounded by a hay field and the Mossey River. The site had a very steep bank down to the waters edge (5%). Vegetation in the tree canopy included Manitoba maple (*Acer negundo*), green ash (*Fraxinus pensylvanica*), trembling aspen (*Populus tremuloides*) and bur oak (*Quercus macrocarpa*). Speckled alder (*Alnus incana*), Saskatoon (*Amelanchier alnifolia*), low-bush cranberry (*Viburnum edule*) and raspberry (*Rubus idaeus*) were observed in the tall shrub layer. The low shrub and herb stratum supported prickly rose (*Rosa acicularis*), wild peavine (*Lathyrus venosus*), Lindley's aster (*Symphotrichum ciliolatum*), Canada anemone (*Anemone canadensis*), palmate-leaved coltsfoot (*Petasites frigidus* var. *palmatus*), wild sarsaparilla (*Aralia nudicaulis*), Canadian milkvetch (*Astragalus canadensis*), hairy meadowrue (*Thalictrum dasycarpum*), Philadelphia fleabane (*Erigeron philadelphicus*), common reed (*Phragmites australis*) and Canada reed grass (*Calamagrostis canadensis*). Several non-native species were present and likely introduced to the riparian area from nearby agricultural activity. These species included Canada thistle (*Cirsium arvense*), field sow-thistle (*Sonchus arvensis*), alfalfa (*Medicago sativa*) and fringed brome (*Bromus ciliatus*).

Lake Manitoba Plain Ecoregion Riparian Areas

In the Lake Manitoba Plain Ecoregion, riparian vegetation commonly included tree species such as bur oak (*Quercus macrocarpa*), cottonwood (*Populus deltoides*), balsam poplar (*Populus balsamifera*), Manitoba maple (*Acer negundo*), green ash (*Fraxinus pensylvanica*) and willows (*Salix* spp.).

Approximately 1 km south of Highway 16, a watercourse was assessed roadside from two locations along the Whitemud River (521510 E 5555822 N and 521448 E 5555969 N). The vegetation was composed of a bur oak (*Quercus macrocarpa*) and green ash (*Fraxinus pensylvanica*) overstory with a well-developed forb and graminoid understory approaching the waters edge. Approximately 6 km south of the Trans Canada Highway, a mile road provided access to assess the Bagot Creek located at 529929 E 5529144 N. The riparian area consisted of mixed hardwoods of balsam poplar (*Populus balsamifera*), bur oak, Manitoba maple (*Acer negundo*), cottonwood (*Populus deltoides*) and trembling aspen (*Populus tremuloides*). The shrub layer included American hazelnut (*Corylus americana*), red-osier dogwood (*Cornus sericea*), high-bush cranberry (*Viburnum opulus*) and a ground layer of cream-coloured vetchling (*Lathyrus ochroleucus*), wild columbine (*Aquilegia canadensis*), smooth brome (*Bromus inermis*), and fowl bluegrass (*Poa palustris*). Common cat-tail (*Typha latifolia*) and Canada reed grass (*Calamagrostis canadensis*) occurred at the waters edge.

Approximately 14 km north of the proposed Assiniboine River crossing, a riparian site located at 529670 E 5526137 N along the Rat Creek was assessed roadside due to no landowner permission. From a distance of greater than 100 m, the trees appeared to consist entirely of hardwoods. Where the preliminary preferred route crossed the

Assiniboine and Red Rivers, riparian vegetation was also assessed from the roadside (no landowner permission). Coordinates for roadside visits included 532050 E 5512333 N (Assiniboine River) and 629700 E 5489448 N (Red River). From a distance (>100 m) the vegetation appeared to consist of mixed hardwoods.

At the riparian area located along the Tourond Creek at 637953 E 5491319 N, south of the City of Winnipeg, vegetation consisted of patches of willow trees and shrubs (*Salix exigua* and *Salix petiolaris*) with open graminoid areas and ground cover composed primarily of lakeshore sedge (*Carex lacustris*). Bur oak (*Quercus macrocarpa*) and trembling aspen (*Populus tremuloides*) were present along the creek, occurring as part of a nearby upland stand. Other vegetation observed included Canada reed grass (*Calamagrostis canadensis*), common cat-tail (*Typha latifolia*), northern bog bedstraw (*Galium labradoricum*), common mare's tail (*Hippuris vulgaris*), tufted loosestrife (*Lysimachia thyrsiflora*), common reed (*Phragmites australis*) and northern arrowhead (*Sagittaria cuneata*).

At the southeastern portion of the preferred route, two riparian areas composed mainly of bur oak (*Quercus macrocarpa*) were assessed from the roadside (661614 E 5525565 N and 635410 E 5488261 N) along the Rat River. In the vicinity of the previous sites, a narrow bur oak riparian area along the Rat River (634219 E 5489109 N) was visited. Green ash (*Fraxinus pennsylvanica*) and American elm (*Ulmus americana*) were other trees species observed at the site. The understory included species such as snowberry (*Symphoricarpos albus*), Wood's rose (*Rosa woodsii*), carrion vine (*Smilax lasioneura*), stinging nettle (*Urtica dioica*), smooth brome (*Bromus inermis*), common hop (*Humulus lupulus*), fringed loosestrife (*Lysimachia ciliata*), Canada violet (*Viola canadensis*), and columbine (*Aquilegia* sp.). Seeded wheat as well as Canada thistle (*Cirsium arvense*) and field sow-thistle (*Sonchus arvensis*) invaded the site from the surrounding cropland. The width of this riparian area was estimated to be approximately 30 to 50 m wide.

7.1.6 Wetlands

Bogs, fens and marshes were the wetland classes identified from Halsey et al. (1997) along the local study area and preferred route RoW. Data for wetland classes were based on the primary class within the wetland category (Table 19).

The total amount of bog wetlands that occur in the local study area is 36,358 ha. Only six ecoregions (Hudson Bay Lowland, Selwyn Lake Upland, Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland and Interlake Plain) along the local study area intersect the bog wetlands with the Hudson Bay Lowland occupying the largest area at 17,041 ha. Fen wetlands, along the local study area total a larger area than the bog wetlands with 90,135 ha being intersected and six ecoregions (Hudson Bay Lowland, Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland, Interlake Plain and Lake Manitoba Plain) contributing to this total. The Mid-Boreal Lowland Ecoregion occupies the largest area of fen wetlands along the local study area with 50,382 ha.

Table 19. Area and proportion of bog, fen and marsh wetlands within the local study area and 66 m right-of-way by ecoregion.

Ecoregion	Bog Wetland			Fen Wetland			Marsh Wetland		
	Area (ha) within Local Study Area	Area (ha) within RoW	Proportion within RoW compared to Local Study Area	Area (ha) within Local Study Area	Area (ha) within RoW	Proportion within RoW compared to Local Study Area	Area (ha) within Local Study Area	Area (ha) within RoW	Proportion within RoW compared Local Study Area
Hudson Bay Lowland	17041.31	75.76	<0.01	2505.06	0.00	0.00	0.00	0.00	0.00
Selwyn Lake Upland	5.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Churchill River Upland	5263.82	17.88	<0.01	7405.53	110.10	0.01	0.00	0.00	0.00
Hayes River Upland	10603.64	143.16	0.01	19302.59	231.48	0.01	516.13	5.66	0.01
Mid-Boreal Lowland	2758.32	34.41	0.01	50381.96	554.14	0.01	8398.79	114.35	0.01
Interlake Plain	685.52	0.60	<0.01	10316.23	150.14	0.01	295.63	4.98	0.01
Aspen Parkland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lake Manitoba Plain	0.00	0.00	0.00	223.51	0.00	0.00	1996.78	13.12	<0.01
Total	36358.25	271.83	<0.01	90134.92	1045.87	0.01	11207.34	138.12	0.01

Values of wetland classes are based on the primary class within the wetland category.

The third wetland category, the marsh wetlands have the smallest area intersected by the local study area with a total of 11,207 ha. Four ecoregions (Hayes River Upland, Mid-Boreal Lowland, Interlake Plain and Lake Manitoba Plain) contribute to the marsh wetland total with the Mid-Boreal Lowland having the largest area along the local study area with 8,399 ha being intersected. The total area of all wetlands along the local study area is approximately 137,701 ha.

Comparison of the preferred route RoW to the local study area shows smaller areas of bog, fen and marsh wetlands being potentially affected. Approximately, 272 ha of bog wetlands within five ecoregions (Hudson Bay Lowland, Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland and Interlake Plain) are potentially affected by the preferred route. The ecoregion with the largest area of bog wetlands affected by the route is the Hayes River Upland with 143 ha. Of all three wetland categories, the fen wetlands have the largest area affected by the preferred route with approximately 1,046 ha. Four ecoregions contribute to this total, with those being the Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland, and Interlake Plain. Of these four ecoregions, the Mid-Boreal Lowland has the highest area (554 ha) of fen wetlands being potentially affected. The marsh wetlands have the smallest area affected by the route with only a total of 138 ha being intersected over four ecoregions (Hayes River Upland, Mid-Boreal Lowland, Interlake Plain and Lake Manitoba Plain). Of these four ecoregions, the Mid-Boreal Lowland had the highest area of marsh wetlands being affected (114 ha). The proportion of bog, fen and marsh wetlands being affected within the preferred route compared to the local study area is 1% or less in all ecoregions. The total area of all wetlands along the preferred route is approximately 1,456 ha.

The area and proportion of wetland class categories within the local study area and 66 m RoW are included in Appendix H. Ninety-nine wetland class categories were identified along the local study area and 54 along the RoW. The species structure and composition of the wetland communities, observed during the field studies, are described in the community types section of this report (see Section 7.1.4).

7.1.7 Plants and Distribution of Species

Vegetation composition was recorded at 119 plots (see Map 13) and at 54 additional sites (Map 14) along the preliminary preferred route. Appendix F provides the locations for these areas. Additional sites included areas that were non-homogeneous or too overgrazed to establish plots but were assessed for species of concern, unique locations that had the potential to support species of concern, roadside ditches, and areas of interest where roadside assessments were completed to describe the vegetation, but land-owner permission was not provided. Assessments conducted in 2010 did not include botanical information from agricultural crop fields.

A total of 457 plant taxa were observed in the local study area (Appendix I). There were 407 plants identified to the species level while 50 taxa were identified to the genus level including 39 vascular (herbs) and 11 non-vascular plants (mosses and lichens). Vascular plants identified only to the genus level were a result of absent or non-mature floral or

fruiting parts when observed during the field assessment which are used for identification.

All plants were grouped by primitive vasculars (eg. ferns and horsetails), gymnosperms (conifers), angiosperms (flowering plants) and non-vascular plants. Angiosperms were divided into dicotyledons and monocotyledons with this group (angiosperms) of plants representing the greatest number of species. There were 412 angiosperms (290 dicotyledons and 122 monocotyledons), 12 primitive vasculars, seven gymnosperms, and 26 non-vascular plants.

Vascular plants were distributed among 76 families, with the angiosperms representing 69 of these. The aster (Asteraceae) and grass (Poaceae) families were the largest with 54 and 49 plant taxa each, followed by the sedge (Cyperaceae) and rose (Rosaceae) families with 36 and 24 species, respectively. Greater than 20 species were observed in each of the crowfoot (Ranunculaceae), heath (Ericaceae), and pea (Fabaceae) families. The primitive vasculars are distributed among five families including the horsetail (Equisetaceae), club-moss (Lycopodiaceae), adder's tongue (Ophioglossaceae), fern (Pteridaceae) and spikemoss (Selaginellaceae). Species within the gymnosperms were members of the cypress (Cupressaceae) and pine (Pinaceae) families.

Twenty-seven species of the flora observed in the local study area were introduced. These species were members of eight families including the pea (Fabaceae) and grass (Poaceae) families that had the highest amount of introduced plants with eight each. Introduced plants were observed in all ecoregions except for plots sampled in the Selwyn Lake Upland and the Hudson Bay Lowland. Invasive plant species included Canada thistle (*Cirsium arvense*), white sweetclover (*Melilotus alba*), yellow sweetclover (*Melilotus officinalis*), purple loosestrife (*Lythrum salicaria*), and reed canarygrass (*Phalaris arundinacea*).

The flora observed in the local study area was distributed among seven ecoregions (Hudson Bay Lowland, Selwyn Lake Upland, Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland, Interlake Plain and Lake Manitoba Plain). No sampling occurred in the Aspen Parkland Ecoregion as landowner permission was not provided for private lands along this very short portion of the route. The Lake Manitoba Plain had 280 plant taxa recorded. The majority of graminoids and species of the aster family observed were recorded in this ecoregion. Two hundred and ten plant taxa were observed in the Interlake Plain followed by 160 in the Mid-Boreal Lowland, 147 in the Hayes River Upland, and 101 taxa in the Churchill River Upland. Sixty and 38 plant taxa were observed in the Hudson Bay Lowland and Selwyn Lake Upland respectively.

7.1.8 Plant Species of Conservation Concern

A search of the Manitoba Conservation Data Centre records identified species of conservation concern previously known to occur within the local study area and along the preferred route RoW (Table 20). Information was provided as both point and polygon records for plant locations.

Twenty nine records (two point and 27 polygon) were previously known to occur in the local study area and 15 records were previously known to occur along the RoW. Of the plants along the RoW, two records of annual skeletonweed (*Shinnersoseris rostrata*) occurred which is ranked very rare to rare (S1S2). Plants ranked rare (S2) along the RoW included whorled milkweed (*Asclepias verticillata*), Houghton's umbrella-sedge (*Cyperus houghtonii*), Louisiana broom-rape (*Orobanche ludoviciana*), smooth woodsia (*Woodsia glabella*), white-haired panic-grass (*Dichanthelium linearifolium*) and lyre-leaved rock cress (*Arabis lyrata*). Few-flowered meadow-rue (*Thalictrum sparsiflorum*) is ranked rare to uncommon (S2S3), while green needle grass (*Nassella viridula*), yellow stargrass (*Hypoxis hirsuta*), and dog violet (*Viola conspersa*) are ranked as uncommon species (S3). Eleven of the 15 records occurring along the RoW are listed historical by the MBCDC. Map 15 shows the locations for species of conservation concern along the preferred route. No species listed by COSEWIC, SARA or MBESA were known to occur along the route.

In 2010, botanical surveys identified 14 species of conservation concern (26 locations) within the local study area of the preferred route (Table 21). Species ranked as rare (S2) throughout their range included dwarf bilberry (*Vaccinium caespitosum*), hairy prairie-clover (*Dalea villosa*), large enchanter's nightshade (*Circaea lutetiana*), Schweinitz's flatsedge (*Cyperus schweinitzii*), slender-leaved sundew (*Drosera linearis*), timber oatgrass (*Danthonia intermedia*) and western jewelweed (*Impatiens noli-tangere*). American bugseed (*Corispermum americanum*) is ranked as rare to uncommon (S2S3). Five species were ranked uncommon (S3) throughout their range or in the province and included linear-leaved pucoon (*Lithospermum incisum*), lopseed (*Phryma leptostachya*), oblong-leaved sundew (*Drosera anglica*), snow willow (*Salix vestita*), and yellow star grass (*Hypoxis hirsuta*). Lesser wintergreen (*Pyrola minor*) was ranked as uncommon to widespread (S3S4). Map 16 shows the location for these species. Hairy prairie-clover (Photograph 1) is also listed as threatened by COSEWIC and is protected by SARA and MBESA. Hairy prairie-clover is a threatened species that could become endangered in Canada if the factors affecting its vulnerability are not reversed. Hairy prairie-clover was observed at one location (536565 E 5509606 N) in the local study area during the surveys where 12 individuals were counted in a prairie habitat.



Photograph 1. Hairy prairie-clover (*Dalea villosa*).

Table 20. Species of conservation concern previously known along the preferred route.

Species	Common Name	MBCDC Rank	COSEWIC, MBESA and SARA Status	Observation Year	Ecoregion
Species of concern outside RoW in study area (MBCDC point records)					
<i>Draba reptans</i>	Creeping Whitlow-grass	SU	Not listed	2007	Lake Manitoba Plain
<i>Vernonia fasciculata</i> ssp. <i>corymbosa</i>	Western Ironweed	S1	Not listed	2006	Lake Manitoba Plain
Species of concern outside RoW in study area (MBCDC polygon records)					
<i>Arabis lyrata</i>	Lyre-leaved Rock Cress	S2?	Not listed	1953	Interlake Plain
<i>Arethusa bulbosa</i>	Arethusa	S2	Not listed	1951	Interlake Plain
<i>Asclepias verticillata</i>	Whorled Milkweed	S2	Not listed	1958	Lake Manitoba Plain
<i>Astragalus neglectus</i>	Milkvetch	S1	Not listed	1958	Aspen Parkland, Lake Manitoba Plain
<i>Bromus pubescens</i>	Canada Brome Grass	SNA	Not listed	1945	Aspen Parkland, Lake Manitoba Plain
<i>Calopogon tuberosus</i>	Swamp-pink	S2	Not listed	1933	Interlake Plain
<i>Carex garberi</i>	Elk Sedge	S1?	Not listed	1955	Mid-Boreal Lowland
<i>Chamaesyce geyeri</i>	Prostrate Spurge	S1	Not listed	1943	Aspen Parkland, Lake Manitoba Plain
<i>Cyperus houghtonii</i>	Houghton's Umbrella-sedge	S2	Not listed	1944	Lake Manitoba Plain
<i>Dichanthelium linearifolium</i>	White-haired Panic-grass	S2	Not listed	1945	Lake Manitoba Plain
<i>Draba reptans</i>	Creeping Whitlow-grass	SU	Not listed	2007	Lake Manitoba Plain
<i>Galium aparine</i>	Cleavers	SU	Not listed	1986	Mid-Boreal Lowland
<i>Hypoxis hirsuta</i>	Yellow Stargrass	S3	Not listed	1973	Lake Manitoba Plain
<i>Hypoxis hirsuta</i>	Yellow Stargrass	S3	Not listed	1954	Lake Manitoba Plain
<i>Nassella viridula</i>	Green Needle Grass	S3	Not listed	1953	Lake Manitoba Plain
<i>Orobanche ludoviciana</i>	Louisiana Broom-rape	S2	Not listed	1943	Aspen Parkland, Lake Manitoba Plain
<i>Pellaea glabella</i> ssp. <i>occidentalis</i>	Cliff-brake	S2	Not listed	2008	Mid-Boreal Lowland
<i>Platanthera orbiculata</i>	Round-leaved Bog Orchid	S3	Not listed	1953	Mid-Boreal Lowland
<i>Poa arctica</i> ssp. <i>caespitans</i>	Blue-grass	SU	Not listed	1990	Hudson Bay Lowland

Species	Common Name	MBCDC Rank	COSEWIC, MBESA and SARA Status	Observation Year	Ecoregion
<i>Shinnersoseris rostrata</i>	Annual Skeletonweed	S1S2	Not listed	1943	Lake Manitoba Plain
<i>Shinnersoseris rostrata</i>	Annual Skeletonweed	S1S2	Not listed	1943	Aspen Parkland, Lake Manitoba Plain
<i>Thalictrum sparsiflorum</i>	Few-flowered Meadow-rue	S2S3	Not listed	1969	Mid-Boreal Lowland
<i>Vernonia fasciculata</i> ssp. <i>corymbosa</i>	Western Ironweed	S1	Not listed	2006	Lake Manitoba Plain
<i>Viola conspersa</i>	Dog Violet	S3?	Not listed	1922	Lake Manitoba Plain
<i>Viola selkirkii</i>	Long-spurred Violet	S2	Not listed	1950	Mid-Boreal Lowland
<i>Woodsia glabella</i>	Smooth Woodsia	S2	Not listed	1987	Mid-Boreal Lowland
<i>Woodsia glabella</i>	Smooth Woodsia	S2	Not listed	1987	Mid-Boreal Lowland
Species of concern on RoW (MBCDC polygon records)					
<i>Arabis lyrata</i>	Lyre-leaved Rock Cress	S2?	Not listed	1953	Interlake Plain
<i>Asclepias verticillata</i>	Whorled Milkweed	S2	Not listed	1958	Lake Manitoba Plain
<i>Bromus pubescens</i>	Canada Brome Grass	SNA	Not listed	1945	Aspen Parkland, Lake Manitoba Plain
<i>Cyperus houghtonii</i>	Houghton's Umbrella-sedge	S2	Not listed	1944	Lake Manitoba Plain
<i>Dichanthelium linearifolium</i>	White-haired Panic-grass	S2	Not listed	1945	Lake Manitoba Plain
<i>Galium aparine</i>	Cleavers	SU	Not listed	1986	Mid-Boreal Lowland
<i>Hypoxis hirsuta</i>	Yellow Stargrass	S3	Not listed	1954	Lake Manitoba Plain
<i>Nassella viridula</i>	Green Needle Grass	S3	Not listed	1953	Lake Manitoba Plain
<i>Orobanche ludoviciana</i>	Louisiana Broom-rape	S2	Not listed	1943	Lake Manitoba Plain
<i>Shinnersoseris rostrata</i>	Annual Skeletonweed	S1S2	Not listed	1943	Lake Manitoba Plain
<i>Shinnersoseris rostrata</i>	Annual Skeletonweed	S1S2	Not listed	1943	Lake Manitoba Plain
<i>Thalictrum sparsiflorum</i>	Few-flowered Meadow-rue	S2S3	Not listed	1969	Mid-Boreal Lowland
<i>Viola conspersa</i>	Dog Violet	S3?	Not listed	1922	Lake Manitoba Plain
<i>Woodsia glabella</i>	Smooth Woodsia	S2	Not listed	1987	Mid-Boreal Lowland
<i>Woodsia glabella</i>	Smooth Woodsia	S2	Not listed	1987	Mid-Boreal Lowland

Refer to Tables 3, 4, and 5 for the Manitoba Conservation Data Centre (MBCDC) ranking system and the status categories for the Manitoba *Endangered Species Act* (MBESA), Committee On the Status of Endangered Wildlife In Canada (COSEWIC), and the *Species at Risk Act* (SARA). *Easting and northing coordinates for polygon records are based on centroid locations.

Table 21. Species of conservation concern observed in the local study area.

Species	Common Name	MBCDC Rank	COSEWIC ¹ , MBESA ² and SARA ³ Status	Habitat	Ecoregion
<i>Circaea lutetiana</i>	Large Enchanter's Nightshade	S2	Not listed	Manitoba Maple-Trembling Aspen	Lake Manitoba Plain
<i>Circaea lutetiana</i>	Large Enchanter's Nightshade	S2	Not listed	Bur oak/Saskatoon	Lake Manitoba Plain
<i>Corispermum americanum</i>	American Bugseed	S2S3	Not listed	Upland prairie	Lake Manitoba Plain
<i>Cyperus schweinitzii</i>	Schweinitz's flatsedge	S2	Not listed	Upland prairie	Lake Manitoba Plain
<i>Danthonia intermedia</i>	Timber Oatgrass	S2?	Not listed	Balsam Poplar/Red-osier Dogwood	Interlake Plain
<i>Danthonia intermedia</i>	Timber Oatgrass	S2?	Not listed	Black Spruce/Labrador Tea	Interlake Plain
<i>Danthonia intermedia</i>	Timber Oatgrass	S2?	Not listed	Trembling Aspen/shrub	Interlake Plain
<i>Dalea villosa</i>	Hairy Prairie-clover	S2	Threatened ^{1,2,3}	Upland prairie	Lake Manitoba Plain
<i>Drosera anglica</i>	Oblong-leaved Sundew	S3	Not listed	Fen wetland	Mid Boreal Lowland
<i>Drosera anglica</i>	Oblong-leaved Sundew	S3	Not listed	Bog wetland	Hayes River Upland
<i>Drosera linearis</i>	Slender-leaved Sundew	S2	Not listed	Fen wetland	Mid Boreal Lowland
<i>Hypoxis hirsuta</i>	Yellow Star Grass	S3	Not listed	Grazed prairie	Lake Manitoba Plain
<i>Hypoxis hirsuta</i>	Yellow Star Grass	S3	Not listed	Grazed prairie	Lake Manitoba Plain
<i>Impatiens noli-tangere</i>	Western Jewelweed	S2	Not listed	Moist prairie	Lake Manitoba Plain
<i>Lithospermum incisum</i>	Linear-leaved Pucoon	S3	Not listed	Upland prairie	Lake Manitoba Plain
<i>Phryma leptostachya</i>	Lopseed	S3	Not listed	Manitoba Maple-Trembling Aspen	Lake Manitoba Plain
<i>Phryma leptostachya</i>	Lopseed	S3	Not listed	Bur Oak/Saskatoon	Lake Manitoba Plain

Species	Common Name	MBCDC Rank	COSEWIC ¹ , MBESA ² and SARA ³ Status	Habitat	Ecoregion
<i>Pyrola minor</i>	Lesser Wintergreen	S3S4	Not listed	Black Spruce-Tamarack/Labrador Tea	Hudson Bay Lowland
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Black Spruce/feathermoss	Hayes River Upland
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Jack Pine regeneration	Selwyn Lake
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Jack Pine-Black Spruce regeneration	Hudson Bay Lowland
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Black Spruce/feathermoss	Hudson Bay Lowland
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Black Spruce-Tamarack/Labrador Tea	Hudson Bay Lowland
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Jack Pine-Black Spruce/feathermoss	Hudson Bay Lowland
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Black Spruce/lichen	Hudson Bay Lowland
<i>Vaccinium caespitosum</i>	Dwarf Bilberry	S2	Not listed	Jack Pine regeneration	Mid Boreal Lowland

Refer to Tables 3, 4, and 5 for the Manitoba Conservation Data Centre (MBCDC) ranking system and the status categories for the Manitoba *Endangered Species Act* (MBESA), Committee On the Status of Endangered Wildlife In Canada (COSEWIC), and the *Species at Risk Act* (SARA).

Nine species of conservation concern, listed by the MBCDC, were observed along the preferred route RoW (exact locations unknown) during surveys conducted for Swan Lake First Nation (Reeves 2011). These included tall hairy agrimony (*Agrimonia gryposepala*) ranked very rare to rare (S1S2), bloodroot (*Sanguinaria canadensis*), enchanter's nightshade (*Circaea lutetiana* ssp. *canadensis*), showy tick-trefoil (*Desmodium canadense*) and hairy sweet cicely (*Osmorhiza claytonii*) ranked rare (S2), alternate-leaved dogwood (*Cornus alternifolia*), black ash (*Fraxinus nigra*) and lopseed (*Phryma leptostachya*) ranked uncommon (S3), and western false gromwell (*Onosmodium molle* var. *occidentale*) ranked uncommon to possibly in peril (S3SU).

Communities of Conservation Concern

No previously known communities of conservation concern listed by the MBCDC were identified along the preferred route. No communities of concern were identified during the 2010 field assessments.

7.1.9 Aboriginal Traditional Knowledge

Aboriginal Traditional Knowledge is a component of the Project that was assessed in order to understand the importance of certain plant species/communities in the local study area and to minimize the effect on these sites. Aboriginal communities have long histories of living on the land as well as the knowledge, experience and an appreciation for the plants growing in their respective resource areas.

The information contained here is the result of Community Councils and First Nations sharing their knowledge and experiences through interviews and questionnaires conducted through the ATK process. The participating Community Councils are: Barrows, Camperville, Cormorant, Dawson Bay, Duck Bay, Herb Lake, Pikwitonei, Pelican Rapids and Thicket Portage, and the participating First Nations are: Chemawawin, Dakota Plains, Dakota Tipi, Pine Creek and Waywayseecappo. Self-directed ATK studies completed for the Project are discussed below.

During the interviews, participants identified traditional areas where plants have been harvested for many years, berry patches, places where medicinal plants grow and trails traveled to collect plants. Community members in consultation with the interviewers provided information on locations of these areas for use in assessments for the Bipole III Transmission Project. Communities consulted were not asked to share their traditional practices concerning medicinal and other uses of plants.

The traditional harvesting areas that intersect with the Bipole III preferred route or local study area include the following: Labrador tea harvesting (Barrows, Dawson Bay), berry harvesting (Pine Creek), wild grape, plum and choke cherry picking (Dakota Plains), Saskatoon picking (Dakota Plains), mint picking (Barrows), blueberry picking (Camperville, Duck Bay), pin cherry picking (Duck Bay), medicine gathering (Camperville, Cormorant, Duck Bay), cranberry picking (Camperville, Cormorant, Dawson Bay, Dakota Plains), seneca root gathering (Barrows, Camperville, Duck Bay,

Pine Creek), sweet flag/rat root/ginger root harvesting (Cormorant, Dawson Bay, Duck Bay), herb picking (Camperville), cranberry bark harvesting (Dawson Bay), red willow collecting (Dawson Bay), ash tree cutting (Dawson Bay), spruce tree cutting (Duck Bay), diamond willow gathering (Dawson Bay), sage harvesting (Dawson Bay, Dakota Plains, Duck Bay), wood harvesting (Barrows, Pikwitonei), sage-fungus collecting (Dawson Bay), moss berry picking (Pelican Rapids, Dawson Bay), strawberry picking (Dawson Bay), and sweet grass picking (Barrows, Dawson Bay, Duck Bay). Communities have also identified salt flats as places where they gather sweet grass (Barrows, Dawson Bay).

Nineteen locations that are used for traditional plant gathering and berry harvesting are found within the RoW. The plants harvested and gathered are provided for each community including the area of land affected. These include Labrador tea, mint, Seneca root, sweet grass and tamarack harvesting by Barrows (143 ha); blueberry picking and medicine gathering by Camperville (102 ha); cranberry picking by Dawson Bay (2 ha); medicine gathering by Cormorant (41 ha); wild grape, plum, Saskatoon, choke cherry, cranberry and sage harvesting by Dakota Plains (27 ha); berry harvesting by Pine Creek (50 ha); and spruce tree, blueberry, pin cherry, seneca root, sweet grass, ginger root, sage and medicine harvesting by Duck Bay (393 ha). The total area potentially affected along the RoW for traditional plant harvesting and gathering is approximately 758 ha.

Self-Directed Aboriginal Traditional Knowledge Studies

Self directed ATK studies for the Project were completed by Fox Lake Cree Nation (Ross and Fox Lake Cree Nation 2011), Tataskweyak Cree Nation (Tataskweyak Cree Nation 2011), Opaskwayak Cree Nation (Opaskwayak Cree Nation Natural Resource Council 2011), Long Plain First Nation (Daniels et al. 2011), Swan Lake First Nation (Scott 2011), and the Manitoba Metis Federation (MMF) (Manitoba Metis Federation 2011). These studies identified important plant species that are used for subsistence, medicinal and cultural purposes. Some plants were noted as being used historically and are no longer found in resource areas or found in limited supply (Daniels et al. 2011). Wuskwi Sipiik First Nation (Wuskwi Sipiik First Nation 2011) conducted their own ATK interviews and provided maps that included plant gathering areas.

Plants harvested or fruits gathered include the following: cloudberry, Labrador tea and pitcher plant (Fox Lake), bear nuts, frog leaf and mushrooms (MMF), seneca root (Long Plain, MMF, Wuskwi Sipiik), wee-kaa root, grapes, plums and sweet clover (Long Plain), pin cherry (Long Plain, MMF, Wuskwi Sipiik), sweet grass (Fox Lake, MMF, Swan Lake, Wuskwi Sipiik), beaked hazelnut (MMF, Swan Lake) strawberry (Fox Lake, Long Plain, MMF, Wuskwi Sipiik), raspberry, Saskatoon and sage (Fox Lake, Long Plain, MMF, Swan Lake, Wuskwi Sipiik), blueberry (Fox Lake, MMF, Wuskwi Sipiik), moss berry (Fox Lake, MMF), cranberry and gooseberry (Fox Lake, Long Plain, MMF, Swan Lake, Wuskwi Sipiik), choke cherry (Long Plain, MMF, Swan Lake, Wuskwi Sipiik), crocus, wild rose and sand cherry (Long Plain, Swan Lake), nana/nanny berry (Long Plain, MMF, Swan Lake), common burdock, lamb's-quarters, bunchberry, hawthorn, wolf willow, ostrich fern, ground cherry, smooth sumac, wild black currant, dewberry, buffaloberry, marsh hedge-nettle, common dandelion, red clover, stinging

nettle, violets, giant hyssop, wild sarsaparilla, red-osier dogwood, common horsetail, sweet-scented bedstraw, cow-parsnip, alumroot, hops, spotted touch-me-not, creeping juniper, hoary puccoon, narrow-leaved puccoon, wild mint, wild bergamot, yellow evening-primrose, sweet cicely, colt's-foot, cinquefoil, black snakeroot, carrion flower and late goldenrod (Swan Lake), cloud berry, crowberry, bearberry, cow-parsnip, herbs, weegus, wild ginger, grand berry tree, cedar, willows, maple sap, potatoes, and ceremonial, medicinal and traditional plants (Wuskwi Sipihk), wild vegetables, rubarb and crab-apple (Long Plain), wild flowers including tiger lilies, lady slippers, ferns and cedar (Long Plain), trees including black poplar, pine, silverleaf as well as tree bark (Long Plain), birch (Long Plain, Opaskwayak, Wuskwi Sipihk), black ash and bur oak (Swan Lake), cottonwood, Manitoba maple and trembling aspen (Long Plain, Swan Lake), elderberry, blackberry, fiddle heads, horse radish, wild tea, weeka root, balsam bark, fuel wood and black poplar buds (MMF), red willow (Long Plain, MMF), and medicinal plants and berries (Tataskweyak).

Although no area calculations were determined for traditional plant harvesting and gathering locations along the Row, general harvesting and gathering locations were identified in the self-directed studies. A review of the studies completed, identified that traditional use areas for Fox Lake Cree Nation, Tataskweyak Cree Nation, Opaskwayak Cree Nation, Wuskwi Sipihk, Long Plain First Nation, Swan Lake First Nation, and the MMF may potentially be affected by the Project.

Table 22 below, lists the plant species used by the Communities and First Nations mentioned above. More than 80 plant species that have traditional value, not including the various unknown species, were noted in being used. During plant surveys conducted for Swan Lake First Nation, approximately 95% of the greater than 200 species identified are known as medicinal plants or have other uses by the community (Reeves 2011).

Table 22. Plant species used by Communities and First Nations in the local study area.

Scientific Name	Traditional/Common Names
<i>Acer negundo</i>	Manitoba maple
<i>Achillea millefolium</i>	Yarrow
<i>Acorus americanus</i>	Belle –Angelique-Sweet flag, Flag root/Rat root, Wekas, Wekay, Wee-kaa, Weegus, Weekis
<i>Agastache foeniculum</i>	Giant hyssop
<i>Amelanchier</i> spp.	Saskatoon
<i>Anemone patens</i>	Prairie crocus
<i>Anthoxanthum hirtum</i>	Sweet grass
<i>Apocynum androsaemifolium</i>	Spreading dogbane
<i>Aralia nudicaulis</i>	Wild sarsaparilla
<i>Arctium lappa</i>	Burdock
<i>Arctostaphylos uva-ursi</i>	Bearberry
<i>Artemisia frigida</i>	Pasture sage

Scientific Name	Traditional/Common Names
<i>Artemisia ludoviciana</i>	Prairie sage
<i>Artemisia</i> spp.	Sages
<i>Asarum canadense</i>	Wild ginger
<i>Betula papyrifera</i>	Birch
<i>Chenopodium album</i>	Lamb's-quarters
<i>Cornus canadensis</i>	Bunchberry
<i>Cornus sericea</i>	Red willow, Red-osier dogwood
<i>Corylus cornuta</i>	Beaked hazelnut
<i>Crataegus rotundifolia</i>	Hawthorn
<i>Cypripedium</i> spp.	Lady's-slipper orchids
<i>Elaeagnus commutata</i>	Wolfwillow, Silverberry
<i>Equisetum arvense</i>	Common horsetail
<i>Fragaria</i> spp.	Strawberries
<i>Fraxinus nigra</i>	Black ash
<i>Fraxinus</i> spp.	Ash trees
<i>Galium triflorum</i>	Sweet-scented bedstraw
<i>Heracleum maximum</i>	Cow-parsnip
<i>Heuchera richardsonii</i>	Alumroot
<i>Humulus lupulus</i>	Common hop
<i>Impatiens biflora</i>	Spotted touch-me-not
<i>Juniperus horizontalis</i>	Creeping juniper, cedar vines, ground cedar
<i>Larix laricina</i>	Tamarack
<i>Lilium</i> spp.	Tiger lilies
<i>Lithospermum canescens</i>	Hoary puccoon
<i>Lithospermum incisum</i>	Narrow-leaved puccoon
<i>Matteuccia struthiopteris</i>	Ostrich fern
<i>Mentha arvensis</i>	Common mint, mint, baume, wild mint
<i>Melilotus</i> spp.	Sweet clover
<i>Monarda fistulosa</i>	Wild bergamot
<i>Oenothera biennis</i>	Yellow evening-primrose
<i>Osmorhiza claytonii</i>	Hairy sweet cicely
<i>Osmorhiza longistylis</i>	Sweet cicely
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved colt's-foot
<i>Petasites frigidus</i> var. <i>vitifolius</i>	Vine-leaved colt's-foot
<i>Physalis virginiana</i>	Ground cherry
<i>Picea</i> spp.	Black or White spruce
<i>Pinus banksiana</i>	Jack pine
<i>Polygala senega</i>	Seneca root
<i>Populus balsamifera</i>	Balsam poplar
<i>Populus deltoides</i>	Cottonwood
<i>Populus</i> spp.	Poplars

Scientific Name	Traditional/Common Names
<i>Populus tremuloides</i>	Trembling aspen
<i>Potentilla</i> sp.	Cinquefoil
<i>Prunus pensylvanica</i>	Pin cherry
<i>Prunus pumila</i>	Sand cherry
<i>Prunus</i> spp.	Wild Plum
<i>Prunus virginiana</i>	Choke cherry
<i>Quercus macrocarpa</i>	Bur oak
<i>Rhododendron groenlandicum</i>	Labrador tea
<i>Rhus glabra</i>	Smooth sumac
<i>Ribes hudsonianum</i>	Wild black currant
<i>Ribes oxycanthoides</i>	Northern gooseberry
<i>Ribes</i> spp.	Gooseberries, Osapominkh
<i>Rosa</i> spp.	Wild rose
<i>Rubus chamaemorus</i>	Ostikonihminah, Cloudberries
<i>Rubus idaeus</i>	Raspberries
<i>Rubus pubescens</i>	Dewberry
<i>Rubus</i> spp.	Anoskanuk, Logan berries, Oskisihkominah
<i>Sambucus racemosa</i>	Elderberry
<i>Sanicula marilandica</i>	Black snakeroot
<i>Sarracenia purpurea</i>	Pitcher plant
<i>Shepherdia argentea</i>	Buffaloberry
<i>Smilax lasioneura</i>	Carrion flower
<i>Solidago gigantea</i>	Late goldenrod
<i>Stachys palustris</i>	Marsh hedge-nettle
<i>Taraxacum officinale</i>	Common dandelion
<i>Trifolium pratense</i>	Red clover
<i>Urtica dioica</i>	Stinging nettle
<i>Vaccinium</i> spp.	Blueberries, Niskeminah, Cranberries, Wesahkeminah, Moss berries, "muskego minana"
various unknown species	Medicine, heart medicine, berries, bear root bark, rare orchids, bear nuts, frog leaf, bark, fern, mushrooms
various wild vegetables, nuts and fruits	Turnips, onions, potatoes, carrots, horse radish, peanuts, filberts, rhubarb, crab apple
<i>Viburnum lentago</i>	Nannyberry, Nana berries
<i>Viburnum opulus</i>	High-bush cranberry
<i>Viburnum</i> spp.	Cranberries, Wesahkeminah
<i>Viola canadensis</i>	Canada violet
<i>Viola cucullata</i> ?	Violet
<i>Viola sororia</i> ?	Blue violet
<i>Vitis riparia</i>	Wild purple grapes

Scientific Name	Traditional/Common Names
<i>Zizania palustris</i>	Wild rice

7.1.10 Fire History along the Preferred Route

Available fire history data (Manitoba Land Initiative and Manitoba Conservation 2011) for the dates 1928 until 2010 was assessed for the preferred route by ecoregion. Land area burnt within each ecoregion intersected by the RoW was determined on a per hectare basis. Data analysis did not delineate overlapping burns in each ecoregion along the RoW. Table 23 shows the burn area per year within the 66 m RoW by ecoregion and Map 17 shows the fire history along the preferred route in ten year increments.

Hudson Bay Lowland

From 1928 to 2010, three fires have occurred in the Hudson Bay Lowland area intersected by the RoW. Approximately, 237 of the 350 ha of land (67%) intersected by the RoW have been burnt.

Sewlyn Lake Upland

Only one burn has been recorded along the RoW in the Sewlyn Lake Upland Ecoregion with 100% of the 52 ha that are intersected by the RoW being affected by the burn in 1992.

Churchill River Upland

Five fires have occurred between 1928 and 2010 that have encompassed the RoW that intersects the Churchill River Upland Ecoregion. Approximately 322 of the 746 ha of land (43%) intersected by the RoW in this ecoregion have been burnt.

Hayes River Upland

From 1928 to 2010, nine fires have occurred in the Hayes River Upland area intersected by the RoW. Approximately, 693 of the 1,948 ha of land (35%) intersected by the RoW have been burnt.

Mid Boreal Lowland

Of the 1,767 ha of land intersected by the RoW in the Mid Boreal Lowland Ecoregion, 344 ha (19%) have been burnt during nine separate fires.

Interlake Plain

In the Interlake Plain Ecoregion, thirteen fires since 1928 have accounted for 574 of 1,252 ha of land (45%) intersected by the RoW been burnt.

Lake Manitoba Plain

Approximately 384 of 2,994 ha of land (12%) intersected by the RoW have been burnt in eight burn occurrences since 1928. The most recent fire was in 1984 and burned 8 ha of land.

Table 23. Burn area per year within the 66 m right-of-way by ecoregion.

Area (ha) Burnt Per Year	Ecoregion						
	Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid Boreal Lowland	Interlake Plain	Lake Manitoba Plain
1928	0.00	0.00	0.00	22.73	0.00	0.00	0.00
1929	0.00	0.00	17.18	233.99	52.20	0.00	0.00
1942	0.00	0.00	0.00	0.00	18.36	0.00	0.00
1957	0.00	0.00	0.00	0.00	0.00	98.75	0.00
1960	0.00	0.00	0.00	0.00	24.09	0.00	0.00
1961	0.00	0.00	0.00	0.00	0.00	244.07	0.00
1962	0.00	0.00	0.00	0.00	2.58	0.00	0.00
1963	0.00	0.00	0.00	0.00	9.54	0.00	0.00
1964	0.00	0.00	207.01	134.43	0.00	8.08	0.00
1965	0.00	0.00	0.00	0.00	0.00	23.98	14.68
1968	0.00	0.00	0.00	0.00	0.00	4.79	8.70
1969	0.00	0.00	0.00	0.00	6.93	0.00	0.00
1972	0.00	0.00	0.00	0.00	0.00	0.00	7.01
1973	0.00	0.00	0.00	0.00	0.00	18.72	0.00
1974	0.00	0.00	0.00	0.00	0.00	0.00	31.09
1975	0.00	0.00	0.00	0.00	0.00	0.00	0.90
1976	0.00	0.00	0.00	0.00	0.00	36.53	0.00
1977	0.00	0.00	0.00	0.00	0.00	8.39	110.13
1980	0.00	0.00	0.00	0.00	0.00	0.00	204.09
1984	0.00	0.00	0.00	103.72	34.82	4.51	7.62
1989	0.00	0.00	0.00	0.00	192.27	73.67	0.00
1990	0.00	0.00	0.99	0.00	0.00	0.00	0.00

Area (ha) Burnt Per Year	Ecoregion						
	Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid Boreal Lowland	Interlake Plain	Lake Manitoba Plain
1992	197.00	51.69	0.00	35.38	0.00	0.00	0.00
1993	0.00	0.00	0.00	2.82	0.00	0.00	0.00
1994	3.14	0.00	2.42	0.00	0.00	0.00	0.00
1995	0.00	0.00	43.95	64.47	0.00	0.00	0.00
1998	0.00	0.00	0.00	0.00	0.00	8.03	0.00
1999	0.00	0.00	0.00	0.00	0.00	7.90	0.00
2000	36.78	0.00	0.00	0.00	3.62	0.00	0.00
2003	0.00	0.00	0.00	95.80	0.00	36.73	0.00
2006	0.00	0.00	0.00	0.09	0.00	0.00	0.00
Total Area (ha) Burnt 1928-2006	236.92	51.69	321.55	693.43	344.41	574.15	384.22
Total Land Area (ha)	350.25	51.69	745.55	1947.80	1766.95	1251.51	2994.11
Percent of Total Area Burnt	67	100	43	35	19	45	12
Number of Recorded Burn Occurrences	3	1	5	9	9	13	8

7.2 Other Project Components

The following section discusses results from desktop analyses and 2010 field assessments for other Project components including the northern collector lines, construction camp, construction power station, Keewatinoow converter station, construction powerline, Long Spruce to Henday transmission line, northern electrode distribution line, northern and southern ground electrode sites, borrow sites and excavated material placement sites.

In winter of 2010, NES6 was recommended for the preferred location for the northern ground electrode site (see Map 3). NES7 site was identified as an alternate location for the northern ground electrode should unforeseen site specific environmental considerations make NES6 prohibitively unfeasible to mitigate.

In winter of 2010, SES1c was recommended for the preferred location for the southern ground electrode site (see Map 3). SES3 site was identified as an alternate location for the southern ground electrode should unforeseen site specific environmental considerations make SES1c prohibitively unfeasible to mitigate.

7.2.1 Ecological Land Classification

The other components for the Bipole III Project are located within three ecoregions including the Hudson Bay Lowland, Interlake Plain and the Lake Manitoba Plain. Project components in the Hudson Bay Lowland include the northern collector lines RoW (822 ha), construction camp (28 ha), construction power station (2 ha), Keewatinoow converter station (120 ha), construction powerline RoW (24 ha), Henday to Long Spruce transmission line RoW (160 ha), northern electrode distribution line RoW (44 ha), ground electrodes NES6 (401 ha) and NES7 (385 ha), borrow sites (260 ha) and excavated material placement sites (143 ha). Individually, all components occupy less than 1% of the local study area in this ecoregion.

The southern ground electrode SES1c is located in the Interlake Plain and Lake Manitoba Plain Ecoregions, and occupies areas of 44 and 227 ha respectively, while southern ground electrode SES3 is located entirely in the Interlake Plain Ecoregion (259 ha). Both ground electrodes individually occupy less than 1% of the local study area by ecoregion.

7.2.2 Vegetation Cover Types

Cover types from the Land Cover Classification Enhanced for Bipole for the other Project components (excluding borrow and excavation material placement sites which are discussed separately below) are provided in Table 24. For the other Project component footprints combined, the wetland shrub cover type represents the greatest area affected (457 ha, excluding alternate ground electrode sites).

Wetland shrub was the dominant cover type for ground electrode NES6, Long Spruce to Henday transmission line and the construction power station transmission line.

Table 24. Area and proportion of vegetation cover types within the local study area and other Project component footprints.

Cover Type ¹	Area (ha) and Proportion ²	Northern Collector Lines	Construction Camp	Construction Power Station	Keewatinoow Converter Station	Construction Power Line	Long Spruce to Henday Transmission Line	Northern Ground Electrode Distribution Line	Preferred Northern Ground Electrode NES6	Alternate Northern Ground Electrode NES7	Preferred Southern Ground Electrode SES1c	Alternate Southern Ground Electrode SES3	Total Area (ha) and Proportion ²
Exposed Land	Local Study Area	1816.21	1816.21	1816.21	1816.21	1816.21	1816.21	1816.21	1816.21	1816.21	991.52	855.57	2807.73
	Footprint	17.52	2.25	1.45	8.57	0.00	17.90	14.51	21.84	8.21	0.00	0.00	92.25
	Proportion	<0.01	<0.01	<0.01	<0.01	0.00	<0.01	<0.01	0.01	<0.01	0.00	0.00	0.03
Developed Land	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5854.93	346.01	5854.93
	Footprint	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.31	0.00	10.31
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	0.00	<0.01
Shrub Tall	Local Study Area	13263.48	13263.48	13263.48	13263.48	13263.48	13263.48	13263.48	13263.48	13263.48	332.17	184.64	13595.65
	Footprint	90.87	18.23	0.79	103.39	5.30	28.13	13.84	3.43	0.00	0.00	0.00	263.98
	Proportion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.00	0.00	0.02
Wetland Treed	Local Study Area	807.20	807.20	807.20	807.20	807.20	807.20	807.20	807.20	807.20	9290.01	9259.19	10097.21
	Footprint	11.17	0.00	0.00	0.00	1.42	0.65	0.00	6.74	9.02	0.00	59.63	88.63
	Proportion	0.01	0.00	0.00	0.00	<0.01	<0.01	0.00	<0.01	0.01	0.00	<0.01	<0.01
Wetland Shrub	Local Study Area	14583.02	14583.02	14583.02	14583.02	14583.02	14583.02	14583.02	14583.02	14583.02	16295.76	10006.39	30878.78
	Footprint	217.64	1.53	0.00	1.52	12.40	76.97	4.58	142.06	77.53	0.00	0.00	534.23
	Proportion	0.01	<0.01	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.00	0.01
Wetland Herb	Local Study Area	2007.60	2007.60	2007.60	2007.60	2007.60	2007.60	2007.60	2007.60	2007.60	11330.22	3785.97	13337.82
	Footprint	17.85	0.00	0.00	0.00	1.01	0.27	0.00	3.06	1.59	0.00	0.00	23.78
	Proportion	<0.01	0.00	0.00	0.00	<0.01	<0.01	0.00	<0.01	<0.01	0.00	0.00	<0.01
Grassland	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54520.87	7494.23	54520.87
	Footprint	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.88	23.93	26.81
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01	<0.01
Annual Cropland	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	111555.16	7446.54	111555.16
	Footprint	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	257.15	0.00	257.15
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	0.00	<0.01
Coniferous Dense	Local Study Area	3955.41	3955.41	3955.41	3955.41	3955.41	3955.41	3955.41	3955.41	3955.41	4566.92	4566.92	8522.33
	Footprint	52.30	0.00	0.00	0.00	0.00	5.13	2.25	52.81	87.47	0.00	19.77	219.73
	Proportion	0.01	0.00	0.00	0.00	0.00	<0.01	<0.01	0.01	0.02	0.00	<0.01	0.02
Coniferous Open	Local Study Area	7588.84	7588.84	7588.84	7588.84	7588.84	7588.84	7588.84	7588.84	7588.84	2019.54	2013.84	9608.38
	Footprint	124.63	0.00	0.00	4.39	0.81	2.37	0.83	127.05	121.66	0.00	0.00	381.74
	Proportion	0.01	0.00	0.00	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.00	0.00	0.04
Coniferous Sparse	Local Study Area	8608.04	8608.04	8608.04	8608.04	8608.04	8608.04	8608.04	8608.04	8608.04	1.73	1.73	8609.77
	Footprint	279.80	5.61	0.00	2.38	3.24	21.91	7.35	43.87	79.50	0.00	0.00	443.66
	Proportion	0.03	<0.01	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.00	0.05
Broadleaf Dense	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15677.74	10842.85	15677.74
	Footprint	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	136.02	136.18
	Proportion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	0.01	<0.01
Mixedwood Dense	Local Study Area	111.73	111.73	111.73	111.73	111.73	111.73	111.73	111.73	111.73	4732.05	4707.92	4843.78
	Footprint	<0.01	0.00	0.00	0.00	0.00	0.81	0.00	0.00	0.00	0.00	19.12	19.93
	Proportion	<0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	<0.01

1 Land Cover Classification Enhanced for Bipole cover types.

2 Proportion is the area of the cover type that occupies the footprint compared to the local study area assessed by ecoregion.

Coniferous sparse was the second most abundant cover type for the Project components with 364 ha. The northern collector lines and construction camp had coniferous sparse as the dominant cover type. Other types that followed included shrub tall (264 ha), coniferous open (260 ha), and annual cropland (257 ha). Annual cropland was the dominant cover type for the southern ground electrode SES1c.

In comparison between the other Project component footprints and the local study area, only coniferous sparse for the northern collector lines had the greatest proportion with 3%. Coniferous sparse also had the highest proportion when comparing the Project footprints combined to the local study area with 5%.

Borrow and excavated material placement sites are discussed separately as the borrow site extraction areas may be limited by pre-construction surveys and the actual utilization area of the deposits have not been determined at this time. The following provides information on the cover types for these components. Nine cover types were identified for the northern borrow sites and seven for the excavation material placement sites. The cover types and combined area of borrow sites include exposed land (30 ha), shrub tall (63 ha), wetland treed (10 ha), wetland shrub (29 ha), wetland herb (2 ha), coniferous dense (98 ha), coniferous open (13 ha), coniferous sparse (8 ha) and mixedwood dense (4 ha). The cover types and combined area for the excavated material placement sites include exposed land (9 ha), shrub tall (77 ha), wetland treed (24 ha), wetland shrub (5 ha), coniferous dense (3 ha), coniferous open (9 ha), and coniferous sparse (16 ha).

7.2.3 Riparian Habitat

The total amount of riparian habitat found at other Project components (excluding alternate sites) is approximately 310 ha (Table 25). The Project component with the largest amount of riparian habitat was the northern collector lines with 193 ha. All Project components occupy less than 2% of riparian habitat when their combined footprints are assessed with the local study area.

7.2.4 Wetlands

Bog and fen wetland classes that were identified for the other Project components are included in Table 26. Project components occupy bog wetlands that total 741 ha (excluding alternate sites) with the northern collector lines potentially affecting the largest area (544 ha). Ground electrode NES7 occupies the second largest area with

168 ha. Fen wetlands occupy a total of 37 ha (excluding alternate sites) for the other Project components and all occur along the proposed Long Spruce to Henday transmission line. When compared to the local study area, the total proportion of bog and fen wetlands (777 ha) potentially affected by the Project components is less than 1%.

Table 25. Area and proportion of riparian habitat within the local study area and other Project component footprints.

Project Component	Area (ha) of Riparian Habitat within Local Study Area	Area (ha) of Riparian Habitat within Footprint	Proportion of Footprint within Local Study Area
Northern Collector Lines	17250.51	192.66	0.01
Construction Camp	17250.51	7.40	<0.01
Keewatinoow Converter Station	17250.51	15.47	<0.01
Construction Power Line	17250.51	7.52	<0.01
Long Spruce to Henday Transmission Line	17250.51	25.60	<0.01
Northern Ground Electrode Distribution Line	17250.51	12.07	<0.01
Preferred Northern Ground Electrode NES6	17250.51	49.43	<0.01
Alternate Northern Ground Electrode NES7	17250.51	62.35	<0.01
Alternate Southern Ground Electrode SES3	11395.39	13.75	<0.01
Total	28645.90	386.25	0.01

Note: Area of riparian habitat for Project components is assessed by ecoregion.

Table 26. Area and proportion of bog and fen wetlands within the local study area and other Project component footprints.

Project Component	Bog Wetland			Fen Wetland		
	Area (ha) within Local Study Area*	Area (ha) within Footprint	Proportion within Footprint compared to Local Study Area	Area (ha) within Local Study Area	Area (ha) within Footprint	Proportion within Footprint compared to Local Study Area
Northern Collector Lines	17041.31	544.16	0.03	2505.06	0.00	0.00
Construction Power Line	17041.31	5.84	<0.01	2505.06	0.00	0.00
Long Spruce to Henday Transmission Line	17041.31	53.95	<0.01	2505.06	36.92	0.01
Preferred Northern Ground Electrode NES6	17041.31	136.62	<0.01	2505.06	0.00	0.00
Alternate Northern Ground Electrode NES7	17041.31	167.80	<0.01	2505.06	0.00	0.00
Alternate Southern Ground Electrode SES3	685.52	0.00	0.00	10316.23	19.68	<0.01
Total	154742.83	908.37	<0.01	43401.51	56.60	<0.01

Note: Area of wetland habitat for Project components is assessed by ecoregion. Values of wetland classes are based on the primary class within the wetland category.

7.2.5 Fire History

Available fire history data from 1928 to 2010 was assessed for other Project components (Table 27). The dates of fires for the components occurred between 1975 and 2005. Fire history included four fires for the northern collector lines RoW (2 ha in 1994, 165 ha in 2000, 40 ha in 2003, 20 ha in 2005), two fires for the construction camp footprint (2 ha in 1976, 10 ha in 1994), and two fires for the Henday to Long Spruce transmission line RoW (5 ha in 1975, 27 ha in 1991). In 1994, fire also occurred for the construction power site footprint (2 ha), Keewatinoow converter station footprint (113 ha), construction power line RoW (15 ha), and the northern electrode distribution line RoW (<1 ha). In 2000, the northern electrode NES6 and NES7 footprints were affected by fire with 147 ha and 159 ha of land burnt respectively.

7.2.6 Aboriginal Traditional Knowledge

Fox Lake Cree Nation and Tataskweyak Cree Nation identified general plant harvesting and gathering locations in the vicinity of the northern Project components (Ross and Fox Lake Cree Nation 2011, Tataskweyak Cree Nation 2011). No area calculations were determined for traditional plant harvesting and gathering locations. Species harvested or gathered for subsistence, medicinal or cultural uses include seneca root, pitcher plant, sage, sweetgrass, Labrador tea, strawberries, Saskatoon, blueberries, cranberries, gooseberries, cloudberries, raspberries and moss berries.

7.2.7 Manitoba Conservation Data Centre Records

A search of the Manitoba Conservation Data Centre records identified previously known locations for species of concern along the northern collector lines RoW as well as at the alternate southern ground electrode site. Along the northern collector lines RoW, blue-grass (*Poa arctica* ssp. *caespitans*) was previously known to occur, which is ranked as a species that is possibly in peril, but the status is uncertain (SU) and more information is needed. Species of concern previously known to occur in the area of the alternate southern ground electrode site are arethusa (*Arethusa bulbosa*), swamp-pink (*Calopogon tuberosus*) and Houghton's umbrella-sedge (*Cyperus houghtonii*), all of which are ranked as rare (S2).

7.2.8 Field Assessments

Field assessments and surveys for species of conservation concern were conducted for those component footprints which had been identified during the 2010 growing season. These components included the preferred Keewatinoow converter station site, preferred construction power station site, and all potential northern and southern ground electrode sites, as preferred northern and southern ground electrode sites had not been identified prior to the 2010 field assessments.

Table 27. Burn area per year within the other Project component footprints.

Area (ha) Burnt Per Year	Northern Collector Lines	Construction Camp	Construction Power Station	Keewatinoow Converter Station	Construction Power Line	Longspruce to Henday Transmission Line	Northern Ground Electrode Distribution Line	Preferred Northern Ground Electrode NES6	Alternate Northern Ground Electrode NES7
1975	0	0	0	0	0	4.70	0	0	0
1976	0	1.98	0	0	0		0	0	0
1991	0	0	0	0	0	27.39	0	0	0
1994	1.79	9.52	2.25	112.72	14.80		0.44	0	0
2000	165.43							146.52	158.74
2003	40.11	0	0	0	0	0	0	0	0
2005	20.33	0	0	0	0	0	0	0	0
Total Area (ha) Burnt 1975-2005	227.66	11.50	2.25	112.72	14.80	32.09	0.44	146.52	158.74
Total Land Area (ha)	822.28	27.63	2.25	120.28	24.20	159.82	43.73	400.91	385.02
Percent of Total Area	28	42	100	94	61	20	1	37	41

7.2.8.1 Keewatinoow Converter Station

The proposed Keewatinoow converter station site (see Map 3) consists dominantly of black spruce (*Picea mariana*) with Labrador tea (*Rhododendron groenlandicum*) as the major understory shrub. Several open bog areas with surface water also occur in the area. The northern part of the site is a regenerating burn, with standing dead trees. The middle of the site (west side of the Conawapa Road) is a very wet area that consists of black spruce, tamarack (*Larix laricina*), willows (*Salix* spp.), white birch (*Betula papyrifera*) and dwarf birch (*Betula glandulosa*). The southern part of the site is a mature black spruce - tamarack bog with feathermosses (*Pleurozium schreberi* and *Hylocomium splendens*), peat mosses (*Sphagnum* spp.), reindeer lichen (*Cladina* sp.) and brown mosses as ground cover. No species of conservation concern were observed at the Keewatinoow converter station site. Refer to Appendix I for a species list at the Keewatinoow converter station site.

7.2.8.2 Construction Power Station and Transmission Line

A substantial portion of the proposed site for the construction power station (see Map 3) has already been degraded of vegetation. The middle of the site consists of gravel that has been invaded by plant species such as common dandelion (*Taraxacum officinale*) and golden rod (*Solidago* sp.). The eastern part of the site is a black spruce (*Picea mariana*) dominated forest with minor amounts of tamarack (*Larix laricina*) present. Trees in the canopy are approximately 10 m tall with these species also occurring in the shrub stratum. The western part of site is a regenerating burn area with black spruce and tamarack that are less than 5 m tall. Labrador tea (*Rhododendron groenlandicum*) is the principle low shrub, while the ground cover consists of feathermosses (*Pleurozium schreberi* and *Hylocomium splendens*), peat mosses (*Sphagnum* spp.), reindeer lichen (*Cladina* sp.) and pelt lichens (*Petligera* spp.). Snow willow (*Salix vestita*) was the only species of conservation concern observed at the proposed construction power station site (Table 28). This species is ranked as uncommon (S3) by the MBCDC. Refer to Appendix I for a species list at the construction power station site.

The location of the construction power transmission line (KN36) was determined in the winter of 2011 (see Map 3) and therefore a field assessment for this component was not completed.

7.2.8.3 Northern Ground Electrodes

Potential northern ground electrode sites (see Map 4) were assessed during the 2010 field season for vegetation composition and species of conservation concern. A vegetation summary description has been provided below for the preferred (NES6) and alternate (NES7) northern ground electrode sites. Refer to Appendix I for a species list of the northern electrode sites.

Table 28. Species of conservation concern observed at the ground electrode sites and construction power station site.

Species	Common Name	MBCDC Rank	COSEWIC, MBESA and SARA Status	Site	Easting	Northing	Habitat	Ecoregion
<i>Cypripedium reginae</i>	Showy Lady's-slipper	S3	Not listed	Southern Electrode SES3	677938	5532130	Trembling Aspen/shrub	Interlake Plain
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Northern Electrode NES7	809002	6280124	Black spruce-Tamarack/Peat moss	Hudson Bay Lowland
<i>Salix vestita</i>	Snow Willow	S3	Not listed	Construction Power Station	816146	6293427	Disturbed	Hudson Bay Lowland

Refer to Tables 3, 4, and 5 for the Manitoba Conservation Data Centre (MBCDC) ranking system and the status categories for the Manitoba *Endangered Species Act* (MBESA), Committee On the Status of Endangered Wildlife In Canada (COSEWIC), and the *Species at Risk Act* (SARA).

Electrode Site: NES6

Black spruce (*Picea mariana*) and tamarack (*Larix laricina*) dominated the dense coniferous forest canopy. The understory is dominated by Labrador tea (*Rhododendron groenlandicum*) and a high abundance of cloud berry (*Rubus chamaemorus*). The understory also consisted of several other ericaceous shrubs (*Kalmia polifolia*, *Rhododendron tomentosum*, and *Vaccinium* spp.), peat moss (*Sphagnum* sp.), feathermoss (*Pleurozium schreberi*) and reindeer lichen (*Cladina* sp.). Several small bogs and a large pond are present at this site. No species of concern were observed at this site.

Electrode Site: NES7

This potential electrode site also consisted of a black spruce (*Picea mariana*) and tamarack (*Larix laricina*) forest canopy. The shrub stratum is dominated by Labrador tea (*Rhododendron groenlandicum*), while the ground cover is mainly feathermosses (*Hylocomium splendens*, *Pleurozium schreberi*), peat moss (*Sphagnum* sp.), and lichen species (*Cladina* sp., *Cladonia* spp.). A trembling aspen (*Populus tremuloides*) stand occurs at the periphery of the site near the road. The site has several forest gaps that occupy willows (*Salix* spp.) and dwarf birch (*Betula pumila*). Small open bogs and areas with standing water are scattered throughout the site. Snow willow (*Salix vestita*) was the only species of conservation concern observed at the alternate northern ground electrode site during the surveys (Table 28). This species is ranked as uncommon (S3) by the MBCDC.

In late spring of 2011, NES6 was chosen as the final preferred location for the ground electrode based on technical review.

7.2.8.4 Northern Ground Electrode Distribution Line

The location of the northern DC ground electrode distribution line was determined in the winter of 2011 (see Map 3) and therefore a field assessment was not completed.

7.2.8.5 Northern Collector Lines

The location of the northern AC collector lines (L61K, K61H, K62H, K63H, K64H) were determined in the winter of 2011 (see Map 3) and therefore a field assessment for this component was not completed.

7.2.8.6 Construction Camp

The location of the temporary construction camp was determined in the winter of 2011 (see Map 3) and therefore a field assessment for this component was not completed.

7.2.8.7 Riel Converter Station

The Riel converter station (see Map 5) was visited during the summer of 2010. As the area was under development for its joint use with the Riel Reliability Improvement Initiative Project, the visit occurred along the periphery of the site, adjacent to Provincial Road 207. In the spring and summer of 2008, surveys for rare vascular plants were conducted around the area proposed for development. The site consisted of agricultural land but the surrounding ditches were surveyed for rare plants. No species of conservation concern were identified during the 2008 surveys (Szwaluk Environmental Consulting 2008).

7.2.8.8 Southern Ground Electrodes

Potential southern ground electrode sites (see Map 6) were assessed during the 2010 field season for vegetation composition and species of conservation concern. A vegetation summary description has been provided below for the preferred (SES1c) and alternate (SES3) southern ground electrode sites. Appendix I includes a list of species observed.

Electrode Site: SES1c

Electrode Site 1c (21-11-6E1) was the preferred location identified for the southern ground electrode (see Map 5). As a result of this site being identified and selected in the winter of 2010, a field assessment at this site was not completed. A high level desktop analysis identified that the site consisted of agricultural land, and would have a low probability of supporting species of conservation concern.

Electrode Site: SES3

This section (13-11-7E1) of land is comprised primarily of a mature mixed deciduous forest on mineral soil with trembling aspen (*Populus tremuloides*) as the dominant tree species. The shrub layer is dominated by red-osier dogwood (*Cornus sericea*), highbush cranberry (*Viburnum opulus*), Saskatoon (*Amelanchier alnifolia*) and willow species (*Salix* spp.). The understory is comprised of a wide variety of herbaceous forb and graminoid species including Canada May flower (*Maianthemum canadense*), fireweed (*Chamerion angustifolium*), aster species (*Symphyotrichum ciliolatum*, *S. lateriflorum*), yarrow (*Achillea millefolium*), Kentucky bluegrass (*Poa pratensis*) and Canada reed grass (*Calamagrostis canadensis*). The northeast corner of this section is imperfectly to poorly drained, more sparsely treed, and contains a greater percentage of shrubs including Bebb's willow (*Salix bebbiana*) as well as immature trembling aspen. Showy lady's-slipper (*Cypripedium reginae*) was the only species of conservation concern observed at the alternate southern ground electrode site during the surveys. This species is ranked as uncommon (S3) by the MBCDC (Table 28).

In late spring of 2011, SES1c was chosen as the final preferred location for the ground electrode based on technical review.

7.2.8.9 Southern Ground Electrode Line

The location of the southern ground electrode distribution line has not been determined and therefore a field assessment for this component was not completed.

7.2.8.10 Borrow and Excavated Material Placement Sites

Aggregate material that is required for both foundation construction for the transmission line and construction of the stations (i.e., converter and construction power) generally will be hauled from off-site borrow sources. Currently the only borrow sources identified for the Project are located in the vicinity of the northern components. Fifteen sites were identified for the borrow areas (see Map 3) and six locations for the excavated material placement sites after the 2010 field season, and therefore were not part of the field assessment.

Borrow sites that may be required for the construction of the transmission line foundations, will be located along the transmission line RoW wherever possible in order to minimize environmental effects, haul distances and cost.

7.2.8.11 Access Roads/Trails

Proposed access roads/trails required for the construction of the Bipole III Project were identified in late spring 2011 (Stantec Consulting Ltd. 2011). The majority of the proposed access routes identified use existing highways, municipal and forestry roads, trails and man-made linear features. Field assessments were not conducted for new access roads/trails due to their identification after the 2010 field season.

7.3 Environmentally Sensitive Sites

Environmentally sensitive sites for the Bipole III Transmission Project identified from the assessment include dry upland prairies, salt marshes/flats, patterned fen wetlands, areas that support species of conservation concern, and areas of botanical importance identified through ATK (Map 18). These sites were identified as being environmentally sensitive as they have greater potential for occupying species of concern (i.e., dry upland prairies, and patterned fens), may contain unique species (i.e., salt marshes/flats), and support plants of medicinal and cultural value (i.e., ATK sites). Although no terrestrial communities of concern listed by MBCDC were identified during the 2010 field studies, there is the potential for these communities to exist along the preferred route. Below, a brief summary for each type of sensitive site is provided.

Dry Upland Prairies

Several grassland sites, including six sample plots, were assessed along the southern portion of the proposed route within the Lake Manitoba Plain Ecoregion. The species structure and composition of the mixed grass community type is detailed in the community types section of this report (see Section 7.1.4). No additional information

was available on the location of grades of native grassland and cultivated sites included in the mixed grass prairie inventory for Manitoba (see Figure 1).

Grassland areas are treeless, or sparsely treed, the shrub layer is patchy or absent, and the composition of herbs and low shrubs can be quite diverse. Compared to other community types within the Lake Manitoba Plain, the mixed grass type had low tree and shrub cover, moderate shrub diversity, moderate ground cover.

All grassland sites visited during the 2010 fieldwork season are considered agricultural pastureland. Each site displayed evidence of cattle grazing (e.g., close cropped grasses and forbs, some browsing on shrubs or rubbing on trees), and either current or past cattle activity (e.g., cattle and/or cattle trails in pasture and through forested areas, manure, fencing to enclose cattle).

Some effects of cattle grazing can include a potential increase in non-native species diversity, changes to vegetation community composition or structure, and decrease in biomass at a site can occur where cattle graze. Certain shrub species (snowberry, wolf-willow) may become dominant with extended or intense grazing. In certain grazed plots there was a notable presence of tree seedlings, which could denote a return to a more forested site type, in absence of grazing.

One grassland site was located within the Lakeview Community Pasture. This site was previously surveyed in a document through Manitoba Conservation (Newman et al. 2000), and found to be in moderate condition at that time. Currently, this grazed site supports a mix of non-native species, and native grasses and forbs.

Although not included within the grassland community typing results, a drier mixed grass prairie was also identified through FRI mapping. These dry upland prairie ridge sites were visited to assess each area for plant species and communities of concern. Although each of the sites visited had cattle grazing activity present, there were also several plant species of conservation concern observed (American bugseed, linear-leaved puccoon, Schweinitz's flatsedge). One site (536565 E 5509606 N) supported hairy prairie-clover, a species protected by SARA and MBESA. Depending on the level of grazing activity, a grazed site can also support a diverse composition of native species. The dry upland prairie ridge sites have the best variety of native prairie observed along the preferred route even though these areas often contained sparse to open tree cover.

Dry upland prairies were located along the local study area of the Aspen Parkland, Interlake Plain, and Lake Manitoba Plain Ecoregions (Map 18). Table 29 displays the land area and proportion of these features within the local study area and 66 m RoW. The total area of the dry upland prairie ridge sites within the study area was 428 ha with 348 ha (81%) occurring in the Lake Manitoba Plain Ecoregion. Within the RoW, only the Lake Manitoba Plain includes dry upland prairies and these sites occupy an area of 9 ha. Of the dry upland prairie ridge land area in the local study area, 2% will potentially be affected by the 66 m RoW.

Eighty-eight dry upland prairie ridge sites were identified along the local study area while 17 sites occur along the 66 m RoW. Appendix J includes the information on their individual locations and land area. The majority (85%) of these sites within the study area occupy less than 10 ha of land. Based on FRI data along the 66 m RoW, the majority (71%) of dry prairies occupy less than one hectare of land.

Table 29. Area and proportion of dry upland prairies within the local study area and 66 m right-of-way by ecoregion.

Ecoregion	Dry Upland Prairie				
	Area (ha) within Local Study Area	Proportion within Local Study Area	Area (ha) within RoW	Proportion within RoW	Proportion within RoW compared to Local Study Area
Interlake Plain	69.15	0.16	0.00	0.00	0.00
Aspen Parkland	10.55	0.02	0.00	0.00	0.00
Lake Manitoba Plain	347.89	0.81	9.24	1.00	0.02
Total	427.61	1.00	9.24	1.00	0.02

Salt Marshes/Salt Flats

Salt marsh complexes (Ducks Unlimited data source) are found in the Mid-Boreal Lowland and Interlake Plain Ecoregions along the local study area (Table 30). The total area of salt marshes within the study area covers 712 ha. Along the RoW, salt marshes are only found in the Interlake Plain Ecoregion and cover an area of 6 ha. The proportion of salt marshes in the Interlake Plain that will potentially be affected in the RoW compared to the local study area is 4%, while the total proportion affected is less than 1%. Appendix J identifies the locations and land area of salt marsh complexes within the local study area and 66 m RoW. Four sites are located within the local study area while only one site is found along the RoW.

Table 30. Area and proportion of salt marsh complexes within the local study area and 66 m right-of-way by ecoregion.

Ecoregion	Salt Marsh Complexes				
	Area (ha) within Local Study Area	Proportion within Local Study Area	Area (ha) within RoW	Proportion within RoW	Proportion within RoW compared to Local Study Area
Mid-Boreal Lowland	576.93	0.81	0.00	0.00	0.00
Interlake Plain	135.32	0.19	5.53	1.00	0.04
Total	712.25	1.00	5.53	1.00	<0.01

Salt flats (FRI data source) are found in the Mid-Boreal Lowland, Interlake Plain and Lake Manitoba Plain Ecoregions along the local study area (Table 31). The total area of salt flats within the local study area covers 212 ha. Along the RoW, salt flats are only found in the Interlake Plain Ecoregion and cover an area of 1 ha. The proportion of salt flats in the Interlake Plain that will potentially be affected in the RoW compared to the local study area is less than 1%. The location of salt flats within the local study area and 66 m RoW are identified in Appendix J. Twenty salt flats occur within the local study area while only one site is found within the RoW.

Table 31. Area and proportion of salt flats within the local study area and 66 m right-of-way by ecoregion.

Ecoregion	Salt Flats				
	Area (ha) within Local Study Area	Proportion within Local Study Area	Area (ha) within RoW	Proportion within RoW	Proportion within RoW compared to Local Study Area
Mid-Boreal Lowland	68.18	0.32	0.00	0.00	0.00
Interlake Plain	138.09	0.65	1.16	1.00	<0.01
Lake Manitoba Plain	6.12	0.03	0.00	0.00	0.00
Total	212.40	1.00	1.16	1.00	<0.01

The Ducks Unlimited and FRI data sources both identify the only salt marsh and only salt flat along the RoW as approximately the same location. Map 18 shows the locations for the salt marshes/salt flats along the local study area.

Along the preferred route, the only salt marsh/salt flat that occurred was sampled for vegetation composition and abundance. This site was located in the northern portion of the Interlake Plain Ecoregion (362936 E 5862641 N). Vegetation consisted dominantly of arctic rush (*Juncus arcticus*), common spike-rush (*Eleocharis palustris*) and reed grass (*Calamagrostis* spp.) with the presence of salt tolerant species such as marsh arrow-grass (*Triglochin palustris*) and seaside arrow-grass (*Triglochin maritima*). The site was characterized by a high ground litter cover (50%), with standing water covering over one quarter of the ground area (28%). The water regime is likely semi-permanently to seasonally flooded. No species of concern were identified at this location during the time of the assessment.

Patterned Fen Wetlands

Patterned fen complexes were identified from Wetlands of Manitoba (Halsey et al. 1997). These fens are composed of narrow ridges of peat that have wet depressions between the ridges. Patterned fens occur in the Churchill River Upland, Hayes River Upland, Mid-Boreal Lowland and Interlake Plain Ecoregions within the local study area and 66 m RoW (Table 32). Map 18 shows the locations of patterned fen complexes along the

Table 32. Area and proportion of patterned fen wetland complexes within the local study area and 66 m right-of-way by ecoregion.

Ecoregion	Patterned Fen Wetland Complexes				
	Area (ha) within Local Study Area	Proportion within Local Study Area	Area (ha) within RoW	Proportion within RoW	Proportion within RoW compared to Local Study Area
Churchill River Upland	3256.57	0.07	26.30	0.05	<0.01
Hayes River Upland	4320.87	0.09	73.75	0.14	0.01
Mid-Boreal Lowland	35162.79	0.76	395.52	0.74	0.01
Interlake Plain	3227.02	0.07	39.34	0.07	0.01
Total	45967.26	1.00	534.93	1.00	0.01

Note only patterned fens with a primary wetland class included in the analysis.

preferred route. The total area occupied by primary patterned fen classes within the local study area is 45,967 ha while 535 ha occurred within the RoW. The Mid-Boreal Lowland will potentially have the greatest area affected in the RoW with 396 ha. This ecoregion represents 74% of the patterned fens within the RoW. A comparison of the area between the RoW and the local study area indicates that no ecoregion has a proportion of greater than 1% for patterned fens. Twenty-three primary patterned fen classes occur within the RoW and the area of individual fens do not exceed 43 ha (Appendix J). Thirty-nine patterned fen complexes are located within the local study area. In the local study area, oblong-leaved sundew (*Drosera anglica*) and slender-leaved sundew (*Drosera linearis*) were two species of concern observed in patterned fen wetlands.

Locations for Species of Conservation Concern

Fifteen locations for plant species of conservation concern were previously known to occur from the MBCDC records along the transmission line RoW and three species were previously known to occur at other Project components (northern collector lines and alternate southern electrode SES3). Field investigations in 2010 identified one species of concern at each of the construction power station, alternate northern ground electrode (NES7), and alternate southern ground electrode (SES3) sites. Several other species were previously known to occur in the local study area including MBCDC records, 14 species that were observed in 2010, and eight observations from studies conducted by Swan Lake First Nation. Refer to Sections 7.1.8, 7.2.6 and 7.2.7 for additional information on these species and their locations. Map 18 shows the locations for species of concern along the preferred route.

Areas Identified through Aboriginal Traditional Knowledge

A total of 20 Community Councils and First Nations, as well as the MMF participated in sharing their knowledge and experiences for the Bipole III Transmission Project. Traditional plant harvesting and gathering by the communities, First Nations, and the MMF are detailed in Sections 7.1.9 and 7.2.6. The total area occupied by Aboriginal traditional lands used for plant harvesting and berry picking in the local study area (not including self-directed ATK studies) was 56,837 ha while 758 ha occurred within the RoW. A total of 48 ATK sites occurred in the local study area and 19 along the RoW. Appendix J identifies the locations and area of ATK sites important for vegetation (excluding self-directed studies). Map 18 shows the locations for ATK sites along the preferred route (excluding self-directed studies). Self-directed ATK studies (Fox Lake Cree Nation, Tataskweyak Cree Nation, Opaskwayak Cree Nation, Wuskwi Sipihk, Long Plain First Nation, Swan Lake First Nation and the MMF) identified important plant harvesting and gathering along the RoW and in the area of the northern Project components.

7.4 Environmental Effects Identification and Mitigation

The purpose of the previous inventories and data summaries was to provide information for the identification of potential effects on VECs as well as terrestrial ecosystems and vegetation for the Bipole III Project. Fifteen potential environmental effects (i.e., predicated change in the environment) for terrestrial ecosystems and vegetation that could occur as a result of the Project were identified. To minimize the adverse effects on VECs and terrestrial ecosystems and vegetation caused by the Project, mitigation measures (i.e., measures to avoid, and minimize adverse environmental effects) are provided for each potential effect. Information on the environmental indicator, measurable parameter and residual effect are also provided. Environmental indicators are defined as aspects of the VECs or the environment that are subject to change from a project activity, while measurable parameters are used to express changes in the indicators. Residual effects are those that remain after mitigation measures have been applied to the environmental effects.

The potential effects and mitigation measures have been identified for the following Project components: transmission lines (which includes the 500 kV transmission line, northern collector lines, ground electrode lines, and construction power line), converter stations, construction power station; construction camp, the northern and southern ground electrodes, borrow sites (which include excavated material placement sites) and access roads/trails. Environmental effects, mitigation measures and residual effects for project phases of clearing and construction, operation and maintenance, and decommissioning are included in Table 33 which follows the listed effects discussed below. Potential effects and mitigation measures for environmentally sensitive sites along the local study area and RoW are provided in Appendix J.

1. Potential Loss of Plants of Conservation Concern

Plant species of conservation concern and the habitat they occupy may be affected by the Project. Construction and maintenance of transmission lines may destroy individual plants of a species or alter their habitat where conditions are left unfavorable for growth (Public Service Commission of Wisconsin 2009). Protection of species of conservation concern is critical as the abundance and distribution of these species is often restricted. Species of conservation concern were previously known to occur (MBCDC records) and were observed during the 2010 field assessments along the local study area, RoW and at the associated Project component footprints. Species of concern were also observed in the vicinity of the proposed RoW during studies conducted for Swan Lake First Nation. One species (*Dalea villosa*) that is listed as threatened by COSEWIC and protected by SARA and MBESA was also observed in the local study area but not on the RoW. If the RoW is adjusted, a setback distance of 30 m is recommended for protected species (Henderson 2009) where no activity shall occur.

The loss of some snow willow (*Salix vestita*) plants, which is a species of conservation concern, at the construction power station is non-mitigable due to the complete removal of all vegetation cover from the site. Snow willow is not a protected species but is ranked as S3 (uncommon) by the MBCDC. Removal of this plant from the construction power station location would likely have minimal effect on the species numbers in the province. This species was observed at nine other locations in the vicinity of the construction power station location.

The loss of plants of conservation concern may occur from the following:

- Construction, maintenance and decommissioning activities for the transmission lines.
- Construction activities for the construction power station.

Mitigation

- Carry out clearing, construction, maintenance and decommissioning activities during the winter months when effects to plant species are minimized.
- Where activities do not occur during the winter months, minimize disturbance to shrub and herb layers in areas where species of concern have been observed.
- Use existing access roads and trails to the extent possible.
- Locations of species of conservation concern will be mapped and clearly marked with flagging tape prior to clearing activities.

The environmental indicator for plants of conservation concern has been identified as species or community occurrence and the measurable parameter is number of plants present. Residual effects include the loss of plants of conservation concern from clearing activities at the construction power station location.

2. Environmentally Sensitive Areas May be Affected

Areas that were considered sensitive for vegetation along the preferred route include dry upland prairies, patterned fen wetlands, and salt marshes/salt flats. Other sensitive areas identified include locations for species of conservation concern, and plant harvesting and berry picking locations identified through the ATK process, which are discussed individually under effects 1 and 3 of this section respectively. Dry upland prairies exemplify the best variety of native prairie that may be affected from construction activities. These areas are known to support species of conservation concern as well as a species protected by MBESA and SARA (*Dalea villosa*). Patterned fen wetlands are also known to support species of conservation concern (*Drosera anglica* and *Drosera linearis*). Construction activities in these wetlands may result in changes to water flow and soil compaction affecting plant populations. One saline area occurred along the preferred route. Although no species of conservation concern were observed during the field assessment, saline areas have the potential to support species of concern. One recommendation from another project was that drainage patterns which may affect saline flats and the species of concern that occupy them remain unaltered during project activities (National Energy Board and Canadian Environmental Assessment Agency 1996). Other than the loss of plants of concern at these sensitive sites (patterned fens, dry upland prairies, salt marshes/flats), potential effects from project activities may also include habitat disturbance or loss.

Environmentally sensitive areas may be affected from the following:

- Construction, maintenance and decommissioning activities for the transmission lines.

Mitigation

- Carry out clearing, construction, maintenance and decommissioning activities during the winter months to minimize surface damage, rutting and erosion.
- Where clearing, construction, maintenance and decommissioning activities, do not occur during winter months, minimize soil and vegetation disturbance in the dry upland prairie areas, patterned fen wetlands, and salt marshes/flats.
- Where construction does not occur in the winter months, construction mats could be utilized where wetlands may be affected (Minnesota Department of Commerce et al. 2010).
- Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur (Minnesota Department of Commerce et al. 2010).
- During construction, implement measures to manage storm water runoff to reduce the potential for erosion (Minnesota Department of Commerce et al. 2010).
- Use existing access roads and trails to the extent possible.
- Where disturbance has occurred in areas of increased erosion potential in sensitive areas, re-establish vegetation using native species appropriate for the site (i.e., prairie habitat).

The environmental indicator has been identified as the area of sensitive site and the measurable parameter is hectares. Residual effects identified include the removal of trees from dry upland prairie sites, as a result of clearing activities that may occur.

3. Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process

Plants and important areas used by Aboriginal people have been identified along the preferred route and other Project components by participating Communities, First Nations, and the MMF through Aboriginal Traditional Knowledge workshops and self-directed studies. Nineteen traditional plant harvesting locations were identified along the RoW (excluding self-directed studies) for gathering food and medicines, and harvesting plants and trees for cultural and other purposes. From the self-directed studies, general resource areas were identified in other locations along the RoW as well as in the vicinity of the northern Project components.

Potential effects from project activities such as construction include the mortality of vegetation and habitat alteration at locations identified through the ATK process. As a result of plant loss, Aboriginal people may have to travel further from current traditional areas to find sites supporting suitable quality plants. Where possible, potential disturbance to these areas identified as a result of project activities should be minimized. Continued dialogue with Aboriginal groups should also occur to reduce effects in these areas.

In a self-directed study completed for the Project, it was found that a majority of the medicinal gatherers were of the opinion that clearing has encouraged growth of roots that were commonly used (Opaskwayak Cree Nation Natural Resource Council 2011). Limited information was found to support good recovery of berry growth within transmission RoWs. However, Barker (1997) observed that spring burning and fall clipping were useful techniques for increasing vegetative reproduction of lowbush blueberry (*Vaccinium myrtilloides*) on rock outcrops in northern Manitoba. Sandy sites had increased cover with fertilizer treatments as well as spring clipping with fertilizer treatments. In the absence of treatments (e.g., fertilizer), vegetative reproduction may not significantly improve.

The potential mortality and habitat loss of plants used by Aboriginal people may occur from the following:

- Construction, maintenance and decommissioning activities for the transmission lines and northern ground electrodes.
- Construction activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.

Mitigation

- Carry out clearing, construction, maintenance and decommissioning activities during the winter months to minimize surface damage, rutting and erosion.

- Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.
- Maintain understory stratus during clearing, construction, maintenance and decommissioning activities.
- Remove trees, by low ground disturbance methods.
- Use existing access roads and trails to the extent possible.
- Non-mitigable for the Keewatinoow converter station, construction power station, construction camp, and borrow sites due to complete removal of all vegetation cover for the sites.

The environmental indicator has been identified as area of habitat and plant loss and the measurable parameter is hectares. Residual effects identified include the loss of plant communities important for Aboriginal people from the construction activities for the transmission lines, northern ground electrode and line, Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.

4. Loss of Native Forest Vegetation

The Bipole III Transmission Project will result in the loss of native forest vegetation for some of the Project components during clearing and construction activities. It is estimated that 3355 ha of upland forest vegetation will be affected from clearing for the 500 kV transmission line RoW and 738 ha for the other Project components. Removal and long-term loss of forest cover as a result of RoW clearing as well as potential damage to forest vegetation adjacent to the RoW during the clearing and construction phases of the Project have been identified as effects of transmission line development (Manitoba Hydro et al. 2003).

The loss of native forest vegetation will occur from the following:

- Construction activities for the transmission lines, Keewatinoow converter station, construction power station, construction camp, ground electrodes, borrow sites and access roads/trails.

Mitigation

- Carry out clearing and construction activities during the winter months to minimize the effect on understory species.
- Tree removal will be confined within the limits of the RoW, with the exception of danger trees located outside the RoW that can affect transmission lines (Manitoba Hydro 2006a).
- Tree removal will be confined within the limits of other Project component sites.
- Trees will be felled into the RoW and other Project component sites so as not to damage existing vegetation along RoW or other Project component boundaries.
- Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station

site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails.

The environmental indicator has been identified as area of native forest and the measurable parameter is hectares. Residual effects identified include the loss of native forest vegetation from clearing activities for the transmission lines, Keewatinoow converter station, construction power station, ground electrode, construction camp, borrow sites and access roads/trails.

5. Riparian Areas May be Disrupted

Disruption to riparian vegetation can come from various project activities such as clearing, construction and maintenance for transmission lines and construction activities for other Project components. The lack of riparian vegetation along a river, stream or shoreline can lead to the degradation of its banks and can result in further changes to the riparian zone and the species which it can support. Removal of vegetation adjacent to a waterway can increase erosion and subsequently increase the amount of sedimentation. Stream crossing guidelines for Manitoba identified that construction activities which remove vegetation can cause an increased sediment load (Manitoba Natural Resources 1996a). Studies have shown significant changes in the status of stream water from clear-cutting, where significant increases in average runoff occurred (Rosen et al. 1996). Other studies have identified vegetation and forest clearing in riparian areas as a potential negative effect from the development of transmission lines (Manitoba Hydro et al. 2003). Buffer widths that range from no buffer to greater than 100 m, based on various resource values and site specific conditions, were identified by Manitoba Conservation in their forest management guidelines for riparian areas (2008) which will reduce adverse effects on these areas.

Riparian areas may be disrupted or lost from the following:

- Construction, maintenance and decommissioning activities for the transmission lines.
- Construction for the Keewatinoow converter station, construction camp, ground electrodes and access roads/trails.

Mitigation

- Maintain a minimum vegetation (i.e., trees and shrubs) buffer width of 30 m of the high water mark for waterbodies such as lakes, ponds and streams.
- Where a buffer zone will be disrupted, clearing, construction, maintenance and decommissioning activities will occur during the winter months and activities will be minimized within the buffer zone.
- If clearing activities are necessary in riparian areas, grubbing will not occur.
- Where riparian areas are disrupted during clearing, construction, maintenance or decommissioning activities, a revegetation plan will be developed to re-establish vegetation where required.

The environmental indicator has been identified as area of riparian habitat and the measurable parameter is hectares. Residual effects identified include the disruption of riparian habitat from construction activities for the transmission lines, Keewatinoow converter station, construction camp, ground electrodes and access roads/trails.

