

# Lake Manitoba Outlet Channel Route Options Vegetation Technical Report

*Final Report*  
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*Prepared for:*

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## 1.0 INTRODUCTION

Manitoba Infrastructure (MI) is currently developing options to address ongoing flood issues in the Assiniboine River and Lake Manitoba watershed basins. As part of this endeavour, MI initiated the Assiniboine River & Lake Manitoba Basins Flood Mitigation Study. This study, which was completed in 2011, included several components. In particular, the "Assiniboine River & Lake Manitoba Basins Flood Mitigation Study Lake Manitoba & Lake St. Martin Outlet Channels Conceptual Design - Stage 1 - Deliverable No: LMB-01" (KGS Group 2014) and the "Assiniboine River & Lake Manitoba Basins - Flood Mitigation Study LMB & LSM Outlet Channels Conceptual Design - Stage 2" (KGS Group 2016) were key to identifying future flood protection initiatives for the Assiniboine River and Lake Manitoba watershed basins.

The Stage 1 and Stage 2 Conceptual Designs prepared by KGS and MI included the three following components:

- further development of the Lake St. Martin Outlet Channel (LSMOC), which involves development of a channel in the area referred to as Reach 2 and completion of the channel referred to as Reach 3;
- construction and operation of a new channel from Lake Manitoba (LM) to Lake St. Martin (LSM) to increase flow capacity and expedite movement of flood waters between these waterbodies; and
- construction and operation of an All Season Road (ASR) in the area of the Lake St. Martin Outlet Channels to facilitate year-round vehicle, crew and equipment access to the Lake St. Martin Outlet Channels.

These three main components formed the overall MI Lake Manitoba and Lake St. Martin Access Road and Outlet Channels Project (the Project) at the time of this writing.

MI later engaged M. Forster Enterprises (MFE) and a team of professional consultants to conduct desktop and field investigations at varying spatial scales near the Project to provide information on the existing environmental conditions for each of the three Project components listed above. The intent of these investigations was to describe the baseline conditions in vicinity of the Project to support a future Environmental Impact Assessment (EIA). While the overall Project will require approval and licensing under the federal Canadian Environmental Assessment Act (CEAA) and the Manitoba Environment Act, the realignment and construction of an ASR for construction access will require regulatory approval and licensing from the Province of Manitoba.

This report was prepared to provide a summary of the existing vegetation and conditions for the LM Outlet Channel (LMOC) options of the Project, as identified through desktop, field studies and associated analysis, to provide the required baseline data for the environmental assessment and support the preparation of the federal and provincial Environmental Impact Assessment (EIA) for the LMOC component of the Project.

## 1.1 Background

Prior to this assignment, MI had evaluated a number of different conceptual route options for the LMOC. At the time of this writing, MI had selected two preferred route options for the LMOC, referred to as the LMOC Route C and LMOC Route D. As such, the examination of existing environmental conditions for the LMOC was completed for these two preferred route options identified by MI.

The LMOC Route C would be located south of the Fairford River and run roughly parallel to the southern border of the Pinaymootang First Nation (FN). The LMOC Route D would run from an inlet on Watchorn Bay in Lake Manitoba to the outlet of Birch Creek on Lake St. Martin (KGS Group 2016). The Stage 2 Conceptual Design for Route C is presented on Plate 2 in KGS Group 2016, and the Stage 2 Conceptual Design for Route D is presented on Plate 5 in KGS Group 2016. Figure 1 provides a map of the LMOC Project local study area and the proposed locations for LMOC Route C and LMOC Route D. Information on the boundaries selected for the Project study area is provided below in Section 3.