6. Vegetation Diversity Will be Temporarily Reduced on the Project Site

Diversity is defined as the richness of species within an area (Cauboue et al. 1996). The diversity of native vegetation will be temporarily reduced in areas where the RoW is cleared and in areas of other project activities. Many communities assessed along the preliminary preferred route consist of multiple vegetation strata including a tree canopy, tall shrub, low shrub and ground vegetation. Depending on the type of vegetation (e.g., trembling aspen stand), several species can exist at each stratum. In forested communities, clearing of vegetation will remove the upper stratum (tree canopy), while the understory strata (shrub and herb) may also be affected from clearing activities where the soil is disturbed and plant roots are damaged. A reduction in the upper canopy can result in increased solar radiation exposure and adversely affect vegetation understory composition and structure. Transmission line RoW clearing changes the cover of vegetation for the entire width of the RoW (Wildlife Resource Consulting Services Inc. 1995). Other studies/research have also identified that changes to vegetation cover or a reduction in species diversity will result from transmission clearing and construction activities (e.g., Williams 2003; Amec Earth & Environmental 2010; Bureau of Land Management 2010). Other Project components such as the Keewatinoow converter station, construction power station, construction camp and borrow sites will have complete removal of vegetation. Soil/material that has been cleared from other sites (e.g. Keewatinoow converter station) can be used for reclamation of borrow sites.

A reduction in vegetation diversity will occur from the following:

- Construction activities for the transmission lines, Keewatinoow converter station, construction power station and construction camp, ground electrode sites, borrow sites and access roads.

Mitigation

- Carry out clearing and construction activities during the winter months when effects to plant species are minimized.
- Grubbing will be minimized within the RoW to reduce root damage except at foundation sites.
- Native plant species will be used for revegetation of disturbed areas with increased erosion potential or in areas where vegetation has been completely removed. The revegetation plan will focus on the development of stable plant communities rather than the establishment of a few species (Ecological Land Surveys Ltd. 1999).

- Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails.

The environmental indicator has been identified as species diversity and the measurable parameter is species richness and abundance. Residual effects identified include the loss of vegetation diversity from clearing activities for the transmission lines, Keewatinoow converter station, construction power station, construction camp, ground electrodes, borrow sites and access roads/trails.

7. Abundance of Non-Native Species May Increase

The abundance of non-native or invasive plant species may increase as a result of clearing, construction, maintenance and decommissioning activities along the transmission line RoW and other Project components. Non-native species are plants that grow outside of their normal range while invasive species are plants that out-compete native species when introduced outside of their natural setting. Studies have shown that construction related ground disturbance could increase the potential for weed introduction (Bonnyville Power Administration 2010). Construction materials used for station development such as gravel and fill could provide a source for introduced species.

Construction equipment and vehicles can introduce non-native plants such as purple loosestrife (Public Service Commission of Wisconsin 2009). Purple loosestrife is an aggressive herbaceous wetland perennial that thrives due to its prolific seed production, tough roots and low interest to grazing species (Kershaw 2003). Many non-native species thrive in disturbed habitat (Kershaw 2003), and some species compete exceptionally well with desirable or native plants (Royer and Dickinson 1999). During the field assessments in 2010, twenty-seven non-native species were observed throughout the Project area; several of these were invasive plants.

Non-native species are problematic for one or a number of the following reasons. Introduced plants are capable of growing under a wide range of climatic and soil conditions; they produce abundant seeds that are easily disseminated and seeds that are long lived or can remain dormant through the winter season; they can continue to persist even after the removal of vegetative portions of the plant, and they often have vigorous growth and produce seeds under conditions adverse for other plants (Frankton 1961), and can therefore outcompete native species.

Non-native species may be introduced from the following:

- Construction, maintenance and decommissioning activities for the transmission lines and ground electrodes sites.
- Construction and decommissioning activities for the converter stations, construction power station, construction camp, and borrow sites.

- Construction activities for the access roads/trails and use of access roads/trails for maintenance and decommissioning activities.

Mitigation

- Carry out clearing, construction, maintenance and decommissioning activities during the winter months.
- Where clearing, construction, maintenance and decommissioning will occur, all equipment will be thoroughly washed and inspected prior to working in new sites to reduce the spread of introduced species.
- Use construction materials, such as gravel, from clean sources. Materials will be certified weed free prior to use.
- Minimize excessive vegetation maintenance (e.g., unnecessary vegetation removal or suppression) to reduce the establishment of introduced species (International Finance Corporation 2007).
- To address the introduction of non-native species to areas as a result of increased access, an access management plan will be developed prior to clearing and construction of the proposed transmission lines.
- Monitor areas for the introduction of non-native species and use appropriate methods (e.g., mechanical or chemical) to control spreading of these plants.

The environmental indicator has been identified as non-native species occurrence and the measurable parameter is abundance. Residual effects include the introduction of invasive and non-native species from construction, maintenance and site decommissioning activities for the transmission lines and the construction and site decommissioning activities for the Keewatinoow converter station, Riel converter station, construction power station, construction camp, and borrow sites. Invasive and non-native species can also be introduced from construction activities for the access roads/trails and use of access roads/trails for maintenance and decommissioning activities.

8. Vegetation Composition and Structure May be Modified Adjacent to the Disturbance Zone

The removal of vegetation and the creation of new forest edges along a disturbance zone may result in changes to the nearby forest vegetation. Increased solar radiation exposure and a change in the microclimate along these edges may cause changes in plant community understory composition and structure (Ecological Land Surveys Ltd. 1999 and 2003). Species that prefer shaded and moist conditions may decrease in abundance while xerophytic species may increase. A reduction in growth or viability of plant species adjacent to transmission RoWs has been found in other studies (Jackson et al. 1994). Edge effects or long-term disturbance has the potential to gradually damage important habitat and threaten the long-term survival of plants in these areas (Henderson 2009).

Another potential effect to native vegetation adjacent to the disturbance zone is windfall. Windfall or blow-down is a factor influencing newly created edges of forest stands,

(Ecological Land Surveys Ltd. 2003). Windfall usually occurs during the first few years after clearing due to trees being susceptible from increased exposure (British Columbia Transportation Corporation 2010). As a result of windfall, tree canopy cover may decrease, altering forest edge habitat. Increased solar radiation exposure to the vegetation below may affect species composition and possibly community structure.

Vegetation composition and structure may be modified adjacent to the disturbance zone from the following:

- Construction activities for the transmission lines, Keewatinoow converter station, construction power station, construction camp, ground electrode sites, borrow sites and access roads/trails.

Mitigation

- Carry out clearing activities during the winter months to minimize removal of understory species.
- Grubbing will be minimized within the Row to reduce root damage except at foundation sites.
- Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails.

The environmental indicator has been identified as species or communities occurrence and the measurable parameter is species composition and abundance. Residual effects identified include the modification of vegetation composition and community structure adjacent to the disturbance zone from clearing activities for the transmission lines, Keewatinoow converter station, construction power station, construction camp, ground electrode sites, borrow sites and access roads/trails.

9. Fragmentation of Vegetation Communities Will Occur

Fragmentation is defined as the discontinuity in the spatial distribution of resources and conditions present in an area that affects occupancy, reproduction or species survival, resulting from a given set of mechanisms (Franklin et al. 2002) such as disturbance. Construction of the proposed Bipole III transmission line will result in fragmentation of vegetation communities, and according to Joro Consultants Inc. (2011b), fragmentation of large-scale corridor projects is frequently an inevitable consequence. A 66 m RoW will be cleared of trees and shrub vegetation, while wetland vegetation such as sparsely treed bogs will be less affected from fragmentation as a result of less overstory removal. The Bipole III transmission line RoW will intercept a total of 480 km of forest which is 35% of the entire route (Joro Consultants Inc. 2011b). As transmission lines contribute to habitat fragmentation (Wildlife Resource Consulting Services Inc. 1995) some plant species may become vulnerable to extreme weather events (e.g., high winds that may

cause windfall) and competition from edge species. Species richness of plants is highest in edges where drought tolerant plants mix with interior species (Smith 1992).

Another possible consequence of fragmentation is the isolation of vegetation communities that may result in reduced pollen quality and quantity, where a community may be unable to maintain the species. The continued fragmentation of an area can cause long-term reduction in species diversity and suitable habitat (Public Service Commission of Wisconsin 2009). Continued fragmentation could result from ongoing suppression of vegetation (e.g., vegetation maintenance) or additional clearing activities in the area.

Fragmentation of vegetation will occur from the following:

- Construction activities for the transmission lines, Keewatinoow converter station, construction power station, construction camp, ground electrode sites, borrow sites and access roads/trails.

Mitigation

- Non-mitigable for all Project components.

The environmental indicator has been identified as area of vegetation fragmented and the measurable parameter is hectares. The residual effect identified includes fragmentation of local vegetation communities from clearing for the transmission lines, Keewatinoow converter station, construction power station, construction camp, ground electrode sites, borrow sites, access roads/trails.

10. Wetlands May be Affected

Construction of the Bipole III transmission lines may affect wetlands. Long-term effects from construction activities in transmission corridors were observed in shrub/bog wetlands (Nickerson et al. 1989). In these wetlands, measures of plant community composition and recovery of vegetation were lower, compared to controls, after ten years. According to the Public Service Commission of Wisconsin (2009), wetlands may be affected in several ways. Heavy equipment can crush wetland vegetation and change the physical nature of the soils; peatland soils can be easily compacted, increasing runoff, impeding flows and significantly reducing the wetland's water holding capacity; access road construction can change the quantity or direction of water flow, resulting in permanent damage to wetland soils and vegetation; and the introduction of non-native species may also result from the clearing of wetlands. Other potential effects include the disturbance, alteration or loss of wetlands as a result of project activities (Minnesota Department of Commerce et al. 2010).

Wetlands may be affected from the following:

- Construction, maintenance and decommissioning activities for the transmission lines.

Mitigation

- Carry out clearing, construction, maintenance and decommissioning activities during the winter months.
- Where construction activities do not occur over winter months, construction mats could be utilized where wetlands may be affected (Minnesota Department of Commerce et al. 2010).
- Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur (Minnesota Department of Commerce et al. 2010).
- During construction, implement measures to manage storm water runoff to reduce the potential for erosion (Minnesota Department of Commerce et al. 2010).

The environmental indicator has been identified as area of wetlands and the measurable parameter is hectares. No residual effects are anticipated.

11. Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances

Accidents, malfunctions, spills and leaks of fuels and hazardous substances that may occur during the life cycle of the transmission Project can have a negative effect on the environment. One such effect of spills is the potential damage to soils and waterbodies from transmission RoW construction (Wildlife Resource Consulting Services Inc. 1995) which can result in the possible stress and mortality to vegetation. A research study on an experimental RoW oil spill found that total plant cover declined by 73% in the first growing season (Seburn et al. 1996). Although significant plant recovery occurred in subsequent years, 13 of the 34 species identified declined significantly by the third growing season after the spill. Walker et al. (1978) observed in their research that non-vascular plants and most dicot plants showed no recovery after oil was spilled on selected plant communities.

The release of fuels and hazardous substances can occur during the following:

- Construction, maintenance and decommissioning activities for the transmission lines, the converter stations, construction power station and construction camp, ground electrode sites, and borrow sites.
- Construction activities for the access roads/trails and use of access roads/trails for maintenance and decommissioning activities.

Mitigation

- Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures (International Finance Corporation 2007).
- Fuel construction vehicles and maintenance equipment outside of wetlands.
- When servicing equipment, waste products such as oil and antifreeze will be drained into appropriate containers and removed to an approved disposal ground (Manitoba Natural Resources 1996c).

- Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer (Manitoba Natural Resources 1996c).

The environmental indicator has been identified as species occurrence and the measurable parameter is square metres affected. No residual effects are anticipated.

12. Potential Effect of Dust from Project Activities on the Health of Plants

Access road use and maintenance for the transmission lines and other Project components, creates dust that can have a potential negative effect on the environment by causing stress on adjacent vegetation communities. Studies have indicated that dust has adverse effects on vegetation (Techman Engineering Limited 1982, Hirano et al. 1995, Gebhart et al. 1996, Government of Nunavut 2002, Environment Canada 2007). A covering of dust on leaf surfaces increases solar heat absorption and decreases transpiration rates resulting in a reduction of carbon uptake (Succarieh 1992). Vegetation adjacent to access roads where dust levels are high may be susceptible to changes in photosynthetic rate and decreases in growth. Suppressants are an effective option to reduce road dust emissions however dust suppressants are not without their own effects, primarily to vegetation surrounding gravels roads (Environment Canada 2007). To avoid negative effects of road dust on species at risk, a minimum distance of 40 m was identified for short-term survival of plant species (Gleason et al. 2007).

Effects of dust on the health of plants can occur from the following:

- Construction, maintenance and decommissioning activities for the transmission lines, converter stations, construction power station and construction camp, ground electrodes sites and borrow sites.
- Construction activities for the access roads/trails and use of access roads/trails for maintenance and decommissioning activities.

Mitigation

- Carry out construction, maintenance and decommissioning activities during the winter months.
- Access roads can be rocked (i.e., use of coarse aggregates rather than fine materials) to reduce the amount of dust from road use (Bonnyville Power Administration 2010).
- Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement (Manitoba Hydro 2006a). Environmentally friendly dust suppressants include Adherex Road Dust Suppressant (Envirosafe Chemicals Canada Inc.) and Dust Stop (Cypher International Ltd.).

The environmental indicator has been identified as vegetation growth and the measurable parameter is biomass. No residual effects are anticipated.

13. Use of Herbicides May Affect Desirable Vegetation

One common practice of suppressing vegetation growth along transmission line RoWs is the use of herbicides. Unfortunately herbicides not only inhibit the growth of undesirable species but can also negatively effect desirable species by causing undue stress and possible mortality of vegetation that may be considered important for other reasons such as wildlife, traditional uses, or have botanical value. Studies have shown that herbicides have an effect on non-target plant species (Luken et al. 1994) as well as early successional vegetation (Bell et al. 1997). Carvell (1975) observed that herbicide sprayed RoWs differed from communities on unsprayed areas, where herbicide sprayed communities are generally less dense and poorer in number of perennials, particularly the showy wild flowers.

Other research identified that through the use of an integrated vegetation management approach, using herbicide treatment, desirable species densities along RoWs can increase over time (Ballard et al. 2002). In addition, herbicide treatments can be favoured over physical maintenance such as mowing and use of heavy equipment to control vegetation which can result in greater damage to non-target species, erosion, and safety issues (British Columbia Transmission Corporation. 2005).

The potential negative effect of herbicides on desired species may occur during the following:

- Maintenance activities for the transmission lines.

Mitigation

- Control tree growth along the RoW, employing a non-herbicide method such as hand cutting, mechanical cutting or winter shearing (Manitoba Hydro et al. 2003).
- If herbicides are required to control vegetation growth, adhere to all applicable permits and provincial regulations (*The Noxious Weed Act; Pesticides and Fertilizers Control Act*).
- On private lands, prior to any vegetation management work, landowners or appropriate authorities will be contacted to obtain the necessary permission.
- On Crown Lands the necessary work permit(s) are required under the *Manitoba Forest Act*.
- Monitor and identify/mark species of concern and restrict the use of herbicides in these areas.

The environmental indicator has been identified as vegetation composition and the measurable parameter is abundance. There were no residual effects identified.

14. Increased Risk of Wildfire

Wildfires have the potential to develop from the accumulation of slash during clearing, construction and maintenance activities. If underlying growth or slash from construction

and maintenance is left to accumulate within the RoW, sufficient fuel can accumulate that may promote fires in forested areas (International Finance Corporation 2007). There also is the potential for new RoWs to create additional local access, which can result in the potential increase in human-related fire occurrences. A positive effect of transmission line RoWs is the creation of natural firebreaks which can slow or help stop the spread of wildfire as well as provide ground access for firefighting to remote areas. These same RoW's create additional local access, which can result in the potential increase in human-related fire occurrences.

An increase in the risk of wildfire may occur from the following:

- Construction and maintenance activities for the transmission lines.
- Construction activities for the Keewatinoow converter station, construction power station, construction camp, ground electrodes, borrow sites and access roads/trails.

Mitigation

- The removal of slash and other tree maintenance activities will be scheduled to avoid the forest fire season, and burning will occur in the winter months.
- Slash will be cut, piled, burned or disposed of as specified in the Manitoba Conservation work permits.
- Where practical, slash piles will be located on sites with mineral soils.
- Slash piles will be placed away from the RoW edges to reduce the potential for scorching of standing vegetation.
- All fires must be completely extinguished after burning of slash. Burn piles will be monitored to ensure hotspots are not present.
- To address the potential effect of increased human related-fires as a result of increased access, an access management plan should be developed prior to clearing and construction of the proposed transmission lines.

The environmental indicator has been identified as forest fire occurrences along the RoW and the measurable parameter is number of hectares burned. No residual effects are anticipated.

15. Potential for Increased Access by Non-Aboriginal People to Vegetation Resources used by Aboriginal People as Identified Through the ATK Process

Clearing and construction of transmission line rights-of-way can allow increased access by non-community members to sensitive areas that have been identified by local Aboriginal communities and can result in the potential loss of important vegetation resources found at these sites. Although non-Aboriginal people also have long established traditional uses related to botanical resources, several locations along the preferred route have been identified that support plants that are used by Aboriginal people including areas for berry picking, medicine gathering, and harvesting plants and trees for cultural purposes. The harvesting and profiting from non-timber resources by

non-community members is a concern for Aboriginal people (National Aboriginal Forestry Association 1999).

Increased access by non-Aboriginal people to vegetation resources used by Aboriginal people can occur from the following:

- Construction activities for the transmission lines and access roads/trails.

Mitigation

- Where the issue of increased access is important to a community (i.e., effect of increased access to areas deemed important for plant harvesting) an access management plan should be developed prior to clearing and construction of the proposed transmission lines.

The environmental indicator has been identified as access points and the measurable parameter is number of access points/100 km to vegetation resources identified through ATK. There were no residual effects identified.

Table 33: Summary of environmental effects on the terrestrial ecosystems and vegetation for the preferred route and Project components.

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
Clearing and Construction – Transmission Lines¹				
Potential Loss of Plants of Conservation Concern • The effect is the potential loss of plants of conservation concern.	Species or community occurrence	Number of plants present	<ul style="list-style-type: none">• Carry out clearing and construction activities during the winter months when effects to plant species are minimized.• Where activities do not occur over winter months, minimize disturbance to the shrub and herb layers where species of conservation concern have been observed.• Use existing access roads and trails to the extent possible.• Locations of species of conservation concern will be mapped and clearly marked with flagging tape prior to clearing activities.	No
Environmentally Sensitive Areas May be Affected • Potential effects include habitat disturbance, alteration or loss of dry upland prairie, salt marsh/flats, and patterned fens.	Area of sensitive site	Hectares	<ul style="list-style-type: none">• Carry out clearing and construction activities during the winter months to minimize surface damage, rutting and erosion.• Where clearing and construction activities do not occur during winter months, minimize soil and vegetation disturbance in the dry upland prairie areas, patterned fen wetlands and salt marsh/salt flats.• Where disturbance has occurred in areas of increased erosion potential in sensitive areas, re-establish vegetation using native species appropriate for the site.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• Use existing access roads and trails to the extent possible.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.	Loss of trees that may occur in dry upland prairie sites
Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process • Potential effects include the loss of habitat and plants as identified through the ATK process.	Area of habitat or plant loss	Hectares	<ul style="list-style-type: none">• Carry out clearing and construction activities during the winter months to minimize surface damage, rutting and erosion.• Where clearing and construction activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Maintain understory strata during clearing and construction activities.• Remove trees by low ground disturbance• Use existing access roads and trails to the extent possible.	Loss of habitat and plants important to Aboriginal communities
Loss of Native Forest Vegetation • The effect will be the loss of native forest vegetation.	Area of native forest	Hectares	<ul style="list-style-type: none">• Carry out clearing and construction activities during the winter months to minimize the effect on understory species.• Tree removal will be confined within the limits of the RoW with the exception of danger trees located outside of the RoW that can affect the transmission lines.• Tree removal will be confined within the limits of other Project component sites.• Trees will be felled into the RoW and other Project component sites so as not to damage existing vegetation along the RoW or other Project component boundaries.	Loss of native forest vegetation
Riparian Areas May be Disrupted • The potential effect is the disruption of riparian habitats.	Area of riparian habitat	Hectares	<ul style="list-style-type: none">• Maintain a minimum vegetation buffer width of 30 m of the high water mark for waterbodies such as lakes, ponds and streams.• Where a buffer zone will be disrupted, clearing and construction activities will occur during the winter months and activities will be minimized within the buffer zone.• If clearing activities are necessary in riparian areas, grubbing will not occur.• Where riparian areas are disrupted during clearing and construction activities, a revegetation plan will be developed to re-establish vegetation where required.	Disruption of riparian habitat
Vegetation Diversity Will be Temporarily Reduced on the Project Site • The effect is a temporary reduction in vegetation diversity.	Species diversity	Species richness and abundance	<ul style="list-style-type: none">• Carry out clearing and construction activities during the winter months when effects to plant species are minimized.• Grubbing will be minimized within the RoW to reduce root damage except at foundation sites.• Native plant species will be used for revegetation of disturbed areas with increased erosion potential or in areas where vegetation has been completely removed. The revegetation plan should focus on the development of stable plant communities rather than the establishment of a few species.	Loss of vegetation diversity

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
Abundance of Non-Native Species May Increase <ul style="list-style-type: none"> The potential effect is an increase in non-native species occurrence and abundance. 	Non-native species occurrence	Abundance	<ul style="list-style-type: none"> Carry out clearing and construction activities during the winter months. All equipment will be washed and inspected prior to working in new sites to reduce the spread of introduced species. Use construction materials (i.e., gravel) from clean sources. Materials will be certified weed free prior to use. Minimize excessive vegetation maintenance (unnecessary removal) to reduce the establishment of introduced species. To address the introduction of non-native species to areas as a result of increased access, it is recommended that an access management plan be developed prior to clearing and construction of the proposed transmission lines. 	Introduction of invasive and non-native species
Vegetation Composition and Structure May be Modified Adjacent to the Disturbance Zone <ul style="list-style-type: none"> The effect is the modification of species composition and community structure adjacent to the disturbance zone. 	Species or communities occurrence	Species composition and abundance	<ul style="list-style-type: none"> Carry out clearing activities during the winter months to minimize removal of shrub and understory species. Grubbing will be minimized within the RoW to reduce root damage except at foundation sites. 	Modification of vegetation composition and structure adjacent to the disturbance zone
Fragmentation of Vegetation Communities Will Occur <ul style="list-style-type: none"> The effect is the fragmentation of vegetation. 	Area of vegetation fragmented	Hectares	<ul style="list-style-type: none"> Non-mitigable for the transmission lines as a result of vegetation clearing. 	Fragmentation of vegetation and landscape
Wetlands May be Affected <ul style="list-style-type: none"> The potential effects include the disturbance, alteration or loss of wetlands. 	Area of wetlands	Hectares	<ul style="list-style-type: none"> Carry out clearing and construction during the winter months. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion. 	No
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none"> The potential effect is the stress and mortality of vegetation. 	Species occurrence	Square metres	<ul style="list-style-type: none"> Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures. Fuel vehicles and equipment outside of wetlands. When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground. Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer. 	No
Potential Effect of Dust from Project Activities on the Health of Plants <ul style="list-style-type: none"> The potential effect is the stress on surrounding vegetation. 	Vegetation growth	Biomass	<ul style="list-style-type: none"> Carry out construction activities during the winter months. Access roads can be rocked to reduce the amount of dust from road use. Use water or approved dust suppression agents that will not negatively affect surrounding vegetation will be used for dust abatement. Enviromentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop. 	No
Increased Risk of Wildfire <ul style="list-style-type: none"> The potential effect is the loss of vegetation communities. 	Forest fire occurrences along RoW	Number of hectares burned	<ul style="list-style-type: none"> The removal of slash and other tree maintenance activities will be scheduled to avoid the forest fire season, and burning should occur in the winter months. Slash will be cut, piled, burned or disposed of as specified in the Manitoba Conservation work permits. Where practical, slash piles will be located on sites with mineral soils. Slash piles will be placed away from the RoW edges to reduce the potential for scorching of standing vegetation. All fires must be completely extinguished after burning of slash. Burn piles will be monitored to ensure hotspots are not present. To address the potential effect of increased human related-fires as a result of increased access, an access management plan is recommended to be developed prior to clearing and construction of the proposed transmission lines. 	No
Potential for Increased Access by Non-Aboriginal People to Vegetation Resources used by Aboriginal People as Identified Through the ATK Process <ul style="list-style-type: none"> The potential effect is the loss of vegetation resources used by Aboriginal People. 	Access points	Number of access points/100 km to vegetation resources identified through ATK	<ul style="list-style-type: none"> Where the issue of increased access is important to a community (i.e., effect of increased access to areas deemed important for plant harvesting) an access management plan is recommended to be developed prior to clearing and construction of the proposed transmission lines. 	No

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
Clearing and Construction – Converter Stations, Construction Power Station, Construction Camp, Borrow Sites and Access Roads/Trails				
Potential Loss of Plants of Conservation Concern at the Construction Power Station Site • The effect is the loss of plants of conservation concern at the construction power station site.	Species or community occurrence	Number of plants present	• Non-mitigable due to complete removal of all vegetation cover for site.	Loss of plants of conservation concern at the construction power station location
Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process • Potential effects include the loss of habitat and plants as identified through the ATK process for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.	Area of habitat or plant loss	Hectares	• Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails. • Carry out clearing, construction, activities for the access roads/trails during the winter months to minimize surface damage, rutting and erosion.	Loss of habitat and plants important to Aboriginal communities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.
Loss of Native Forest Vegetation • The effect is the loss of native forest vegetation for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails..	Area of native forest	Hectares	• Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails.	Loss of native forest vegetation from clearing activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails..
Riparian Habitat May be Disrupted • The potential effect is the disruption of riparian habitat at the proposed Keewatinoow converter station site construction camp and access roads/trails.	Area of riparian habitat	Hectares	• Maintain a minimum vegetation buffer width of 30 m of the high water mark for waterbodies such as lakes, ponds and streams. • Where a buffer zone will be disrupted, clearing and construction activities will occur during the winter months and activities will be minimized within the buffer zone. • If clearing activities are necessary in riparian areas, grubbing will not occur. • Where riparian areas are disrupted during clearing and construction activities, revegetation plan will be developed to re-establish vegetation where required.	Disruption of riparian habitat at the proposed Keewatinoow converter station site, construction camp and access roads/trails.
Vegetation Diversity Will be Temporarily Reduced on the Project Site • The effect includes a temporary reduction in vegetation diversity for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.	Species diversity	Species richness and abundance	• Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails.	Loss of vegetation diversity from clearing activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.
Abundance of Non-Native Species May Increase • The potential effect is an increase in non-native species occurrence and abundance.	Non-native species occurrence	Abundance	• Carry out clearing and construction activities during the winter months. • All equipment will be washed and inspected prior to working in new sites to reduce the spread of introduced species. • Use construction materials (i.e., gravel) from clean sources. Materials will be certified weed free prior to use.	Introduction of invasive and non-native species
Vegetation Composition and Structure May be Modified Adjacent to the Disturbance Zone • The effect is the modification of species composition and community structure	Species or communities occurrence	Species composition and abundance	• Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails.	Modification of vegetation composition and structure adjacent to the disturbance zone from clearing activities for Keewatinoow converter station,

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
adjacent to the disturbance zone for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.				construction power station, construction camp, borrow sites and access roads/trails.
Fragmentation of Vegetation Communities Will Occur • The effect is the fragmentation of vegetation for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.	Area of vegetation fragmented	Hectares	• Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails.	Fragmentation of vegetation and landscape from clearing activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances • The potential effect is the stress and mortality of vegetation.	Species occurrence	Square metres	• Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures. • Fuel vehicles and equipment outside of wetlands. • When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground. • Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer.	No
Potential Effect of Dust from Project Activities on the Health of Plants • The potential effect is the stress on surrounding vegetation.	Vegetation growth	Biomass	• Carry out construction activities during the winter months. • Access roads can be rocked to reduce the amount of dust from road use. • Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop.	No
Increased Risk of Wildfire • The potential effect is the loss of vegetation communities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.	Forest fire occurrences	Number of hectares burned	• The removal of slash will be scheduled to avoid the forest fire season, and burning should occur in the winter months. • Slash will be cut, piled, burned or disposed of as specified in the Manitoba Conservation work permits. • Where practical, slash piles will be located on sites with mineral soils. • Slash piles will be placed away from the station edges to reduce the potential for scorching of standing vegetation. • All fires must be completely extinguished after burning of slash. Burn piles will be monitored to ensure hotspots are not present. • To address the potential effect of increased human related-fires as a result of increased access, an access management plan is recommended to be developed prior to clearing and construction of the proposed transmission lines. The access plan should consider management objectives, the approach during construction and operation, and a monitoring plan.	No
Potential for Increased Access by Non-Aboriginal People to Vegetation Resources used by Aboriginal People as Identified Through the ATK Process • The potential effect is the loss of vegetation resources used by Aboriginal People from construction activities for the access roads/trails.	Access points	Number of access points/100 km to vegetation resources identified through ATK	• Where the issue of increased access is important to a community (i.e., effect of increased access to areas deemed important for plant harvesting) an access management plan is recommended to be developed prior to clearing and construction of the proposed transmission lines.	No
Clearing and Construction – Ground Electrodes				
Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process • Potential effects include the loss of habitat and plants as identified through the ATK process at the northern ground electrode.	Area of habitat or plant loss	Hectares	• Non-mitigable due to removal of vegetation cover for the ground electrode sites.	Loss of habitat and plants important to Aboriginal communities at the northern groun electrode
Loss of Native Forest Vegetation	Area of native forest	Hectares	• Non-mitigable due to removal of vegetation cover for site.	Loss of native forest vegetation

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
<ul style="list-style-type: none">• The effect is the loss of native forest vegetation for the proposed ground electrode sites.				
Riparian Habitat May be Disrupted <ul style="list-style-type: none">• The potential effect is the disruption of riparian habitat at the ground electrode sites.	Area of riparian habitat	Hectares	<ul style="list-style-type: none">• Maintain a minimum vegetation buffer width of 30 m of the high water mark for waterbodies such as lakes, ponds and streams.• Where a buffer zone will be disrupted, clearing and construction activities will occur during the winter months and activities will be minimized within the buffer zone.• If clearing activities are necessary in riparian areas, grubbing will not occur.• Where riparian areas are disrupted during clearing and construction activities, a revegetation plan will be developed to re-establish vegetation where required.	Disruption of riparian habitat
Vegetation Diversity Will be Temporarily Reduced on the Project Site <ul style="list-style-type: none">• The effect is a temporary reduction in vegetation diversity.	Species diversity	Species richness and abundance	<ul style="list-style-type: none">• Carry out clearing and construction activities during the winter months when effects to plant species are minimized.• Native plant species will be used for revegetation of disturbed areas or in areas where vegetation has been completely removed. The revegetation plan should focus on the development of stable plant communities rather than the establishment of a few species.	Loss of vegetation diversity
Abundance of Non-Native Species May Increase <ul style="list-style-type: none">• The potential effect is an increase in non-native species occurrence and abundance.	Non-native species occurrence	Abundance	<ul style="list-style-type: none">• Carry out clearing and construction activities during the winter months.• All equipment will be washed and inspected prior to working in new sites to reduce the spread of introduced species.• Use construction materials from clean sources. Materials will be certified weed free prior to use.	Introduction of invasive and non-native species
Vegetation Composition and Structure May be Modified Adjacent to the Disturbance Zone <ul style="list-style-type: none">• The effect is the modification of species composition and community structure adjacent to the disturbance zone.	Species or communities occurrence	Species composition and abundance	<ul style="list-style-type: none">• Carry out clearing activities during the winter months to minimize removal of shrub and understory species.	Modification of vegetation composition and structure adjacent to the disturbance zone
Fragmentation of Vegetation Communities Will Occur <ul style="list-style-type: none">• The effect is the fragmentation of vegetation for the ground electrode sites.	Area of vegetation fragmented	Hectares	<ul style="list-style-type: none">• Non-mitigable due to removal of vegetation cover for the ground electrode sites.	Fragmentation of vegetation and landscape
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none">• The potential effect is the stress and mortality of vegetation.	Species occurrence	Square metres	<ul style="list-style-type: none">• Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures.• Fuel vehicles and equipment outside of wetlands.• When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground.• Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer.	No
Potential Effect of Dust from Project Activities on the Health of Plants <ul style="list-style-type: none">• The potential effect is the stress on surrounding vegetation.	Vegetation growth	Biomass	<ul style="list-style-type: none">• Carry out construction activities during the winter months.• Access roads can be rocked to reduce the amount of dust from road use.• Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop.	No
Increased Risk of Wildfire <ul style="list-style-type: none">• The potential effect is the loss of vegetation communities.	Forest fire occurrences	Number of hectares burned	<ul style="list-style-type: none">• The removal of slash will be scheduled to avoid the forest fire season, and burning should occur in the winter months.• Slash will be cut, piled, burned or disposed of as specified in the Manitoba Conservation work permits.• Where practical, slash piles will be located on sites with mineral soils.• Slash piles will be placed away from the forest edges to reduce the potential for scorching of standing vegetation.• All fires must be completely extinguished after burning of slash. Burn piles will be monitored to ensure hotspots are not present.• To address to potential effect of increased human related-fires as a result of increased access, an access management plan is recommended to be developed prior to clearing and construction of the proposed transmission lines. The access plan should consider management objectives, the approach during construction and operation, and a monitoring plan.	No

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
Operations and Maintenance – Transmission Lines				
Potential Loss of Plants of Conservation Concern <ul style="list-style-type: none"> The environmental effect includes the potential loss of plants of conservation concern. 	Species or community occurrence	Number of plants present	<ul style="list-style-type: none"> Carry out maintenance activities during the winter months when effects to plants are minimized. Where activities do not occur over winter months, minimize disturbance to the shrub and herb layer in areas where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concern will be mapped and clearly marked with flagging tape prior to maintenance activities. 	No
Environmentally Sensitive Areas May be Affected <ul style="list-style-type: none"> Potential effects include habitat disturbance, alteration or loss of dry upland prairie, salt marsh/flats, and patterned fens. 	Area of sensitive site	Hectares	<ul style="list-style-type: none"> Carry out maintenance activities during the winter months to minimize surface damage, rutting and erosion. Where maintenance activities do not occur during winter months, minimize soil and vegetation disturbance in the dry upland prairie areas, patterned fen wetlands, and salt marsh/flat. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential in sensitive areas, re-establish vegetation using native species appropriate for the site. 	No
Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process <ul style="list-style-type: none"> Potential effects include the loss of habitat and plants as identified through the ATK process. 	Species or community occurrence	Number of plants present	<ul style="list-style-type: none"> Carry out maintenance activities during the winter months to minimize surface damage, rutting and erosion. Where maintenance activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Maintain understory stratus during maintenance activities. Remove trees low ground disturbance methods. Use existing access roads and trails to the extent possible. 	No
Riparian Habitat May be Disrupted <ul style="list-style-type: none"> The potential effect includes the disruption of riparian habitats. 	Area of riparian habitat	Hectares	<ul style="list-style-type: none"> Maintain a minimum vegetation buffer width of 30 m of the high water mark for waterbodies such as lakes, ponds and streams. Where a buffer zone will be disrupted, activities will occur during the winter months and maintenance activities will be minimized within the buffer zone. Where riparian areas are disrupted during maintenance activities, a revegetation plan will be developed to re-establish vegetation where required. 	No
Abundance of Non-Native Species May Increase <ul style="list-style-type: none"> The potential effect is an increase in non-native species occurrence and abundance. 	Non-native species occurrence	Abundance	<ul style="list-style-type: none"> Carry out maintenance activities during the winter months. All equipment will be washed and inspected prior to working in new sites to reduce the spread of introduced species. Minimize excessive vegetation maintenance (unnecessary removal) to reduce the establishment of introduced species. Monitor areas for the introduction of non-native species and use appropriate methods (i.e., environmentally friendly herbicides) to control spreading of these plants. 	Introduction of invasive and non-native species
Wetlands May be affected <ul style="list-style-type: none"> The potential effects include the disturbance, alteration or loss of wetlands. 	Area of wetlands	Hectares	<ul style="list-style-type: none"> Carry out maintenance activities during the winter months. 	No
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none"> The potential effect is the stress and mortality of vegetation. 	Species occurrence	Square metres	<ul style="list-style-type: none"> Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures. Fuel vehicles and equipment outside of wetlands. When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground. Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer. 	No
Potential Effect of Dust from Project Activities on the Health of Plants <ul style="list-style-type: none"> The potential effect is the stress on surrounding vegetation. 	Vegetation growth	Biomass	<ul style="list-style-type: none"> Carry out maintenance activities during the winter months. Access roads can be rocked to reduce the amount of dust from road use. Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop. 	No
Use of Herbicides May Affect Desirable Vegetation	Vegetation composition	Abundance	<ul style="list-style-type: none"> Control tree growth along the RoW, employing a non-herbicide method such as hand cutting, mechanical cutting or winter shearing. 	No

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
<ul style="list-style-type: none">The potential effect is the loss of native species as a result of herbicide use.			<ul style="list-style-type: none">If herbicides are required to control vegetation growth, adhere to all applicable permits and provincial regulations (<i>The Noxious Weed Act</i>).On private lands, prior to any vegetation management work, landowners or appropriate authorities will be contacted to obtain the necessary permission.On Crown Lands the necessary work permit(s) are required under the <i>Manitoba Forest Act</i>.Monitor and identify/mark species of concern and restrict the use of herbicides in these areas.	
Increased Risk of Wildfire <ul style="list-style-type: none">The potential effect is the loss of vegetation communities.	Forest fire occurrences along RoW	Number of hectares burned	<ul style="list-style-type: none">The removal of slash and other tree maintenance activities will be scheduled to avoid the forest fire season, and burning should occur in the winter months.Slash will be cut, piled, burned or disposed of as specified in the Manitoba Conservation work permits.Where practical, slash piles will be located on sites with mineral soils.Slash piles will be placed away from the RoW edges to reduce the potential for scorching of standing vegetation.All fires must be completely extinguished after burning of slash. Burn piles will be monitored to ensure hotspots are not present.To address to potential effect of increased human related-fires as a result of increased access, an access management plan is recommended to be developed prior to clearing and construction of the proposed transmission lines.	No
Operations and Maintenance – Converter Stations, Construction Power Station, Construction Camp, Borrow Sites and Access Roads/Trails				
Abundance of Non-Native Species May Increase The potential effect is an increase in non-native species occurrence and abundance	Non-native species occurrence	Abundance	<ul style="list-style-type: none">Carry out maintenance activities during the winter months.All equipment will be washed prior to working in new sites to reduce the spread of introduced species.Use construction materials from clean sources.To address the introduction of non-native species to areas as a result of increased access, an access management plan is recommended to be developed prior to clearing and construction.	Introduction of invasive and non-native species.
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none">The potential effect is the stress and mortality of vegetation.	Species occurrence	Square metres	<ul style="list-style-type: none">Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures.Fuel vehicles and equipment outside of wetlandsWhen servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground.Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer.	No
Potential Effect of Dust from Project Activities on the Health of Plants <ul style="list-style-type: none">The potential effect is the stress on surrounding vegetation.	Vegetation growth	Biomass	<ul style="list-style-type: none">Carry out maintenance activities during the winter months.Access roads can be rocked to reduce the amount of dust from road use.Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop.	No
Operations and Maintenance – Ground Electrodes				
Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process <ul style="list-style-type: none">Potential effects include the loss of habitat and plants as identified through the ATK process for the northern ground electrode.	Species or community occurrence	Number of plants present	<ul style="list-style-type: none">Carry out maintenance activities during the winter months to minimize surface damage, rutting and erosion.Where maintenance activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.Maintain understory stratum during maintenance activities.Remove trees by low ground disturbance methods.Use existing access roads and trails to the extent possible.	No
Abundance of Non-Native Species May Increase <ul style="list-style-type: none">The potential effect is an increase in non-native species occurrence and abundance.	Non-native species occurrence	Abundance	<ul style="list-style-type: none">Carry out maintenance activities during the winter months.All equipment will be washed prior to working in new sites to reduce the spread of introduced species.Minimize excessive vegetation maintenance to reduce the establishment of introduced species.Monitor areas for the introduction of non-native species and use appropriate methods (i.e., environmentally friendly herbicides) to control spreading of these plants.	Introduction of invasive and non-native species
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none">The potential effect is the stress and	Species occurrence	Square metres	<ul style="list-style-type: none">Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures.Fuel vehicles and equipment outside of wetlands.When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground.	No

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
mortality of vegetation.			<ul style="list-style-type: none"> Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer. 	
Potential Effect of Dust from Project Activities on the Health of Plants <ul style="list-style-type: none"> The potential effect is the stress on surrounding vegetation. 	Vegetation growth	Biomass	<ul style="list-style-type: none"> Carry out maintenance activities during the winter months. Access roads can be rocked to reduce the amount of dust from road use. Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop. 	No
Decommissioning – Transmission Lines				
Potential Loss of Plants of Conservation Concern <ul style="list-style-type: none"> The environmental effect includes the potential loss of plants of conservation concern. 	Species or community occurrence	Number of plants present	<ul style="list-style-type: none"> Carry out decommissioning activities during the winter months when effects to plants are minimized. Where activities do not occur during winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concern will be clearly mapped and marked with flagging tape prior to decommissioning activities. 	No
Environmentally Sensitive Areas May be Affected <ul style="list-style-type: none"> Potential effects include habitat disturbance, alteration or loss of dry upland prairie, salt marsh/flats, and patterned fens. 	Area of sensitive site	Hectares	<ul style="list-style-type: none"> Carry out decommissioning activities during the winter months to minimize surface damage, rutting and erosion. Where decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance in the dry upland prairie areas, patterned fen wetlands and salt marsh/salt flat. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential in sensitive areas, re-establish vegetation using native species that are appropriate for the site. 	No
Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process <ul style="list-style-type: none"> Potential effects include the loss of habitat and plants as identified through the ATK process. 	Species or community occurrence	Number of plants present	<ul style="list-style-type: none"> Carry out decommissioning activities during the winter months to minimize surface damage, rutting, erosion. Where decommissioning activities do not occur during winter, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Maintain shrub and understory stratus during decommissioning activities. Use existing access roads and trails to the extent possible. 	No
Riparian Habitat May be Disrupted <ul style="list-style-type: none"> The potential effect includes the disruption of riparian habitats. 	Area of riparian habitat	Hectares	<ul style="list-style-type: none"> Maintain a minimum vegetation buffer width of 30 m of the high water mark for waterbodies such as lakes, ponds and streams. Where a buffer zone will be disrupted, activities will occur during the winter months and activities minimized within the buffer zone. Where riparian areas are disrupted during decommissioning activities a revegetation plan will be developed to re-establish vegetation where required. 	No
Abundance of Non-Native Species May Increase <ul style="list-style-type: none"> The potential effect is an increase in non-native species occurrence and abundance. 	Non-native species occurrence	Abundance	<ul style="list-style-type: none"> Carry out decommissioning activities during the winter months. All equipment will be washed prior to working in new sites to reduce the spread of introduced species. Monitor areas for the introduction of non-native species and use appropriate methods (i.e., environmentally friendly herbicides) to control spreading of these plants. 	Introduction of invasive and non-native species
Wetlands May be Affected <ul style="list-style-type: none"> The potential effects include the disturbance, alteration or loss of wetlands. 	Area of wetlands	Hectares	<ul style="list-style-type: none"> Carry out decommissioning activities during the winter months. During decommissioning, implement measures to manage storm water runoff to reduce the potential for erosion. 	No
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none"> The potential effect is the stress and mortality of vegetation. 	Species occurrence	Square metres	<ul style="list-style-type: none"> Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures. Fuel vehicles and equipment outside of wetlands. When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground. Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer. 	No
Potential Effect of Dust from Project Activities on the Health of Plants	Vegetation growth	Biomass	<ul style="list-style-type: none"> Carry out decommissioning activities during the winter months. Access roads can be rocked to reduce the amount of dust from road use. 	No

Environmental Effect	Environmental Indicator	Measureable Parameter / Variable	Mitigation Measures	Residual Environmental Effects
<ul style="list-style-type: none">The potential effect is the stress on surrounding vegetation.			<ul style="list-style-type: none">Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop.	
Decommissioning – Converter Stations, Construction Power Station, Construction Camp, Borrow sites and Access Roads/Trails				
Abundance of Non-Native Species May Increase <ul style="list-style-type: none">The potential effect is an increase in non-native species occurrence and abundance.	Non-native species occurrence	Abundance	<ul style="list-style-type: none">Carry out decommissioning activities during the winter months.All equipment will be washed prior to working in new sites to reduce the spread of introduced species.Monitor areas for the introduction of non-native species and use appropriate methods (i.e., environmentally friendly herbicides) to control spreading of these plants.	Introduction of invasive and non-native species
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none">The potential effect is the stress and mortality of vegetation.	Species occurrence	Square metres	<ul style="list-style-type: none">Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures.Fuel vehicles and equipment outside of wetlands.When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground.Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer.	No
Potential Effect of Dust from Project Activities on the Health of Plants <ul style="list-style-type: none">The potential effect is the stress on surrounding vegetation.	Vegetation growth	Biomass	<ul style="list-style-type: none">Carry out decommissioning activities during the winter months.Access roads can be rocked to reduce the amount of dust from road use.Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop.	No
Decommissioning – Ground Electrodes				
Potential Loss of Habitat and Plants Used by Aboriginal People as Identified Through the ATK Process <ul style="list-style-type: none">Potential effects include the loss of habitat and plants as identified through the ATK process for the northern ground electrode.	Species or community occurrence	Number of plants present	<ul style="list-style-type: none">Carry out maintenance activities during the winter months to minimize surface damage, rutting and erosion.Where maintenance activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.Maintain understory stratoms during maintenance activities.Remove trees by low ground disturbance methods.Use existing access roads and trails to the extent possible.	No
Abundance of Non-Native Species May Increase <ul style="list-style-type: none">The potential effect is an increase in non-native species occurrence and abundance.	Non-native species occurrence	Abundance	<ul style="list-style-type: none">Carry out decommissioning activities during the winter months.All equipment will be washed prior to working in new sites to reduce the spread of introduced species.Monitor areas for the introduction of non-native species and use appropriate methods (i.e., environmentally friendly herbicides) to control spreading of these plants.	Introduction of invasive and non-native species
Potential Effect to Vegetation from the Release of Fuels and Hazardous Substances <ul style="list-style-type: none">The potential effect is the stress and mortality of vegetation.	Species occurrence	Square metres	<ul style="list-style-type: none">Observe manufacturer machinery and equipment guidelines, procedures and spill prevention and emergency response measures.Fuel vehicles and equipment outside of wetlands.When servicing equipment, waste products such as oil and antifreeze should be drained into appropriate containers and removed to an approved disposal ground.Any spills of hazardous substances will be cleaned up immediately and reported to the local Conservation Officer.	No
Potential Effect of Dust from Project Activities on the Health of Plants <ul style="list-style-type: none">The potential effect is the stress on surrounding vegetation.	Vegetation growth	Biomass	<ul style="list-style-type: none">Carry out decommissioning activities should occur during the winter months.Access roads can be rocked to reduce the amount of dust from road use.Water or approved dust suppression agents that will not negatively effect surrounding vegetation will be used for dust abatement. Environmentally friendly dust suppressants include Adherex Road Dust Suppressant and Dust Stop.	No

¹ Transmission lines include the 500 kV HVdc line, northern collector lines, Long Spruce to Henday transmission line, construction power line and ground electrode distribution lines.

7.4.1 Valued Environmental Components

Environmental effects, mitigation measures and residual effects were identified for the following valued environmental components (VEC): plant species and communities of conservation concern; native grassland/prairie areas; and plant species/communities important to Aboriginal people as identified through the ATK process. Although these three VECs are discussed in this section (7.4.1), they have also been included in the first three effects that were identified in the Environmental Effects Identification and Mitigation Section 7.4. The environmental effects, mitigation measures and residual effects for each VEC are found below and in Table 34.

1. Plant species/communities of conservation concern

Species of conservation concern are important because these plants exist in low numbers, play a role in helping to preserve species diversity, their distribution is often restricted, and some species are protected. Plants species of conservation concern were identified as a VEC and utilized in the assessment due to the low abundance of these species and the need to protect them either provincially, federally or as a result of them being listed by the Manitoba Conservation Data Centre (S1 to S3). Fifteen locations for plant species of conservation concern were previously known to occur along the transmission RoW and one along the northern collector RoW (MBCDC records). Assessments conducted in 2010 identified species of concern at the construction power station and 26 other locations along the local study area; species of concern were also observed during studies conducted for Swan Lake First Nation.

The environmental effect identified is the potential loss of plants of conservation concern as a result of construction, maintenance and decommissioning activities along the transmission lines and construction activities for the construction power station. There is the potential for plant species of conservation concern and the habitats they occupy to be lost as a result of the use of heavy equipment (crushing) during construction, maintenance and decommissioning activities and clearing and grubbing (removal of roots) of vegetation during construction activities for the transmission lines and other associated Project components. For the transmission lines mitigation measures include: conducting clearing, construction, maintenance and decommissioning activities in the winter months; where activities do not occur over the winter months, minimize disturbance to the shrub and herb layer in areas where species of conservation concern have been observed; use existing access roads and trails to the extent possible; and mapping and clearly marking the location of species of conservation concern prior to construction, maintenance and decommissioning activities. The potential loss of plants (from one species) of conservation concern was a residual effect identified for the construction power station as a result of construction activities and the complete removal of vegetation from the site.

2. Native grassland/prairie areas

Historically, grassland ecosystems existed over large areas but only few undisturbed natural areas remain today and need to remain intact as these areas provide important

Table 34. Valued environmental components selected for the Project.

Valued Environmental Component	Environmental Indicator	Measureable Parameter / Variable	Environmental Effect	Mitigation Measures	Residual Environmental Effect
Clearing and Construction – Transmission Lines					
Plant species and communities of conservation concern	Species or community occurrence	Number of plants present	Loss of plants of concern along RoW from clearing and construction activities.	<ul style="list-style-type: none"> • Conduct clearing and construction activities in the winter months. • Where activities do not occur over winter months, minimize disturbance to the shrub and herb layer in areas where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concern will be mapped and clearly marked with flagging tape prior to clearing activities. 	No loss of plants of conservation concern.
Native grassland/prairie areas	Area of native grassland/prairie	Hectares	Loss of native grassland/prairie areas along RoW from clearing and construction activities.	<ul style="list-style-type: none"> • Conduct clearing and construction activities in the winter months. • Where activities do not occur over winter months, minimize soil and vegetation disturbance in these areas. • Where disturbance has occurred, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible. 	Loss of trees that may occur in dry upland prairie sites.
Plant species/communities important to Aboriginal people as identified through the ATK process	Area of habitat or plants used for medicinal, food and cultural uses	Hectares	Loss of habitat or plants valued by Aboriginal people along RoW from clearing and construction activities.	<ul style="list-style-type: none"> • Conduct clearing and construction activities in the winter months. • Where activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Maintain understory stratus during clearing and construction activities. • Use existing access roads and trails to the extent possible. 	Loss of plants/communities important to Aboriginal people.
Operations and Maintenance – Transmission Line					
Plant species and communities of conservation concern	Species or community occurrence	Number of plants present	Loss of plants of concern along RoW from maintenance activities.	<ul style="list-style-type: none"> • Conduct maintenance activities in the winter months. • Where activities do not occur over winter months, minimize disturbance to the shrub and herb layer in areas where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concern will be mapped and clearly marked with flagging tape prior to maintenance activities. 	No loss of plants of conservation concern.
Native grassland/prairie areas	Area of native grassland/prairie	Hectares	Loss of native grassland/prairie areas along RoW from maintenance activities.	<ul style="list-style-type: none"> • Conduct maintenance activities in the winter months. • Where maintenance activities do not occur over winter months, minimize soil and vegetation disturbance in these areas. • Where disturbance has occurred, re-establish vegetation using native species appropriate for the site. 	No disturbance to native grassland/prairie areas.

Valued Environmental Component	Environmental Indicator	Measureable Parameter / Variable	Environmental Effect	Mitigation Measures	Residual Environmental Effect
				<ul style="list-style-type: none"> Use existing access roads and trails to the extent possible. 	
Plant species/communities important to Aboriginal people as identified through the ATK process	Area of habitat or plants used for medicinal, food and cultural uses	Hectares	Loss of habitat and plants valued by Aboriginal people along RoW from maintenance activities.	<ul style="list-style-type: none"> Conduct maintenance activities in the winter months. Where activities do not occur during winter months, minimize clearing and construction activities in areas of plants used by Aboriginal people as identified through the ATK process. Maintain understory stratus during maintenance activities. Use existing access roads and trails to the extent possible. 	No loss of plants/communities important to Aboriginal people.
Decommissioning – Transmission Lines					
Plant species and communities of conservation concern	Species or community occurrence	Number of plants present	Loss of plants of concern along RoW from decommissioning activities.	<ul style="list-style-type: none"> Conduct decommissioning activities in the winter months. Where activities do not occur over winter months, minimize disturbance to the shrub and herb layer in areas where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concern will be mapped and clearly marked with flagging tape prior to decommissioning activities. 	No loss of plants of conservation concern.
Native grassland/prairie areas	Area of native grassland/prairie	Hectares	Loss of native grassland/prairie areas along RoW from decommissioning activities.	<ul style="list-style-type: none"> Conduct decommissioning activities in the winter months. Where decommissioning activities do not occur over winter months, minimize soil and vegetation disturbance in these areas. Where disturbance has occurred, re-establish vegetation using native species appropriate for the site. Use existing access roads and trails to the extent possible. 	No disturbance to native grassland/prairie areas.
Plant species/communities important to Aboriginal people as identified through the ATK process	Area of habitat or plants used for medicinal, food and cultural uses	Hectares	Loss of habitat and plants valued by Aboriginal people along RoW and other components from decommissioning activities.	<ul style="list-style-type: none"> Conduct decommissioning activities in the winter months. Where activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Maintain understory stratus during decommissioning activities. Use existing access roads and trails to the extent possible. 	No loss of plants/communities important to Aboriginal people.
Clearing and Construction – Keewatinooow Converter Station, Construction Power Station, Construction Camp, Borrow Sites and Access Roads					
Plant species and communities of conservation concern	Species or community occurrence	Number of plants present	Loss of plants of concern at the construction power station from clearing and construction activities.	<ul style="list-style-type: none"> Non-mitigable due to the complete removal of vegetation from the site. 	Loss of plants (from one species) of conservation concern at the construction power station.

Valued Environmental Component	Environmental Indicator	Measureable Parameter / Variable	Environmental Effect	Mitigation Measures	Residual Environmental Effect
Plant species/ communities important to Aboriginal people as identified through the ATK process	Area of habitat or plants used for medicinal, food and cultural uses	Hectares	Loss of habitat and plants valued by Aboriginal peoples from clearing and construction activities for the Keewatinoow converter station, construction power station, construction camp and borrow sites	<ul style="list-style-type: none">• Non-mitigable for the Keewatinoow converter station, construction power station, construction camp, and borrow sites due to complete removal of all vegetation cover for the sites.• Carry out clearing, construction, activities for the access roads/trails during the winter months to minimize surface damage, rutting and erosion.	Loss of habitat and plants valued by Aboriginal peoples from clearing and construction activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.
Clearing and Construction –Ground Electrode Sites					
Plant species/ communities important to Aboriginal people as identified through the ATK process	Area of habitat or plants used for medicinal, food and cultural uses	Hectares	Loss of habitat and plants valued by Aboriginal peoples from clearing and construction activities for the northern ground electrode site.	<ul style="list-style-type: none">• Conduct clearing and construction activities in the winter months.• Where activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Maintain understory stratus during decommissioning activities.• Use existing access roads and trails to the extent possible.	Loss of habitat and plants valued by Aboriginal peoples from clearing and construction activities for the northern ground electrode site.

plant and wildlife habitat. Native grasslands are also important sites as there is the potential for federal and provincial species of concern to exist in these areas. Thirteen plant species that are listed as protected have the potential to occur in the southern portion of the local study area and may potentially be affected by construction activities. Grasslands and prairie areas, of which dry upland prairie sites are part of, were identified as a VEC and utilized in this assessment for the reason that these areas are known to support species of conservation concern and that this ecosystem is among the most threatened in North America. A loss in the amount of native grasslands could result in a reduction of species found in these areas.

The environmental effect identified is the loss of native grassland/prairie areas along the transmission line RoWs from construction, maintenance and decommissioning activities. Mitigation measures include: conducting construction, maintenance and decommissioning activities in the winter months; where activities do not occur over winter months, minimize soil and vegetation disturbance in these areas; where disturbance has occurred, re-establish vegetation using native species appropriate for the site; and use existing access roads and trails to the extent possible. During field assessments in 2010, areas of sparse bur oak (*Quercus macrocarpa*) were observed in dry upland prairie sites that span the width of the transmission line RoW and will be removed during construction activities, resulting in a potential residual effect.

3. Plant species/communities important to First Nations as identified through the ATK process

Plant communities that are important to Aboriginal people have been identified as a valued environmental component as these sites are used for gathering food and medicines, and harvesting plants and trees for cultural and other purposes. Nineteen traditional plant harvesting locations were identified along the RoW. From self-directed studies, botanical resource areas have also been identified in the vicinity of the northern Project components and along the RoW.

The environmental effect identified is the loss or temporary disturbance of habitat and plants valued by Aboriginal people from construction, maintenance and site decommissioning activities from the transmission lines and northern ground electrode and line, and construction activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails. Project activities can also increase access (for other people) to sensitive areas that can result in the potential loss of important vegetation resources found at these sites. Mitigation measures include: conduct construction, maintenance and decommissioning activities in the winter months; where activities do not occur in the winter, then minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process; maintain understory stratus during construction, maintenance and decommissioning activities; and use existing access roads and trails to the extent possible. Although mitigation measures have been suggested for construction activities for the transmission lines, northern ground electrode site and line and access roads/trails, there is the likelihood that a loss of plant communities (especially trees) important to Aboriginal communities will

occur. Due to the potential loss of plant communities along the transmission line Row, northern ground electrode and line and access roads/trails as well as the complete removal of vegetation for the Keewatinoow converter station, construction power station, construction camp, borrow sites, a residual effect has been identified.

7.5 Residual Effects Assessment

Guided by the Canadian Environmental Assessment Act (Federal Environmental Assessment Review Office 1994), the significance approach framework was used to determine whether the Project is likely to cause significant adverse environmental effects.

An environmental effect is a change in the environment caused by the project. A residual environmental effect is the resultant change in the environment after the application of mitigation measures. The significance of residual environmental effects (after application of mitigation) will be assessed using the following criteria:

- Direction of the Effect – The direction of the effect describes the difference or trend compared with existing conditions.
- Ecological Importance – Ecological importance includes rarity and uniqueness, fragility, importance within ecosystem, and importance to scientific studies.
- Societal Importance – Societal importance includes the value that individuals/communities place on components of the affected socio-economic and/or biophysical environments that are necessary for economic, social and cultural well-being.
- Magnitude – Magnitude is the degree of disturbance the effect has on a component of the biophysical or socio-economic environment.
- Geographic Extent – Geographical extent is the spatial boundary where the effect would occur.
- Duration – Duration is how long would the effect last.
- Frequency – Frequency is how often would the effect occur.
- Reversibility – Reversibility is the potential for recovery from an adverse effect.

Ratings for each of the criteria have been identified as follows: positive, negligible and negative for direction of residual effect; high, medium and low for ecological importance, high medium and low value for societal importance; large, medium and small for magnitude; regional, local or project site/footprint for geographic extent; long term, medium term and short-term for duration; regular/continuous, sporadic/intermittent and once for frequency; and irreversible/permanent and reversible for reversibility. Definitions for each of these ratings can be found in Appendix K. The ratings of the residual effects considered scientific study and Aboriginal Traditional Knowledge, and relate to each phase of the Project.

Table 35 identifies the residual effects and criteria ratings for the Project, taking into account all Project components. Overall, it is expected that the Project will have nine

Table 35. Bipole III residual environmental effects assessment summary.

Residual Environmental Effect	Direction	Ecological Importance	Societal Importance	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Construction – Transmission Lines								
Removal of trees that may occur in dry upland prairie sites	Negative	Low	Low value	Small	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Loss of plant communities important to Aboriginal people	Negative	Low	Medium value	Medium	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, medium value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Loss of native forest vegetation	Negative	Low	Low value	Small	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Loss of vegetation diversity temporarily	Negative	Low	Low value	Small	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect of construction is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Disruption of riparian habitat	Negative	Low	Low value	Small	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Modification of vegetation composition and structure adjacent to the disturbance zone	Negative	Low	Low value	Small	Local	Medium-term	Once	Reversible

Residual Environmental Effect	Direction	Ecological Importance	Societal Importance	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Rationale: Mitigation will serve to restrict the location and timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, local geographical extent, medium-term duration, frequency is once and reversible upon decommissioning.								
Fragmentation of vegetation communities	Negative	Medium	Low value	Medium	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the location of construction activities. The residual environmental effect of construction activities is negative with medium ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once and reversible upon decommissioning.								
Introduction of invasive and non-native species	Negative	Low	Low value	Medium	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the method and timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Construction – Converter Stations, Construction Power Station, Construction Camp, Borrow Sites, Access Road/Trails								
Loss of plants (from one species) of conservation concern from the construction power station site	Negative	Medium	Medium value	Small	Project	Long-term	Once	Irreversible/Permanent
Rationale: Non-mitigable due to complete removal of all vegetation cover for the development of the construction power station site. The residual environmental effect of construction activities is negative with medium ecological, and medium value for societal importance, small magnitude, limited geographical extent, long-term duration, frequency is once, and irreversible/ permanent even after decommissioning.								
Loss of plant communities important to Aboriginal people for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.	Negative	Low	Medium value	Medium	Project	Medium-term	Once	Reversible
Rationale: Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, medium value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once and reversible upon decommissioning.								
Loss of native forest vegetation from clearing activities for the Keewatinoow converter station, construction power	Negative	Low	Low value	Small	Project	Medium-term	Once	Reversible

Residual Environmental Effect	Direction	Ecological Importance	Societal Importance	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
station, construction camp, borrow sites and access roads/trails.								
Rationale: Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Loss of vegetation diversity for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.	Negative	Low	Low value	Small	Project	Medium-term	Once	Reversible
Rationale: Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Disruption of riparian habitat for the Keewatinoow converter station, construction camp and access roads/trails.	Negative	Low	Low value	Small	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the location, extent, method, and timing of construction activities for the Keewatinoow converter station, construction camp and access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Modification of vegetation composition and structure adjacent to the disturbance zone for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails.	Negative	Low	Low value	Small	Local	Medium-term	Once	Reversible
Rationale: Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, borrow sites and access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, local geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Fragmentation of vegetation communities for the Keewatinoow converter station,	Negative	Medium	Low value	Medium	Project	Medium-term	Once	Reversible

[illegible]

Residual Environmental Effect	Direction	Ecological Importance	Societal Importance	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
reversible upon decommissioning.								
Modification of vegetation composition and structure adjacent to the disturbance zone	Negative	Low	Low value	Small	Local	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, local geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Fragmentation of vegetation communities	Negative	Medium	Low value	Medium	Project	Medium-term	Once	Reversible
Rationale: Non-mitigable due to removal of vegetation cover for the ground electrode sites. The residual environmental effect of construction activities is negative with medium ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Introduction of invasive and non-native species	Negative	Low	Low value	Medium	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the method and timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Operations – Transmission Lines								
Introduction of invasive and non-native species	Negative	Low	Low value	Medium	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the method and timing of maintenance activities. The residual environmental effect of maintenance activities is negative with low ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Operations – Converter Stations, Construction Power Station, Construction Camp, Borrow Sites, Access Roads/Trails								
Introduction of invasive and non-native species	Negative	Low	Low value	Medium	Project	Medium-term	Once	Reversible
Rationale: Mitigation will serve to restrict the method and timing of site maintenance activities. The residual environmental effect of site maintenance activities is negative with low ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.								
Operations – Ground Electrodes								
Introduction of invasive and non-native species	Negative	Low	Low value	Medium	Project	Medium-term	Once	Reversible

different residual effects on vegetation after the application of mitigation for one or more of the following Project components: transmission lines, converter stations, construction power station, construction camp, borrow sites, ground electrodes and associated lines, and access roads/trails. These residual effects include the loss of plants (from one species) of conservation concern from the construction power station site, the removal of trees in prairie areas, loss of plant communities important to Aboriginal people, loss of native forest vegetation, disruption of riparian habitat, temporary loss of vegetation diversity, modification of vegetation adjacent to the disturbance zone, fragmentation of vegetation communities and introduction of invasive and non-native species. These residual effects can also occur during one or more of the project activity phases (i.e. construction, maintenance and site decommissioning). All potential effects are considered non-permanent and are reversible within the life of the Project except for the loss of uncommon plants at the construction power station. However, this species is well represented in the area surrounding the construction power station. A description of the criteria ratings for the residual effects are provided below.

Transmission Lines

1. **Removal of trees that may occur in dry upland prairie sites** from construction activities. Mitigation will serve to restrict the location, extent, method and timing of construction activities for the transmission line. The residual environmental effect of construction is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
2. **Loss of plant communities important to Aboriginal people** from construction activities from the transmission lines. Although mitigation measures have been suggested for construction activities for the transmission lines there is the likelihood that a loss of plant communities (especially trees) important to Aboriginal communities will occur and therefore a residual effect has been identified. Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect is negative with low ecological importance, medium value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
3. **Loss of native forest vegetation** from construction activities for the transmission lines. Mitigation will serve to restrict the location, extent, and timing of construction activities. The residual environmental effect of construction is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
4. **Loss of vegetation diversity** temporarily from clearing activities for the transmission lines. Mitigation will serve to restrict the location, extent, method, and timing of

clearing activities. The residual environmental effect of clearing is negative with low ecological importance, low societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.

5. **Disruption of riparian habitat** from construction activities for the transmission lines. Although mitigation measures were suggested to minimize potential effects on riparian habitats during construction activities, the potential for vegetation to be disturbed in riparian habitats to create access for the construction of the Project exists. For this reason, loss of riparian habitat was identified as a residual effect. Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
6. **Modification of vegetation composition and structure adjacent to the disturbance zone** from clearing activities for the transmission lines. Mitigation will serve to restrict the location and timing of clearing activities. The residual environmental effect of clearing and maintenance activities is negative with low ecological and societal importance, small magnitude, local geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
7. **Fragmentation of vegetation communities** from construction activities for the transmission lines. Due to fragmentation being non-mitigable for the transmission lines it was identified as residual. The residual environmental effect is negative with medium ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
8. **Introduction of invasive and non-native plants** from construction, maintenance and site decommissioning activities for the transmission lines. Invasive and non-native species may also be introduced from access roads/trails use for construction, maintenance and site decommissioning activities for. Although mitigation measures have been suggested to minimize the introduction of invasive and non-native species during project activities (i.e., washing equipment), the potential exists for these species to be introduced as a result of improper equipment cleaning methods and the ability of these species to establish quickly in disturbed sites. Mitigation will serve to restrict the method and timing of construction activities. The residual environmental effect is negative with low ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.

Converter Stations, Construction Power Station, Construction Camp, Borrow Sites and Access Roads/Trails

1. **Loss of plants (from one species) of conservation concern** from construction activities for the construction power station site. Non-mitigable due to complete removal of all vegetation cover for the development of the construction power station site. The residual environmental effect of construction activities is negative with medium ecological importance and medium value for societal importance, small magnitude, limited geographical extent, long-term duration, frequency is once, and irreversible.
2. **Loss of plant communities important to Aboriginal people** from construction activities from the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails. Due to the removal of vegetation for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads, a residual effect has been identified. The residual environmental effect is negative with low ecological importance, medium value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
3. **Loss of native forest vegetation** from construction activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads/trails. Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
4. **Loss of vegetation diversity** from construction activities for the Keewatinoow converter station, construction power station, construction camp, borrow sites and access roads. Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
5. **Disruption of riparian habitat** from construction activities for the Keewatinoow converter station, construction camp and access roads/trails. Although mitigation measures were suggested to minimize potential effects on riparian habitats during construction activities the potential still exists for vegetation to be disturbed as a

result of those activities (i.e. access across riparian areas during construction). For this reason, loss of riparian habitat was identified as a residual effect. Mitigation will serve to restrict the location, extent, method, and timing of construction activities for the Keewatinoow converter station, construction camp and access roads/trails. The residual environmental effect is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.

6. **Modification of vegetation composition and structure adjacent to the disturbance zone** from construction activities for the Keewatinoow converter station, construction power station, construction camp and borrow sites. Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, local geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
7. **Fragmentation of vegetation communities** from construction activities for the Keewatinoow converter station, construction power station, construction camp, and borrow sites. Non-mitigable due to complete removal of all vegetation cover for the development of the Keewatinoow converter station, construction power station site, construction camp, and borrow sites and removal of trees and shrubs from access roads/trails. The residual environmental effect of construction is negative with medium ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.
8. **Introduction of invasive and non-native plants** from construction and site decommissioning activities for the Keewatinoow converter station, Riel converter station, construction power station, construction camp, borrow sites and access roads/trails. Although mitigation measures have been suggested to minimize the introduction of invasive and non-native species during project activities, the potential exists for these species to be introduced as a result of improper equipment cleaning methods and the ability of these species to establish quickly in disturbed sites. Mitigation will serve to restrict the method and timing of construction activities. The residual environmental effect is negative with low ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.

Ground Electrodes

1. **Loss of plant communities that are important to Aboriginal communities** from construction activities from the northern ground electrode and line. Although mitigation measures have been suggested for construction activities for the northern

ground electrode site and line, there is the likelihood that a loss of plant communities important to Aboriginal communities will occur. Due to the potential loss of plant communities along the northern ground electrode and line a residual effect has been identified. Non-mitigable due to removal of vegetation cover for the northern ground electrode site and line. The residual environmental effect is negative with low ecological importance, medium value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.

2. **Loss of native forest vegetation** from construction activities for the ground electrodes. Non-mitigable due to removal of vegetation cover for the development of the ground electrode sites. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.
3. **Loss of vegetation diversity** temporarily from construction activities for the ground electrodes. Mitigation will serve to restrict the timing of clearing activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.
4. **Disruption of riparian habitat** from construction activities for the ground electrode sites. Although mitigation measures were suggested to minimize potential effects on riparian habitats during construction activities, the potential for vegetation to be disturbed in riparian habitats for the construction of the Project exists. For this reason, loss of riparian habitat was identified as a residual effect. Mitigation will serve to restrict the location, extent, method, and timing of construction activities. The residual environmental effect is negative with low ecological importance, low value for societal importance, small magnitude, limited geographical extent, medium-term duration, frequency is once and is reversible upon decommissioning.
5. **Modification of vegetation composition and structure adjacent to the disturbance zone** from construction activities for the ground electrodes. Mitigation will serve to restrict the timing of construction activities. The residual environmental effect of construction activities is negative with low ecological importance, low value for societal importance, small magnitude, local geographical extent, medium-term duration, frequency is once, and reversible upon decommissioning.
6. **Fragmentation of vegetation communities** from construction activities for the ground electrode sites. Non-mitigable due to removal of vegetation cover for the development of the ground electrode. The residual environmental effect of construction is negative with medium ecological importance, low value for societal

importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.

7. **Introduction of invasive and non-native plants** from construction, maintenance and site decommissioning activities for the ground electrodes and lines. Invasive and non-native species may also be introduced from access roads/trails use for construction, maintenance and site decommissioning activities. Although mitigation measures have been suggested to minimize the introduction of invasive and non-native species during project activities (i.e., washing equipment), the potential exists for these species to be introduced as a result of improper equipment cleaning methods and the ability of these species to establish quickly in disturbed sites. Mitigation will serve to restrict the method and timing of construction activities. The residual environmental effect is negative with low ecological importance, low value for societal importance, medium magnitude, limited geographical extent, medium-term duration, frequency is once, and is reversible upon decommissioning.

7.5.1 Determination of Significance

The residual effects identified for terrestrial ecosystems and vegetation VECs (loss of plants of concern, loss of trees in dry upland prairie and loss of plant communities important to Aboriginal people) are considered not significant for the following reasons:

- Snow willow is ranked S3 (uncommon) and other locations for this plant were found in the vicinity of the northern Project components and local study area of the transmission line;
- Trees were commonly observed in the dry upland prairie ecosystem and these sites are not protected areas; and
- The loss of plant species and communities, as a result of project activities, are common species/communities that can be found in the Project study area and may eventually return after construction activities or site decommissioning of Project components.

The actual determination of significance will be made by Manitoba Hydro Licensing and Environmental Assessment staff based on the information provided and consideration of uncertainty and likelihood of occurrences. The determination of significance will be provided in the Environmental Impact Statement.

7.6 Cumulative Effects Assessment

Cumulative effects occur when the environmental effects from a project combine with the environmental effects from other past, present and reasonably foreseeable future projects or activities. Cumulative effects assessments (CEA) involve determining the combined effects from all developments/activities occurring within relevant spatial (geographic) and temporal (time) boundaries.

Cumulative effects assessments usually consider effects on the VECs due to potential interactions with other projects and activities, including the project under review. The analysis of cumulative effects will focus on the effects on the terrestrial ecosystem and vegetation VECs identified for the Bipole III Project. The cumulative effects assessment will be carried out using residual environmental effects (i.e., effects remaining after the application of mitigation measures) that may occur for the VECs. For the Bipole III Project, the framework used for the cumulative effects assessment involved the following five tasks:

- Scoping;
- Analysis of Effects;
- Identification of Mitigation Measures;
- Identification of Follow-up; and
- Evaluation of Significance

7.6.1 Scoping

In order to determine if the Project has the potential to contribute to any cumulative effects, scoping involved identifying any important issues, VECs and environmental effects. The five steps below were carried out for scoping of cumulative effects for the Project.

7.6.1.1 Identification of Regional Issues of Concern

Regional issues of concern that relate to terrestrial ecosystems and vegetation were identified based on observations/information collected during the terrestrial ecosystem and vegetation assessments; from the public consultation process which included the general public, environmental organizations, government and scientific community; meetings that were conducted with Aboriginal groups and organizations; and through the ATK workshop process. The following regional issues of concern were identified:

- a) Increased access to First Nation resource use areas from non-Aboriginal peoples (i.e., blueberry picking areas).

Increased access by non-Aboriginal peoples to vegetation resource areas used by Aboriginal peoples could occur as a result of the Bipole III Project. Resource use areas identified include berry picking sites and other plant harvesting areas.

- b) Potential effect to local habitat that has been left in a natural state in agricultural areas.

These areas may consist of pockets or stands of native vegetation left undisturbed by surrounding agricultural activities. Reasons for these areas to be left in their natural state include (but are not limited to) native prairie, aesthetics, shelterbelts, woodlots,

habitat for wildlife (which may be under conservation agreements), and potential botanical resource areas.

c) Potential effect on species of conservation concern.

Species of conservation concern occur in the Project footprint and were also observed and previously known to occur in the local study area. Desktop studies also identified previously known occurrences of species of conservation concern in the Project study area. Species of conservation concern are important as these plants occur in lower numbers than common species, are often located in unique habitats, and for maintaining species diversity.

7.6.1.2 Identification of Valued Environmental Components

Table 36 summarizes the terrestrial ecosystem and vegetation VECs identified for the Bipole III Project. These include plant species and communities of conservation concern, native grassland/prairie areas, and plant species/communities important to Aboriginal people as identified through the ATK process. Residual environmental effects for the three VECs were determined to be minimal.

7.6.1.3 Spatial and Temporal Boundaries for the Cumulative Effects Assessment Area

a) Spatial Boundaries

The VECs identified above for terrestrial ecosystems and vegetation are site-specific, immobile and therefore the cumulative effects assessment area is relatively small and does not extend beyond the local study area.

b) Temporal Boundaries

Twenty years before present was the temporal boundary identified, based on professional opinion, to assess any potential effects of actions on the VECs. Future actions that may affect the VECs, have been restricted to those actions up to and including 10 years into the future based on general forestry and mining exploration plans.

7.6.1.4 Identification of Other Actions

In order to identify other actions (i.e., projects or activities) that may affect the VEC's identified for Bipole III, the following spatial and temporal criteria were used to determine which other actions need to be included in the cumulative assessment.

a) Spatial Criteria

Actions/developments with footprints within the cumulative effects assessment area that may affect the VECs being assessed include the following: hydroelectric projects,

forestry operations, mining explorations and operations, infrastructure developments, resource use activities, agricultural practices, and natural events. Further information on the potential effects from these actions are detailed below.

Table 36. Cumulative effects assessment valued environmental component summary.

Valued Environmental Component	Environmental Indicator	Measurable Parameter/ Variable	Residual Environmental Effect	Comments
Plant species and communities of conservation concern	Species or community occurrence	Number of plants present	No or minimal loss of plants / communities of conservation concern.	Effects are restricted to the construction power station site.
Native grassland/ prairie areas	Area of native grassland/ prairie	Hectares	Loss of trees in dry upland prairie areas.	Effects are primarily restricted to the RoW.
Plant species/ communities important to Aboriginal people	Area of habitat or plants used for medicinal, food and cultural uses	Hectares	Loss of plants / communities important to Aboriginal people.	Effects are primarily restricted to the RoW, northern Project components and access roads/trails.

b) Temporal Criteria

Temporal criteria used for the selection of actions to be considered in the cumulative effects assessment include: past, existing or current and future actions. Past actions are those actions that are abandoned but still may cause effects of concern to the VECs. Existing or current actions include those that currently exist or are under construction and will be completed prior to or during the Bipole III construction period. Future actions include those that may yet occur and consideration must be given to those actions that actually will proceed.

c) Induced Action Selection Criteria

Induced actions are projects and activities that may occur as indirect effects if the Project under assessment is approved. It was determined that no induced actions will result from the Bipole III Project that would affect the identified terrestrial ecosystem and vegetation VECs.

7.6.1.5 Other Actions and Potentially Affected Valued Environmental Components

Listed below (Table 37) are potential actions and their temporal extents that can potentially adversely affect the identified VECs. Information on the measurable parameter/variable and the environmental effect of each action on the identified VEC is also provided.

Table 37. Cumulative effects assessment other action summary.

Other Action Category	Other Action Description	Temporal Extent	VEC Affected	Measurable Parameters/Variables	Environmental Effects
Hydroelectric Projects	Wuskwatim Transmission Project	Existing	Plant species of conservation concern	Number of plants present	Loss of plants of conservation concern
			Plant species/communities important to First Nations	Hectares	Loss of plant valued by Aboriginal people
	Keeyask and Conawapa Projects	Future	Plant species of conservation concern	Number of plants present	Loss of plants of conservation concern
			Plant species/communities important to First Nations	Hectares	Loss of plant species valued by Aboriginal people
Forestry	Tolko and Louisiana-Pacific Operations	Past, Existing, Future	Plant species and communities of conservation concern	Number of plants present	Loss of plants of conservation concern
			Plant species/communities important to First Nations	Hectares	Loss of plants valued by Aboriginal people
Mining	Mining Exploration by Vale-Inco, Pure Nickel, Crowflight Minerals, Hudson Bay Exploration and Development Company	Existing and Future	Plant species and communities of conservation concern	Number of plants present	Loss of plants of conservation concern
			Plant species/communities important to First Nations	Hectares	Loss of plants valued by Aboriginal people
Infrastructure	New highway construction	Future	Plant species and communities of conservation concern	Number of plants present	Loss of plants of conservation concern
			Plant species/communities important to First Nations	Hectares	Loss of plants valued by Aboriginal people
Activities	Resource Use	Existing and Future	Plant species and communities of conservation concern	Number of plants present	Loss of plants of conservation concern
	Agricultural Practices	Existing and Future	Native grassland/prairie areas	Hectares	Loss or reduction of trees present in dry upland prairie sites
			Plant species and communities of conservation concern	Number of plants present	Loss of plants of conservation concern
Natural Events	Floods, Fires and Wind/Tornadoes	Past and Future	Plant species and communities of conservation concern	Number of plants present	Loss of plants of conservation concern
			Native grassland/prairie areas	Hectares	Loss or reduction of trees present in dry upland prairie sites
			Plant species/communities important to First Nations	Hectares	Loss of plants valued by Aboriginal people

7.6.2 Analysis of Effects

The analysis of cumulative effects involved relating the environmental effects of other actions to the residual effects of the Project on the same VECs. Provided below is information on the potential other actions that may cumulatively effect the VECs identified for the Bipole III Project.

a) Hydroelectric, Mining, Forestry and Infrastructure projects

Past, existing and future hydroelectric, mining, forestry and infrastructure projects usually require environmental or due diligence assessments as part of their permitting or licensing process prior to development. These assessments are conducted to evaluate the potential effects of the development on VECs including similar vegetation VECs identified in this cumulative effects assessment. Assessments of other actions usually include the collection of information pertaining to any species/communities of conservation concern or areas of interest (i.e., grassland/prairie areas) that may be present in the project area or that may be affected by the project, as well as include meetings and workshops with First Nations to obtain information regarding traditional land use areas and ATK. It is assumed that the information gathered would be utilized to develop appropriate mitigation measures to minimize impacts to VECs resulting in no or minimal residual effects, similar to those determined for the Bipole III Project. As a result of the mitigation measures identified for the Bipole III VEC's, there are minimal resultant cumulative effects from past, existing, and future hydroelectric, mining, forestry and infrastructure projects. These include the species of concern which will be lost at the construction power station and the potential loss of plant communities that are important to Aboriginal people for the transmission lines and northern Project components which has been identified as a residual effect.

Plant species of conservation concern

At the construction power station, the loss of an uncommon plant species will occur. In conjunction with other actions (past, existing and future) that have been identified above, there is the potential for cumulative effects to result. Assessments conducted for other actions near the location of the construction power station would provide information on the presence of the same species of conservation concern found and whether or not mitigation measures were applied. If mitigation measures were identified for other actions that resulted in no residual effects then there would be no resulting cumulative effects.

Plant communities important to Aboriginal people

A number of Communities and First Nations participated in the ATK workshops or completed their own self-directed studies for the Bipole III Transmission Project and as a result plant communities important to Aboriginal people for medicinal, cultural and traditional purposes have been identified. There is the potential for plant communities

that are important to Aboriginal people to be lost during the development of the Project components for the Bipole III Transmission Project and in conjunction with other actions (past, existing and future) that have been identified above, there is the potential for cumulative effects to occur. ATK studies that may have been conducted for other actions (i.e. hydroelectric) would provide information on locations of important plant communities as well as mitigation measures that have been suggested to reduce potential impacts of those actions on traditional areas. If the mitigation measures suggested have resulted in no residual effects for other actions then there would be no resulting cumulative effects for the Bipole III Project.

The loss of ATK areas as a result of complete vegetation removal at the northern Project component sites (such as the Keewatinooow converter station) was identified as being non-mitigable. If project components from other actions (i.e., Conawapa) result in the same effect (loss of ATK areas as a result of complete vegetation removal) and have also been identified as non-mitigable, then cumulative effects will result. The residual effect of ATK areas being lost has been considered reversible upon decommissioning of the Bipole III Transmission Project and may be reversible for other actions upon their decommissioning. In order to reduce potential cumulative effects to ATK areas, continued dialogue with Aboriginal groups to discuss proper planning of projects and identification of additional mitigation measures to potentially reduce effects in these areas should occur.

b) Resource Use Activities

Existing and future resource use may also adversely affect plant species of conservation concern. Plants of conservation concern may be affected as a result of disturbance from berry picking and plant harvesting activities. If multiple resource activities occur in areas where plant species of conservation concern are identified, there is the potential for plants of concern to be lost and cumulative effects to occur. Proper planning and implementation of mitigation measures can reduce the likelihood of residual and subsequent cumulative effects.

c) Agricultural Activities

Dry upland prairie areas, which are included in the native grassland area VEC, have the potential to support species of conservation concern. In these areas, trees were commonly found to grow and as a result, the residual effect identified is the loss of those trees due to clearing activities for the transmission line. Current and future agricultural activities not only have the potential to adversely affect plant species of conservation concern but the stands of trees located in these areas as well. During field assessments conducted in the summer of 2010, many of the grassland/prairie areas assessed were found to have been reverted to pasture with a mixture of native and non-native species.

With respect to plant species of concern that may be found in grassland areas, mitigation measures have been suggested for the Bipole III Project that would result in no loss of

plants of concern from clearing, construction, maintenance or decommissioning activities. Therefore, any effect to plant species of concern in native grassland areas as a result of agricultural activities would not act additively with the Bipole III Project and would therefore result in no cumulative effect.

The cumulative effect that may occur in grassland areas is the additive effect of the loss of trees in dry upland prairie from other existing and future actions as well as the current project under review. Loss of these trees may occur from the modification of grassland areas to pasture areas including the potential removal of trees, possible harvesting of trees in these areas for personal resource use, development of private trails, and the loss of trees as a result of clearing activities for the Bipole III Project. With proper planning and involvement of landowners, mitigation measures can be implemented (i.e., compensatory mitigation such as tree planting) to protect this ecosystem and reduce the residual and cumulative effects.

d) Natural Events

Both past and future natural events, such as floods, fires, and wind/tornadoes can have potential adverse effects on vegetation VECs. Past natural events may also have an additive effect on vegetation VECs, but are difficult to assess due to a lack of information/records available. Effects from future natural events can be substantial and are not necessarily easy to predict or mitigate once they have occurred.

Natural events have the potential to increase in frequency as a result of climate change. Changes in weather may include a greater amount of precipitation, increased wind speeds, and changes in temperature. The difficulty is that climate change generally works on a regional basis, and the resulting changes will not be experienced in all regions in the same way (MMM Group 2011b). Due to climate change and the unpredictability of natural weather events, the potential cumulative effects that may occur to terrestrial ecosystems and vegetation are difficult to mitigate for and are beyond the control of Manitoba Hydro.

7.6.3 Identification of Mitigation Measures

The following mitigation measures have been suggested to minimize the potential cumulative effects that may occur from the Bipole III Project in conjunction with other actions on the terrestrial ecosystem and vegetation VECs identified for this Project. These mitigation measures can also be used for future hydroelectric projects to minimize potential cumulative effects.

1. **Assessments for species of conservation concern.** Information collected on plant locations through future project assessments will help to ensure the application of appropriate mitigation measures (i.e., winter clearing, minimization of soil and vegetation disturbance, avoidance) to reduce or eliminate potential effects. Information collected will also be useful in updating the provincial database

(MBCDC records) and will provide more current information on species of conservation concern locations. This information will also aid in proper planning for future projects.

2. **Education programs on species of conservation concern and sensitive sites.** Education programs would be valuable to resource users and private landowners that provides them with information on plant species of concern as well as sensitive sites that may be located in areas where activities currently occur or may occur in the future. By understanding the importance of species of concern and sensitive sites, resource users/landowners can help to maintain these sites by minimizing potential effects in these areas from current and future activities. Education programs could be delivered through schools, conservation programs, or through Manitoba Hydro.
3. **Compensatory mitigation for the loss of trees from dry upland prairie sites.** Tree planting programs can be implemented in other locations to compensate for the loss of trees from dry upland prairie sites as a result of the Bipole III Project and other actions such as agricultural activities, harvesting by private landowners and the development of private trails.
4. **Aboriginal Traditional Knowledge Studies.** Information collected on plant communities important to Aboriginal people through ATK studies for future projects will help to ensure the application of mitigation measures that will facilitate in reducing or eliminating potential effects. Continued dialogue with Aboriginal people to discuss proper planning of these projects in their traditional areas as well as the potential identification of additional mitigation measures to reduce potential impacts should occur.

7.6.4 Identification of Follow-up Actions

Follow-up actions for the Project can be used to confirm any predications for potential cumulative effects. Follow-up actions include reviewing assessments for future projects/actions or conducting inspections for activities (that do not require assessments) to determine if cumulative effects occurred.

7.6.5 Evaluation of Significance

If mitigation suggested above is applied to the potential cumulative effects identified, it is anticipated that cumulative effects on the VECs will be insignificant. The actual determination of significance for potential cumulative effects will be made by Manitoba Hydro Licensing and Environmental Assessment staff based on the information provided and consideration of uncertainty and likelihood of occurrences. The determination of significance for potential cumulative effects will be provided in the Environmental Impact Statement.

7.7 Environmental Protection Plan

An Environmental Protection Plan (EnvPP) will be prepared prior to construction of the Project that will detail site-specific mitigation requirements. Environmentally sensitive sites that have been identified for terrestrial ecosystems and vegetation will be mapped and specific environmental protection measures developed for these sites will also be provided in the EnvPP. It is recommended that Manitoba Hydro correspond with First Nations to have any other plant gathering and harvesting areas mapped in addition to those areas identified in this report.

A project-specific EnvPP for clearing and construction, operation and maintenance, and eventually decommissioning as required, will minimize the possibility of long-term effects on terrestrial ecosystems and vegetation. Information used to develop portions of the project specific EnvPPs will be derived from the Environmental Impact Statement and Technical Reports submitted for this Project.

7.8 Additional Project Fieldwork

A pre-construction assessment for the small white lady's-slipper (*Cypripedium canadidum*) in the southern portion of the preferred route is recommended. This species is listed as endangered and is protected under the Manitoba *Endangered Species Act* and the federal *Species at Risk Act*. As flowering for this plant species occurs in early spring, assessments for this plant along the preferred route were limited as the route selection was not confirmed. The assessment should focus on areas with the greatest potential to occupy this species.

It is also recommended, that pre-construction surveys for species of conservation concern be conducted in areas likely to contain plants of concern along the portions of the preferred route that were adjusted and finalized after the 2010 field season. These areas include a portion of the route north of Thompson and a portion of the route between Thompson and The Pas. Information acquired from ATK identified one location (361555 E 5855163 N) that may potentially occupy rare orchids outside the RoW but within the local study area. This site should be investigated prior to clearing and construction activities if the route is adjusted to include this location.

A field assessment for species of conservation concern should also be completed for Project components not assessed in 2010 as a result of the timing of their identification. These components include the construction power station transmission line, construction camp, northern collector lines, northern and southern ground electrode distribution lines, southern ground electrode site SES1c, borrow sites and any off-Row deviations that may be required for access. Locations for species of concern or sensitive sites found and mitigative measures would be provided to Manitoba Hydro prior to clearing and construction activities.

7.9 Environmental Monitoring and Follow-Up

In order to ensure mitigation measures are implemented effectively, monitoring will be conducted for the Project which will involve verifying the predictions made in the assessment, determining the effectiveness of measures implemented to mitigate adverse environmental effects, and detecting any unforeseen environmental effects. Monitoring will extend through the clearing and construction, operation and maintenance, and decommissioning phases of the proposed Project.

It is recommended that the following terrestrial ecosystem and vegetation components be monitored: environmentally sensitive areas including species of conservation concern and botanical resource areas identified through the ATK process, as well as riparian areas, and the introduction of non-native and invasive species. Some of the effects identified (e.g., disruption of riparian areas, and disturbance to environmentally sensitive sites) will be monitored by aerial inspections and/or ground investigations while other effects (e.g., introduction of non-native species) will be monitored using permanent sample areas. Monitoring will occur at predetermined sites selected prior to the onset of the monitoring program.

Aerial inspections will involve determining if recommended buffers were maintained for riparian area and mitigation was followed for environmentally sensitive sites. Ground inspections will involve assessments in the immediate vicinity of project activities for environmental effects such as the loss of plants of conservation concern.

Permanently located sampling areas will be used to record the change in vegetation (i.e., introduction of non-native species) that can be systematically monitored through time. The sampling methods outlined by Redburn and Strong (2008) will be followed for the monitoring program to determine composition, abundance and structure of species. Plant cover will be estimated to the nearest 1% for species <15% cover and nearest 5% for those with higher cover. Cover estimates will also include ground cover conditions such as woody debris and exposed soil. The collection of vegetation information should occur at a similar time during the growing season to maximize the comparability of data (Ecological Land Surveys Ltd. 1999). The assessment of vegetation will occur annually for the duration of the monitoring period as determined by Manitoba Hydro.

Revegetation and access management plans are recommended to be developed for the Project which include measures that would be implemented to reduce potential environmental effects. Revegetation plans would be used in areas where vegetation has been completely removed (e.g., construction camp) and in areas susceptible to erosion (e.g., slopes). Access management plans would help to reduce the introduction of non-native species, the risk of fire, and access by non-Aboriginal people to vegetation resources used by Aboriginal people as identified through the ATK process. These measures would be assessed as part of the monitoring plan to determine if they were effective in mitigating potential environmental effects.

The Project components that could be monitored, where concerns exist, include the 500 kV transmission line, ground electrodes, construction power station transmission line, construction camp, northern collector system, ground electrode distribution lines connecting the electrodes to the converter stations, borrow sites, and any off-RoW deviations that are required for access. A monitoring report will be prepared for each year of monitoring. The report will document the results from the monitoring program including temporal changes and re-establishment of vegetation, and whether the identified mitigation measures were successful for the environmental effects identified. The report will also document if additional environmental effects occurred as a result of the Project. Follow-up activities that can occur include post project audits or inspections to determine if the monitoring plan was effective and if modifications to the identified mitigation measures are required for implementation for future projects.

7.10 Decommissioning

There is currently no definitive timeline or plan for final disposition or decommissioning of the Bipole III transmission line and associated Project components. It is expected that decommissioning of the Bipole III transmission line would follow the standards outlined in Manitoba Hydro's Environmental Protection Plan that will be developed for decommissioning for the Bipole III Transmission Project, as well as any applicable legislation and/or regulations in existence at the time of decommissioning with the result of no effect on vegetation VECs presented in this report. Upon decommissioning of any project components, it is recommended that a revegetation plan be developed that would include only native species.

8 CONCLUSIONS

8.1 Limitations To and Gaps in the Data Sources

Limitations and gaps were identified in the data sources utilized to assess terrestrial ecosystems and vegetation for the Bipole III Project.

In Manitoba, information regarding types and distribution of native vegetation species has primarily been developed based on assessing productive forest resources (e.g. FRI). Although other land cover classification systems have been developed for Manitoba (and Canada), none provide information on native vegetation for the entire Bipole III Project study area. Vegetation cover classes are also not consistent between the various classification systems. In addition, much of the existing cover class data has been developed based on aerial photography interpretation with limited confirmation assessments. In the northern portion of the Project study area (approximately 160 linear km) detailed information on vegetation cover is also lacking.

In terms of the vegetation cover types identified, only 21 cover types (vegetation/land cover) were delineated from the Land Cover Classification Enhanced for Bipole. These types are broadly identified and do not provide information on species composition and vegetation structure. In addition, the information developed and presented in the Land Cover Classification Enhanced for Bipole is coarse and unable to provide concise detail.

A portion of the available information for species of conservation concern within the Bipole III Project study area is based on single data points derived from broader polygons. Confirmation assessment to determine the current aerial extent and existence of these species is limited. In addition, information on species of concern from the Manitoba Conservation Data Centre exists as point and polygon records. While point records provide specific location information for the species, polygon records have uncertainly as to the location of the species.

With respect to field assessments, several privately owned lands identified for vegetation assessments were unable to be accessed as a result of denied landowner permission. Thus, there is a potential for species of conservation concern to exist in these areas that were not assessed in the field. In addition, field data presented in this report is based on sampling along a preliminary preferred route and corridor identified in the spring of 2010. Adjustments to this route occurred and a final preferred route was released in January 2011.

8.2 Outstanding Information Requirements

The following outlines outstanding information requirements for the Project:

- A rare plant survey should be completed for the small white lady's-slipper (*Cypripedium canadidum*) along the southern portion of the preferred route prior to clearing and construction activities.
- Surveys for species of conservation concern should be conducted in areas likely to contain plants of concern along the portions of the preferred route that were adjusted and finalized after the 2010 field season.
- Field assessments should be completed for species of conservation concern for Project components including the construction power transmission line, northern collector lines, northern and southern ground electrode distribution lines, southern ground electrode site SES1c, construction camp, borrow sites, excavated material placement sites and off-Row deviations required for access.

8.3 Environmentally Sensitive Sites

Environmentally sensitive sites for the Bipole III Transmission Project were identified as follows:

1. Dry upland prairies

Dry upland prairies represent important areas along the preferred route as they have the potential to support federally and provincially protected species. Hairy prairie-clover, which is protected by SARA and MBESA, as well as other species of concern were observed in dry upland prairies in 2010. The dry upland prairies have the best variety of native prairie observed along the preferred route. Soil and vegetation disturbance should be minimized in these areas to reduce the alteration of plant composition and native habitat conditions.

2. Salt Marshes/Salt Flats

Salt marshes and flats are areas with high salt concentrations. These areas are important habitats as they often support a limited number of plants adapted to high salt concentrations, which may include unique species and species of conservation concern.

3. Patterned Fen Wetlands

Patterned fens are peatlands with a fluctuating water table that are rich in dissolved minerals due to ground and surface water movement. These areas are composed of subparallel, low peat ridges which enclose elongated wet hollows and have the potential to support plant species of concern. Two species of concern were observed in patterned fens assessed in 2010 (*Drosera anglica* and *Drosera linearis*).

4. Locations for Species of Conservation Concern

Species of conservation concern are important because these plants exist in low numbers and play a role in helping to preserve species diversity. Fifteen locations for plant species of conservation concern were previously known to occur along the transmission RoW and one along the northern collector RoW (MBCDC records). Assessments conducted in 2010 identified species of concern at the construction power station and 26 other locations along the local study area. Species of conservation concern were also observed in the vicinity of the proposed transmission line RoW during studies conducted for Swan Lake First Nation.

5. Plant Locations Identified through Aboriginal Traditional Knowledge

Community Councils, First Nations, and the MMF participated in sharing their knowledge on important botanical resources in the Bipole III study area. Locations were identified along the RoW and other Project components that are used for traditional plant harvesting and picking berries.

8.4 Valued Environmental Components

Three VECs were identified for terrestrial ecosystems and vegetation. These included the following:

- Plant species and communities of conservation concern.
- Native grassland/prairie areas.
- Plant species/communities important to Aboriginal people as identified through the ATK process.

For each VEC, the environmental indicator, measurable parameter, environmental effect, and mitigation measures were identified. Mitigation was provided for each VEC with the exception of one species of concern that occurred at the construction power station. This species is ranked as uncommon by the MBCDC and will be affected from clearing activities that will result in the removal of all vegetation at the site.

8.5 Environmental Effects and Mitigation Measures

Fifteen potential environmental effects were identified for terrestrial ecosystems and vegetation along the preferred route and Project components. Potential effects included the loss of native forest vegetation, disruption to riparian areas and wetlands; temporary reduction in vegetation diversity; alteration to species composition and structure adjacent to the disturbance zone; vegetation fragmentation; an increase in non-native species; increased access to valued vegetation resources (ATK) by non-Aboriginal people; stress to vegetation from dust and spills, risk of wildfire, and the effect of herbicides on native vegetation. Three potential effects specific to the VECs were identified that included:

- Potential loss of plants of conservation concern.
- Environmentally sensitive areas may be affected.
- Potential loss of plants and communities used by Aboriginal people.

A description of mitigation measures were outlined for each environmental effect. It is anticipated that if the recommended mitigation measures are implemented by Manitoba Hydro, potential effects to the terrestrial ecosystems and vegetation along the preferred route and other Project components will have no to minimal effect on the environment.

8.6 Residual Effects

For the Bipole III preferred route and Project components, residual effects were identified after mitigation measures were applied to the environmental effects. Overall, it is expected that the Project will have nine different residual effects on vegetation after the application of mitigation for one or more of following Project components: transmission lines, converter stations, construction power station, construction camp, ground electrodes and associated lines, borrow sites (including excavated material placement sites), and use of access roads/trails. These residual effects include the loss of plants (from one species) of conservation concern from the construction power station site, the removal of trees in dry upland prairie areas, loss of plant communities important to Aboriginal people, loss of native forest vegetation, disruption of riparian habitat, temporary loss of vegetation diversity, modification of vegetation adjacent to the disturbance zone, fragmentation of vegetation communities and introduction of invasive and non-native species. These residual effects can also occur during one or more of the project activity phases (i.e. construction, maintenance and site decommissioning). All potential effects were considered non-permanent and are reversible within the life of the Project except for the loss of plants (from one species) of conservation concern at the construction power station. However, this species is well represented in the area surrounding the construction power station.

The loss of plant communities important to Aboriginal people, loss of native forest vegetation, the temporary loss of vegetation diversity, disruption to riparian areas, the modification of vegetation adjacent to the disturbance zone, fragmentation of vegetation communities and the introduction of invasive and non-native species were residual effects identified for transmission lines, the Keewatinooow converter station, construction power station, construction camp, borrow sites, ground electrode sites and access roads/trails. The removal of trees that may occur in dry upland prairie sites was an additional residual effect identified for the transmission lines, while the loss of plants (from one species) of conservation concern from clearing activities was also identified as a residual effect for the construction power station site. The introduction of invasive and non-native species was also identified as a residual effect for the operations and site decommissioning of all Project components.

8.7 Monitoring and Follow-Up

Recommended monitoring and follow-up activities will occur during the clearing and construction, and operation and maintenance phases of the Project. It is recommended that monitoring be conducted for environmentally sensitive sites including locations for species of conservation concern and botanical resource areas identified through the ATK process, as well as for riparian areas and the introduction of non-native and invasive species. The Project components that could be monitored where issues are identified include the transmission line RoW, ground electrodes and distribution lines, construction power station transmission line, construction camp, northern collector system, borrow sites, and off-Row deviations for access.

The monitoring of the transmission line and other Project components will provide management data on the effectiveness of the mitigation measures identified and provide information regarding changes and development of vegetation. The assessment of vegetation will occur annually for the duration of the monitoring period as determined by Manitoba Hydro.

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Technical Report Maps



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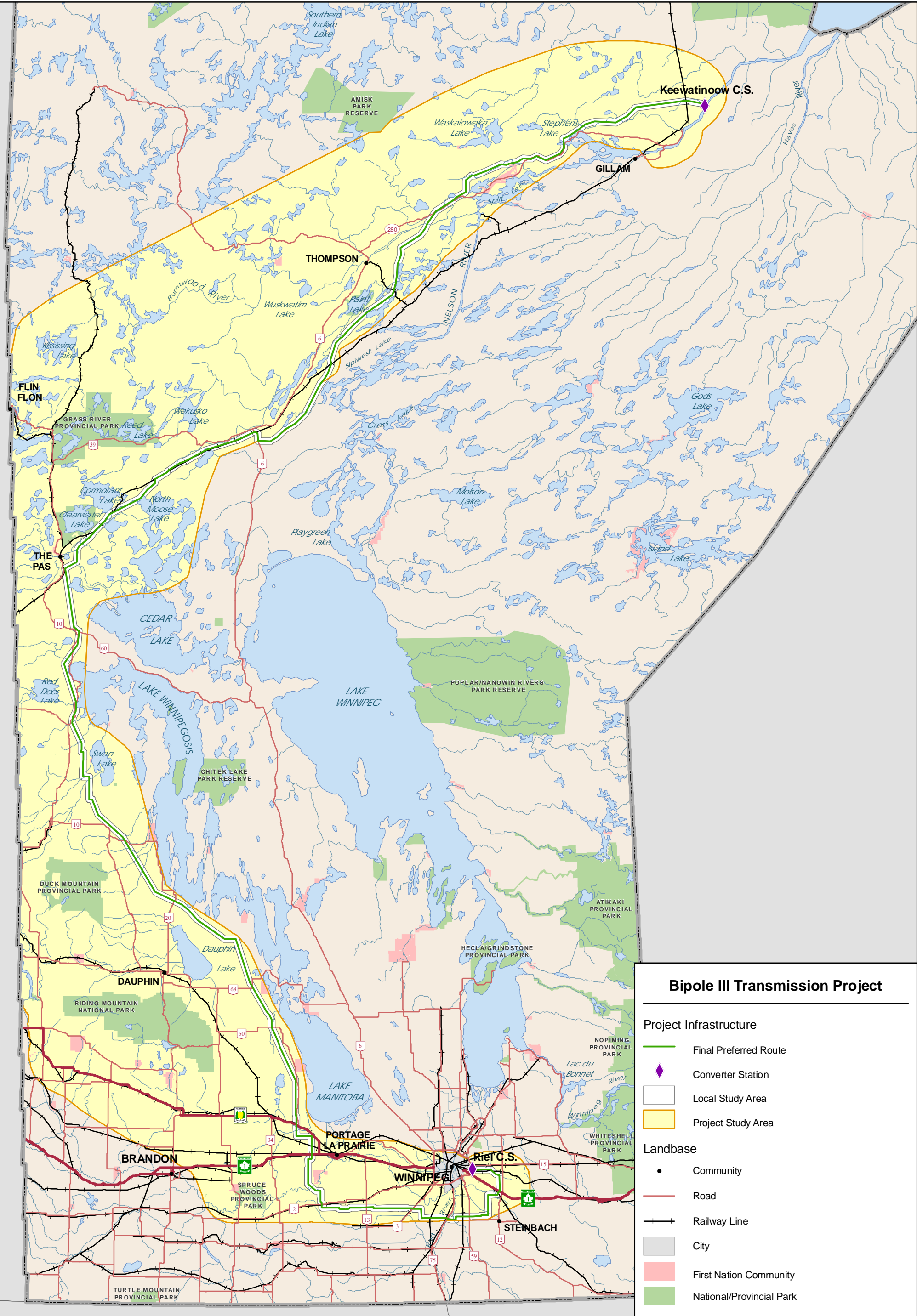
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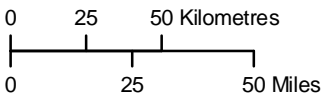


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Bipole III Project Study Area

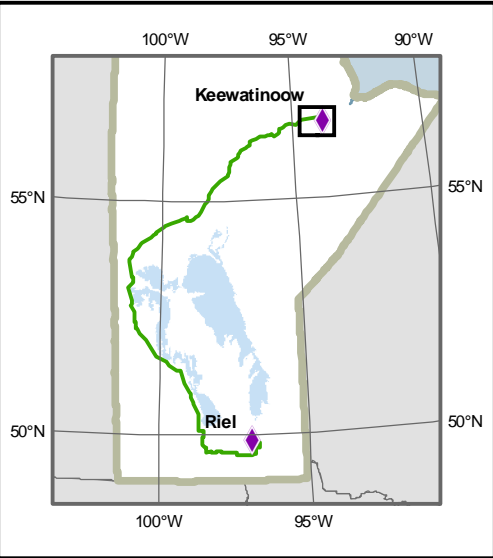
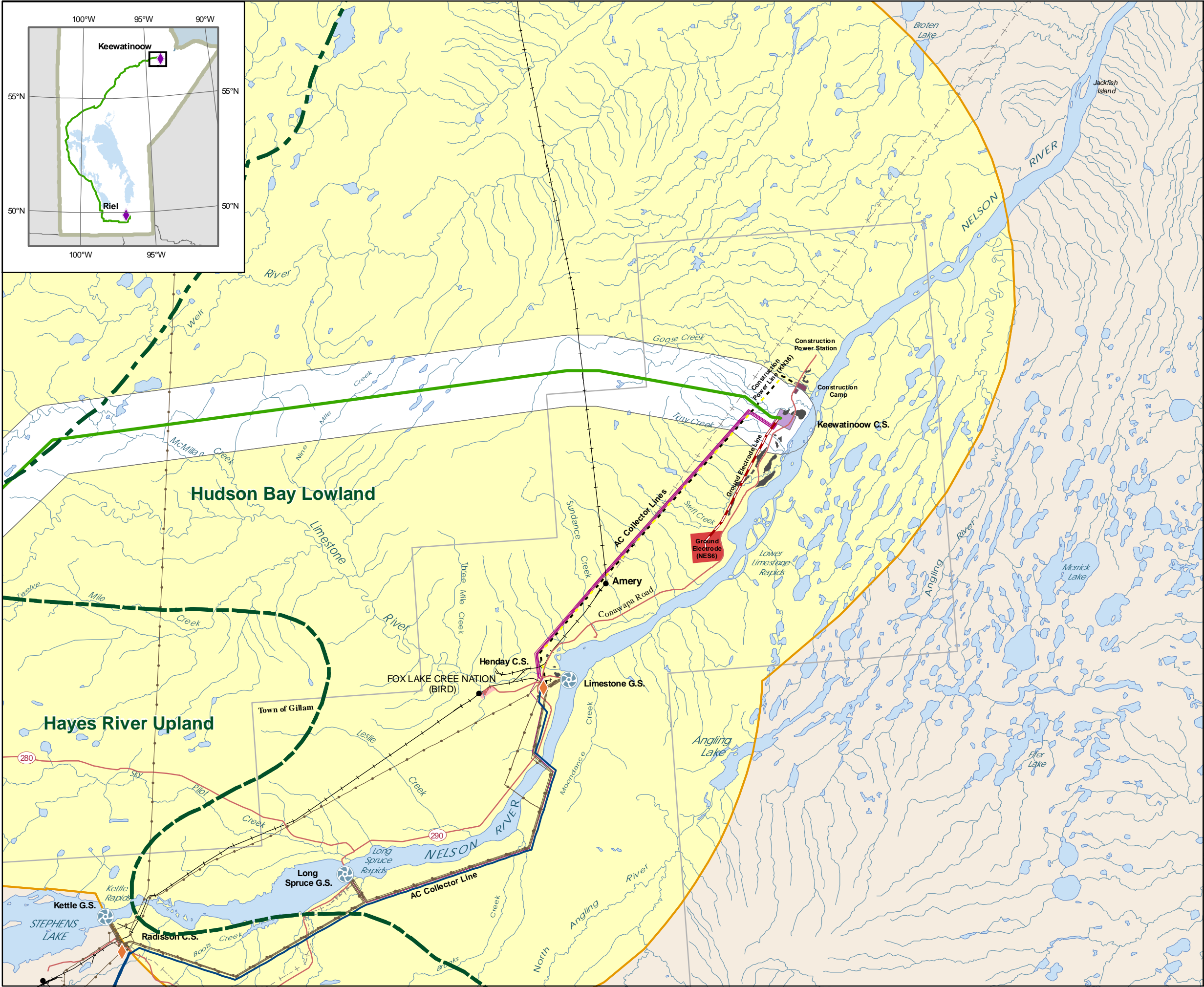


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Bipole III Final Preferred Route



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Borrow Site

- Keewatinooow Borrow Area

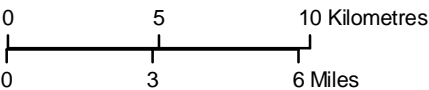
Ecoregion

- Ecoregion Boundary

Landbase

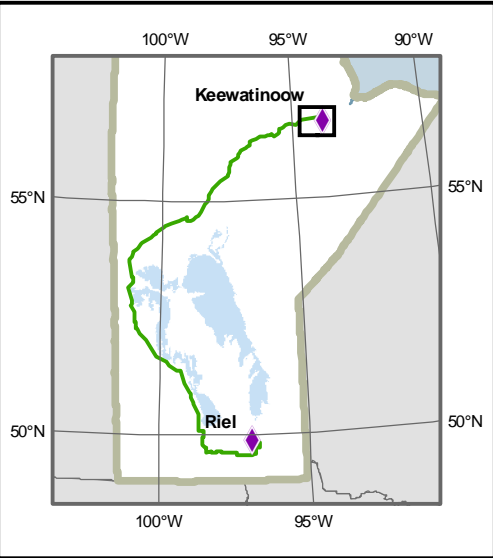
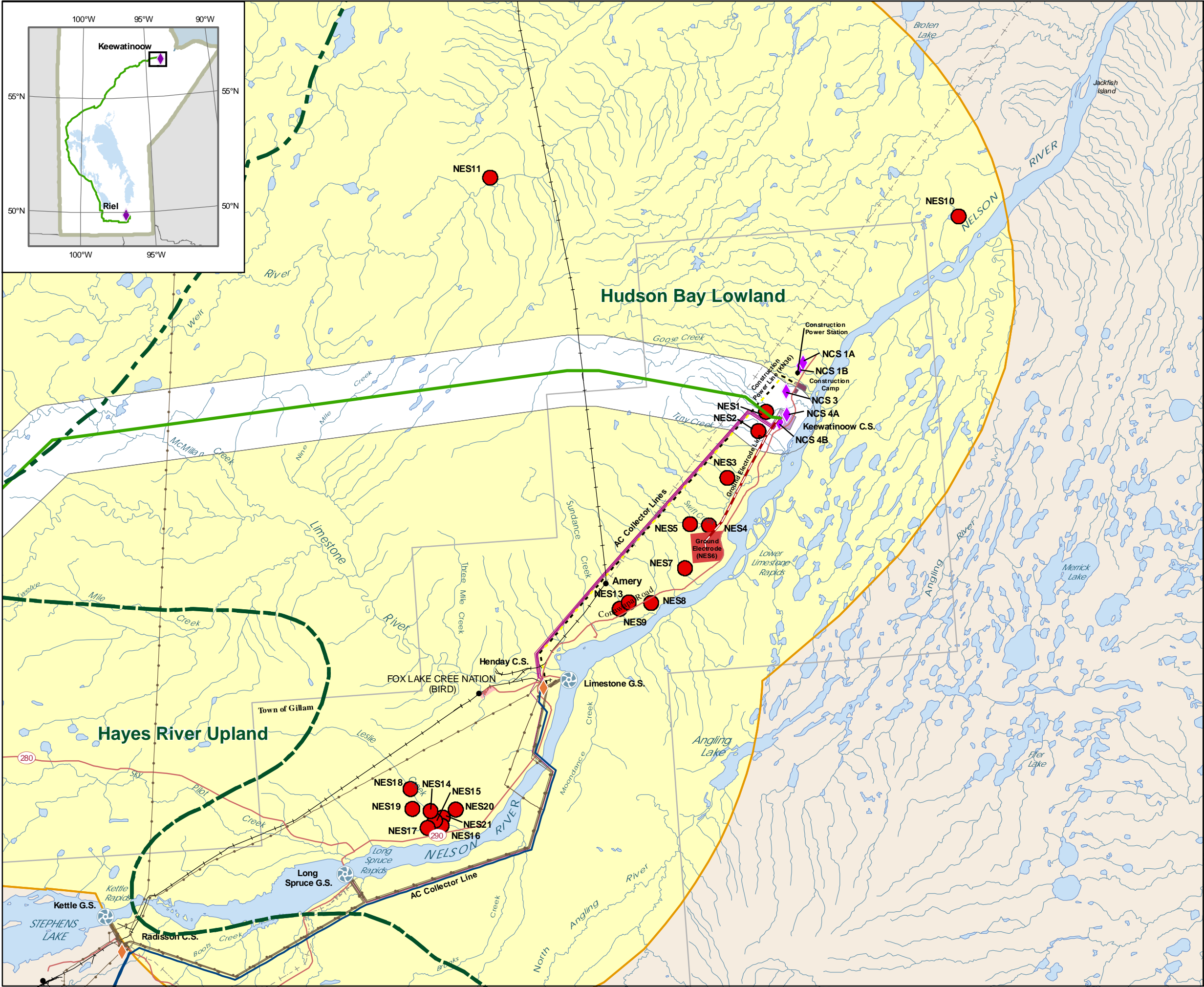
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- First Nation

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Preferred Locations for the Northern Project Components



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station Site
- AC Collector Line
- Ground Electrode Line
- Ground Electrode Site
- Construction Power (KN36)
- Construction Power Site
- Construction Camp Site
- Local Study Area
- Project Study Area

Infrastructure

- Converter Station
- Generating Station
- Bipole I and II
- Transmission Line
- Electrical Station

Northern Preliminary Locations

- Preliminary Keewatinow Converter Station Site
- Preliminary Ground Electrode Site

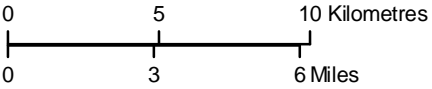
Ecoregion

- Ecoregion Boundary

Landbase

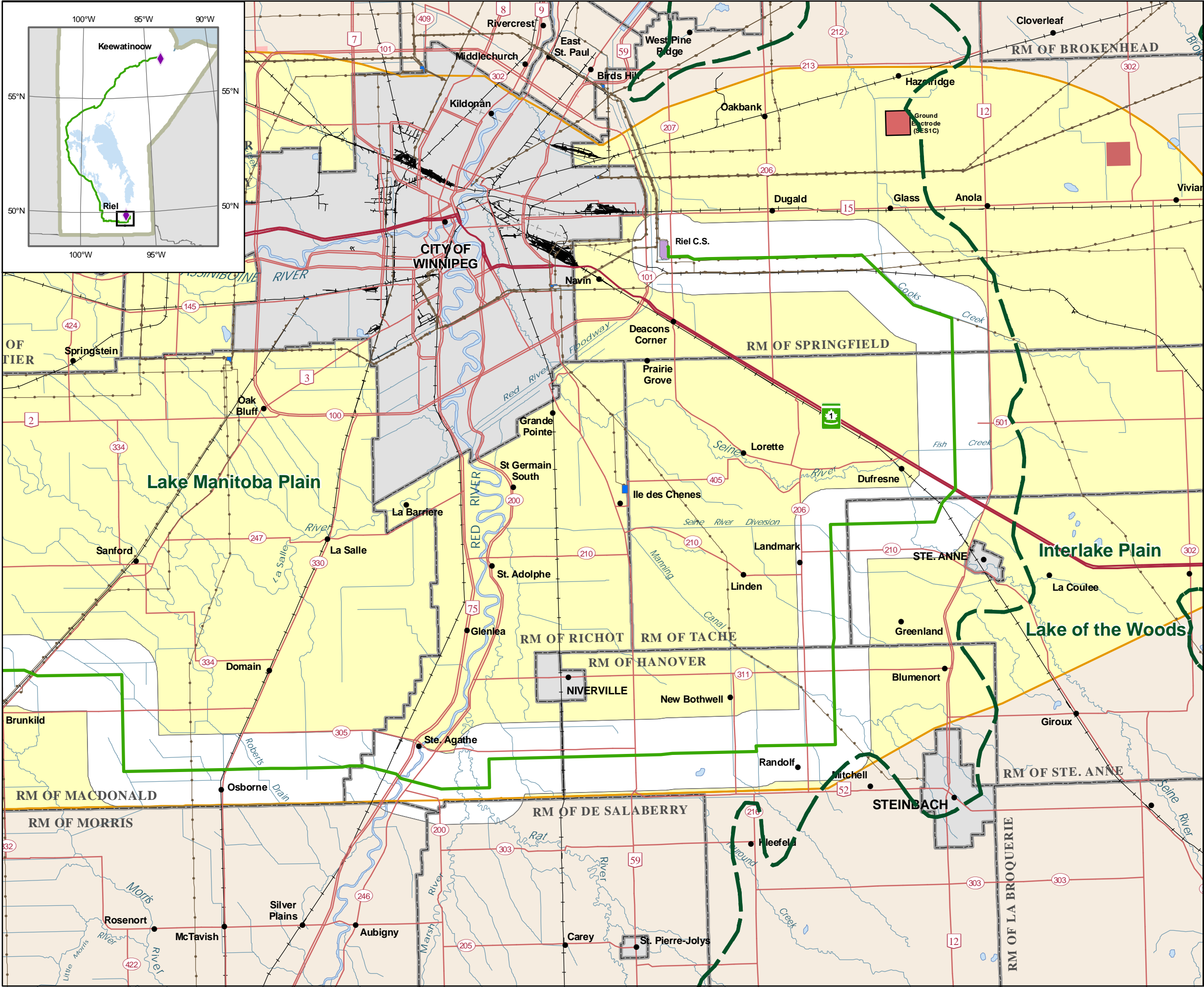
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Preliminary Locations for Keewatinow Converter Station and Northern Ground Electrode Sites



Bipole III Transmission Project

- Project Infrastructure**
- Final Preferred Route
 - Converter Station Site
 - Secondary Ground Electrode Site
 - Ground Electrode Site
 - Local Study Area
 - Project Study Area

- Infrastructure**
- Transmission Line
 - Electrical Station

- Ecoregion**
- Ecoregion Boundary

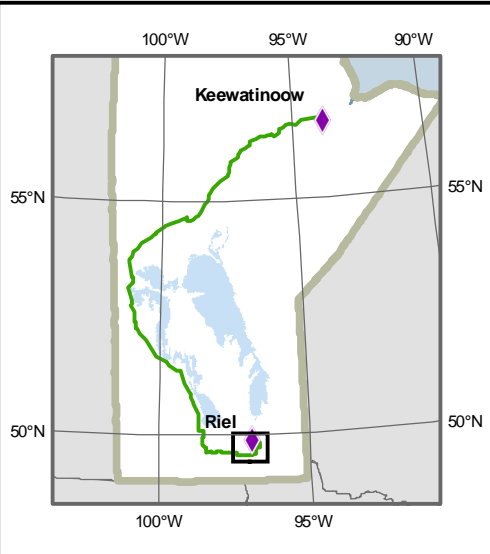
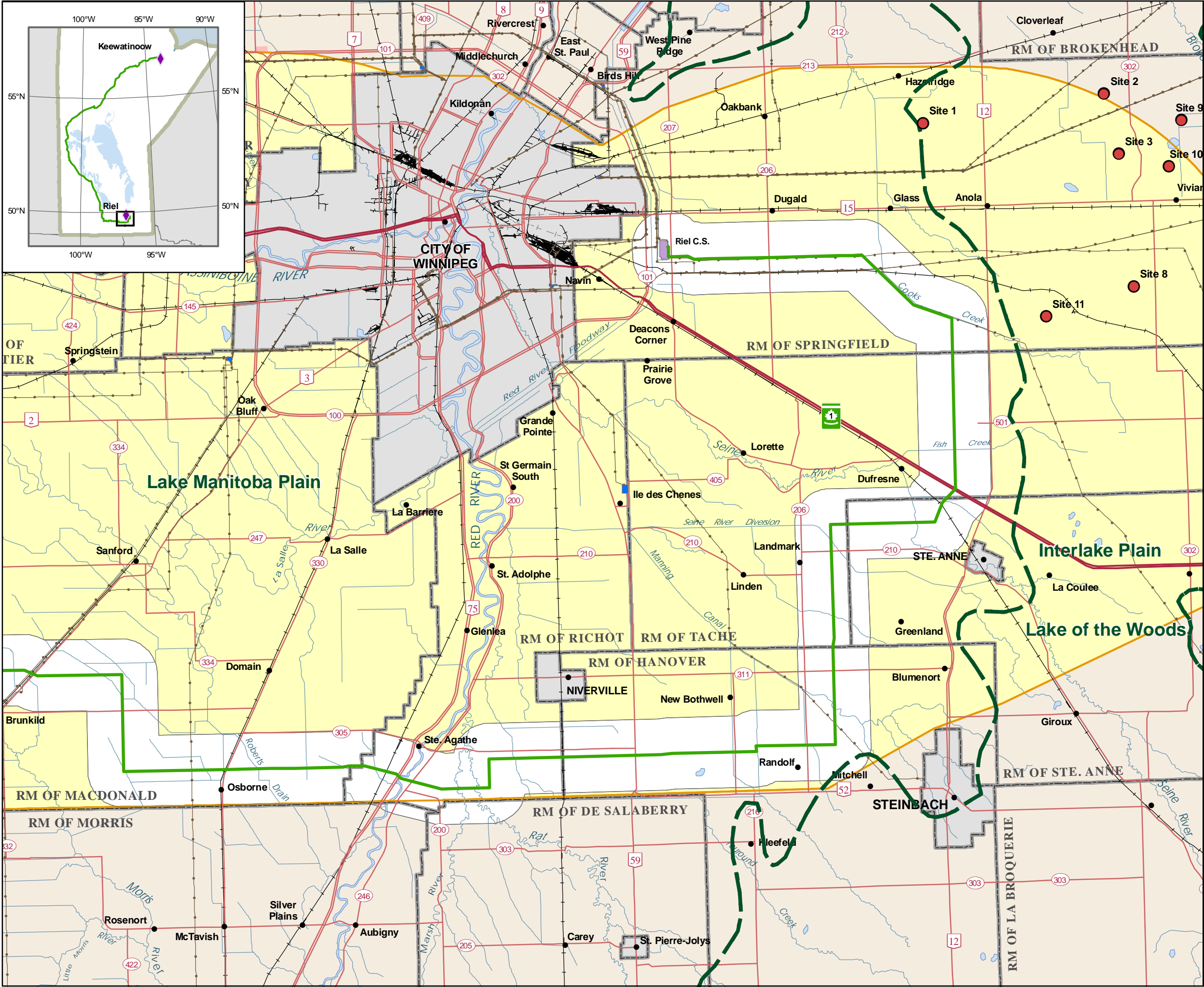
- Landbase**
- Community
 - City / Town
 - Rural Municipality
 - First Nation

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Preferred Locations for the Southern Project Components



Bipole III Transmission Project

- Project Infrastructure**
- Final Preferred Route
 - Preliminary Ground Electrode Site
 - Converter Station Site
 - Local Study Area
 - Project Study Area

- Infrastructure**
- Transmission Line
 - Electrical Station

- Ecoregion**
- Ecoregion Boundary

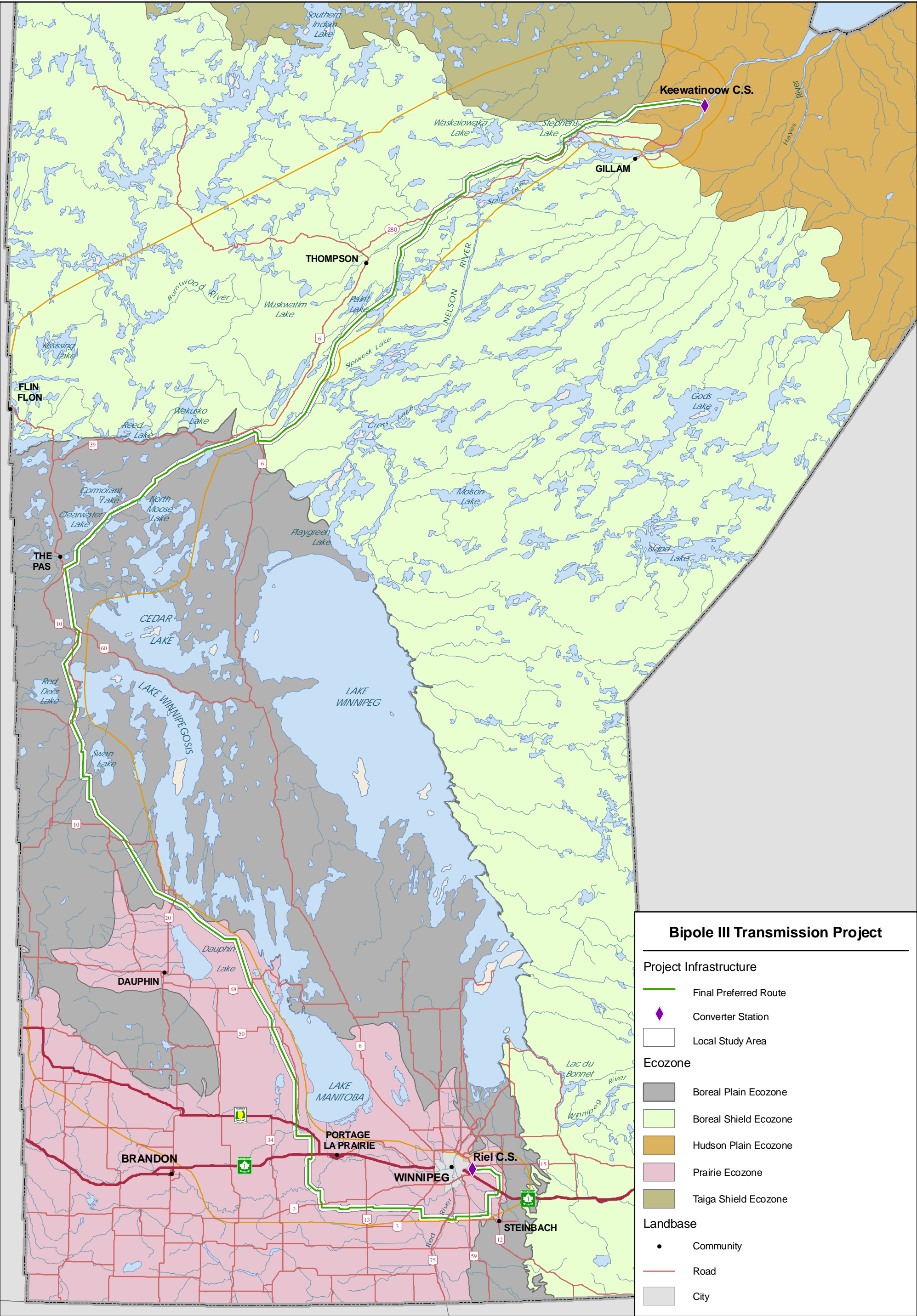
- Landbase**
- Community
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 - Rural Municipality
 - First Nation

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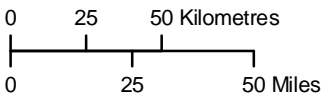
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**Preliminary Locations for the
Southern Ground Electrode Sites**

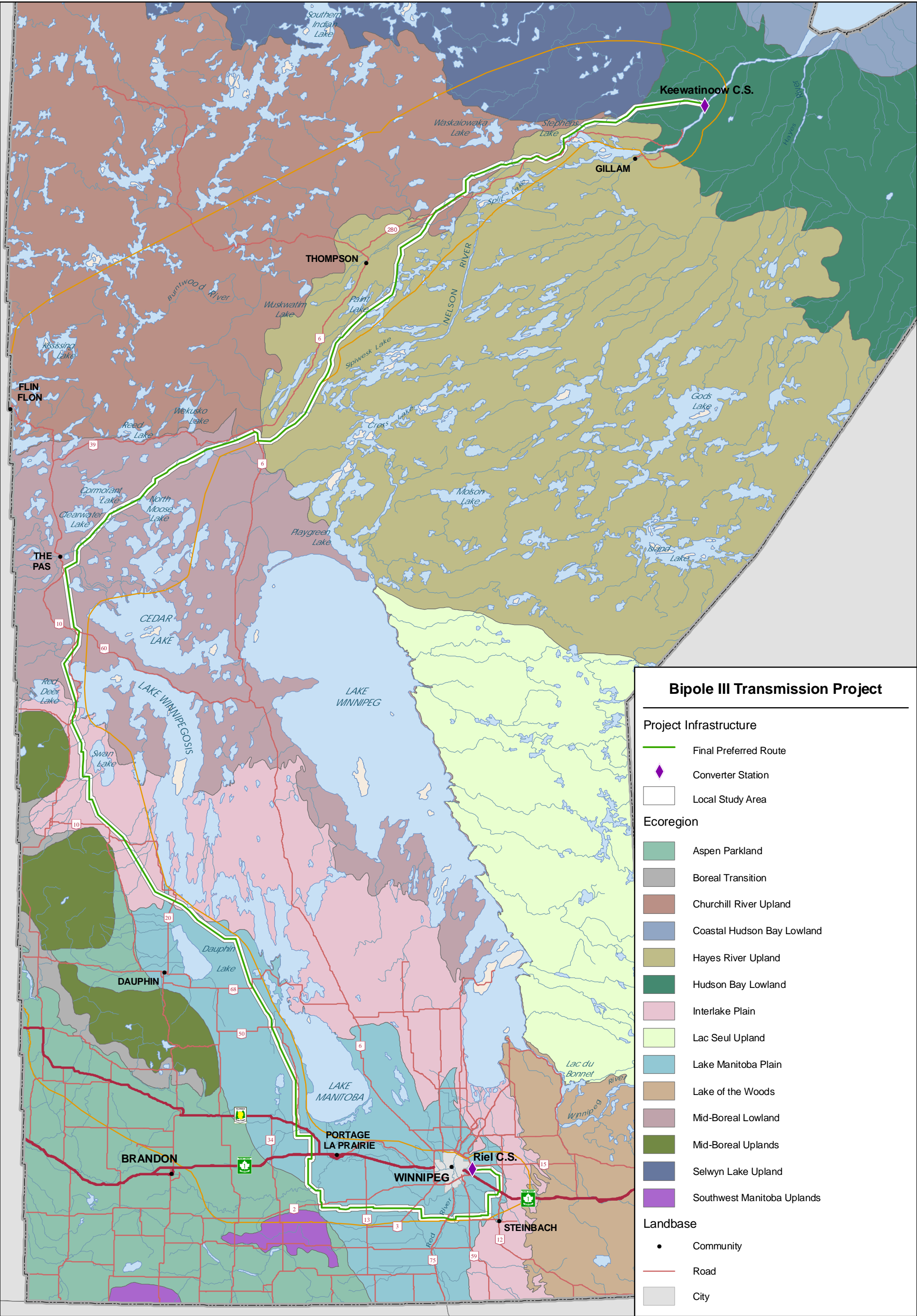


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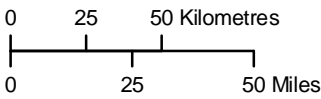


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Ecozones within the Bipole III Project Study Area

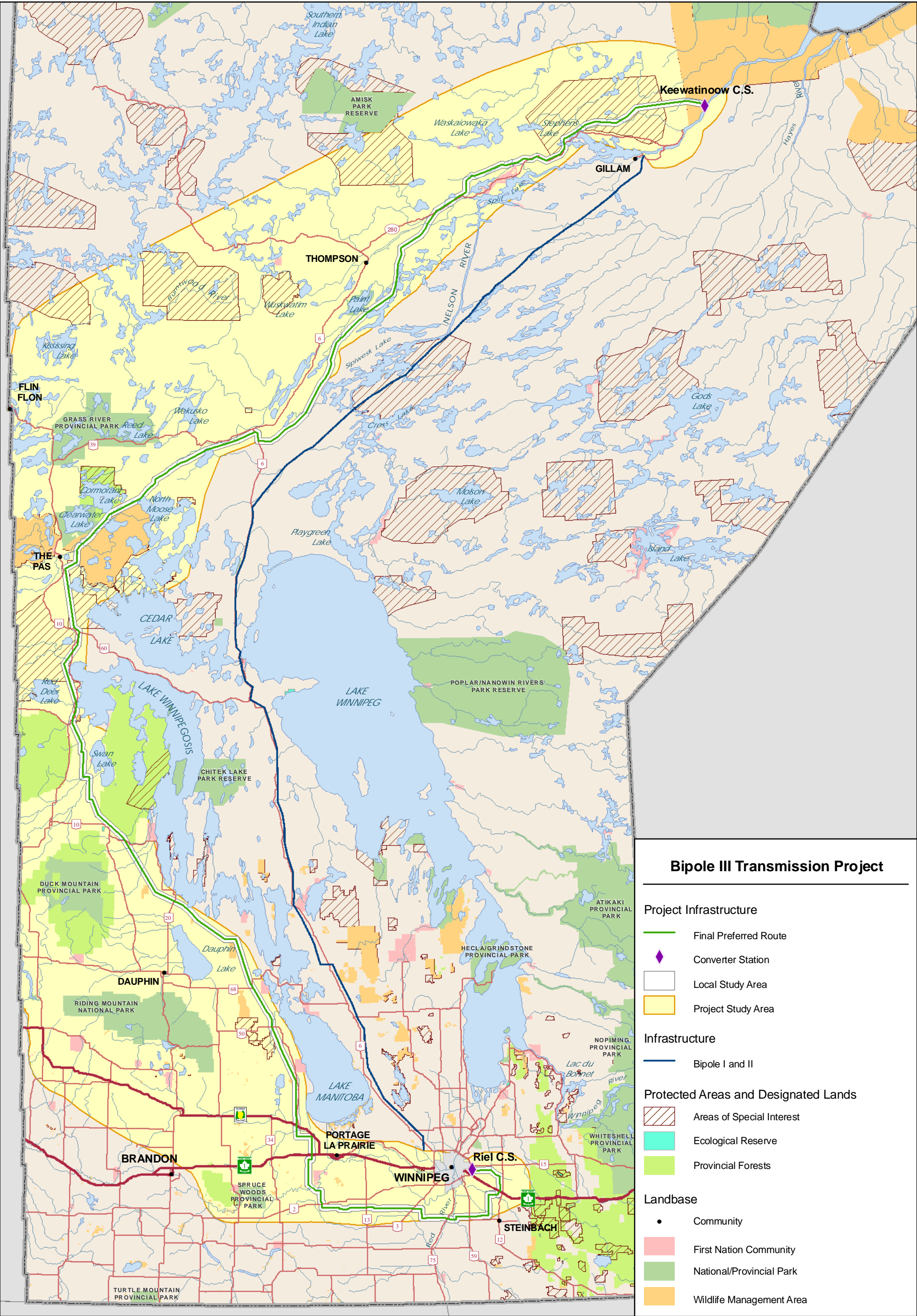


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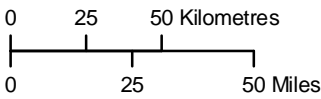


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Ecoregions within the Bipole III Project Study Area

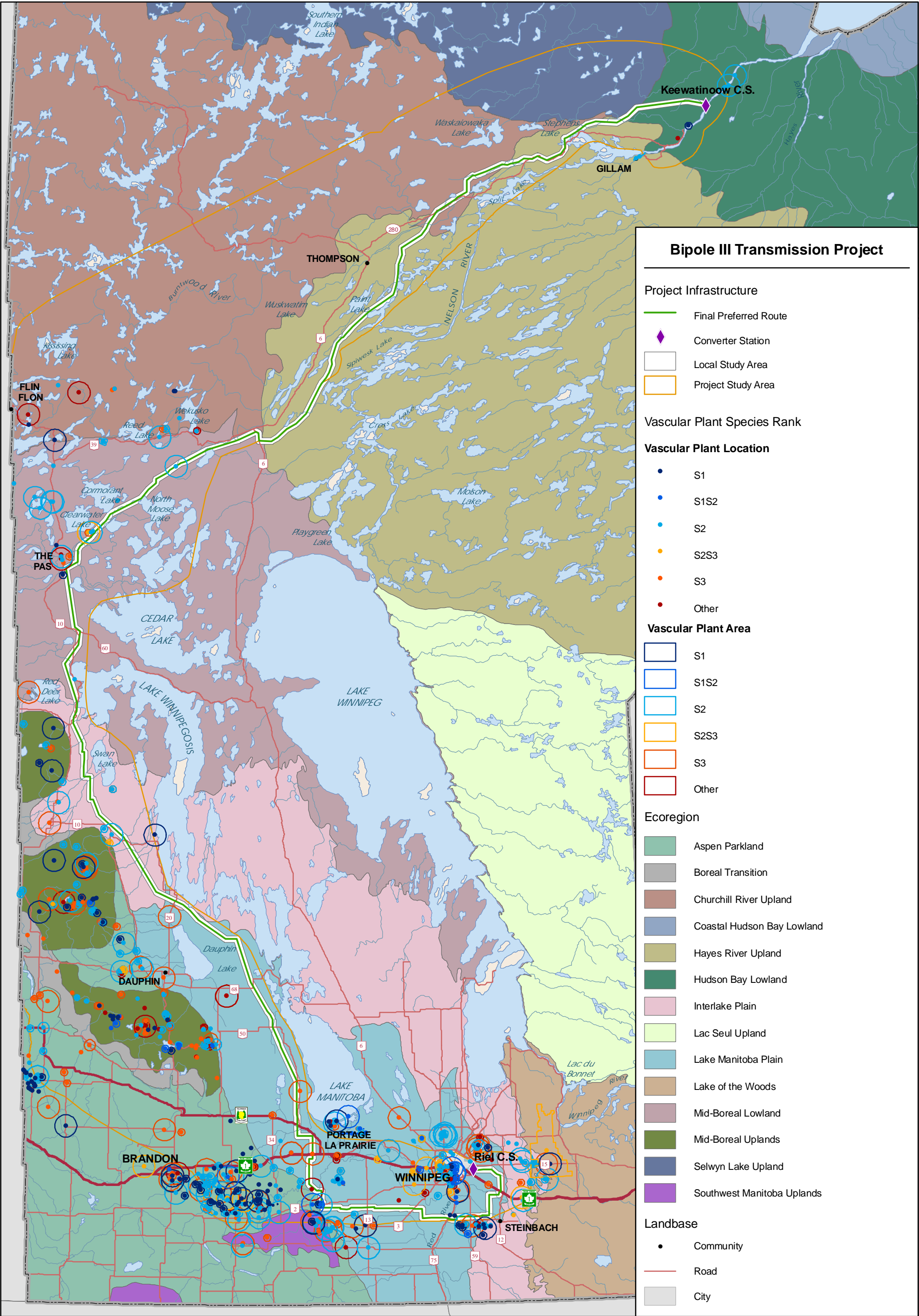


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**Protected Land and Areas of Special Interest
within the Bipole III Project Study Area**



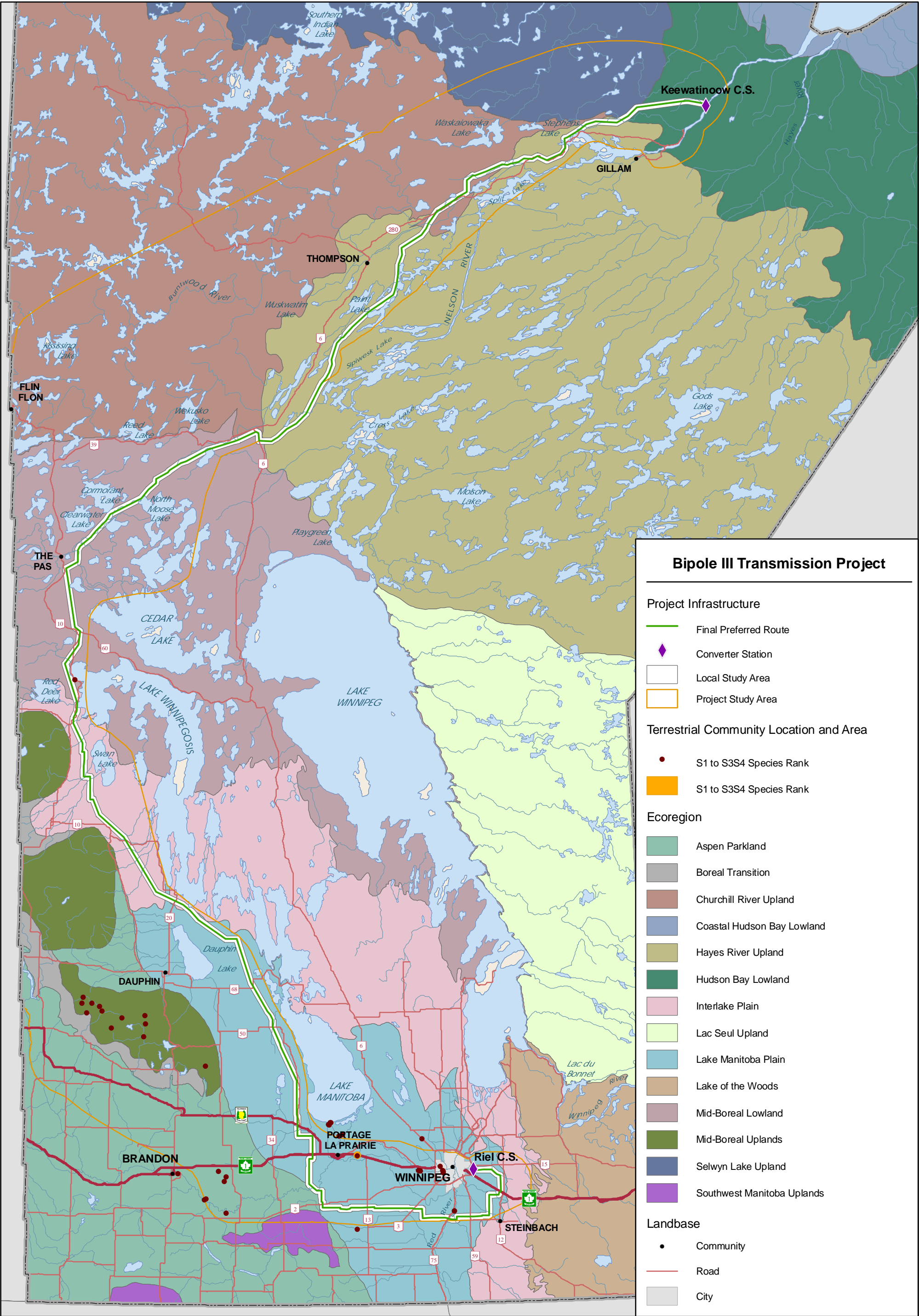
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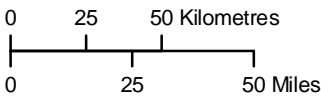


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Plants of Conservation Concern within the Bipole III Project Study Area

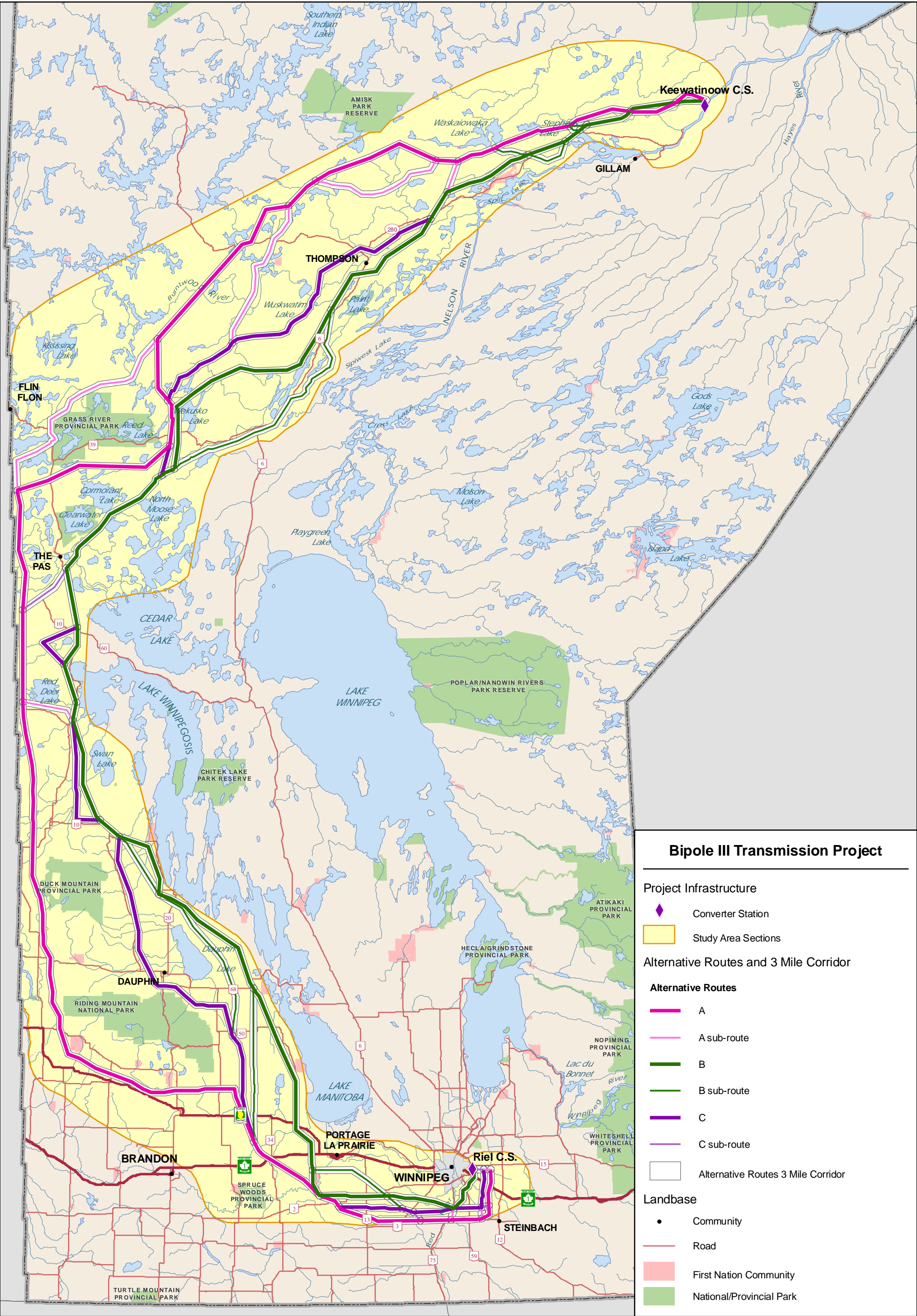


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Terrestrial Communities of Conservation Concern within the Bipole III Project Study Area



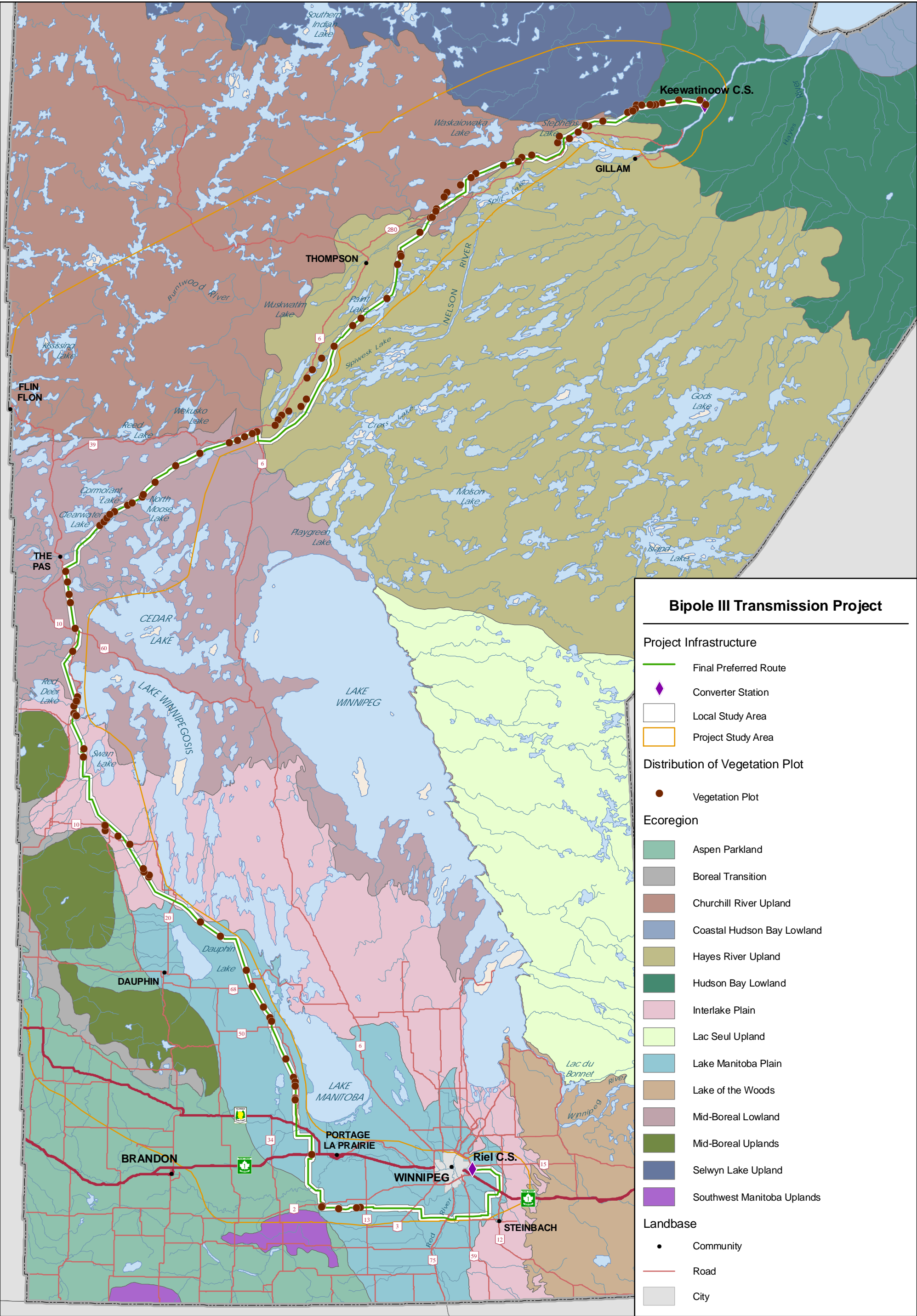
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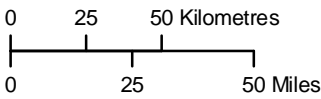


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Bipole III Project Study Area Alternative Routes (Segments)

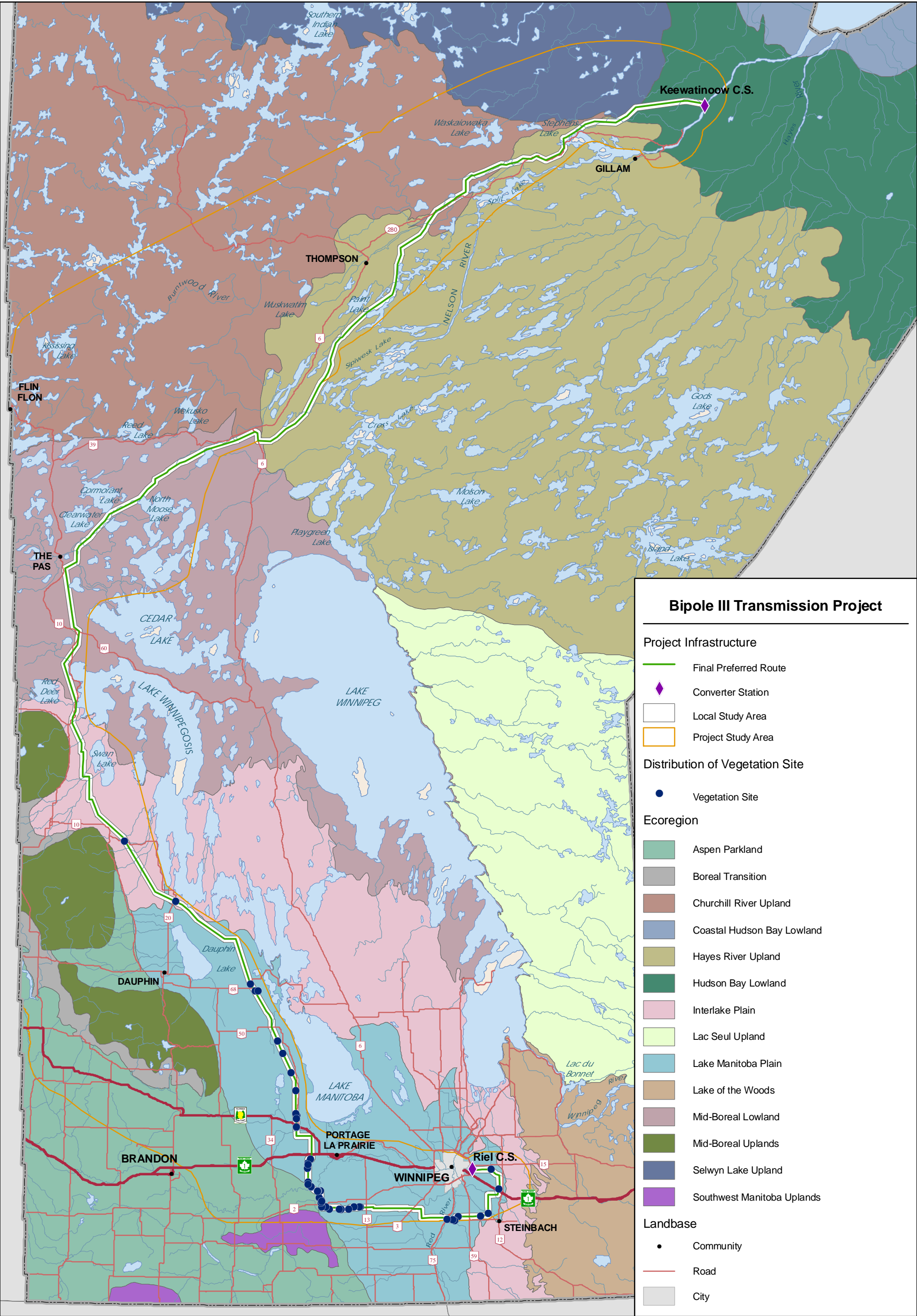


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Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 04, 2011

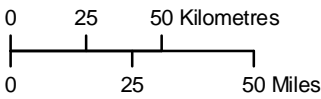


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Distribution of Vegetation Plots along the Final Preferred Route

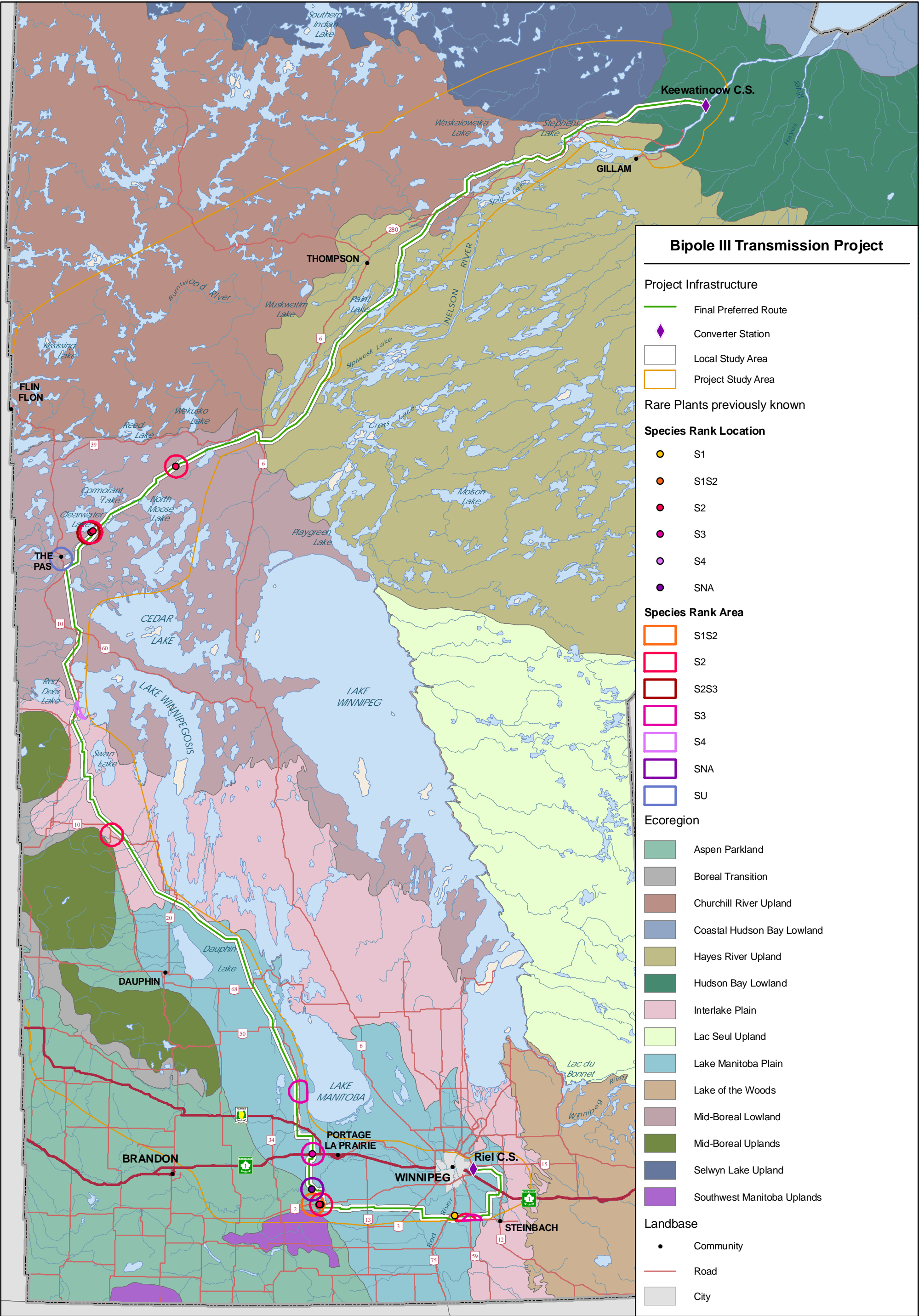


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Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 04, 2011



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Distribution of Vegetation Sites along the Final Preferred Route



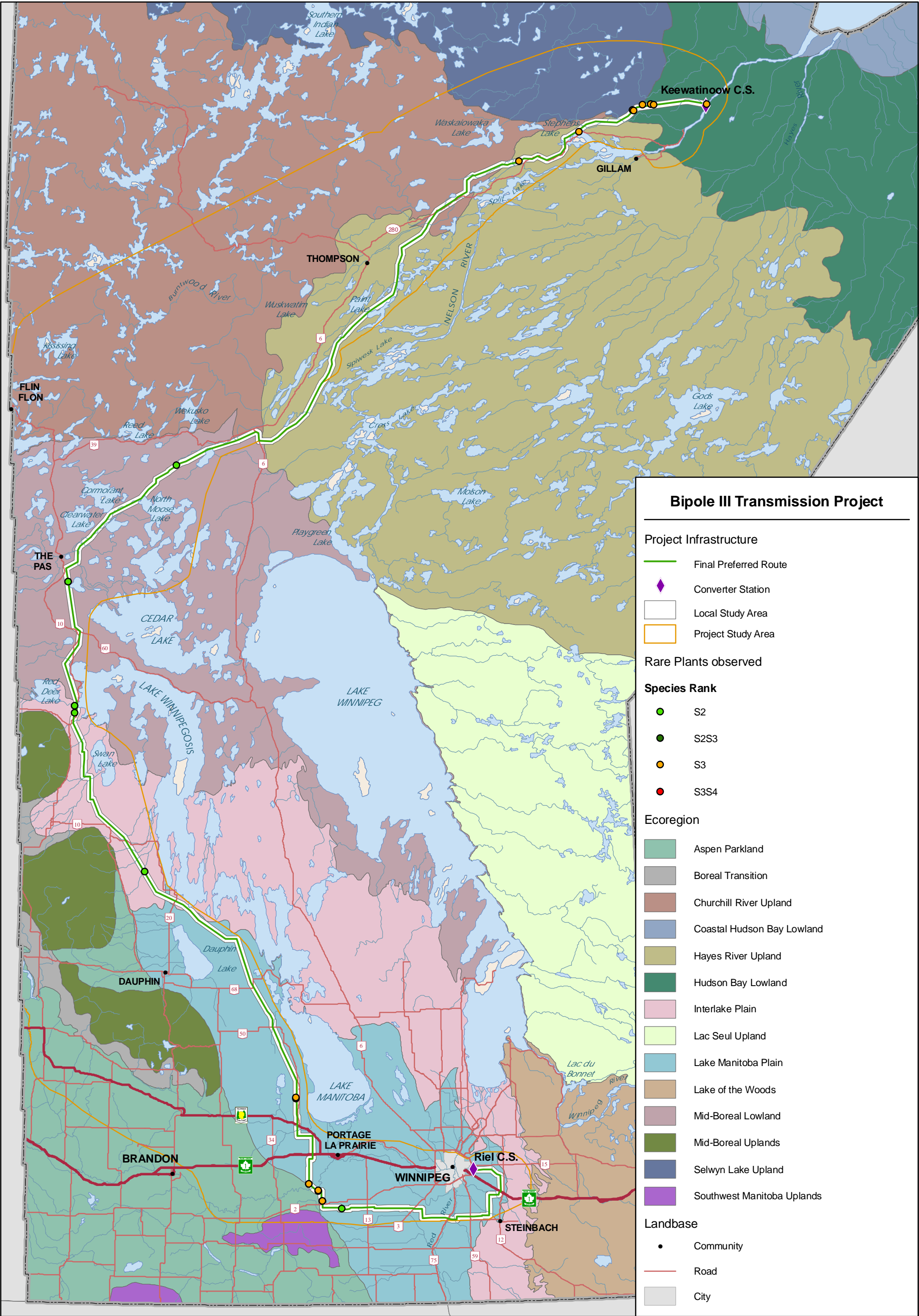
Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 04, 2011

0 25 50 Kilometres
0 25 50 Miles



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Species of Conservation Concern Previously Known along the Preferred Route



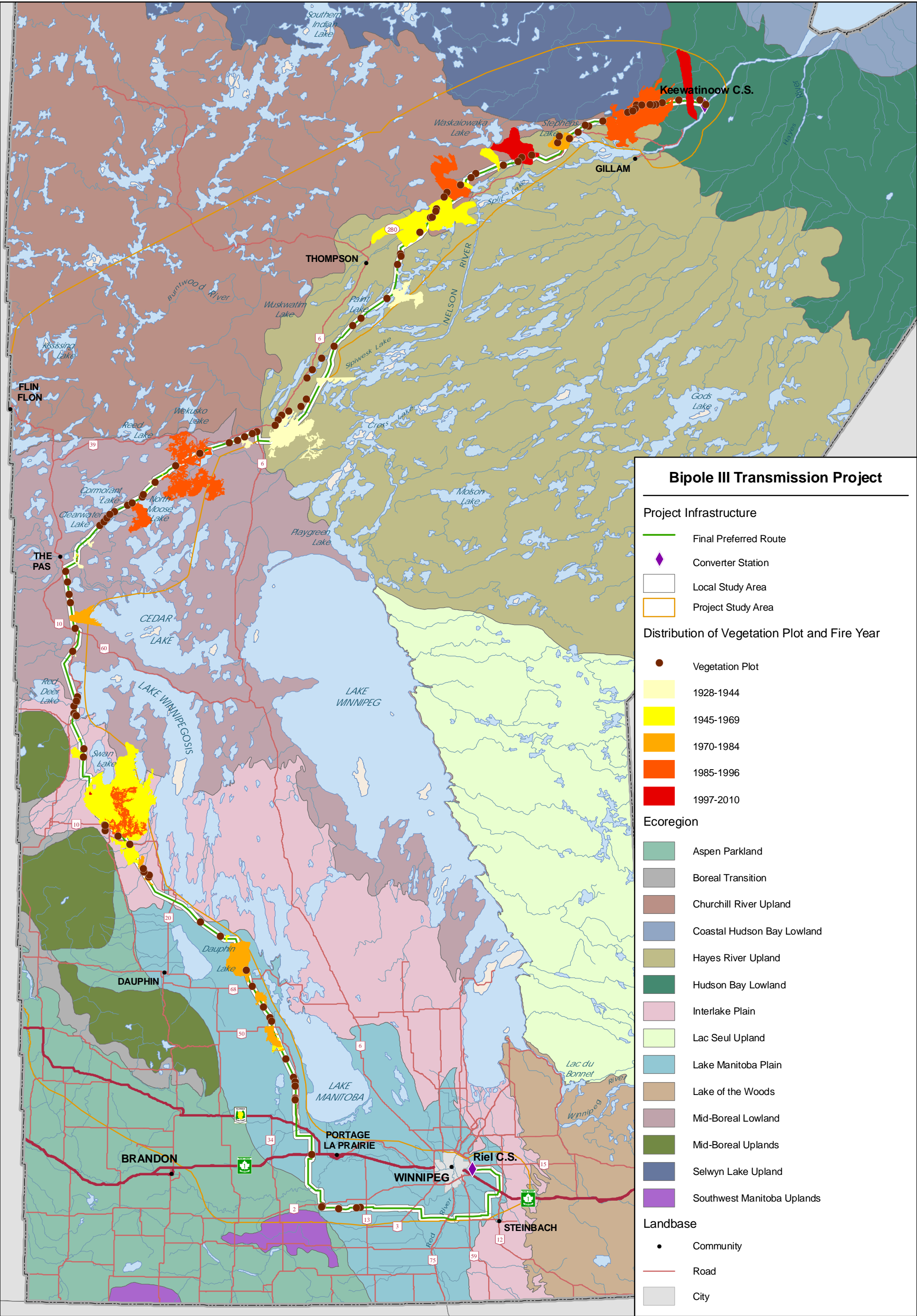
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Data Source: MB Hydro, MMM, Stantec, ProvMB, NRCAN
Date Created: July 04, 2011

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0 25 50 Miles



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Species of Conservation Concern Observed along the Preferred Route



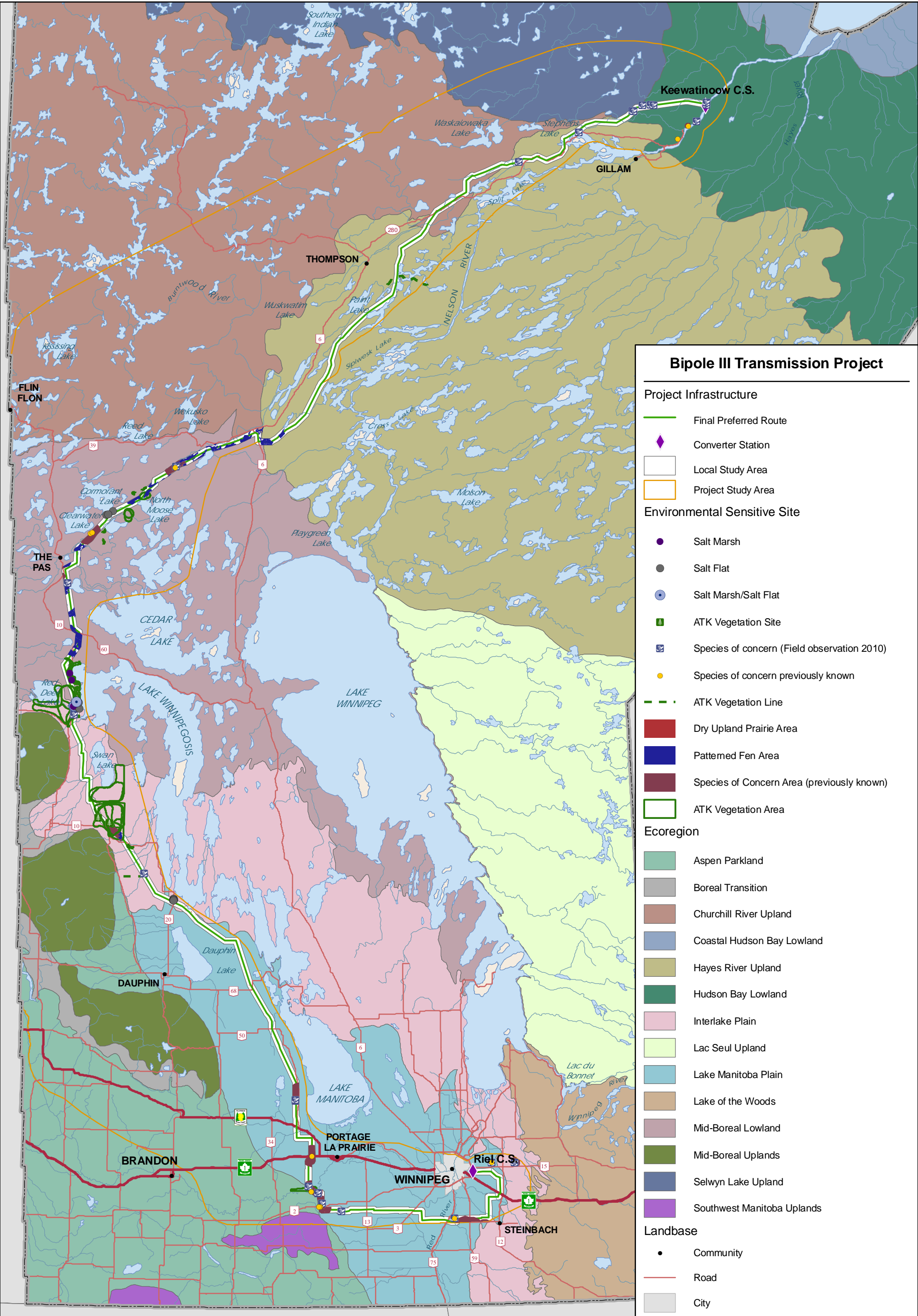
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Date Created: July 04, 2011

0 25 50 Kilometres
0 25 50 Miles

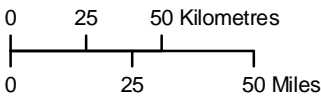


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Distribution of Vegetation Plots and Forest Fires along the Final Preferred Route

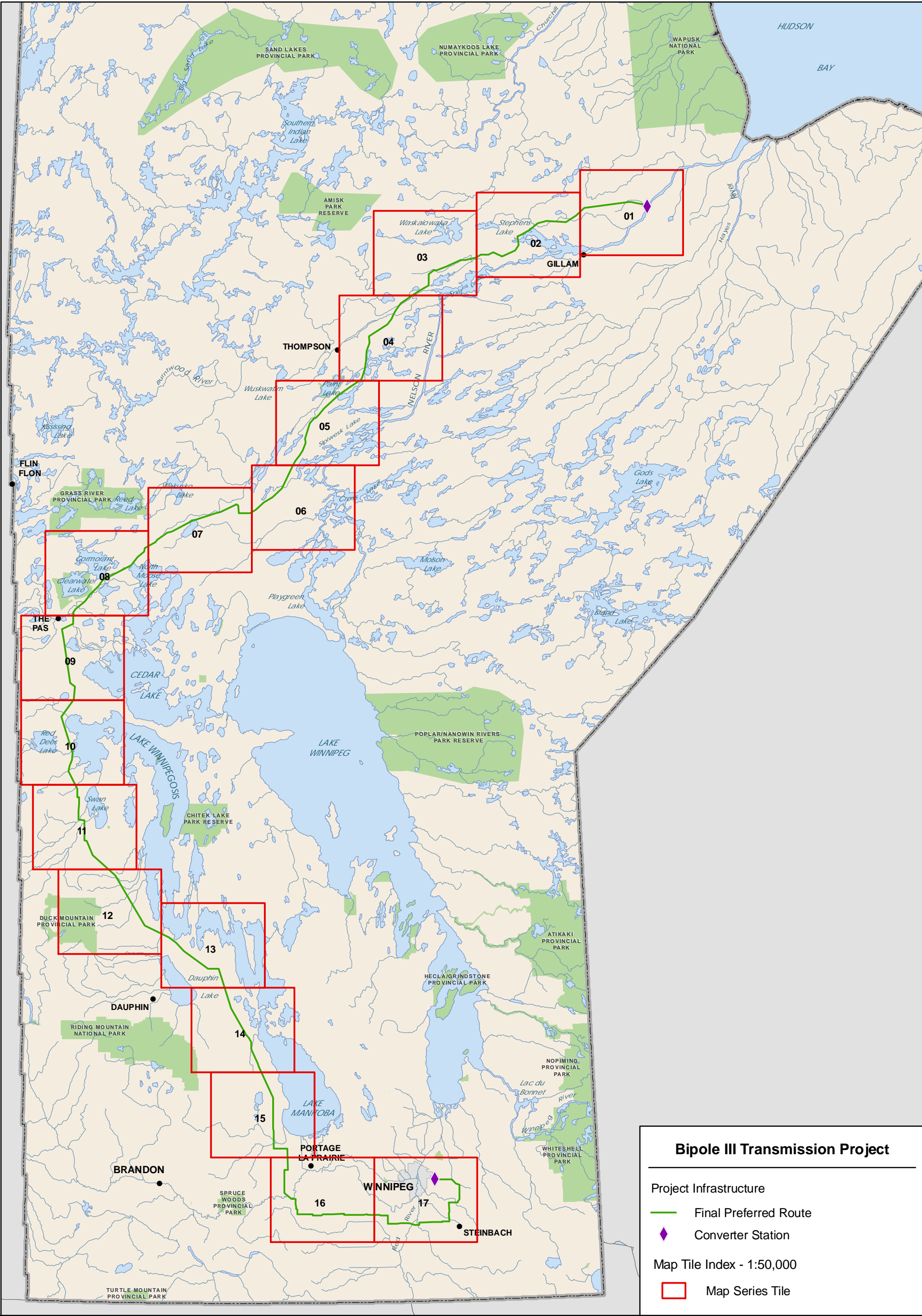


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Date Created: September 19, 2011

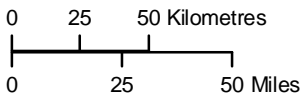


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Environmentally Sensitive Sites along the Preferred Route



Coordinate System: UTM Zone 14N NAD83
Data Source: MB Hydro, MMM, Stantec, ProvMB
Date Created: July 4, 2011



1:2,750,000



Bipole III Vegetation Cover Type Index

Bipole III Transmission Project

Project Infrastructure

Final Preferred Route

Converter Station

Infrastructure

Converter Station

Bipole I and II

Transmission Line

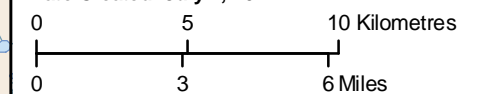
LCCEB Forest Cover Type and Ecoregion

Forest Cover Type	
Exposed Land	Agricultural Land
Developed	Coniferous - Dense
Shrubland	Coniferous - Open
Shrub - Tall	Coniferous - Sparse
Wetland	Broadleaf
Wetland Treed	Broadleaf - Dense
Wetland Shrub	Broadleaf - Open
Wetland Herb	Broadleaf - Sparse
Herb	Mixedwood - Dense
Grassland	Mixedwood - Open
	Ecoregion

Landbase

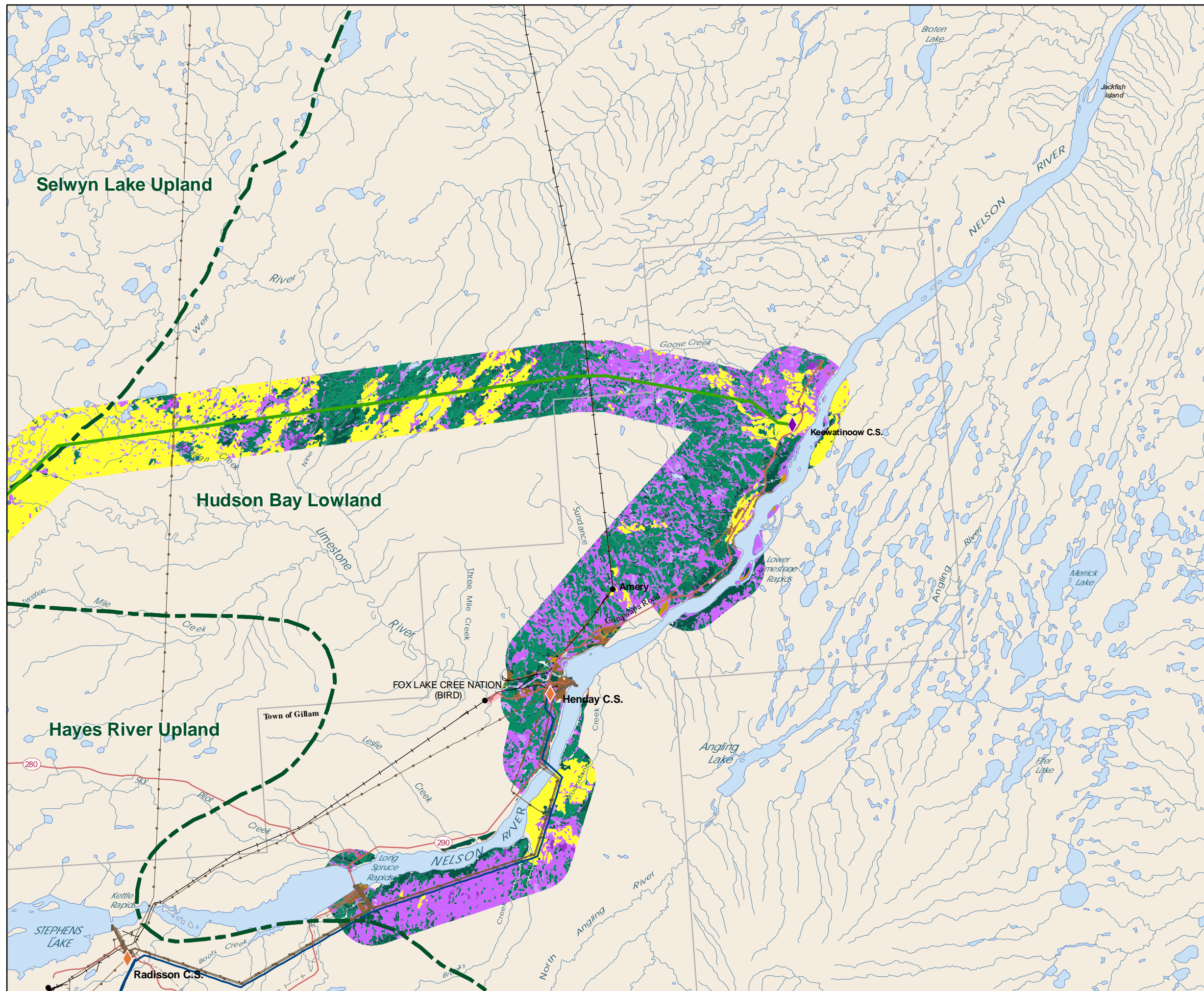
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

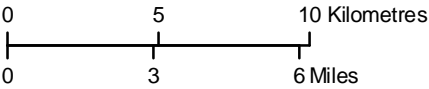
LCCEB Forest Cover Type and Ecoregion

- | | |
|-------------------|---------------------|
| Forest Cover Type | |
| Agricultural Land | Coniferous - Dense |
| Exposed Land | Coniferous - Open |
| Developed | Coniferous - Sparse |
| Shrubland | Broadleaf |
| Shrub - Tall | Broadleaf - Dense |
| Wetland | Broadleaf - Open |
| Wetland Treed | Broadleaf - Sparse |
| Wetland Shrub | Mixedwood - Dense |
| Wetland Herb | Mixedwood - Open |
| Herb | Ecoregion |
| Grassland | |