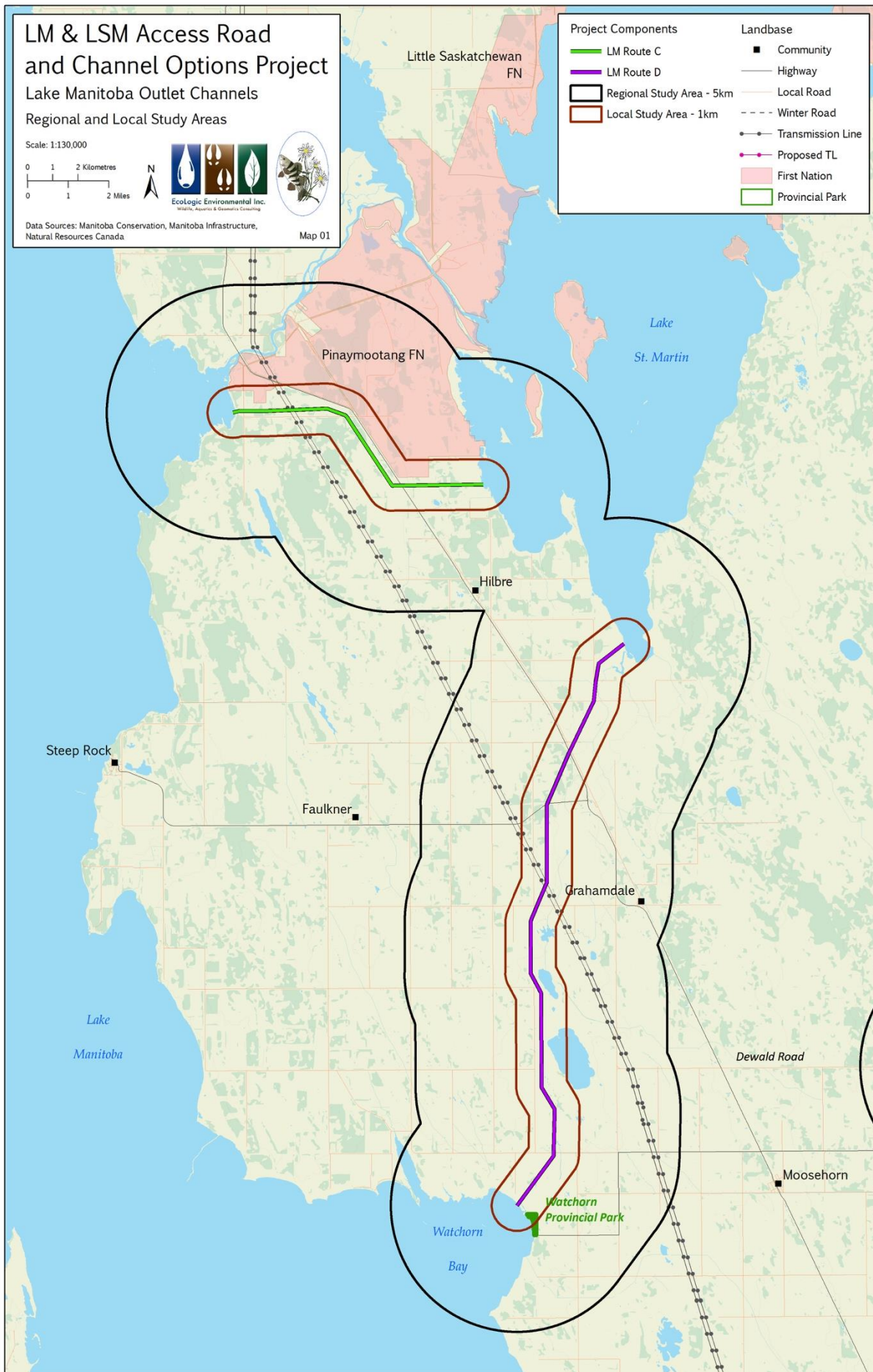
Based on the analysis conducted by KGS Group, the LMOC will be designed to convey a flow of 212 cubic metres per second (m<sup>3</sup>/s) (7,500 cubic feet per second [cfs]) (KGS Group 2016). In addition to the design, excavation, construction and operation of the LMOC, selection of either route would require changes to existing roads and highways in the area of the channel, as well as the design, installation and operation of new bridges and new culvert crossings. At the time of this writing, the conceptual design of the LMOC included the construction and operation of a gated water control structure to manage flows within the LMOC; a permanent groyne to be constructed in Lake Manitoba at the LMOC inlet; and the use of temporary cofferdams at the Lake Manitoba inlet and Lake St. Martin outlet areas during construction (KGS Group 2016).

## 1.2 Study Area

Given that the information collected for the baseline studies will be used in the environmental assessment for the Project, the study design for the vegetation baseline studies included the establishment of appropriate study area spatial boundaries. For the purposes of environmental assessment, the spatial boundaries for a project are typically described at three spatial scales: a Project Footprint (PF), a Local Study Area (LSA) and a Regional Study Area (RSA). The PF is the physical space or directly affected area on which the Project components or activities are located; the LSA is the area beyond the Project footprint in which potential Project effects are measurable; and the RSA is the area beyond the LSA within which most potential indirect and cumulative effects would occur (CEAA 2015).

The PF for the vegetation assessment for the LMOC works was defined as the 500 m RoW of the Route C and Route D channel alignments (Figure 1). The LSA for the vegetation assessment for the LMOC works included a 1 km buffer on either side of the Route C and Route D channel alignments (Figure 1). For vegetation, the LSA was designated as the total length of the RoW with a width of 1 km from either side of the centreline of each proposed alignment to reflect the mostly sessile nature of plants, but include areas of potential seed dispersal and new growth/colonization.