Landbase

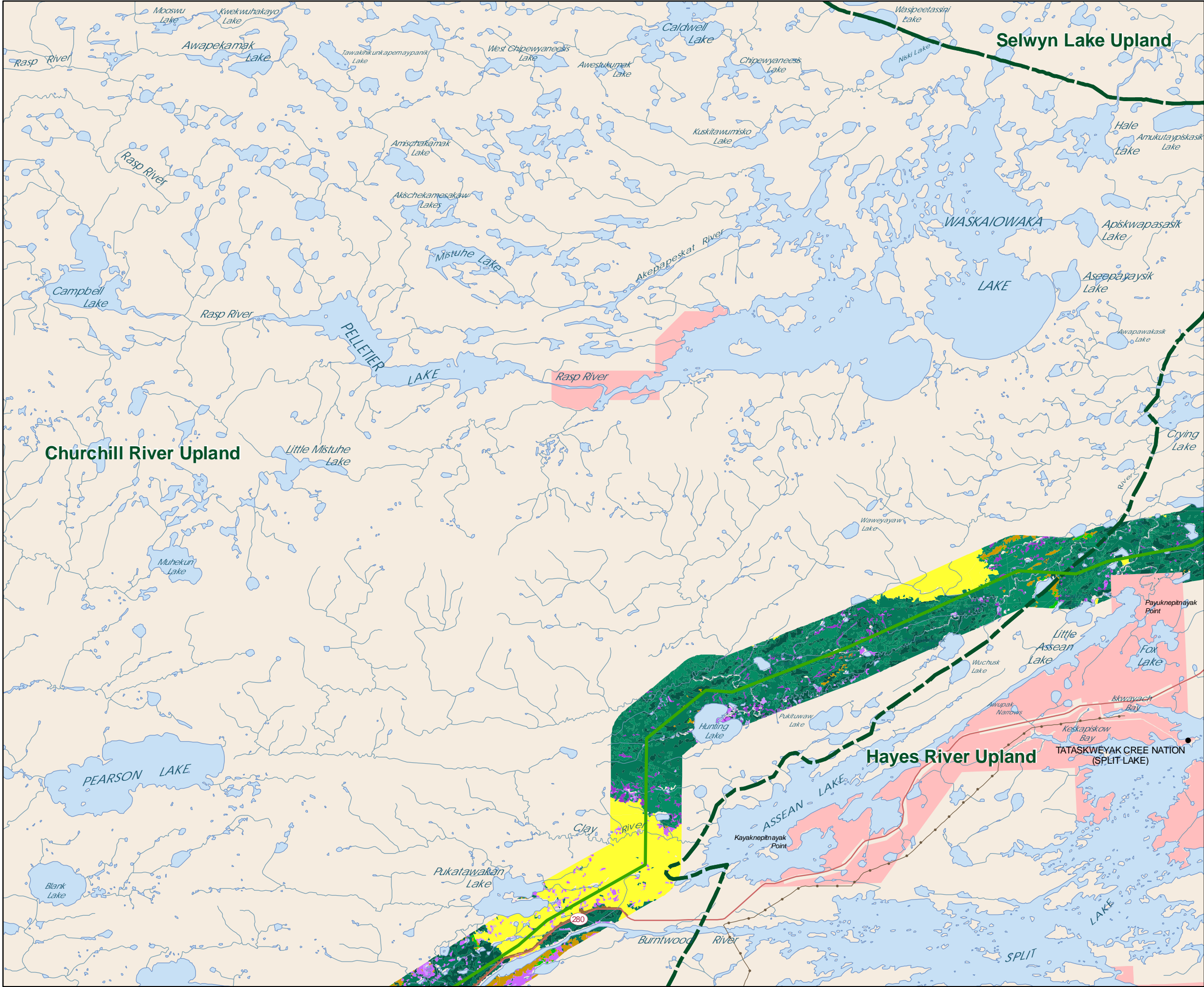
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

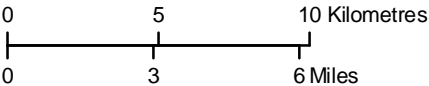
LCCEB Forest Cover Type and Ecoregion

- | | |
|--------------------------|---------------------|
| Forest Cover Type | Agricultural Land |
| Exposed Land | Coniferous - Dense |
| Developed | Coniferous - Open |
| Shrubland | Coniferous - Sparse |
| Shrub - Tall | Broadleaf |
| Wetland | Broadleaf - Dense |
| Wetland Treed | Broadleaf - Open |
| Wetland Shrub | Broadleaf - Sparse |
| Wetland Herb | Mixedwood - Dense |
| Herb | Mixedwood - Open |
| Grassland | Ecoregion |

Landbase

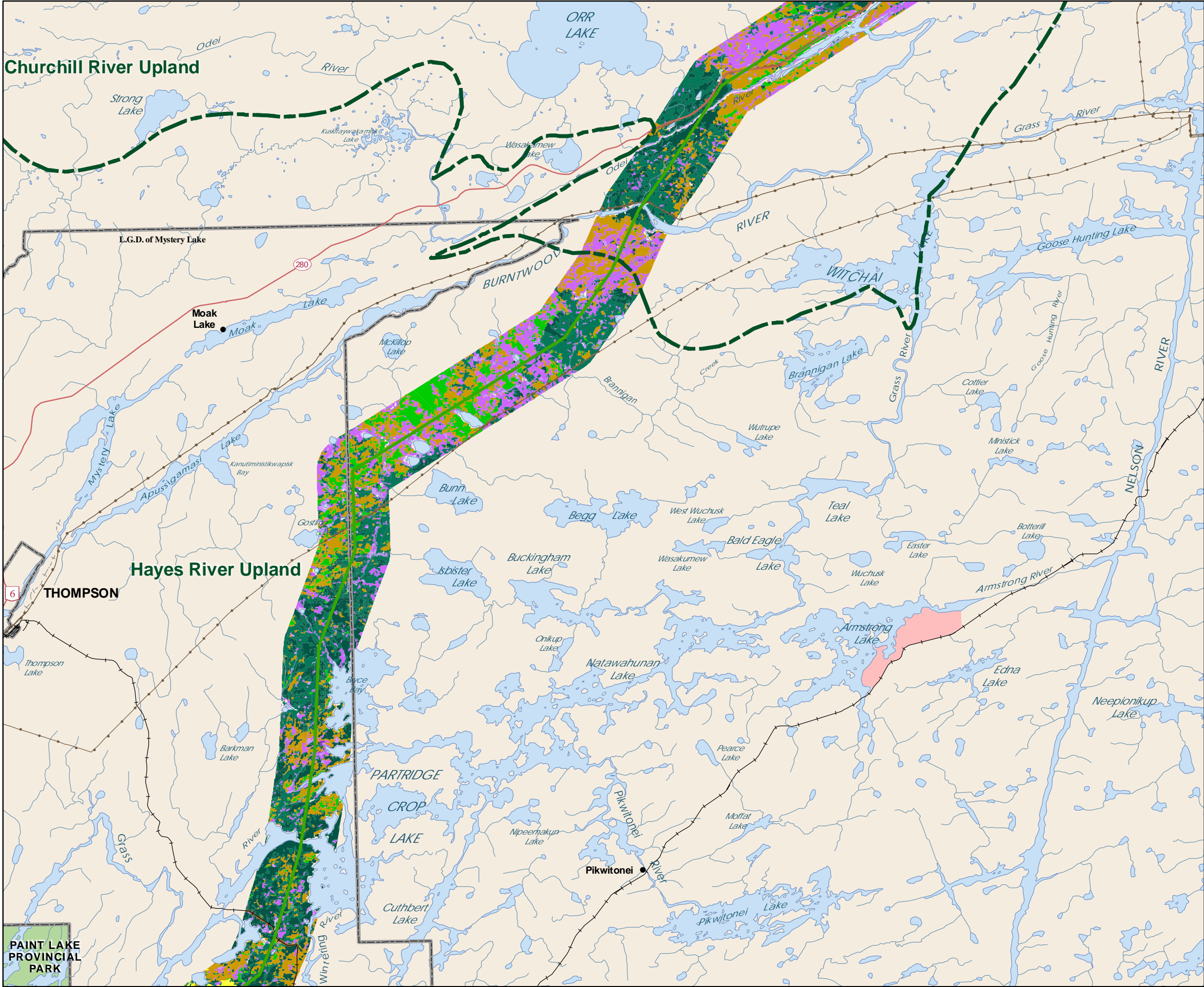
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

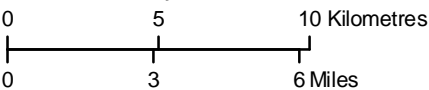
LCCEB Forest Cover Type and Ecoregion

- | Forest Cover Type | |
|-------------------|---------------------|
| Exposed Land | Agricultural Land |
| Developed | Coniferous - Dense |
| Shrubland | Coniferous - Open |
| Shrub - Tall | Coniferous - Sparse |
| Wetland | Broadleaf |
| Wetland Treed | Broadleaf - Dense |
| Wetland Shrub | Broadleaf - Open |
| Wetland Herb | Broadleaf - Sparse |
| Herb | Mixedwood - Dense |
| Grassland | Mixedwood - Open |
| | Ecoregion |

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
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Bipole III Vegetation Cover Types

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

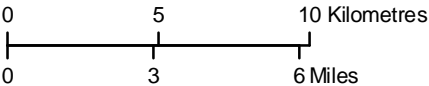
LCCEB Forest Cover Type and Ecoregion

- | Forest Cover Type | |
|-------------------|---------------------|
| Agricultural Land | Coniferous - Dense |
| Exposed Land | Coniferous - Open |
| Developed | Coniferous - Sparse |
| Shrubland | Broadleaf |
| Shrub - Tall | Broadleaf - Dense |
| Wetland | Broadleaf - Open |
| Wetland Treed | Broadleaf - Sparse |
| Wetland Shrub | Mixedwood - Dense |
| Wetland Herb | Mixedwood - Open |
| Herb | Ecoregion |
| Grassland | |

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types

Bipole III Transmission Project

Project Infrastructure

Final Preferred Route

Converter Station

Infrastructure

Converter Station

Bipole I and II

Transmission Line

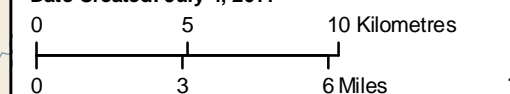
LCCEB Forest Cover Type and Ecoregion

Forest Cover Type		
Exposed Land	Coniferous - Dense	Agricultural Land
Developed	Coniferous - Open	Broadleaf
Shrubland	Coniferous - Sparse	Broadleaf - Dense
Shrub - Tall	Broadleaf	Broadleaf - Open
Wetland	Broadleaf - Sparse	Mixedwood - Dense
Wetland Treed	Broadleaf - Open	Mixedwood - Open
Wetland Shrub	Broadleaf - Sparse	Ecoregion
Wetland Herb	Broadleaf - Open	
Herb	Broadleaf - Sparse	
Grassland	Broadleaf - Open	

Landbase

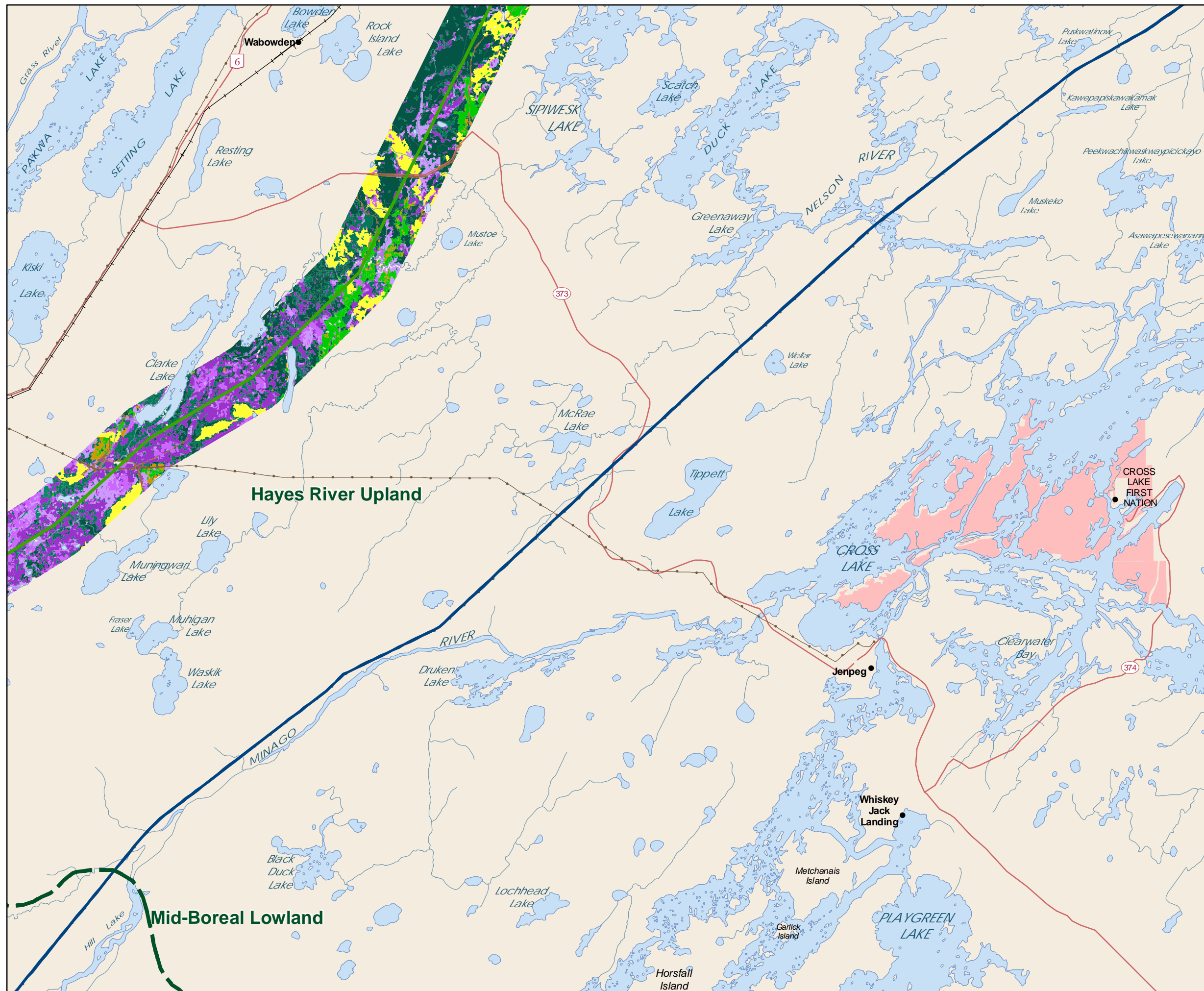
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

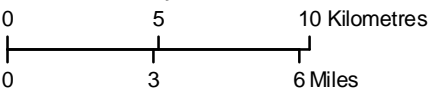
LCCEB Forest Cover Type and Ecoregion

- | | |
|--------------------------|---------------------|
| Forest Cover Type | |
| Exposed Land | Agricultural Land |
| Developed | Coniferous - Dense |
| Shrubland | Coniferous - Open |
| Shrub - Tall | Coniferous - Sparse |
| Wetland | Broadleaf |
| Wetland Treed | Broadleaf - Dense |
| Wetland Shrub | Broadleaf - Open |
| Wetland Herb | Broadleaf - Sparse |
| Herb | Mixedwood - Dense |
| Grassland | Mixedwood - Open |
| | Ecoregion |

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

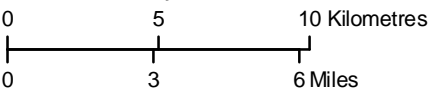
LCCEB Forest Cover Type and Ecoregion

- | Forest Cover Type | |
|-------------------|---------------------|
| Exposed Land | Agricultural Land |
| Developed | Coniferous - Dense |
| Shrubland | Coniferous - Open |
| Shrub - Tall | Coniferous - Sparse |
| Wetland | Broadleaf |
| Wetland Treed | Broadleaf - Dense |
| Wetland Shrub | Broadleaf - Open |
| Wetland Herb | Broadleaf - Sparse |
| Herb | Mixedwood - Dense |
| Grassland | Mixedwood - Open |
| | Ecoregion |

Landbase

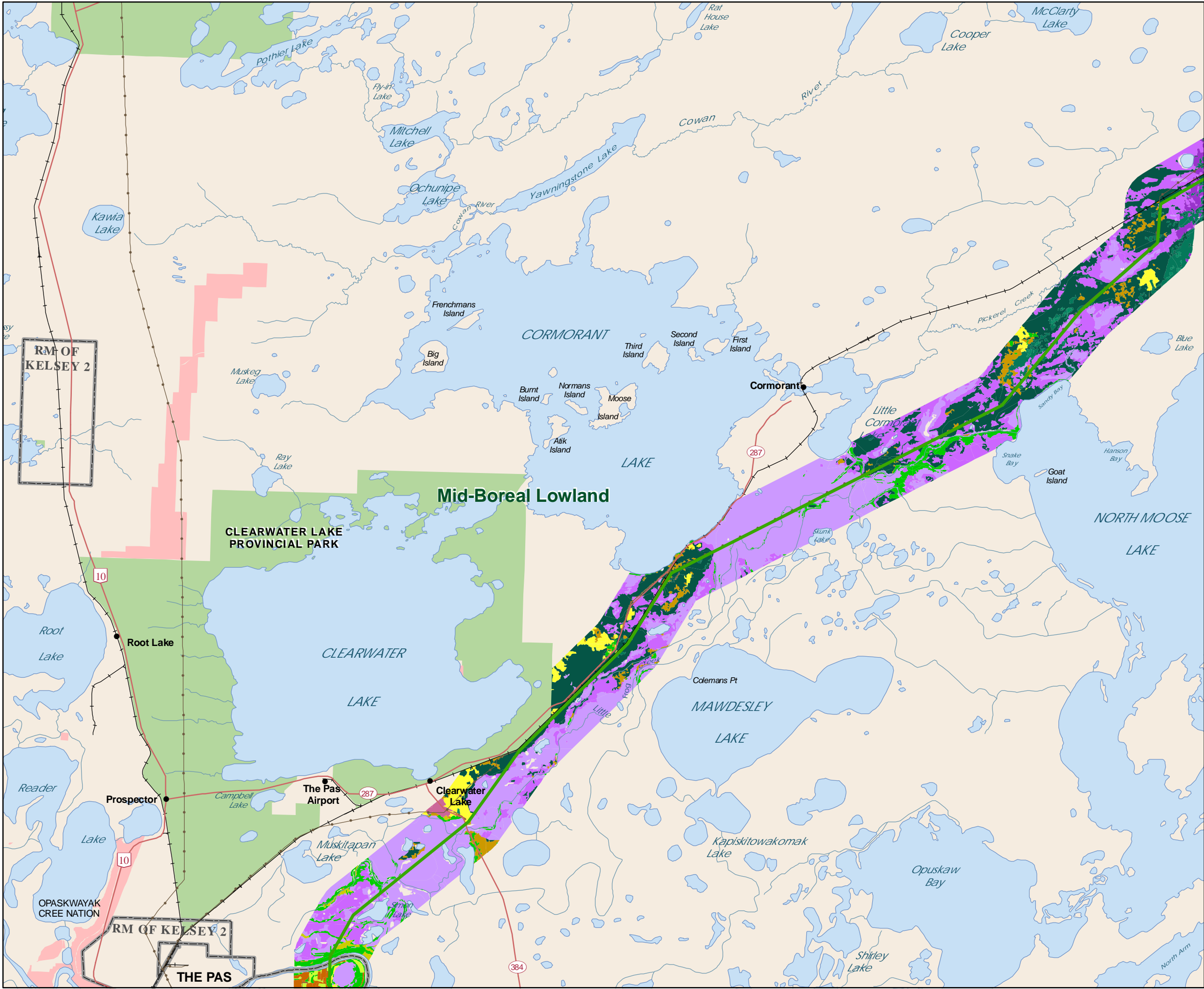
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

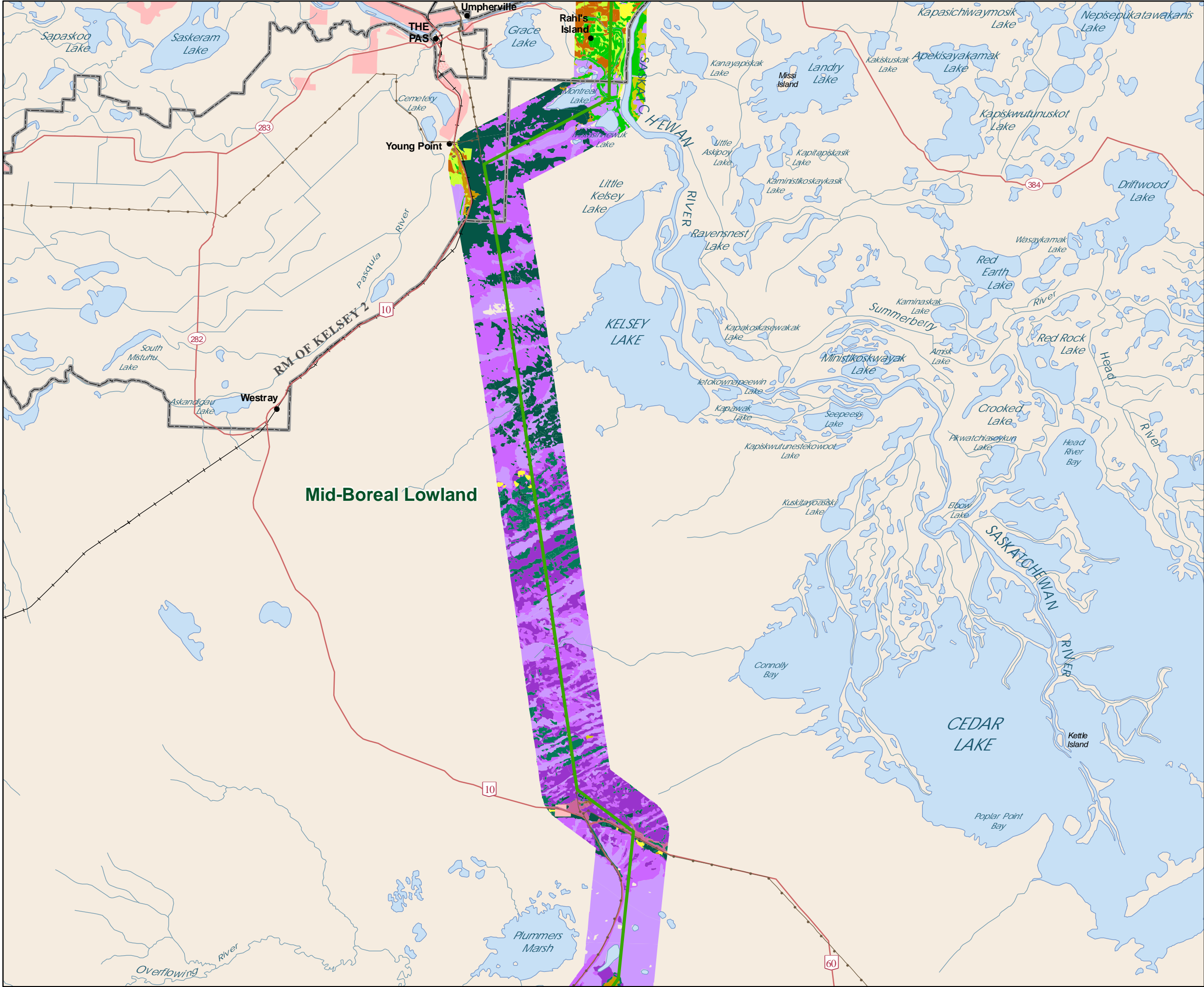
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Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types





Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

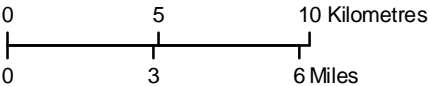
LCCEB Forest Cover Type and Ecoregion

- | | | |
|---------------------|--|--|
| Forest Cover Type | | |
| Agricultural Land | | |
| Exposed Land | | |
| Developed | | |
| Shrubland | | |
| Shrub - Tall | | |
| Wetland | | |
| Wetland Treed | | |
| Wetland Shrub | | |
| Wetland Herb | | |
| Herb | | |
| Grassland | | |
| Coniferous - Dense | | |
| Coniferous - Open | | |
| Coniferous - Sparse | | |
| Broadleaf | | |
| Broadleaf - Dense | | |
| Broadleaf - Open | | |
| Broadleaf - Sparse | | |
| Mixedwood - Dense | | |
| Mixedwood - Open | | |
| Ecoregion | | |

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

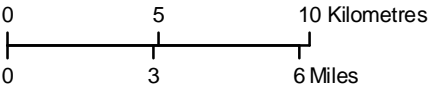
LCCEB Forest Cover Type and Ecoregion

- | Forest Cover Type | |
|---------------------|--|
| Agricultural Land | |
| Exposed Land | |
| Developed | |
| Shrubland | |
| Shrub - Tall | |
| Wetland | |
| Wetland Treed | |
| Wetland Shrub | |
| Wetland Herb | |
| Herb | |
| Grassland | |
| Coniferous - Dense | |
| Coniferous - Open | |
| Coniferous - Sparse | |
| Broadleaf | |
| Broadleaf - Dense | |
| Broadleaf - Open | |
| Broadleaf - Sparse | |
| Mixedwood - Dense | |
| Mixedwood - Open | |
| Ecoregion | |

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

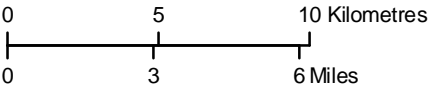
LCCEB Forest Cover Type and Ecoregion

- | Forest Cover Type | |
|---------------------|--|
| Agricultural Land | |
| Exposed Land | |
| Developed | |
| Shrubland | |
| Shrub - Tall | |
| Wetland | |
| Wetland Treed | |
| Wetland Shrub | |
| Wetland Herb | |
| Herb | |
| Grassland | |
| Coniferous - Dense | |
| Coniferous - Open | |
| Coniferous - Sparse | |
| Broadleaf | |
| Broadleaf - Dense | |
| Broadleaf - Open | |
| Broadleaf - Sparse | |
| Mixedwood - Dense | |
| Mixedwood - Open | |
| Ecoregion | |

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

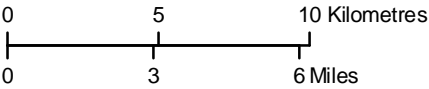
LCCEB Forest Cover Type and Ecoregion

- | | |
|--------------------------|---------------------|
| Forest Cover Type | Agricultural Land |
| Exposed Land | Coniferous - Dense |
| Developed | Coniferous - Open |
| Shrubland | Coniferous - Sparse |
| Shrub - Tall | Broadleaf |
| Wetland | Broadleaf - Dense |
| Wetland Treed | Broadleaf - Open |
| Wetland Shrub | Broadleaf - Sparse |
| Wetland Herb | Mixedwood - Dense |
| Herb | Mixedwood - Open |
| Grassland | Ecoregion |

Landbase

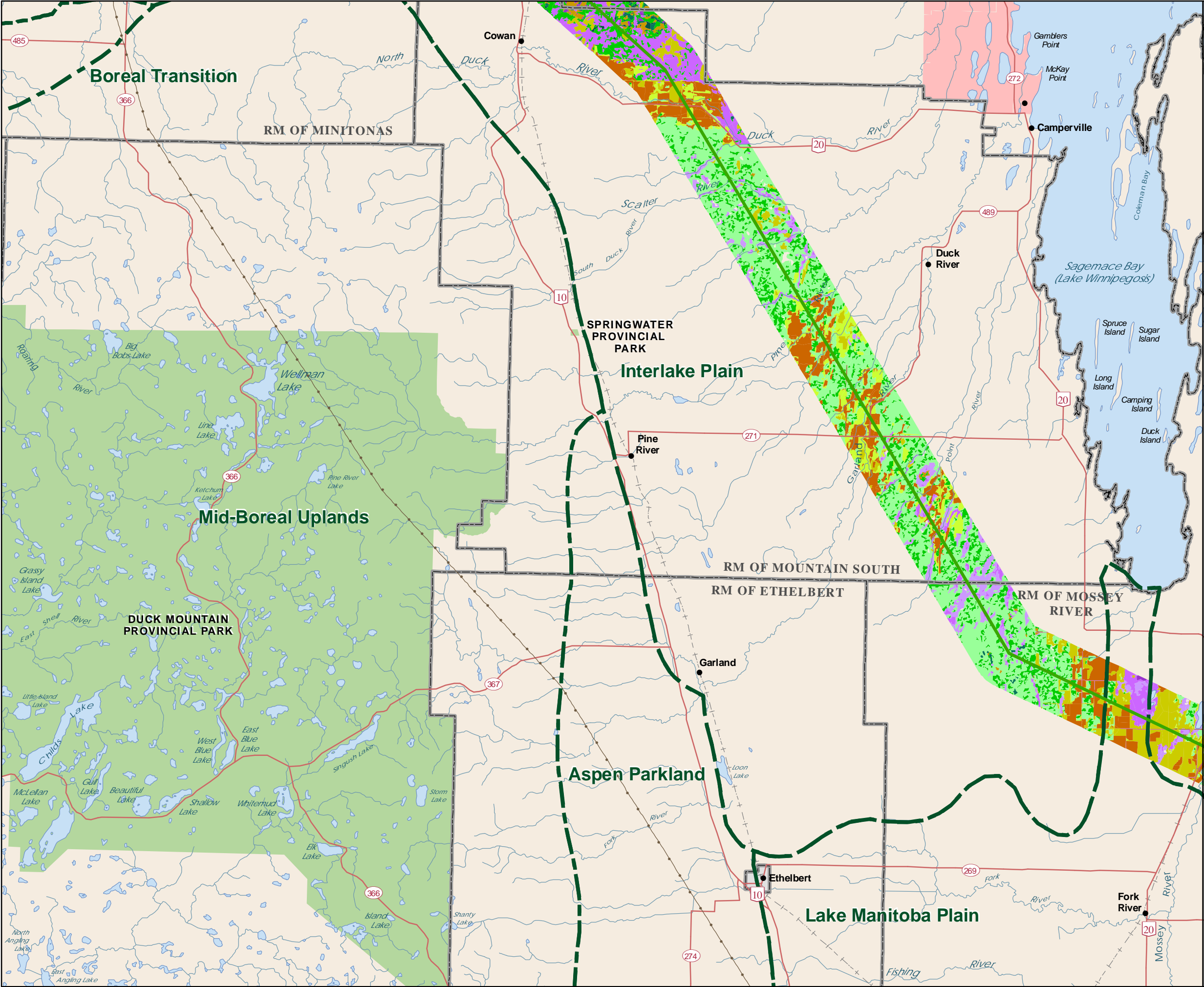
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

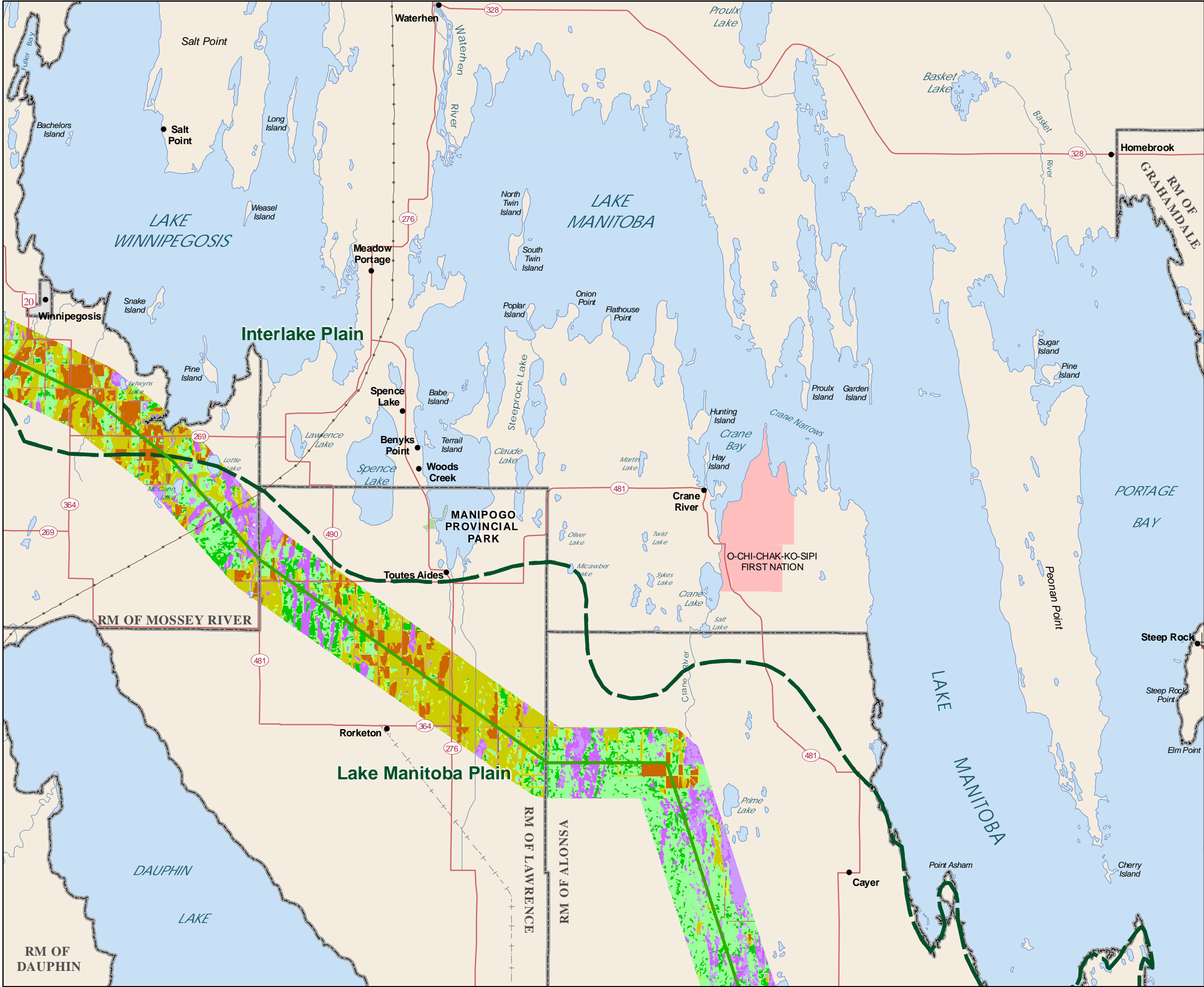
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Data Source: MBHydro, MMM, Stantec, Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types





Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

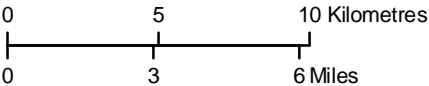
LCCEB Forest Cover Type and Ecoregion

- | | | |
|--------------------------|--|---------------------|
| Forest Cover Type | | Agricultural Land |
| Exposed Land | | Coniferous - Dense |
| Developed | | Coniferous - Open |
| Shrubland | | Coniferous - Sparse |
| Shrub - Tall | | Broadleaf |
| Wetland | | Broadleaf - Dense |
| Wetland Treed | | Broadleaf - Open |
| Wetland Shrub | | Broadleaf - Sparse |
| Wetland Herb | | Mixedwood - Dense |
| Herb | | Mixedwood - Open |
| Grassland | | Ecoregion |

Landbase

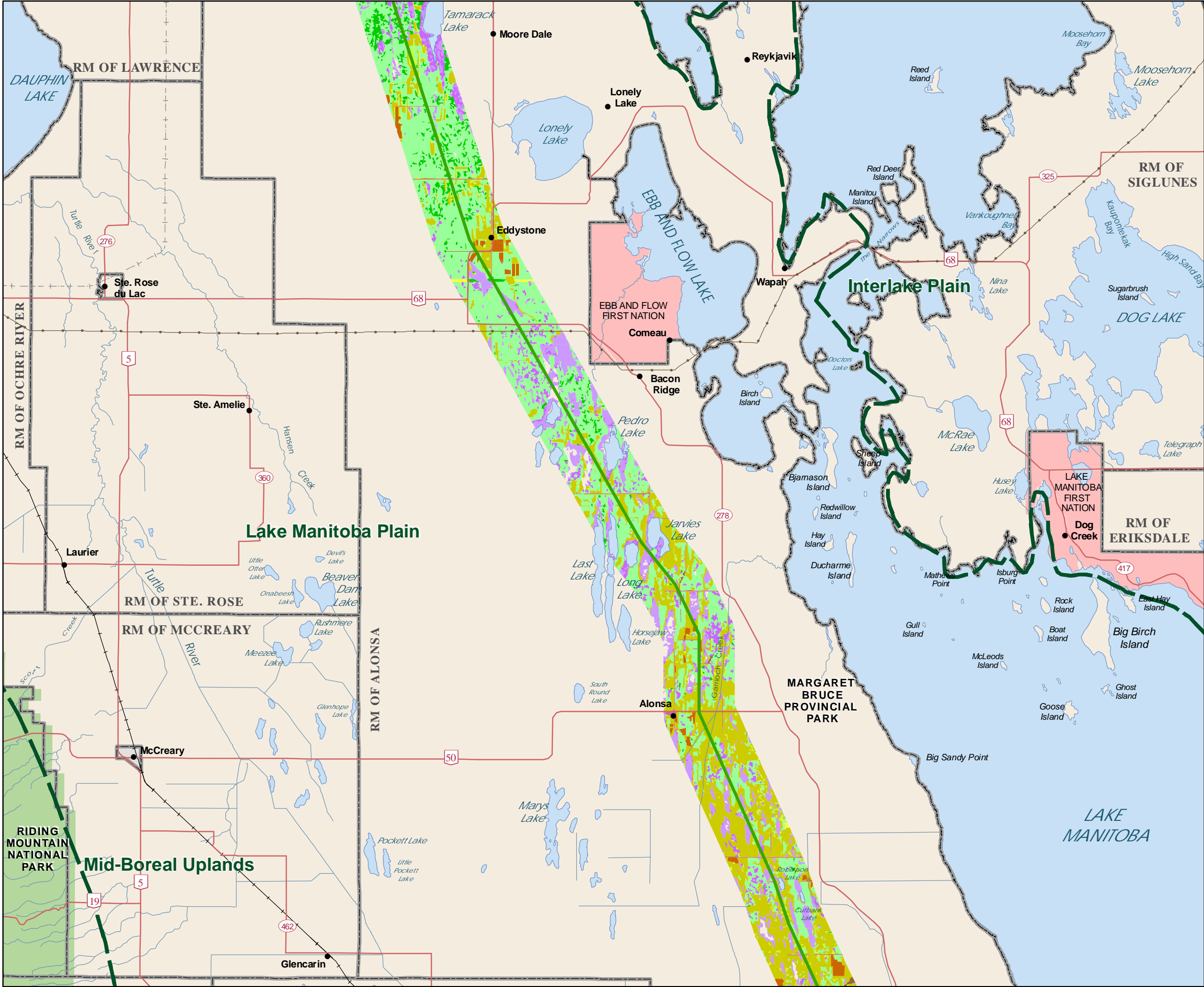
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011



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Bipole III Vegetation Cover Types



Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

LCCEB Forest Cover Type and Ecoregion

- | | |
|--------------------------|---------------------|
| Forest Cover Type | |
| Exposed Land | Agricultural Land |
| Developed | Coniferous - Dense |
| Shrubland | Coniferous - Open |
| Shrub - Tall | Coniferous - Sparse |
| Wetland | Broadleaf |
| Wetland Treed | Broadleaf - Dense |
| Wetland Shrub | Broadleaf - Open |
| Wetland Herb | Broadleaf - Sparse |
| Herb | Mixedwood - Dense |
| Grassland | Mixedwood - Open |
| | Ecoregion |

Landbase

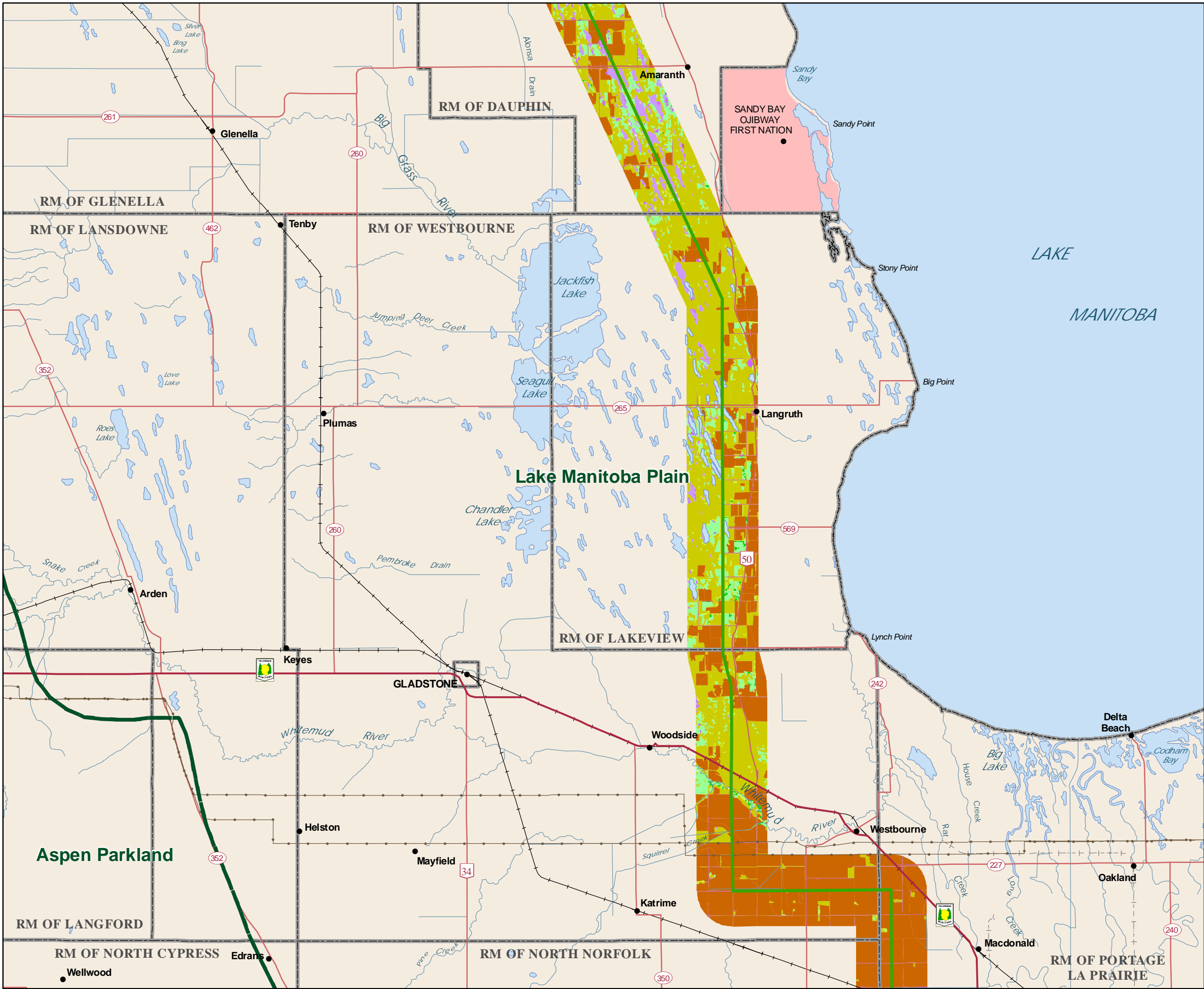
- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011

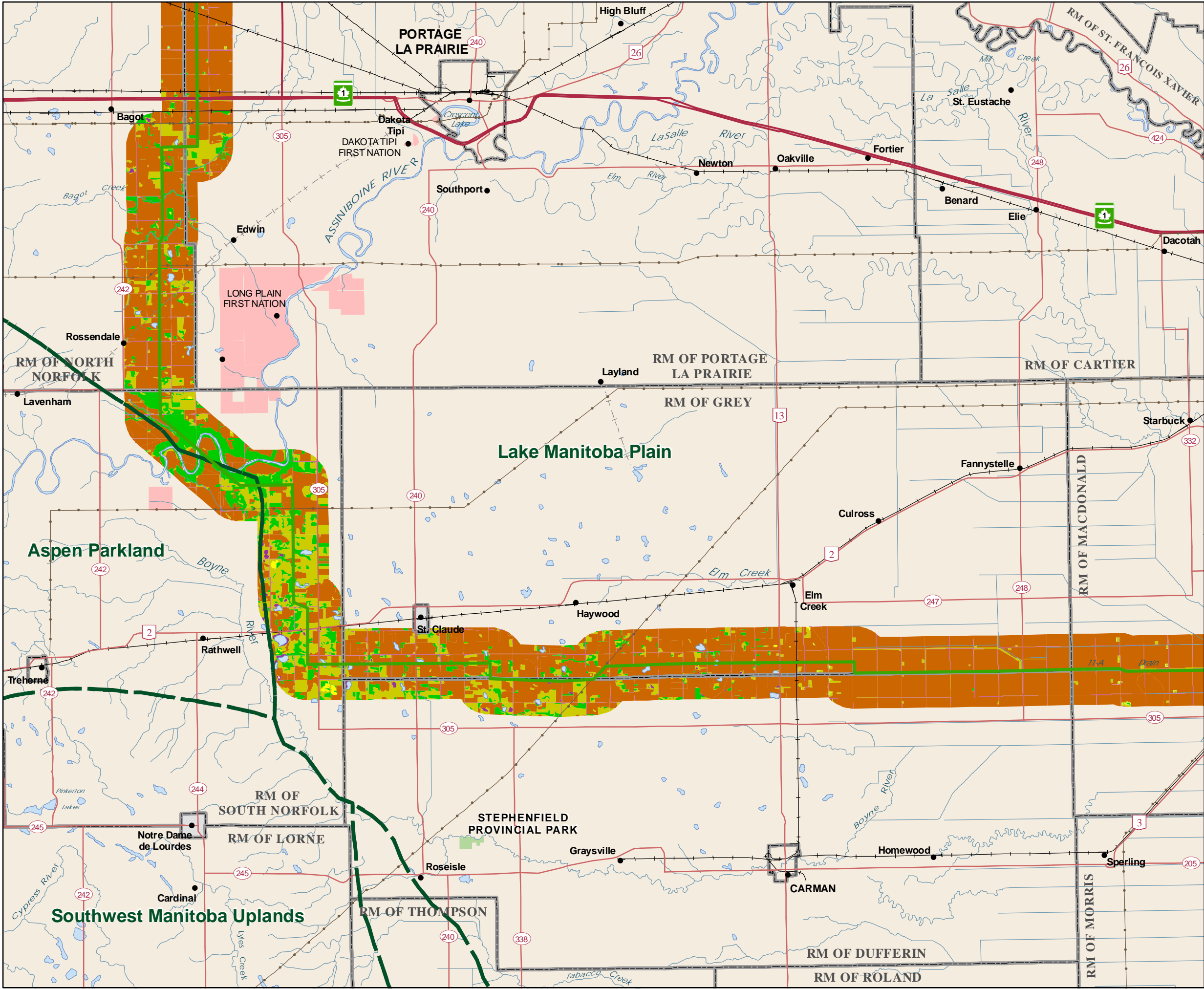
0 5 10 Kilometres
0 3 6 Miles

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Bipole III Vegetation Cover Types





Map 100 - 15






Bipole III Transmission Project
















Project Infrastructure

-  Final Preferred Route
-  Converter Station






Infrastructure

-  Converter Station
-  Bipole I and II
-  Transmission Line

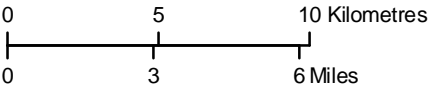
LCCEB Forest Cover Type and Ecoregion

- | | |
|---|--|
| Forest Cover Type |  Agricultural Land |
|  Exposed Land |  Coniferous - Dense |
|  Developed |  Coniferous - Open |
|  Shrubland |  Coniferous - Sparse |
|  Shrub - Tall |  Broadleaf |
|  Wetland |  Broadleaf - Dense |
|  Wetland Treed |  Broadleaf - Open |
|  Wetland Shrub |  Broadleaf - Sparse |
|  Wetland Herb |  Mixedwood - Dense |
|  Herb |  Mixedwood - Open |
|  Grassland |  Ecoregion |

Landbase

-  Community
-  City / Town
-  Rural Municipality
-  First Nation
-  National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec,
Joro, ProvMB, NRCAN
Date Created: July 4, 2011



1:250,000

Bipole III Vegetation Cover Types

Bipole III Transmission Project

Project Infrastructure

- Final Preferred Route
- Converter Station

Infrastructure

- Converter Station
- Bipole I and II
- Transmission Line

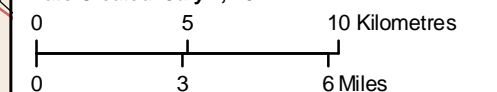
LCCEB Forest Cover Type and Ecoregion

- | | | |
|--------------------------|--|---------------------|
| Forest Cover Type | | |
| Exposed Land | | Agricultural Land |
| Developed | | Coniferous - Dense |
| Shrubland | | Coniferous - Open |
| Shrub - Tall | | Coniferous - Sparse |
| Wetland | | Broadleaf |
| Wetland Treed | | Broadleaf - Dense |
| Wetland Shrub | | Broadleaf - Open |
| Wetland Herb | | Broadleaf - Sparse |
| Herb | | Mixedwood - Dense |
| Grassland | | Mixedwood - Open |
| | | Ecoregion |

Landbase

- Community
- City / Town
- Rural Municipality
- First Nation
- National/Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, MMM, Stantec, Joro, ProvMB, NRCAN
Date Created: July 4, 2011



1:250,000

Bipole III Vegetation Cover Types

APPENDIX A. Glossary of selected technical terms.

Abundance-Dominance – This term expresses the number of individuals of a plant species and their coverage in a phytosociological survey; it is based on the coverage of individuals for classes with a coverage higher than 5% and on the abundance for classes with a lower percentage (Cauboue et al. 1996).

Action – The term action is used for the purpose of cumulative effects assessment to represent projects (developments), activities and natural events (Manitoba Hydro 2011).

Activity – Activity in relation to a project means actions carried out for construction, operation and eventual decommissioning; and in relation to human presence, actions carried out for domestic and commercial purposes including hunting, fishing, trapping, forestry, mining etc (Manitoba Hydro 2011).

Angiosperm – A seed borne in a vessel (carpel); thus one of a group of plants whose seeds are borne within a mature ovary or fruit (Raven et al. 1992).

Bog – Ombrotrophic peatlands generally unaffected by nutrient-rich groundwater that are acidic and often dominated by heath shrubs and Sphagnum mosses and that may include open-growing, stunted trees (Cauboue et al. 1996).

Boreal – Pertaining to the north; a climatic and ecological zone that occurs south of the subarctic, but north of the temperate hardwood forests of eastern North America, the parkland of the Great Plains region, and the montane forests of the Canadian cordillera (Cauboue et al. 1996).

Broadleaf – Refers to perennial plants from which the leaves abscise and fall off at the end of the growing season (Cauboue et al. 1996).

Bryophyte – A plant of the group Bryophyta; a liverwort, moss or hornwort (Johnson et al. 1995).

Canopy – The more or less continuous cover of branches and foliage formed by the crowns of trees (Cauboue et al. 1996).

Canopy Closure – The degree of canopy cover relative to openings (Cauboue et al. 1996).

Classification – The systematic grouping and organization of objects, usually in a hierarchical manner (Cauboue et al. 1996).

Closed – see canopy closure.

Cluster Analysis – A multidimensional statistical technique used to group samples according to their degree of similarity (Cauboue et al. 1996).

Community-Type – A group of vegetation stands that share common characteristics, an abstract plant community (Cauboue et al. 1996).

Coniferous – A cone-bearing plant belonging to the taxonomic group Gymnospermae (Cauboue et al. 1996).

Cover – The area of ground covered with plants of one or more species, usually expressed as a percentage (Cauboue et al. 1996).

Cumulative Environmental Effects – The environmental effects that are likely to result from a project in combination with environmental effects of other past, existing and future projects or activities (Manitoba Hydro 2011).

Deciduous – Refers to perennial plants from which the leaves abscise and fall off at the end of the growing season (Cauboue et al. 1996).

Dicotyledon – One of the two divisions of the Angiosperms; the embryo has two cotyledons, the leaves are usually net-veined, the stems have open bundles, and the flower parts are usually in fours or fives (Usher 1996).

Disjunct – Marked by separation of or from usually contiguous parts or individuals (Merriam-Webster 2010).

Ecodistrict – A subdivision of an ecoregion based on distinct assemblages of relief, geology, landform, soils, vegetation, water and fauna (Cauboue et al. 1996).

Ecological Land Classification – The Canadian classification of lands from an ecological perspective, an approach that attempts to identify ecologically similar areas (Cauboue et al. 1996).

Ecoregion – An area characterized by a distinctive regional climate as expressed by vegetation (Cauboue et al. 1996).

Ecozone – An area of the earth's surface representing large and very generalized ecological units characterized by interacting abiotic and biotic factors; the most general level of the Canadian ecological land classification (Cauboue et al. 1996).

Environmental Effect – Any change in biophysical or socio-economic environment caused by a project or its components or activities (Manitoba Hydro 2011).

Epiphyte – A plant growing on another plant structure for physical support (Cauboue et al. 1996).

Ericaceous – Ericaceae family, heather-like (Usher 1996).

Fen – Wetland with a peat substrate, nutrient-rich waters, and primarily vegetated by shrubs and graminoids (Cauboue et al. 1996).

Flood Plain – An area adjacent to a stream or river that is periodically inundated during periods of high stream flow (Cauboue et al. 1996).

Flora – A list of the plant species present in an area (Cauboue et al. 1996).

Forb – A broad-leaved, non-woody plant that dies back to the ground after each growing season (Johnson et al. 1995).

Forest – A relatively large assemblage of tree-dominated stands (Cauboue et al. 1996).

Graminoid – A plant that is grass-like; the term refers to grasses and plant that look like grasses, i.e., only narrow-leaved herbs; in the strictest sense, it includes plants belonging only to the family *Graminaceae* (Cauboue et al. 1996).

Grassland – Vegetation consisting primarily of grass species occurring on sites that are arid or at least well drained (Cauboue et al. 1996).

Grubbing – Removal of roots and other ground vegetation (Manitoba Hydro 2006a).

Gymnosperm – A seed plant with seeds not enclosed in the ovary; the conifers are the most familiar group (Raven et al. 1992).

Habitat – The place in which an animal or plant lives; the sum of environmental circumstances in the place inhabited by an organism, population or community (Cauboue et al. 1996).

Herb (Herbaceous) – A plant without woody above-ground parts, the stems dying back to the ground each year (Johnson et al. 1995).

Induced Actions – Projects and activities that may occur if the project under assessment is approved (Manitoba Hydro 2011).

Invasive – Invasive species are plants that are growing outside of their country or region of origin and are out-competing or even replacing native plants (Invasive Species Council of Manitoba).

Mitigation – Often the process or act of minimizing the negative effects of a proposed action (Cauboue et al. 1996).

Mixedwood – Forest stands composed of conifers and angiosperms each representing between 25 and 75% of the cover (Cauboue et al. 1996).

Monocotyledon – A class of the Angiosperms; the seeds have a single cotyledon, the floral parts are in three or multiples of three, the leaves have parallel veins, and the vascular bundles of the stem are scattered and closed (Usher 1996).

Natural Event – An event that occurs naturally including forest fires, floods, landslides, earthquakes and extreme weather (Manitoba Hydro 2011).

Non-vascular Plant – A plant without a vascular system (eg. mosses and lichens).

Photosynthesis – The conversion of light energy to chemical energy; the production of carbohydrates from carbon dioxide and water in the presence of chlorophyll by using light energy (Raven et al. 1992).

Plot – A vegetation sampling unit used to delineate a fixed amount of area for the purpose of estimating plant cover, biomass, or density (Cauboue et al. 1996).

Pteridophyte – A division of the plant kingdom; the sporophyte is vascular and independent of the gametophyte at maturity; generally they have stems, leaves and roots (Usher 1996).

Rareness – Noun of rare, refers to scarcity, see also rare species.

Rare Species – Any indigenous species of flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reasons, exists in low numbers or in very restricted areas of Canada but is not a threatened species (Cauboue et al. 1996).

Regeneration – The renewal of a forest crop by natural or artificial means (Cauboue et al. 1996).

Riparian – Refers to terrain, vegetation or simply a position adjacent to or associated with a stream, flood plain, or standing body of water (Cauboue et al. 1996).

Salt Marsh – A marsh that is affected by the daily or seasonal influences of brackish to saline water (Cauboue et al. 1996).

Shrub – A perennial plant usually with a woody stem, shorter than a tree, often with a multi-stemmed base (Cauboue et al. 1996).

Site – The place or category of places, considered from an environmental perspective, that determines the type and quality of plants that can grow there (Cauboue et al. 1996).

Solar Radiation – Radiant energy received from the sun (Cauboue et al. 1996).

Species – A group of organisms having a common ancestry that are able to reproduce only among themselves; a general definition that does not account for hybridization (Cauboue et al. 1996).

Stand – A collection of plants having a relatively uniform composition and structure, and age in the case of forests (Cauboue et al. 1996).

Stratum – A distinct layer within a plant community, a component of structure (Cauboue et al. 1996).

Taxon – Any taxonomic unit within a classification system (Cauboue et al. 1996).

Terrestrial – Pertaining to land as opposed to water (Cauboue et al. 1996).

Understory – Vegetation growing beneath taller plants such as trees or tall shrubs (Cauboue et al. 1996).

Valued Environmental Component – Any part of the environment that is considered important by the proponent, public, scientists, and government involved in the assessment process; importance may be determined on the basis of societal or cultural values, or scientific interest or concern (Manitoba Hydro 2011).

Vascular Plant – A plant having a vascular system (Usher 1996).

Vegetation – The general cover of plants growing on a landscape (Cauboue et al. 1996).

Vegetation Type – In phytosociology, the lowest possible level to be described (Cauboue et al. 1996).

Wetland – Land that is saturated with water long enough to promote hydric soils or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to wet environments (Cauboue et al. 1996).

Windfall – A tree uprooted or broken off by wind, and areas containing such trees (Cauboue et al. 1996).

Xerophyte – Plants that grow on dry sites (Cauboue et al. 1996).

APPENDIX B. Ecological land classification descriptions.

1. Hudson Plains Ecozone

In the north, the Hudson Plains consists of short cool summers with long cold winters. Mean annual temperatures can reach -7°C . The area is largely characterized with wetlands of bogs and fens. The bogs may generally occupy mosses, shrubs and black spruce, while fens occupy sedges, mosses, a varying abundance of shrub cover and tamarack.

1.1. Hudson Bay Lowland Ecoregion

The Hudson Bay Lowland Ecoregion is part of the Hudson Plains Ecozone. It occurs in the northeastern portion of the study area. This ecoregion forms part of the transition between the boreal forest to the south and the tundra to the north. Vegetation characteristic of the boreal forest dominates and is interspersed with stands of low black spruce and an understory of dwarf birch, Labrador tea, lichen and moss. Drier, mineral sites support stands of black spruce, white spruce and paper birch with an understory of low shrubs, such as bearberry, bog cranberry as well as widespread lichen and moss ground cover. Low black spruce, Labrador tea, blueberry, bog rosemary and sphagnum moss and lichens populate the poorly drained, peat-filled sites of this ecoregion.

1.1.1. Winisk River Lowland Ecodistrict

Bogs with stunted black spruce forests dominate this ecodistrict. The bogs support ericaceous shrubs such as Labrador tea as well as mosses and lichens. Sedges, brown mosses, willows, dwarf birch and tamarack are found in the fens. Drier mineral sites support alder, willow, ericaceous shrubs, mosses and lichens under black spruce stands.

2. Taiga Shield Ecozone

The Taiga Shield has a subarctic climate with short summers and long cold winters. The mean annual temperature can reach -9°C and can accumulate 200 to 500 mm of precipitation annually. The Precambrian Shield is characteristic of the ecozone with open coniferous forest occurring on shallow soils. White spruce, paper birch, and trembling aspen may occur in more southern areas. Lowlands are dominated by bogs and fens.

2.1 Selwyn Lake Upland Ecoregion

The Selwyn Lake Upland Ecoregion is part of the Taiga Shield Ecozone. It is part of a broad area of coniferous forest transition, present in the northeastern portion of the study area. Typically this ecoregion can have closed coniferous boreal forest to open stands of low black spruce with an understory of dwarf birch, Labrador tea, lichens, and mosses. Black spruce dominates this ecoregion, although open stands of white spruce and paper birch are commonly found in drier sites with an understory of ericaceous shrubs, such as bearberry and rock cranberry. Bogs in the region are populated by sphagnum mosses, ericaceous shrubs and black spruce.

2.1.1. Embelton Lake Ecodistrict

The northern portion of this ecodistrict supports fairly sparse black spruce stands while the southern portion has a denser, taller forest including black spruce with white spruce and trembling aspen. The sparse black spruce stands and peatland regions have a ground cover of sphagnum and other mosses, ericaceous shrubs and lichens. The wetter fens support tamarack, shrubs, sedges and brown mosses.

2.1.2. Northern Indian Lake Ecodistrict

Vegetation cover in this ecodistrict is sparse black spruce and lichens on well to imperfectly drained sites and black spruce on peatlands in the wetter areas. Mosses and ericaceous shrubs dominate the ground cover. Fens support tamarack, sedges and brown mosses.

3. Boreal Shield Ecozone

The Boreal Shield has a strong continental climate of long, cold winters and summers that are short and cool. The mean annual temperature is near -4°C and the area receives approximately 400 mm of precipitation annually. A rolling mosaic of uplands and lowlands typifies the landform. Closed stands of white spruce, black spruce, balsam fir and jack pine are found on well to imperfectly drained sites. White birch, trembling aspen, and balsam poplar occur towards the south. Stands of black spruce or tamarack are located on organic deposits. Bedrock outcrops are also a component of this ecozone.

3.1 *Churchill River Upland Ecoregion*

The Churchill River Upland Ecoregion is part of the Boreal Shield Ecozone. This ecoregion occurs in the northern portion of the study area. Black spruce and jack pine stands dominate forest cover while white spruce, white birch and trembling aspen are particularly important components of some of these stands. Feather mosses, rock cranberry, blueberry, Labrador tea and lichen comprise the understory vegetation in this ecoregion. Black spruce and jack pine stands occupy drier sites while lichens generally dominate exposed bedrock. Poorly drained basin and peat plateau bogs have stands of stunted black spruce with an understory of Labrador tea, blueberry, bog rosemary and sphagnum mosses.

3.1.1. Waskaiowaka Lake Ecodistrict

Black spruce is the dominant cover in this ecodistrict. In drier and favourable sites, white spruce, white birch, trembling aspen and jack pine are found. In the wetlands tamarack occurs along with black spruce.

3.1.2. Granville Lake Ecodistrict

Black spruce dominates this ecodistrict with closed stands in favourable areas and sparse cover on peatlands and bedrock outcrops. Well-drained sites support white spruce, trembling aspen and balsam fir. White birch is also present as well as jack pine due to frequent fire.

3.1.3. Orr Lake Ecodistrict

The northern boreal forest in the ecodistrict is dominated by black spruce in dense upland stands. Upland sites also support mixed stands with jack pine or pure stands of jack pine due to the frequent occurrence of fires. Feather moss and ericaceous shrubs form the ground cover. Trembling aspen also occur on more upland sites. The bogs support sparse black spruce while fens occupy brown mosses and sedges with no tree cover or sparse tamarack and black spruce.

3.1.4. Three Point Lake Ecodistrict

Peatlands in the region are dominated by black spruce. Bogs support sphagnum mosses and ericaceous shrubs as well. Fens can support brown mosses and sedges or tamarack, dwarf birch and a mixture of sedges and herbs. More upland areas are dominated by black spruce stands with mosses and ericaceous shrubs. Also in these areas jack pine occurs due to the influence of fire and trembling aspen with alders is widespread. White spruce and balsam fir are found associated with lakes and rivers.

3.1.5. Weskusko Lake Ecodistrict

The bedrock in this area supports a patchy forest cover of black spruce and sometimes trembling aspen, jack pine, white birch, grasses and shrubs. Peatlands support black spruce, ericaceous shrubs and mosses while the fen areas support sedges, brown mosses, shrubs and tamarack.

3.1.6. Flin Flon Ecodistrict

This largely bedrock area, subject to forest fires, is dominated by jack pine. Moist areas and those that have escaped fire are covered with pure black spruce stands or are mixed with jack pine. Bogs support black spruce over sphagnum and feather mosses while fens have sedges, brown mosses, shrubs and tamarack. Emissions from the smelter in Flin Flon have adversely affected the growth of lichens in the vicinity.

3.1.7. Reed Lake Ecodistrict

Forest cover in this ecodistrict ranges from pure black spruce in less well drained sites to mixed jack pine, black spruce and trembling aspen on upland sites. Jack pine is found where fires are frequent. White spruce occurs along lakes and rivers. Vegetation cover in

fens consists of sedges and shrubs with sparse tamarack. Bogs have open stands of black spruce over ericaceous shrubs and mosses.

3.2. Hayes River Upland Ecoregion

The Hayes River Upland Ecoregion is part of the Boreal Shield Ecozone. This ecoregion occurs in the northern portion of the study area. Dominant tree species in this ecoregion include black spruce, jack pine and lesser amounts of paper birch. Understory species include feather moss, rock cranberry, blueberry, Labrador tea and lichen. The southern area of this ecoregion is host to white spruce, balsam fir and trembling aspen stands, which are especially abundant along rivers in the region. Black spruce and jack pine stands occupy drier sites while lichens generally dominate exposed bedrock. Bog vegetation is comprised of stands of black spruce with an understory of Labrador tea, blueberry, bog rosemary and sphagnum mosses.

3.2.1. Knee Lake Ecodistrict

Black spruce is the dominant tree cover with jack pine occurring on bedrock as a result of frequent fires. River valleys and lakeshores support white spruce, and trembling aspen occurs where soil conditions are favourable. Stunted black spruce with ericaceous shrub and mosses occupy bog peatlands. Fens support stunted tamarack with sedges, brown mosses and shrubs.

3.2.2. Pikwitonei Ecodistrict

Widespread peatlands support stunted black spruce over mosses and ericaceous shrubs. The fens consist of tamarack, sedges, brown mosses and shrubs. Trembling aspen occurs infrequently with white spruce only in the river valleys and near lakes. The balance of the area is covered with forests of black spruce interspersed with jack pine stands on bedrock.

3.2.3. Sipiwesk Lake Ecodistrict

Black spruce is the dominant tree cover in the ecodistrict. In bogs tree cover is sparse over sphagnum, feather moss and ericaceous ground cover. Fens support stunted tamarack with sedges, brown mosses and shrubs. In upland sites black spruce forms a dense canopy over feather mosses. Where the canopy is more open green alder and Labrador tea occur. Trembling aspen and jack pine are important regeneration species after fire and are often present in mixed stands with black spruce.

3.2.4. Norway House Ecodistrict

The ecodistrict consists of mainly black spruce forest over peatlands, fens and uplands. The fens are poorly drained and support stunted spruce and tamarack over sedge and shrub ground cover. In the peatlands tree cover is sparse. Upland areas consist of black spruce and also trembling aspen and white birch. Jack pine is found in fire regeneration

areas especially on bedrock and sandy sites. White spruce and balsam fir thrive on suitable sites along rivers and lakes.

3.3. Lake of the Woods Ecoregion

The Lake of the Woods Ecoregion is part of the Boreal Shield Ecozone. The southeastern most portion of the study area lies in this ecoregion. The region is forested with mixed forests. On the driest sites, jack pine, trembling aspen, green ash and bur oak are found. Moist sites support mixtures of trembling aspen, elm, black ash, eastern white cedar, white spruce, paper birch and jack pine. Red pine and eastern white pine are present in this ecoregion. Poorly drained peatland sites support black spruce and tamarack.

3.3.1. Stead Ecodistrict

The ecodistrict is a mixture of bogs, fens, meadows and forested riverbanks. Prior to settlement, areas that are now croplands were meadows of tall prairie grasses, meadow grasses and sedges. Forests along the riverbanks support elm, ash and bur oak. Eastern white cedar is found in southern areas in swamps and organic soils. Jack pine, white birch and trembling aspen occur in the upland forested areas. Balsam poplar is common on wetter sites, and white spruce and balsam fir are found where conditions are favourable. Bog peatlands support black spruce, shrubs and mosses. Fen peatlands are sedge-dominated with tamarack and shrubs.

4. Boreal Plains Ecozone

The Boreal Plains has a continental climate that consists of cold winters and moderately warm summers. The mean annual temperature ranges from -2°C to 2.5°C with approximately 600 mm of precipitation falling annually. Nearly level to gently rolling plains dominates the landscape. The vegetation is characterized by stands of white spruce, black spruce, jack pine and tamarack. Towards the south, trembling aspen, white birch and balsam poplar are more frequent.

4.1. Mid-boreal Lowland Ecoregion

The Mid-Boreal Lowland Ecoregion is part of the Boreal Plains Ecozone. It is part of the Subhumid Mid-Boreal Ecoclimatic Region and is characterized by mixed boreal forest. This ecoregion occurs in the central portion of the study area. Stands of black spruce, trembling aspen, balsam poplar and jack pine are common to this ecoregion. Older forested stands are typically dominated by black spruce. Jack pine stands dominate dry upland sites especially after forest fires. Mixed stands of black spruce, white spruce, balsam fir and trembling aspen can be found along the shores of lakes and rivers while poorly drained soils are vegetated by black spruce and shrubs. Black spruce, ericaceous shrubs and mosses inhabit bog areas of this ecoregion.

4.1.1. Playgreen Lake Ecodistrict

The vegetation in this ecodistrict is a mixture of peatlands and uplands. Bog peatlands support stunted black spruce, sphagnum mosses, and ericaceous shrubs. Fens are sedge-dominated with brown mosses, swamp birch and tamarack. Upland areas support black spruce; jack pine and trembling aspen show up in forests after fire. Black spruce over alder, willows and mosses is found in the moister areas.

4.1.2. Cormorant Lake Ecodistrict

Black spruce is the dominant tree cover in this ecodistrict. Understory vegetation includes alder, ericaceous shrubs, mosses and herbs. After fire, jack pine and trembling aspen dominate the regenerating forest. Fens support sedges, brown mosses, swamp birch, alder, willow and tamarack while bogs support ericaceous shrubs, mosses, dwarf birch and stunted black spruce.

4.1.3. Nome Lake Ecodistrict

The drainage in this ecodistrict affects the vegetation cover. Well-drained upland areas, especially where fire has been a factor, support jack pine with alder, ericaceous shrubs, herbs, mosses and lichens. In favorable sites on banks of creeks and rivers, stands of jack pine, white spruce, black spruce and trembling aspen may occur. Most of the ecodistrict is poorly drained resulting in a dominant cover of black spruce, alder, ericaceous shrubs, herbs, lichens and mosses.

4.1.4. Cedar Lake Ecodistrict

Flooding and fire have altered vegetation cover in this ecodistrict. Flooding associated with the Grand Rapids Dam has increased the size of Cedar and Moose Lakes and affected the distribution of eastern white cedar. Frequent fires on dry terrain have favored the development of jack pine forests with an understory layer of blueberry, rock cranberry and bearberry and a ground cover of grasses, herbs, mosses and lichens. Black spruce and trembling aspen with alder, willow herbs and mosses cover less well-drained sites. Wetter areas such as bogs support stunted black spruce, ericaceous shrubs and mosses, while fens support sedges, brown mosses, swamp birch, alder, willow and tamarack.

4.1.5. Summerberry Ecodistrict

Fen vegetation including black spruce, tamarack, brown mosses, sedges, willow, alder and swamp birch dominates the cover in this ecodistrict. Upland forests are dominated by black spruce with white spruce, sporadic jack pine and trembling aspen. Mosses are dominant under coniferous forests while trembling aspen stands have an understory of grasses and forbs. Shrub cover varies with moisture conditions. Deciduous trees occur on banks and floodplains with canopy cover of elm, ash, balsam poplar, trembling aspen and white birch; black and white spruce are occasional.

4.1.6. The Pas Moraine Ecodistrict

Upland areas in this ecodistrict support black spruce, white spruce, white birch and trembling aspen. Eastern white cedar is at the northern edge of its range here. Bogs and fens are the dominant land cover. Bogs support black spruce, swamp birch, ericaceous shrubs and sphagnum mosses. Drier sites support black spruce, alder and feather mosses. Fens are sedge-dominated with brown mosses, swamp birch and tamarack.

4.1.7. Saskatchewan Delta Ecodistrict

Fire and logging activities have removed much of the coniferous forest in the ecodistrict. Upland areas have forests of balsam poplar, trembling aspen, jack pine white spruce and balsam fir. Natural levees had elm, balsam poplar, Manitoba maple, white birch, white spruce, green ash, balsam fir and trembling aspen. Much of the ecodistrict is poorly drained peatlands consisting of a varying cover of black spruce, tamarack, sedges and rushes. Sites less wet are covered with willows, swamp birch and scattered balsam poplar.

4.1.8. Overflowing River Ecodistrict

Peatlands dominate the vegetation in this ecodistrict. Black spruce is the dominant tree cover in a variety of drainage conditions. In upland areas it is mixed with jack pine, white birch, balsam fir and trembling aspen with an understory of alder, willow, hazel, ericaceous shrubs, herbs, forbs and feather mosses. Wetter peatlands support black spruce, ericaceous shrubs and sphagnum mosses. Brown mosses and sedges dominate the fens with varying amounts of swamp birch, willow, tamarack and ericaceous shrubs.

4.1.9. Pelican Lake Ecodistrict

Most of this ecodistrict is covered by water. The vegetation types follow the terrain changes from upland ridges to lowland depressions. The upland ridges support mixed forests of white and black spruce, aspen, balsam fir and white birch. Drier sites favour jack pine while the wetter sites are dominated by black spruce with occasional balsam poplar. Understory vegetation includes hazel, alder, feather mosses, grasses and herbs. The low areas are sedge dominated with some shrubs, herbs and forbs. Peatlands include bogs of black spruce and sphagnum moss and fens with sedges, swamp birch and tamarack.

4.2. *Boreal Transition Ecoregion*

The Boreal Transition Ecoregion is part of the Boreal Plains Ecozone and consists of a narrow belt of wooded upland. This ecoregion is present in the central and very southern portion of the study area. Dominant vegetation in this ecoregion consists of trembling aspen with an understory of mixed herbs and tall shrubs. Climax communities consist of white spruce and balsam fir but forest fires and logging have restricted the abundance of these species. Black spruce, tamarack, willow and sedges populate poorly drained sites.

4.2.1. Swan River Ecodistrict

In Manitoba this ecodistrict is a small wooded belt of uplands bordering the Porcupine Hills, Riding Mountain and Duck Mountain. Dominant vegetation consists of closed trembling aspen stands with some balsam poplar over tall shrubs and mixed herbs. Much of the climax forests of white spruce and balsam fir have been removed by fire and logging. Black spruce, tamarack, sedges and willows are found in poorly drained areas.

4.3. *Mid-Boreal Uplands Ecoregion*

The Mid-Boreal Uplands Ecoregion is part of the Boreal Plains Ecozone. It is comprised of three separate elevated uplands along the Manitoba Escarpment which include the Porcupine Hills, Duck Mountain and Riding Mountain. This ecoregion occurs in the central portion of the study area and is populated by stands of trembling aspen and balsam poplar interspersed with successional stands of white spruce, balsam fir and black spruce. Jack pine and white birch also colonize this ecoregion, especially in dryer areas. A wide variety of shrubs and herbs comprise the understory species in deciduous and mixed forest stands, while feather moss dominates as the ground cover in coniferous stands. Tamarack and black spruce bogs are also interspersed throughout this ecoregion.

4.3.1. Porcupine Hills Ecodistrict

Logging activities and major fires have altered the climax forest in this ecodistrict. White spruce and balsam fir stands previously dominated the forest cover. Trembling aspen with some balsam poplar and jack pine are now widespread. White birch is dominant on the east facing slopes, while black spruce is found in wet areas, peatlands, and poorly drained sites.

4.3.2. Riding Mountain Ecodistrict

The vegetation cover in this ecodistrict is a mixture of coniferous and deciduous forests. Trembling aspen is the dominant cover while areas of jack pine, white spruce and balsam poplar can also be found. Black spruce occurs in some of the mixed forests but dominates in peatlands and poorly drained locations. North facing slopes are conifer-moss dominated while mixed forests with an understory of hazel and herbs occur on south and west facing slopes. In the drier, western region, small stands of aspen and white spruce are interspersed with grasslands.

4.3.3. Duck Mountain Ecodistrict

Deciduous trees dominate the forest in this ecoregion. Mixed forest cover includes trembling aspen, balsam poplar and white birch with white spruce. Black spruce is found in some mixed forests on moist sites and poorly drained areas. South and west facing slopes tend to have more mixed forest cover over hazel and herbs while north facing slopes favor conifer and moss cover.

4.4. Interlake Plain Ecoregion

The Interlake Plain Ecoregion is part of the Boreal Plains Ecozone. This ecoregion is comprised of a mixture of farmland and forest; the northern extent of which marks the southern limit of mixed boreal forest and the northern and eastern extent of which marks the limit for productive agriculture. This ecoregion occurs in the central portion and southeast corner of the study area. Dominant deciduous species in this ecoregion include trembling aspen and balsam poplar with mixed herbs and tall shrubs comprising the understory. Limited communities of white spruce and balsam fir can also be found within this ecoregion. Jack pine is often found on dry, sandy sites. Sedges, willows, and minor amounts of black spruce and tamarack dominate poorly drained sites.

4.4.1. Gimli Ecodistrict

Trembling aspen dominates the forest in this ecodistrict. In the northern portion, white spruce is the more common forest cover. Riverbanks support elm, Manitoba maple, green ash and cottonwood. Low areas support willow, meadow grasses and sedges while vegetation in marshes consists of cattails, reeds and sedges. Birds Hill contains peatlands with black spruce, eastern white cedar and tamarack.

4.4.2. Swan Lake Ecodistrict

Agriculture has reduced the dominant cover of trembling aspen and balsam poplar in this ecodistrict. White spruce mixed with trembling aspen is found on higher elevations. Riverbanks and flats support, green ash and Manitoba maple. Jack pine occurs on the drier sandy areas. Peatlands support black spruce and tamarack, willows and sedges.

4.4.3. Waterhen Ecodistrict

Mixed forest of trembling aspen, balsam poplar and white spruce is the dominant forest cover in this ecodistrict. Conifers are more common in the northern portion. Jack pine occurs in pure stands on dry sites, and balsam fir and white spruce occur on lakeshores where conditions are favorable. Low areas support willow and sedges. Bogs support black spruce and mosses while fens occupy tamarack and sedges. Land used for native hay and pasture is common in the ecodistrict.

4.4.4. Steinbach Ecodistrict

Trembling aspen is the dominant tree in the forested areas of this ecodistrict. Understory commonly is willow, red-osier dogwood, grasses and herbs. Balsam poplar is less common while jack pine is located on sandy sites in the eastern portion of the district. Transitional bogs contain black spruce and tamarack with mosses and fen peatlands are dominated by sedges and reed grasses with willow. Much of the ecodistrict is under cultivation.

5. Prairies Ecozone

In the south, the Prairies have a continental climate with long, cold winters and short, warm summers. Mean annual temperature ranges from 1.5°C to 3.5°C. Mean annual precipitation reaches approximately 550 mm. The landscape is characterized by level to rolling or gently undulating terrain. Agricultural crops dominantly represent the vegetation. Groves of trembling aspen, balsam poplar and bur oak are represented in the prairies. Nearly all the tall grass and mixed grass prairie have been modified by human activity. Remaining grassland vegetation is dominated by spear grass, wheat grass and blue gamma grass.

5.1 *Aspen Parkland Ecoregion*

The Aspen Parkland Ecoregion is part of the Prairies Ecozone. It forms part of the parkland belt between the boreal forest to the north and the grasslands to the west. Moist sites support trembling aspen and shrubs, while drier sites include bur oak and grassland communities. Numerous shrubs and herbs also occupy the ecoregion. Common grasses in the Aspen Parkland include fescues, June grass, Kentucky bluegrass, and wheatgrasses. Slough grasses, marsh reed grass, sedges, cattails, and willows are found on poorly drained sites. This ecoregion occupies part of the southern portion of the study area.

5.1.1. Grandview Ecodistrict

Much of the native vegetation has been converted to croplands and pasture. The area used to support grasslands. Groves of aspen and balsam poplar have undergrowth of hazel, dogwood and willows with grasses and herbs. White spruce occurs in the forest cover of the upper slopes of the Riding and Duck Mountains. Balsam poplar, willow and reeds and sedges occur in poorly drained areas. Peat areas support black spruce and tamarack.

5.1.2. St. Lazare Ecodistrict

Natural grasslands once dominated this ecoregion, which is now mostly cultivated land. Deep valleys support grasslands on the west and south facing slopes while trees and shrubs occur in the grasslands on the north and east facing slopes.

5.1.3. Hamiota Ecodistrict

The rolling topography of the ecodistrict is comprised of knolls and depressions. Where agriculture has not displaced the native vegetation in depressions, sedges, rushes and slough grass occur on the pond edges giving way to willow and aspen in less moist conditions. The uplands around the depressions support shrubs including prairie rose, silverberry and snowberry culminating in grasslands of grama grass, June grass, pasture sage, anemones and other herbs. Areas in the northern part of the ecodistrict bordering the Boreal Transition Ecoregion support more trees on moister sites, along waterways and on north and east facing slopes.

5.1.4. Shilo Ecodistrict

This ecodistrict has much of the land under cultivation however large tracts of the natural vegetation still remain in Spruce Woods Provincial Park and the Canadian Forces Base Camp Shilo. Natural grasslands cover the drier sites with occasional trees such as bur oak, white spruce and trembling aspen, and shrubs of hazel and creeping and common juniper. Tree and shrub cover becomes heavier on north facing slopes. Moist sites support balsam poplar, aspen, and a dense shrub cover of dogwood and alder. Wetter sites have willow, alder, and red-osier dogwood with a ground cover of grasses and sedges. River bottom lands support green ash and Manitoba maple. A unique feature of the ecodistrict is the mixed prairie grasslands dotted with white spruce trees.

5.1.5. Stockton Ecodistrict

Native mixed-grass prairie with aspen groves has largely been altered by cultivation in the ecodistrict. Very well drained sites support grasslands, junipers, hazelnut, white spruce, aspen and bur oak. Tree and shrub cover becomes heavier on north facing slopes. Wetter areas support sedges, grasses, dogwood, willows and alders while less moist sites contain aspen, balsam poplar, dogwoods and alders. Floodplains in the Assiniboine River valley support deciduous forests of elm, green ash, balsam poplar and Manitoba maple with an understory of dogwood, alder and high-bush cranberry. Valleys in Spruce Woods Park contain peatlands that support willow, dogwood, tamarack, black spruce and sedge fens. Swamps support Manitoba maple, green ash, elm, alder, high-bush cranberry, dogwood and ferns.

5.1.6. Carberry Ecodistrict

Since settlement the vegetation in this ecodistrict has been greatly modified by agriculture. The area previously consisted of tall grass prairie with associated herbs interspersed with small aspen and willow groves.

5.1.7. Manitou Ecodistrict

Most of the tall grass prairie has been converted to cultivated land in this ecodistrict. Natural vegetation remains in the ravines and gullies. To the east, the slopes are mixtures of bur oak, aspen, Saskatoon and hazel. The western part of the ecodistrict supports similar vegetation on the north and east-facing slopes and mixtures of grass and sages on the drier, south and west-facing slopes. In the central area, the remaining natural vegetation in the alluvial plains consists of elm, green ash, Manitoba maple, balsam poplar, white birch and willow.

5.2. *Lake Manitoba Plain Ecoregion*

This ecoregion is part of the Prairies Ecozone and occurs in the southern portion of the study area. Historically, this ecoregion was comprised of prairie grasslands and stands of trembling aspen and oak; however domestic crops and pastureland have now replaced

much of the natural vegetation. Trembling aspen and shrubs dominate moist sites, while bur oak and grassland communities dominate drier sites. Dominant grasses in this ecoregion include grass species such as fescues, wheat and June grass and Kentucky bluegrass. Various deciduous shrubs and herbs also contribute to the understory. Hydrophilic plant species including slough grasses, marsh reed grass, sedges, cattails, sedges and willow can be found in poorly drained areas of this ecoregion.

5.2.1. Dauphin Ecodistrict

Agricultural fields have replaced most of the original grasslands and trembling aspen bluffs in this ecodistrict. Remaining bluffs of trembling aspen have an understory of red osier dogwood, beaked hazelnut, rose, high-bush cranberry, pin cherry and Saskatoon. Ground cover includes red baneberry, sarsaparilla and sweet-scented bedstraw. Flood plains along creeks and rivers support Manitoba maple, elm, green ash and willow. Balsam poplar occurs on poorly drained sites.

5.2.2. Alonsa Ecodistrict

Agricultural practices have modified much of the natural vegetation in this ecodistrict. Native vegetation is a mix of grassland and aspen groves with balsam poplar occurring on moister sites. The dry, well-drained sites support bur oak and grasses including big and little bluestem and rye grass. Shrubs associated with the aspen groves are pin cherry, beaked hazelnut and red-osier dogwood. Herbs include sweet-scented bedstraw and sarsaparilla. Manitoba maple, basswood, green ash, willow and elm grow on the riverbanks and flats.

5.2.3. Ste. Rose Ecodistrict

Well-drained ridges support trembling aspen, balsam poplar, bur oak and occasionally jack pine. Trembling aspen and balsam poplar, grasses and willows occur on imperfectly drained sites. Where conditions are wetter, sedges, reed grasses, meadow grasses and willows dominate. Peatlands support willows, swamp birch, meadow grasses, reeds and sedges. Much of the ecodistrict is modified for pasture and crop production.

5.2.4. McCreary Ecodistrict

Most of the land in this ecodistrict is under cultivation as pasture, hay and cropland. The native vegetation remaining in imperfectly drained areas includes aspen, balsam poplar, red-osier dogwood and willow. Beach ridges support bur oak, aspen, beaked hazelnut, pin cherry, Saskatoon grasses and herbs. Sedges, willows and meadow grasses grow in the poorly drained areas while flood plains along rivers support green ash, Manitoba maple, elm, willows, shrubs and herbs.

5.2.5. Gladstone Ecodistrict

Agriculture has modified much of the vegetation. Cattails, sedges and reed grasses dominate the Big Grass Marsh that is found in this ecodistrict. Trembling aspen groves, areas of shrubs and grasslands were the native vegetation in the area.

5.2.6. Langruth Ecodistrict

Crop production and pasture have taken up most of the land in this ecodistrict. Some saline areas are used as native pastures and hay lands. Shallow peatlands near the shore of Lake Manitoba support meadow grasses and sedges. Poorly drained sites have a cover of meadow grasses, sedges and reeds while more upland areas support meadow grasses with groves of aspen and balsam poplar.

5.2.7. Winnipeg Ecodistrict

This ecodistrict encompasses the City of Winnipeg and the subsequent development and drainage associated with the city and surrounding agricultural land. Originally tall grass prairie, only small remnants of this native vegetation remain. The remaining tree cover along the flood plains of the waterways contain Manitoba maple, green ash, cottonwood, basswood and elm. The understory includes willows, ferns and various herbs. Upper terraces are a mixture aspen, bur oak, hazelnut, snowberry and red-osier dogwood.

5.2.8. McGregor Ecodistrict

Agriculture has significantly altered the vegetation in this ecodistrict. The native vegetation used to be comprised of tall prairie grasses and sedges dotted with groves of trembling aspen and balsam poplar associated with shrubs including snow berry, red-osier dogwood, Saskatoon, willow and various herbs.

5.2.9. Portage Ecodistrict

The land in this ecodistrict consists largely of cultivated fields. Agriculture has replaced almost all of the native tall grass prairie. Some aspen groves remain along with deciduous forest remnants of elm, green ash, Manitoba maple and basswood along waterways. Bur oaks occur in the upper dry terraces. The Delta Marsh supports cattails, reed grass, willows and reeds. The beach ridges around the marsh support Manitoba maple and poplars.

5.2.10. Winkler Ecodistrict

Most of the native tall grass prairie has been replaced by croplands. Remnants of forests remain along river and stream banks. Bur oaks are found above flood levels while elm, green ash, Manitoba maple with hazel and Saskatoon are found in floodplains.

5.3. Southwest Manitoba Uplands Ecoregion

Calcareous glacial till and fluvioglacial deposits cover Cretaceous and Tertiary shales to form the uplands in this ecozone. Sloughs, ponds and small lakes fill the shallow depressions among the deposits. The landscape is covered by deciduous forests of trembling aspen, balsam poplar and bur oak with an understory of tall shrubs and herbs. Some of the land is planted to white spruce and has been altered to support farmland. The more poorly drained areas support sedges and willows.

5.3.1. Pembina Hills Ecodistrict

The Pembina Hills are one of the distinct uplands located in the ecoregion. Much of the original trembling aspen and bur oak woodlands have been converted to farmland. The oak and aspen along with Saskatoon, pin cherry and hazel persist on the steeper slopes along with grasses and herbs. Some extremely dry hillsides are grasslands without trees. Green ash, dogwood, Manitoba maple and willows are found in the lower, moister areas.

APPENDIX C. Plant species list for the Bipole III Project study area.

Table 1. List of plant species with the potential to occur within the Bipole III Project study area.

Scientific Name	Common Name
<i>Abies balsamea</i>	Balsam Fir
<i>Acer negundo</i>	Manitoba Maple
<i>Acer spicatum</i>	Mountain Maple
<i>Achillea millefolium</i>	Common Yarrow
<i>Achillea sibirica</i>	Many-flowered Yarrow
<i>Achnatherum hymenoides</i>	Indian Rice Grass
<i>Achnatherum richardsonii</i>	Richardson Needle Grass
<i>Acorus americanus</i>	Sweet Flag
<i>Actaea rubra</i>	Red Baneberry
<i>Agalinis aspera</i>	Rough Purple False-foxglove
<i>Agalinis paupercula</i>	Small Flowered Gerardia
<i>Agalinis tenuifolia</i>	Narrow-leaved Gerardia
<i>Agastache foeniculum</i>	Blue Giant Hyssop
<i>Agoseris glauca</i>	False Dandelion
<i>Agrimonia striata</i>	Agrimony
<i>Agropyron cristatum</i> ssp. <i>pectinatum</i>	Crested Wheat-grass
<i>Agrostis scabra</i>	Tickle-grass
<i>Agrostis stolonifera</i>	Creeping Bent Grass
<i>Alisma gramineum</i>	Narrow-leaved Water-plantain
<i>Alisma triviale</i>	Common Water-plantain
<i>Allium schoenoprasum</i> var. <i>sibiricum</i>	Chives
<i>Allium stellatum</i>	Pink-flowered Onion
<i>Allium textile</i>	Prairie Onion
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled Alder
<i>Alnus viridis</i> ssp. <i>crispa</i>	Green or Mountain Alder
<i>Alopecurus aequalis</i>	Short-awned Foxtail
<i>Amaranthus retroflexus</i>	Redroot Pigweed
<i>Ambrosia acanthicarpa</i>	Sandbur
<i>Ambrosia artemisiifolia</i>	Common Ragweed
<i>Ambrosia psilostachya</i>	Perennial Ragweed
<i>Ambrosia trifida</i>	Giant Ragweed
<i>Amelanchier alnifolia</i>	Saskatoon
<i>Amerorchis rotundifolia</i>	Small or Round-leaved Orchis
<i>Amorpha fruticosa</i>	False Indigo
<i>Amorpha nana</i>	Fragrant False Indigo
<i>Amphicarpaea bracteata</i>	Hog-peanut
<i>Andromeda polifolia</i>	Bog Rosemary
<i>Andropogon gerardii</i>	Big Bluestem
<i>Andropogon hallii</i>	Sand Bluestem
<i>Androsace septentrionalis</i>	Pygmyflower
<i>Anemone americana</i>	Liverleaf

Scientific Name	Common Name
<i>Anemone canadensis</i>	Canada Anemone
<i>Anemone cylindrica</i>	Thimbleweed
<i>Anemone multifida</i>	Cut-leaved Anemone
<i>Anemone parviflora</i>	Small Wood Anemone
<i>Anemone patens</i>	Prairie Crocus
<i>Anemone quinquefolia</i>	Wood Anemone
<i>Anemone virginiana</i>	Virginia Anemone
<i>Antennaria howellii</i>	Howell's pussytoes
<i>Antennaria neglecta</i>	Field Cat's-foot
<i>Antennaria parvifolia</i>	Small-leaved Everlasting
<i>Antennaria pulcherrima</i>	Showy Everlasting
<i>Antennaria rosea</i>	Rosy Everlasting
<i>Anthoxanthum hirtum</i>	Hairy Sweet Grass
<i>Apocynum androsaemifolium</i>	Spreading Dogbane
<i>Aquilegia brevistyla</i>	Small-flowered Columbine
<i>Aquilegia canadensis</i>	Wild Columbine
<i>Arabis arenicola</i> var. <i>pubescens</i>	Arctic Rock Cress
<i>Arabis divaricarpa</i>	Purple Rock Cress
<i>Arabis drummondii</i>	Drummond's Rock Cress
<i>Arabis glabra</i>	Tower Mustard
<i>Arabis hirsuta</i>	Hirsute Rock Cress
<i>Arabis hirsuta</i> var. <i>pyncocarpa</i>	Hirsute Rock Cress
<i>Arabis lyrata</i>	Lyre-leaved Rock Cress
<i>Aralia hispida</i>	Bristly Sarsaparilla
<i>Aralia nudicaulis</i>	Wild Sarsaparilla
<i>Arceuthobium americanum</i>	Pine or Dwarf Mistletoe
<i>Arceuthobium pusillum</i>	Dwarf Mistletoe
<i>Arctium lappa</i>	Great Burdock
<i>Arctium minus</i>	Common Burdock
<i>Arctium tomentosum</i>	Wooly Burdock
<i>Arctium vulgare</i>	Burdock
<i>Arctostaphylos alpina</i>	Alpine Bearberry
<i>Arctostaphylos rubra</i>	Alpine Bearberry
<i>Arctostaphylos uva-ursi</i>	Common Bearberry
<i>Arethusa bulbosa</i>	Arethusa
<i>Argentina anserina</i>	Silverweed
<i>Arisaema triphyllum</i> ssp. <i>triphyllum</i>	Jack-in-the-pulpit
<i>Aristida purpurea</i> var. <i>longiseta</i>	Red Three-awn
<i>Arnica angustifolia</i>	Narrowleaf arnica
<i>Arnica chamissonis</i>	Leafy Arnica
<i>Arnica cordifolia</i>	Heart-leaved Arnica
<i>Arnica lonchophylla</i>	Spear-leaved Arnica
<i>Artemisia absinthium</i>	Wormwood
<i>Artemisia biennis</i>	Biennial Wormwood

Scientific Name	Common Name
<i>Artemisia campestris</i>	Field Sagewort
<i>Artemisia campestris</i> ssp. <i>canadensis</i>	Boreal sage
<i>Artemisia campestris</i> ssp. <i>caudata</i>	Sagewort
<i>Artemisia dracunculus</i> ssp. <i>glauca</i>	Tarragon
<i>Artemisia frigida</i>	Pasture Sage
<i>Artemisia ludoviciana</i>	Prairie Sage
<i>Artemisia tilesii</i>	Herriot's Sage
<i>Asarum canadense</i>	Wild Ginger
<i>Asclepias incarnata</i>	Swamp Milkweed
<i>Asclepias lanuginosa</i>	Hairy Milkweed
<i>Asclepias ovalifolia</i>	Dwarf Milkweed
<i>Asclepias speciosa</i>	Showy Milkweed
<i>Asclepias syriaca</i>	Common Milkweed
<i>Asclepias verticillata</i>	Whorled Milkweed
<i>Asclepias viridiflora</i>	Green Milkweed
<i>Astragalus agrestis</i>	Milkvetch
<i>Astragalus alpinus</i>	Alpine Milkvetch
<i>Astragalus bisulcatus</i>	Two-grooved Milkvetch
<i>Astragalus canadensis</i>	Canadian Milkvetch
<i>Astragalus crassicaulus</i>	Ground-plum
<i>Astragalus drummondii</i>	Drummond's Milkvetch
<i>Astragalus eucosmus</i>	Pretty Milkvetch
<i>Astragalus flexuosus</i>	Slender or Low Milkvetch
<i>Astragalus laxmannii</i>	Ascending Milkvetch
<i>Astragalus laxmannii</i> var. <i>robustior</i>	Ascending Milkvetch
<i>Astragalus missouriensis</i>	Missouri Milkvetch
<i>Astragalus neglectus</i>	Milkvetch
<i>Astragalus tenellus</i>	Loose-flowered Milkvetch
<i>Athyrium filix-femina</i> var. <i>cyclosorum</i>	Lady Fern
<i>Atriplex argentea</i>	Saltbrush
<i>Atriplex patula</i>	Spearscale
<i>Avena fatua</i>	Wild Oats
<i>Avenula hookeri</i>	Hooker's Oat Grass
<i>Avenula hookeri</i>	Hooker's Oat Grass
<i>Axyris amaranthoides</i>	Russian Pigweed
<i>Beckmannia syzigachne</i>	Slough Grass
<i>Betula glandulosa</i>	Dwarf Birch
<i>Betula neoalaskana</i>	Alaskan Birch
<i>Betula occidentalis</i>	River Birch
<i>Betula papyrifera</i>	White Birch
<i>Betula pumila</i>	Dwarf Birch
<i>Betula pumila</i> var. <i>glandulifera</i>	Dwarf Birch
<i>Bidens amplissima</i>	Beggar-ticks
<i>Bidens cernua</i>	Stick-tight

Scientific Name	Common Name
<i>Bistorta vivipara</i>	Alpine Bistort
<i>Blismopsis rufa</i>	Red Bulrush
<i>Bolboschoenus fluviatilis</i>	River Bulrush
<i>Boltonia asteroides</i> var. <i>recognita</i>	White Boltonia
<i>Botrychium campestre</i>	Prairie Moonwort
<i>Botrychium lunaria</i>	Common Moonwort
<i>Botrychium matricariifolium</i>	Daisy-leaf Moonwort
<i>Botrychium minganense</i>	Mingan Moonwort
<i>Botrychium multifidum</i>	Leathery Grape-fern
<i>Botrychium pallidum</i>	Pale Moonwort
<i>Botrychium virginianum</i>	Rattlesnake Fern
<i>Bouteloua curtipendula</i>	Side-oats Grama
<i>Bouteloua gracilis</i>	Blue Grama
<i>Brassica rapa</i>	Bird's Rape
<i>Bromus ciliatus</i>	Fringed Brome
<i>Bromus inermis</i>	Smooth Brome
<i>Bromus kalmii</i>	Wild Chess
<i>Bromus pumpellianus</i>	Awnless or Hungarian Brome
<i>Bromus tectorum</i>	Downy Chess
<i>Calamagrostis canadensis</i>	Marsh Reed Grass
<i>Calamagrostis montanensis</i>	Plains Reed Grass
<i>Calamagrostis stricta</i>	Northern reed grass
<i>Calamovilfa longifolia</i>	Sand Grass
<i>Calla palustris</i>	Water-arum
<i>Callitriche hermaphrodita</i>	Northern Water-starwort
<i>Callitriche palustris</i>	Vernal Water-starwort
<i>Calopogon tuberosus</i>	Swamp-pink
<i>Caltha palustris</i>	Marsh Marigold
<i>Calypso bulbosa</i>	Calypso
<i>Calystegia sepium</i>	Hedge Bindweed
<i>Campanula aparinoides</i>	Marsh Bellflower
<i>Campanula rotundifolia</i>	Bluebell
<i>Capsella bursa-pastoris</i>	Shepherd's Purse
<i>Caragana arborescens</i>	Common Caragana
<i>Cardamine pensylvanica</i>	Bitter Cress
<i>Cardamine pratensis</i>	Cuckoo-flower
<i>Carex adusta</i>	Browned Sedge
<i>Carex albicans</i>	Bellow-beaked Sedge
<i>Carex alopecoidea</i>	Foxtail Sedge
<i>Carex aquatilis</i>	Water Sedge
<i>Carex assiniboinensis</i>	Assiniboia Sedge
<i>Carex atherodes</i>	Awned Sedge
<i>Carex athrostachya</i>	Long-bracted Sedge
<i>Carex aurea</i>	Golden Sedge

Scientific Name	Common Name
<i>Carex backii</i>	Back's Sedge
<i>Carex bebbii</i>	Bebb's Sedge
<i>Carex bicknellii</i>	Bicknell's Sedge
<i>Carex brunnescens</i>	Brownish Sedge
<i>Carex buxbaumii</i>	Brown Sedge
<i>Carex canescens</i>	Hoary Sedge
<i>Carex capillaris</i>	Hair-like Sedge
<i>Carex capitata</i>	Capitate Sedge
<i>Carex castanea</i>	Chestnut Sedge
<i>Carex chordorrhiza</i>	Prostrate Sedge
<i>Carex communis</i>	Fibrous-rooted Sedge
<i>Carex concinna</i>	Beautiful Sedge
<i>Carex crawei</i>	Crawe's Sedge
<i>Carex crawfordii</i>	Crawford's Sedge
<i>Carex cristatella</i>	Crested Sedge
<i>Carex cryptolepis</i>	Northeastern Sedge
<i>Carex deflexa</i>	Bent Sedge
<i>Carex deweyana</i>	Dewey's Sedge
<i>Carex diandra</i>	Two-stamened Sedge
<i>Carex disperma</i>	Two-seeded Sedge
<i>Carex douglasii</i>	Douglas Sedge
<i>Carex eburnea</i>	Bristle-leaved Sedge
<i>Carex emoryi</i>	Emory's Sedge
<i>Carex flava</i>	Yellow Sedge
<i>Carex foenea</i>	Hay Sedge
<i>Carex garberi</i>	Elk Sedge
<i>Carex granularis</i>	Granular Sedge
<i>Carex gynocrates</i>	Northern Bog Sedge
<i>Carex hallii</i>	Hall's Sedge
<i>Carex houghtoniana</i>	Sand Sedge
<i>Carex hystericina</i>	Porcupine Sedge
<i>Carex inops</i>	Long-stolon Sedge
<i>Carex inops</i> ssp. <i>heliophila</i>	Sun Sedge
<i>Carex interior</i>	Inland Sedge
<i>Carex lacustris</i>	Lakeshore Sedge
<i>Carex lasiocarpa</i>	Hairy-fruited Sedge
<i>Carex leptalea</i>	Bristle-stalked Sedge
<i>Carex limosa</i>	Mud Sedge
<i>Carex livida</i>	Livid Sedge
<i>Carex magellanica</i>	Bog Sedge
<i>Carex maritima</i>	Seaside Sedge
<i>Carex michauxiana</i>	Long-fruited Sedge
<i>Carex microglochin</i>	False Uncina Sedge
<i>Carex microptera</i>	Thick-spike Sedge

Scientific Name	Common Name
<i>Carex normalis</i>	Larger Straw Sedge
<i>Carex obtusata</i>	Blunt Sedge
<i>Carex oligosperma</i>	Few-fruited Sedge
<i>Carex parryana</i>	Parry's Sedge
<i>Carex pauciflora</i>	Few -flowered Sedge
<i>Carex peckii</i>	Black-margined Sedge
<i>Carex pedunculata</i>	Stalked Sedge
<i>Carex pellita</i>	Woolly Sedge
<i>Carex pensylvanica</i>	Pennsylvania Sedge
<i>Carex praegracilis</i>	Graceful Sedge
<i>Carex prairea</i>	Prairie Sedge
<i>Carex praticola</i>	Northern Meadow Sedge
<i>Carex projecta</i>	Necklace Sedge
<i>Carex pseudocyperus</i>	Cyperus-like Sedge
<i>Carex retrorsa</i>	Turned Sedge
<i>Carex richardsonii</i>	Richardson's Sedge
<i>Carex rosea</i>	Stellate Sedge
<i>Carex rossii</i>	Ross' Sedge
<i>Carex rostrata</i>	Beaked Sedge
<i>Carex sartwellii</i>	Sartwell's Sedge
<i>Carex siccata</i>	Dry-spike Sedge
<i>Carex sprengelii</i>	Sprengel's Sedge
<i>Carex sterilis</i>	Dioecious Sedge
<i>Carex stipata</i>	Awl-fruited Sedge
<i>Carex supina</i> var. <i>spaniocarpa</i>	Weak Sedge
<i>Carex sychnocephala</i>	Dense Long-beaked Sedge
<i>Carex tenera</i>	Slender Sedge
<i>Carex tenuiflora</i>	Thin-flowered Sedge
<i>Carex tetanica</i>	Rigid Sedge
<i>Carex torreyi</i>	Torrey's Sedge
<i>Carex tribuloides</i>	Prickly Sedge
<i>Carex trisperma</i>	Three-seeded Sedge
<i>Carex utriculata</i>	Beaked Sedge
<i>Carex vaginata</i>	Sheathed Sedge
<i>Carex viridula</i>	Green Sedge
<i>Carex vulpinoidea</i>	Fox Sedge
<i>Carex xerantica</i>	White-scaled Sedge
<i>Carum carvi</i>	Caraway
<i>Castilleja coccinea</i>	Scarlet Paintbrush
<i>Castilleja miniata</i>	Red Painted-cup
<i>Castilleja raupii</i>	Purple Paintbrush
<i>Castilleja septentrionalis</i>	Labrador Indian-paintbrush
<i>Catabrosa aquatica</i>	Water Hairgrass/brookgrass
<i>Celastrus scandens</i>	Climbing Bittersweet

Scientific Name	Common Name
<i>Celtis occidentalis</i>	Hackberry
<i>Cerastium arvense</i>	Field Chickweed
<i>Cerastium nutans</i>	Long-stalked Chickweed
<i>Ceratophyllum demersum</i>	Common Hornwort
<i>Chaenorhinum minus</i>	Dwarf Snapdragon
<i>Chamaedaphne calyculata</i>	Leather-leaf
<i>Chamaesyce geyeri</i>	Prostrate Spurge
<i>Chamaesyce glyptosperma</i>	Ridge-seeded Spurge
<i>Chamerion angustifolium</i>	Fireweed
<i>Chenopodium album</i>	Lamb's-quarters
<i>Chenopodium berlandieri</i>	Pitseed Goosefoot
<i>Chenopodium capitatum</i>	Strawberry Blite
<i>Chenopodium glaucum</i> var. <i>glaucum</i>	Oak-leaf Goosefoot
<i>Chenopodium pratericola</i>	Goosefoot
<i>Chenopodium rubrum</i>	Coast-blite
<i>Chenopodium simplex</i>	Maple-leaved goosefoot
<i>Chenopodium strictum</i>	Strict Goosefoot
<i>Chenopodium subglabrum</i>	Smooth Goosefoot
<i>Chimaphila umbellata</i>	Prince's-pine
<i>Chrysosplenium iowense</i>	Iowa Golden-saxifrage
<i>Cicuta bulbifera</i>	Bulb-bearing Water-hemlock
<i>Cicuta maculata</i>	Water-hemlock
<i>Cicuta virosa</i>	Mackenzie's Water-hemlock
<i>Cinna latifolia</i>	Slender Wood Grass
<i>Circaea alpina</i>	Small Enchanter's-nightshade
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	Large Enchanter's-nightshade
<i>Cirsium arvense</i>	Canada Thistle
<i>Cirsium drummondii</i>	Short-stemmed Thistle
<i>Cirsium flodmanii</i>	Flodman's Thistle
<i>Cirsium muticum</i>	Swamp Thistle
<i>Cirsium vulgare</i>	Bull Thistle
<i>Clematis ligusticifolia</i>	Western Virgin's-bower
<i>Clematis virginiana</i>	Virgin's-bower
<i>Coeloglossum viride</i> var. <i>viride</i>	Frog-orchis
<i>Collomia linearis</i>	Narrow-leaved Collomia
<i>Comandra umbellata</i> ssp. <i>pallida</i>	Bastard Toadflax
<i>Comandra umbellata</i> ssp. <i>umbellata</i>	Bastard Toadflax
<i>Comarum palustre</i>	Marsh Five-finger
<i>Convolvulus arvensis</i>	Field Bindweed
<i>Conyza canadensis</i>	Horse-weed
<i>Coptis trifolia</i>	Goldthread
<i>Corallorhiza maculata</i>	Large or Spotted Coralroot
<i>Corallorhiza striata</i>	Striped Coralroot
<i>Corallorhiza trifida</i>	Early Coralroot

Scientific Name	Common Name
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood
<i>Cornus canadensis</i>	Bunchberry
<i>Cornus sericea</i>	Red Osier Dogwood
<i>Corydalis aurea</i>	Golden Corydalis
<i>Corydalis sempervirens</i>	Pink Corydalis
<i>Corylus americana</i>	American Hazelnut
<i>Corylus cornuta</i>	Beaked Hazelnut
<i>Coryphantha vivipara</i>	Pincushion Cactus
<i>Crataegus chrysocarpa</i>	Round-leaved Hawthorn
<i>Crataegus succulenta</i>	Long-spined Hawthorn
<i>Crepis runcinata</i>	Scapose Hawks-beard
<i>Crepis tectorum</i>	Narrow-leaved Hawks-beard
<i>Cryptogramma acrostichoides</i>	Parsley Fern
<i>Cryptotaenia canadensis</i>	Honewort
<i>Cuscuta gronovii</i>	Common Dodder
<i>Cuscuta megalocarpa</i>	Big-fruit Dodder
<i>Cuscuta pentagona</i> var. <i>pentagona</i>	Dodder
<i>Cycloloma atriplicifolium</i>	Winged Pigseed
<i>Cymopterus acaulis</i>	Plains Cymopterus
<i>Cymopterus montanus</i>	Mountain Spring-parsley
<i>Cynoglossum officinale</i>	Common Hound's Tongue
<i>Cyperus erythrorhizos</i>	Red-root Flatsedge
<i>Cyperus houghtonii</i>	Houghton's Umbrella-sedge
<i>Cyperus schweinitzii</i>	Schweinitz's Flatsedge
<i>Cypripedium arietinum</i>	Ram's Head Lady's-slipper
<i>Cypripedium candidum</i>	Small White Lady's-slipper
<i>Cypripedium parviflorum</i>	Yellow Lady's-slipper
<i>Cypripedium parviflorum</i> var. <i>makasin</i>	Yellow Lady's-Slipper
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Large Yellow Lady's-slipper
<i>Cypripedium passerinum</i>	Sparrow's-egg Lady's-slipper
<i>Cypripedium reginae</i>	Showy Lady's-slipper
<i>Cystopteris fragilis</i>	Fragile Fern
<i>Dalea candida</i>	White Prairie-clover
<i>Dalea purpurea</i>	Purple Prairie Clover
<i>Dalea villosa</i> var. <i>villosa</i>	Hairy Prairie-clover
<i>Danthonia intermedia</i>	Timber Oat Grass
<i>Danthonia spicata</i>	Poverty Oat Grass
<i>Dasiphora fruticosa</i>	Shrubby Cinquefoil
<i>Delphinium glaucum</i>	Tall Larkspur
<i>Deschampsia cespitosa</i>	Tufted Hairgrass
<i>Descurainia incana</i>	Gray Tansy Mustard
<i>Descurainia sophia</i>	Flixweed
<i>Desmodium canadense</i>	Beggar's-lice
<i>Dianthus deltoides</i>	Maiden-pink

Scientific Name	Common Name
<i>Dichanthelium leibergii</i>	Lieberg's Panic-grass
<i>Dichanthelium linearifolium</i>	White-haired Panic-grass
<i>Dichanthelium wilcoxianum</i>	Sand Millet
<i>Diervilla lonicera</i>	Bush-honeysuckle
<i>Diphasiastrum complanatum</i>	Trailing Club-moss
<i>Doellingeria umbellata</i>	Flat-topped White Aster
<i>Draba nemorosa</i>	Yellow Whitlow-grass
<i>Draba reptans</i>	Creeping Whitlow-grass
<i>Dracocephalum parviflorum</i>	American Dragon-head
<i>Dracocephalum thymiflorum</i>	Dragonhead
<i>Drosera anglica</i>	Oblong-leaved Sundew
<i>Drosera intermedia</i>	Spoon-leaved Sundew
<i>Drosera rotundifolia</i>	Round-leaved Sundew
<i>Dryopteris carthusiana</i>	Spinulose Wood Fern
<i>Dryopteris cristata</i>	Crested Shield Fern
<i>Dryopteris fragrans</i>	Fragrant Shield Fern
<i>Echinochloa crus-galli</i>	Barnyard Grass
<i>Echinochloa muricata</i>	Prickly Barnyard Grass
<i>Echinocystis lobata</i>	Wild Cucumber
<i>Elaeagnus angustifolia</i>	Russian Olive
<i>Elaeagnus commutata</i>	Silverberry
<i>Elatine americana</i>	Mud-purslane
<i>Eleocharis acicularis</i>	Needle Spike-rush
<i>Eleocharis ovata</i>	Ovate Spikerush
<i>Eleocharis palustris</i>	Creeping Spike-rush
<i>Eleocharis quinqueflora</i>	Few-flowered Spikerush
<i>Eleocharis uniglumis</i>	One-glumed Spike-rush
<i>Elodea canadensis</i>	Canada Waterweed
<i>Elymus canadensis</i>	Canada Wild-rye
<i>Elymus diversiglumis</i>	Various-glumed Wild Rye
<i>Elymus hystrix</i>	Bottle-brush Grass
<i>Elymus lanceolatus</i>	Northern Wheat Grass
<i>Elymus trachycaulus</i>	Slender Wheat Grass
<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	Slender Wheat Grass
<i>Elymus virginicus</i>	Virginia Wild Rye
<i>Elytrigia repens</i> var. <i>repens</i>	Quack-grass
<i>Empetrum nigrum</i>	Black Crowberry
<i>Epilobium ciliatum</i>	Hairy Willow-herb
<i>Epilobium leptophyllum</i>	Willowherb
<i>Epilobium palustre</i>	Marsh Willowherb
<i>Equisetum arvense</i>	Common Horsetail
<i>Equisetum fluviatile</i>	Swamp Horsetail
<i>Equisetum hyemale</i>	Common Scouring-rush
<i>Equisetum hyemale</i> var. <i>affine</i>	Common Scouring-rush

Scientific Name	Common Name
<i>Equisetum palustre</i>	Marsh Horsetail
<i>Equisetum pratense</i>	Meadow Horsetail
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush
<i>Equisetum sylvaticum</i>	Wood Horsetail
<i>Equisetum variegatum</i>	Variegated Horsetail
<i>Eragrostis hypnoides</i>	Creeping Teal Love Grass
<i>Erigeron acris</i>	Northern Daisy Fleabane
<i>Erigeron annuus</i>	White-top Fleabane
<i>Erigeron asper</i>	Rough Fleabane
<i>Erigeron caespitosus</i>	Tufted Fleabane
<i>Erigeron elatus</i>	Swamp Fleabane
<i>Erigeron glabellus</i>	Smooth Fleabane
<i>Erigeron lonchophyllus</i>	Hirsute Fleabane
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane
<i>Erigeron strigosus</i>	Daisy Fleabane
<i>Eriogonum flavum</i>	Yellow Eriogonum
<i>Eriophorum angustifolium</i>	Tall Cotton-grass
<i>Eriophorum brachyantherum</i>	Closed-sheathed Cotton-grass
<i>Eriophorum callitrix</i>	Beautiful Cotton-grass
<i>Eriophorum chamissonis</i>	Russett Cotton-grass
<i>Eriophorum gracile</i>	Slender Cotton-grass
<i>Eriophorum vaginatum</i>	Sheathed Cotton-grass
<i>Eriophorum vaginatum</i> var. <i>spissum</i>	Sheathed Cotton-grass
<i>Eriophorum virginicum</i>	Tawny Cotton-grass
<i>Eriophorum viridicarinatum</i>	Thin-leaved Cotton-grass
<i>Erucastrum gallicum</i>	Dog-mustard
<i>Erysimum cheiranthoides</i>	Wormseed Mustard
<i>Erysimum inconspicuum</i>	Small-flowered Prairie-rocket
<i>Erysimum inconspicuum</i> var. <i>inconspicuum</i>	Small-flowered Prairie-rocket
<i>Eschscholzia californica</i>	California Poppy
<i>Eupatorium maculatum</i>	Spotted joe-pye-weed
<i>Eupatorium maculatum</i> var. <i>maculatum</i>	Joe-pye-weed
<i>Eupatorium perfoliatum</i>	Thoroughwort
<i>Euphorbia esula</i>	Leafy Spurge
<i>Euphrasia frigida</i>	Northern Eyebright
<i>Euphrasia hudsoniana</i>	Eyebright
<i>Euphrasia subarctica</i>	Arctic Eyebright
<i>Eurybia macrophylla</i>	White Wood Aster
<i>Euthamia graminifolia</i>	Flat-topped Goldenrod
<i>Fagopyrum tataricum</i>	Tartary Buckwheat
<i>Fallopia cilinodis</i>	Fringed Black Bindweed
<i>Fallopia convolvulus</i>	Black Bindweed
<i>Fallopia scandens</i>	Climbing False-buckwheat
<i>Festuca hallii</i>	Plains Rough Fescue

Scientific Name	Common Name
<i>Festuca rubra</i>	Red Fescue
<i>Festuca saximontana</i>	Rocky Mountain Fescue
<i>Festuca subverticillata</i>	Nodding Fescue
<i>Fragaria vesca</i>	Woodland Strawberry
<i>Fragaria vesca</i> ssp. <i>americana</i>	Woodland Strawberry
<i>Fragaria virginiana</i>	Smooth Wild Strawberry
<i>Fraxinus pennsylvanica</i>	Red Ash
<i>Gaillardia aristata</i>	Great-flowered Gaillardia
<i>Gaillardia pulchella</i>	Blanket Flower
<i>Galeopsis bifida</i>	Common Hemp-nettle
<i>Galeopsis tetrahit</i>	Common Hemp-nettle
<i>Galium aparine</i>	Cleavers
<i>Galium boreale</i>	Northern Bedstraw
<i>Galium labradoricum</i>	Ladie's Bedstraw
<i>Galium palustre</i>	Marsh Bedstraw
<i>Galium trifidum</i>	Small Bedstraw
<i>Galium triflorum</i>	Sweet-scented Bedstraw
<i>Gaultheria hispidula</i>	Creeping Snowberry
<i>Gaultheria procumbens</i>	Teaberry
<i>Gaura coccinea</i>	Scarlet Gaura
<i>Gentiana affinis</i>	Oblong-leaved Gentian
<i>Gentiana andrewsii</i>	Closed Gentian
<i>Gentiana linearis</i>	Closed Gentian
<i>Gentiana puberulenta</i>	Downy Gentian
<i>Gentiana rubricaulis</i>	Closed Gentian
<i>Gentianella amarella</i>	Felwort
<i>Gentianopsis crinita</i>	Fringed Gentian
<i>Gentianopsis macounii</i>	Fringed Gentian
<i>Gentianopsis virgata</i>	Fringed Gentian
<i>Geocaulon lividum</i>	Northern Comandra
<i>Geranium bicknellii</i>	Bicknell's Geranium
<i>Geranium carolinianum</i>	Carolina Wild Geranium
<i>Geum aleppicum</i>	Yellow Avens
<i>Geum macrophyllum</i>	Large-leaved Avens
<i>Geum rivale</i>	Water or Purple Avens
<i>Geum triflorum</i>	Three-flowered Avens
<i>Glaux maritima</i>	Sea-milkwort
<i>Glyceria borealis</i>	Northern Manna Grass
<i>Glyceria grandis</i>	Tall Manna Grass
<i>Glyceria pulchella</i>	Graceful Manna Grass
<i>Glyceria striata</i>	Fowl Manna Grass
<i>Glycyrrhiza lepidota</i>	Wild Licorice
<i>Goodyera repens</i>	Lesser Rattlesnake Plantain
<i>Grindelia squarrosa</i>	Curly-cup Gumweed

Scientific Name	Common Name
<i>Gymnocarpium dryopteris</i>	Common Oak Fern
<i>Gymnocarpium jessoense</i>	Northern Oak Fern
<i>Gymnocarpium robertianum</i>	Limestone Oak Fern
<i>Hackelia deflexa</i>	Beggar's Lice
<i>Halenia deflexa</i>	Spurred Gentian
<i>Hedysarum alpinum</i>	American Hedysarum
<i>Hedysarum boreale</i>	Northern Hedysarum
<i>Helianthus annuus</i>	Common Sunflower
<i>Helianthus giganteus</i>	Large Sunflower
<i>Helianthus maximiliani</i>	Narrow-leaved Sunflower
<i>Helianthus nuttallii</i>	Tuberous-rooted Sunflower
<i>Helianthus nuttallii</i> ssp. <i>nuttallii</i>	Tuberous-rooted Sunflower
<i>Helianthus nuttallii</i> ssp. <i>rydbergii</i>	Tuberous-rooted Sunflower
<i>Helianthus pauciflorus</i>	Beautiful Sunflower
<i>Helianthus pauciflorus</i> ssp. <i>pauciflorus</i>	Stiff Sunflower
<i>Helianthus petiolaris</i>	Prairie Sunflower
<i>Helianthus tuberosus</i>	Jerusalem Artichoke
<i>Helianthus x laetiflorus</i>	Beautiful Sunflower
<i>Heliopsis helianthoides</i>	Ox-eye
<i>Heracleum maximum</i>	Cow-parsnip
<i>Hesperis matronalis</i>	Dame's-violet
<i>Hesperostipa comata</i>	Spear Grass
<i>Hesperostipa curtiseta</i>	Western Porcupine Grass
<i>Hesperostipa spartea</i>	Porcupine Grass
<i>Heteranthera dubia</i>	Water Star-grass
<i>Heterotheca villosa</i>	Hairy Golden-aster
<i>Heuchera richardsonii</i>	Alumroot
<i>Hieracium umbellatum</i>	Hawkweed
<i>Hippuris vulgaris</i>	Mare's-tail
<i>Hordeum jubatum</i>	Wild Barley
<i>Houstonia longifolia</i>	Long-leaved Bluets
<i>Hudsonia tomentosa</i>	False Heather
<i>Humulus lupulus</i> var. <i>lupuloides</i>	Common Hop
<i>Huperzia lucidula</i>	Shining Club-moss
<i>Hypericum majus</i>	Large Canada St. John's-wort
<i>Hypoxis hirsuta</i>	Yellow Stargrass
<i>Impatiens capensis</i>	Spotted Touch-me-not
<i>Impatiens noli-tangere</i>	Western Jewelweed
<i>Iris versicolor</i>	Blue Flag
<i>Isoetes echinospora</i>	Spiny-spored Quillwort
<i>Iva xanthifolia</i>	Marsh-elder
<i>Juncus alpinoarticulatus</i>	Alpine rush
<i>Juncus arcticus</i>	Arctic Rush
<i>Juncus arcticus</i> var. <i>balticus</i>	Baltic Rush

Scientific Name	Common Name
<i>Juncus bufonius</i>	Toad Rush
<i>Juncus castaneus</i>	Chestnut Rush
<i>Juncus compressus</i>	Flattened Rush
<i>Juncus dudleyi</i>	Dudley's Rush
<i>Juncus filiformis</i>	Thread Rush
<i>Juncus nodosus</i>	Knotted Rush
<i>Juncus tenuis</i>	Slender Rush
<i>Juniperus communis</i>	Common Juniper
<i>Juniperus horizontalis</i>	Creeping Juniper
<i>Kalmia polifolia</i>	Bog-laurel
<i>Kochia scoparia</i>	Summer Cypress
<i>Koeleria macrantha</i>	June Grass
<i>Lactuca biennis</i>	Tall Blue Lettuce
<i>Lactuca floridana</i>	Woodland Lettuce
<i>Lactuca tatarica</i>	Wild Lettuce
<i>Laportea canadensis</i>	Wood Nettle
<i>Lappula squarrosa</i>	Bristly Stickseed
<i>Larix laricina</i>	Tamarack
<i>Lathyrus japonicus</i>	Beach-pea
<i>Lathyrus ochroleucus</i>	Pale Vetchling
<i>Lathyrus palustris</i>	Marsh Vetchling
<i>Lathyrus venosus</i>	Wild Peavine
<i>Lechea intermedia</i>	Pinweed
<i>Leersia oryzoides</i>	Rice Cutgrass
<i>Leersia oryzoides</i>	Rice Cutgrass
<i>Lemna minor</i>	Lesser Duckweed
<i>Lemna trisulca</i>	Star Duckweed
<i>Leonurus cardiaca</i>	Common Motherwort
<i>Lepidium densiflorum</i>	Common Pepper-grass
<i>Lesquerella ludoviciana</i>	Sand Bladderpod
<i>Leucanthemum vulgare</i>	Ox-eye Daisy
<i>Leucophysalis grandiflora</i>	Large White-flowered Ground-cherry
<i>Leymus innovatus</i>	Hairy Wild Rye
<i>Liatris ligulistylis</i>	Meadow Blazingstar
<i>Liatris punctata</i>	Dotted Blazingstar
<i>Lilium philadelphicum</i>	Wood Lily
<i>Limosella aquatica</i>	Madwort
<i>Linaria vulgaris</i>	Butter-and-eggs
<i>Linnaea borealis</i>	Twinflower
<i>Linum lewisii</i>	Blue Flax
<i>Linum sulcatum</i>	Grooved Yellow Flax
<i>Liparis loeselii</i>	Yellow Twayblade
<i>Listera auriculata</i>	Auricled Twayblade
<i>Listera borealis</i>	Northern Twayblade

Scientific Name	Common Name
<i>Listera cordata</i>	Heartleaf Twayblade
<i>Lithospermum canescens</i>	Hoary Puccoon
<i>Lithospermum officinale</i>	Common Gromwell
<i>Lobelia kalmii</i>	Kalm's Lobelia
<i>Lobelia spicata</i>	Pale-spike Lobelia
<i>Lolium perenne</i>	Perennial Rye Grass/common Darnel
<i>Lomatium macrocarpum</i>	Long-fruited Parsley
<i>Lomatogonium rotatum</i>	Marsh Felwort
<i>Lonicera dioica</i>	Limber or Twining Honeysuckle
<i>Lonicera involucrata</i>	Black Twinberry
<i>Lonicera oblongifolia</i>	Swamp-fly-honeysuckle
<i>Lonicera tatarica</i>	Tartarian Honeysuckle
<i>Lonicera villosa</i>	Mountain-fly-honeysuckle
<i>Lotus unifoliolatus</i>	Prarie trefoil
<i>Luzula acuminata</i>	Hairy Wood-rush
<i>Luzula multiflora</i>	Wood-rush
<i>Luzula parviflora</i>	Small-flowered Woodrush
<i>Lycopodium annotinum</i>	Stiff Club-moss
<i>Lycopodium clavatum</i>	Running Pine
<i>Lycopodium dendroideum</i>	Ground-pine
<i>Lycopus americanus</i>	Water Hore-hound
<i>Lycopus asper</i>	Western Water-horehound
<i>Lycopus uniflorus</i>	Northern Bugle-weed
<i>Lygodesmia juncea</i>	Skeletonweed
<i>Lysimachia ciliata</i>	Fringed Loosestrife
<i>Lysimachia quadriflora</i>	Whorled Loosestrife
<i>Lysimachia thysiflora</i>	Tufted Loosestrife
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Maianthemum canadense</i>	Two-leaved Solomon's-seal
<i>Maianthemum racemosum</i>	False Spikenard
<i>Maianthemum stellatum</i>	Star-flowered Solomon's-seal
<i>Maianthemum trifolium</i>	Three-leaved Solomon's-seal
<i>Malaxis monophyllos</i>	White Adder's-mouth
<i>Malaxis paludosa</i>	Bog Adder's-mouth
<i>Malva rotundifolia</i>	Running Mallow
<i>Matricaria discoidea</i>	Pineapple Weed
<i>Matricaria recutita</i>	Wild Chamomile
<i>Matteuccia struthiopteris</i>	Ostrich Fern
<i>Medicago lupulina</i>	Black Medick
<i>Medicago sativa</i>	Alfalfa
<i>Medicago sativa ssp. falcata</i>	Yellow Lucerne
<i>Melampyrum lineare</i>	Cow-wheat
<i>Melilotus albus</i>	White Sweet Clover
<i>Melilotus officinalis</i>	Yellow Sweet Clover

Scientific Name	Common Name
<i>Menispermum canadense</i>	Moonseed
<i>Mentha arvensis</i>	Common Mint
<i>Mentha spicata</i>	Spearmint
<i>Menyanthes trifoliata</i>	Bogbean
<i>Mertensia lanceolata</i>	Tall Lungwort
<i>Mertensia paniculata</i>	Tall Lungwort
<i>Milium effusum</i>	Millet Grass
<i>Mimulus glabratus</i>	Smooth Monkeyflower
<i>Minuartia dawsonensis</i>	Sandwort
<i>Mirabilis nyctaginea</i>	Heart-leaved Umbrellawort
<i>Mitella nuda</i>	Mitrewort
<i>Moehringia lateriflora</i>	Grove Sandwort
<i>Monarda fistulosa</i>	Wild Bergamot
<i>Moneses uniflora</i>	One-flowered Pyrola
<i>Monotropa hypopithys</i>	Pinesap
<i>Monotropa uniflora</i>	Indian-pipe
<i>Muhlenbergia andina</i>	Foxtail Muhly
<i>Muhlenbergia asperifolia</i>	Scratch Grass
<i>Muhlenbergia cuspidata</i>	Prairie Muhly
<i>Muhlenbergia glomerata</i>	Bog Muhly
<i>Muhlenbergia mexicana</i>	Wood Muhly
<i>Muhlenbergia racemosa</i>	Marsh Muhly
<i>Muhlenbergia richardsonis</i>	Mat Muhly
<i>Musineon divaricatum</i>	Leafy Musineon
<i>Myrica gale</i>	Sweet Gale
<i>Myriophyllum sibiricum</i>	Spiked Water-milfoil
<i>Myriophyllum verticillatum</i>	Whorled Water-milfoil
<i>Najas flexilis</i>	Slender Naiad
<i>Nassella viridula</i>	Green Needle Grass
<i>Nepeta cataria</i>	Catnip
<i>Nuphar microphylla</i>	Small Yellow Pond-lily
<i>Nuphar variegata</i>	Yellow Pond-lily
<i>Nymphaea leibergii</i>	Small Water-lily
<i>Nymphaea tetragona</i>	Small Water-lily
<i>Oenothera biennis</i>	Evening-primrose
<i>Oenothera nuttallii</i>	White Evening-primrose
<i>Onoclea sensibilis</i>	Sensitive Fern
<i>Onosmodium molle</i>	Marble-seed
<i>Opuntia fragilis</i>	Brittle Prickly-pear
<i>Orobanche ludoviciana</i>	Louisiana Broom-rape
<i>Orobanche uniflora</i>	
<i>Orthilia secunda</i>	One-sided Pyrola
<i>Orthocarpus luteus</i>	Owl's-clover
<i>Oryzopsis asperifolia</i>	White-grained Mountain Rice Grass

Scientific Name	Common Name
<i>Osmorhiza claytonii</i>	Wooly or Hairy Sweet Cicely
<i>Osmorhiza depauperata</i>	Blunt-fruited Sweet Cicely
<i>Osmorhiza longistylis</i>	Anise-root
<i>Ostrya virginiana</i>	Hop-hornbeam
<i>Oxalis stricta</i>	Yellow Wood-sorrel
<i>Oxytropis campestris</i>	Late Yellow Locoweed
<i>Oxytropis deflexa</i>	Reflexed Locoweed
<i>Oxytropis monticola</i>	Yellow-flower Locoweed
<i>Oxytropis sericea</i>	Early Yellow Locoweed
<i>Oxytropis splendens</i>	Showy Locoweed
<i>Packera aurea</i>	Golden Ragwort
<i>Packera cana</i>	Silvery Groundsel
<i>Packera indecora</i>	Rayless Ragwort
<i>Packera paupercula</i>	Balsam Groundsel
<i>Packera plattensis</i>	Prairie Ragwort
<i>Packera pseud aurea</i>	Groundsel
<i>Packera tridenticulata</i>	Compact Groundsel
<i>Packera tridenticulata</i>	Compact Groundsel
<i>Panicum capillare</i>	Witch Grass
<i>Panicum virgatum</i>	Switch Grass
<i>Parietaria pensylvanica</i>	American Pellitory
<i>Parnassia glauca</i>	Glaucous Grass-of-parnassus
<i>Parnassia palustris</i>	Grass of Parnassus
<i>Parthenocissus quinquefolia</i>	Virginia Creeper
<i>Pascopyrum smithii</i>	Western Wheat Grass
<i>Pedicularis canadensis</i>	Wood-betony
<i>Pedicularis groenlandica</i>	Elephant's-head
<i>Pedicularis lanceolata</i>	Swamp Lousewort
<i>Pedimelum argophyllum</i>	Silverweed
<i>Pedimelum esculentum</i>	Indian Breadroot
<i>Pedimelum esculentum</i>	Indian Breadroot
<i>Pellaea glabella ssp. occidentalis</i>	Cliff-brake
<i>Penstemon albidus</i>	White Beard-tongue
<i>Penstemon gracilis</i>	Lilac-flowered Beard-tongue
<i>Penstemon nitidus</i>	Smooth Blue Beard-tongue
<i>Penstemon procerus</i>	Slender Beard-tongue
<i>Penthorum sedoides</i>	Ditch-stonecrop
<i>Persicaria amphibia</i>	Water Smartweed
<i>Persicaria hydropiper</i>	Common Smartweed
<i>Persicaria lapathifolia</i>	Pale Smartweed
<i>Persicaria lapathifolia</i>	Pale Smartweed
<i>Persicaria maculosa</i>	Spotted Lady's-thumb
<i>Persicaria pensylvanica</i>	Pennsylvania Smartweed
<i>Persicaria pensylvanica</i>	Pennsylvania Smartweed

Scientific Name	Common Name
<i>Persicaria punctata</i>	Dotted Smartweed
<i>Persicaria punctata</i>	Dotted Smartweed
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Colt's-foot
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved Colt's-foot
<i>Petasites frigidus</i> var. <i>vitifolius</i>	Vine-leaved Colt's-foot
<i>Phacelia franklinii</i>	Franklin's Scorpionweed
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Phleum pratense</i>	Common Timothy
<i>Phlox hoodii</i>	Moss Pink
<i>Phragmites australis</i>	Common Reed
<i>Phryma leptostachya</i>	Lopseed
<i>Physalis virginiana</i>	Prairie Ground-cherry
<i>Physostegia parviflora</i>	Dragonhead
<i>Physostegia virginiana</i> ssp. <i>virginiana</i>	False Dragonhead
<i>Picea glauca</i>	White Spruce
<i>Picea mariana</i>	Black Spruce
<i>Pinguicula villosa</i>	Small Butterwort
<i>Pinguicula vulgaris</i>	Common Butterwort
<i>Pinus banksiana</i>	Jack Pine
<i>Pinus sylvestris</i>	Scots Pine
<i>Piptatherum canadense</i>	Canadian Rice-grass
<i>Piptatherum micranthum</i>	Little-seed Rice Grass
<i>Piptatherum pungens</i>	Northern Rice Grass
<i>Plantago major</i>	Common Plantain
<i>Plantago maritima</i>	Seaside Plantain
<i>Platanthera aquilonis</i>	Tall Northern Green Orchid
<i>Platanthera dilatata</i>	Bog Candle
<i>Platanthera huronensis</i>	Huron Fringed-orchid
<i>Platanthera hyperborea</i>	Northern green orchid
<i>Platanthera macrophylla</i>	Round-leaved Bog Orchid
<i>Platanthera obtusata</i>	Small Northern Bog Orchid
<i>Platanthera orbiculata</i> var. <i>orbiculata</i>	Round-leaved Bog Orchid
<i>Poa alpina</i>	Alpine Blue Grass
<i>Poa annua</i>	Annual Blue Grass
<i>Poa arctica</i> ssp. <i>arctica</i>	Arctic Blue-grass
<i>Poa arctica</i> ssp. <i>caespitans</i>	Blue-grass
<i>Poa arida</i>	Plains Blue Grass
<i>Poa compressa</i>	Canada Blue Grass
<i>Poa fendleriana</i>	Mutton Grass
<i>Poa interior</i>	Interior Blue Grass
<i>Poa nemoralis</i>	Wood Blue Grass
<i>Poa palustris</i>	Fowl Blue Grass
<i>Poa pratensis</i>	Kentucky Blue Grass
<i>Polanisia dodecandra</i> ssp. <i>trachysperma</i>	Clammyweed

Scientific Name	Common Name
<i>Polygala paucifolia</i>	Fringed Polygala
<i>Polygala senega</i>	Seneca Snakeroot
<i>Polygala verticillata</i> var. <i>isocycla</i>	Whorled Milkwort
<i>Polygala verticillata</i> var. <i>verticillata</i>	Whorled Milkwort
<i>Polygonatum biflorum</i>	Hairy Solomon's-seal
<i>Polygonum achoreum</i>	Leathery Knotweed
<i>Polygonum aviculare</i>	Prostrate Knotweed
<i>Polygonum douglasii</i>	Douglas Knotweed
<i>Polygonum erectum</i>	Erect Knotweed
<i>Polygonum ramosissimum</i>	Bushy Knotweed
<i>Polygonum ramosissimum</i> var. <i>prolificum</i>	Proliferous Knotweed
<i>Populus balsamifera</i>	Balsam Poplar
<i>Populus deltoides</i>	Cottonwood
<i>Populus tremuloides</i>	Trembling Aspen
<i>Populus x jackii</i>	No Common Name
<i>Portulaca oleracea</i>	Common Purslane
<i>Potamogeton alpinus</i>	Northern Pondweed
<i>Potamogeton amplifolius</i>	Large-leaved Pondweed
<i>Potamogeton friesii</i>	Fries Pondweed
<i>Potamogeton gramineus</i>	Various-leaved Pondweed
<i>Potamogeton illinoensis</i>	Illinois Pondweed
<i>Potamogeton natans</i>	Common Floating Pondweed
<i>Potamogeton praelongus</i>	White-stemmed Pondweed
<i>Potamogeton pusillus</i>	Small Pondweed
<i>Potamogeton richardsonii</i>	Clasping-leaved Pondweed
<i>Potamogeton strictifolius</i>	Straightleaf Pondweed
<i>Potamogeton zosteriformis</i>	Eelgrass Pondweed
<i>Potentilla arguta</i>	White or Tall Cinquefoil
<i>Potentilla bipinnatifida</i>	Prairie Cinquefoil
<i>Potentilla concinna</i>	Early Cinquefoil
<i>Potentilla gracilis</i>	Fanleaf Cinquefoil
<i>Potentilla hippiana</i>	Woolly Cinquefoil
<i>Potentilla norvegica</i>	Rough Cinquefoil
<i>Potentilla pensylvanica</i> var. <i>pensylvanica</i>	Pennsylvania Cinquefoil
<i>Potentilla rivalis</i>	Brook Cinquefoil
<i>Prenanthes alba</i>	White Lettuce
<i>Prenanthes racemosa</i>	Glaucous White Lettuce
<i>Primula egaliksensis</i>	Greenland Primrose
<i>Primula incana</i>	Mealy Primrose
<i>Primula mistassinica</i>	Bird's-eye-primrose
<i>Prosartes trachycarpa</i>	Fairybells
<i>Prunella vulgaris</i>	Heal-all
<i>Prunella vulgaris</i> ssp. <i>vulgaris</i>	Heal-all
<i>Prunus americana</i>	American Plum

Scientific Name	Common Name
<i>Prunus nigra</i>	Canada Plum
<i>Prunus pensylvanica</i>	Pin Cherry
<i>Prunus pumila</i>	Sand Cherry
<i>Prunus virginiana</i>	Choke Cherry
<i>Pteridium aquilinum</i>	Bracken
<i>Puccinellia distans</i>	Slender Salt-meadow Grass
<i>Puccinellia nuttalliana</i>	Nuttall's Salt-meadow Grass
<i>Pyrola americana</i>	Round-leaved Pyrola
<i>Pyrola asarifolia</i>	Pink Pyrola
<i>Pyrola chlorantha</i>	Greenish-flowered Wintergreen
<i>Pyrola elliptica</i>	Shinleaf
<i>Pyrola grandiflora</i>	Arctic Pyrola
<i>Pyrola minor</i>	Lesser Wintergreen
<i>Quercus macrocarpa</i>	Bur Oak
<i>Ranunculus abortivus</i>	Kidneyleaf Buttercup
<i>Ranunculus acris</i>	Common Buttercup
<i>Ranunculus aquatilis</i>	White Water Crowfoot
<i>Ranunculus cymbalaria</i>	Seaside Crowfoot
<i>Ranunculus cymbalaria</i> var. <i>cymbalaria</i>	Seaside Crowfoot
<i>Ranunculus cymbalaria</i> var. <i>saximontanus</i>	Seaside Crowfoot
<i>Ranunculus flammula</i>	Creeping Spearwort
<i>Ranunculus gmelinii</i>	Small Yellow Water Buttercup
<i>Ranunculus hispidus</i> var. <i>caricetorum</i>	Bristly Buttercup
<i>Ranunculus lapponicus</i>	Lapland Buttercup
<i>Ranunculus macounii</i>	Macoun's Buttercup
<i>Ranunculus pensylvanicus</i>	Bristly Crowfoot
<i>Ranunculus rhomboideus</i>	Prairie Buttercup
<i>Ranunculus sceleratus</i>	Cursed Crowfoot
<i>Ranunculus sceleratus</i> var. <i>sceleratus</i>	Cursed Crowfoot
<i>Ratibida columnifera</i>	Long-headed Coneflower
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn
<i>Rhamnus cathartica</i>	Common Buckthorn
<i>Rhinanthus minor</i>	Yellow Rattle
<i>Rhododendron groenlandicum</i>	Labrador-tea
<i>Rhododendron tomentosum</i>	Dwarf Labrador-tea/Trapper's Tea
<i>Rhynchospora alba</i>	White Beakrush
<i>Rhynchospora capillacea</i>	Horned Beakrush
<i>Ribes americanum</i>	Wild Black Currant
<i>Ribes glandulosum</i>	Skunk Currant
<i>Ribes hirtellum</i>	Smooth Gooseberry
<i>Ribes hudsonianum</i>	Northern Wild Black Currant
<i>Ribes lacustre</i>	Bristly Black Currant
<i>Ribes oxycanthoides</i> ssp. <i>oxycanthoides</i>	Bristly Wild Gooseberry
<i>Ribes triste</i>	Wild Red Currant

Scientific Name	Common Name
<i>Rorippa palustris</i> ssp. <i>fernaldiana</i>	Marsh Yellow Cress
<i>Rorippa palustris</i> ssp. <i>hispida</i>	Marsh Yellow Cress
<i>Rosa acicularis</i>	Prickly Rose
<i>Rosa acicularis</i> ssp. <i>sayi</i>	Prickly Rose
<i>Rosa arkansana</i>	Low Prairie Rose
<i>Rosa blanda</i>	Smooth Rose
<i>Rosa woodsii</i>	Wood's Rose
<i>Rubus arcticus</i> ssp. <i>acaulis</i>	Stemless Raspberry
<i>Rubus chamaemorus</i>	Baked-apple-berry
<i>Rubus idaeus</i>	Wild Red Raspberry
<i>Rubus pubescens</i>	Dewberry
<i>Rubus x paracaulis</i>	Raspberry
<i>Rudbeckia hirta</i>	Black-eyed Susan
<i>Rudbeckia laciniata</i>	Tall Coneflower
<i>Rumex britannica</i>	Water Dock
<i>Rumex crispus</i>	Yellow or Curled Dock
<i>Rumex fueginus</i>	Golden Dock
<i>Rumex occidentalis</i>	Western Dock
<i>Rumex pseudonatronatus</i>	Field Dock
<i>Rumex triangulivalvis</i>	Narrow-leaved Dock
<i>Ruppia cirrhosa</i>	Widgeon-grass
<i>Sagina nodosa</i>	Pearlwort
<i>Sagittaria cuneata</i>	Arum-leaved Arrowhead
<i>Sagittaria latifolia</i>	Broad-leaved Arrowhead
<i>Salicornia rubra</i>	Slender Glasswort
<i>Salix alba</i>	White Willow
<i>Salix amygdaloides</i>	Peach-leaved Willow
<i>Salix bebbiana</i>	Bebb's or Beaked Willow
<i>Salix candida</i>	Hoary Willow
<i>Salix discolor</i>	Pussy Willow
<i>Salix exigua</i>	Sandbar Willow
<i>Salix fragilis</i>	Brittle Willow
<i>Salix glauca</i>	Smooth Willow
<i>Salix humilis</i>	Gray Willow
<i>Salix lucida</i>	Shining Willow
<i>Salix lutea</i>	Yellow Willow
<i>Salix maccalliana</i>	Velvet-fruited Willow
<i>Salix myrtilifolia</i>	Myrtle-leaved Willow
<i>Salix myrtilifolia</i> var. <i>myrtilifolia</i>	Myrtle-leaved Willow
<i>Salix pedicellaris</i>	Bog Willow
<i>Salix pellita</i>	Satin Willow
<i>Salix petiolaris</i>	Basket Willow
<i>Salix planifolia</i>	Tea-leaved Willow
<i>Salix pseudomonticola</i>	False Mountain Willow

Scientific Name	Common Name
<i>Salix pseudomyrsinites</i>	Myrtle-leaved Willow
<i>Salix pyrifolia</i>	Balsam Willow
<i>Salix scouleriana</i>	Scouler Willow
<i>Salix serissima</i>	Autumn Willow
<i>Salsola tragus</i>	Russian Thistle
<i>Sambucus racemosa</i>	Red Elderberry
<i>Sambucus racemosa</i> var. <i>racemosa</i>	Red Elderberry
<i>Sanguinaria canadensis</i>	Blood-root
<i>Sanicula marilandica</i>	Snakeroot
<i>Saponaria officinalis</i>	Bouncing Bet
<i>Sarracenia purpurea</i>	Pitcher Plant
<i>Saxifraga paniculata</i>	White Mountain Saxifrage
<i>Saxifraga tricuspidata</i>	Three-toothed Saxifrage
<i>Scheuchzeria palustris</i>	Podgrass
<i>Schizachne purpurascens</i>	Purple Oat Grass
<i>Schizachyrium scoparium</i>	Little Bluestem
<i>Schoenoplectus acutus</i>	Hard-stemmed Bulrush
<i>Schoenoplectus pungens</i>	Chair-maker's rush
<i>Schoenoplectus subterminalis</i>	Water Bulrush
<i>Schoenoplectus tabernaemontani</i>	Soft-stem Bulrush
<i>Scirpus cyperinus</i>	Wool-grass
<i>Scirpus microcarpus</i>	Small Fruited-bulrush
<i>Scolochloa festuacea</i>	Spangletop
<i>Scutellaria galericulata</i>	Hooded Skullcap
<i>Scutellaria lateriflora</i>	Mad-dog Skullcap
<i>Selaginella densa</i>	Prairie Spike-moss
<i>Selaginella rupestris</i>	Rock Spike-moss
<i>Selaginella selaginoides</i>	Northern Spike-moss
<i>Senecio eremophilus</i>	Cut-leaved Ragwort
<i>Senecio integerrimus</i>	Entire-leaved Groundsel
<i>Senecio viscosus</i>	Sticky Groundsel
<i>Senecio vulgaris</i>	Common Groundsel
<i>Setaria viridis</i>	Green Foxtail
<i>Shepherdia argentea</i>	Silver Buffaloberry
<i>Shepherdia canadensis</i>	Soapberry
<i>Shinnersoseris rostrata</i>	Annual Skeletonweed
<i>Sibbaldiopsis tridentata</i>	Three-toothed Cinquefoil
<i>Silene antirrhina</i>	Sleepy Catchfly
<i>Silene csereii</i>	Smooth Catchfly
<i>Silene drummondii</i>	Drummond's Cockle
<i>Silene latifolia</i>	White Cockle
<i>Silene noctiflora</i>	Night-flowering Catchfly
<i>Silene vulgaris</i>	Bladder campion
<i>Sisyrinchium campestre</i>	White-eyed Grass

Scientific Name	Common Name
<i>Sisyrinchium montanum</i>	Common Blue-eyed Grass
<i>Sium suave</i>	Water-parsnip
<i>Smilax lasioneura</i>	Carrion Flower
<i>Solidago bicolor</i>	White Goldenrod
<i>Solidago canadensis</i>	Canada Goldenrod
<i>Solidago gigantea</i>	Late Goldenrod
<i>Solidago hispida</i>	Hairy Goldenrod
<i>Solidago hispida</i> var. <i>hispida</i>	Hairy Goldenrod
<i>Solidago juncea</i>	Sharp-toothed Goldenrod
<i>Solidago lepida</i>	Western Canada goldenrod
<i>Solidago missouriensis</i>	Low Goldenrod
<i>Solidago multiradiata</i>	Alpine Goldenrod
<i>Solidago nemoralis</i>	Showy Goldenrod
<i>Solidago ptarmicoides</i>	White Upland Aster
<i>Solidago riddellii</i>	Riddell's Goldenrod
<i>Solidago rigida</i>	Stiff Goldenrod
<i>Solidago simplex</i>	Sticky goldenrod
<i>Sonchus arvensis</i>	Field Sow-thistle
<i>Sonchus asper</i>	Spiny-leaved Sow-thistle
<i>Sonchus oleraceus</i>	Common Sow-thistle
<i>Sorbus decora</i>	Mountain-ash
<i>Sorghastrum nutans</i>	Indian Grass
<i>Sparganium angustifolium</i>	Narrow-leaved Bur-reed
<i>Sparganium eurycarpum</i>	Broad-fruited Bur-reed
<i>Sparganium hyperboreum</i>	Northern Bur-reed
<i>Sparganium natans</i>	Small Bur-reed
<i>Spartina gracilis</i>	Alkali Cord Grass
<i>Spartina pectinata</i>	Slough Grass
<i>Spergularia salina</i>	Sand Spurrey
<i>Sphenopholis intermedia</i>	Slender Wedge Grass
<i>Sphenopholis obtusata</i>	Prairie Wedge Grass
<i>Spiraea alba</i>	Meadowsweet
<i>Spiranthes lacera</i> var. <i>lacera</i>	Northern Slender Ladies'-tresses
<i>Spiranthes romanzoffiana</i>	Hooded Ladies'-tresses
<i>Spirodela polyrrhiza</i>	Water-flaxseed
<i>Sporobolus cryptandrus</i>	Sand Dropseed
<i>Sporobolus heterolepis</i>	Prairie Dropseed
<i>Sporobolus neglectus</i>	Annual Dropseed
<i>Stachys palustris</i>	Marsh Hedge-nettle
<i>Stachys pilosa</i>	Woundwort
<i>Stachys tenuifolia</i>	Smooth Hedge Nettle
<i>Stellaria borealis</i> ssp. <i>borealis</i>	Boreal Starwort
<i>Stellaria crassifolia</i>	Fleshy Stitchwort
<i>Stellaria longifolia</i>	Long-leaved Stitchwort

Scientific Name	Common Name
<i>Stellaria longipes</i>	Long-stalked Stitchwort
<i>Stellaria media</i>	Common Chickweed
<i>Streptopus amplexifolius</i>	White Mandarin
<i>Streptopus lanceolatus</i>	Rose Mandarin
<i>Stuckenia filiformis</i>	Filiform Pondweed
<i>Stuckenia pectinata</i>	Sago Pondweed
<i>Stuckenia vaginata</i>	Sheathed Pondweed
<i>Suaeda calceoliformis</i>	Horned Sea-blite
<i>Symphoricarpos albus</i>	Snowberry
<i>Symphoricarpos occidentalis</i>	Western Snowberry
<i>Symphyotrichum boreale</i>	Northern Borealis
<i>Symphyotrichum ciliatum</i>	Alkali American-aster
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster
<i>Symphyotrichum ericoides</i>	Heath or Many-flowered Aster
<i>Symphyotrichum laeve</i>	Smooth Aster
<i>Symphyotrichum lanceolatum</i> var. <i>hesperium</i>	willow aster
<i>Symphyotrichum lanceolatum</i> var. <i>lanceolatum</i>	Lance-leaved aster
<i>Symphyotrichum lateriflorum</i>	Calico or Wood Aster
<i>Symphyotrichum novae-angliae</i>	New England Aster
<i>Symphyotrichum praealtum</i>	Aster
<i>Symphyotrichum puniceum</i> var. <i>puniceum</i>	Purple-stemmed Aster
<i>Symphyotrichum robynianum</i>	Robyns's Aster
<i>Symphyotrichum sericeum</i>	Western Silvery Aster
<i>Tanacetum vulgare</i>	Common Tansy
<i>Taraxacum officinale</i> ssp. <i>ceratophorum</i>	Dandelion
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	Common Dandelion
<i>Tephrosia palustris</i>	Marsh-fleabane
<i>Teucrium canadense</i> var. <i>occidentale</i>	Hairy Germander
<i>Thalictrum dasycarpum</i>	Tall or Purple Meadow-rue
<i>Thalictrum dioicum</i>	Early Meadow-Rue
<i>Thalictrum sparsiflorum</i>	Few-flowered Meadow-rue
<i>Thalictrum venulosum</i>	Veiny Meadow-rue
<i>Thaspium barbinode</i>	Hairy-jointed Meadow-parsnip
<i>Thelypteris palustris</i>	Marsh Fern
<i>Thermopsis rhombifolia</i>	Golden Bean
<i>Thlaspi arvense</i>	Field Pennycress
<i>Thuja occidentalis</i>	Eastern White Cedar
<i>Tilia americana</i>	Basswood
<i>Tofieldia pusilla</i>	Bog Asphodel
<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Pale Manna Grass
<i>Townsendia exscapa</i>	Silky Townsend-daisy
<i>Toxicodendron rydbergii</i>	Poison-ivy
<i>Tragopogon pratensis</i>	Goat's-beard
<i>Triadenum fraseri</i>	Marsh St. John's-wort

Scientific Name	Common Name
<i>Triantha glutinosa</i>	Sticky False Asphodel
<i>Trichophorum alpinum</i>	Alpine Cotton-grass
<i>Trichophorum caespitosum</i>	Tufted clubrush
<i>Trientalis borealis</i>	Northern Starflower
<i>Trifolium hybridum</i>	Alsike Clover
<i>Trifolium pratense</i>	Red Clover
<i>Trifolium repens</i>	White Clover
<i>Triglochin maritima</i>	Seaside Arrow-grass
<i>Triglochin palustris</i>	Marsh Arrow-grass
<i>Trillium cernuum</i>	Nodding Trillium
<i>Tripleurospermum maritimum</i>	False mayweed
<i>Tripleurospermum perforata</i>	Scentless Mayweed
<i>Typha angustifolia</i>	Narrow-leaved Cat-tail
<i>Typha latifolia</i>	Common Cat-tail
<i>Typha x glauca</i>	Hybrid Cattail
<i>Ulmus americana</i>	American or White Elm
<i>Urtica dioica</i> ssp. <i>gracilis</i>	Stinging Nettle
<i>Utricularia cornuta</i>	Horned Bladderwort
<i>Utricularia intermedia</i>	Flat-leaved Bladderwort
<i>Utricularia macrorhiza</i>	Greater bladderwort
<i>Utricularia minor</i>	Lesser Bladderwort
<i>Uvularia sessilifolia</i>	Small Bellwort
<i>Vaccinium angustifolium</i>	Low Sweet Blueberry
<i>Vaccinium caespitosum</i>	Dwarf Bilberry
<i>Vaccinium macrocarpon</i>	Large Cranberry
<i>Vaccinium myrtilloides</i>	Velvet-leaf Blueberry
<i>Vaccinium oxycoccos</i>	Small Cranberry
<i>Vaccinium uliginosum</i>	Bog Whortleberry
<i>Vaccinium vitis-idaea</i>	Bog Cranberry
<i>Valeriana dioica</i> var. <i>sylvatica</i>	Wood Valerian
<i>Verbascum thapsus</i>	Common Mullein
<i>Verbena bracteata</i>	Bracted Vervain
<i>Vernonia fasciculata</i> ssp. <i>corymbosa</i>	Western Ironweed
<i>Veronica americana</i>	American Brooklime
<i>Veronica peregrina</i> ssp. <i>xalapensis</i>	Neck-weed
<i>Veronica scutellata</i>	Marsh Speedwell
<i>Veronicastrum virginicum</i>	Culver's-root
<i>Viburnum edule</i>	Mooseberry
<i>Viburnum lentago</i>	Nannyberry
<i>Viburnum opulus</i>	Highbush-cranberry
<i>Viburnum opulus</i> var. <i>americanum</i>	Highbush-cranberry
<i>Viburnum rafinesquianum</i>	Downy Arrow-wood
<i>Vicia americana</i>	Common Vetch
<i>Vicia cracca</i>	Tufted Vetch

Scientific Name	Common Name
<i>Viola adunca</i>	Early Blue Violet
<i>Viola canadensis</i> var. <i>rugulosa</i>	Canada Violet
<i>Viola conspersa</i>	Dog Violet
<i>Viola nephrophylla</i> var. <i>nephrophylla</i>	Northern Bog Violet
<i>Viola palustris</i>	Marsh Violet
<i>Viola pedatifida</i>	Purple Prairie Violet
<i>Viola pubescens</i>	Downy Yellow Violet
<i>Viola renifolia</i>	Kidney-shaped Violet
<i>Viola selkirkii</i>	Long-spurred Violet
<i>Viola sororia</i>	Wooly Blue Violet
<i>Vitis riparia</i>	Riverbank Grape
<i>Wolffia columbiana</i>	Water-meal
<i>Woodsia alpina</i>	Northern Woodsia
<i>Woodsia glabella</i>	Smooth Woodsia
<i>Woodsia ilvensis</i>	Rusty Woodsia
<i>Woodsia oregana</i> ssp. <i>cathcartiana</i>	Large Woodsia
<i>Xanthium strumarium</i>	Cocklebur
<i>Zannichellia palustris</i>	Horned-pondweed
<i>Zigadenus elegans</i>	White Camas
<i>Zizania palustris</i>	Northern Wild Rice
<i>Zizia aptera</i>	Heart-leaved Alexanders
<i>Zizia aurea</i>	Golden Alexanders

APPENDIX D. Protected species in Manitoba.

This appendix includes the following table and figures:

- Table 1. Protected plant species in Manitoba listed by the *Species at Risk Act* and the Manitoba *Endangered Species Act*.
- Figure 1. Known occurrences of rough purple false-foxglove in Manitoba (Krause Danielsen and Friesen 2009)
- Figure 2. Known occurrences of small white lady's-slipper in Manitoba (Krause Danielsen and Friesen 2009).
- Figure 3. Known occurrences of smooth goosefoot in Manitoba (Reimer and Hamel 2003).
- Figure 4. Known occurrences of hackberry in Manitoba (Reimer and Hamel 2003).
- Figure 5. Known occurrences of hairy prairie clover in Manitoba (Reimer and Hamel 2002).
- Figure 6. Known occurrences of Riddell's goldenrod in Manitoba (Krause Danielsen and Friesen 2009).
- Figure 7. Known occurrences of Culver's root in Manitoba (Krause Danielsen and Friesen 2009).

Table 1. Protected plant species in Manitoba listed by the *Species at Risk Act* and the *Manitoba Endangered Species Act*.

Species of Conservation Concern	Common Name	Conservation Status	Habitat	Range in Manitoba	Location in Study Area
<i>Agalinis aspera</i>	Rough Purple Agalinis	SARA - Endangered MBCDC - S1S2	Low prairie meadows that are wet, exposed patches of bare stony soil and limestone gravel, oil disturbance is tolerated	South Interlake west to Brandon	Yes
<i>Agalinis gattingeri</i>	Gattinger's Agalinis	SARA - Endangered MBCDC - S1	Low prairie meadows that are wet, exposed patches of bare stony soil and limestone gravel, oil disturbance is tolerated	South Interlake near St. Laurent	No record
<i>Buchloë dactyloides</i>	Buffalo Grass	SARA - Threatened MBESA - Threatened MBCDC - S1	Short grass prairie, meadows, pastures	Western Manitoba in valleys of the Souris and Blind Rivers	No record
<i>Celtis occidentalis</i>	Hackberry	MBESA - Threatened MBCDC - S1	Dry prairie and sandhills	Scattered locations, Lauder Sandhills to Delta Beach	Yes
<i>Chenopodium subglabrum</i>	Smooth Goosefoot	SARA - Threatened MBCDC - S1	Prairie sand areas	Sandhills of Oak Lake and Routledge	Yes
<i>Cypripedium candidum</i>	Small White Lady's-slipper	SARA - Endangered MBESA - Endangered MBCDC - S1	Prairie openings in wooded grasslands or in more open sites in calcareous sandy loam soil	Southern Manitoba	Yes
<i>Dalea villosa</i>	Hairy Prairie-clover	SARA – Threatened MBESA - Threatened MBCDC - S2	Active sand or sandhill blowouts and partially stable sandy sites	Southwestern Manitoba, south to Shilo	Yes
<i>Platanthera praeclara</i>	Western Prairie Fringed Orchid	SARA - Endangered MBESA - Endangered MBCDC - S1	Remnant native prairie grasslands	Southeastern Manitoba close to the USA border	No record
<i>Solidago riddellii</i>	Riddell's Goldenrod	SARA -Special concern MBESA - Threatened MBCDC - S2	Moist to wet calcareous sandy loam soils in relatively undisturbed roadsides, tall-grass prairie and open shrubby fens	Kleefeld and Giroux area south to the USA border	Yes
<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses	SARA - Endangered MBESA - Endangered MBCDC - S1	Meadows of tall grass prairie, also colonizes disturbed areas such as roadside ditches and abandoned fields	Southeastern Manitoba close to the USA border	No record
<i>Symphyotrichum sericeum</i>	Western Silvery Aster	SARA - Threatened MBESA - Threatened MBCDC - S1	Gravelly areas	Bird's Hill east to Beausejour, near Richer and south of St. Pierre to the USA border	No record

Species of Conservation Concern	Common Name	Conservation Status	Habitat	Range in Manitoba	Location in Study Area
<i>Tradescantia occidentalis</i>	Western Spiderwort	SARA - Threatened MBESA - Threatened MBCDC - S1	Sandy soils, in open to partially stabilized dune systems	Routledge Sandhills and Lauder Sandhills, northeast of Melita	No record
<i>Veronicastrum virginicum</i>	Culver's-root	MBESA - Threatened MBCDC - S1	Tall grass prairie, edges of thickets and open aspen/bur oak woods, adjacent to shrubs along roadsides, railway right-of-ways and fences. It prefers moist, calcareous sandy loam soil but can grow on drier upland sites	Kleefeld south through Tolstoi to the Minnesota border	Yes

Note: Species of conservation concern listed by the *Species at Risk Act* (SARA), the Manitoba *Endangered Species Act* (MBESA) and the Manitoba Conservation Data Centre (MBCDC).

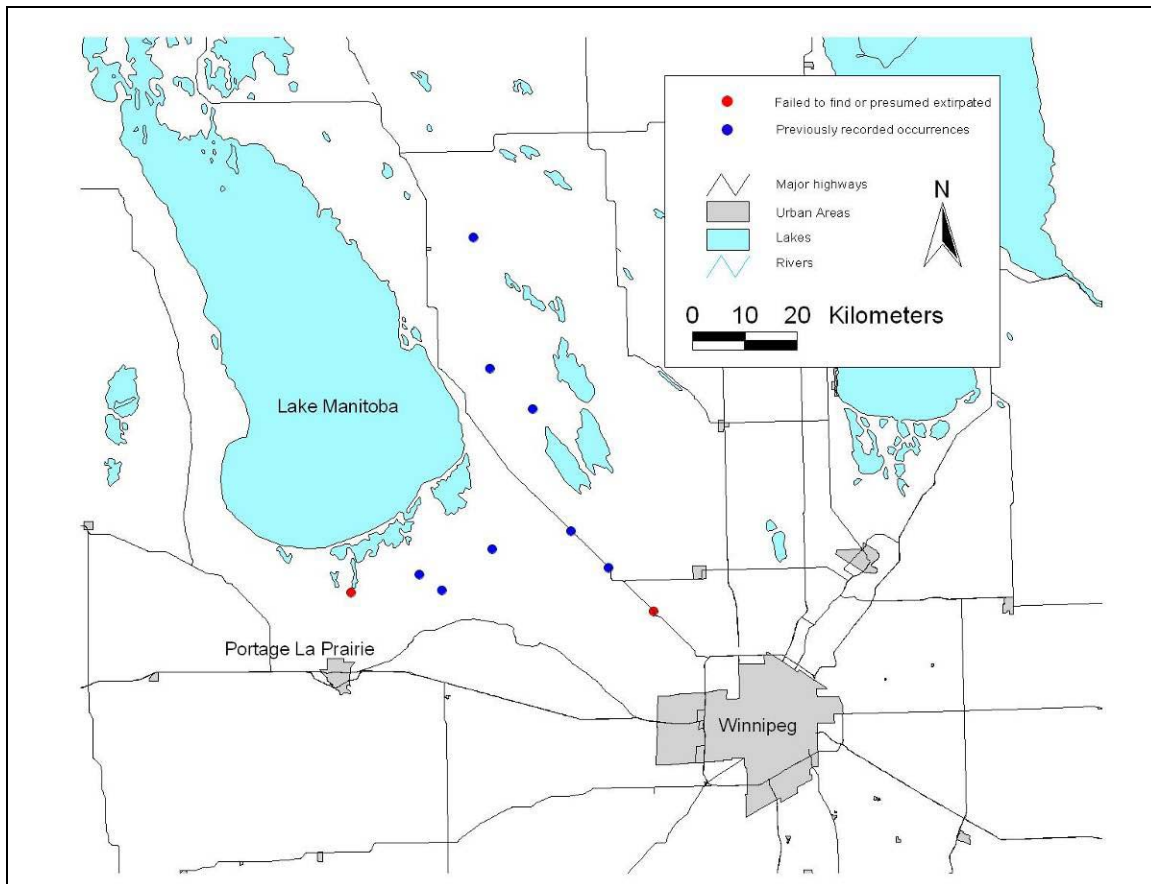


Figure 1. Known occurrences of rough purple false-foxglove (*Agalinis aspera*) in Manitoba (Source: Krause Danielsen and Friesen 2009).

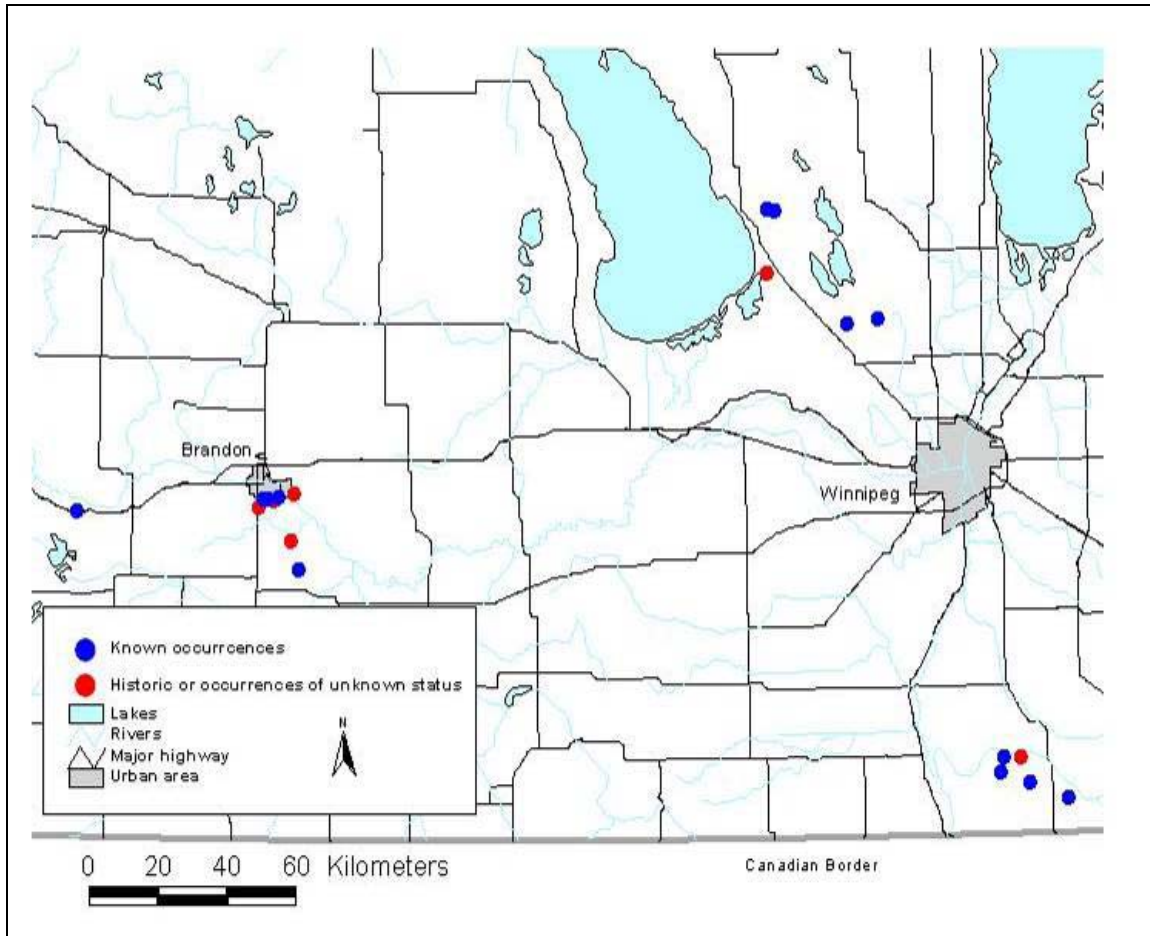


Figure 2. Known occurrences of small white lady's slipper (*Cypripedium candidum*) in Manitoba. (Source: Krause Danielsen and Friesen 2009)

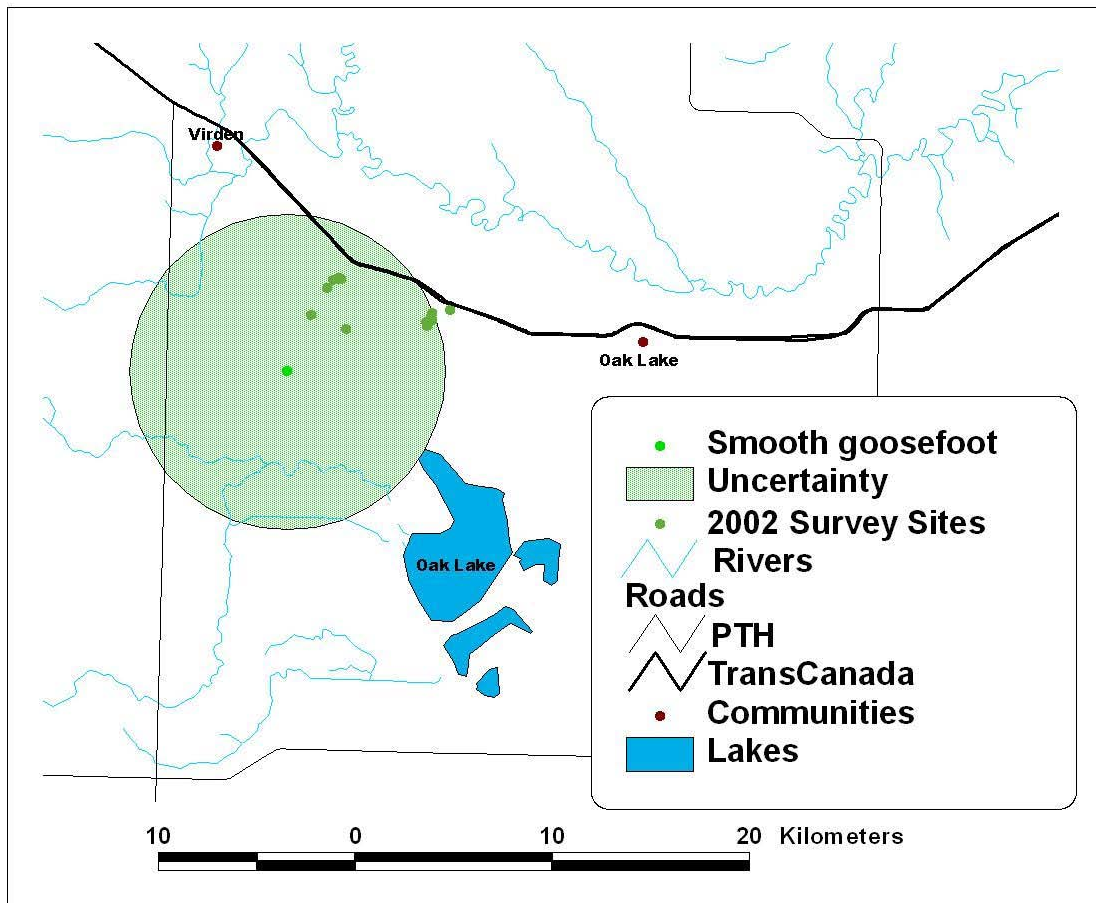


Figure 3. Known occurrences of smooth goosefoot (*Chenopodium subglabrum*) in Manitoba (Source: Reimer and Hamel 2003)

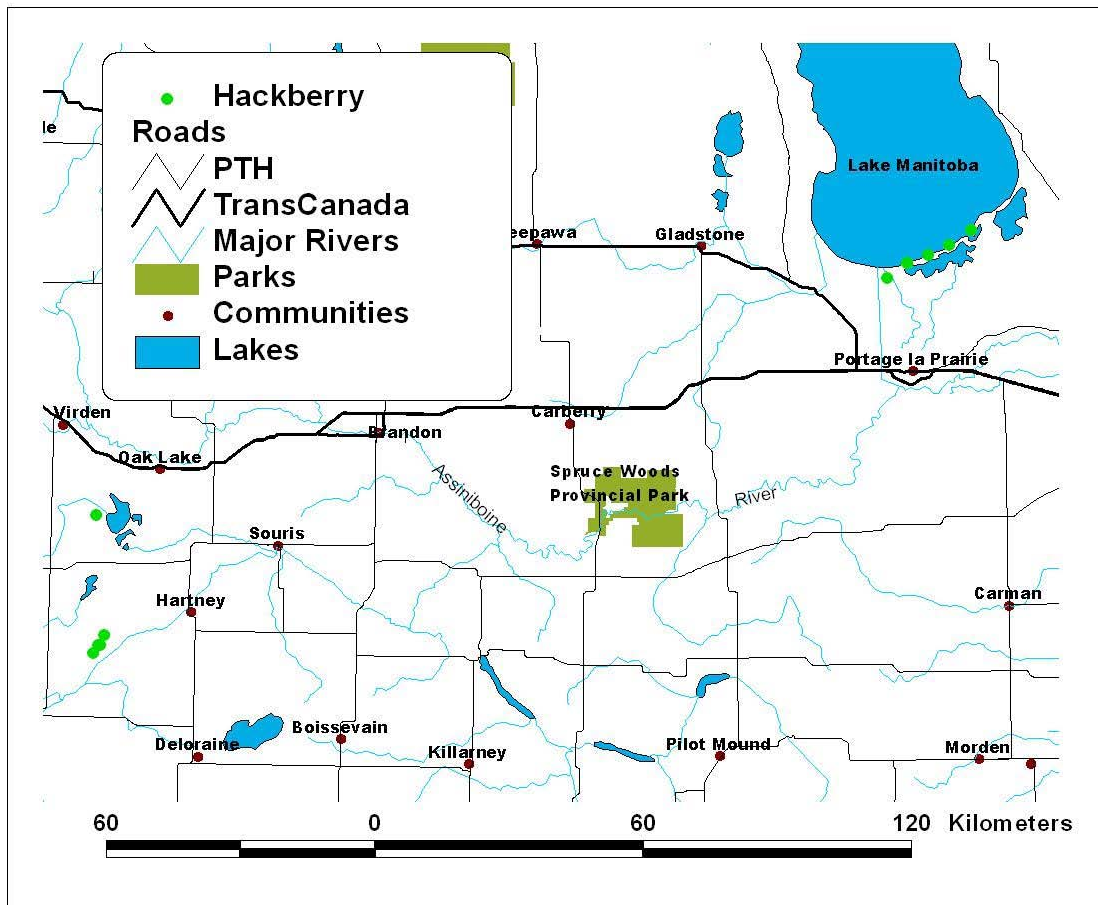


Figure 4. Known occurrences of hackberry (*Celtis occidentalis*) in Manitoba (Source: Reimer and Hamel 2003)

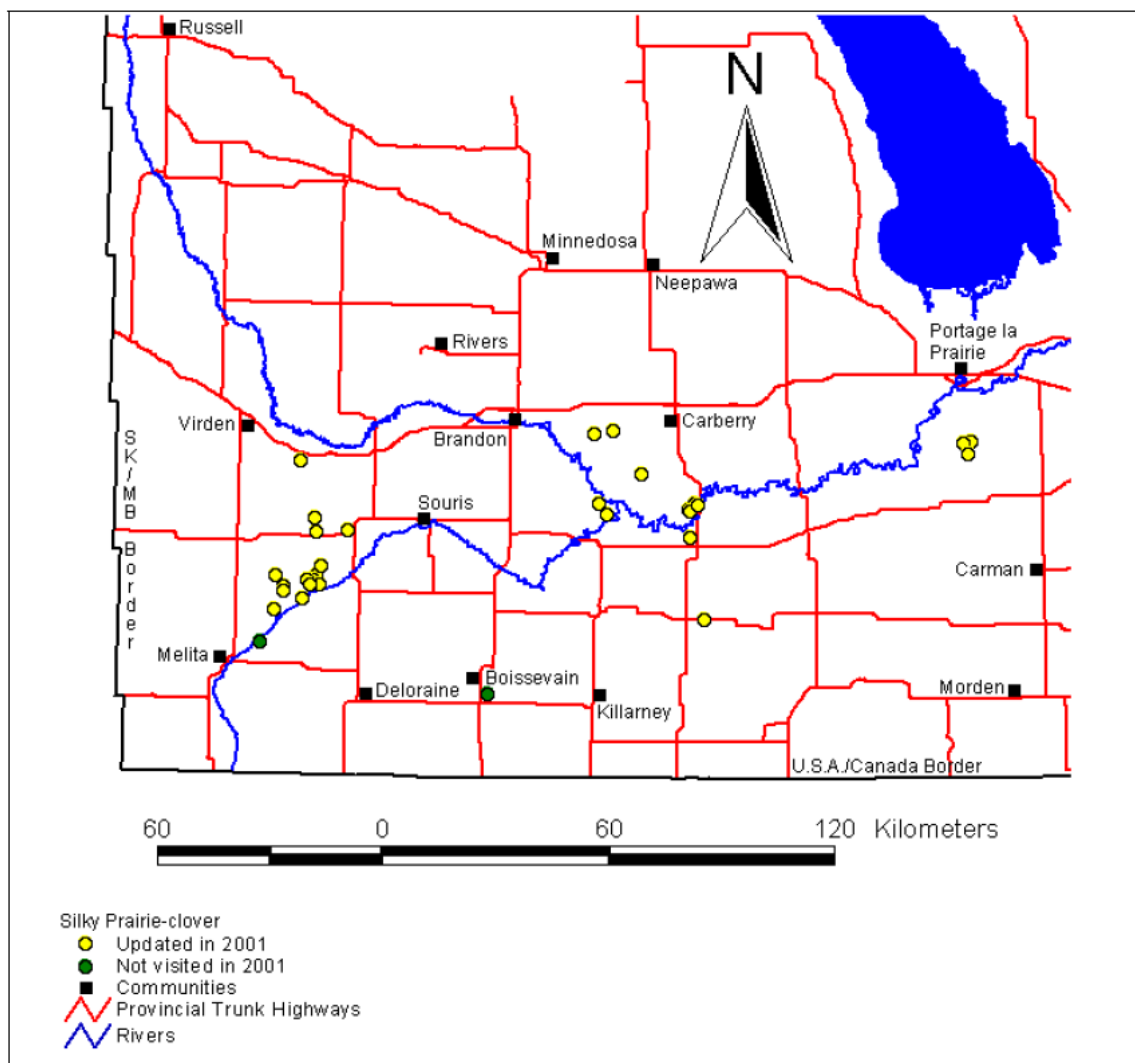


Figure 5. Known occurrences of hairy prairie-clover (*Dalea villosa*) in Manitoba (Source: Reimer and Hamel 2002).