The RSA for the vegetation assessment for the LMOC works included a 5 km buffer surrounding the Route C and Route D channel alignments (Figure 1). For vegetation, the RSA was designated as the total length of the RoW with a width of 5 km from either side of the centreline of each proposed alignment to allow for the assessment of vegetation at a community level, if required.



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Figure 1: Lake Manitoba Outlet Channel Options Vegetation Study Areas



### 1.3 Study Objectives

The objectives of the LMOC vegetation studies and technical report included:

- determination of the existing baseline vegetation within the LSA of the LMOC channel options;
- delineation of habitat types in the LSA and RSA, including sensitive habitat (i.e. rare ecosystems, habitats that support rare or endangered species, and areas that are easily disturbed or degraded by human activities and developments);
- identification of any species at risk or species of conservation concern in the LSA;
- documentation of any plant species of importance to First Nations in the LSA and RSA; and
- identification of species that are exotic (i.e., non-native but not invasive) or invasive (non-native and threaten the diversity or abundance of native species or their habitats).

### 1.4 Plant Species of Conservation Concern

For the purpose of this assessment, a species at risk (SAR) is defined as any species protected under the federal Species at Risk Act (SARA) (Minister of Justice 2002) and/or the Manitoba Endangered Species and Ecosystems Act (MESEA) (MC 2012). Under these acts, it is considered a provincial and/or federal offence to kill, injure, harass, capture, possess, sell, or export an individual belonging to an extirpated, endangered, or threatened species and/or damager, or destroy its habitat. The identification and assessment of SAR is conducted federally by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and provincially by the Manitoba Conservation Data Centre (MBCDC).

In addition to species designated as extirpated, endangered, and threatened, species may also be identified federally as species of special concern. These species do not receive immediate protection under SARA, but require a management plan and assessment by COSEWIC, and may be eligible for further protection under provincial regulatory bodies (Minister of Justice 2002). Similarly, the MBCDC maintains a list of tracked species considered to be rare or uncommon within Manitoba (MBCDC 2013).

Species listed by the MBCDC that are of conservation concern, meaning they are rare, disjunct, or at risk throughout their range, as well as species listed under MESEA, SARA, and species that have a special designation from COSEWIC, were focused on during the desktop analysis and field surveys.

The MBCDC lists "species of conservation concern", which are species that are ranked on their abundance throughout Manitoba as per the following chart:

**Table 1: Ranking of Species of Concern**

Rank	Definition
S1	Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.
S2	Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.
S3	Uncommon throughout its range or in the province (21 to 100 occurrences).
S4	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).
S5	Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially impossible to eradicate under present conditions.

Source: Manitoba Conservation Data Centre, 2013

### 1.5 Plant Species of Significance to First Nations

MI and First Nations consultations were ongoing at the time of this writing, and a list of species important to the local First Nation communities had yet to be compiled. It is recognized that there are many plant species of significance to many First Nations peoples, and that the plant species of significance will vary by the practices of each First Nation, and their gathering locations. It is recognized that First Nations people have a special relationship with the earth and all living things in it. This relationship is based on a profound spiritual connection to the environment that guided indigenous peoples to practice reverence, humility and reciprocity. First Nations people have been sustainably harvesting plants based on subsistence needs and values extending back thousands of years.

Sweetgrass (*Hierochloe odorata*) is one of the four main plants (tobacco, sage, cedar and sweetgrass) considered as sacred to First Nations, Inuit and Métis Peoples (WEAP 2013a). It is known for its sweet scent, due to the presence of coumarins (Marles et al. 2000). Sweetgrass is usually associated with the prairies but is found in many different growing conditions from low meadows, forest openings, and along lakeshores. The best time to harvest sweetgrass is late June to early July. Sweetgrass is often picked, dried, and braided; the three sections representing mind, body and soul. One end of the braid is lit and the smoke is used for smudges, healings or talking circles because of its purification effects (WEAP 2013a).

Pasture sage (*Artemisia frigida*) and prairie sage (*Artemisia ludoviciana*) are broadly used for many purposes by First Nations. Pasture and prairie sages are common in meadows and pastures throughout the prairies and parklands. Like sweetgrass, sage may be burned for meditation, smudging, and cleansing of spirit and dwelling. In some beliefs, sage smoke is believed to provide a barrier that prevents negative spirits from entering the room in which the ceremony is being held (WEAP 2013b). Sage is also high in

protein and its leaves have proven to have insect-repellent properties. The boiled leaves have also been used to make a tea as a diuretic, and to treat kidney pain and headaches (Marles et al. 2000).