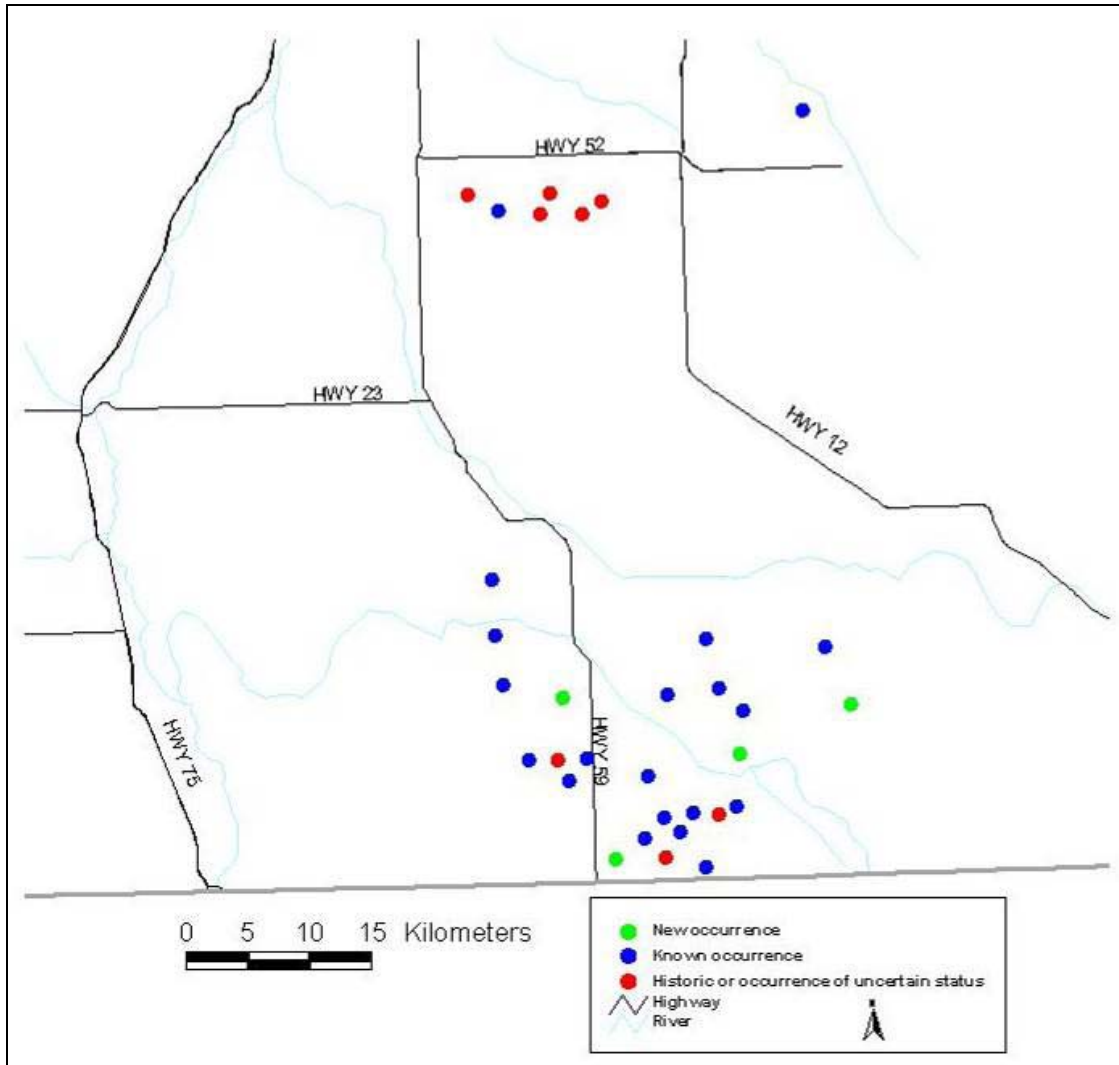


Figure 6. Known occurrences of Riddell's goldenrod (*Solidago riddellii*) in Manitoba (Source: Krause Danielsen and Friesen 2009)

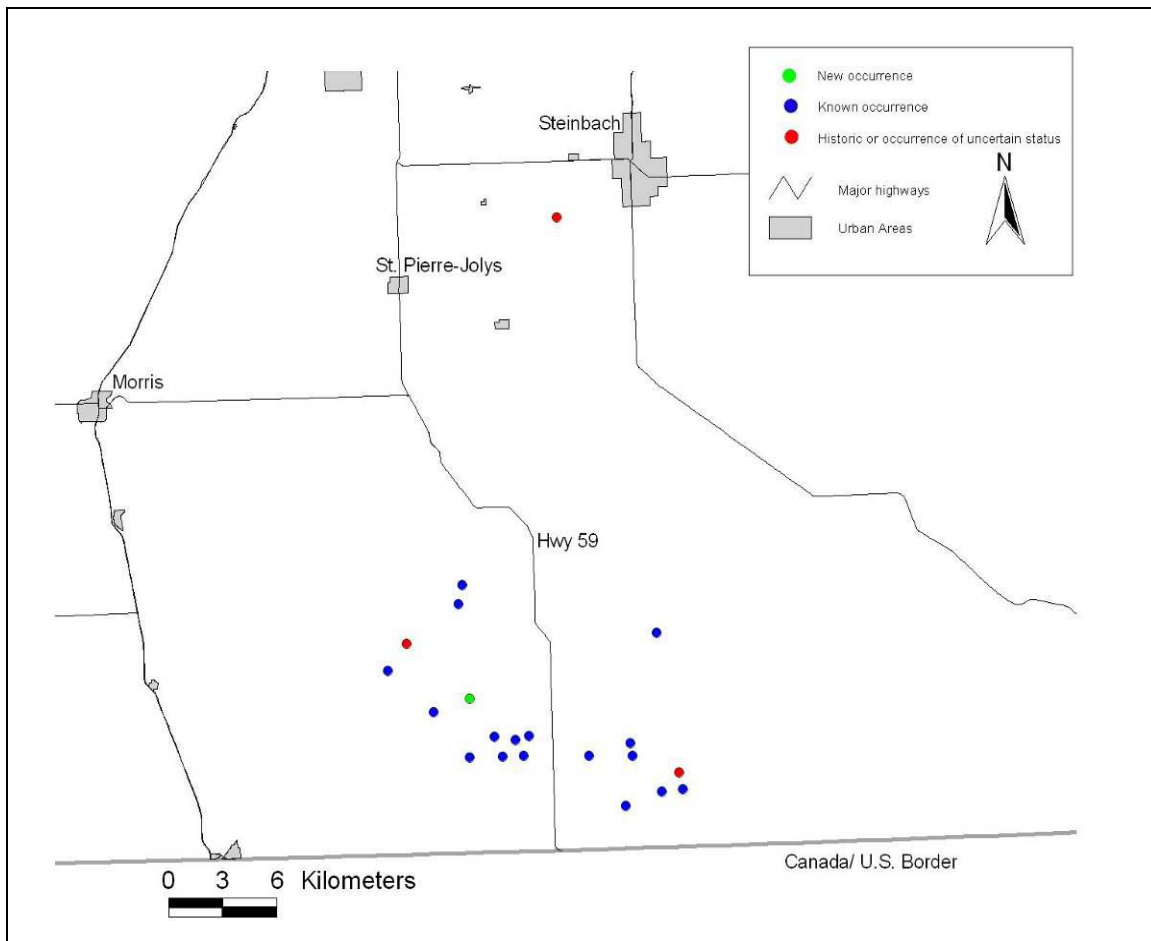


Figure 7. Known occurrences of Culver's-root (*Veronicastrum virginicum*) in Manitoba (Krause Danielsen and Friesen 2009).

APPENDIX E. Species of concern in the Project study area.

Table 1. Species of conservation concern known to occur in the Bipole III Project study area.

SCIENTIFIC NAME	COMMON NAME	GRANK	S RANK	MBESA	SARA	COSEWIC
Vascular Plants						
<i>Adoxa moschatellina</i>	Moschatel	G5	S1			
<i>Alisma gramineum</i>	Narrow-leaved Water-plantain	G5	S1			
<i>Anemone americana</i>	Liverleaf	G5T5	S1			
<i>Aristida purpurea</i> var. <i>longiseta</i>	Red Three-awn	G5T5?	S1			
<i>Asclepias lanuginosa</i>	Hairy Milkweed	G4?	S1			
<i>Astragalus neglectus</i>	Milkvetch	G4	S1			
<i>Botrychium campestre</i>	Prairie Moonwort	G3G4	S1			
<i>Botrychium matricariifolium</i>	Daisy-leaf Moonwort	G5	S1			
<i>Carex athrostachya</i>	Long-bracted Sedge	G5	S1			
<i>Carex cryptolepis</i>	Northeastern Sedge	G4	S1			
<i>Celtis occidentalis</i>	Hackberry	G5	S1	Th		
<i>Chamaesyce geyeri</i>	Prostrate Spurge	G5	S1			
<i>Chenopodium subglabrum</i>	Smooth Goosefoot	G3G4	S1		Th	Th
<i>Clematis ligusticifolia</i>	Western Virgin's-bower	G5	S1			
<i>Cyperus erythrorhizos</i>	Red-root Flatsedge	G5	S1			
<i>Cypripedium candidum</i>	Small White Lady's-slipper	G4	S1	E	E	E
<i>Elatine americana</i>	Mud-purslane	G4	S1			
<i>Eurybia macrophylla</i>	White Wood Aster	G5TNR	S1			
<i>Festuca subverticillata</i>	Nodding Fescue	G5	S1			
<i>Gymnocarpium robertianum</i>	Limestone Oak Fern	G5	S1			
<i>Lechea intermedia</i>	Pinweed	G5	S1			
<i>Listera auriculata</i>	Auricled Twayblade	G3G4	S1			
<i>Malaxis paludosa</i>	Bog Adder's-mouth	G4	S1			
<i>Mimulus glabratus</i>	Smooth Monkeyflower	G5	S1			
<i>Mimulus glabratus</i> var. <i>jamesii</i>	Smooth Monkeyflower	G5T5	S1			
<i>Muhlenbergia andina</i>	Foxtail Muhly	G4	S1			
<i>Oxytropis sericea</i>	Early Yellow Locoweed	G5	S1			
<i>Piptatherum canadense</i>	Canadian Rice-grass	G5	S1			
<i>Polanisia dodecandra</i> ssp. <i>dodecandra</i>	Clammyweed	G5T5?	S1			
<i>Polanisia dodecandra</i> ssp. <i>trachysperma</i>	Clammyweed	G5T5?	S1			
<i>Vernonia fasciculata</i> ssp. <i>corymbosa</i>	Western Ironweed	G5T3T5	S1			

SCIENTIFIC NAME	COMMON NAME	GRANK	S RANK	MBESA	SARA	COSEWIC
<i>Veronicastrum virginicum</i>	Culver's-root	G4	S1	Th		
<i>Wolffia columbiana</i>	Water-meal	G5	S1			
<i>Woodsia alpina</i>	Northern Woodsia	G4	S1			
<i>Woodsia oregana</i> ssp. <i>cathcartiana</i>	Large Woodsia	G5T5	S1			
<i>Carex garberi</i>	Elk Sedge	G5	S1?			
<i>Castilleja septentrionalis</i>	Labrador Indian-paintbrush	G5	S1?			
<i>Chrysosplenium iowense</i>	Iowa Golden-saxifrage	G3?	S1?			
<i>Penstemon procerus</i>	Slender Beard-tongue	G5	S1?			
<i>Poa arctica</i> ssp. <i>caespitans</i>	Blue-grass	G5	S1?			
<i>Achnatherum richardsonii</i>	Richardson Needle Grass	G5	S1S2			
<i>Agalinis aspera</i>	Rough Purple False-foxglove	G5	S1S2		E	E
<i>Ambrosia acanthicarpa</i>	Sandbur	G5	S1S2			
<i>Amorpha fruticosa</i>	False Indigo	G5	S1S2			
<i>Botrychium minganense</i>	Mingan Moonwort	G4	S1S2			
<i>Carex microptera</i>	Thick-spike Sedge	G5	S1S2			
<i>Penthorum sedoides</i>	Ditch-stonecrop	G5	S1S2			
<i>Ranunculus cymbalaria</i> var. <i>saximontanus</i>	Seaside Crowfoot	G5T5	S1S2			
<i>Shinnersoseris rostrata</i>	Annual Skeletonweed	G5?	S1S2			
<i>Achnatherum hymenoides</i>	Indian Rice Grass	G5	S2			
<i>Andropogon hallii</i>	Sand Bluestem	G4	S2			
<i>Arethusa bulbosa</i>	Arethusa	G4	S2			
<i>Arisaema triphyllum</i> ssp. <i>triphyllum</i>	Jack-in-the-pulpit	G5T5	S2			
<i>Artemisia tilesii</i>	Herriot's Sage	G5	S2			
<i>Asclepias verticillata</i>	Whorled Milkweed	G5	S2			
<i>Atriplex argentea</i>	Saltbrush	G5	S2			
<i>Blysmopsis rufa</i>	Red Bulrush	G5	S2			
<i>Bouteloua curtipendula</i>	Side-oats Grama	G5	S2			
<i>Calopogon tuberosus</i>	Swamp-pink	G5	S2			
<i>Carex cristatella</i>	Crested Sedge	G5	S2			
<i>Carex maritima</i>	Seaside Sedge	G4G5	S2			
<i>Carex michauxiana</i>	Long-fruited Sedge	G5	S2			
<i>Carex microglochin</i>	False Uncina Sedge	G5?	S2			
<i>Carex sterilis</i>	Dioecious Sedge	G4	S2			
<i>Carex tetanica</i>	Rigid Sedge	G4G5	S2			

SCIENTIFIC NAME	COMMON NAME	GRANK	S RANK	MBESA	SARA	COSEWIC
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	Large Enchanter's-nightshade	G5T5	S2			
<i>Clematis virginiana</i>	Virgin's-bower	G5	S2			
<i>Coryphantha vivipara</i>	Pincushion Cactus	G5	S2			
<i>Cryptotaenia canadensis</i>	Honewort	G5	S2			
<i>Cycloloma atriplicifolium</i>	Winged Pigseed	G5	S2			
<i>Cyperus houghtonii</i>	Houghton's Umbrella-sedge	G4?	S2			
<i>Cyperus schweinitzii</i>	Schweinitz's Flatsedge	G5	S2			
<i>Dalea villosa</i>	Hairy Prairie-clover	G5T5	S2	Th	Th	Th
<i>Desmodium canadense</i>	Beggar's-lice	G5	S2			
<i>Dichanthelium linearifolium</i>	White-haired Panic-grass	GNR	S2			
<i>Dichanthelium wilcoxianum</i>	Sand Millet	G5	S2			
<i>Elymus hystrix</i>	Bottle-brush Grass	G5	S2			
<i>Erigeron caespitosus</i>	Tufted Fleabane	G5	S2			
<i>Eriophorum callitrix</i>	Beautiful Cotton-grass	G5	S2			
<i>Gentiana puberulenta</i>	Downy Gentian	G4G5	S2			
<i>Glyceria pulchella</i>	Graceful Manna Grass	G5	S2			
<i>Helianthus nuttallii</i> ssp. <i>rydbergii</i>	Tuberous-rooted Sunflower	G5T5	S2			
<i>Heteranthera dubia</i>	Water Star-grass	G5	S2			
<i>Impatiens noli-tangere</i>	Western Jewelweed	G4G5	S2			
<i>Listera borealis</i>	Northern Twayblade	G4	S2			
<i>Lysimachia quadriflora</i>	Whorled Loosestrife	G5?	S2			
<i>Mertensia lanceolata</i>	Tall Lungwort	G5	S2			
<i>Milium effusum</i>	Millet Grass	G5	S2			
<i>Milium effusum</i> var. <i>cisatlanticum</i>	Millet Grass	G5TNR	S2			
<i>Musineon divaricatum</i>	Leafy Musineon	G5	S2			
<i>Nymphaea tetragona</i>	Small Water-lily	G5	S2			
<i>Orobanche ludoviciana</i>	Louisiana Broom-rape	G5	S2			
<i>Osmorhiza claytonii</i>	Wooly or Hairy Sweet Cicely	G5	S2			
<i>Osmorhiza depauperata</i>	Blunt-fruited Sweet Cicely	G5	S2			
<i>Ostrya virginiana</i>	Hop-hornbeam	G5	S2			
<i>Pellaea glabella</i> ssp. <i>occidentalis</i>	Cliff-brake	G5T4	S2			
<i>Penstemon nitidus</i>	Smooth Blue Beard-tongue	G5	S2			
<i>Piptatherum micranthum</i>	Little-seed Rice Grass	G5	S2			
<i>Plantago maritima</i>	Seaside Plantain	G5	S2			

SCIENTIFIC NAME	COMMON NAME	GRANK	S RANK	MBESA	SARA	COSEWIC
<i>Poa fendleriana</i>	Mutton Grass	G5	S2			
<i>Polygala verticillata</i>	Whorled Milkwort	G5	S2			
<i>Polygala verticillata</i> var. <i>isocycla</i>	Whorled Milkwort	G5T5	S2			
<i>Potamogeton illinoensis</i>	Illinois Pondweed	G5	S2			
<i>Pyrola americana</i>	Round-leaved Pyrola	G5	S2			
<i>Ranunculus hispidus</i> var. <i>caricetorum</i>	Bristly Buttercup	G5T5	S2			
<i>Rhynchospora capillacea</i>	Horned Beakrush	G4	S2			
<i>Sanguinaria canadensis</i>	Blood-root	G5	S2			
<i>Selaginella selaginoides</i>	Northern Spike-moss	G5	S2			
<i>Solidago riddellii</i>	Riddell's Goldenrod	G5	S2	Th	SC	SC
<i>Symphyotrichum sericeum</i>	Western Silvery Aster	G5	S2			
<i>Thermopsis rhombifolia</i>	Golden Bean	G5	S2			
<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Pale Manna Grass	G5T4Q	S2			
<i>Townsendia exscapa</i>	Silky Townsend-daisy	G5	S2			
<i>Uvularia sessilifolia</i>	Small Bellwort	G5	S2			
<i>Vaccinium caespitosum</i>	Dwarf Bilberry	G5	S2			
<i>Viola selkirkii</i>	Long-spurred Violet	G5?	S2			
<i>Woodsia glabella</i>	Smooth Woodsia	G5	S2			
<i>Arabis lyrata</i>	Lyre-leaved Rock Cress	G5	S2?			
<i>Carex emoryi</i>	Emory's Sedge	G5	S2?			
<i>Carex projecta</i>	Necklace Sedge	G5	S2?			
<i>Carex supina</i> var. <i>spaniocarpa</i>	Weak Sedge	G5T3T5	S2?			
<i>Danthonia intermedia</i>	Timber Oat Grass	G5	S2?			
<i>Elymus diversiglumis</i>	Various-glumed Wild Rye	G3G4Q	S2?			
<i>Malaxis monophyllos</i>	White Adder's-mouth	G5	S2?			
<i>Potamogeton amplifolius</i>	Large-leaved Pondweed	G5	S2?			
<i>Agalinis tenuifolia</i>	Narrow-leaved Gerardia	G5	S2S3			
<i>Boltonia asteroides</i> var. <i>recognita</i>	White Boltonia	G5T3T5	S2S3			
<i>Carex flava</i>	Yellow Sedge	G5	S2S3			
<i>Cymopterus acaulis</i>	Plains Cymopterus	G5	S2S3			
<i>Cypripedium arietinum</i>	Ram's Head Lady's-slipper	G3	S2S3			
<i>Lomatogonium rotatum</i>	Marsh Felwort	G5	S2S3			
<i>Lotus unifoliolatus</i>	prarie trefoil	G5	S2S3			
<i>Thalictrum sparsiflorum</i>	Few-flowered Meadow-rue	G5	S2S3			

SCIENTIFIC NAME	COMMON NAME	GRANK	S RANK	MBESA	SARA	COSEWIC
<i>Asclepias viridiflora</i>	Green Milkweed	G5	S3			
<i>Botrychium multifidum</i>	Leathery Grape-fern	G5	S3			
<i>Calamagrostis montanensis</i>	Plains Reed Grass	G5	S3			
<i>Carex castanea</i>	Chestnut Sedge	G5	S3			
<i>Carex hallii</i>	Hall's Sedge	G4?Q	S3			
<i>Carex livida</i>	Livid Sedge	G5	S3			
<i>Carex pauciflora</i>	Few -flowered Sedge	G5	S3			
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	G5	S3			
<i>Drosera anglica</i>	Oblong-leaved Sundew	G5	S3			
<i>Eriogonum flavum</i>	Yellow Eriogonum	G5	S3			
<i>Festuca hallii</i>	Plains Rough Fescue	G4	S3			
<i>Hudsonia tomentosa</i>	False Heather	G5	S3			
<i>Hypoxis hirsuta</i>	Yellow Stargrass	G5	S3			
<i>Leucophysalis grandiflora</i>	Large White-flowered Ground-cherry	G4?	S3			
<i>Linum sulcatum</i>	Grooved Yellow Flax	G5	S3			
<i>Lomatium macrocarpum</i>	Long-fruited Parsley	G5	S3			
<i>Menispermum canadense</i>	Moonseed	G5	S3			
<i>Nassella viridula</i>	Green Needle Grass	G5	S3			
<i>Phlox hoodii</i>	Moss Pink	G5	S3			
<i>Phryma leptostachya</i>	Lopseed	G5	S3			
<i>Platanthera orbiculata</i>	Round-leaved Bog Orchid	G5	S3			
<i>Potamogeton strictifolius</i>	Straightleaf Pondweed	G5	S3			
<i>Ruppia cirrhosa</i>	Widgeon-grass	G5	S3			
<i>Tripleurospermum maritimum</i>	False mayweed	G5	S3			
<i>Utricularia minor</i>	Lesser Bladderwort	G5	S3			
<i>Verbena bracteata</i>	Bracted Vervain	G5	S3			
<i>Asarum canadense</i>	Wild Ginger	G5	S3?			
<i>Bromus porteri</i>	Porter's Chess	G5	S3?			
<i>Carex douglasii</i>	Douglas Sedge	G5	S3?			
<i>Carex hystericina</i>	Porcupine Sedge	G5	S3?			
<i>Carex oligosperma</i>	Few-fruited Sedge	G5?	S3?			
<i>Carex parryana</i>	Parry's Sedge	G4	S3?			
<i>Carex pedunculata</i>	Stalked Sedge	G5	S3?			
<i>Carex vulpinoidea</i>	Fox Sedge	G5	S3?			

SCIENTIFIC NAME	COMMON NAME	GRANK	S RANK	MBESA	SARA	COSEWIC
<i>Leersia oryzoides</i>	Rice Cutgrass	G5	S3?			
<i>Oxytropis deflexa</i>	Reflexed Locoweed	G5	S3?			
<i>Rhynchospora alba</i>	White Beakrush	G5	S3?			
<i>Sporobolus neglectus</i>	Annual Dropseed	G5	S3?			
<i>Triadenum fraseri</i>	Marsh St. John's-wort	G5	S3?			
<i>Viola conspersa</i>	Dog Violet	G5	S3?			
<i>Carex adusta</i>	Browned Sedge	G5	S3S4			
<i>Carex alopecoidea</i>	Foxtail Sedge	G5	S3S4			
<i>Carex assiniboinensis</i>	Assiniboia Sedge	G4G5	S3S4			
<i>Carex crawei</i>	Crawe's Sedge	G5	S3S4			
<i>Corallorhiza striata</i>	Striped Coralroot	G5	S3S4			
<i>Dryopteris fragrans</i>	Fragrant Shield Fern	G5	S3S4			
<i>Gymnocarpium jessoense</i>	Northern Oak Fern	G5	S3S4			
<i>Liparis loeselii</i>	Yellow Twayblade	G5	S3S4			
<i>Botrychium pallidum</i>	Pale Moonwort	G3	SH			
<i>Cardamine bulbosa</i>	Spring Cress	G5	SH			
<i>Carex bicknellii</i>	Bicknell's Sedge	G5	SH			
<i>Lactuca floridana</i>	Woodland Lettuce	G5	SH			
<i>Bidens amplissima</i>	Beggar-ticks	G3	SNA			
<i>Bromus pubescens</i>	Canada Brome Grass	G5	SNA			
<i>Carex albicans</i> var. <i>albicans</i>	Bellow-beaked Sedge	G5T4T5	SNA			
<i>Carex communis</i>	Fibrous-rooted Sedge	G5	SNA			
<i>Carex normalis</i>	Larger Straw Sedge	G5	SNA			
<i>Carex tribuloides</i>	Prickly Sedge	G5	SNA			
<i>Erigeron annuus</i>	White-top Fleabane	G5	SNA			
<i>Lemna minor</i>	Lesser Duckweed	G5	SNA			
<i>Arabis arenicola</i> var. <i>pubescens</i>	Arctic Rock Cress	G4G5T3?Q	SU			
<i>Cuscuta pentagona</i> var. <i>pentagona</i>	Dodder	G5T5	SU			
<i>Draba reptans</i>	Creeping Whitlow-grass	G5	SU			
<i>Galium aparine</i>	Cleavers	G5	SU			
<i>Helianthus pauciflorus</i> ssp. <i>pauciflorus</i>	Stiff Sunflower	G5T5?	SU			
<i>Orobanche uniflora</i>	One-flowered Broom-rape	G5	SU			
<i>Physostegia parviflora</i>	Dragonhead	G4G5	SU			
<i>Sisyrinchium campestre</i>	White-eyed Grass	G5	SU			

SCIENTIFIC NAME	COMMON NAME	GRANK	S RANK	MBESA	SARA	COSEWIC
<i>Solidago simplex</i>	Sticky Goldenrod	G5	SU			
<i>Symphyotrichum robynsianum</i>	Robyns's Aster	G4G5	SU			
Non Vascular Plants						
<i>Leptogium rivulare</i>	Flooded jellyskin	G3G5	SNR			Th
Terrestrial Communities						
<i>Andropogon gerardii</i> - <i>Sporobolus heterolepis</i> - <i>Andropogon scoparius</i> herbaceous vegetation	Big Bluestem-Prairie Dropseed-little Bluestem herbaceous vegetation	GNR	S1			
<i>Festuca hallii</i> -(<i>Stipa</i> spp.) herbaceous vegetation	Plains Rough Fescue-(Spear Grass) herbaceous vegetation	GNR	S1			
<i>Distichlis stricta</i> - <i>Hordeum jubatum</i> - <i>Puccinellia nuttalliana</i> - <i>Plantago maritima</i> saline herbaceous vegetation	Alkali Grass-Wild Barley-Nuttall's Salt Meadow Grass-Seaside Plantain saline herbaceous vegetation	GNR	S2			
<i>Fraxinus pennsylvanica</i> - <i>Ulmus americana</i> -(<i>Celtis occidentalis</i> , <i>Tilia americana</i>) forest	Green Ash-American Elm-(Hackberry, Basswood) forest	GNR	S2			
<i>Andropogon scoparius</i> - <i>Bouteloua</i> spp. (<i>curtipendula</i> , <i>gracilis</i>)- <i>Carex filifolia</i> herbaceous vegetation	Little Bluestem-Grama Grass (Blue, Side-oats)-Thread-leaved Sedge herbaceous vegetation	GNR	S3			
<i>Fraxinus pennsylvanica</i> -(<i>Ulmus americana</i>)- <i>Acer negundo</i> forest	Green Ash-(American Elm)-Manitoba Maple forest	GNR	S3			
<i>Stipa comata</i> - <i>Bouteloua gracilis</i> - <i>Carex filifolia</i> herbaceous vegetation	Needle-and-thread-Blue Grama-Thread-leaved Sedge herbaceous vegetation	GNR	S3			
<i>Phragmites australis</i> herbaceous vegetation	Common Reed herbaceous vegetation	GNR	S3?			
<i>Quercus macrocarpa</i> - <i>Amelanchier alnifolia</i> - <i>Aralia nudicaulis</i> - <i>Carex assiniboensis</i> forest	Bur Oak/Saskatoon Serviceberry/Sarsaparilla-Assiniboia Sedge forest	GNR	S3?			
<i>Populus tremuloides</i> - <i>Quercus macrocarpa</i> - <i>Aralia nudicaulis</i> forest	Trembling Aspen-Bur Oak/Sarsaparilla forest	GNR	S3S4			
<i>Salix exigua</i> shrubland	Sandbar Willow shrubland	GNR	S3S4			
<i>Scolochloa festuacea</i> herbaceous vegetation	Sprangletop herbaceous vegetation	GNR	S3S4			

Note: Plant information obtained from Manitoba Conservation; G (global), S (provincial), Rank 1 (very rare), Rank 2 (rare), Rank 3 (uncommon), Rank 4 (widespread), Rank 5 (demonstrably widespread), GNR/SNR (species not ranked), SNA (rank not applicable), SH (historically known), SU (possibly in peril), E (endangered), Th (threatened), SC (special concern), ? (inexact or uncertain), T (rank for subspecific taxon), Q (taxonomic questions involved).

APPENDIX F. Plot and site location information.

This appendix includes the following tables:

- Table 1. Coordinates of plots established along the preliminary preferred route.
- Table 2. Community types and locations of plots sampled in the Hudson Bay Lowland Ecoregion.
- Table 3. Community types and locations of plots sampled in the Selwyn Lake Upland Ecoregion.
- Table 4. Community types and locations of plots sampled in the Churchill River Upland Ecoregion.
- Table 5. Community types and locations of plots sampled in the Hayes River Upland Ecoregion.
- Table 6. Community types and locations of plots sampled in the Mid-Boreal Lowland Ecoregion.
- Table 7. Community types and locations of plots sampled in the Interlake Plain Ecoregion.
- Table 8. Community types and locations of plots sampled in the Lake Manitoba Plain Ecoregion.
- Table 9. Coordinates of sites established along the preliminary preferred route.

Table 1. Coordinates of plots established along the preliminary preferred route.

Plot	Easting	Northing	Ecoregion
HBL1	811933	6295357	Hudson Bay Lowland
HBL2	796605	6295245	Hudson Bay Lowland
HBL3	784691	6293245	Hudson Bay Lowland
HBL4	780099	6292044	Hudson Bay Lowland
HBL5	778089	6291450	Hudson Bay Lowland
HBL6	769745	6291264	Hudson Bay Lowland
HBL7	765100	6288903	Hudson Bay Lowland
HBL8	763724	6287274	Hudson Bay Lowland
HBL9	816050	6291691	Hudson Bay Lowland
HBL10	775695	6291727	Hudson Bay Lowland
SLU11	766306	6291501	Selwyn Lake Upland
SLU12	762931	6287717	Selwyn Lake Upland
SLU13	759924	6286365	Selwyn Lake Upland
CRU14	729198	6276879	Churchill River Upland
CRU15	670292	6248096	Churchill River Upland
CRU16	650691	6242342	Churchill River Upland
CRU17	646988	6239245	Churchill River Upland
CRU18	639601	6234046	Churchill River Upland
CRU19	629762	6228623	Churchill River Upland
CRU20	627822	6225579	Churchill River Upland
CRU21	622255	6217039	Churchill River Upland
CRU22	617799	6210421	Churchill River Upland
CRU23	619190	6210875	Churchill River Upland
CRU24	621588	6215142	Churchill River Upland
CRU25	493093	6056475	Churchill River Upland
CRU26	489798	6055237	Churchill River Upland
CRU27	484202	6052820	Churchill River Upland
CRU28	479278	6050143	Churchill River Upland
CRU29	479079	6050111	Churchill River Upland
HRU30	741859	6280017	Hayes River Upland
HRU31	731629	6276120	Hayes River Upland
HRU32	724198	6272008	Hayes River Upland
HRU33	717945	6267500	Hayes River Upland
HRU34	709229	6264466	Hayes River Upland
HRU35	710473	6269099	Hayes River Upland
HRU36	690597	6255635	Hayes River Upland
HRU37	683595	6253897	Hayes River Upland
HRU38	680894	6250938	Hayes River Upland
HRU39	610391	6200059	Hayes River Upland
HRU40	596354	6184262	Hayes River Upland
HRU41	596786	6182592	Hayes River Upland

Plot	Easting	Northing	Ecoregion
HRU42	594322	6176771	Hayes River Upland
HRU43	586772	6152182	Hayes River Upland
HRU44	567977	6138336	Hayes River Upland
HRU45	562125	6132846	Hayes River Upland
HRU46	548407	6117953	Hayes River Upland
HRU47	548655	6117887	Hayes River Upland
HRU48	539649	6109422	Hayes River Upland
HRU49	532865	6101088	Hayes River Upland
HRU50	529234	6095150	Hayes River Upland
HRU51	528793	6079796	Hayes River Upland
HRU52	524912	6074610	Hayes River Upland
HRU53	515914	6071294	Hayes River Upland
HRU54	510787	6068410	Hayes River Upland
HRU55	508285	6064970	Hayes River Upland
HRU56	506381	6061250	Hayes River Upland
MBL57	380100	5988639	Mid-Boreal Lowland
MBL58	390410	5998905	Mid-Boreal Lowland
MBL59	399767	6003652	Mid-Boreal Lowland
MBL60	403090	6005247	Mid-Boreal Lowland
MBL61	410533	6009606	Mid-Boreal Lowland
MBL62	411507	6011003	Mid-Boreal Lowland
MBL63	357878	5939002	Mid-Boreal Lowland
MBL64	355315	5955554	Mid-Boreal Lowland
MBL65	383104	5991548	Mid-Boreal Lowland
MBL66	385073	5994327	Mid-Boreal Lowland
MBL67	387168	5996792	Mid-Boreal Lowland
MBL68	356649	5947953	Mid-Boreal Lowland
MBL69	358790	5933246	Mid-Boreal Lowland
MBL70	358798	5933100	Mid-Boreal Lowland
MBL71	362218	5914747	Mid-Boreal Lowland
MBL72	360601	5898149	Mid-Boreal Lowland
MBL73	419659	6019935	Mid-Boreal Lowland
MBL74	434699	6031709	Mid-Boreal Lowland
MBL75	452134	6040890	Mid-Boreal Lowland
MBL76	473127	6048347	Mid-Boreal Lowland
IP77	383342	5773278	Interlake Plain
IP78	363699	5862298	Interlake Plain
IP79	362282	5852445	Interlake Plain
IP80	415017	5736167	Interlake Plain
IP81	415429	5737367	Interlake Plain
IP82	411574	5739472	Interlake Plain
IP83	411539	5742025	Interlake Plain
IP84	401561	5759207	Interlake Plain

Plot	Easting	Northing	Ecoregion
IP85	392985	5765271	Interlake Plain
IP86	386887	5769434	Interlake Plain
IP87	383700	5772934	Interlake Plain
IP88	367994	5822438	Interlake Plain
IP89	368379	5828461	Interlake Plain
IP90	361510	5858660	Interlake Plain
IP91	361458	5853833	Interlake Plain
IP92	362542	5851787	Interlake Plain
IP93	363229	5852073	Interlake Plain
IP94	364016	5864827	Interlake Plain
IP95	364006	5865638	Interlake Plain
IP96	362926	5862641	Interlake Plain
LMP97	452451	5703301	Lake Manitoba Plain
LMP98	513619	5604609	Lake Manitoba Plain
LMP99	519408	5591557	Lake Manitoba Plain
LMP100	532537	5536044	Lake Manitoba Plain
LMP101	567430	5497905	Lake Manitoba Plain
LMP102	564690	5497703	Lake Manitoba Plain
LMP103	552081	5497177	Lake Manitoba Plain
LMP104	539941	5498922	Lake Manitoba Plain
LMP105	539752	5498345	Lake Manitoba Plain
LMP106	489601	5657304	Lake Manitoba Plain
LMP107	520735	5588297	Lake Manitoba Plain
LMP108	520559	5585310	Lake Manitoba Plain
LMP109	520553	5585157	Lake Manitoba Plain
LMP110	485328	5668581	Lake Manitoba Plain
LMP111	466956	5693360	Lake Manitoba Plain
LMP112	497809	5642460	Lake Manitoba Plain
LMP113	502355	5634934	Lake Manitoba Plain
LMP114	503443	5631910	Lake Manitoba Plain
LMP115	520728	5576762	Lake Manitoba Plain
LMP116	520764	5576779	Lake Manitoba Plain
LMP117	520529	5575820	Lake Manitoba Plain
LMP118	520549	5575503	Lake Manitoba Plain
LMP119	520487	5575364	Lake Manitoba Plain

Datum NAD 83, Zone 14U

Table 2. Community types and locations of plots sampled in the Hudson Bay Lowland Ecoregion.

Community Type	Plot	Easting	Northing
Coniferous Forest			
1. Open Black Spruce—Coniferous/ Schreber's Moss	HBL9	816050	6291691
1. Open Black Spruce—Coniferous/ Schreber's Moss	HBL6	769745	6291264
1. Open Black Spruce—Coniferous/ Schreber's Moss	HBL5	778089	6291450
2. Open Black Spruce—Coniferous/ Reindeer Lichen—Peat Moss	HBL10	775695	6291727
2. Open Black Spruce—Coniferous/ Reindeer Lichen—Peat Moss	HBL3	784691	6293245
2. Open Black Spruce—Coniferous/ Reindeer Lichen—Peat Moss	HBL2	796605	6295245
3. Regenerating Open Jack Pine—Black Spruce	HBL8	763724	6287274
3. Regenerating Open Jack Pine—Black Spruce	HBL7	765100	6288903
Wetland			
4. Treed Black Spruce Bog	HBL4	780099	6292044
4. Treed Black Spruce Bog	HBL1	811933	6295357

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Table 3. Community types and locations of plots sampled in the Selwyn Lake Upland Ecoregion.

Community Types	Plot	Easting	Northing
Coniferous Forest			
1. Open Black Spruce—Coniferous/ Splendid Feather Moss	SLU13	759924	6286365
2. Regenerating Jack Pine/ Tall Shrub	SLU12	762931	6287717
Wetland			
3. Sedge Fen	SLU11	766306	6291501

Datum NAD 83, Zone 14U

Table 4. Community types and locations of plots sampled in the Churchill River Upland Ecoregion.

Community Type	Plot	Easting	Northing
Coniferous Forest			
1. Open Black Spruce/ Schreber's Moss	CRU29	479079	6050111
1. Open Black Spruce/ Schreber's Moss	CRU26	489798	6055237
1. Open Black Spruce/ Schreber's Moss	CRU24	621588	6215142
1. Open Black Spruce/ Schreber's Moss	CRU22	617799	6210421
1. Open Black Spruce/ Schreber's Moss	CRU17	646988	6239245
2. Open Jack Pine–Black Spruce/ Splendid Feather Moss	CRU25	493093	6056475
2. Open Jack Pine– Black Spruce/ Splendid Feather Moss	CRU23	619190	6210875
3. Sparse Black Spruce/ Labrador Tea	CRU21	622255	6217039
3. Sparse Black Spruce/ Labrador Tea	CRU19	629762	6228623
3. Sparse Black Spruce/ Labrador Tea	CRU18	639601	6234046
3. Sparse Black Spruce/ Labrador Tea	CRU15	670292	6248096
Mixed Forest			
4. Open Trembling Aspen Mixed/ Green Reindeer Lichen	CRU28	479278	6050143
Wetland			
5. Treed Black Spruce Bog	CRU27	484202	6052820
5. Treed Black Spruce Bog	CRU20	627822	6225579
6. Willow Riparian	CRU16	650691	6242342
7. Sedge Fen	CRU14	729198	6276879

Datum NAD 83, Zone 14U

Table 5. Community types and locations of plots sampled in the Hayes River Upland Ecoregion.

Community Type	Plot	Easting	Northing
Coniferous Forest			
1. Open Black Spruce/ Labrador Tea/ Schreber's Moss	HRU53	515914	6071294
1. Open Black Spruce/ Labrador Tea/ Schreber's Moss	HRU48	539649	6109422
1. Open Black Spruce/ Labrador Tea/ Schreber's Moss	HRU40	596354	6184262
2. Open Black Spruce/ Labrador Tea/ Reindeer Lichen	HRU36	690597	6255635
2. Open Black Spruce/ Labrador Tea/ Reindeer Lichen	HRU32	724198	6272008
3. Sparse Black Spruce/ Reindeer Lichen	HRU34	709229	6264466
3. Sparse Black Spruce/ Reindeer Lichen	HRU33	717945	6267500
4. Sparse Black Spruce—Jack Pine/ Green Reindeer Lichen	HRU55	508285	6064970
4. Sparse Black Spruce—Jack Pine/ Green Reindeer Lichen	HRU54	510787	6068410
4. Sparse Black Spruce—Jack Pine/ Green Reindeer Lichen	HRU49	532865	6101088
5. Open Tamarack—Black Spruce/ Peat Moss	HRU39	610391	6200059
6. Regenerating Open Conifer	HRU51	528793	6079796
6. Regenerating Open Conifer	HRU46	548407	6117953
6. Regenerating Open Conifer	HRU43	586772	6152182
Mixed Forest			
7. Closed Trembling Aspen Mixed	HRU52	524912	6074610
7. Closed Trembling Aspen Mixed	HRU44	567977	6138336
8. Trembling Aspen Mixed/ Green Alder	HRU42	594322	6176771
8. Trembling Aspen Mixed/ Green Alder	HRU41	596786	6182592
9. Closed White Spruce—Balsam Poplar	HRU35	710473	6269099
10. Treeless Regenerating Jack Pine Mixed	HRU37	683595	6253897
Deciduous Forest			
11. Closed White Birch	HRU31	731629	6276120
Wetland			
12. Graminoid Wetland	HRU56	506381	6061250
12. Graminoid Wetland	HRU45	562125	6132846
13. Treed Black Spruce/ Peat Moss Bog	HRU50	529234	6095150
13. Treed Black Spruce/ Peat Moss Bog	HRU47	548655	6117887
13. Treed Black Spruce/ Peat Moss Bog	HRU38	680894	6250938
13. Treed Black Spruce/ Peat Moss Bog	HRU30	741859	6280017

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Table 6. Community types and locations of plots sampled in the Mid-Boreal Lowland Ecoregion.

Community Type	Plot	Easting	Northing
Coniferous Forest			
1. Jack Pine/Green Reindeer Lichen	MBL71	362218	5914747
1. Jack Pine/Green Reindeer Lichen	MBL62	411507	6011003
1. Jack Pine/Green Reindeer Lichen	MBL61	410533	6009606
2. Regenerating Jack Pine	MBL75	452134	6040890
2. Regenerating Jack Pine	MBL74	434699	6031709
3. Black Spruce-Tamarack/Labrador Tea-Common Horsetail/Feathermoss	MBL72	360601	5898149
4. Black Spruce/Stair-Step Moss	MBL57	380100	5988639
5. Tamarack/Speckled Alder/Peat Moss	MBL76	473127	6048347
Mixed Forest			
6. Jack Pine-White Spruce-Trembling Aspen/Common Juniper/Feathermoss	MBL73	419659	6019935
6. Jack Pine-White Spruce-Trembling Aspen/Common Juniper/Feathermoss	MBL67	387168	5996792
6. Jack Pine-White Spruce-Trembling Aspen/Common Juniper/Feathermoss	MBL65	383104	5991548
Wetland			
7. Wet Sedge Meadow	MBL70	358798	5933100
7. Wet Sedge Meadow	MBL68	356649	5947953
7. Wet Sedge Meadow	MBL59	399767	6003652
8. Treed Black Spruce-Tamarack/ Peat Moss Bog	MBL60	403090	6005247
8. Treed Black Spruce-Tamarack/ Peat Moss Bog	MBL58	390410	5998905
9. Sparse Black Spruce/Labrador Tea/Peat Moss-Feathermoss	MBL69	358790	5933246
9. Sparse Black Spruce/Labrador Tea/Peat Moss-Feathermoss	MBL66	385073	5994327
9. Sparse Black Spruce/Labrador Tea/Peat Moss-Feathermoss	MBL64	355315	5955554
9. Sparse Black Spruce/Labrador Tea/Peat Moss-Feathermoss	MBL63	357878	5939002

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Table 7. Community types and locations of plots sampled in the Interlake Plain Ecoregion.

Community Type	Plot	Easting	Northing
Coniferous Forest			
1. Closed Black Spruce-Coniferous	IP95	364006	5865638
1. Closed Black Spruce-Coniferous	IP92	362542	5851787
1. Closed Black Spruce-Coniferous	IP90	361510	5858660
1. Closed Black Spruce-Coniferous	IP85	392985	5765271
1. Closed Black Spruce-Coniferous	IP79	362282	5852445
1. Closed Black Spruce-Coniferous	IP77	383342	5773278
Mixed Forest			
2. Open Trembling Aspen-Mixed/Tall Shrub	IP93	363229	5852073
2. Open Trembling Aspen-Mixed/Tall Shrub	IP86	386887	5769434
2. Open Trembling Aspen-Mixed/Tall Shrub	IP82	411574	5739472
2. Open Trembling Aspen-Mixed/Tall Shrub	IP81	415429	5737367
2. Open Trembling Aspen-Mixed/Tall Shrub	IP80	415017	5736167
3. Closed Deciduous-Mixed	IP94	364016	5864827
3. Closed Deciduous-Mixed	IP91	361458	5853833
3. Closed Deciduous-Mixed	IP89	368379	5828461
3. Closed Deciduous-Mixed	IP87	383700	5772934
3. Closed Deciduous-Mixed	IP78	363699	5862298
4. Closed Deciduous/Tall Shrub	IP88	367994	5822438
4. Closed Deciduous/Tall Shrub	IP84	401561	5759207
4. Closed Deciduous/Tall Shrub	IP83	411539	5742025
Wetland			
5. Salt Marsh	IP96	362926	5862641

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Table 8. Community types and locations of plots sampled in the Lake Manitoba Plain Ecoregion.

Community Type	Plot	Easting	Northing
Deciduous Forests			
1. Sparse Trembling Aspen-Balsam Poplar	LMP 110	485328	5668581
1. Sparse Trembling Aspen-Balsam Poplar	LMP 107	520735	5588297
1. Sparse Trembling Aspen-Balsam Poplar	LMP 106	489601	5657304
2. Closed Trembling Aspen/Bluegrass	LMP 118	520549	5575503
2. Closed Trembling Aspen/Bluegrass	LMP 115	520728	5576762
2. Closed Trembling Aspen/Bluegrass	LMP 114	503443	5631910
3. Open Trembling Aspen-Bur Oak/Tall Shrub	LMP 113	502355	5634934
3. Open Trembling Aspen-Bur Oak/Tall Shrub	LMP 105	539752	5498345
4. Closed Bur Oak	LMP 102	564690	5497703
4. Closed Bur Oak	LMP 100	532537	5536044
Grasslands			
5. Mixed Grass	LMP 117	520529	5575820
5. Mixed Grass	LMP 116	520764	5576779
5. Mixed Grass	LMP 109	520553	5585157
5. Mixed Grass	LMP 108	520559	5585310
5. Mixed Grass	LMP 104	539941	5498922
5. Mixed Grass	LMP 99	519408	5591557
Wetlands			
6. Sedge Wetland	LMP 119	520487	5575364
6. Sedge Wetland	LMP 112	497809	5642460
6. Sedge Wetland	LMP 111	466956	5693360
6. Sedge Wetland	LMP 98	513619	5604609
6. Sedge Wetland	LMP 97	452451	5703301
7a. Cattail-Soft-Stem Bulrush Wetland	LMP 101	567430	5497905
7b. Reed Canary Grass Wetland	LMP 103	552081	5497177

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Table 9. Coordinates of sites visited along the preliminary preferred route.

Site	Easting	Northing	Ecoregion
1	654965	5525156	Lake Manitoba Plain
2	661614	5525565	Lake Manitoba Plain
3	653946	5491771	Lake Manitoba Plain
4	659561	5493712	Lake Manitoba Plain
5	667125	5511130	Lake Manitoba Plain
6	637953	5491319	Lake Manitoba Plain
7	635410	5488261	Lake Manitoba Plain
8	634219	5489109	Lake Manitoba Plain
9	629700	5489448	Lake Manitoba Plain
10	567563	5498569	Lake Manitoba Plain
11	566570	5498544	Lake Manitoba Plain
12	562727	5498458	Lake Manitoba Plain
13	559167	5496687	Lake Manitoba Plain
14	553759	5496561	Lake Manitoba Plain
15	553539	5496684	Lake Manitoba Plain
16	552133	5496754	Lake Manitoba Plain
17	545271	5496689	Lake Manitoba Plain
18	542540	5498310	Lake Manitoba Plain
19	539709	5498295	Lake Manitoba Plain
20	539708	5503205	Lake Manitoba Plain
21	537827	5504832	Lake Manitoba Plain
22	538873	5510006	Lake Manitoba Plain
23	536889	5509761	Lake Manitoba Plain
24	536575	5509746	Lake Manitoba Plain
25	529856	5514582	Lake Manitoba Plain
26	532050	5512333	Lake Manitoba Plain
27	532046	5512477	Lake Manitoba Plain
28	532015	5512681	Lake Manitoba Plain
29	531932	5512924	Lake Manitoba Plain
30	529822	5516234	Lake Manitoba Plain
31	529670	5526137	Lake Manitoba Plain
32	529810	5529379	Lake Manitoba Plain
33	529916	5530394	Lake Manitoba Plain
34	531533	5532661	Lake Manitoba Plain
35	521510	5555822	Lake Manitoba Plain
36	521448	5555969	Lake Manitoba Plain
37	521811	5563905	Lake Manitoba Plain
38	520946	5565441	Lake Manitoba Plain
39	520830	5581799	Lake Manitoba Plain
40	539317	5501561	Lake Manitoba Plain
41	511722	5608984	Lake Manitoba Plain

Site	Easting	Northing	Ecoregion
42	517679	5594951	Lake Manitoba Plain
43	507706	5617890	Lake Manitoba Plain
44	488401	5658883	Lake Manitoba Plain
45	491839	5653988	Lake Manitoba Plain
46	493729	5653999	Lake Manitoba Plain
47	507696	5617890	Lake Manitoba Plain
48	529929	5529144	Lake Manitoba Plain
49	529957	5514555	Lake Manitoba Plain
50	539447	5502385	Lake Manitoba Plain
51	536565	5509606	Lake Manitoba Plain
52	521421	5562137	Lake Manitoba Plain
53	434769	5718100	Interlake Plain
54	397903	5761869	Interlake Plain

Note: Sites visited along the preliminary preferred route include locations that had the potential to support species of concern, areas where land owner permission was not provided but roadside assessments were completed for species of concern, or areas that were non-homogeneous or overgrazed to establish plots but were assessed for species of concern.

APPENDIX G. Species composition and percent cover for community types by ecoregion.

The following tables detail the species composition and mean percent cover, for all community types recorded across seven ecoregions of the study area. In each table, data is ordered by the four possible vegetation strata: trees, tall shrubs, herbs and low shrubs, and non-vascular ground and inanimate cover. Mean percent cover values are shown in order of decreasing abundance.

This appendix contains the following tables:

Table 1. Hudson Bay Lowland	Table 1.1. – Table 1.4.
Table 2. Selwyn Lake Upland	Table 2.1. – Table 2.3.
Table 3. Churchill River Upland	Table 3.1. – Table 3.7.
Table 4. Hayes River Upland	Table 4.1. – Table 4.13.
Table 5. Mid-Boreal Lowland	Table 5.1. – Table 5.9.
Table 6. Interlake Plain	Table 6.1. – Table 6.5.
Table 7. Lake Manitoba Plain	Table 7.1. – Table 7.7.

Table 1. Four Community Types of the Hudson Bay Lowland (HBL) Ecoregion
Table 1.1. HBL: Open Black Spruce—Coniferous/ Schreber's Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	30.00
<i>Pinus banksiana</i>	Jack Pine	6.67
<i>Larix laricina</i>	Tamarack	3.67
<i>Populus tremuloides</i>	Trembling Aspen	1.67
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	7.00
<i>Juniperus communis</i>	Common Juniper	3.00
<i>Larix laricina</i>	Tamarack	2.27
<i>Alnus incana</i>	Speckled Alder	2.13
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	1.80
<i>Shepherdia canadensis</i>	Canada Buffaloberry	1.67
<i>Betula pumila</i>	Dwarf Birch	1.33
<i>Salix</i> sp.	Willow	0.93
<i>Viburnum edule</i>	Low-bush Cranberry	0.33
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	13.67
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	7.27
<i>Carex</i> sp.	Sedge	6.93
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	4.93
<i>Arctous alpina</i>	Alpine Bearberry	4.33
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	4.13
<i>Salix vestita</i>	Snow Willow	3.40
<i>Juniperus horizontalis</i>	Creeping Juniper	3.27
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	3.00
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	2.87
<i>Rosa acicularis</i>	Prickly Rose	2.40
<i>Picea mariana</i>	Black Spruce	2.33
<i>Linnaea borealis</i>	Twinflower	2.27
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	2.27
<i>Solidago</i> sp.	Goldenrod	1.33
<i>Alnus incana</i>	Speckled Alder	1.13
<i>Chamerion angustifolium</i>	Fireweed	1.07
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	1.00

Scientific Name	Common Name	Mean % Cover
<i>Rubus acaulis</i>	Stemless Raspberry	0.93
<i>Arctostaphylos uva-ursi</i>	Bearberry	0.87
<i>Viola renifolia</i>	Kidney-leaved Violet	0.67
<i>Achillea millefolium</i>	Yarrow	0.60
<i>Symphyotrichum</i> sp.	Aster	0.53
<i>Pyrola</i> sp.	Wintergreen	0.53
<i>Anemone parviflora</i>	Small Wood Anemone	0.53
<i>Mitella nuda</i>	Mitrewort	0.47
<i>Geocaulon lividum</i>	Northern Comandra	0.47
<i>Viburnum edule</i>	Low-bush Cranberry	0.40
	Unidentified Forb	0.40
<i>Juniperus communis</i>	Common Juniper	0.33
<i>Betula pumila</i>	Dwarf Birch	0.33
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.13
<i>Rubus idaeus</i>	Raspberry	0.13
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.13
<i>Galium boreale</i>	Northern Bedstraw	0.13
<i>Empetrum nigrum</i>	Crowberry	0.13
<i>Salix</i> sp.	Willow	0.07
	Unidentified Grass	0.07
Nonvascular Ground Stratum and Inanimate Cover		
<i>Pleurozium schreberi</i>	Schreber's Moss	41.67
<i>Cladina</i> sp.	Reindeer Lichen	12.87
	Unidentified Moss	4.33
	Mushroom	1.67
<i>Cladonia</i> sp.	Cladonia	1.27
<i>Peltigera</i> sp.	Pelt	0.87
<i>Hylocomium splendens</i>	Splendid Feather Moss	0.80
	Litter	10.53

Table 1.2. HBL: Open Black Spruce—Coniferous/ Reindeer Lichen—Peat Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	36.67
<i>Larix laricina</i>	Tamarack	13.67
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	21.47
<i>Betula pumila</i>	Dwarf Birch	9.53
<i>Larix laricina</i>	Tamarack	8.13
<i>Salix</i> sp.	Willow	3.80
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	16.13
<i>Picea mariana</i>	Black Spruce	6.87
<i>Empetrum nigrum</i>	Crowberry	5.33
<i>Betula pumila</i>	Dwarf Birch	4.40
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	4.27
<i>Carex</i> sp.	Sedge	4.00
<i>Larix laricina</i>	Tamarack	2.73
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	2.07
<i>Rubus chamaemorus</i>	Cloud Berry	1.93
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	1.60
<i>Vaccinium oxycoccus</i>	Bog Cranberry	1.53
<i>Equisetum arvense</i>	Common Horsetail	1.07
<i>Pyrola minor</i>	Lesser Wintergreen	0.87
<i>Rhododendron tomentosum</i>	Trapper's Tea	0.80
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.73
<i>Juniperus communis</i>	Common Juniper	0.67
<i>Salix vestita</i>	Snow Willow	0.47
<i>Salix</i> sp.	Willow	0.47
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.40
<i>Maianthemum canadense</i>	Canada May Flower	0.40
<i>Rubus acaulis</i>	Stemless Raspberry	0.33
<i>Achillea millefolium</i>	Yarrow	0.27
<i>Salix pedicellaris</i>	Bog Willow	0.27
<i>Kalmia polifolia</i>	Pale Laurel	0.27
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.20
<i>Mitella nuda</i>	Mitrewort	0.20
<i>Arctous alpina</i>	Alpine Bearberry	0.13

Scientific Name	Common Name	Mean % Cover
<i>Equisetum hyemale</i>	Common Scouring-rush	0.07
<i>Chamerion angustifolium</i>	Fireweed	0.07
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladina</i> sp.	Reindeer Lichen	31.53
<i>Sphagnum</i> sp.	Peat Moss	21.20
	Unidentified Moss	13.33
<i>Pleurozium schreberi</i>	Schreber's Moss	6.53
<i>Cladonia</i> sp.	Cladonia	3.53
<i>Hylocomium splendens</i>	Splendid Feather Moss	1.67
	Unidentified Mushroom	0.40
<i>Peltigera</i> sp.	Pelt	0.33
	Litter	12.87
	Water	1.33

Table 1.3. HBL: Regenerating Open Jack Pine—Black Spruce/ Labrador Tea Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Pinus banksiana</i>	Jack Pine	40.0
<i>Picea mariana</i>	Black Spruce	12.5
<i>Larix laricina</i>	Tamarack	0.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus incana</i>	Speckled Alder	14.0
<i>Picea mariana</i>	Black Spruce	9.9
<i>Pinus banksiana</i>	Jack Pine	7.1
<i>Betula pumila</i>	Dwarf Birch	6.2
<i>Salix</i> sp.	Willow	5.0
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	3.1
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	31.8
<i>Salix myrtillofolia</i>	Myrtle-leaved Willow	13.2
<i>Alnus incana</i>	Speckled Alder	4.0
<i>Salix</i> sp.	Willow	3.7
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	3.7
<i>Salix planifolia</i>	Flat-leaved Willow	3.5
<i>Picea mariana</i>	Black Spruce	2.7
<i>Arctous alpina</i>	Alpine Bearberry	2.5
<i>Carex</i> sp.	Sedge	2.5
<i>Rubus acaulis</i>	Stemless Raspberry	1.8
<i>Rosa acicularis</i>	Prickly Rose	1.6
<i>Betula pumila</i>	Dwarf Birch	1.5
<i>Chamerion angustifolium</i>	Fireweed	1.3
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.7
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	0.5
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.2
<i>Solidago</i> sp.	Goldenrod	0.2
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	0.2
<i>Symphyotrichum</i> sp.	Aster	0.1
<i>Equisetum arvense</i>	Common Horsetail	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladonia</i> sp.	Cladonia	4.1
	Unidentified Moss	2.5
<i>Peltigera</i> sp.	Pelt	1.6
<i>Cladina</i> sp.	Reindeer Lichen	1.4
	Litter	31.0
	Organic matter	3.0

Table 1.4. HBL: Treed Black Spruce Bog

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	0.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	0.8
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	18.7
<i>Chamaedaphne calyculata</i>	Leatherleaf	14.5
<i>Rubus chamaemorus</i>	Cloud Berry	7.0
<i>Kalmia polifolia</i>	Pale Laurel	4.6
<i>Picea mariana</i>	Black Spruce	4.3
<i>Eriophorum angustifolium</i>	Cotton-grass	2.8
<i>Vaccinium oxycoccus</i>	Bog Cranberry	2.4
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	2.1
<i>Rhododendron tomentosum</i>	Trapper's Tea	1.2
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	0.5
<i>Carex</i> sp.	Sedge	0.4
Nonvascular Ground Stratum and Inanimate Cover		
<i>Sphagnum</i> sp.	Peat Moss	54.4
<i>Cladina</i> sp.	Reindeer Lichen	8.1
<i>Cladonia</i> sp.	Cladonia	5.6
	Unidentified Moss	2.1
	Litter	15.8
	Water	0.5
	Organic matter	7.5

Table 2. Three Community Types of the Selwyn Lake Upland (SLU) Ecoregion.
Table 2.1. SLU: Open Black Spruce—Coniferous/ Splendid Feather Moss Forest

Scientific Name	Common Name	% Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	40.0
<i>Larix laricina</i>	Tamarack	2.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	13.0
<i>Salix</i> sp.	Willow	8.0
<i>Betula pumila</i>	Dwarf Birch	2.0
Herb and Low Shrub Stratum (≤1m)		
<i>Picea mariana</i>	Black Spruce	17.0
<i>Rhododendron groenlandicum</i>	Labrador Tea	14.2
<i>Arctous alpina</i>	Alpine Bearberry	6.6
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	6.2
<i>Carex</i> sp.	Sedge	2.6
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	2.6
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	2.0
<i>Linnaea borealis</i>	Twinflower	1.8
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	1.4
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	1.0
<i>Juniperus communis</i>	Common Juniper	1.0
<i>Salix</i> sp.	Willow	1.0
<i>Betula pumila</i>	Dwarf Birch	0.8
<i>Viola renifolia</i>	Kidney-leaved Violet	0.8
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.6
<i>Orthilia secunda</i>	One-sided Wintergreen	0.4
<i>Rubus acaulis</i>	Stemless Raspberry	0.4
	Unidentified Grass	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladina</i> sp.	Reindeer Lichen	29.0
<i>Hylocomium splendens</i>	Splendid Feather Moss	25.8
	Unidentified Moss	25.8
<i>Peltigera</i> sp.	Pelt	5.0
<i>Sphagnum</i> sp.	Peat Moss	2.4
<i>Cladonia</i> sp.	Cladonia	0.8
	Litter	11.8

Table 2.2. SLU: Regenerating Jack Pine/ Tall Shrub Forest

Scientific Name	Common Name	% Cover
Tall Shrub Stratum (1 - 2.5m)		
<i>Pinus banksiana</i>	Jack Pine	48.0
<i>Alnus viridis</i>	Green Alder	20.0
<i>Picea glauca</i>	White Spruce	6.4
<i>Betula pumila</i>	Dwarf Birch	5.0
Herb and Low Shrub Stratum (≤1m)		
<i>Picea glauca</i>	White Spruce	13.0
<i>Arctous alpina</i>	Alpine Bearberry	10.0
<i>Salix vestita</i>	Snow Willow	9.0
<i>Rosa acicularis</i>	Prickly Rose	7.6
<i>Pinus banksiana</i>	Jack Pine	6.6
<i>Linnaea borealis</i>	Twinflower	6.4
<i>Alnus viridis</i>	Green Alder	6.0
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	6.0
<i>Rhododendron groenlandicum</i>	Labrador Tea	4.8
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	4.8
<i>Petasites frigidus</i> var. <i>palmaris</i>	Palmate-leaved Coltsfoot	2.2
<i>Symphyotrichum laeve</i>	Smooth Aster	1.6
<i>Chamerion angustifolium</i>	Fireweed	1.6
<i>Rubus acaulis</i>	Stemless Raspberry	1.2
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	1.2
<i>Betula pumila</i>	Dwarf Birch	1.0
<i>Solidago</i> sp.	Goldenrod	1.0
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.6
<i>Achillea millefolium</i>	Yarrow	0.4
<i>Carex</i> sp.	Sedge	0.4
	Unidentified Grass	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladonia</i> sp.	Cladonia	8.2
	Unidentified Foliose Lichen	1.0
	Unidentified Moss	1.0
	Litter	52.0
	Bare Ground	3.0

Table 2.3. SLU: Sedge Fen Wetland

Scientific Name	Common Name	% Cover
Herb and Low Shrub Stratum ($\leq 1\text{m}$)		
<i>Carex utriculata</i>	Beaked Sedge	29.0
	Unidentified Moss	21.0
<i>Comarum palustre</i>	Marsh Cinquefoil	15.2
<i>Equisetum fluviatile</i>	Swamp Horsetail	13.0
<i>Menyanthes trifoliata</i>	Bog Bean	1.2
<i>Symphyotrichum boreale</i>	Northern Bog Aster	0.2
<i>Carex</i> sp.	Sedge	0.2
Nonvascular Ground Stratum and Inanimate Cover		
	Litter	30.0
	Organic Matter	13.8

Table 3. Seven Community Types of the Churchill River Upland (CRU) Ecoregion.
Table 3.1. CRU: Open Black Spruce/ Schreber's Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	51.00
<i>Picea glauca</i>	White Spruce	3.00
<i>Betula papyrifera</i>	White Birch	2.00
<i>Larix laricina</i>	Tamarack	0.40
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus viridis</i>	Green Alder	3.80
<i>Picea mariana</i>	Black Spruce	1.04
<i>Salix</i> sp.	Willow	0.64
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.28
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.24
<i>Alnus incana</i>	Speckled Alder	0.20
<i>Salix bebbiana</i>	Bebb's Willow	0.20
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	3.48
<i>Equisetum arvense</i>	Common Horsetail	2.32
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	1.84
<i>Picea mariana</i>	Black Spruce	1.28
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.84
<i>Arctous alpina</i>	Alpine Bearberry	0.72
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	0.56
<i>Cornus canadensis</i>	Bunchberry	0.52
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.44
<i>Equisetum sylvaticum</i>	Wood Horsetail	0.44
<i>Linnaea borealis</i>	Twinflower	0.44
<i>Orthilia secunda</i>	One-sided Wintergreen	0.44
<i>Carex</i> sp.	Sedge	0.32
<i>Geocaulon lividum</i>	Northern Comandra	0.28
<i>Symphyotrichum</i> sp.	Aster	0.20
<i>Mitella nuda</i>	Mitrewort	0.20
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.16
<i>Gaultheria hispidula</i>	Creeping Snowberry	0.16
<i>Rosa acicularis</i>	Prickly Rose	0.16
<i>Mertensia paniculata</i>	Tall Lungwort	0.12
<i>Achillea millefolium</i>	Yarrow	0.08

Scientific Name	Common Name	Mean % Cover
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.08
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.08
<i>Solidago</i> sp.	Goldenrod	0.08
<i>Viburnum edule</i>	Low-bush Cranberry	0.08
<i>Actaea rubra</i>	Baneberry	0.04
<i>Calamagrostis</i> sp.	Reed Grass	0.04
<i>Leymus innovatus</i>	Boreal Wild Rye	0.04
<i>Larix laricina</i>	Tamarack	0.04
<i>Lathyrus ochroleucus</i>	Pale Vetchling	0.04
<i>Moneses uniflora</i>	One-flowered Wintergreen	0.04
<i>Populus balsamifera</i>	Balsam Poplar	0.04
<i>Pyrola asarifolia</i>	Pink Pyrola	0.04
Nonvascular Ground Stratum and Inanimate Cover		
<i>Hylocomium splendens</i>	Splendid Feather Moss	40.24
<i>Pleurozium schreberi</i>	Schreber's Moss	30.00

Table 3.2. CRU: Open Jack Pine –Black Spruce/ Splendid Feather Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Pinus banksiana</i>	Jack Pine	25.0
<i>Picea mariana</i>	Black Spruce	10.5
<i>Populus tremuloides</i>	Trembling Aspen	0.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus viridis</i>	Green Alder	11.6
<i>Picea mariana</i>	Black Spruce	0.3
Herb and Low Shrub Stratum (≤1m)		
<i>Juniperus communis</i>	Common Juniper	6.4
<i>Arctostaphylos uva-ursi</i>	Bearberry	1.7
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	1.7
<i>Rosa acicularis</i>	Prickly Rose	1.5
<i>Picea mariana</i>	Black Spruce	1.5
<i>Linnaea borealis</i>	Twinflower	1.3
<i>Orthilia secunda</i>	One-sided Wintergreen	1.1
<i>Lonicera dioica</i>	Twining Honeysuckle	0.4
<i>Leymus innovatus</i>	Boreal Wild Rye	0.4
<i>Galium boreale</i>	Northern Bedstraw	0.4
<i>Geocaulon lividum</i>	Northern Comandra	0.3
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.3
<i>Rubus pubescens</i>	Trailing Dewberry	0.2
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.2
<i>Potentilla tridentata</i>	Three-toothed Cinquefoil	0.2
<i>Mitella nuda</i>	Mitrewort	0.2
<i>Goodyera repens</i>	Lesser Rattlesnake-Plantain	0.2
<i>Carex concinna</i>	Beautiful Sedge	0.2
<i>Viola</i> sp.	Violet	0.1
<i>Symphoricarpos albus</i>	Snowberry	0.1
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.1
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	0.1
<i>Populus tremuloides</i>	Trembling Aspen	0.1
<i>Campanula rotundifolia</i>	Harebells	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Hylocomium splendens</i>	Splendid Feather Moss	32.2
<i>Pleurozium schreberi</i>	Schreber's Moss	14.2
<i>Cladina</i> sp.	Reindeer Lichen	4.0

Scientific Name	Common Name	Mean % Cover
<i>Polytrichum</i> sp.	Polytrichum Moss	2.2
<i>Cladonia</i> sp.	Cladonia	0.4
<i>Cladina mitis</i>	Green Reindeer Lichen	0.3
<i>Dicranum</i> sp.	Dicranum Moss	0.1
	Litter	24.0
	Rock	0.3
	Unidentified Moss covered Rock	8.0

Table 3.3. CRU: Sparse Black Spruce/ Labrador Tea Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	14.3
<i>Betula papyrifera</i>	White Birch	1.3
<i>Larix laricina</i>	Tamarack	0.5
<i>Pinus banksiana</i>	Jack Pine	0.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	12.0
<i>Alnus viridis</i>	Green Alder	7.5
<i>Salix</i> sp.	Willow	5.0
<i>Betula pumila</i>	Dwarf Birch	2.6
<i>Betula occidentalis</i>	River Birch	1.0
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.8
<i>Populus tremuloides</i>	Trembling Aspen	0.3
<i>Alnus incana</i>	Speckled Alder	0.1
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	37.2
<i>Picea mariana</i>	Black Spruce	7.3
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	2.8
<i>Equisetum arvense</i>	Common Horsetail	2.7
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	2.4
<i>Rubus chamaemorus</i>	Cloud Berry	2.1
<i>Alnus viridis</i>	Green Alder	1.7
<i>Carex</i> sp.	Sedge	1.6
<i>Salix</i> sp.	Willow	1.6
<i>Rosa acicularis</i>	Prickly Rose	1.2
<i>Maianthemum canadense</i>	Canada May Flower	1.1
<i>Kalmia polifolia</i>	Pale Laurel	0.9
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.8
<i>Vaccinium oxycoccus</i>	Bog Cranberry	0.8
<i>Viburnum edule</i>	Low-bush Cranberry	0.8
<i>Betula pumila</i>	Dwarf Birch	0.7
<i>Chamerion angustifolium</i>	Fireweed	0.7
<i>Geocaulon lividum</i>	Northern Comandra	0.7
<i>Arctous alpina</i>	Alpine Bearberry	0.6
<i>Linnaea borealis</i>	Twinflower	0.6

Scientific Name	Common Name	Mean % Cover
<i>Rubus pubescens</i>	Trailing Dewberry	0.5
<i>Salix myrtillofolia</i>	Myrtle-leaved Willow	0.5
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.4
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.2
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.2
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.2
<i>Mertensia paniculata</i>	Tall Lungwort	0.2
<i>Mitella nuda</i>	Mitrewort	0.2
	Unidentified Grass	0.1
<i>Cornus canadensis</i>	Bunchberry	0.1
<i>Ribes hudsonianum</i>	Northern Black Currant	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladina</i> sp.	Reindeer Lichen	22.9
<i>Sphagnum</i> sp.	Peat Moss	12.2
	Unidentified Moss	5.8
<i>Cladonia</i> sp.	Cladonia	4.5
	Unidentified Crustose Lichen	0.9
<i>Peltigera</i> sp.	Pelt	0.7
<i>Hylocomium splendens</i>	Splendid Feather Moss	0.6
	Litter	11.8
	Organic matter	3.5

Table 3.4. CRU: Open Trembling Aspen Mixed/ Green Reindeer Lichen Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	40.0
<i>Picea glauca</i>	White Spruce	7.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Shepherdia canadensis</i>	Canada Buffaloberry	2.4
<i>Amelanchier alnifolia</i>	Saskatoon	0.6
<i>Picea glauca</i>	White Spruce	0.6
Herb and Low Shrub Stratum (≤1m)		
<i>Shepherdia canadensis</i>	Canada Buffaloberry	20.4
<i>Cornus canadensis</i>	Bunchberry	13.8
<i>Mertensia paniculata</i>	Tall Lungwort	11.4
<i>Picea glauca</i>	White Spruce	5.0
<i>Rosa acicularis</i>	Prickly Rose	3.6
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	2.4
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	2.4
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	2.2
<i>Viburnum edule</i>	Low-bush Cranberry	1.6
<i>Lonicera dioica</i>	Twining Honeysuckle	1.6
<i>Galium boreale</i>	Northern Bedstraw	1.6
<i>Linnaea borealis</i>	Twinflower	1.4
<i>Lathyrus venosus</i>	Wild Peavine	1.4
<i>Orthilia secunda</i>	One-sided Wintergreen	1.2
<i>Equisetum arvense</i>	Common Horsetail	1.2
<i>Oryzopsis asperifolia</i>	Rice Grass	0.8
<i>Taraxacum officinale</i>	Common Dandelion	0.6
<i>Mitella nuda</i>	Mitrewort	0.6
<i>Chamerion angustifolium</i>	Fireweed	0.6
<i>Achillea millefolium</i>	Yarrow	0.4
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.4
<i>Symphoricarpos albus</i>	Snowberry	0.4
<i>Amelanchier alnifolia</i>	Saskatoon	0.4
<i>Anemone multifida</i>	Cut-leaved Anemone	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Hylocomium splendens</i>	Splendid Feather Moss	2.2
	Unidentified Moss	0.2
	Litter	43.0

Table 3.5. CRU: Treed Black Spruce Bog

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	3.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	5.9
Herb and Low Shrub Stratum (≤1m)		
<i>Chamaedaphne calyculata</i>	Leatherleaf	6.6
<i>Rhododendron groenlandicum</i>	Labrador Tea	4.8
<i>Carex</i> sp.	Sedge	4.7
<i>Kalmia polifolia</i>	Pale Laurel	2.4
<i>Maianthemum canadense</i>	Canada May Flower	2.1
<i>Menyanthes trifoliata</i>	Bogbean	1.4
<i>Vaccinium oxycoccus</i>	Bog Cranberry	1.3
<i>Drosera rotundifolia</i>	Round-leaved Sundew	1.1
<i>Picea mariana</i>	Black Spruce	0.6
<i>Rubus chamaemorus</i>	Cloud Berry	0.5
<i>Larix laricina</i>	Tamarack	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Sphagnum</i> sp.	Peat Moss	60.8
<i>Cladina mitis</i>	Green Reindeer Lichen	19.6
<i>Pleurozium schreberi</i>	Schreber's Moss	7.7
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	3.3
<i>Dicranum</i> sp.	Dicranum Moss	0.4
<i>Cladonia</i> sp.	Cladonia	0.1
<i>Icmadophila ericetorum</i>	Spraypaint	0.1
	Litter	6.8
	Water	0.5

Table 3.6. CRU: Willow Riparian Wetland

Scientific Name	Common Name	Mean % Cover
Tall Shrub Stratum (1 - 2.5m)		
<i>Salix planifolia</i>	Flat-leaved Willow	50.0
<i>Betula pumila</i>	Dwarf Birch	20.0
<i>Betula papyrifera</i>	White Birch	3.0
<i>Picea glauca</i>	White Spruce	1.0
Herb and Low Shrub Stratum (≤1m)		
<i>Chamaedaphne calyculata</i>	Leatherleaf	33.0
<i>Carex</i> sp.	Sedge	16.2
<i>Betula pumila</i>	Dwarf Birch	11.0
<i>Salix planifolia</i>	Flat-leaved Willow	10.4
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	5.0
	Unidentified Grass	4.8
<i>Salix pedicellaris</i>	Bog Willow	1.2
<i>Equisetum hyemale</i>	Common Scouring-rush	0.2
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	15.4
<i>Peltigera</i> sp.	Pelt	0.2
	Litter	32.0

Table 3.7. CRU: Sedge Fen Wetland

Scientific Name	Common Name	Mean % Cover
Herb and Low Shrub Stratum (≤1m)		
<i>Carex capillaris</i>	Hair-like Sedge	31.0
<i>Menyanthes trifoliata</i>	Bogbean	14.8
<i>Betula pumila</i>	Dwarf Birch	12.0
<i>Equisetum</i> sp.	Horsetail	8.2
<i>Salix pedicellaris</i>	Bog Willow	6.6
<i>Comarum palustre</i>	Marsh Cinquefoil	2.4
<i>Larix laricina</i>	Tamarack	1.0
<i>Vaccinium oxycoccus</i>	Bog Cranberry	0.8
<i>Galium labradoricum</i>	Northern Bog Bedstraw	0.4
<i>Platanthera aquilonis</i>	Northern Green Bog Orchid	0.4
<i>Epilobium palustre</i>	Marsh Willowherb	0.2
	Unidentified Forb	0.2
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	41.0
	Litter	44.0
	Water	1.0
	Organic matter	6.0

Table 4. Thirteen Community Types of the Hayes River Upland (HRU) Ecoregion.
Table 4.1. HRU: Open Black Spruce/ Labrador Tea/ Schreber's Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	38.3
<i>Larix laricina</i>	Tamarack	1.7
<i>Pinus banksiana</i>	Jack Pine	1.7
<i>Populus tremuloides</i>	Trembling Aspen	0.3
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	3.7
<i>Alnus viridis</i>	Green Alder	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	12.2
<i>Picea mariana</i>	Black Spruce	4.4
<i>Rubus chamaemorus</i>	Cloud Berry	1.9
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	1.4
<i>Cornus canadensis</i>	Bunchberry	0.7
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	0.3
<i>Carex vaginata</i>	Sheathed Sedge	0.3
<i>Leymus innovatus</i>	Boreal Wild Rye	0.2
<i>Equisetum arvense</i>	Common Horsetail	0.2
<i>Geocaulon lividum</i>	Northern Comandra	0.2
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.2
	Unidentified Grass	0.2
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	0.2
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.1
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.1
<i>Linnaea borealis</i>	Twinflower	0.1
<i>Salix myrtillofolia</i>	Myrtle-leaved Willow	0.1
<i>Achillea millefolium</i>	Yarrow	0.1
<i>Carex concinna</i>	Beautiful Sedge	0.1
<i>Mitella nuda</i>	Mitrewort	0.1
<i>Rosa acicularis</i>	Prickly Rose	0.1
<i>Viola renifolia</i>	Kidney-leaved Violet	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Pleurozium schreberi</i>	Schreber's Moss	69.7
<i>Hylocomium splendens</i>	Splendid Feather Moss	12.6
<i>Cladina stellaris</i>	Northern Reindeer Lichen	1.9

Scientific Name	Common Name	Mean % Cover
<i>Sphagnum</i> sp.	Peat Moss	1.7
<i>Peltigera</i> sp.	Pelt	0.5
<i>Ptilium crista-castrensis</i>	Knights Plume Moss	0.3
<i>Dicranum</i> sp.	Dicranum Moss	0.2
	Unidentified Moss	0.1
<i>Cladina mitis</i>	Green Reindeer Lichen	0.1
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	0.1
	Litter	8.0

Table 4.2. HRU: Open Black Spruce/ Labrador Tea/ Reindeer Lichen Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	35.0
<i>Larix laricina</i>	Tamarack	2.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	9.9
<i>Larix laricina</i>	Tamarack	0.5
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	27.0
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	6.3
<i>Rubus chamaemorus</i>	Cloud Berry	5.7
<i>Picea mariana</i>	Black Spruce	4.3
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	3.8
<i>Juniperus communis</i>	Common Juniper	3.5
<i>Shepherdia canadensis</i>	Canada Buffaloberry	3.0
<i>Arctous alpina</i>	Alpine Bearberry	1.5
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	1.3
<i>Geocaulon lividum</i>	Northern Comandra	1.2
<i>Carex</i> sp.	Sedge	1.1
<i>Salix vestita</i>	Snow Willow	1.0
<i>Linnaea borealis</i>	Twinflower	0.8
<i>Vaccinium oxycoccus</i>	Bog Cranberry	0.7
<i>Equisetum arvense</i>	Common Horsetail	0.6
<i>Chamaedaphne calyculata</i>	Leatherleaf	0.5
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.4
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.3
<i>Rosa acicularis</i>	Prickly Rose	0.3
<i>Betula pumila</i>	Dwarf Birch	0.2
<i>Mertensia paniculata</i>	Tall Lungwort	0.2
<i>Symphyotrichum</i> sp.	Aster	0.1
<i>Chamerion angustifolium</i>	Fireweed	0.1
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.1
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	38.0
<i>Cladina</i> sp.	Reindeer Lichen	31.7
<i>Sphagnum</i> sp.	Peat Moss	11.3
<i>Peltigera</i> sp.	Pelt	1.5
	Litter	6.5

Table 4.3. HRU: Sparse Black Spruce/ Reindeer Lichen Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	3.5
<i>Betula papyrifera</i>	White Birch	1.5
<i>Larix laricina</i>	Tamarack	1.0
<i>Picea glauca</i>	White Spruce	1.0
<i>Populus tremuloides</i>	Trembling Aspen	1.0
<i>Salix</i> sp.	Willow	0.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	51.0
<i>Shepherdia canadensis</i>	Canada Buffaloberry	6.1
<i>Salix</i> sp.	Willow	4.3
<i>Betula pumila</i>	Dwarf Birch	1.5
<i>Betula papyrifera</i>	White Birch	1.0
<i>Populus tremuloides</i>	Trembling Aspen	0.7
Herb and Low Shrub Stratum (≤1m)		
<i>Picea mariana</i>	Black Spruce	20.9
<i>Rhododendron groenlandicum</i>	Labrador Tea	11.9
<i>Shepherdia canadensis</i>	Canada Buffaloberry	7.5
<i>Chamerion angustifolium</i>	Fireweed	4.6
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	4.6
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	4.5
<i>Linnaea borealis</i>	Twinflower	4.1
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	3.3
<i>Rosa acicularis</i>	Prickly Rose	2.5
<i>Symphyotrichum</i> sp.	Aster	1.7
<i>Betula pumila</i>	Dwarf Birch	1.5
<i>Salix</i> sp.	Willow	1.5
<i>Carex</i> sp.	Sedge	1.3
<i>Viburnum edule</i>	Low-bush Cranberry	1.2
<i>Cornus canadensis</i>	Bunchberry	1.1
	Unidentified Grass	1.0
<i>Rubus acaulis</i>	Stemless Raspberry	0.6
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.5
<i>Achillea millefolium</i>	Yarrow	0.4
<i>Gentianella amarella</i>	Northern Gentian	0.4
<i>Petasites frigidus</i> var. <i>palmaris</i>	Palmate-leaved Coltsfoot	0.4

Scientific Name	Common Name	Mean % Cover
<i>Viola</i> sp.	Violet	0.4
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.3
<i>Ribes triste</i>	Swamp Red Currant	0.3
<i>Arctous alpina</i>	Alpine Bearberry	0.2
<i>Juniperus communis</i>	Common Juniper	0.2
<i>Mertensia paniculata</i>	Tall Lungwort	0.2
<i>Solidago</i> sp.	Goldenrod	0.2
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	21.3
<i>Cladonia</i> sp.	Cladonia	17.8
<i>Cladina</i> sp.	Reindeer Lichen	5.4
<i>Pohlia</i> sp.	Wire Moss	4.0
	Unidentified Foliose Lichen	3.2
<i>Peltigera</i> sp.	Pelt	2.4
	Unidentified Crustose Lichen	2.2
	Litter	18.5
	Bare Ground	2.7

Table 4.4. HRU: Sparse Black Spruce—Jack Pine/ Green Reindeer Lichen Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	6.3
<i>Pinus banksiana</i>	Jack Pine	3.7
<i>Betula papyrifera</i>	White Birch	0.7
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	4.2
<i>Betula papyrifera</i>	White Birch	0.3
Herb and Low Shrub Stratum (≤1m)		
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	2.3
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.7
<i>Picea mariana</i>	Black Spruce	0.6
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	0.3
<i>Geocaulon lividum</i>	Northern Comandra	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladina mitis</i>	Green Reindeer Lichen	40.1
<i>Cladina stellaris</i>	Northern Reindeer Lichen	11.4
<i>Pleurozium schreberi</i>	Schreber's Moss	10.1
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	4.3
	Unidentified Crustose Lichen	2.8
<i>Stereocaulon tomentosum</i>	Woolly Coral	2.5
	Unidentified Moss	2.0
<i>Cladonia uncialis</i>	Prickle Cladonia	1.4
<i>Dicranum</i> sp.	Dicranum Moss	1.0
<i>Cladonia</i> sp.	Cladonia	0.9
<i>Polytrichum</i> sp.	Polytrichum Moss	0.7
<i>Hylocomium splendens</i>	Splendid Feather Moss	0.3
	Unidentified Lichen	0.1
<i>Umbilicaria</i> sp.	Rocktripe	0.1
	Litter	7.7
	Rock	11.3

Table 4.5. HRU: Open Tamarack—Black Spruce/ Peat Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Larix laricina</i>	Tamarack	30.0
<i>Picea mariana</i>	Black Spruce	20.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus incana</i>	Speckled Alder	11.6
<i>Salix</i> sp.	Willow	7.2
<i>Betula pumila</i>	Dwarf Birch	6.6
<i>Picea mariana</i>	Black Spruce	6.6
<i>Larix laricina</i>	Tamarack	4.0
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	18.0
<i>Alnus incana</i>	Speckled Alder	8.4
<i>Betula pumila</i>	Dwarf Birch	6.2
<i>Maianthemum canadense</i>	Canada May Flower	5.8
<i>Salix pedicellaris</i>	Bog Willow	3.2
<i>Salix</i> sp.	Willow	3.0
<i>Carex</i> sp.	Sedge	1.8
<i>Vaccinium oxycoccus</i>	Bog Cranberry	1.8
<i>Equisetum</i> sp.	Horsetail	1.2
<i>Rhododendron tomentosum</i>	Trapper's Tea	1.2
<i>Larix laricina</i>	Tamarack	1.0
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	1.0
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.8
<i>Rubus pubescens</i>	Trailing Dewberry	0.8
<i>Equisetum arvense</i>	Common Horsetail	0.4
<i>Linnaea borealis</i>	Twinflower	0.4
<i>Mitella nuda</i>	Mitrewort	0.2
<i>Pyrola</i> sp.	Wintergreen	0.2
	Unidentified Grass	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Sphagnum</i> sp.	Peat Moss	26.2
<i>Hylocomium splendens</i>	Splendid Feather Moss	1.8
	Unidentified Moss	1.0
<i>Pleurozium schreberi</i>	Schreber's Moss	1.0
<i>Dicranum</i> sp.	Dicranum Moss	0.2
<i>Peltigera</i> sp.	Pelt	0.2
	Litter	18.2

Table 4.6. HRU: Regenerating Open Jack Pine Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Pinus banksiana</i>	Jack Pine	32.5
<i>Picea mariana</i>	Black Spruce	1.0
<i>Populus balsamifera</i>	Balsam Poplar	1.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus viridis</i>	Green Alder	6.6
<i>Picea mariana</i>	Black Spruce	5.7
<i>Pinus banksiana</i>	Jack Pine	4.6
<i>Salix bebbiana</i>	Bebb's Willow	2.0
<i>Populus balsamifera</i>	Balsam Poplar	0.3
<i>Populus tremuloides</i>	Trembling Aspen	0.2
<i>Betula papyrifera</i>	White Birch	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	12.3
<i>Cornus canadensis</i>	Bunchberry	11.6
<i>Rosa acicularis</i>	Prickly Rose	4.2
<i>Rhododendron groenlandicum</i>	Labrador Tea	3.0
<i>Chamerion angustifolium</i>	Fireweed	2.9
<i>Linnaea borealis</i>	Twinflower	1.0
<i>Picea mariana</i>	Black Spruce	1.0
<i>Alnus viridis</i>	Green Alder	0.7
<i>Rubus pubescens</i>	Trailing Dewberry	0.7
<i>Equisetum sylvaticum</i>	Wood Horsetail	0.5
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.4
<i>Leymus innovatus</i>	Boreal Wild Rye	0.3
<i>Equisetum arvense</i>	Common Horsetail	0.3
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.3
<i>Viburnum edule</i>	Low-bush Cranberry	0.2
<i>Achillea millefolium</i>	Yarrow	0.1
<i>Arctostaphylos uva-ursi</i>	Bearberry	0.1
<i>Geocaulon lividum</i>	Northern Comandra	0.1
<i>Lycopodium annotinum</i>	Stiff Club-moss	0.1
<i>Maianthemum canadense</i>	Canada May Flower	0.1
<i>Pinus banksiana</i>	Jack Pine	0.1
<i>Populus tremuloides</i>	Trembling Aspen	0.1
<i>Rubus idaeus</i>	Raspberry	0.1

Scientific Name	Common Name	Mean % Cover
<i>Solidago</i> sp.	Goldenrod	0.1
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladonia</i> sp.	Cladonia	4.1
<i>Dicranum</i> sp.	Dicranum Moss	3.7
<i>Pleurozium schreberi</i>	Schreber's Moss	2.6
	Unidentified Moss	0.7
<i>Cladina mitis</i>	Green Reindeer Lichen	0.2
<i>Hylocomium splendens</i>	Splendid Feather Moss	0.1
<i>Vulpicida pinastri</i>	Moonshine Cetraria	0.1
	Litter	42.5
	Bare Ground	0.5
	Organic matter	2.6

Table 4.7. HRU: Closed Trembling Aspen Mixed Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	60.0
<i>Populus balsamifera</i>	Balsam Poplar	5.0
<i>Pinus banksiana</i>	Jack Pine	4.0
<i>Picea mariana</i>	Black Spruce	1.0
<i>Betula papyrifera</i>	White Birch	0.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus viridis</i>	Green Alder	4.5
<i>Viburnum edule</i>	Low-bush Cranberry	3.5
<i>Alnus incana</i>	Speckled Alder	2.0
<i>Picea mariana</i>	Black Spruce	1.7
<i>Salix bebbiana</i>	Bebb's Willow	1.3
<i>Picea glauca</i>	White Spruce	1.0
<i>Betula papyrifera</i>	White Birch	0.8
<i>Prunus pensylvanica</i>	Pin Cherry	0.4
<i>Populus balsamifera</i>	Balsam Poplar	0.1
<i>Rubus idaeus</i>	Raspberry	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Equisetum sylvaticum</i>	Wood Horsetail	6.2
<i>Mertensia paniculata</i>	Tall Lungwort	3.5
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	3.1
<i>Pyrola asarifolia</i>	Pink Pyrola	2.7
<i>Cornus canadensis</i>	Bunchberry	2.2
<i>Maianthemum canadense</i>	Canada May Flower	2.1
<i>Rosa acicularis</i>	Prickly Rose	1.6
<i>Rubus pubescens</i>	Trailing Dewberry	1.6
<i>Ribes triste</i>	Swamp Red Currant	1.4
<i>Rhododendron groenlandicum</i>	Labrador Tea	1.0
<i>Mitella nuda</i>	Mitrewort	0.8
<i>Prunus pensylvanica</i>	Pin Cherry	0.7
<i>Viburnum edule</i>	Low-bush Cranberry	0.7
<i>Chamerion angustifolium</i>	Fireweed	0.6
<i>Rubus idaeus</i>	Raspberry	0.6
<i>Picea glauca</i>	White Spruce	0.3
<i>Elymus trachycaulus</i>	Slender Wheatgrass	0.2
<i>Galium trifidum</i>	Three-petal Bedstraw	0.2

Scientific Name	Common Name	Mean % Cover
<i>Lycopodium annotinum</i>	Stiff Club-moss	0.2
<i>Petasites frigidus</i> var. <i>palmaris</i>	Palmate-leaved Coltsfoot	0.2
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.2
<i>Viola</i> sp.	Violet	0.2
<i>Achillea millefolium</i>	Yarrow	0.1
<i>Actaea rubra</i>	Baneberry	0.1
<i>Agrostis</i> sp.	Bent Grass	0.1
<i>Carex</i> sp.	Sedge	0.1
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.1
<i>Galium boreale</i>	Northern Bedstraw	0.1
<i>Lathyrus ochroleucus</i>	Pale Vetchling	0.1
<i>Lonicera dioica</i>	Twining Honeysuckle	0.1
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.1
<i>Piptatherum pungens</i>	Sharp Piptatherum	0.1
<i>Picea mariana</i>	Black Spruce	0.1
<i>Populus tremuloides</i>	Trembling Aspen	0.1
<i>Salix bebbiana</i>	Bebb's Willow	0.1
<i>Taraxacum officinale</i>	Common Dandelion	0.1
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladonia mitis</i>	Green Reindeer Lichen	1.5
<i>Dicranum</i> sp.	Dicranum Moss	0.9
<i>Stereocaulon tomentosum</i>	Woolly Coral	0.8
<i>Pleurozium schreberi</i>	Schreber's Moss	0.4
	Unidentified Moss	0.2
	Litter	65.0

Table 4.8. HRU: Trembling Aspen Mixed/ Green Alder Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	15.0
<i>Picea glauca</i>	White Spruce	5.0
<i>Picea mariana</i>	Black Spruce	5.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus viridis</i>	Green Alder	38.0
<i>Populus tremuloides</i>	Trembling Aspen	3.0
<i>Picea glauca</i>	White Spruce	1.0
<i>Viburnum edule</i>	Low-bush Cranberry	1.0
<i>Rosa acicularis</i>	Prickly Rose	0.9
<i>Lonicera involucrata</i>	Involucrate Honeysuckle	0.5
<i>Populus balsamifera</i>	Balsam Poplar	0.2
<i>Lonicera dioica</i>	Twining Honeysuckle	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Chamerion angustifolium</i>	Fireweed	17.4
<i>Rosa acicularis</i>	Prickly Rose	6.1
<i>Cornus canadensis</i>	Bunchberry	5.7
<i>Rubus pubescens</i>	Trailing Dewberry	4.8
<i>Mertensia paniculata</i>	Tall Lungwort	4.6
<i>Alnus viridis</i>	Green Alder	3.3
<i>Ribes triste</i>	Swamp Red Currant	2.6
<i>Picea glauca</i>	White Spruce	2.3
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	1.7
<i>Mitella nuda</i>	Mitrewort	1.7
<i>Viburnum edule</i>	Low-bush Cranberry	1.6
<i>Pyrola</i> sp.	Wintergreen	0.9
<i>Rubus idaeus</i>	Raspberry	0.8
<i>Equisetum arvense</i>	Common Horsetail	0.6
<i>Linnaea borealis</i>	Twinflower	0.6
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.6
	Unidentified Grass	0.1
<i>Viola</i> sp.	Violet	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Hylocomium splendens</i>	Splendid Feather Moss	1.4
<i>Pleurozium schreberi</i>	Schreber's Moss	1.2
	Unidentified Moss	0.7
<i>Peltigera</i> sp.	Pelt	0.2
<i>Dicranum</i> sp.	Dicranum Moss	0.1
	Litter	38.0

Table 4.9. HRU: Closed White Spruce—Balsam Poplar Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea glauca</i>	White Spruce	30.0
<i>Populus balsamifera</i>	Balsam Poplar	30.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea glauca</i>	White Spruce	18.2
<i>Shepherdia canadensis</i>	Canada Buffaloberry	12.6
<i>Populus balsamifera</i>	Balsam Poplar	12.0
<i>Salix</i> sp.	Willow	4.0
<i>Alnus viridis</i>	Green Alder	2.0
<i>Amelanchier alnifolia</i>	Saskatoon	2.0
Herb and Low Shrub Stratum (≤1m)		
<i>Arctous alpina</i>	Alpine Bearberry	11.6
<i>Juniperus communis</i>	Common Juniper	8.4
<i>Rosa acicularis</i>	Prickly Rose	5.0
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	4.8
<i>Lonicera involucrata</i>	Involucrate Honeysuckle	4.8
<i>Shepherdia canadensis</i>	Canada Buffaloberry	4.2
<i>Carex</i> sp.	Sedge	4.0
<i>Linnaea borealis</i>	Twinflower	4.0
<i>Chamerion angustifolium</i>	Fireweed	3.4
<i>Viburnum edule</i>	Low-bush Cranberry	3.4
<i>Achillea millefolium</i>	Yarrow	1.8
<i>Arctostaphylos uva-ursi</i>	Bearberry	1.8
<i>Cornus canadensis</i>	Bunchberry	1.8
<i>Salix</i> sp.	Willow	1.8
<i>Symphyotrichum</i> sp.	Aster	1.6
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	1.6
<i>Anemone multifida</i>	Cut-leaved Anemone	1.0
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	1.0
<i>Equisetum arvense</i>	Common Horsetail	0.6
<i>Rubus acaulis</i>	Stemless Raspberry	0.6
<i>Solidago</i> sp.	Goldenrod	0.6
<i>Amelanchier alnifolia</i>	Saskatoon	0.4
<i>Pyrola</i> sp.	Wintergreen	0.4
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	0.4
<i>Viola</i> sp.	Violet	0.4

Scientific Name	Common Name	Mean % Cover
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.2
<i>Mertensia paniculata</i>	Tall Lungwort	0.2
<i>Mitella nuda</i>	Mitrewort	0.2
	Unidentified Forb	0.2
	Unidentified Grass	0.2
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Foliose Lichen	25.0
Cladonia sp.	Cladonia	5.0
	Unidentified Moss	2.0
Cladina sp.	Reindeer Lichen	1.4
	Litter	23.0
	Bare Ground	9.6

Table 4.10. HRU: Treeless Regenerating Jack Pine Mixed Forest

Scientific Name	Common Name	Mean % Cover
Tall Shrub Stratum (1 - 2.5m)		
<i>Pinus banksiana</i>	Jack Pine	6.0
<i>Populus balsamifera</i>	Balsam Poplar	1.4
<i>Betula papyrifera</i>	White Birch	1.0
<i>Populus tremuloides</i>	Trembling Aspen	1.0
<i>Salix</i> sp.	Willow	1.0
<i>Shepherdia canadensis</i>	Canada Buffaloberry	1.0
Herb and Low Shrub Stratum (≤1m)		
<i>Rosa acicularis</i>	Prickly Rose	10.0
<i>Pinus banksiana</i>	Jack Pine	9.6
<i>Chamerion angustifolium</i>	Fireweed	8.6
<i>Betula papyrifera</i>	White Birch	5.6
<i>Salix</i> sp.	Willow	5.4
<i>Picea glauca</i>	White Spruce	4.2
<i>Solidago</i> sp.	Goldenrod	4.0
<i>Linnaea borealis</i>	Twinflower	3.6
<i>Symphyotrichum</i> sp.	Aster	2.8
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	2.2
<i>Gentianella amarella</i>	Northern Gentian	1.0
<i>Larix laricina</i>	Tamarack	1.0
<i>Carex</i> sp.	Sedge	0.8
<i>Salix myrtillofolia</i>	Myrtle-leaved Willow	0.8
<i>Cornus canadensis</i>	Bunchberry	0.6
<i>Equisetum arvense</i>	Common Horsetail	0.6
<i>Platanthera</i> sp.	Rein Orchid	0.4
<i>Rubus acaulis</i>	Stemless Raspberry	0.4
	Unidentified Forb	0.4
<i>Arnica</i> sp.	Arnica	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Pohlia</i> sp.	Wire Moss	35.0
	Unidentified Foliose Lichen	8.0
	Litter	12.6
	Bare Ground	16.0

Table 4.11. HRU: Closed White Birch Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Betula papyrifera</i>	White Birch	60.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Rubus idaeus</i>	Raspberry	12.6
<i>Rosa acicularis</i>	Prickly Rose	3.0
<i>Viburnum lentago</i>	Nannyberry	2.4
<i>Betula papyrifera</i>	White Birch	2.2
Herb and Low Shrub Stratum (≤1m)		
<i>Equisetum arvense</i>	Common Horsetail	27.4
<i>Rubus idaeus</i>	Raspberry	25.0
<i>Calamagrostis canadensis</i>	Canada Reed Grass	13.0
<i>Ribes triste</i>	Swamp Red Currant	11.0
<i>Chamerion angustifolium</i>	Fireweed	5.4
<i>Cornus canadensis</i>	Bunchberry	4.8
<i>Rosa acicularis</i>	Prickly Rose	4.0
<i>Mertensia paniculata</i>	Tall Lungwort	1.6
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	1.0
	Litter	30.0

Table 4.12. HRU: Graminoid Wetland

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Larix laricina</i>	Tamarack	0.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Betula pumila</i>	Dwarf Birch	0.5
<i>Larix laricina</i>	Tamarack	0.2
Herb and Low Shrub Stratum (≤1m)		
<i>Calamagrostis</i> sp.	Reed Grass	11.5
<i>Carex pellita</i>	Woolly Sedge	3.5
<i>Carex atherodes</i>	Awned Sedge	3.3
<i>Betula pumila</i>	Dwarf Birch	2.5
<i>Andromeda polifolia</i>	Bog-rosemary	1.6
<i>Glyceria borealis</i>	Boreal Mannagrass	1.6
<i>Menyanthes trifoliata</i>	Bogbean	1.6
<i>Comarum palustre</i>	Marsh Cinquefoil	1.6
<i>Carex chordorrhiza</i>	Prostrate Sedge	1.2
<i>Utricularia vulgaris</i>	Common Bladderwort	1.0
<i>Equisetum fluviatile</i>	Swamp Horsetail	0.8
<i>Salix pedicellaris</i>	Bog Willow	0.8
<i>Drosera anglica</i>	Oblong-leaved Sundew	0.5
<i>Sarracenia purpurea</i>	Pitcher Plant	0.5
<i>Trichophorum alpinum</i>	Alpine Bulrush	0.5
<i>Calla palustris</i>	Wild Calla	0.4
<i>Carex gynocrates</i>	Bog Sedge	0.4
<i>Vaccinium oxycoccus</i>	Bog Cranberry	0.4
<i>Ranunculus gmelinii</i>	Small Yellow Water-crowfoot	0.3
<i>Carex diandra</i>	Two-stamened Sedge	0.2
<i>Cicuta bulbifera</i>	Bulblet-bearing Water Hemlock	0.2
<i>Larix laricina</i>	Tamarack	0.2
<i>Persicaria amphibia</i>	Water Smartweed	0.2
<i>Rubus acaulis</i>	Stemless Raspberry	0.2
<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	0.2
<i>Caltha palustris</i>	Marsh Marigold	0.1
<i>Carex aquatilis</i>	Water Sedge	0.1
<i>Drosera rotundifolia</i>	Round-leaved Sundew	0.1
<i>Epilobium palustre</i>	Marsh Willowherb	0.1
<i>Galium labradoricum</i>	Northern Bog Bedstraw	0.1

Scientific Name	Common Name	Mean % Cover
<i>Hippuris vulgaris</i>	Common Mare's Tail	0.1
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.1
<i>Sparganium angustifolium</i>	Narrow-leaved Bur-reed	0.1
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	22.8
<i>Sphagnum sp.</i>	Peat Moss	1.5
	Litter	55.5
	Water	1.0

Table 4.13. HRU: Treed Black Spruce/ Peat Moss Bog

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	4.0
<i>Larix laricina</i>	Tamarack	0.3
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	3.8
<i>Larix laricina</i>	Tamarack	0.2
<i>Salix planifolia</i>	Flat-leaved Willow	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	4.2
<i>Menyanthes trifoliata</i>	Bogbean	3.6
<i>Kalmia polifolia</i>	Pale Laurel	3.4
<i>Chamaedaphne calyculata</i>	Leatherleaf	3.2
<i>Carex limosa</i>	Mud Sedge	2.9
<i>Carex</i> sp.	Sedge	2.5
<i>Picea mariana</i>	Black Spruce	2.0
<i>Vaccinium oxycoccus</i>	Bog Cranberry	1.9
<i>Rubus chamaemorus</i>	Cloud Berry	1.6
<i>Larix laricina</i>	Tamarack	1.6
<i>Andromeda polifolia</i>	Bog-rosemary	1.2
<i>Salix pedicellaris</i>	Bog Willow	1.2
<i>Betula pumila</i>	Dwarf Birch	1.0
<i>Drosera rotundifolia</i>	Round-leaved Sundew	0.9
<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	0.8
<i>Drosera</i> sp.	Sundew	0.6
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	0.5
<i>Carex capillaris</i>	Hair-like Sedge	0.5
<i>Drosera anglica</i>	Oblong-leaved Sundew	0.5
<i>Eleocharis palustris</i>	Common Spike-rush	0.3
<i>Comarum palustre</i>	Marsh Cinquefoil	0.3
<i>Equisetum fluviatile</i>	Swamp Horsetail	0.3
<i>Carex aquatilis</i>	Water Sedge	0.2
<i>Carex trisperma</i>	Three-seeded Sedge	0.2
<i>Carex magellanica</i>	Bog Sedge	0.1
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.1
<i>Platanthera aquilonis</i>	Northern Green Bog Orchid	0.1
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	0.1

Scientific Name	Common Name	Mean % Cover
Nonvascular Ground Stratum and Inanimate Cover		
<i>Sphagnum</i> sp.	Peat Moss	74.0
<i>Pleurozium schreberi</i>	Schreber's Moss	4.0
<i>Cladina mitis</i>	Green Reindeer Lichen	3.5
	Unidentified Moss	1.1
<i>Icmadophila ericetorum</i>	Spraypaint	0.5
<i>Hylocomium splendens</i>	Splendid Feather Moss	0.2
<i>Cladonia</i> sp.	Cladonia	0.1
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	0.1
	Litter	8.6
	Water	1.0
	Organic matter	1.3

Table 5. Nine Community Types of the Mid-Boreal Lowland (MBL) Ecoregion.
Table 5.1. MBL: Jack Pine/Green Reindeer Lichen Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Pinus banksiana</i>	Jack Pine	23.3
<i>Betula papyrifera</i>	Paper Birch	1.7
<i>Populus tremuloides</i>	Trembling Aspen	0.7
<i>Picea mariana</i>	Black Spruce	0.3
<i>Salix bebbiana</i>	Bebb's Willow	0.3
Tall Shrub Stratum (1 - 2.5m)		
<i>Betula papyrifera</i>	Paper Birch	1.3
<i>Picea glauca</i>	White Spruce	0.5
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.5
<i>Picea mariana</i>	Black Spruce	0.3
<i>Pinus banksiana</i>	Jack Pine	0.3
<i>Populus balsamifera</i>	Balsam Poplar	0.1
<i>Rosa acicularis</i>	Prickly Rose	0.1
<i>Salix bebbiana</i>	Bebb's Willow	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Rosa acicularis</i>	Prickly Rose	5.4
<i>Arctostaphylos uva-ursi</i>	Bearberry	4.5
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	2.1
<i>Apocynum cannabinum</i>	Indian Hemp	2.1
<i>Leymus innovatus</i>	Boreal Wild Rye	1.9
<i>Shepherdia canadensis</i>	Canada Buffaloberry	1.3
<i>Symphoricarpos albus</i>	Snowberry	1.3
<i>Galium boreale</i>	Northern Bedstraw	1.1
<i>Linnaea borealis</i>	Twinflower	1.0
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.9
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.5
<i>Amelanchier alnifolia</i>	Saskatoon	0.3
<i>Prunus virginiana</i>	Chokecherry	0.3
<i>Lathyrus ochroleucus</i>	Cream-coloured Vetchling	0.3
<i>Solidago</i> sp.	Goldenrod	0.3
<i>Viburnum edule</i>	Low-bush Cranberry	0.3
<i>Diervilla lonicera</i>	Bush-Honeysuckle	0.2
<i>Juniperus communis</i>	Common Juniper	0.2
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	0.2
<i>Viola</i> sp.	Violet	0.2

Scientific Name	Common Name	Mean % Cover
<i>Campanula rotundifolia</i>	Harebells	0.1
<i>Ribes lacustre</i>	Swamp Gooseberry	0.1
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	0.1
<i>Carex</i> sp.	Sedge	0.1
<i>Lilium philadelphicum</i>	Wood Lily	0.1
<i>Piptatherum pungens</i>	Sharp Piptatherum	0.1
<i>Picea mariana</i>	Black Spruce	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladina mitis</i>	Green Reindeer Lichen	21.9
	Unidentified Lichen	1.4
	Unidentified Moss	0.9
<i>Cladonia</i> sp.	Cladonia	0.9
<i>Pleurozium schreberi</i>	Schreber's Moss	0.5
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	0.5
<i>Hylocomium splendens</i>	Splendid Feather Moss	0.5
<i>Polytrichum</i> sp.	Polytrichum Moss	0.1
	Litter	69.0
	Rock	3.4

Table 5.2. MBL: Regenerating Jack Pine Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Pinus banksiana</i>	Jack Pine	45.0
<i>Populus tremuloides</i>	Trembling Aspen	5.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Pinus banksiana</i>	Jack Pine	8.2
<i>Populus tremuloides</i>	Trembling Aspen	3.4
<i>Alnus viridis</i>	Green Alder	0.8
<i>Salix bebbiana</i>	Bebb's Willow	0.5
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.2
<i>Lonicera dioica</i>	Twining Honeysuckle	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Rosa acicularis</i>	Prickly Rose	7.2
<i>Picea mariana</i>	Black Spruce	6.1
<i>Cornus canadensis</i>	Bunchberry	5.9
<i>Shepherdia canadensis</i>	Canada Buffaloberry	5.9
<i>Chamerion angustifolium</i>	Fireweed	4.1
<i>Rubus pubescens</i>	Trailing Dewberry	2.1
<i>Viburnum edule</i>	Low-bush Cranberry	1.9
<i>Salix myrtillofolia</i>	Myrtle-leaved Willow	1.1
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	1.0
<i>Galium boreale</i>	Northern Bedstraw	1.0
<i>Vicia americana</i>	American Vetch	0.6
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.5
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.5
<i>Populus tremuloides</i>	Trembling Aspen	0.5
<i>Hedysarum alpinum</i>	American Hedysarum	0.4
<i>Lathyrus ochroleucus</i>	Cream-coloured Vetchling	0.4
<i>Solidago hispida</i>	Hairy Goldenrod	0.4
<i>Carex concinna</i>	Beautiful Sedge	0.3
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	0.3
<i>Amelanchier alnifolia</i>	Saskatoon	0.2
<i>Arctostaphylos uva-ursi</i>	Bearberry	0.2
<i>Leymus innovatus</i>	Boreal Wild Rye	0.2
<i>Pinus banksiana</i>	Jack Pine	0.2
	Unidentified Grass	0.2
<i>Alnus viridis</i>	Green Alder	0.1

Scientific Name	Common Name	Mean % Cover
<i>Betula papyrifera</i>	Paper Birch	0.1
<i>Linnaea borealis</i>	Twinflower	0.1
<i>Melampyrum lineare</i>	Cow-wheat	0.1
<i>Oryzopsis asperifolia</i>	Rice Grass	0.1
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.1
<i>Prunus</i> sp.	Cherry	0.1
<i>Rubus idaeus</i>	Raspberry	0.1
<i>Taraxacum officinale</i>	Common Dandelion	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Cladonia</i> sp.	Cladonia	1.9
<i>Peltigera</i> sp.	Pelt	0.5
<i>Cladina mitis</i>	Green Reindeer Lichen	0.3
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	0.1
	Litter	91.5

Table 5.3. MBL: Black Spruce-Tamarack/Labrador Tea-Common Horsetail/Schreber's Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	25.0
<i>Larix laricina</i>	Tamarack	10.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	5.8
<i>Alnus incana</i>	Speckled Alder	0.4
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	36.0
<i>Equisetum arvense</i>	Common Horsetail	23.0
<i>Alnus incana</i>	Speckled Alder	5.0
<i>Picea mariana</i>	Black Spruce	3.2
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	3.0
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	1.6
<i>Carex aquatilis</i>	Water Sedge	0.8
<i>Carex gynocrates</i>	Bog Sedge	0.4
<i>Geocaulon lividum</i>	Northern Comandra	0.4
<i>Vaccinium oxycoccus</i>	Bog Cranberry	0.4
<i>Empetrum nigrum</i>	Crowberry	0.2
<i>Equisetum fluviatile</i>	Swamp Horsetail	0.2
<i>Larix laricina</i>	Tamarack	0.2
<i>Orthilia secunda</i>	One-sided Wintergreen	0.2
<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Pleurozium schreberi</i>	Schreber's Moss	47.0
<i>Hylocomium splendens</i>	Splendid Feather Moss	17.6
	Unidentified Moss	16.4
	Unidentified Moss, aquatic	2.0
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	0.2
	Litter	3.4
	Water	12.0

Table 5.4. MBL: Black Spruce/Splendid Feather Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	45.0
<i>Pinus banksiana</i>	Jack Pine	5.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	1.4
Herb and Low Shrub Stratum (≤1m)		
<i>Juniperus communis</i>	Common Juniper	1.6
<i>Picea mariana</i>	Black Spruce	1.6
<i>Linnaea borealis</i>	Twinflower	1.2
<i>Galium boreale</i>	Northern Bedstraw	0.8
<i>Rosa acicularis</i>	Prickly Rose	0.6
	Unidentified Grass	0.4
<i>Amelanchier alnifolia</i>	Saskatoon	0.2
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.2
<i>Cornus canadensis</i>	Bunchberry	0.2
<i>Lonicera dioica</i>	Twining Honeysuckle	0.2
<i>Mitella nuda</i>	Mitrewort	0.2
<i>Viburnum edule</i>	Low-bush Cranberry	0.2
<i>Viola renifolia</i>	Kidney-leaved Violet	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Hylocomium splendens</i>	Splendid Feather Moss	93.0
<i>Pleurozium schreberi</i>	Schreber's Moss	2.0
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	0.4
<i>Peltigera</i> sp.	Pelt	0.4
	Unidentified Moss	0.2
	Litter	5.0

Table 5.5. MBL: Tamarack/Speckled Alder/Peat Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Larix laricina</i>	Tamarack	35.0
<i>Picea mariana</i>	Black Spruce	5.0
Tall Shrub Stratum (1 - 2.5m)		
<i>Alnus incana</i>	Speckled Alder	12.6
<i>Betula papyrifera</i>	Paper Birch	6.0
Herb and Low Shrub Stratum (≤1m)		
<i>Carex disperma</i>	Two-seeded Sedge	7.4
<i>Linnaea borealis</i>	Twinflower	5.0
<i>Lycopodium annotinum</i>	Stiff Club-moss	4.2
<i>Viola</i> sp.	Violet	4.0
<i>Alnus incana</i>	Speckled Alder	3.6
<i>Equisetum arvense</i>	Common Horsetail	3.6
<i>Picea mariana</i>	Black Spruce	2.6
<i>Carex canescens</i>	Grey Sedge	1.6
<i>Rubus pubescens</i>	Trailing Dewberry	1.0
<i>Stellaria longifolia</i>	Long-leaved Starwort	1.0
<i>Mitella nuda</i>	Mitrewort	0.8
	Unidentified Grass	0.8
<i>Calamagrostis</i> sp.	Reed Grass	0.6
<i>Comarum palustre</i>	Marsh Cinquefoil	0.6
<i>Ranunculus lapponicus</i>	Lapland Buttercup	0.6
<i>Carex</i> sp.	Sedge	0.6
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.4
<i>Pyrola</i> sp.	Wintergreen	0.4
<i>Ribes triste</i>	Swamp Red Currant	0.4
<i>Betula papyrifera</i>	Paper Birch	0.2
<i>Calla palustris</i>	Wild Calla	0.2
<i>Circaea alpina</i>	Small Enchanter's Nightshade	0.2
<i>Epilobium glandulosum</i>	Northern Willowherb	0.2
<i>Galium labradoricum</i>	Northern Bog Bedstraw	0.2
<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	0.2
Nonvascular Ground Stratum and Inanimate Cover		
<i>Sphagnum</i> sp.	Peat Moss	40.0
	Unidentified Moss	0.4
	Litter	34.6

Table 5.6. MBL: Jack Pine-White Spruce-Trembling Aspen/Common Juniper/Schreber's Moss Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Pinus banksiana</i>	Jack Pine	11.7
<i>Picea glauca</i>	White Spruce	7.7
<i>Populus tremuloides</i>	Trembling Aspen	7.3
<i>Picea mariana</i>	Black Spruce	1.3
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	3.5
<i>Picea glauca</i>	White Spruce	1.8
<i>Juniperus communis</i>	Common Juniper	1.0
<i>Alnus viridis</i>	Green Alder	0.1
<i>Betula papyrifera</i>	Paper Birch	0.1
<i>Populus tremuloides</i>	Trembling Aspen	0.1
<i>Amelanchier alnifolia</i>	Saskatoon	0.1
<i>Salix bebbiana</i>	Bebb's Willow	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Juniperus communis</i>	Common Juniper	12.1
<i>Arctostaphylos uva-ursi</i>	Bearberry	6.6
<i>Rosa acicularis</i>	Prickly Rose	3.6
<i>Linnaea borealis</i>	Twinflower	3.3
<i>Picea mariana</i>	Black Spruce	2.3
<i>Picea</i> sp.	Spruce	2.0
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	1.2
<i>Oryzopsis asperifolia</i>	Rice Grass	1.0
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.7
<i>Cornus canadensis</i>	Bunchberry	0.6
<i>Galium boreale</i>	Northern Bedstraw	0.5
<i>Symphoricarpos albus</i>	Snowberry	0.5
<i>Epilobium glandulosum</i>	Northern Willowherb	0.5
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	0.5
<i>Amelanchier alnifolia</i>	Saskatoon	0.4
<i>Maianthemum canadense</i>	Canada May Flower	0.4
<i>Rubus pubescens</i>	Trailing Dewberry	0.4
<i>Solidago hispida</i>	Hairy Goldenrod	0.3
<i>Viburnum edule</i>	Low-bush Cranberry	0.3
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.3

Scientific Name	Common Name	Mean % Cover
<i>Leymus innovatus</i>	Boreal Wild Rye	0.3
<i>Carex vaginata</i>	Sheathed Sedge	0.2
<i>Geocaulon lividum</i>	Northern Comandra	0.2
<i>Lonicera dioica</i>	Twining Honeysuckle	0.2
<i>Melampyrum lineare</i>	Cow-wheat	0.2
<i>Carex concinna</i>	Beautiful Sedge	0.1
<i>Piptatherum pungens</i>	Sharp Piptatherum	0.1
<i>Orthilia secunda</i>	One-sided Wintergreen	0.1
<i>Viola renifolia</i>	Kidney-leaved Violet	0.1
<i>Achillea millefolium</i>	Yarrow	0.1
<i>Anemone patens</i>	Prairie Crocus	0.1
<i>Comandra umbellata</i>	Bastard Toadflax	0.1
<i>Cornus sericea</i>	Red-osier Dogwood	0.1
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.1
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.1
<i>Solidago</i> sp.	Goldenrod	0.1
<i>Viola</i> sp.	Violet	0.1
<i>Zigadenus elegans</i>	Smooth Camas	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Pleurozium schreberi</i>	Schreber's Moss	28.3
<i>Cladina mitis</i>	Green Reindeer Lichen	13.3
<i>Hylocomium splendens</i>	Splendid Feather Moss	5.9
<i>Dicranum</i> sp.	Dicranum Moss	1.8
	Unidentified Moss	1.1
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	0.5
<i>Polytrichum</i> sp.	Polytrichum Moss	0.3
<i>Cladonia</i> sp.	Cladonia	0.3
	Unidentified Lichen	0.1
	Litter	44.9
	Rock	0.1

Table 5.7. MBL: Wet Sedge Meadow

Scientific Name	Common Name	Mean % Cover
Herb and Low Shrub Stratum (≤1m)		
<i>Carex pellita</i>	Woolly Sedge	22.9
<i>Carex aquatilis</i>	Water Sedge	8.8
<i>Utricularia intermedia</i>	Flat-leaved Bladderwort	6.1
<i>Menyanthes trifoliata</i>	Bog Bean	5.3
<i>Equisetum fluviatile</i>	Swamp Horsetail	3.8
<i>Calamagrostis canadensis</i>	Canada Reed Grass	3.7
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	2.3
<i>Carex chordorrhiza</i>	Prostrate Sedge	1.5
<i>Betula pumila</i>	Dwarf Birch	0.9
<i>Sarracenia purpurea</i>	Pitcher Plant	0.7
<i>Viola</i> sp.	Violet	0.5
<i>Carex magellanica</i>	Bog Sedge	0.4
<i>Trichophorum cespitosum</i>	Tufted Bulrush	0.4
<i>Galium labradoricum</i>	Northern Bog Bedstraw	0.3
<i>Persicaria amphibia</i>	Water Smartweed	0.3
<i>Typha latifolia</i>	Common Cat-tail	0.3
<i>Symphyotrichum boreale</i>	Northern Bog Aster	0.3
<i>Salix pedicellaris</i>	Bog Willow	0.3
<i>Andromeda polifolia</i>	Bog-rosemary	0.2
<i>Drosera anglica</i>	Oblong-leaved Sundew	0.2
<i>Drosera linearis</i>	Slender-leaved Sundew	0.2
<i>Larix laricina</i>	Tamarack	0.2
<i>Scheuchzeria palustris</i>	Pod-grass	0.2
<i>Callitriche verna</i>	Water-starwort	0.1
<i>Cicuta maculata</i>	Spotted Water Hemlock	0.1
<i>Eleocharis</i> sp.	Spike-rush	0.1
<i>Eriophorum angustifolium</i>	Cotton-grass	0.1
<i>Ranunculus aquatilis</i>	Water Crowfoot	0.1
<i>Vaccinium oxycoccus</i>	Bog Cranberry	0.1
<i>Agrostis</i> sp.	Bent Grass	0.1
<i>Eleocharis palustris</i>	Common Spike-rush	0.1
<i>Epilobium palustre</i>	Marsh Willowherb	0.1
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	16.9
	Litter	28.0
	Water	50.3

Table 5.8. MBL: Treed Black Spruce-Tamarack /Dwarf Birch/Peat Moss Bog

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Larix laricina</i>	Tamarack	1.5
<i>Picea mariana</i>	Black Spruce	1.5
Tall Shrub Stratum (1 - 2.5m)		
<i>Larix laricina</i>	Tamarack	1.6
<i>Picea mariana</i>	Black Spruce	0.8
<i>Betula pumila</i>	Dwarf Birch	0.7
Herb and Low Shrub Stratum (≤1m)		
<i>Betula pumila</i>	Dwarf Birch	7.1
<i>Carex vaginata</i>	Sheathed Sedge	4.5
<i>Picea mariana</i>	Black Spruce	4.1
<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	3.5
<i>Carex gynocrates</i>	Bog Sedge	1.6
<i>Comarum palustre</i>	Marsh Cinquefoil	1.6
<i>Equisetum fluviatile</i>	Swamp Horsetail	1.4
<i>Vaccinium oxycoccus</i>	Bog Cranberry	1.4
<i>Andromeda polifolia</i>	Bog-rosemary	1.2
<i>Salix pedicellaris</i>	Bog Willow	1.1
<i>Drosera rotundifolia</i>	Round-leaved Sundew	0.9
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.7
<i>Rubus acaulis</i>	Stemless Raspberry	0.7
<i>Carex scirpoidea</i>	Rush-like Sedge	0.6
<i>Trichophorum cespitosum</i>	Tufted Bulrush	0.3
<i>Galium labradoricum</i>	Northern Bog Bedstraw	0.2
<i>Larix laricina</i>	Tamarack	0.2
<i>Menyanthes trifoliata</i>	Bog Bean	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Sphagnum</i> sp.	Peat Moss	39.5
	Unidentified Moss	27.8
	Litter	6.5
	Water	9.0

Table 5.9. MBL: Sparsely Treed Black Spruce/Labrador Tea/Peat Moss-Schreber's Moss Bog

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	8.5
<i>Larix laricina</i>	Tamarack	1.0
<i>Pinus banksiana</i>	Jack Pine	0.3
Tall Shrub Stratum (1 - 2.5m)		
<i>Picea mariana</i>	Black Spruce	9.2
<i>Salix planifolia</i>	Flat-leaved Willow	1.0
<i>Betula pumila</i>	Dwarf Birch	0.4
<i>Larix laricina</i>	Tamarack	0.1
<i>Salix pedicellaris</i>	Bog Willow	0.1
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	11.8
<i>Picea mariana</i>	Black Spruce	5.8
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	5.8
<i>Maianthemum trifolium</i>	Three-leaved Solomon's Seal	3.0
<i>Vaccinium oxycoccus</i>	Bog Cranberry	1.5
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	1.3
<i>Trichophorum cespitosum</i>	Tufted Bulrush	1.3
<i>Equisetum arvense</i>	Common Horsetail	1.1
<i>Rubus chamaemorus</i>	Cloud Berry	1.1
<i>Betula pumila</i>	Dwarf Birch	1.0
<i>Andromeda polifolia</i>	Bog-rosemary	0.9
<i>Juniperus horizontalis</i>	Creeping Juniper	0.9
<i>Drosera rotundifolia</i>	Round-leaved Sundew	0.8
<i>Carex vaginata</i>	Sheathed Sedge	0.8
<i>Carex scirpoidea</i>	Rush-like Sedge	0.7
<i>Salix myrtillofolia</i>	Myrtle-leaved Willow	0.7
<i>Cornus canadensis</i>	Bunchberry	0.6
<i>Kalmia polifolia</i>	Pale Laurel	0.6
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.6
<i>Linnaea borealis</i>	Twinflower	0.5
<i>Arctous alpina</i>	Alpine Bearberry	0.4
<i>Geocaulon lividum</i>	Northern Comandra	0.4
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.4
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	0.3
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.3

Scientific Name	Common Name	Mean % Cover
<i>Leymus innovatus</i>	Boreal Wild Rye	0.2
<i>Equisetum pratense</i>	Meadow Horsetail	0.2
<i>Salix bebbiana</i>	Bebb's Willow	0.2
<i>Comandra umbellata</i>	Bastard Toadflax	0.2
<i>Salix pedicellaris</i>	Bog Willow	0.2
<i>Platanthera</i> sp.	Rein Orchid	0.1
<i>Anemone quinquefolia</i>	Wood Amemone	0.1
<i>Carex disperma</i>	Two-seeded Sedge	0.1
<i>Chamaedaphne calyculata</i>	Leatherleaf	0.1
<i>Coptis trifolia</i>	Goldthread	0.1
<i>Equisetum fluviatile</i>	Swamp Horsetail	0.1
<i>Galium boreale</i>	Northern Bedstraw	0.1
<i>Myrica gale</i>	Sweet Gale	0.1
<i>Oryzopsis asperifolia</i>	Rice Grass	0.1
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.1
<i>Rosa acicularis</i>	Prickly Rose	0.1
<i>Solidago</i> sp.	Goldenrod	0.1
<i>Trientalis borealis</i>	Northern Starflower	0.1
Nonvascular Ground Stratum and Inanimate Cover		
<i>Sphagnum</i> sp.	Peat Moss	52.0
<i>Pleurozium schreberi</i>	Schreber's Moss	21.6
<i>Cladina rangiferina</i>	Grey Reindeer Lichen	14.5
<i>Cladina mitis</i>	Green Reindeer Lichen	2.7
<i>Cladina stellaris</i>	Northern Reindeer Lichen	1.1
<i>Hylocomium splendens</i>	Splendid Feather Moss	0.4
	Unidentified Moss	0.4
<i>Cladonia</i> sp.	Cladonia	0.3
<i>Polytrichum</i> sp.	Polytrichum Moss	0.2
<i>Icmadophila ericetorum</i>	Spraypaint	0.1
	Litter	7.9
	Water	0.1

Table 6. Five Community Types of the Interlake Plain (IP) Ecoregion.
Table 6.1. IP: Closed Black Spruce—Coniferous Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Picea mariana</i>	Black Spruce	61.67
<i>Pinus banksiana</i>	Jack Pine	6.67
<i>Larix laricina</i>	Tamarack	5.50
<i>Populus tremuloides</i>	Trembling Aspen	2.83
<i>Alnus incana</i>	Speckled Alder	1.50
<i>Salix</i> sp.	Willow	0.40
Tall Shrub Stratum (1 - 2.5m)		
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	4.17
<i>Larix laricina</i>	Tamarack	2.83
<i>Picea mariana</i>	Black Spruce	2.83
<i>Alnus incana</i>	Speckled Alder	1.67
<i>Salix</i> sp.	Willow	1.33
<i>Shepherdia canadensis</i>	Canada Buffaloberry	1.33
<i>Populus tremuloides</i>	Trembling Aspen	1.03
<i>Cornus sericea</i>	Red-osier Dogwood	0.90
<i>Alnus viridis</i>	Green Alder	0.57
<i>Amelanchier alnifolia</i>	Saskatoon	0.37
<i>Juniperus communis</i>	Common Juniper	0.33
<i>Rosa acicularis</i>	Prickly Rose	0.30
<i>Lonicera dioica</i>	Twining Honeysuckle	0.20
<i>Populus balsamifera</i>	Balsam Poplar	0.20
<i>Betula pumila</i>	Dwarf Birch	0.10
<i>Viburnum edule</i>	Low-bush Cranberry	0.03
Herb and Low Shrub Stratum (≤1m)		
<i>Rhododendron groenlandicum</i>	Labrador Tea	13.60
<i>Linnaea borealis</i>	Twinflower	6.03
<i>Carex</i> sp.	Sedge	4.07
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	3.97
<i>Cornus canadensis</i>	Bunchberry	3.60
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	2.43
<i>Juniperus horizontalis</i>	Creeping Juniper	2.10
<i>Mitella nuda</i>	Mitrewort	1.93
<i>Arctostaphylos uva-ursi</i>	Bearberry	1.73
<i>Maianthemum canadense</i>	Canada May Flower	1.67
<i>Rubus pubescens</i>	Trailing Dewberry	1.67

Scientific Name	Common Name	Mean % Cover
<i>Picea mariana</i>	Black Spruce	1.50
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	1.37
<i>Equisetum arvense</i>	Common Horsetail	1.10
<i>Rosa acicularis</i>	Prickly Rose	1.03
<i>Larix laricina</i>	Tamarack	0.83
<i>Vaccinium oxycoccus</i>	Bog Cranberry	0.70
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	0.67
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.67
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.67
<i>Salix</i> sp.	Willow	0.67
<i>Trientalis borealis</i>	Northern Starflower	0.57
<i>Galium boreale</i>	Northern Bedstraw	0.50
<i>Andromeda polifolia</i>	Bog-rosemary	0.47
<i>Geocaulon lividum</i>	Northern Comandra	0.47
<i>Alnus incana</i>	Speckled Alder	0.40
<i>Viola</i> sp.	Violet	0.37
<i>Equisetum hyemale</i>	Common Scouring-rush	0.33
<i>Viburnum edule</i>	Low-bush Cranberry	0.33
<i>Comandra umbellata</i>	Bastard Toadflax	0.27
<i>Polygala paucifolia</i>	Fringed Milkwort	0.27
<i>Vaccinium angustifolium</i>	Blueberry	0.27
<i>Cornus sericea</i>	Red-osier Dogwood	0.23
	Unidentified Composite Forb	0.23
	Unidentified Forb	0.23
<i>Pyrola</i> sp.	Wintergreen	0.20
<i>Lathyrus</i> sp.	Vetchling	0.17
<i>Symphoricarpos occidentalis</i>	Western Snowberry	0.17
	Unidentified Grass	0.17
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.13
<i>Taraxacum officinale</i>	Common Dandelion	0.13
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.10
<i>Coptis trifolia</i>	Goldthread	0.10
<i>Galium triflorum</i>	Sweet-scented Bedstraw	0.10
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.10
<i>Maianthemum stellatum</i>	Solomon's Seal	0.10
<i>Symphyotrichum</i> sp.	Aster	0.07
<i>Cinna latifolia</i>	Slender Woodreed	0.07
<i>Lathyrus palustris</i>	Marsh Vetchling	0.07
<i>Lonicera dioica</i>	Twining Honeysuckle	0.07

Scientific Name	Common Name	Mean % Cover
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved Coltsfoot	0.07
<i>Ribes triste</i>	Swamp Red Currant	0.07
<i>Bromus inermis</i>	Smooth Brome	0.03
<i>Danthonia intermedia</i>	Timber Oatgrass	0.03
<i>Vaccinium</i> sp.	Blueberry/Cranberry	0.03
<i>Zizia aptera</i>	Heart-leaved Alexander	0.03
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	29.83
<i>Pleurozium schreberi</i>	Schreber's Moss	19.85
<i>Hylocomium splendens</i>	Splendid Feather Moss	7.25
<i>Sphagnum</i> sp.	Peat Moss	3.67
<i>Cladina</i> sp.	Reindeer Lichen	3.03
	Unidentified Lichen	1.27
<i>Dicranum</i> sp.	Dicranum Moss	0.67
<i>Polytrichum</i> sp.	Polytrichum Moss	0.17
	Unidentified Crustose Lichen	0.03
	Litter	15.50
	Water	0.43

Table 6.2. IP: Open Trembling Aspen—Mixed/ Tall Shrub Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	33.00
<i>Picea glauca</i>	White Spruce	12.20
<i>Salix</i> sp.	Willow	1.00
<i>Betula papyrifera</i>	Paper Birch	0.40
<i>Populus balsamifera</i>	Balsam Poplar	0.20
Tall Shrub Stratum (1 - 2.5m)		
<i>Corylus americana</i>	American Hazelnut	28.60
<i>Amelanchier alnifolia</i>	Saskatoon	8.08
<i>Cornus sericea</i>	Red-osier Dogwood	6.96
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	5.60
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	5.28
<i>Betula pumila</i>	Dwarf Birch	3.60
<i>Rosa acicularis</i>	Prickly Rose	2.92
<i>Prunus virginiana</i>	Chokecherry	2.36
<i>Populus tremuloides</i>	Trembling Aspen	1.88
<i>Salix</i> sp.	Willow	1.60
<i>Lonicera dioica</i>	Twining Honeysuckle	1.52
<i>Shepherdia canadensis</i>	Canada Buffaloberry	1.20
<i>Viburnum opulus</i>	High-bush Cranberry	1.12
<i>Rubus idaeus</i>	Raspberry	0.68
<i>Viburnum edule</i>	Low-bush Cranberry	0.60
<i>Symphoricarpos occidentalis</i>	Western Snowberry	0.32
<i>Alnus viridis</i>	Green Alder	0.20
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.08
Herb and Low Shrub Stratum (≤1m)		
<i>Corylus cornuta</i>	Beaked Hazelnut	6.88
<i>Cornus canadensis</i>	Bunchberry	6.32
<i>Rubus pubescens</i>	Trailing Dewberry	5.32
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	5.24
<i>Rosa acicularis</i>	Prickly Rose	5.12
<i>Carex</i> sp.	Sedge	5.04
<i>Linnaea borealis</i>	Twinflower	4.32
<i>Diervilla lonicera</i>	Bush-Honeysuckle	4.20
<i>Galium boreale</i>	Northern Bedstraw	3.60
<i>Danthonia intermedia</i>	Timber Oatgrass	3.20

Scientific Name	Common Name	Mean % Cover
<i>Maianthemum canadense</i>	Canada May Flower	3.12
<i>Arctostaphylos uva-ursi</i>	Bearberry	2.56
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	2.40
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	2.40
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	2.20
<i>Thalictrum</i> sp.	Meadowrue	2.16
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	1.96
<i>Coptis trifolia</i>	Goldthread	1.92
<i>Lathyrus</i> sp.	Vetchling	1.88
<i>Amelanchier alnifolia</i>	Saskatoon	1.84
<i>Cornus sericea</i>	Red-osier Dogwood	1.80
<i>Mitella nuda</i>	Mitrewort	1.72
<i>Symphoricarpos occidentalis</i>	Western Snowberry	1.56
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	1.48
<i>Lonicera dioica</i>	Twining Honeysuckle	1.44
<i>Sanicula marilandica</i>	Seneca Snakeroot	1.24
<i>Prunus virginiana</i>	Chokecherry	1.20
<i>Pyrola</i> sp.	Wintergreen	0.88
<i>Viburnum edule</i>	Low-bush Cranberry	0.88
<i>Vicia</i> sp.	Vetch	0.84
<i>Lathyrus ochroleucus</i>	Cream-coloured Vetchling	0.80
<i>Picea glauca</i>	White Spruce	0.80
<i>Oryzopsis asperifolia</i>	Rice Grass	0.72
<i>Populus tremuloides</i>	Trembling Aspen	0.64
<i>Betula pumila</i>	Dwarf Birch	0.60
<i>Comandra umbellata</i>	Bastard Toadflax	0.60
<i>Salix</i> sp.	Willow	0.60
<i>Zigadenus elegans</i>	Smooth Camas	0.52
<i>Achillea millefolium</i>	Yarrow	0.48
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.48
<i>Taraxacum officinale</i>	Common Dandelion	0.44
<i>Viola</i> sp.	Violet	0.44
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	0.40
<i>Lathyrus palustris</i>	Marsh Vetchling	0.36
<i>Rubus idaeus</i>	Raspberry	0.32
<i>Vaccinium angustifolium</i>	Blueberry	0.32
<i>Galium triflorum</i>	Sweet-scented Bedstraw	0.24
<i>Bromus ciliatus</i>	Fringed Brome	0.20

Scientific Name	Common Name	Mean % Cover
<i>Calamagrostis stricta</i>	Northern Reed Grass	0.20
<i>Stellaria calycantha</i>	Northern Starwort	0.20
<i>Trientalis borealis</i>	Northern Starflower	0.20
<i>Viola renifolia</i>	Kidney-leaved Violet	0.20
<i>Poa</i> sp.	Bluegrass	0.16
<i>Polygala paucifolia</i>	Fringed Milkwort	0.16
<i>Actaea rubra</i>	Baneberry	0.12
<i>Anemone canadensis</i>	Canada Anemone	0.12
<i>Larix laricina</i>	Tamarack	0.12
<i>Trifolium repens</i>	White Clover	0.12
	Unidentified Forb	0.12
	Unidentified Grass	0.12
<i>Elymus repens</i>	Quackgrass	0.08
<i>Symphyotrichum</i> sp.	Aster	0.08
<i>Rhododendron groenlandicum</i>	Labrador Tea	0.08
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.08
<i>Maianthemum stellatum</i>	Solomon's Seal	0.08
<i>Solidago</i> sp.	Goldenrod	0.08
	Unidentified Composite Forb	0.08
<i>Corallorhiza trifida</i>	Early Coral-root	0.04
<i>Ribes triste</i>	Swamp Red Currant	0.04
<i>Vicia americana</i>	American Vetch	0.04
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	3.08
	Litter	47.52

Table 6.3. IP: Closed Deciduous—Mixed Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus balsamifera</i>	Balsam Poplar	16.00
<i>Picea glauca</i>	White Spruce	14.00
<i>Pinus banksiana</i>	Jack Pine	14.00
<i>Betula papyrifera</i>	Paper Birch	13.00
<i>Populus tremuloides</i>	Trembling Aspen	13.00
<i>Alnus incana</i>	Speckled Alder	11.00
<i>Picea mariana</i>	Black Spruce	10.00
<i>Abies balsamea</i>	Balsam Fir	4.00
<i>Salix</i> sp.	Willow	4.00
<i>Larix laricina</i>	Tamarack	2.00
Tall Shrub Stratum (1 - 2.5m)		
<i>Cornus sericea</i>	Red-osier Dogwood	6.44
<i>Alnus incana</i>	Speckled Alder	4.00
<i>Rosa acicularis</i>	Prickly Rose	2.32
<i>Salix</i> sp.	Willow	1.80
<i>Picea glauca</i>	White Spruce	1.40
<i>Populus balsamifera</i>	Balsam Poplar	1.40
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	1.12
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.68
<i>Amelanchier alnifolia</i>	Saskatoon	0.40
<i>Betula papyrifera</i>	Paper Birch	0.40
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.20
<i>Viburnum edule</i>	Low-bush Cranberry	0.20
Herb and Low Shrub Stratum (≤1m)		
<i>Rubus pubescens</i>	Trailing Dewberry	7.16
<i>Carex</i> sp.	Sedge	5.36
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	4.84
<i>Rosa acicularis</i>	Prickly Rose	4.52
<i>Linnaea borealis</i>	Twinflower	4.48
<i>Cornus canadensis</i>	Bunchberry	4.20
<i>Arctostaphylos uva-ursi</i>	Bearberry	4.08
<i>Equisetum arvense</i>	Common Horsetail	3.60
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	3.56
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	2.96
<i>Salix</i> sp.	Willow	2.80

Scientific Name	Common Name	Mean % Cover
<i>Rhododendron groenlandicum</i>	Labrador Tea	2.68
<i>Mitella nuda</i>	Mitrewort	2.60
<i>Maianthemum canadense</i>	Canada May Flower	2.48
<i>Cornus sericea</i>	Red-osier Dogwood	1.60
<i>Ribes triste</i>	Swamp Red Currant	1.36
<i>Trientalis borealis</i>	Northern Starflower	1.36
<i>Picea mariana</i>	Black Spruce	1.20
<i>Galium boreale</i>	Northern Bedstraw	1.12
<i>Chamerion angustifolium</i>	Fireweed	1.08
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	1.00
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.84
<i>Amelanchier alnifolia</i>	Saskatoon	0.80
<i>Lycopodium annotinum</i>	Stiff Club-moss	0.80
<i>Cinna latifolia</i>	Slender Woodreed	0.72
<i>Abies balsamea</i>	Balsam Fir	0.60
<i>Viola</i> sp.	Violet	0.60
<i>Viburnum edule</i>	Low-bush Cranberry	0.48
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	0.40
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.40
<i>Ribes oxycanthoides</i>	Northern Gooseberry	0.40
<i>Taraxacum officinale</i>	Common Dandelion	0.32
<i>Picea glauca</i>	White Spruce	0.28
	Unidentified Grass	0.28
<i>Alnus incana</i>	Speckled Alder	0.24
<i>Lathyrus palustris</i>	Marsh Vetchling	0.20
<i>Populus tremuloides</i>	Trembling Aspen	0.20
<i>Lonicera dioica</i>	Twining Honeysuckle	0.16
	Unidentified Composite Forb	0.16
<i>Galium triflorum</i>	Sweet-scented Bedstraw	0.12
<i>Geocaulon lividum</i>	Northern Comandra	0.12
<i>Populus balsamifera</i>	Balsam Poplar	0.12
<i>Danthonia intermedia</i>	Timber Oatgrass	0.08
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.08
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.04
<i>Symphyotrichum</i> sp.	Aster	0.04
<i>Bromus inermis</i>	Smooth Brome	0.04
<i>Cirsium arvense</i>	Canada Thistle	0.04
<i>Helianthus</i> sp.	Sunflower	0.04

Scientific Name	Common Name	Mean % Cover
<i>Pyrola</i> sp.	Wintergreen	0.04
<i>Rubus idaeus</i>	Raspberry	0.04
<i>Solidago</i> sp.	Goldenrod	0.04
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	8.36
<i>Hylocomium splendens</i>	Splendid Feather Moss	1.86
<i>Pleurozium schreberi</i>	Schreber's Moss	1.86
<i>Cladina</i> sp.	Reindeer Lichen	1.12
<i>Peltigera</i> sp.	Pelt	0.32
	Unidentified Lichen	0.12
	Litter	55.68

Table 6.4. IP: Closed Deciduous/ Tall Shrub Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	53.33
<i>Acer negundo</i>	Manitoba Maple	23.33
<i>Prunus virginiana</i>	Chokecherry	16.67
<i>Salix</i> sp.	Willow	16.67
<i>Populus balsamifera</i>	Balsam Poplar	10.00
<i>Alnus incana</i>	Speckled Alder	0.67
Tall Shrub Stratum (1 - 2.5m)		
<i>Rubus idaeus</i>	Raspberry	11.00
<i>Rosa acicularis</i>	Prickly Rose	5.93
<i>Populus tremuloides</i>	Trembling Aspen	4.67
<i>Salix</i> sp.	Willow	4.47
<i>Cornus sericea</i>	Red-osier Dogwood	3.33
<i>Acer negundo</i>	Manitoba Maple	2.20
<i>Populus balsamifera</i>	Balsam Poplar	1.67
<i>Prunus virginiana</i>	Chokecherry	1.60
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	1.33
<i>Spiraea alba</i>	Meadowsweet	1.00
<i>Viburnum lentago</i>	Nannyberry	0.67
Herb and Low Shrub Stratum (≤1m)		
<i>Rubus idaeus</i>	Raspberry	23.00
	Unidentified Grass	6.67
<i>Anemone canadensis</i>	Canada Anemone	6.00
<i>Carex</i> sp.	Sedge	5.00
<i>Rosa acicularis</i>	Prickly Rose	4.33
<i>Ribes triste</i>	Swamp Red Currant	2.93
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved Coltsfoot	2.20
<i>Thalictrum dasycarpum</i>	Hairy Meadowrue	1.60
<i>Solidago</i> sp.	Goldenrod	1.53
<i>Urtica dioica</i>	Stinging Nettle	1.33
<i>Prunus virginiana</i>	Chokecherry	1.27
<i>Equisetum arvense</i>	Common Horsetail	1.20
<i>Rubus pubescens</i>	Trailing Dewberry	1.13
<i>Populus balsamifera</i>	Balsam Poplar	1.13
<i>Thalictrum</i> sp.	Meadowrue	0.80
<i>Populus tremuloides</i>	Trembling Aspen	0.80
<i>Caltha palustris</i>	Marsh Marigold	0.80

Scientific Name	Common Name	Mean % Cover
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.73
<i>Maianthemum stellatum</i>	Solomon's Seal	0.67
<i>Humulus lupulus</i>	Common Hop	0.67
<i>Cornus sericea</i>	Red-osier Dogwood	0.67
<i>Agastache foeniculum</i>	Giant Hyssop	0.67
<i>Cirsium arvense</i>	Canada Thistle	0.60
<i>Stellaria calycantha</i>	Northern Starwort	0.53
<i>Lonicera dioica</i>	Twining Honeysuckle	0.53
<i>Taraxacum officinale</i>	Common Dandelion	0.47
<i>Spiraea alba</i>	Meadowsweet	0.47
<i>Helianthus</i> sp.	Sunflower	0.47
<i>Galium boreale</i>	Northern Bedstraw	0.47
	Unidentified Forb	0.40
<i>Salix</i> sp.	Willow	0.33
<i>Lathyrus palustris</i>	Marsh Vetchling	0.27
<i>Elymus repens</i>	Quackgrass	0.27
<i>Cornus canadensis</i>	Bunchberry	0.20
<i>Cirsium</i> sp.	Thistle	0.20
	Unidentified Composite Forb	0.20
<i>Maianthemum canadense</i>	Canada May Flower	0.13
<i>Galium triflorum</i>	Sweet-scented Bedstraw	0.13
<i>Cinna latifolia</i>	Slender Woodreed	0.13
<i>Alnus incana</i>	Speckled Alder	0.13
<i>Botrychium virginianum</i>	Common Grape-fern	0.07
<i>Acer negundo</i>	Manitoba Maple	0.07
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	0.53
	Litter	66.67
	Water	15.33

Table 6.5. IP: Salt Marsh Wetland

Scientific Name	Common Name	Mean % Cover
Herb and Low Shrub Stratum (≤1m)		
<i>Juncus arcticus</i>	Arctic Rush	20.00
<i>Eleocharis palustris</i>	Common Spike-rush	8.20
<i>Calamagrostis</i> sp.	Reed Grass	6.80
<i>Lycopus asper</i>	Western Waterhorehound	4.60
<i>Lysimachia maritima</i>	Sea Milkwort	0.60
<i>Symphyotrichum boreale</i>	Northern Bog Aster	0.40
<i>Cicuta maculate</i>	Spotted Water Hemlock	0.40
<i>Triglochin maritima</i>	Seaside Arrow-grass	0.40
<i>Triglochin palustris</i>	Marsh Arrow-grass	0.40
<i>Carex pellita</i>	Woolly Sedge	0.20
Nonvascular Ground Stratum and Inanimate Cover		
	Litter	50.00
	Water	28.00

Table 7. Seven Community Types of the Lake Manitoba Plain (LMP) Ecoregion.
Table 7.1. LMP: Sparse Trembling Aspen—Balsam Poplar Deciduous Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	16.22
<i>Populus balsamifera</i>	Balsam Poplar	6.67
Tall Shrub Stratum (1 - 2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	3.33
<i>Betula</i> sp.	Birch	2.20
<i>Alnus viridis</i>	Green Alder	2.00
<i>Viburnum opulus</i>	High-bush Cranberry	1.67
<i>Salix</i> sp.	Willow	1.33
<i>Amelanchier alnifolia</i>	Saskatoon	1.07
<i>Salix bebbiana</i>	Bebb's Willow	1.07
<i>Cornus sericea</i>	Red-osier Dogwood	0.93
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.67
<i>Viburnum lentago</i>	Nannyberry	0.47
<i>Prunus virginiana</i>	Chokecherry	0.33
<i>Salix monticola</i>	Mountain Willow	0.13
Herb and Low Shrub Stratum (≤1m)		
<i>Rubus pubescens</i>	Trailing Dewberry	5.73
<i>Cornus sericea</i>	Red-osier Dogwood	3.73
<i>Poa</i> sp.	Bluegrass	2.53
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	2.40
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	2.07
	Unidentified Grass	1.87
<i>Rosa acicularis</i>	Prickly Rose	1.80
<i>Carex</i> sp.	Sedge	1.73
<i>Toxicodendron rydbergii</i>	Poison Ivy	1.73
<i>Ribes oxycanthoides</i>	Northern Gooseberry	1.60
<i>Symphoricarpos occidentalis</i>	Western Snowberry	1.53
<i>Thalictrum dasycarpum</i>	Hairy Meadowrue	1.47
<i>Maianthemum canadense</i>	Canada May Flower	1.33
<i>Galium boreale</i>	Northern Bedstraw	1.07
<i>Symphoricarpos albus</i>	Snowberry	1.07
<i>Sanicula marilandica</i>	Seneca Snakeroot	0.93
<i>Amelanchier alnifolia</i>	Saskatoon	0.80
<i>Viola</i> sp.	Violet	0.80
<i>Betula pumila</i>	Dwarf Birch	0.67
<i>Salix</i> sp.	Willow	0.60
<i>Maianthemum stellatum</i>	Solomon's Seal	0.60
<i>Taraxacum officinale</i>	Common Dandelion	0.60
<i>Zizia aurea</i>	Golden Alexanders	0.60

Scientific Name	Common Name	Mean % Cover
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.47
<i>Betula</i> sp.	Birch	0.47
<i>Linnaea borealis</i>	Twinflower	0.47
<i>Thalictrum</i> sp.	Meadowrue	0.47
<i>Thalictrum venulosum</i>	Veiny Meadowrue	0.40
<i>Zizia aptera</i>	Heart-leaved Alexander	0.40
<i>Comandra umbellata</i>	Bastard Toadflax	0.33
<i>Corylus americana</i>	American Hazelnut	0.33
<i>Populus tremuloides</i>	Trembling Aspen	0.33
<i>Pyrola</i> sp.	Wintergreen	0.33
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.33
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.33
<i>Alnus viridis</i>	Green Alder	0.27
<i>Oryzopsis asperifolia</i>	Rice Grass	0.27
<i>Prunus virginiana</i>	Chokecherry	0.27
	Unidentified Composite Forb	0.27
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	0.27
<i>Achillea millefolium</i>	Yarrow	0.20
<i>Juncus arcticus</i>	Arctic Rush	0.20
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.20
<i>Populus balsamifera</i>	Balsam Poplar	0.20
	Unidentified Forb	0.20
<i>Viburnum opulus</i>	High-bush Cranberry	0.20
<i>Calamagrostis</i> sp.	Reed Grass	0.13
<i>Carex capillaris</i>	Hair-like Sedge	0.13
<i>Cinna latifolia</i>	Slender Woodreed	0.13
<i>Equisetum arvense</i>	Common Horsetail	0.13
<i>Galium triflorum</i>	Sweet-scented Bedstraw	0.13
<i>Lathyrus ochroleucus</i>	Cream-coloured Vetchling	0.13
<i>Lysimachia ciliata</i>	Fringed Loosestrife	0.13
<i>Moehringia lateriflora</i>	Blunt-leaved sandwort	0.13
<i>Solidago</i> sp.	Goldenrod	0.13
<i>Trifolium</i> sp.	Clover	0.13
<i>Viburnum edule</i>	Low-bush Cranberry	0.13
<i>Viburnum lentago</i>	Nannyberry	0.13
<i>Actaea rubra</i>	Baneberry	0.07
<i>Cirsium arvense</i>	Canada Thistle	0.07
<i>Mitella nuda</i>	Mitrewort	0.07
<i>Trifolium repens</i>	White Clover	0.07
Nonvascular Ground Stratum and Inanimate Cover		
	Litter	78.33
	Unidentified Moss	0.40

Table 7.2. LMP: Closed Trembling Aspen/ Bluegrass Deciduous Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	65.00
<i>Quercus macrocarpa</i>	Bur Oak	0.33
Tall Shrub Stratum (1 - 2.5m)		
<i>Amelanchier alnifolia</i>	Saskatoon	3.27
<i>Populus tremuloides</i>	Trembling Aspen	0.73
<i>Crataegus chrysocarpa</i>	Round-leaved Hawthorn	0.33
<i>Symphoricarpos occidentalis</i>	Western Snowberry	0.33
<i>Salix</i> sp.	Willow	0.13
<i>Shepherdia canadensis</i>	Canada Buffaloberry	0.13
Herb and Low Shrub Stratum (≤1m)		
<i>Poa</i> sp.	Bluegrass	5.93
<i>Amelanchier alnifolia</i>	Saskatoon	2.27
<i>Carex</i> sp.	Sedge	2.07
<i>Cornus sericea</i>	Red-osier Dogwood	1.67
<i>Symphoricarpos occidentalis</i>	Western Snowberry	1.53
<i>Rosa acicularis</i>	Prickly Rose	1.47
<i>Maianthemum canadense</i>	Canada May Flower	1.33
<i>Taraxacum officinale</i>	Common Dandelion	1.27
<i>Galium boreale</i>	Northern Bedstraw	1.00
	Unidentified Grass	0.93
<i>Ribes oxycanthoides</i>	Northern Gooseberry	0.87
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.87
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.80
<i>Thalictrum</i> sp.	Meadowrue	0.67
<i>Lathyrus palustris</i>	Marsh Vetchling	0.47
<i>Elaeagnus commutata</i>	Wolf-willow	0.40
<i>Sanicula marilandica</i>	Seneca Snakeroot	0.40
<i>Trifolium</i> sp.	Clover	0.40
<i>Oryzopsis asperifolia</i>	Rice Grass	0.33
<i>Prunus virginiana</i>	Chokecherry	0.33
<i>Toxicodendron rydbergii</i>	Poison Ivy	0.33
<i>Spiraea alba</i>	Meadowsweet	0.27
<i>Viola</i> sp.	Violet	0.27
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	0.20
<i>Rubus pubescens</i>	Trailing Dewberry	0.20
<i>Packera paupercula</i>	Balsam Groundsel	0.20
<i>Zizia aurea</i>	Golden Alexanders	0.20
<i>Ambrosia psilostachya</i>	Perennial Ragweed	0.13
<i>Carex aurea</i>	Golden Sedge	0.13
<i>Crataegus chrysocarpa</i>	Round-leaved Hawthorn	0.13

Scientific Name	Common Name	Mean % Cover
<i>Chamerion angustifolium</i>	Fireweed	0.13
<i>Mitella nuda</i>	Mitrewort	0.13
<i>Maianthemum stellatum</i>	Solomon's Seal	0.13
	Unidentified Forb	0.13
<i>Zizia aptera</i>	Heart-leaved Alexander	0.13
<i>Achillea millefolium</i>	Yarrow	0.07
<i>Elymus</i> sp.	Wheatgrass	0.07
<i>Anemone quinquefolia</i>	Wood Anemone	0.07
<i>Comandra umbellata</i>	Bastard Toadflax	0.07
<i>Lonicera dioica</i>	Twining Honeysuckle	0.07
<i>Moehringia lateriflora</i>	Blunt-leaved sandwort	0.07
<i>Plantago major</i>	Common Plantain	0.07
<i>Populus tremuloides</i>	Trembling Aspen	0.07
<i>Quercus macrocarpa</i>	Bur Oak	0.07
<i>Sonchus arvensis</i>	Field Sow-thistle	0.07
<i>Triglochin maritima</i>	Seaside Arrow-grass	0.07
Nonvascular Ground Stratum and Inanimate Cover		
	Litter	80.00
	Water	9.40
	Unidentified Moss	0.60

Table 7.3. LMP: Open Trembling Aspen—Bur Oak/ Tall Shrub Deciduous Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Populus tremuloides</i>	Trembling Aspen	32.50
<i>Quercus macrocarpa</i>	Bur Oak	4.00
Tall Shrub Stratum (1 - 2.5m)		
<i>Corylus americana</i>	American Hazelnut	30.30
<i>Amelanchier alnifolia</i>	Saskatoon	16.00
<i>Viburnum opulus</i>	High-bush Cranberry	2.90
<i>Quercus macrocarpa</i>	Bur Oak	0.80
<i>Prunus pensylvanica</i>	Pin Cherry	0.70
<i>Cornus sericea</i>	Red-osier Dogwood	0.20
Herb and Low Shrub Stratum (≤1m)		
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	5.30
	Unidentified Grass	4.90
<i>Rubus pubescens</i>	Trailing Dewberry	4.80
<i>Amelanchier alnifolia</i>	Saskatoon	3.60
<i>Corylus americana</i>	American Hazelnut	3.50
<i>Maianthemum canadense</i>	Canada May Flower	3.50
<i>Rubus idaeus</i>	Raspberry	3.40
<i>Thalictrum dasycarpum</i>	Hairy Meadowrue	3.00
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	1.80
<i>Rosa acicularis</i>	Prickly Rose	1.00
<i>Symphoricarpos occidentalis</i>	Western Snowberry	1.00
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.80
<i>Cornus sericea</i>	Red-osier Dogwood	0.50
<i>Fraxinus pennsylvanica</i>	Green Ash	0.50
<i>Quercus macrocarpa</i>	Bur Oak	0.50
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	0.50
<i>Chamerion angustifolium</i>	Fireweed	0.30
<i>Prunus virginiana</i>	Chokecherry	0.30
<i>Maianthemum stellatum</i>	Solomon's Seal	0.30
<i>Galium boreale</i>	Northern Bedstraw	0.20
<i>Lathyrus ochroleucus</i>	Cream-coloured Vetchling	0.20
<i>Prunus pensylvanica</i>	Pin Cherry	0.20
<i>Populus tremuloides</i>	Trembling Aspen	0.10
<i>Sanicula marilandica</i>	Seneca Snakeroot	0.10
<i>Schizachne purpurascens</i>	False Melic	0.10
<i>Toxicodendron rydbergii</i>	Poison Ivy	0.10
<i>Zizia aptera</i>	Heart-leaved Alexander	0.10
Nonvascular Ground Stratum and Inanimate Cover		
	Litter	67.00
	Unidentified Moss	0.30

Table 7.4. LMP: Closed Bur Oak Deciduous Forest

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Quercus macrocarpa</i>	Bur Oak	55.00
<i>Acer negundo</i>	Manitoba Maple	4.00
<i>Amelanchier alnifolia</i>	Saskatoon	4.00
<i>Populus tremuloides</i>	Trembling Aspen	3.50
<i>Prunus virginiana</i>	Chokecherry	2.00
Tall Shrub Stratum (1 - 2.5m)		
<i>Corylus americana</i>	American Hazelnut	23.30
<i>Viburnum opulus</i>	High-bush Cranberry	7.30
<i>Prunus virginiana</i>	Chokecherry	4.90
<i>Amelanchier alnifolia</i>	Saskatoon	1.30
<i>Viburnum edule</i>	Low-bush Cranberry	1.20
<i>Crataegus chrysocarpa</i>	Round-leaved Hawthorn	0.30
<i>Cornus sericea</i>	Red-osier Dogwood	0.20
<i>Lonicera dioica</i>	Twining Honeysuckle	0.20
<i>Populus tremuloides</i>	Trembling Aspen	0.10
Herb and Low Shrub Stratum (≤1m)		
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	18.90
<i>Carex</i> sp.	Sedge	5.70
<i>Actaea rubra</i>	Baneberry	2.90
<i>Rubus pubescens</i>	Trailing Dewberry	1.80
<i>Maianthemum canadense</i>	Canada May Flower	1.60
<i>Toxicodendron rydbergii</i>	Poison Ivy	1.60
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.90
<i>Prunus virginiana</i>	Chokecherry	0.80
<i>Rubus idaeus</i>	Raspberry	0.70
<i>Amelanchier alnifolia</i>	Saskatoon	0.60
<i>Cornus sericea</i>	Red-osier Dogwood	0.60
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	0.50
<i>Populus tremuloides</i>	Trembling Aspen	0.50
<i>Thalictrum dasycarpum</i>	Hairy Meadowrue	0.50
<i>Corylus americana</i>	American Hazelnut	0.40
<i>Galium triflorum</i>	Sweet-scented Bedstraw	0.40
<i>Sanicula marilandica</i>	Seneca Snakeroot	0.40
<i>Maianthemum stellatum</i>	Solomon's Seal	0.40
<i>Bromus inermis</i>	Smooth Brome	0.30
<i>Circaea lutetiana</i>	Large Enchanter's Nightshade	0.30
<i>Elymus trachycaulus</i>	Slender Wheatgrass	0.20
<i>Ambrosia trifida</i>	Giant Ragweed	0.10
<i>Galium boreale</i>	Northern Bedstraw	0.10
<i>Lathyrus ochroleucus</i>	Cream-coloured Vetchling	0.10

Scientific Name	Common Name	Mean % Cover
<i>Rosa acicularis</i>	Prickly Rose	0.10
<i>Smilax lasioneura</i>	Carrion Vine	0.10
<i>Trillium cernuum</i>	Nodding Trillium	0.10
	Unidentified Forb	0.10
<i>Viola canadensis</i>	Canada Violet	0.10
<i>Zizia aptera</i>	Heart-leaved Alexander	0.10
Nonvascular Ground Stratum and Inanimate Cover		
	Litter	65.00

Table 7.5. LMP: Mixed Grassland

Scientific Name	Common Name	Mean % Cover
Tree Stratum (>2.5m)		
<i>Quercus macrocarpa</i>	Bur Oak	0.50
Tall Shrub Stratum (1 - 2.5m)		
<i>Elaeagnus commutata</i>	Wolf-willow	0.20
<i>Populus tremuloides</i>	Trembling Aspen	0.20
<i>Salix bebbiana</i>	Bebb's Willow	0.20
<i>Cornus sericea</i>	Red-osier Dogwood	0.07
<i>Quercus macrocarpa</i>	Bur Oak	0.03
Herb and Low Shrub Stratum (≤1m)		
<i>Andropogon gerardii</i>	Big Bluestem	3.13
<i>Poa</i> sp.	Bluegrass	2.97
<i>Carex</i> sp.	Sedge	2.10
<i>Bouteloua gracilis</i>	Blue Gramma	2.03
<i>Festuca ovina</i>	Sheep Fescue	1.77
<i>Amelanchier alnifolia</i>	Saskatoon	1.33
<i>Symphoricarpos occidentalis</i>	Western Snowberry	1.33
<i>Taraxacum officinale</i>	Common Dandelion	1.20
<i>Populus tremuloides</i>	Trembling Aspen	1.10
<i>Antennaria howellii</i>	Howell's Pussytoes	1.03
<i>Carex aurea</i>	Golden Sedge	1.03
<i>Elaeagnus commutata</i>	Wolf-willow	0.93
<i>Rosa acicularis</i>	Prickly Rose	0.73
<i>Calamovilfa longifolia</i>	Prairie Sandreed	0.67
<i>Quercus macrocarpa</i>	Bur Oak	0.67
<i>Deschampsia cespitosa</i>	Tufted Hairgrass	0.60
<i>Juncus alpinoarticulatus</i>	Alpine Rush	0.60
	Unidentified Grass	0.60
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.57
<i>Galium boreale</i>	Northern Bedstraw	0.53
<i>Maianthemum stellatum</i>	Solomon's Seal	0.53
<i>Solidago canadensis</i>	Canada Goldenrod	0.50
<i>Sonchus arvensis</i>	Field Sow-thistle	0.47
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	0.47
	Unidentified Forb	0.43
<i>Agrostis stolonifera</i>	Creeping Bent	0.40
	Unidentified Composite Forb	0.40
<i>Packera paupercula</i>	Balsam Groundsel	0.30
<i>Antennaria parvifolia</i>	Small-leaved Everlasting	0.27
<i>Glycyrrhiza lepidota</i>	Wild Licorice	0.27
<i>Viola nephrophylla</i>	Bog Violet	0.27
<i>Achillea millefolium</i>	Yarrow	0.23

Scientific Name	Common Name	Mean % Cover
<i>Bromus inermis</i>	Smooth Brome	0.23
<i>Zizia aurea</i>	Golden Alexanders	0.23
<i>Plantago major</i>	Common Plantain	0.20
<i>Salix bebbiana</i>	Bebb's Willow	0.20
<i>Agrostis scabra</i>	Ticklegrass	0.17
<i>Calamagrostis</i> sp.	Reed Grass	0.17
<i>Eleocharis</i> sp.	Spike-rush	0.17
<i>Elymus trachycaulus</i>	Slender Wheatgrass	0.13
<i>Hypoxis hirsuta</i>	Yellow Star Grass	0.13
<i>Koeleria macrantha</i>	June Grass	0.13
<i>Thalictrum</i> sp.	Meadowrue	0.13
<i>Trifolium</i> sp.	Clover	0.13
<i>Viola</i> sp.	Violet	0.13
<i>Cirsium arvense</i>	Canada Thistle	0.10
<i>Salix</i> sp.	Willow	0.10
<i>Sporobolus cryptandrous</i>	Sand Dropseed	0.10
<i>Thalictrum dasycarpum</i>	Hairy Meadowrue	0.10
<i>Toxicodendron rydbergii</i>	Poison Ivy	0.10
<i>Symphyotrichum laeve</i>	Smooth Aster	0.07
<i>Symphyotrichum</i> sp.	Aster	0.07
<i>Astragalus agrestis</i>	Purple Milk-vetch	0.07
<i>Chenopodium leptophyllum</i>	Narrow-leaved Goosefoot	0.07
<i>Cirsium vulgare</i>	Bull Thistle	0.07
<i>Juncus arcticus</i>	Arctic Rush	0.07
<i>Muhlenbergia</i> sp.	Muhly	0.07
<i>Salix exigua</i>	Sandbar Willow	0.07
<i>Trifolium repens</i>	White Clover	0.07
<i>Elymus repens</i>	Quackgrass	0.03
<i>Anemone canadensis</i>	Canada Anemone	0.03
<i>Symphyotrichum ericoides</i>	Many-flowered Aster	0.03
<i>Comandra umbellata</i>	Bastard Toadflax	0.03
<i>Cornus sericea</i>	Red-osier Dogwood	0.03
<i>Cypripedium parviflorum</i> var. <i>makasin</i>	Small Yellow Lady's-slipper	0.03
<i>Anthoxanthum hirtum</i>	Hairy Sweet Grass	0.03
<i>Lathyrus palustris</i>	Marsh Vetchling	0.03
<i>Lepidium densiflorum</i>	Pepperwort	0.03
<i>Lithospermum canescens</i>	Hoary Puccoon	0.03
<i>Maianthemum canadense</i>	Canada May Flower	0.03
<i>Medicago lupulina</i>	Black Medic	0.03
<i>Melilotus alba</i>	White Sweetclover	0.03
<i>Mentha arvensis</i>	Mint	0.03
<i>Dichanthelium leibergii</i>	Leiberg's Panicgrass	0.03
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.03

Scientific Name	Common Name	Mean % Cover
<i>Prunus virginiana</i>	Chokecherry	0.03
<i>Ranunculus cymbalaria</i>	Seaside Buttercup	0.03
<i>Rudbeckia hirta</i>	Black-eyed Susan	0.03
<i>Sanicula marilandica</i>	Seneca Snakeroot	0.03
<i>Selaginella densa</i>	Prairie Club-moss	0.03
<i>Sisyrinchium montanum</i>	Blue-eyed Grass	0.03
<i>Thalictrum venulosum</i>	Veiny Meadowrue	0.03
Nonvascular Ground Stratum and Inanimate Cover		
	Litter	58.12
	Water	0.03
	Unidentified Moss	0.03
	Unidentified Lichen	0.03
	Bare Ground	3.93

Table 7.6. LMP: Sedge Wetland

Scientific Name	Common Name	Mean % Cover
Tall Shrub Stratum (1 - 2.5m)		
<i>Salix bebbiana</i>	Bebb's Willow	0.20
Herb and Low Shrub Stratum (≤1m)		
<i>Carex</i> sp.	Sedge	20.32
<i>Juncus arcticus</i>	Arctic Rush	8.80
<i>Calamagrostis</i> sp.	Reed Grass	4.04
<i>Schoenoplectus</i> sp.	Bulrush	2.52
<i>Salix exigua</i>	Sandbar Willow	1.80
	Unidentified Grass	0.92
<i>Potentilla anserina</i>	Silver Weed	0.56
<i>Poa palustris</i>	Fowl Bluegrass	0.32
<i>Maianthemum stellatum</i>	Solomon's Seal	0.28
<i>Anemone quinquefolia</i>	Wood Anemone	0.24
<i>Carex aurea</i>	Golden Sedge	0.24
<i>Eleocharis palustris</i>	Common Spike-rush	0.24
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	0.24
	Unidentified Forb	0.24
<i>Eleocharis</i> sp.	Spike-rush	0.20
<i>Rosa acicularis</i>	Prickly Rose	0.20
<i>Triglochin maritima</i>	Seaside Arrow-grass	0.20
<i>Hordeum jubatum</i>	Foxtail Barley	0.16
<i>Muhlenbergia asperifolia</i>	Scratchgrass	0.16
<i>Persicaria amphibia</i>	Water Smartweed	0.16
<i>Equisetum arvense</i>	Common Horsetail	0.12
<i>Lycopus asper</i>	Western Waterhorehound	0.12
<i>Comarum palustre</i>	Marsh Cinquefoil	0.12
<i>Elymus</i> sp.	Wheatgrass	0.08
<i>Symphyotrichum</i> sp.	Aster	0.08
<i>Galium boreale</i>	Northern Bedstraw	0.08
<i>Lysimachia</i> sp.	Loosestrife	0.08
<i>Salix</i> sp.	Willow	0.08
<i>Scutellaria galericulata</i>	Marsh Skullcap	0.08
<i>Symphyotrichum ericoides</i>	Many-flowered Aster	0.04
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	0.04
<i>Ranunculus cymbalaria</i>	Seaside Buttercup	0.04
<i>Rubus pubescens</i>	Trailing Dewberry	0.04
	Unidentified Composite Forb	0.04
Nonvascular Ground Stratum and Inanimate Cover		
	Unidentified Moss	1.48
	Litter	13.48
	Water	57.52
	Rock	0.04

Table 7.7. LMP: Cattail or Reed Canary Wetland

Scientific Name	Common Name	Mean % Cover
Herb and Low Shrub Stratum (≤1m)		
<i>Lemna minor</i>	Lesser Duckweed	40.50
<i>Phalaris arundinacea</i>	Reed Canarygrass	19.00
<i>Typha angustifolia</i>	Narrow-leaved Cat-tail	10.20
<i>Carex</i> sp.	Sedge	5.00
<i>Schoenoplectus tabernaemontani</i>	Soft-stem Bulrush	3.70
<i>Elymus</i> sp.	Wheatgrass	3.30
<i>Cypripedium</i> sp.	Lady's-slipper	1.40
<i>Mentha arvensis</i>	Mint	1.00
<i>Alisma triviale</i>	Water Plantain	0.20
<i>Lycopus asper</i>	Western Waterhorehound	0.20
<i>Glyceria striata</i>	Ridged Glyceria	0.10
Nonvascular Ground Stratum and Inanimate Cover		
	Water	100.00
	Algae	16.00

APPENDIX H. Wetland class categories.

This appendix includes the following table:

Table 1. Area of wetland class categories within the local study area, preferred route
RoW and Project components by ecoregion.

Table 1. Area of wetland class categories within the local study area, preferred route RoW and Project components by ecoregion.

[illegible]

Wetland Class Category ¹	Area (ha)	Ecoregion								Total Area (ha)
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
B7f-F3to	Local Study Area	0.00	0.00	0.00	0.00	0.00	685.52	0.00	0.00	685.52
	RoW	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7fx-F2fi-Z1f	Local Study Area	0.00	0.00	0.00	3198.16	0.00	0.00	0.00	0.00	3198.16
	RoW	0.00	0.00	0.00	41.73	0.00	0.00	0.00	0.00	41.73
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7ox-Z2t-F1o	Local Study Area	0.00	0.00	0.00	342.97	0.00	0.00	0.00	0.00	342.97
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7tx-F2o-Z1t	Local Study Area	11270.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11270.05
	RoW	71.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	71.08
	Components	724.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	724.71
B7tx-F2t-Z1f	Local Study Area	0.00	0.00	0.00	3264.89	0.00	0.00	0.00	0.00	3264.89
	RoW	0.00	0.00	0.00	65.06	0.00	0.00	0.00	0.00	65.06
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B7tx-F3o	Local Study Area	806.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	806.00
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	12.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.20
B8fx-F2oti	Local Study Area	0.00	0.00	6.69	0.00	0.00	0.00	0.00	0.00	6.69
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B8fx-F2to	Local Study Area	0.00	0.00	0.00	0.00	2226.32	0.00	0.00	0.00	2226.32
	RoW	0.00	0.00	0.00	0.00	30.35	0.00	0.00	0.00	30.35
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B8f-Z2t	Local Study Area	0.00	0.00	0.00	0.00	373.71	0.00	0.00	0.00	373.71
	RoW	0.00	0.00	0.00	0.00	4.05	0.00	0.00	0.00	4.05

Wetland Class Category ¹	Area (ha)	Ecoregion								Total Area (ha)
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B8tx-F2o	Local Study Area	1387.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1387.39
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	24.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.00
B9tx-F1o	Local Study Area	1078.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1078.69
	RoW	4.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.68
	Components	69.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	69.71
F10top	Local Study Area	0.00	0.00	647.42	0.00	2669.90	0.00	0.00	0.00	3317.32
	RoW	0.00	0.00	0.00	0.00	19.73	0.00	0.00	0.00	19.73
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F10topi	Local Study Area	0.00	0.00	0.00	1791.59	0.00	0.00	0.00	0.00	1791.59
	RoW	0.00	0.00	0.00	36.82	0.00	0.00	0.00	0.00	36.82
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F10tp	Local Study Area	0.00	0.00	252.88	0.00	0.00	0.00	0.00	0.00	252.88
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F4o-B4fx-Z2f	Local Study Area	0.00	0.00	0.00	2535.03	0.00	0.00	0.00	0.00	2535.03
	RoW	0.00	0.00	0.00	14.12	0.00	0.00	0.00	0.00	14.12
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F4ot-B4fx-Z2f	Local Study Area	0.00	0.00	0.00	2574.52	0.00	0.00	0.00	0.00	2574.52
	RoW	0.00	0.00	0.00	27.21	0.00	0.00	0.00	0.00	27.21
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F4toi-B4fx-Z2f	Local Study Area	0.00	0.00	3208.02	0.00	1134.82	0.00	0.00	0.00	4342.84
	RoW	0.00	0.00	70.94	0.00	20.43	0.00	0.00	0.00	91.37
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F5fo-Z3fo	Local Study Area	0.00	0.00	0.00	0.00	0.00	1550.71	0.00	0.00	1550.71

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Wetland Class Category ¹	Area (ha)	Ecoregion								Total Area (ha)
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6o-Z2f	Local Study Area	0.00	0.00	0.00	1003.93	0.00	0.00	0.00	0.00	1003.93
	RoW	0.00	0.00	0.00	12.06	0.00	0.00	0.00	0.00	12.06
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6o-Z4t	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	223.51	223.51
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6to-B2fx-Z2f	Local Study Area	0.00	0.00	0.00	196.10	0.00	0.00	0.00	0.00	196.10
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6toi-B4fx	Local Study Area	0.00	0.00	7.00	0.00	3.09	0.00	0.00	0.00	3.09
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6toip-B3fx-Z1f	Local Study Area	0.00	0.00	0.00	0.00	279.37	0.00	0.00	0.00	279.37
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6topi-Z3f-B1fxi	Local Study Area	0.00	0.00	0.00	0.00	2275.66	0.00	0.00	0.00	2275.66
	RoW	0.00	0.00	0.00	0.00	21.74	0.00	0.00	0.00	21.74
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6top-Z3f-B1fx	Local Study Area	0.00	0.00	0.00	0.00	1634.71	0.00	0.00	0.00	1634.71
	RoW	0.00	0.00	0.00	0.00	26.20	0.00	0.00	0.00	26.20
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6to-Z3f	Local Study Area	0.00	0.00	0.00	0.00	3316.84	0.00	0.00	0.00	3316.84
	RoW	0.00	0.00	0.00	0.00	47.75	0.00	0.00	0.00	47.75
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F6to-Z4f	Local Study Area	0.00	0.00	0.00	0.00	363.53	0.00	0.00	0.00	363.53

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Wetland Class Category ¹	Area (ha)	Ecoregion								Total Area (ha)
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F8top-B1fx-Z1f	Local Study Area	0.00	0.00	0.00	0.00	1494.90	0.00	0.00	0.00	1494.90
	RoW	0.00	0.00	0.00	0.00	13.29	0.00	0.00	0.00	13.29
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F8topi-B1fx-Z1f	Local Study Area	0.00	0.00	0.00	0.00	1456.68	0.00	0.00	0.00	1456.68
	RoW	0.00	0.00	0.00	0.00	28.55	0.00	0.00	0.00	28.55
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F8topi-B1fx-Z1fi	Local Study Area	0.00	0.00	0.00	1363.64	0.00	0.00	0.00	0.00	1363.64
	RoW	0.00	0.00	0.00	30.07	0.00	0.00	0.00	0.00	30.07
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F8topi-Z1f-B1fx	Local Study Area	0.00	0.00	0.00	0.00	2583.39	0.00	0.00	0.00	2583.39
	RoW	0.00	0.00	0.00	0.00	41.80	0.00	0.00	0.00	41.80
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F8to-Z1f	Local Study Area	0.00	0.00	0.00	0.00	416.91	0.00	0.00	0.00	416.91
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F8t-Z2t	Local Study Area	0.00	0.00	0.00	0.00	0.00	1759.55	0.00	0.00	1759.55
	RoW	0.00	0.00	0.00	0.00	0.00	28.79	0.00	0.00	28.79
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F9o-M1o	Local Study Area	0.00	0.00	45.09	0.00	0.00	0.00	0.00	0.00	45.09
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F9op-B1f	Local Study Area	0.00	0.00	0.00	0.00	27.66	0.00	0.00	0.00	27.66
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F9otp-B1f	Local Study Area	0.00	0.00	0.00	0.00	5900.22	0.00	0.00	0.00	5900.22

[illegible]

[illegible]

Wetland Class Category ¹	Area (ha)	Ecoregion								Total Area (ha)
		Hudson Bay Lowland	Selwyn Lake Upland	Churchill River Upland	Hayes River Upland	Mid-Boreal Lowland	Interlake Plain	Aspen Parkland	Lake Manitoba Plain	
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
M6o-Z4t	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	565.17	565.17
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.44	5.44
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
M7o-F2o	Local Study Area	0.00	0.00	0.00	0.00	0.00	124.74	0.00	0.00	124.74
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
M7o-W3o	Local Study Area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	414.73	414.73
	RoW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
M8f-Z2ot	Local Study Area	0.00	0.00	0.00	0.00	386.46	0.00	0.00	0.00	386.46
	RoW	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.50
	Components	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

¹Source: Halsey et al. (1997). Wetland Class: B = Bog, F = Fen, M = Marsh, S = Swamp, W = Shallow Open Water, Z = Mineral; Vegetation Modifier: f = Forested (>70% tree cover), t = Wooded (>6-70% tree cover), o = Open (≤6% tree cover); Landform Modifier: p = Patterned, x = Permafrost, i = Type 2 Internal Lawns, n = Nonpatterned.
Note: Study Area = local study area; RoW = 500 kV transmission line; Components = other Project components (i.e., collector lines, ground electrodes, etc.)

APPENDIX I. Flora observed in the local study area.

This appendix includes the following tables:

- Table 1. Flora observed and distribution of species along the preliminary preferred route by ecoregion.
- Table 2. Flora of the northern converter station, construction power station and northern ground electrode sites.
- Table 3. Flora of the southern ground electrode sites.

Table 1. Flora observed and distribution of species along the preliminary preferred route by ecoregion.