Seneca root (*Polygala senega*) is another plant that is widely used by First Nations and is expected to occur within the RSA. It is fairly common in prairies and dry open woodland across southern Canada, from New Brunswick to Alberta (Marles et al. 2000). The common name for the plant ‘Seneca snakeroot’ is from the Seneca First Nations’ use of the plant as a treatment for snakebites (CHIN 2005). The root is often used to treat sore throats, respiratory problems, headaches, and stomachaches (CHIN 2005).

## 1.6 Invasive Species

Invasive species are those species that are not native to the area and tend to reproduce rapidly, displace native plants, and are difficult to control or eradicate. They can threaten the native biodiversity and pose a threat to natural habitats. Most alien species are adapted to habitats that have been disturbed in some way. This disturbance for a wetland could be in the form of changes in the regime of water level fluctuations and for an upland forest it could be encroaching clearing of adjacent lands that increase the likelihood of the introduction or spread of invasive species into an area.

Environment Canada categorizes species into three levels of invasiveness: principal, moderate, and minor (EC 1999). Principal Invasives contain species that are considered to pose the greatest threat to natural areas (e.g. Upland habitat - leafy spurge *Euphorbia esula*], common buckthorn [*Rhamnus cathartica*]; Wetland habitat - flowering-rush (*Butomus umbellatus*), reed canary grass (*Phalaris arundinacea*), purple loosestrife [*Lythrum salicaria*]). Moderate Invasives include several species that are considered to be moderately invasive such as Canada thistle (*Cirsium arvense*), yellow and white sweet clover (*Melilotus spp.*), smooth brome grass (*Bromus inermis*), great manna grass (*Glyceria maxima*), and marsh cress (*Rorippa ainphibia*). Minor Invasives include the species that are considered to be only minor problems (e.g. nodding thistle [*Carduus nutans*], absinth [*Artemisia absinthium*], Kentucky blue grass [*Poa pratensis*]) (EC 1999). Although no principal invasive species are known or expected to occur within the RSA, several moderate and minor invasives such as Canada thistle, sweet clover, brome grass, and Kentucky blue grass are likely to occur within disturbed areas.

The Invasive Species Council of Manitoba (ISCM) has created an Early Detection and Rapid Response (EDRR) list and placed invasive species into two categories: Category 1 and Category 2 (ISCM 2016). Category 1 species are those that are not yet known to be present in Manitoba or if so, only in cultivation, are listed as a Manitoba Noxious Weed, and has the capability of establishing in Manitoba with a pathway of introduction (e.g. spotted knapweed [*Centaurea stoebe*]). Category 2 species are those that are already known to occur in Manitoba and capable of further spread (e.g. scentless chamomile [*Tripleurospermum inodorum*]). Eradication is the first management option if a Category 1 or 2 species is detected and if feasible. Otherwise, containment and control programs are recommended. If a Category 1 species is found, the ISCM should be contacted and a management committee will be formed to develop an eradication strategy (ISCM 2016).

*The Noxious Weeds Act* (NWA) of Manitoba lists 79 species and has placed them into three categories:

Tier 1, Tier 2 and Tier 3. Many of the invasive species listed by EC and the ISCM are also considered noxious weed under the NWA. A noxious weed, as defined by the act, is a plant that is likely to negatively affect any aspect of Manitoba's economy, the environment, or the well-being of residents if allowed to spread. As with the EDRR Category 1 species, the Tier 1 species are those that are most threatening though may not yet be present in Manitoba. Under the NWA, it is required to destroy or eradicate them before they establish. (e.g. spotted knapweed). Tier 2 species are already present in Manitoba and can be easily spread (e.g. scentless chamomile, leafy spurge). The mitigation for tier 2 species depends on the size of infestation. An infected area under five acres is required to have all individuals destroyed; whereas, infected areas over five acres require the noxious weed to be controlled from spreading. Tier 3 species are all other species that are designated as noxious weeds but do not pose an immediate threat. These species do not require immediate mitigation, though would require control measures if the spread of the species poses a threat to the economy, the environment, or the well-being of residents. These species include common dandelion (*Taraxacum officinale*), Canada thistle and perennial sow thistle (*Sonchus arvensis*) (Minister of Justice 2017).

## 2.0 STUDY METHODS

### 2.1 Desktop Studies

Prior to field work, a review of the current and historical vegetation data, specifically rare plants, was conducted as a key component to planning field strategies and assessing the effects of the LMOC Project on local and regional vegetation communities.