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HLB	SLU	CRU	HRU	MBL	IP	LMP
				VASCULAR SPECIES						
				Pteridophytes						
EQUISETACEAE	HORSETAIL FAMILY									
<i>Equisetum arvense</i>	Common Horsetail	S5		X		X	X	X	X	X
<i>Equisetum fluviatile</i>	Swamp Horsetail	S5			X		X	X		
<i>Equisetum hyemale</i>	Common Scouring-rush	S5		X		X			X	
<i>Equisetum pratense</i>	Meadow Horsetail	S4S5						X		
<i>Equisetum sylvaticum</i>	Wood Horsetail	S5				X	X			
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush	S5		X	X	X	X	X	X	
<i>Equisetum</i> sp.	Horsetail					X	X			
LYCOPODIACEAE	CLUB-MOSS FAMILY									
<i>Lycopodium annotinum</i>	Stiff Club-moss	S5					X	X	X	
<i>Lycopodium obscurum</i>	Ground-pine	S5							X	
OPHIOGLOSSACEAE	ADDER’S TONGUE FAMILY									
<i>Botrychium virginianum</i>	Common Grape-fern	S5							X	X
PTERIDACEAE	MAIDENHAIR FERN FAMILY									
<i>Cryptogramma acrostichoides</i>	Parsley Fern	S4					X			
SELAGINELLACEAE	SPIKEMOSS FAMILY									
<i>Selaginella densa</i>	Prairie Club-moss	S4								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
				Gymnosperms						
CUPRESSACEAE	CYPRESS FAMILY									
<i>Juniperus communis</i>	Common Juniper	S5		X	X	X	X	X	X	
<i>Juniperus horizontalis</i>	Creeping Juniper	S5		X				X		X
PINACEAE	PINE FAMILY									
<i>Abies balsamea</i>	Balsam Fir	S5							X	
<i>Larix laricina</i>	Tamarack	S5		X	X	X	X	X	X	
<i>Picea glauca</i>	White Spruce	S5			X	X	X	X	X	
<i>Picea mariana</i>	Black Spruce	S5		X	X	X	X	X	X	
<i>Pinus banksiana</i>	Jack Pine	S5		X	X	X	X	X	X	
				Angiosperms – Dicotyledons						
ACERACEAE	MAPLE FAMILY									
<i>Acer negundo</i>	Manitoba Maple	S5							X	X
ALISMATACEAE	ARROWHEAD FAMILY									
<i>Alisma triviale</i>	Water Plantain	S5							X	X
<i>Sagittaria cuneata</i>	Northern Arrowhead	S5								X
ANACARDIACEAE	SUMAC FAMILY									
<i>Toxicodendron rydbergii</i>	Poison Ivy	S5							X	X
APIACEAE	CARROT FAMILY									
<i>Cicuta bulbifera</i>	Bulblet-bearing Water Hemlock	S5					X			
<i>Cicuta maculata</i>	Spotted Water Hemlock	S5						X	X	
<i>Heracleum lanatum</i>	Cow parsnip	S5							X	X
<i>Osmorrhiza longistylis</i>	Sweet Cicely	S5								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Sanicula marilandica</i>	Seneca Snakeroot	S5							X	X
<i>Sium suave</i>	Water Parsnip	S5								X
<i>Zizia aptera</i>	Heart-leaved Alexander	S5							X	X
<i>Zizia aurea</i>	Golden Alexanders	S5							X	X
APOCYNACEAE	DOGBANE FAMILY									
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	S5							X	X
<i>Apocynum cannabinum</i>	Indian Hemp	S4						X	X	
ARACEAE	ARUM FAMILY									
<i>Calla palustris</i>	Wild Calla	S5					X	X		
ARALIACEAE	GINSENG FAMILY									
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	S5					X	X	X	X
ASCLEPIADACEAE	MILKWEED FAMILY									
<i>Asclepias speciosa</i>	Showy Milkweed	S4								X
ASTERACEAE	ASTER FAMILY									
<i>Achillea millefolium</i>	Yarrow	S5		X	X	X	X	X	X	X
<i>Achillea sibirica</i>	Many-flowered Yarrow	S5							X	
<i>Agoseris glauca</i>	False Dandelion	S5								X
<i>Ambrosia psilostachya</i>	Perennial Ragweed	S5								X
<i>Ambrosia</i> sp.	Ragweed									X
<i>Ambrosia trifida</i>	Giant Ragweed	S5								X
<i>Antennaria howellii</i>	Howell's Pussytoes	S4S5								X
<i>Antennaria neglecta</i>	Field Pussytoes	S4S5								X
<i>Antennaria parvifolia</i>	Small-leaved Everlasting	S4								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Antennaria</i> sp.	Pussytoes									X
<i>Arctium minus</i>	Lesser Burdock	SNA	X						X	X
<i>Arctium</i> sp.	Burdock									X
<i>Artemisia ludoviciana</i>	Prairie Sage	S5								X
<i>Artemisia</i> sp.	Sage					X			X	X
<i>Bidens cernua</i>	Smooth Begarticks	S5								X
<i>Cirsium arvense</i>	Canada Thistle	SNA	X						X	X
<i>Cirsium drummondii</i>	Short-stemmed Thistle	S4				X				
<i>Cirsium</i> sp.	Thistle								X	X
<i>Cirsium vulgare</i>	Bull Thistle	SNA	X							X
<i>Conyza canadensis</i>	Canada fleabane	S5								X
<i>Doellingeria umbellata</i>	Flat-topped White Aster	S5							X	
<i>Erigeron glabellus</i>	Smooth Fleabane	S4								X
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	S5							X	X
<i>Erigeron</i> sp.	Fleabane									X
<i>Euthamia graminifolia</i>	Flat-topped Goldenrod	S5								X
<i>Eutrochium maculatum</i>	Spotted Joepyeweed	S5							X	
<i>Helianthus maximiliani</i>	Narrow-leaved Sunflower	S5								X
<i>Helianthus pauciflorus</i> ssp. <i>pauciflorus</i>	Stiff Sunflower	SU								X
<i>Helianthus</i> sp.	Sunflower								X	
<i>Hieracium umbellatum</i>	Northern Hawkweed	S5							X	
<i>Liatris punctata</i>	Dotted Blazing Star	S4								X
<i>Packera paupercula</i>	Balsam Groundsel	S5								X
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot	S5		X	X	X	X	X	X	X
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved Coltsfoot	S5						X	X	X
<i>Prenanthes alba</i>	White Rattlesnakeroot	S4S5							X	
<i>Prenanthes racemosa</i>	Glaucous White Lettuce	S4								X
<i>Ratibida columnifera</i>	Prairie Coneflower	S4								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Rudbeckia hirta</i>	Black-eyed Susan	SNA	X						X	X
<i>Rudbeckia laciniata</i>	Tall coneflower	S4								X
<i>Solidago canadensis</i>	Canada Goldenrod	S5							X	X
<i>Solidago gigantea</i>	Tall Goldenrod	S5								X
<i>Solidago hispida</i>	Hairy Goldenrod	S5						X		
<i>Solidago simplex</i>	Decumbent Goldenrod	SU								X
<i>Solidago</i> sp.	Goldenrod			X	X	X	X	X	X	X
<i>Sonchus arvensis</i>	Field Sow-thistle	SNA	X				X		X	X
<i>Symphyotrichum boreale</i>	Northern Bog Aster	S5			X			X	X	X
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	S5			X	X	X	X	X	X
<i>Symphyotrichum ericoides</i>	Many-flowered Aster	S4								X
<i>Symphyotrichum laeve</i>	Smooth Aster	S5							X	X
<i>Symphyotrichum lateriflorum</i>	Calico Aster	S4							X	X
<i>Symphyotrichum novae-angliae</i>	New England Aster	S4							X	
<i>Symphyotrichum</i> sp.	Aster			X		X	X		X	X
<i>Taraxacum officinale</i>	Common Dandelion	SNA	X			X	X	X	X	X
<i>Tephrosia palustris</i>	Marsh Ragwort	S5								X
BALSAMINACEAE	TOUCH-ME-NOT FAMILY									
<i>Impatiens capensis</i>	Jewelweed	S5							X	X
<i>Impatiens noli-tangere</i>	Western Jewelweed	S2								X
BETULACEAE	BIRCH FAMILY									
<i>Alnus viridis</i>	Green Alder	S5			X	X	X	X	X	X
<i>Alnus incana</i>	Speckled Alder	S5		X		X	X	X	X	X
<i>Betula occidentalis</i>	River Birch	S4S5				X				
<i>Betula papyrifera</i>	Paper Birch	S5				X	X	X	X	
<i>Betula pumila</i>	Dwarf Birch	S5		X	X	X	X	X	X	X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Betula</i> sp.	Birch									X
<i>Corylus americana</i>	American Hazelnut	S4							X	X
<i>Corylus cornuta</i>	Beaked Hazelnut	S5							X	X
BORAGINACEAE	BORAGE FAMILY									
<i>Hakelia deflexa</i> var. <i>americana</i>	American Stickseed	S5								X
<i>Lithospermum canescens</i>	Hoary Puccoon	S5								X
<i>Lithospermum incisum</i>	Linear-leaved Puccoon	S3								X
<i>Mertensia paniculata</i>	Tall Lungwort	S5				X	X			
BRASSICACEAE	MUSTARD FAMILY									
<i>Lepidium densiflorum</i>	Pepperwort	S5								X
CALLITRICHACEAE	STARWORT FAMILY									
<i>Callitriche verna</i>	Water-starwort	S5						X		
CAMPANULACEAE	BELLFLOWER FAMILY									
<i>Campanula rotundifolia</i>	Harebells	S5				X	X	X		X
CANNABACEAE	HEMP FAMILY									
<i>Humulus lupulus</i>	Common Hop	SNA							X	X
CAPRIFOLIACEAE	HONEYSUCKLE FAMILY									
<i>Diervilla lonicera</i>	Bush-Honeysuckle	S5						X	X	
<i>Linnaea borealis</i>	Twinflower	S5		X	X	X	X	X	X	X
<i>Lonicera dioica</i>	Twining Honeysuckle	S5				X	X	X	X	X
<i>Lonicera involucrata</i>	Involucrate Honeysuckle	S4					X			
<i>Lonicera villosa</i>	Blue Fly Honeysuckle	S5				X	X	X	X	

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Symphoricarpos albus</i>	Snowberry	S5				X		X	X	X
<i>Symphoricarpos occidentalis</i>	Western Snowberry	S5							X	X
<i>Viburnum edule</i>	Low-bush Cranberry	S5		X		X	X	X	X	X
<i>Viburnum lentago</i>	Nannyberry	S4							X	X
<i>Viburnum opulus</i>	High-bush Cranberry	S5							X	X
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	S4							X	X
CARYOPHYLLACEAE	PINK FAMILY									
<i>Moehringia lateriflora</i>	Blunt-leaved sandwort	S5								X
<i>Stellaria calycantha</i>	Northern Starwort	SU							X	
<i>Stellaria longifolia</i>	Long-leaved Starwort	S5						X		
CHENOPODIACEAE	GOOSEFOOT FAMILY									
<i>Chenopodium leptophyllum</i>	Narrow-leaved Goosefoot	SU								X
<i>Corispermum americanum</i>	American Bugseed	S2S3								X
CLUSIACEAE	GARCINIA FAMILY									
<i>Hypericum majus</i>	Large Canada St. John's-wort	S4								X
CONVOLVULACEAE	CONVOLVULUS FAMILY									
<i>Calystegia sepium</i>	Hedge Bindweed	S4							X	
<i>Convolvulus arvensis</i>	Field Bindweed	SNA	X						X	
CORNACEAE	DOGWOOD FAMILY									
<i>Cornus canadensis</i>	Bunchberry	S5				X	X	X	X	
<i>Cornus sericea</i>	Red-osier Dogwood	S5						X	X	X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
DROSERACEAE	SUNDEW FAMILY									
<i>Drosera anglica</i>	Oblong-leaved Sundew	S3					X	X		
<i>Drosera linearis</i>	Slender-leaved Sundew	S2						X		
<i>Drosera rotundifolia</i>	Round-leaved Sundew	S5		X		X	X	X		
ELAEAGNACEAE	OLEASTER FAMILY									
<i>Elaeagnus commutata</i>	Wolf-willow	S4								X
<i>Shepherdia canadensis</i>	Canada Buffaloberry	S5		X		X	X	X	X	X
EMPETRACEAE	CROWBERRY FAMILY									
<i>Empetrum nigrum</i>	Crowberry	S5		X				X		
ERICACEAE	HEATH FAMILY									
<i>Andromeda polifolia</i>	Bog-rosemary	S5					X	X	X	
<i>Arctostaphylos uva-ursi</i>	Bearberry	S5		X		X	X	X	X	X
<i>Arctous alpina</i>	Alpine Bearberry	S5		X	X	X	X	X		
<i>Chamaedaphne calyculata</i>	Leatherleaf	S5		X		X	X	X		
<i>Gaultheria hispidula</i>	Creeping Snowberry	S5				X				
<i>Kalmia polifolia</i>	Pale Laurel	S5		X		X	X	X		
<i>Moneses uniflora</i>	One-flowered Wintergreen	S5				X				
<i>Orthilia secunda</i>	One-sided Wintergreen	S5			X	X		X	X	
<i>Pyrola asarifolia</i>	Pink Wintergreen	S5				X	X	X		X
<i>Pyrola chlorantha</i>	Greenish-flowered Wintergreen	S5							X	
<i>Pyrola minor</i>	Lesser Wintergreen	S3S4		X						
<i>Pyrola</i> sp.	Wintergreen			X		X	X	X	X	X
<i>Rhododendron groenlandicum</i>	Labrador Tea	S5		X	X	X	X	X	X	
<i>Rhododendron tomentosum</i>	Trapper's Tea	S4		X			X			

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Vicia americana</i>	American Vetch	S5						X	X	X
FAGACEAE	BEECH FAMILY									
<i>Quercus macrocarpa</i>	Bur Oak	S5							X	X
FUMARIACEAE	FUMITORY FAMILY									
<i>Corydalis sempervirens</i>	Pink and Yellow Corydalis	S5					X			
GENTIANACEAE	GENTIAN FAMILY									
<i>Gentiana andrewsii</i>	Closed Gentian	S4								X
<i>Gentianella amarella</i>	Northern Gentian	S5					X			
<i>Gentianopsis crinita</i>	Fringed Gentian	S4							X	X
<i>Menyanthes trifoliata</i>	Bog Bean	S5			X	X	X	X		
GROSSULARIACEAE	CURRENT FAMILY									
<i>Ribes americanum</i>	Wild Black Currant	S5								X
<i>Ribes hudsonianum</i>	Northern Black Currant	S5				X				
<i>Ribes lacustre</i>	Swamp Gooseberry	S4						X		
<i>Ribes oxycanthoides</i>	Northern Gooseberry	S5							X	X
<i>Ribes triste</i>	Swamp Red Currant	S5					X	X	X	X
HIPPURIDACEAE	MARE'S-TAIL FAMILY									
<i>Hippuris vulgaris</i>	Common Mare's Tail	S5					X			X
LAMIACEAE	MINT FAMILY									
<i>Agastache foeniculum</i>	Giant Hyssop	S5							X	
<i>Lycopus asper</i>	Western Waterhorehound	S4							X	X
<i>Lycopus uniflorus</i>	Northern Waterhorehound	S5							X	X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Lycopus</i> sp.	Waterhorehound								X	
<i>Mentha arvensis</i>	Mint	S5							X	X
<i>Monarda fistulosa</i>	Wild Bergamot	S4								X
<i>Scutellaria galericulata</i>	Marsh Skullcap	S5						X	X	X
<i>Stachys palustris</i>	Marsh Hedge-nettle	S5						X		
LEMNACEAE	DUCKWEED FAMILY									
<i>Lemna minor</i>	Lesser Duckweed	SU								X
LENTIBULARIACEAE	BLADDERWORT FAMILY									
<i>Utricularia intermedia</i>	Flat-leaved Bladderwort	S5						X		
<i>Utricularia macrorhiza</i>	Greater Bladderwort	S5					X			
LYTHRACEAE	LOOSESTRIFE FAMILY									
<i>Lythrum salicaria</i>	Purple Loosestrife	SNA	X							X
MYRICACEAE	WAX-MYRTLE FAMILY									
<i>Myrica gale</i>	Sweet Gale	S5						X		
MYRSINACEAE	MYRSINE FAMILY									
<i>Lysimachia maritima</i>	Sea Milkwort	S4S5							X	
<i>Lysimachia ciliata</i>	Fringed Loosestrife	S5						X		X
<i>Lysimachia thyrsiflora</i>	Tufted Loosestrife	S5								X
<i>Lysimachia</i> sp.	Loosestrife						X			X
<i>Trientalis borealis</i>	Northern Starflower	S5						X	X	
OLEACEAE	OLIVE FAMILY									
<i>Fraxinus nigra</i>	Black Ash	S3							X	

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Fraxinus pensylvanica</i>	Green Ash	S5							X	X
<i>Fraxinus</i> sp.	Ash								X	
ONAGRACEAE	EVENING PRIMROSE FAMILY									
<i>Circaea alpina</i>	Small Enchanter's Nightshade	S5						X		
<i>Circaea lutetiana</i>	Large Enchanter's Nightshade	S2								X
<i>Chamerion angustifolium</i>	Fireweed	S5		X	X	X	X	X	X	X
<i>Epilobium glandulosum</i>	Northern Willowherb	S5						X	X	
<i>Epilobium palustre</i>	Marsh Willowherb	S5				X	X	X		
<i>Oenothera biennis</i>	Evening Primrose	S5							X	
OXALIDACEAE	WOOD-SORREL FAMILY									
<i>Oxalis stricta</i>	Yellow Wood-sorrel	S4S5								X
PARNASSIACEAE	PARNASUS FAMILY									
<i>Parnassia palustris</i>	Northern Grass-of-Parnassus	S4							X	
PLANTAGINACEAE	PLANTAIN FAMILY									
<i>Plantago major</i>	Common Plantain	SNA	X						X	X
POLYGALACEAE	MILKWORT FAMILY									
<i>Polygala paucifolia</i>	Fringed Milkwort	S4							X	
<i>Polygala senega</i>	Seneca Root	S4							X	X
POLYGONACEAE	SMARTWEED FAMILY									
<i>Persicaria amphibia</i>	Water Smartweed	S5					X	X	X	X
<i>Persicaria lapathifolia</i>	Pale Smartweed	S5								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Polygonum</i> sp.	Smartweed									X
<i>Rumex crispus</i>	Curly Dock	SNA	X							X
RANUNCULACEAE	CROWFOOT FAMILY									
<i>Actaea rubra</i>	Baneberry	S5				X	X		X	X
<i>Anemone canadensis</i>	Canada Anemone	S5						X	X	X
<i>Anemone cylindrica</i>	Thimbleweed	S5							X	X
<i>Anemone multifida</i>	Cut-leaved Anemone	S5				X	X			
<i>Anemone parviflora</i>	Small Wood Anemone	S4		X						
<i>Anemone patens</i>	Prairie Crocus	S4						X		
<i>Anemone quinquefolia</i>	Wood Anemone	S5						X	X	X
<i>Aquilegia canadensis</i>	Wild Columbine	S5						X		
<i>Aquilegia</i> sp.	Columbine									X
<i>Caltha palustris</i>	Marsh Marigold	S5					X	X	X	
<i>Coptis trifolia</i>	Goldthread	S5						X	X	
<i>Ranunculus abortivus</i>	Smooth-leaved Buttercup	S5								X
<i>Ranunculus aquatilis</i>	Water Crowfoot	S5						X		
<i>Ranunculus cymbalaria</i>	Seaside Buttercup	S5								X
<i>Ranunculus gmelinii</i>	Small Yellow Water-crowfoot	S5					X			
<i>Ranunculus lapponicus</i>	Lapland Buttercup	S5						X		
<i>Ranunculus rhomboideus</i>	Early Yellow Buttercup	S4							X	
<i>Ranunculus sceleratus</i>	Celery-leaved Buttercup	S5								X
<i>Ranunculus</i> sp.	Buttercup									X
<i>Thalictrum dasycarpum</i>	Hairy Meadowrue	S5							X	X
<i>Thalictrum</i> sp.	Meadowrue								X	X
<i>Thalictrum venulosum</i>	Veiny Meadowrue	S5							X	X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
RHAMNACEAE	BUCKTHORN FAMILY									
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	S5		X		X	X	X	X	X
ROSACEAE	ROSE FAMILY									
<i>Amelanchier alnifolia</i>	Saskatoon	S5				X	X	X	X	X
<i>Crataegus chrysocarpa</i>	Round-leaved Hawthorn	S4								X
<i>Comarum palustre</i>	Marsh Cinquefoil	S5			X	X	X	X		X
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil	S5		X	X		X	X	X	X
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	S5		X	X	X	X	X	X	X
<i>Geum aleppicum</i>	Yellow Avens	S5							X	
<i>Geum rivale</i>	Purple Avens	S4							X	
<i>Geum triflorum</i>	Three-flowered Avens	S4							X	
<i>Potentilla anserina</i>	Silver Weed	S5								X
<i>Potentilla norvegica</i>	Rough Cinquefoil	S5						X		
<i>Prunus nigra</i>	Canada Plum	S4								X
<i>Prunus pensylvanica</i>	Pin Cherry	S5					X	X		X
<i>Prunus pumila</i>	Ground Cherry	S4								X
<i>Prunus</i> sp.	Cherry							X		
<i>Prunus virginiana</i>	Chokecherry	S5						X	X	X
<i>Rosa acicularis</i>	Prickly Rose	S5		X	X	X	X	X	X	X
<i>Rosa</i> sp.	Rose			X					X	X
<i>Rosa woodsii</i>	Wood's Rose	S4								X
<i>Rubus acaulis</i>	Stemless Raspberry	S5		X	X		X	X		
<i>Rubus chamaemorus</i>	Cloud Berry	S5		X		X	X	X		
<i>Rubus idaeus</i>	Raspberry	S5		X			X	X	X	X
<i>Rubus pubescens</i>	Trailing Dewberry	S5				X	X	X	X	X
<i>Sibbaldiopsis tridentata</i>	Three-toothed Cinquefoil	S5				X				
<i>Spiraea alba</i>	Meadowsweet	S5							X	X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
RUBIACEAE	MADDER FAMILY									
<i>Galium boreale</i>	Northern Bedstraw	S5		X		X	X	X	X	X
<i>Galium labradoricum</i>	Northern Bog Bedstraw	S5				X	X	X		X
<i>Galium trifidum</i>	Three-petal Bedstraw	S5							X	X
<i>Galium triflorum</i>	Sweet-scented Bedstraw	S5					X	X	X	X
SALICAEAE	WILLOW FAMILY									
<i>Populus balsamifera</i>	Balsam Poplar	S5				X	X	X	X	X
<i>Populus deltoides</i>	Cottonwood	S4								X
<i>Populus tremuloides</i>	Trembling Aspen	S5		X		X	X	X	X	X
<i>Salix bebbiana</i>	Bebb's Willow	S5				X	X	X	X	X
<i>Salix exigua</i>	Sandbar Willow	S5							X	X
<i>Salix lutea</i>	Yellow Willow	S4							X	
<i>Salix monticola</i>	Mountain Willow	S4S5							X	X
<i>Salix myrtillifolia</i>	Myrtle-leaved Willow	S5		X	X	X	X	X	X	
<i>Salix pedicellaris</i>	Bog Willow	S5		X		X	X	X		
<i>Salix petiolaris</i>	Willow	S4								X
<i>Salix planifolia</i>	Flat-leaved Willow	S5		X		X	X	X		
<i>Salix</i> sp.	Willow			X	X	X	X		X	X
<i>Salix vestita</i>	Snow Willow	S3		X	X		X			
SANTALACEAE	SANDALWOOD FAMILY									
<i>Comandra umbellata</i>	Bastard Toadflax	S5						X	X	X
<i>Geocaulon lividum</i>	Northern Comandra	S5		X		X	X		X	
SARRACENIACEAE	PITCHER PLANT FAMILY									
<i>Sarracenia purpurea</i>	Pitcher Plant	S5					X	X		

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
SAXIFRAGACEAE	SAXIFRAGE FAMILY									
<i>Mitella nuda</i>	Mitrewort	S5		X		X	X	X	X	X
SCROPHULARIACEAE	FIGWORT FAMILY									
<i>Castilleja coccinea</i>	Scarlet Paintbrush	S5							X	X
<i>Linaria vulgaris</i>	Yellow Toadflax	SNA	X							X
<i>Melampyrum lineare</i>	Cow-wheat	S5						X		
<i>Pedicularis canadensis</i>	Wood-betony	S4								X
<i>Pedicularis labradorica</i>	Labrador Lousewort	S4							X	
<i>Veronica peregrina</i>	Neckweed	S5								X
SOLANACEAE	POTATO FAMILY									
<i>Physalis</i> sp.	Ground Cherry									X
<i>Physalis virginiana</i>	Prairie Ground Cherry	S4								X
ULMACEAE	ELM FAMILY									
<i>Ulmus americana</i>	American Elm	S4								X
URTICACEAE	NETTLE FAMILY									
<i>Urtica dioica</i>	Stinging Nettle	S5							X	X
VALERIANACEAE	VALERIAN FAMILY									
<i>Valeriana dioica</i>	Northern Valerian	S4								X
VERBENACEAE	VERVAIN FAMILY									
<i>Phryma leptostachya</i>	Lopseed	S3								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
VIOLACEAE	VIOLET FAMILY									
<i>Viola adunca</i>	Early Blue Violet	S5							X	
<i>Viola canadensis</i>	Canada Violet	S5								X
<i>Viola nephrophylla</i>	Bog Violet	S5								X
<i>Viola renifolia</i>	Kidney-leaved Violet	S5		X	X		X	X	X	X
<i>Viola</i> sp.	Violet					X	X	X	X	X
				Angiosperms – Monocotyledons						
CYPERACEAE	SEDGE FAMILY									
<i>Carex aurea</i>	Golden Sedge	S5								X
<i>Carex aquatilis</i>	Water Sedge	S5					X	X		
<i>Carex atherodes</i>	Awned Sedge	S5					X			X
<i>Carex backii</i>	Back’s Sedge	S4S5								X
<i>Carex buxbaumii</i>	Brown Sedge	S4S5								X
<i>Carex canescens</i>	Grey Sedge	S5						X		
<i>Carex capillaris</i>	Hair-like Sedge	S5				X	X			X
<i>Carex chordorrhiza</i>	Prostrate Sedge	S5					X	X		
<i>Carex concinna</i>	Beautiful Sedge	S4S5				X	X	X		
<i>Carex deweyana</i>	Dewey’s Sedge	S5								X
<i>Carex diandra</i>	Two-stamened Sedge	S5					X			
<i>Carex disperma</i>	Two-seeded Sedge	S5						X	X	
<i>Carex granularis</i>	Granular Sedge	S4							X	
<i>Carex gynocrates</i>	Bog Sedge	S5					X	X		
<i>Carex inops</i>	Long-stolon Sedge	SU							X	X
<i>Carex interior</i>	Inland Sedge	S4?								X
<i>Carex lacustris</i>	Lakeshore Sedge	S5								X
<i>Carex limosa</i>	Mud Sedge	S5					X			
<i>Carex magellanica</i>	Bog Sedge	S5					X	X		
<i>Carex pellita</i>	Woolly Sedge	S5					X	X	X	X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Carex scirpoidea</i>	Rush-like Sedge	S5						X		
<i>Carex siccata</i>	Dry-spike Sedge	S5								X
<i>Carex</i> sp.	Sedge			X	X	X	X	X	X	X
<i>Carex trisperma</i>	Three-seeded Sedge	S5					X			
<i>Carex utriculata</i>	Beaked Sedge	S5			X				X	
<i>Carex vaginata</i>	Sheathed Sedge	S5					X	X		
<i>Cyperus schweinitzii</i>	Schweinitz's Flatsedge	S2								X
<i>Eleocharis palustris</i>	Common Spike-rush	S5					X	X	X	X
<i>Eleocharis</i> sp.	Spike-rush							X		X
<i>Eriophorum angustifolium</i>	Cotton-grass	S5		X				X		X
<i>Schoenoplectus acutus</i>	Hard-stem Bulrush	S4								X
<i>Schoenoplectus</i> sp.	Bulrush									X
<i>Schoenoplectus tabernaemontani</i>	Soft-stem Bulrush	S5								X
<i>Scirpus microcarpus</i>	Small Fruited-bulrush	S5								X
<i>Trichophorum alpinum</i>	Alpine Bulrush	S5					X			
<i>Trichophorum cespitosum</i>	Tufted Bulrush	S4						X		
IRIDACEAE	IRIS FAMILY									
<i>Iris versicolor</i>	Blue Flag	S4							X	X
<i>Sisyrinchium montanum</i>	Blue-eyed Grass	S5								X
JUNCACEAE	RUSH FAMILY									
<i>Juncus alpinoarticulatus</i>	Alpine Rush	S5								X
<i>Juncus arcticus</i>	Arctic Rush	S5						X	X	X
<i>Juncus</i> sp.	Rush									X
<i>Juncus tenuis</i>	Path Rush	S5								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
<i>Elymus trachycaulus</i>	Slender Wheatgrass	S5								X
<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>	Awned Wheatgrass	S5					X			X
<i>Elytrigia repens</i>	Quackgrass	SNA	X						X	X
<i>Festuca ovina</i>	Sheep Fescue	SNA	X							X
<i>Glyceria borealis</i>	Boreal Mannagrass	S5					X			
<i>Glyceria striata</i>	Ridged Glyceria	S5								X
<i>Hesperostipa spartea</i>	Porcupine Grass	S4								X
<i>Hordeum jubatum</i>	Foxtail Barley	S5								X
<i>Koeleria macrantha</i>	June Grass	S5								X
<i>Leymus innovatus</i>	Boreal Wild Rye	S5				X	X	X		
<i>Muhlenbergia asperifolia</i>	Scratchgrass	S4								X
<i>Muhlenbergia racemosa</i>	Marsh Muhly	S4							X	
<i>Muhlenbergia</i> sp.	Muhly									X
<i>Oryzopsis asperifolia</i>	Rice Grass	S5				X		X	X	X
<i>Panicum capillare</i>	Panicgrass	S5								X
<i>Panicum virgatum</i>	Switchgrass	S4								X
<i>Phalaris arundinacea</i>	Reed Canarygrass	S5	X							X
<i>Phleum pratense</i>	Timothy	SNA	X						X	X
<i>Phragmites australis</i>	Common Reed	S5							X	X
<i>Piptatherum pungens</i>	Sharp Piptatherum	S5					X	X		
<i>Poa palustris</i>	Fowl Bluegrass	S5							X	X
<i>Poa pratensis</i>	Kentucky Bluegrass	S5							X	X
<i>Poa</i> sp.	Bluegrass								X	X
<i>Schizachne purpurascens</i>	False Melic	S5								X
<i>Scolochloa festucacea</i>	Whitetop	S5								X
<i>Setaria viridis</i>	Green Bristlegrass	SNA	X							X
<i>Spartina gracilis</i>	Alkali Cordgrass	S4								X
<i>Sporobolus cryptandrous</i>	Sand Dropseed	S5								X

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
SPARGANIACEAE	BUR-REED FAMILY									
<i>Sparganium angustifolium</i>	Narrow-leaved Bur-reed	S5					X			
<i>Sparganium</i> sp.	Bur-reed									X
TYPHACEAE	CAT-TAIL FAMILY									
<i>Typha angustifolia</i>	Narrow-leaved Cat-tail	S4								X
<i>Typha latifolia</i>	Common Cat-tail	S5						X	X	X
				NON VASCULAR SPECIES						
				Lichens						
<i>Bryoria</i> sp.	Horsehair					X	X	X		
<i>Cladina mitis</i>	Green Reindeer Lichen					X	X	X		
<i>Cladina rangiferina</i>	Grey Reindeer Lichen					X	X	X		
<i>Cladina stellaris</i>	Northern Reindeer Lichen						X	X		
<i>Cladina</i> sp.	Reindeer Lichen			X	X	X	X		X	
<i>Cladonia</i> sp.	Cladonia			X	X	X	X	X		
<i>Cladonia uncialis</i>	Prickle Cladonia						X			
<i>Evernia mesomorpha</i>	Spruce Moss					X	X	X		
<i>Hypogymnia physodes</i>	Monk's Hood Lichen					X	X	X		
<i>Icmadophila ericetorum</i>	Spraypaint					X	X	X		
<i>Parmelia sulcata</i>	Waxpaper Lichen					X		X		
<i>Peltigera aphthosa</i>	Freckle Pelt							X		
<i>Peltigera</i> sp.	Pelt			X	X	X	X	X	X	
<i>Stereocaulon tomentosum</i>	Woolly Coral						X			
<i>Umbilicaria</i> sp.	Rocktripe						X			
<i>Usnea lapponica</i>	Powdery Old Man's Beard								X	
<i>Usnea</i> sp.	Old Man's Beard			X		X	X	X	X	
<i>Vulpicida pinastri</i>	Moonshine Cetraria						X	X		

FAMILY/Species	Common Name	MBCDC Rank	Introduced Species	Ecoregion						
				HBL	SLU	CRU	HRU	MBL	IP	LMP
				Bryophytes						
<i>Dicranum</i> sp.	Dicranum Moss					X	X	X	X	
<i>Hylocomium splendens</i>	Splendid Feather Moss			X	X	X	X	X	X	
<i>Mnium</i> sp.	Mnium Moss								X	
<i>Pleurozium schreberi</i>	Schreber’s Moss			X		X	X	X	X	
<i>Pohlia</i> sp.	Wire Moss						X			
<i>Polytrichum</i> sp.	Polytrichum Moss					X	X	X	X	
<i>Ptilium crista-castrensis</i>	Knights Plume Moss					X	X			
<i>Sphagnum</i> sp.	Peat Moss			X	X	X	X	X	X	
Total number of taxa			27	60	38	101	147	160	210	280

This table includes species observed along the preliminary preferred route, proposed ground electrodes, converter station and construction power station sites. Abbreviations include Hudson Bay Lowland (HBL), Selwyn Lake Upland (SLU), Churchill River Upland (CRU), Hayes River Upland (HRU), Mid-Boreal Lowlands (MBL), Interlake Plain (IP), and Lake Manitoba Plain (LMP).

Table 2. Flora of the northern converter station, construction power station and northern ground electrode sites.

Species	Common name	NCS	CPS	Northern Ground Electrodes						
				Site 4	Site 6	Site 7	Site 10	Site 11	Site 12	Site HES3A
		VASCULAR SPECIES								
<i>Achillea millefolium</i>	Yarrow		X							
<i>Agrostis</i> sp.	Bent Grass						X			
<i>Alnus incana</i>	Speckled Alder						X		X	
<i>Arctous alpina</i>	Alpine Bearberry		X	X		X			X	X
<i>Betula papyrifera</i>	Paper Birch	X							X	
<i>Betula pumila</i>	Dwarf Birch	X	X		X	X		X	X	
<i>Calamagrostis</i> sp.	Reed Grass	X								
<i>Carex</i> sp.	Sedge		X	X	X	X	X	X		
<i>Chamaedaphne calyculata</i>	Leatherleaf	X	X	X					X	
<i>Chamerion angustifolium</i>	Fireweed	X	X				X		X	
<i>Comarum palustris</i>	Marsh Cinquefoil		X							
<i>Cornus canadensis</i>	Bunchberry			X		X	X			X
<i>Cornus sericea</i>	Red-osier Dogwood		X							
<i>Dasiphora fruticosa</i>	Shrubby cinquefoil		X	X			X			
<i>Elymus</i> sp.	Wheatgrass		X							
<i>Empetrum nigrum</i>	Crowberry		X	X	X	X			X	
<i>Equisetum arvense</i>	Common Horsetail		X	X		X			X	
<i>Equisetum fluviatile</i>	Swamp Horsetail	X			X					
<i>Equisetum scirpoides</i>	Dwarf Scouring-rush		X	X			X		X	
<i>Fragaria virginiana</i>	Smooth Wild Strawberry		X				X	X		
<i>Galium boreale</i>	Northern Bedstraw						X			
<i>Geocaulon lividum</i>	Northern Comandra				X	X				
<i>Hordeum jubatum</i>	Foxtail Barley		X							
<i>Juniperus communis</i>	Common Juniper		X							

Species	Common name	NCS	CPS	Northern Ground Electrodes						
				Site 4	Site 6	Site 7	Site 10	Site 11	Site 12	Site HES3A
<i>Kalmia polifolia</i>	Pale Laurel	X	X		X	X				
<i>Larix laricina</i>	Tamarack	X	X	X	X				X	X
<i>Linnaea borealis</i>	Twinflower		X				X			
<i>Maianthemum canadense</i>	Canada May Flower	X	X	X	X	X			X	
<i>Menyanthes trifoliata</i>	Bog Bean	X								
<i>Mitella nuda</i>	Mitrewort		X							
<i>Orthilia secunda</i>	One-sided Wintergreen					X				
<i>Parnassia palustris</i>	Northern Grass-of-Parnassus		X							
<i>Petasites frigidus</i> var. <i>palmaris</i>	Palmate-leaved Coltsfoot		X	X					X	X
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved Coltsfoot			X						
<i>Picea mariana</i>	Black Spruce	X	X	X	X	X	X	X	X	X
<i>Pinus banksiana</i>	Jack Pine						X			
<i>Poa</i> sp.	Bluegrass		X							
<i>Populus balsamifera</i>	Balsam Poplar						X	X		
<i>Populus tremuloides</i>	Trembling Aspen	X				X		X		
<i>Pyrola</i> sp.	Wintergreen		X		X					
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn		X	X						
<i>Rhododendron groenlandicum</i>	Labrador Tea	X	X	X	X	X	X	X	X	X
<i>Rhododendron tomentosum</i>	Trapper's Tea	X		X	X					
<i>Ribes hudsonianum</i>	Northern Black Currant	X							X	
<i>Rosa acicularis</i>	Prickly Rose		X	X			X	X		X
<i>Rubus acaulis</i>	Stemless Raspberry							X	X	
<i>Rubus chamaemorus</i>	Cloud Berry		X	X	X	X			X	
<i>Rubus pubescens</i>	Trailing Dewberry		X			X				

Species	Common name	NCS	CPS	Northern Ground Electrodes						
				Site 4	Site 6	Site 7	Site 10	Site 11	Site 12	Site HES3A
<i>Salix myrtillofolia</i>	Myrtle-leaved Willow		X	X			X	X	X	
<i>Salix pedicellaris</i>	Bog Willow		X							
<i>Salix planifolia</i>	Flat-leaved Willow								X	
<i>Salix</i> sp.	Willow	X		X	X	X		X	X	X
<i>Salix vestita</i>	Snow Willow		X	X		X				
<i>Shepherdia canadensis</i>	Canada Buffaloberry		X					X		
<i>Sibbaldiopsis tridentata</i>	Three-toothed Cinquefoil							X		
<i>Solidago</i> sp.	Goldenrod							X		
<i>Symphoricarpos albus</i>	Snowberry		X							
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster		X							
<i>Symphyotrichum</i> sp.	Aster		X							
<i>Taraxacum officinale</i>	Common Dandelion		X							
<i>Vaccinium angustifolium</i>	Blueberry						X			
<i>Vaccinium oxycoccus</i>	Bog Cranberry	X	X	X	X	X			X	
<i>Vaccinium uliginosum</i>	Tall Sweet Blueberry	X	X		X	X	X	X	X	
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry	X	X	X	X	X	X	X	X	X
<i>Viburnum edule</i>	Low-bush Cranberry						X			
<i>Viola</i> sp.	Violet							X		
		NON VASCULAR SPECIES								
<i>Cladina</i> sp.	Reindeer Lichen		X	X	X	X		X		X
<i>Cladonia</i> sp.	Cladonia	X	X	X		X			X	
<i>Hylocomium splendens</i>	Splendid Feather Moss		X			X		X	X	
<i>Peltigera</i> sp.	Pelt		X			X		X		X
<i>Pleurozium schreberi</i>	Schreber's Moss		X		X	X		X	X	X
<i>Polytrichum</i> sp.	Polytrichum Moss									X
<i>Sphagnum</i> sp.	Peat Moss	X	X	X	X	X			X	
<i>Usnea lapponica</i>	Powdery Old Man's Beard				X					

Species	Common name	NCS	CPS	Northern Ground Electrodes						
				Site 4	Site 6	Site 7	Site 10	Site 11	Site 12	Site HES3A
Total number of taxa		21	48	26	21	26	20	20	27	13

NCS = northern converter station, CPS = construction power station

Table 3. Flora of the southern ground electrode sites.

Species	Common Name	Southern Ground Electrodes			
		Site 1	Site 2	Site 3	Site 10
		VASCULAR SPECIES			
<i>Abies balsamea</i>	Balsam Fir		X		
<i>Acer negundo</i>	Manitoba Maple	X			
<i>Achillea millefolium</i>	Yarrow		X		
<i>Achillea sibirica</i>	Many-flowered Yarrow			X	
<i>Agastache foeniculum</i>	Giant Hyssop		X		
<i>Agrostis scabra</i>	Ticklegrass		X		
<i>Alisma triviale</i>	Water Plantain		X		
<i>Amelanchier alnifolia</i>	Saskatoon	X	X	X	X
<i>Anemone canadensis</i>	Canada Anemone		X	X	
<i>Anthoxanthum hirtum</i>	Hairy Sweet Grass		X	X	X
<i>Apocynum androsaemifolium</i>	Spreading Dogbane		X		
<i>Apocynum cannabinum</i>	Indian Hemp		X		
<i>Aralia nudicaulis</i>	Wild Sarsaparilla		X		X
<i>Arctostaphylos uva-ursi</i>	Bearberry		X		
<i>Artemisia</i> sp.	Sage		X		
<i>Betula papyrifera</i>	Paper Birch			X	X
<i>Betula pumila</i>	Dwarf Birch			X	X
<i>Botrychium virginianum</i>	Common Grape-fern		X		X
<i>Bromus ciliatus</i>	Fringed Brome		X		X
<i>Bromus inermis</i>	Smooth Brome	X			
<i>Calamagrostis canadensis</i>	Canada Reed Grass		X	X	X
<i>Calamagrostis</i> sp.	Reed Grass		X		
<i>Caltha palustris</i>	Marsh Marigold				X
<i>Caragana arborescens</i>	Common Caragana	X			
<i>Carex disperma</i>	Two-seeded Sedge				X
<i>Carex granularis</i>	Granular Sedge			X	
<i>Carex inops</i>	Long-stolon Sedge		X		
<i>Carex</i> sp.	Carex			X	
<i>Carex utriculata</i>	Beaked Sedge				X
<i>Castilleja coccinea</i>	Scarlet Paintbrush		X		
<i>Chamerion angustifolium</i>	Fireweed			X	X
<i>Cicuta maculata</i>	Spotted Water Hemlock			X	
<i>Cirsium arvense</i>	Canada Thistle	X		X	X
<i>Cirsium</i> sp.	Thistle			X	
<i>Comandra umbellata</i>	Bastard Toadflax	X	X	X	
<i>Convolvulus arvensis</i>	Field Bindweed			X	
<i>Cornus sericea</i>	Red-osier Dogwood		X	X	X
<i>Corylus americana</i>	American hazelnut	X	X		
<i>Corylus cornuta</i>	Beaked Hazelnut	X		X	X

Species	Common Name	Southern Ground Electrodes			
		Site 1	Site 2	Site 3	Site 10
<i>Cypripedium reginae</i>	Showy Lady's-slipper		X	X	
<i>Cypripedium</i> sp.	Lady's-slipper			X	
<i>Deschampsia cespitosa</i>	Tufted Hairgrass				X
<i>Doellingeria umbellata</i>	Flat-topped White Aster		X		
<i>Elymus canadensis</i>	Great Plains Wild Rye		X	X	
<i>Elymus</i> sp.	Wheatgrass		X		
<i>Epilobium glandulosum</i>	Northern Willowherb		X	X	X
<i>Equisetum arvense</i>	Common Horsetail		X	X	X
<i>Equisetum hyemale</i>	Common Scouring-rush		X		
<i>Eutrochium maculatum</i>	Spotted Joepyeweed			X	X
<i>Fragaria virginiana</i>	Smooth Wild Strawberry	X	X	X	X
<i>Fraxinus nigra</i>	Black Ash				X
<i>Fraxinus</i> sp.	Ash				X
<i>Galium boreale</i>	Northern Bedstraw		X		X
<i>Galium triflorum</i>	Sweet-scented Bedstraw			X	X
<i>Gentianopsis crinita</i>	Fringed Gentian		X		
<i>Geocaulon lividum</i>	Northern Comandra		X		
<i>Geum aleppicum</i>	Yellow Avens		X	X	X
<i>Geum rivale</i>	Purple Avens				X
<i>Geum triflorum</i>	Three-flowered Avens			X	
<i>Heracleum lanatum</i>	Cow parsnip			X	
<i>Hieracium umbellatum</i>	Northern Hawkweed		X	X	
<i>Impatiens capensis</i>	Jewelweed			X	X
<i>Iris versicolor</i>	Blue Flag			X	X
<i>Juncus arcticus</i>	Arctic Rush		X		
<i>Larix laricina</i>	Tamarack			X	X
<i>Lathyrus ochroleucus</i>	Cream-coloured Vetchling	X	X	X	
<i>Lathyrus palustris</i>	Marsh Vetchling		X		
<i>Lathyrus venosus</i>	Wild Peavine		X		
<i>Lilium philadelphicum</i>	Wood Lily		X		
<i>Linnaea borealis</i>	Twinflower				X
<i>Lycopus asper</i>	Western Waterhorehound				X
<i>Lycopus</i> sp.	Waterhorehound		X		
<i>Lycopus uniflorus</i>	Northern Waterhorehound		X	X	
<i>Maianthemum canadense</i>	Canada May Flower		X	X	
<i>Maianthemum stellatum</i>	Solomon's Seal		X	X	X
<i>Medicago sativa</i>	Alfalfa		X		
<i>Melilotus alba</i>	White Sweetclover			X	
<i>Mentha arvensis</i>	Mint			X	
<i>Mitella nuda</i>	Mitrewort				X
<i>Muhlenbergia racemosa</i>	Marsh Muhly		X		
<i>Oenothera biennis</i>	Evening Primrose		X		

Species	Common Name	Southern Ground Electrodes			
		Site 1	Site 2	Site 3	Site 10
<i>Parnassia palustris</i>	Northern Grass-of-Parnassus		X		
<i>Pedicularis labradorica</i>	Labrador Lousewort		X		
<i>Persicaria amphibia</i>	Water Smartweed				X
<i>Petasites frigidus</i> var. <i>palmatus</i>	Palmate-leaved Coltsfoot				X
<i>Petasites frigidus</i> var. <i>sagittatus</i>	Arrow-leaved Coltsfoot		X	X	X
<i>Phleum pratense</i>	Timothy		X	X	
<i>Phragmites australis</i>	Common Reed				X
<i>Picea glauca</i>	White Spruce		X		
<i>Picea mariana</i>	Black Spruce				X
<i>Pinus banksiana</i>	Jack Pine		X		
<i>Plantago major</i>	Common Plantain		X	X	
<i>Poa palustris</i>	Fowl Bluegrass		X		
<i>Poa pratensis</i>	Kentucky Bluegrass			X	
<i>Populus balsamifera</i>	Balsam Poplar	X	X	X	X
<i>Populus tremuloides</i>	Trembling Aspen	X	X	X	X
<i>Prenanthes alba</i>	White Rattlesnakeroot		X		
<i>Prunus virginiana</i>	Chokecherry	X	X		X
<i>Pyrola chlorantha</i>	Greenish-flowered Wintergreen			X	
<i>Quercus macrocarpa</i>	Bur Oak	X	X	X	X
<i>Ranunculus cymbalaria</i>	Seaside Buttercup		X		
<i>Ranunculus rhomboideus</i>	Early Yellow Buttercup		X		
<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn		X		X
<i>Rhododendron groenlandicum</i>	Labrador Tea				X
<i>Ribes oxycanthoides</i>	Northern Gooseberry			X	X
<i>Rosa acicularis</i>	Prickly Rose		X	X	X
<i>Rosa</i> sp.	Rose		X		
<i>Rubus idaeus</i>	Raspberry			X	X
<i>Rubus pubescens</i>	Trailing Dewberry		X	X	X
<i>Rudbeckia hirta</i>	Black-eyed Susan		X		
<i>Salix bebbiana</i>	Bebb's Willow		X	X	X
<i>Salix exigua</i>	Sandbar Willow		X		
<i>Salix lutea</i>	Yellow Willow				X
<i>Salix monticola</i>	Mountain Willow		X		
<i>Salix</i> sp.	Willow		X	X	X
<i>Sanicula marilandica</i>	Seneca Snakeroot		X		
<i>Scutellaria galericulata</i>	Marsh Skullcap			X	
<i>Shepherdia canadensis</i>	Canada Buffaloberry		X	X	
<i>Smilax lasioneura</i>	Carrion Vine		X		
<i>Solidago canadensis</i>	Canada Goldenrod		X	X	X
<i>Solidago</i> sp.	Goldenrod	X	X	X	X
<i>Sonchus arvensis</i>	Field Sow-thistle	X			
<i>Symphoricarpos albus</i>	Snowberry		X		

Species	Common Name	Southern Ground Electrodes			
		Site 1	Site 2	Site 3	Site 10
<i>Symphyotrichum ciliolatum</i>	Lindley's Aster			X	X
<i>Symphyotrichum laeve</i>	Smooth Aster		X		X
<i>Symphyotrichum lateriflorum</i>	Calico Aster		X	X	X
<i>Symphyotrichum novae-angliae</i>	New England Aster		X	X	X
<i>Taraxacum officinale</i>	Common Dandelion	X	X	X	
<i>Thalictrum dasycarpum</i>	Hairy Meadowrue		X	X	X
<i>Thalictrum</i> sp.	Meadowrue		X		X
<i>Thalictrum venulosum</i>	Veiny Meadowrue		X	X	
<i>Toxicodendron rydbergii</i>	Poison Ivy		X	X	X
<i>Trifolium pratense</i>	Red Clover		X		
<i>Trifolium</i> sp.	Clover		X	X	
<i>Typha latifolia</i>	Common Cat-tail				X
<i>Vaccinium vitis-idaea</i>	Dry-ground Cranberry				X
<i>Viburnum opulus</i>	High-bush Cranberry		X	X	X
<i>Viburnum rafinesquianum</i>	Downy Arrowwood	X	X	X	
<i>Vicia americana</i>	American Vetch		X	X	
<i>Viola adunca</i>	Early Blue Violet	X	X		
<i>Viola renifolia</i>	Kidney-leaved Violet				X
<i>Zizia aurea</i>	Golden Alexanders	X	X	X	
Total number of taxa		20	92	68	64

APPENDIX J. Environmentally sensitive site locations.

This appendix includes the following tables:

Table 1. Location and area of dry upland prairie ridge sites within the local study area and 66 m right-of-way.

Table 2. Location and area of salt marsh complexes within the local study area and 66 m right-of-way

Table 3. Location and area of mud/salt flats within the local study area and 66 m right-of-way.

Table 4. Location and area of patterned fens within the local study area and 66 m right-of-way.

Table 5. Location and area of ATK vegetation sites within the local study area and 66 m right-of-way.

Table 6. Bipole III Transmission Project environmentally sensitive site information.

Table 1. Location and area of dry upland prairie ridge sites within the local study area and 66 m right-of-way.

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
P1	489536	5656772	0.18	Study Area
P2	489928	5656456	8.05	Study Area
P3	490849	5655667	7.86	Study Area
P4	491812	5654752	15.29	Study Area
P5	487024	5658800	0.71	Study Area
P6	487262	5658658	1.34	Study Area
P7	488490	5657792	3.39	Study Area
P8	489127	5657181	6.49	Study Area
P9	470194	5692676	10.30	Study Area
P10	472561	5690602	2.31	Study Area
P11	445450	5709751	0.43	Study Area
P12	448866	5709609	2.53	Study Area
P13	446067	5709514	2.68	Study Area
P14	447977	5706605	0.43	Study Area
P15	447839	5706586	0.71	Study Area
P16	447793	5706443	4.45	Study Area
P17	447065	5706325	1.78	Study Area
P18	447270	5705721	0.42	Study Area
P19	447256	5705496	3.11	Study Area
P20	448153	5705288	2.35	Study Area
P21	441895	5716438	2.02	Study Area
P22	442119	5715939	3.65	Study Area
P23	441290	5715850	2.64	Study Area
P24	441227	5715642	3.12	Study Area
P25	441039	5715489	0.50	Study Area
P26	441045	5715347	2.96	Study Area
P27	442031	5712553	13.31	Study Area
P28	445690	5711363	25.57	Study Area
P29	445448	5711848	1.67	Study Area
P30	441760	5710554	0.71	Study Area
P31	445444	5709933	2.14	Study Area
P32	445386	5709790	0.38	Study Area
P33	448839	5709765	0.38	Study Area
P34	409602	5746695	8.65	Study Area
P35	408074	5746079	3.24	Study Area
P36	408199	5746055	0.10	Study Area
P37	408061	5745816	8.72	Study Area
P38	547295	5495306	3.85	Study Area
P39	541501	5496024	21.78	Study Area

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
P40	540979	5496126	1.70	Study Area
P41	538842	5505231	0.75	Study Area
P42	539297	5504989	9.42	Study Area
P43	538905	5505229	0.07	Study Area
P44	538894	5505175	0.03	Study Area
P45	538916	5505090	0.05	Study Area
P46	539565	5504854	0.79	Study Area
P47	538552	5503910	51.48	Study Area
P48	539189	5504452	5.15	Study Area
P49	539147	5504093	2.44	Study Area
P50	539797	5503344	7.99	Study Area
P51	538926	5503244	0.03	Study Area
P52	539690	5503198	0.52	Study Area
P53	539546	5503209	0.06	Study Area
P54	538842	5503192	0.20	Study Area
P55	538612	5503185	0.88	Study Area
P56	538439	5503194	0.09	Study Area
P57	538011	5503184	1.39	Study Area
P58	538805	5503140	0.27	Study Area
P59	538644	5503159	0.22	Study Area
P60	538012	5503077	8.09	Study Area
P61	538817	5502913	2.89	Study Area
P62	538934	5502874	0.27	Study Area
P63	538960	5502883	0.06	Study Area
P64	538740	5502428	9.38	Study Area
P65	538948	5502016	5.32	Study Area
P66	539428	5502366	12.18	Study Area
P67	538806	5501966	8.41	Study Area
P68	538926	5502087	0.20	Study Area
P69	538913	5501985	0.47	Study Area
P70	540865	5500042	5.40	Study Area
P71	541072	5499379	13.07	Study Area
P72	539610	5498800	70.41	Study Area
P73	540982	5498857	18.61	Study Area
P74	541412	5498651	4.14	Study Area
P75	538976	5498534	0.08	Study Area
P76	539280	5498168	3.94	Study Area
P77	539296	5497644	7.21	Study Area
P78	539602	5496924	9.34	Study Area
P79	536694	5509238	16.78	Study Area
P80	534935	5509156	14.55	Study Area
P81	541202	5508366	0.67	Study Area

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
P82	541014	5508361	1.23	Study Area
P83	537114	5507303	4.53	Study Area
P84	537664	5506929	7.85	Study Area
P85	530849	5510882	1.58	Study Area
P86	539111	5501624	7.23	Study Area
P87	538969	5501821	<0.01	Study Area
P88	539029	5502058	11.59	Study Area
P2	489771	5656603	0.34	RoW
P13	446157	5709546	1.61	RoW
P41	538852	5505222	0.56	RoW
P47	538857	5503715	1.49	RoW
P54	538870	5503195	0.09	RoW
P58	538840	5503142	<0.01	RoW
P61	538875	5502873	0.91	RoW
P64	538896	5502380	2.22	RoW
P65	538952	5501848	0.47	RoW
P67	538891	5501990	1.18	RoW
P68	538921	5502079	0.04	RoW
P69	538907	5501986	0.35	RoW
P72	539822	5498706	5.02	RoW
P79	536668	5509756	0.01	RoW
P86	538969	5501809	<0.01	RoW
P87	538969	5501821	<0.01	RoW
P88	538999	5501845	0.53	RoW

Source: Manitoba Conservation, Forest Resource Inventory. Location is represented by the centroid coordinate of the feature in Datum NAD 83, Zone 14U.

Table 2. Location and area of salt marsh complexes within the local study area and 66 m right-of-way.

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
S21	363008	5862398	76.24	Study Area
S22	361162	5859626	52.72	Study Area
S23	358373	5883211	13.48	Study Area
S24	359602	5878407	564.59	Study Area
S21	362801	5862290	5.53	RoW

Source: Ducks Unlimited 2009. Location is represented by the centroid coordinate of the feature feature in Datum NAD 83, Zone 14U.

Table 3. Location and area of mud/salt flats within the local study area and 66 m right-of-way.

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
S1	432855	5721274	0.18	Study Area
S2	432690	5720398	6.93	Study Area
S3	433181	5720853	6.08	Study Area
S4	432903	5720680	3.40	Study Area
S5	433004	5719973	4.87	Study Area
S6	364320	5863107	35.89	Study Area
S7	363023	5862693	1.45	Study Area
S8	364762	5862118	30.69	Study Area
S9	362406	5861288	2.48	Study Area
S10	363735	5860806	29.16	Study Area
S11	361816	5859908	3.57	Study Area
S12	360834	5859745	7.59	Study Area
S13	361488	5859551	8.78	Study Area
S14	365236	5858058	3.18	Study Area
S15	520176	5576986	1.57	Study Area
S16	520213	5576872	0.33	Study Area
S17	520240	5576657	4.14	Study Area
S18	384610	5996995	6.04	Study Area
S19	389246	5999945	30.76	Study Area
S20	385986	5997408	25.19	Study Area
S7	362740	5862501	1.16	RoW

Source: Manitoba Conservation, Forest Resource Inventory. Location is represented by the centroid coordinate of the feature in Datum NAD 83, Zone 14U.

Table 4. Location and area of patterned fens within the local study area and 66 m right-of-way.

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
W1	494629	6057408	1161.61	Local Study Area
W2 - removed due to route adjustments				Local Study Area
W3 - removed due to route adjustments				Local Study Area
W4	470995	6046339	1539.57	Local Study Area
W5	487429	6055759	252.88	Local Study Area
W6	365290	5973393	2266.03	Local Study Area
W7	360227	5852889	929.02	Local Study Area
W8	359844	5919415	1530.73	Local Study Area
W9	361519	5913568	311.55	Local Study Area
W10	365666	5963961	184.69	Local Study Area
W11	360231	5897436	2109.52	Local Study Area
W12	358225	5960581	1616.27	Local Study Area
W13	461718	6047223	224.96	Local Study Area
W14	457899	6045958	304.76	Local Study Area
W15	414088	6012558	1665.79	Local Study Area
W16	404100	6007181	2292.63	Local Study Area
W17	395283	5766198	1612.23	Local Study Area
W18	476927	6047549	126.67	Local Study Area
W19	451318	6043077	41.11	Local Study Area
W20	488173	6052962	349.24	Local Study Area
W21	360334	5926186	1787.08	Local Study Area
W22	398167	5764495	685.76	Local Study Area
W23	361474	5928289	91.70	Local Study Area
W24	452321	6039470	1316.44	Local Study Area
W25	417394	6018334	1223.65	Local Study Area
W26	356306	5946121	2546.03	Local Study Area
W27	356675	5932304	19.80	Local Study Area
W28	363719	5913661	2437.00	Local Study Area
W29	363948	5904346	3448.61	Local Study Area
W30	484199	6051760	1947.74	Local Study Area
W31	425366	6022620	116.91	Local Study Area
W32 - removed due to route adjustments				Local Study Area
W33	429848	6025585	167.35	Local Study Area
W34	463215	6044975	927.65	Local Study Area

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
W35	443686	6037424	4295.18	Local Study Area
W36	440513	6032902	422.03	Local Study Area
W37	501233	6049336	1791.59	Local Study Area
W38	510847	6055049	1363.64	Local Study Area
W39	500817	6047600	301.33	Local Study Area
W40	501495	6051551	92.92	Local Study Area
W41	497187	6049757	1607.23	Local Study Area
W42	494371	6048560	686.38	Local Study Area
W1 - removed due to route adjustments				RoW
W2 - removed due to route adjustments				RoW
W3 - removed due to route adjustments				RoW
W4	466650	6046305	9.94	RoW
W6	365262	5973508	37.20	RoW
W7	360990	5851398	4.64	RoW
W8	360735	5920378	27.64	RoW
W11	360279	5897517	28.26	RoW
W12	361070	5961146	7.39	RoW
W15	413459	6013557	26.20	RoW
W16	403666	6005562	21.74	RoW
W17	395132	5765701	29.78	RoW
W21	359737	5925985	18.73	RoW
W22	396960	5763839	4.91	RoW
W24	456236	6042829	13.29	RoW
W25	418248	6018123	28.55	RoW
W26	356826	5946258	41.80	RoW
W28	363917	5913817	32.52	RoW
W29	364006	5904517	42.37	RoW
W30	484649	6052936	26.30	RoW
W34	463324	6045257	17.93	RoW
W35	451223	6039895	21.17	RoW
W37	500954	6049496	36.82	RoW
W38	510454	6055047	30.07	RoW
W41	496828	6049529	17.77	RoW
W42	494741	6049563	9.78	RoW

Note only patterned fens with a primary wetland class included in the analysis. Location is represented by the centroid coordinate of the feature in Datum NAD 83, Zone 14U.

Table 5. Location and area of ATK vegetation sites within the local study area and 66 m right-of-way.

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
A1	382791	5982959	**	Local Study Area
A2	413699	6011067	**	Local Study Area
A3	412389	6010729	2340.29	Local Study Area
A4	400782	5998102	94.38	Local Study Area
A5	393404	5775128	66.01	Local Study Area
A6	386800	5775958	*	Local Study Area
A7	378714	5779660	*	Local Study Area
A8	404412	5737385	**	Local Study Area
A9	383507	5778978	7229.31	Local Study Area
A10	387616	5770188	144.72	Local Study Area
A11	388556	5768111	0.53	Local Study Area
A12	364357	5860787	**	Local Study Area
A13	361394	5882650	**	Local Study Area
A14	364431	5863129	42.20	Local Study Area
A15	363586	5862579	109.11	Local Study Area
A16	362220	5860592	39.76	Local Study Area
A17	362574	5859700	67.02	Local Study Area
A18	363115	5872704	3.72	Local Study Area
A19	359548	5880972	352.25	Local Study Area
A20	361198	5878097	35.45	Local Study Area
A21	360876	5880165	1.07	Local Study Area
A22	359211	5890552	48.00	Local Study Area
A23	357921	5882348	43.18	Local Study Area
A24	355444	5861612	2507.99	Local Study Area
A25	361694	5856466	2004.06	Local Study Area
A26	363748	5866659	400.81	Local Study Area
A27	364369	5867032	564.53	Local Study Area
A28	360220	5882727	1849.85	Local Study Area
A29	349618	5863323	1413.59	Local Study Area
A30	361555	5855163	251.17	Local Study Area
A31	357240	5845201	0.05	Local Study Area
A32	401545	5758417	481.23	Local Study Area
A33	388684	5778599	11767.02	Local Study Area
A34	388345	5780070	6095.73	Local Study Area
A35	385707	5772651	2018.10	Local Study Area
A36	390677	5771842	3439.36	Local Study Area
A37	387827	5800100	1919.15	Local Study Area
A38	386503	5796780	630.26	Local Study Area
A39	527976	5512358	1863.15	Local Study Area

Source Identification	Easting	Northing	Area (ha)	Local Study Area or RoW
A40	360283	5882613	260.60	Local Study Area
A41	358874	5853717	1550.22	Local Study Area
A42	363926	5852276	183.92	Local Study Area
A43	391046	5780396	3047.84	Local Study Area
A44	400264	5996374	4.01	Local Study Area
A45	352428	5860466	3966.89	Local Study Area
A46	359109	5892453	**	Local Study Area
A47	600264	6165623	**	Local Study Area
A48	406872	6013426	**	Local Study Area
A3	412389	6010729	40.77	RoW
A9	383507	5778978	102.34	RoW
A15	363586	5862579	2.12	RoW
A25	361694	5856466	22.15	RoW
A27	364369	5867032	10.03	RoW
A28	360220	5882727	15.61	RoW
A29	349618	5863323	21.53	RoW
A32	401545	5758417	10.92	RoW
A33	388684	5778599	199.33	RoW
A34	388345	5780070	81.35	RoW
A35	385707	5772651	36.16	RoW
A36	390677	5771842	52.86	RoW
A37	387827	5800100	12.15	RoW
A39	527976	5512358	27.40	RoW
A41	358874	5853717	15.30	RoW
A43	391046	5780396	49.82	RoW
A45	352428	5860466	57.94	RoW
A46	359109	5892453	**	RoW
A47	600264	6165623	**	RoW

Location is represented by the centroid coordinate of the feature feature in Datum NAD 83, Zone 14U.

*ATK point data (no area) and **ATK line data (no area).

Table 6. Bipole III Transmission Project environmentally sensitive site information.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
Aboriginal Traditional Knowledge (ATK) sites on RoW						
A3	412389	6010729	ATK site	Occurs on RoW. Medicine gathering site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
A9	383507	5778978	ATK site	Occurs on RoW. Blueberry picking and medicine gathering site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
A15	363586	5862579	ATK site	Occurs on RoW. Cranberry picking site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
A25	361694	5856466	ATK site	Occurs on RoW. Labrador tea and mint gathering site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
A27	364369	5867032	ATK site	Occurs on RoW. Sweetgrass gathering site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A28	360220	5882727	ATK site	Occurs on RoW. Sweetgrass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A29	349618	5863323	ATK site	Occurs on RoW. Sweetgrass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A32	401545	5758417	ATK site	Occurs on RoW. Spruce trees are harvested for fence posts.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Minimize disturbance in areas of trees used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan.
A33	388684	5778599	ATK site	Occurs on RoW. Blueberry, seneca root, sweetgrass, ginger root and medicine gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A34	388345	5780070	ATK site	Occurs on RoW. Blueberry and pincherry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> Remove trees by low-ground disturbance methods.
A35	385707	5772651	ATK site	Occurs on RoW. Berry picking site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A36	390677	5771842	ATK site	Occurs on RoW. Blueberry picking site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A37	387827	5800100	ATK site	Occurs on RoW. Seneca root and sage gathering and blueberry picking site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A39	527976	5512358	ATK site	Occurs on RoW. Species collected include: wild grapes, plums, Saskatoons, chokecherries, cranberries and sage.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A41	358874	5853717	ATK site	Occurs on RoW. Seneca root gathering site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						activities. <ul style="list-style-type: none">• Remove trees by low-ground disturbance methods.
A43	391046	5780396	ATK site	Occurs on RoW. Berry harvesting site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
A45	352428	5860466	ATK site	Occurs on RoW. Tamarack harvesting site for firewood.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Minimize disturbance in areas of trees used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.
A46	359109	5892453	ATK site	Occurs on RoW. Sage gathering site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
A47	600264	6165623	ATK site	Occurs on RoW. Wood harvesting site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Minimize disturbance in areas of trees used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.
Aboriginal Traditional Knowledge (ATK) sites outside RoW in Local Study Area						
A1	382791	5982959	ATK site	Occurs outside RoW in local study area. Cranberries picking site.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
A2	413699	6011067	ATK site	Occurs outside RoW in local study area. Berry picking, traditional medicine gathering along creek.	<ul style="list-style-type: none">• Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A3	412389	6010729	ATK site	Occurs outside RoW in local study area. Medicine gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A4	400782	5998102	ATK site	Occurs outside RoW in local study area. Medicine gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A5	393404	5775128	ATK site	Occurs outside RoW in local study area. Seneca root gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A6	386800	5775958	ATK site	Occurs outside RoW in local study area. Blueberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A7	378714	5779660	ATK site	Occurs outside RoW in local study area. Blueberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A8	404412	5737385	ATK site	Occurs outside RoW in local study area. Blueberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A9	383507	5778978	ATK site	Occurs outside RoW in local study area. Blueberry picking and medicine gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A10	387616	5770188	ATK site	Occurs outside RoW in local study area. Blueberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A11	388556	5768111	ATK site	Occurs outside RoW in local study area. Blueberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A12	364357	5860787	ATK site	Occurs outside RoW in local study area. Plants collected include: sweet grass, ginger, cranberry bark, diamond willow and sage-fungus.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A13	361394	5882650	ATK site	Occurs outside RoW in local study area. Sweet grass and ginger gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A14	364431	5863129	ATK site	Occurs outside RoW in local study area. Sweet grass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A15	363586	5862579	ATK site	Occurs outside RoW in local study area. Cranberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A16	362220	5860592	ATK site	Occurs outside RoW in local study area. Sweet grass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A17	362574	5859700	ATK site	Occurs outside RoW in local study area. Sweet grass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified

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						<p>through the ATK process.</p> <ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A18	363115	5872704	ATK site	Occurs outside RoW in local study area. Moss berry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A19	359548	5880972	ATK site	Occurs outside RoW in local study area. Sweet grass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A20	361198	5878097	ATK site	Occurs outside RoW in local study area. Red willow, ginger root, Labrador tea, and sage gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A21	360876	5880165	ATK site	Occurs outside RoW in local study area. Sage gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A22	359211	5890552	ATK site	Occurs outside RoW in local study area. Cranberry bark gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during

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						<p>winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.</p> <ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A23	357921	5882348	ATK site	Occurs outside RoW in local study area. Sweet grass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A24	355444	5861612	ATK site	Occurs outside RoW in local study area. Area of berry and vegetation use.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A25	361694	5856466	ATK site	Occurs outside RoW in local study area. Labrador tea and mint gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A26	363748	5866659	ATK site	Occurs outside RoW in local study area. Sweet grass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A27	364369	5867032	ATK site	Occurs outside RoW in local study area. Sweetgrass	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.

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				gathering site.	moved to include this site.	<ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A28	360220	5882727	ATK site	Occurs outside RoW in local study area. Sweetgrass gathering site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A29	349618	5863323	ATK site	Occurs outside RoW in study area. Sweetgrass gathering site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A30	361555	5855163	ATK site	Occurs outside RoW in local study area. Important plant area.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A31	357240	5845201	ATK site	Occurs outside RoW in local study area. Important plant area at Highways 77 and 10 junction.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A32	401545	5758417	ATK site	Occurs outside RoW in local	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, 	<ul style="list-style-type: none"> Minimize disturbance in areas of trees used by Aboriginal people as identified through the ATK

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				study area. Spruce trees are harvested for fence posts.	maintenance and decommissioning activities if route is moved to include this site.	process. <ul style="list-style-type: none"> Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan.
A33	388684	5778599	ATK site	Occurs outside RoW in local study area. Blueberry picking, and seneca root, sweetgrass, ginger root and medicine gathering site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A34	388345	5780070	ATK site	Occurs outside RoW in local study area. Blueberry and pincherry picking site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A35	385707	5772651	ATK site	Occurs outside RoW in local study area. Berry picking site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A36	390677	5771842	ATK site	Occurs outside RoW in local study area. Blueberry picking site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible. Implement provisions of the Access Management Plan. Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. Remove trees by low-ground disturbance methods.
A37	387827	5800100	ATK site	Occurs outside RoW in local study area. Seneca root and sage gathering and blueberry picking site.	<ul style="list-style-type: none"> Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. Use existing access roads and trails to the extent possible.

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						<ul style="list-style-type: none"> • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A38	386503	5796780	ATK site	Occurs outside RoW in local study area. Blueberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A39	527976	5512358	ATK site	Occurs outside RoW in local study area. Species collected include: wild grapes, plums, Saskatoons, chokecherries, cranberries and sage.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A40	360283	5882613	ATK site	Occurs outside RoW in local study area. Sweet grass gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A41	358874	5853717	ATK site	Occurs outside RoW in local study area. Seneca root gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A42	363926	5852276	ATK site	Occurs outside RoW in local study area. Seneca root gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.

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						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A43	391046	5780396	ATK site	Occurs outside RoW in local study area. Berry harvesting site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A44	400264	5996374	ATK site	Occurs outside RoW in local study area. Wild ginger gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A45	352428	5860466	ATK site	Occurs outside RoW in local study area. Tamarack harvesting site for firewood.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Minimize disturbance in areas of trees used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan.
A46	359109	5892453	ATK site	Occurs outside RoW in local study area. Sage gathering site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan. • Maintain understory stratum during clearing, construction, maintenance and decommissioning activities. • Remove trees by low-ground disturbance methods.
A47	600264	6165623	ATK site	Occurs outside RoW in local study area. Wood harvesting site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Minimize disturbance in areas of trees used by Aboriginal people as identified through the ATK process. • Use existing access roads and trails to the extent possible. • Implement provisions of the Access Management Plan.
A48	406872	6013426	ATK site	Occurs outside RoW in local study area. High-bush cranberry picking site.	<ul style="list-style-type: none"> • Loss of vegetation as a result of clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize disturbance in areas of plants used by Aboriginal people as identified through the ATK process.

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						<ul style="list-style-type: none">• Use existing access roads and trails to the extent possible.• Implement provisions of the Access Management Plan.• Maintain understory stratum during clearing, construction, maintenance and decommissioning activities.• Remove trees by low-ground disturbance methods.
Dry Upland Prairie sites on RoW						
P2	489771	5656603	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P13	446157	5709546	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P41	538852	5505222	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P47	538857	5503715	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P54	538870	5503195	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.

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						<ul style="list-style-type: none"> • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P58	538840	5503142	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P61	538875	5502873	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P64	538896	5502380	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P65	538952	5501848	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P67	538891	5501990	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P68	538921	5502079	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.

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					maintenance and decommissioning activities.	<ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P69	538907	5501986	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P72	539822	5498706	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P79	536668	5509756	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P86	538969	5501809	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P87	538969	5501821	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using

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						native species appropriate for the site. <ul style="list-style-type: none"> Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P88	538999	5501845	Dry upland prairie	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
Dry Upland Prairie sites outside RoW in Local Study Area						
P1	489536	5656772	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P2	489928	5656456	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P3	490849	5655667	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P4	491812	5654752	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.

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P5	487024	5658800	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P6	487262	5658658	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P7	488490	5657792	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P8	489127	5657181	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P9	470194	5692676	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P10	472561	5690602	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.

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						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P11	445450	5709751	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P12	448866	5709609	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P13	446067	5709514	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P14	447977	5706605	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P15	447839	5706586	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce

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						the spread of introduced species.
P16	447793	5706443	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P17	447065	5706325	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P18	447270	5705721	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P19	447256	5705496	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P20	448153	5705288	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P21	441895	5716438	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during

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					moved to include this site.	winter months, minimize soil and vegetation disturbance. <ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P22	442119	5715939	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P23	441290	5715850	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P24	441227	5715642	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P25	441039	5715489	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P26	441045	5715347	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.

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						<ul style="list-style-type: none"> • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P27	442031	5712553	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P28	445690	5711363	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P29	445448	5711848	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P30	441760	5710554	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P31	445444	5709933	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P32	445386	5709790	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.

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					maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P33	448839	5709765	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P34	409602	5746695	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P35	408074	5746079	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P36	408199	5746055	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P37	408061	5745816	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using

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						native species appropriate for the site. <ul style="list-style-type: none"> • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P38	547295	5495306	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P39	541501	5496024	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P40	540979	5496126	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P41	538842	5505231	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P42	539297	5504989	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P43	538905	5505229	Dry upland	Occurs outside RoW in local	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months

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			prairie	study area.	grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	to minimize surface damage, rutting and erosion. <ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P44	538894	5505175	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P45	538916	5505090	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P46	539565	5504854	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P47	538552	5503910	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P48	539189	5504452	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible.

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						<ul style="list-style-type: none"> Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P49	539147	5504093	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P50	539797	5503344	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P51	538926	5503244	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P52	539690	5503198	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P53	539546	5503209	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.

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P54	538842	5503192	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P55	538612	5503185	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P56	538439	5503194	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P57	538011	5503184	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P58	538805	5503140	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P59	538644	5503159	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.

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						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P60	538012	5503077	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P61	538817	5502913	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P62	538934	5502874	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P63	538960	5502883	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P64	538740	5502428	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce

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						the spread of introduced species.
P65	538948	5502016	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P66	539428	5502366	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P67	538806	5501966	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P68	538926	5502087	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P69	538913	5501985	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P70	540865	5500042	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during

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					moved to include this site.	winter months, minimize soil and vegetation disturbance. <ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P71	541072	5499379	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P72	539610	5498800	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P73	540982	5498857	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P74	541412	5498651	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P75	538976	5498534	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.

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						<ul style="list-style-type: none"> • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P76	539280	5498168	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P77	539296	5497644	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P78	539602	5496924	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P79	536694	5509238	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P80	534935	5509156	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P81	541202	5508366	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and grassland species/communities from clearing, construction, 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.

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					maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P82	541014	5508361	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P83	537114	5507303	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P84	537664	5506929	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P85	530849	5510882	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P86	539111	5501624	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using

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						native species appropriate for the site. <ul style="list-style-type: none">• Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P87	538969	5501821	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
P88	539029	5502058	Dry upland prairie	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and grassland species/communities from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Ensure all vehicles and equipment are washed and inspected prior to working in new sites to reduce the spread of introduced species.
Salt Marsh / Salt Flat sites on RoW						
S21	362801	5862290	Salt marsh	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S7	362740	5862501	Salt flat	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
Salt Marsh / Salt Flat sites outside RoW in Local Study Area						
S21	363008	5862398	Salt marsh	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S22	361162	5859626	Salt marsh	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using

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						native species appropriate for the site. <ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible.
S23	358373	5883211	Salt marsh	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S24	359602	5878407	Salt marsh	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S1	432855	5721274	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S2	432690	5720398	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S3	433181	5720853	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S4	432903	5720680	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S5	433004	5719973	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using

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						native species appropriate for the site. <ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible.
S6	364320	5863107	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S7	363023	5862693	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S8	364762	5862118	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S9	362406	5861288	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S10	363735	5860806	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S11	361816	5859908	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site. • Use existing access roads and trails to the extent possible.
S12	360834	5859745	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						native species appropriate for the site. <ul style="list-style-type: none">• Use existing access roads and trails to the extent possible.
S13	361488	5859551	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S14	365236	5858058	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S15	520176	5576986	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S16	520213	5576872	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S17	520240	5576657	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S18	384610	5996995	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
S19	389246	5999945	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						native species appropriate for the site. <ul style="list-style-type: none">• Use existing access roads and trails to the extent possible.
S20	385986	5997408	Salt flat	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Where disturbance has occurred in areas of increased erosion potential, re-establish vegetation using native species appropriate for the site.• Use existing access roads and trails to the extent possible.
Patterned Fen Complexes on RoW						
W1 - removed due to route adjustments			Patterned fen			
W2 - removed due to route adjustments			Patterned fen			
W3 - removed due to route adjustments			Patterned fen			
W4	466650	6046305	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W6	365262	5973508	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W7	360990	5851398	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						seeding these areas with native species will occur. <ul style="list-style-type: none"> During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W8	360735	5920378	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W11	360279	5897517	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W12 - removed due to feature verification			Patterned fen			
W15	413459	6013557	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W16	403666	6005562	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W17 - removed due to feature verification			Patterned fen			
W21	359737	5925985	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W22 - removed due to feature verification			Patterned fen			
W24	456236	6042829	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W25	418248	6018123	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W26	356826	5946258	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<p>wetlands may be affected.</p> <ul style="list-style-type: none"> Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W28	363917	5913817	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W29	364006	5904517	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W30	484649	6052936	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W34	463324	6045257	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
W35	451223	6039895	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W37	500954	6049496	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W38	510454	6055047	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W41	496828	6049529	Patterned fen	Occurs on RoW.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W42 - removed due to feature verification			Patterned fen			

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
Patterned Fen Complexes outside RoW in Local Study Area						
W1	494629	6057408	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W2 - removed due to route adjustments			Patterned fen			
W3 - removed due to route adjustments			Patterned fen			
W4	470995	6046339	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W5	487429	6055759	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.• During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W6	365290	5973393	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none">• Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none">• Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.• Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance.• Use existing access roads and trails to the extent possible.• Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.• Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W7	360227	5852889	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W8	359844	5919415	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W9	361519	5913568	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W10	365666	5963961	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W11	360231	5897436	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
					site.	winter months, minimize soil and vegetation disturbance. <ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. • Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. • During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W12	358225	5960581	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. • Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. • During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W13	461718	6047223	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. • Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. • During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W14	457899	6045958	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. • Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. • During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W15	414088	6012558	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. • Use existing access roads and trails to the extent possible. • Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. • Where transmission structures will be sited in areas of increased erosion potential, planting or

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						seeding these areas with native species will occur. <ul style="list-style-type: none"> During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W16	404100	6007181	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W17	395283	5766198	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W18	476927	6047549	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W19	451318	6043077	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W20	488173	6052962	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
					decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W21	360334	5926186	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W22	398167	5764495	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W23	361474	5928289	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W24	452321	6039470	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W25	417394	6018334	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W26	356306	5946121	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W27	356675	5932304	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W28	363719	5913661	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W29	363948	5904346	Patterned fen	Occurs outside RoW in local	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
				study area.	disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	to minimize surface damage, rutting and erosion. <ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W30	484199	6051760	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W31	425366	6022620	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W32 - removed due to route adjustments			Patterned fen			
W33	429848	6025585	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W34	463215	6044975	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
					decommissioning activities if route is moved to include this site.	<ul style="list-style-type: none"> Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W35	443686	6037424	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W36	440513	6032902	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W37	501233	6049336	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected. Where transmission structures will be sited in areas of increased erosion potential, planting or seeding these areas with native species will occur. During construction, implement measures to manage storm water runoff to reduce the potential for erosion.
W38	510847	6055049	Patterned fen	Occurs outside RoW in local study area.	<ul style="list-style-type: none"> Potential loss of species of conservation concern and habitat disturbance from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where clearing, construction, maintenance and decommissioning activities do not occur during winter months, minimize soil and vegetation disturbance. Use existing access roads and trails to the extent possible. Where construction does not occur over winter months, construction mats could be utilized where wetlands may be affected.

[illegible]

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
SC6			Species of concern	<i>Cyperus houghtonii</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC9			Species of concern	<i>Dichanthelium linearifolium</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC11			Species of concern	<i>Shimmersoseris rostrata</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC12			Species of concern	<i>Shimmersoseris rostrata</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC14			Species of concern	<i>Orobanche ludoviciana</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC15			Species of concern	<i>Asclepias verticillata</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC17			Species of concern	<i>Viola conspersa</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC18			Species of concern	<i>Hypoxis hirsuta</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC19			Species of concern	<i>Nassella viridula</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC20			Species of concern	<i>Woodsia glabella</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC21			Species of concern	<i>Arabis lyrata</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC22			Species of concern	<i>Bromus pubescens</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC23			Species of concern	<i>Thalictrum sparsiflorum</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC25			Species of concern	<i>Woodsia glabella</i> occurs on RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC2			Species of concern	<i>Poa arctica</i> ssp. <i>caespitans</i> occurs on northern collector RoW. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC1			Species of concern	<i>Arethusa bulbosa</i> occurs at southern electrode SES3.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing and construction activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
				MBCDC polygon record.		<ul style="list-style-type: none"> Use existing access roads and trails to the extent possible.
SC3			Species of concern	<i>Calopogon tuberosus</i> occurs at southern electrode SES3. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing and construction activities. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
Species of Concern outside RoW in Local Study Area (MBCDC polygon records)						
SC1			Species of concern	<i>Arethusa bulbosa</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC2			Species of concern	<i>Poa arctica</i> ssp. <i>caespitans</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC3			Species of concern	<i>Calopogon tuberosus</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC4			Species of concern	<i>Hypoxis hirsuta</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC5			Species of concern	<i>Draba reptans</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC6			Species of concern	<i>Cyperus houghtonii</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC7			Species of concern	<i>Astragalus neglectus</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC8			Species of concern	<i>Chamaesyce geyeri</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC9			Species of concern	<i>Dichanthelium linearifolium</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC10			Species of concern	<i>Carex garberi</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC11			Species of concern	<i>Shinnersoseris rostrata</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
SC12			Species of concern	<i>Shinnersoseris rostrata</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC14			Species of concern	<i>Orobanche ludoviciana</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC15			Species of concern	<i>Asclepias verticillata</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC16			Species of concern	<i>Viola selkirkii</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC17			Species of concern	<i>Viola conspersa</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC18			Species of concern	<i>Hypoxis hirsuta</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC19			Species of concern	<i>Nassella viridula</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC20			Species of concern	<i>Woodsia glabella</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC21			Species of concern	<i>Arabis lyrata</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC22			Species of concern	<i>Bromus pubescens</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC23			Species of concern	<i>Thalictrum sparsiflorum</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC24			Species of concern	<i>Platanthera orbiculata</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC25			Species of	<i>Woodsia glabella</i> occurs	<ul style="list-style-type: none"> Potential loss of previously known species of conservation 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
			concern	outside RoW in local study area. MBCDC polygon record.	concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	when effects to plant species are minimized. <ul style="list-style-type: none"> Use existing access roads and trails to the extent possible.
SC26			Species of concern	<i>Vernonia fasciculata</i> ssp. <i>corymbosa</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
SC27			Species of concern	<i>Pellaea glabella</i> ssp. <i>occidentalis</i> occurs outside RoW in local study area. MBCDC polygon record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months when effects to plant species are minimized. Use existing access roads and trails to the extent possible.
Species of Concern outside RoW in Study Area (MBCDC point records)						
SC28			Species of concern	<i>Draba reptans</i> occurs outside RoW in local study area. MBCDC point record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC29			Species of concern	<i>Vernonia fasciculata</i> ssp. <i>corymbosa</i> occurs outside RoW in local study area. MBCDC point record.	<ul style="list-style-type: none"> Potential loss of previously known species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
Species of Concern outside RoW in Study Area and at other Project components (2010 field assessment)						
SC30	529957	5514555	Species of concern	<i>Circaea lutetiana</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC31	539447	5502385	Species of concern	<i>Circaea lutetiana</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC32	536565	5509606	Species of concern	<i>Corispermum americanum</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC33	536565	5509606	Species of	<i>Cyperus schweinitzii</i> occurs	<ul style="list-style-type: none"> Potential loss of species of conservation concern from 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
			concern	outside RoW in local study area, observed during 2010 field assessment.	clearing, construction, maintenance and decommissioning activities if route is moved to include this site.	to minimize surface damage, rutting and erosion. <ul style="list-style-type: none"> Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC34	361458	5853833	Species of concern	<i>Danthonia intermedia</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC35	361510	5858660	Species of concern	<i>Danthonia intermedia</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC36	411574	5739472	Species of concern	<i>Danthonia intermedia</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC37	536565	5509606	Species of concern	<i>Dalea villosa</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC38	356649	5947953	Species of concern	<i>Drosera anglica</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. Use existing access roads and trails to the extent possible. Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC39 – removed due to route adjustments			Species of concern			
SC40	680894	6250938	Species of concern	<i>Drosera anglica</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC41	356649	5947953	Species of concern	<i>Drosera linearis</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC42	520529	5575820	Species of concern	<i>Hypoxis hirsuta</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC43	520764	5576779	Species of concern	<i>Hypoxis hirsuta</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC44	553539	5496684	Species of concern	<i>Impatiens noli-tangere</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC45	536575	5509746	Species of concern	<i>Lithospermum incisum</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC46	529957	5514555	Species of concern	<i>Phryma leptostachya</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC47	539447	5502385	Species of concern	<i>Phryma leptostachya</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC48	775695	6291727	Species of concern	<i>Pyrola minor</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC49	724198	6272008	Species of concern	<i>Salix vestita</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC50	762931	6287717	Species of concern	<i>Salix vestita</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC51	763724	6287274	Species of concern	<i>Salix vestita</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC52	769745	6291264	Species of concern	<i>Salix vestita</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC53	775695	6291727	Species of concern	<i>Salix vestita</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC54	778089	6291450	Species of concern	<i>Salix vestita</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed.

Source Identification	Easting	Northing	ESS Name	ESS Description	Environmental Effects	Mitigation Measures
						<ul style="list-style-type: none"> • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC55	816050	6291691	Species of concern	<i>Salix vestita</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC56	434699	6031709	Species of concern	<i>Vaccinium caespitosum</i> occurs outside RoW in local study area, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing, construction, maintenance and decommissioning activities if route is moved to include this site. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC57	816146	6293427	Species of concern	<i>Salix vestita</i> occurs at the proposed construction power station, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Loss of species of conservation concern from clearing and construction activities. 	<ul style="list-style-type: none"> • Non-mitigable due to complete removal of all vegetation cover for site.
SC58	809002	6280124	Species of concern	<i>Salix vestita</i> occurs at the alternate northern ground electrode NES7, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing and construction activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.
SC59	677938	5532130	Species of concern	<i>Cypripedium reginae</i> occurs at the alternate southern ground electrode SES3, observed during 2010 field assessment.	<ul style="list-style-type: none"> • Potential loss of species of conservation concern from clearing and construction activities. 	<ul style="list-style-type: none"> • Carry out clearing, construction, maintenance and decommissioning activities during winter months to minimize surface damage, rutting and erosion. • Where activities do not occur during the winter months, minimize disturbance to the shrub and herb layer where species of concern have been observed. • Use existing access roads and trails to the extent possible. • Locations of species of conservation concer will be mapped and clearly marked with flagging tape prior to clearing activities.

Note: Source identification A – ATK site, P – Dry upland prairie, S – Salt marsh/flat, W – Patterned fen wetland complex, SC – Species of conservation concern. Location is Easting and Northing, Datum NAD 83, Zone 14U

APPENDIX K. Factors and criteria for residual environmental effects.

1. Direction of the Effect (Direction describes the difference or trend compared with existing conditions).

Positive:

- Beneficial or desirable change in the environment.

Negligible:

- No measurable change in the environment.

Negative:

- Adverse or undesirable change in the environment.

2. Ecological Importance (Ecological importance includes rarity and uniqueness, fragility, importance within ecosystems, and importance to scientific studies).

High:

- Protected species or habitat (e.g., listed under the *Species at Risk Act* (Federal) and/or *The Endangered Species Act* (Provincial)).
- Fragile area, ecosystem or habitat.
- Important ecological function or relationships.
- Important to scientific investigation (i.e., ongoing research/study).

Medium:

- Moderately rare, unique or fragile.
- Moderately/seasonally fragile environmental component.
- Somewhat important to ecosystem function or relationships.
- Some importance to scientific investigations.

Low:

- Not rare or unique (i.e., common).
- Resilient environmental component.
- Minor ecosystem importance.
- Limited scientific importance (i.e., no research/study).

3. Societal Importance (Societal importance includes the value that individuals/communities place on components of the affected socio-economic and/or biophysical environments that are necessary for economic, social and cultural well-being).

High Value:

- Designated areas (e.g., parks) or infrastructure that are protected internationally, nationally or provincially.
- Areas, activities, infrastructure and services, or components of the socio-economic/biophysical environment that have been identified as being important to sustaining the economic, social and cultural well-being of communities through the EA public consultation/ATK processes or EA regulatory guidance.

Medium Value:

- Designated areas or infrastructure that are protected regionally/locally.
- Areas, activities, infrastructure and services, or components of the socio-economic/biophysical environment that have been identified as being somewhat important to sustaining the economic, social and cultural wellbeing of individuals (e.g., domestic resource use) through the EA public consultation/ATK processes or EA regulatory guidance.

Low Value:

- Areas and/or infrastructure that have no formal designation.
- Areas, activities, infrastructure and services or other components of the socio-economic/biophysical environment that the public has not identified through the EA consultation/ATK processes or EA regulatory guidance as important for individuals overall well-being.

4. Magnitude (Degree of disturbance the effect has on a component of the biophysical or socio-economic environment).

Large:

- Effect on a population in sufficient magnitude to cause a decline in abundance and/or change in distribution lasting several generations.
- For socio-economics, effect on an entire community.
- Effect on the physical environment exceeds regulated limits, standards or guidelines.
- Effect can be easily observed, measured and described.

Medium:

- Effect on part of a population that result in a short-term change in abundance and/or distribution over one or more generations.
- For socio-economics, effect on part of a community.
- Effect on the physical environment meets and may occasionally exceed regulated limits, standards or guidelines.
- Effect can be measured with a well-designed monitoring program.

Small:

- Effect on a group of individuals within a population or stock over one generation or less; similar to random changes in the population.
- For socio-economics, effect on a group of individuals.
- Effect on the physical environment does not exceed regulated limits, standards or guidelines.
- No measurable effect on population as a whole.

5. Geographic Extent (The spatial boundaries where the effect would occur).

Regional Assessment Area:

- Effect extends into regional study area.

- Area where indirect or cumulative effects may occur.

Local Assessment Area:

- Effect extends beyond the project footprint into the surrounding areas, including potentially affected communities within a 5.0 km (3 mile) wide corridor of the route (i.e., 2.5 km) on either side of the RoW and around other project components.
- Area where direct and indirect effects may occur.

Project Site/Footprint:

- Effect confined to the footprint for all project components (transmission line RoW).
- Area where direct effects would occur.

6. Duration (How long would the effect last).

Long-term:

- Effect is greater than 50 years.

Medium-term:

- Effect extends throughout the construction and operation phase of the project (i.e., up to 50 years).

Short-term:

- Effect occurs during the construction phase of the project (i.e., 0 to 5 years).

7. Frequency (How often would the effect occur).

Regular/continuous:

- Effect occurs continuously or periodically during the life of the project.

Sporadic/intermittent:

- Effect occurs without any predictable pattern during the life of the project (e.g., wildlife vehicle collisions, bird strikes with transmission lines).

Once:

- Effect may occur only once during the life of the project (e.g., initial RoW clearing).

8. Reversibility (What is the potential for recovery from an adverse effect).

Irreversible:

- A long-term effect that is permanent (i.e., remains indefinite as a residual effect, even after project decommissioning).

Reversible:

- Effect is reversible either during the life of the project or upon project decommissioning.

APPENDIX L. Bipole III field data sheets.

Plot _____ **Day** _____ **Month** _____ 2010

Plot _____ **Day** _____ **Month** _____ 2010

[illegible]

UTM Zone _____ U _____ E _____ N Error _____ m (NAD 83)

Collected by: _____ Aspect _____° Slope _____% Ecoregion _____

Vegetation Type (eg. prairie, wetland, deciduous forest)_____

Notes_____

SURVEY FOR SPECIES OF CONCERN Plot _____ Day _____ Month _____ 2010

UTM Zone _____ U _____ E _____ N Error _____ m (NAD 83)

Collected by: _____ Ecoregion _____

Vegetation Type (eg. moist prairie, wet meadow, pasture, aspen) _____

Notes_____

[illegible]