### 2.2 Data Sources

The desktop review of existing information was completed using available data sources such as:

- The Earth Observation for Sustainable Development of Forests (EOSD) Land Cover Classification (LCC) spatial database;
- aerial photographs provided by M.Forster Enterprises;
- previous studies completed in the Study Area;
- information and reports provided by MI,
- published and online reports for the Study Area;
- wetland classifications from Stuart and Kantrud's 1971 "*Classification of Natural Ponds and Lakes in the Glaciated Prairie Region*";
- plant species and ecosystems listed by MBCDC;
- plant species and ecosystems listed under MESEA; the COSEWIC database and the SARA registry; and
- through a review and research on local species and habitat of interest.

### 2.3 Field Studies

To determine the existing baseline vegetation and habitat types along the Route C and Route D LMOC alignments, qualitative vegetation surveys were conducted in spring (June 5, 2016 to June 11, 2016) and

summer (August 2, 2016 to August 5, 2016) to capture species with different emergence periods. A qualitative sampling method involves the recording of all species identified within a survey plot and is the most effective way to capture the species composition and distribution within a study area. As the total sampled area is larger than that of a more quantitative approach, it also provides a better opportunity to identify any rare and/or targeted species that may be present.

Qualitative vegetation surveys were conducted along the Route C and Route D alignments of the LMOC project. Sample sites were pre-selected and stratified based on habitat-type encountered along the proposed alignments using the LCC data and information gathered during the 2015 aerial survey. A handheld Garmin Oregon 450 GPS pre-loaded with the tracks of each alignment option and each sample site was used to navigate to the survey locations. All sample sites along the Route C and Route D channel options were accessed by a pick-up truck and ATV.

A total of 22 sample plots were completed along the Route C alignment and another 22 sample plots were completed along the Route D alignment, in order to provide a sufficient number of plots within different habitat types. All plots were surveyed during each of the spring and summer surveys. At each plot site, two 100 m transects were placed perpendicular on either side of the centre line of the proposed alignment. Transects were walked and all vascular plants and mosses observed (within a 5 m visual radius) were recorded and identified to species. Immature plants or plants missing structures (e.g., fruiting bodies, etc.) that could not be identified to species were identified to genus or family.

Additional data collected at each sample site included: soil type, site location and description of the vegetation community. No voucher specimens were collected. Photographs of the plant and identifying characteristics were taken of any species not identifiable in the field. The relative location of each sample site, as with any observations of invasive species, plants of interest to Aboriginal peoples, and/or species of conservation concern (S1, S2, S3) were recorded with a handheld Garmin Oregon 450 GPS and incorporated into the data collected for the LMOC component of the Project. Incidental observations of plant species along the proposed LMOC routes that occurred outside of the sample sites, were also documented.

### **3.0 ENVIRONMENTAL SETTING**

#### **3.1 Ecological Land Classification**

The RSA is located within the Boreal Plains Ecozone. In Manitoba, the ecozone extends from the central portion of the Manitoba-Saskatchewan border east to Lake Winnipeg, and then south in a narrow band along the Red River (Smith et al. 1998). White spruce (*Picea glauca*), black spruce (*Picea mariana*), jack pine (*Pinus banksiana*), tamarack (*Larix laricina*), white birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*), and balsam poplar (*Populus balsamifera*) are the most common tree species in the ecozone (Smith et al. 1998). Within the Boreal Plains Ecozone, the RSA is situated in the Gypsumville and Ashern Ecodistricts of the Interlake Plain Ecoregion (Smith et al. 1998).

The Ashern Ecodistrict occupies a major portion of the area generally referred to as the “Interlake”. Trembling aspen dominates the forest stands in the ecodistrict, while balsam poplar and white spruce occur to a lesser extent (Smith et al. 1998). Poorly drained areas have willow (*Salix* spp.), sedge (*Carex* spp.) and meadow grass (e.g. *Poa* spp.) vegetation. Black spruce and tamarack dominate the vegetative cover in the bogs in association with swamp birch (*Betula pumila*), ericaceous shrubs (e.g. Labrador tea [*Rhododendron groenlandicum*]) and sphagnum (*Sphagnum* spp.) and other mosses. Willows and sedges, and to a lesser extent tamarack, and various herbs and forbs, are dominant in fen peatlands (Smith et al. 1998).

The Gypsumville Ecodistrict occupies a small area in the north-central part of the Interlake Plain Ecoregion and encompasses Lake St. Martin (Smith et al. 1998). Nearly all of the soils are imperfectly drained, and the vegetation varies based on moisture content of the soils (Smith et al. 1998). The forest stands in the ecodistrict are a mixture of trembling aspen, balsam poplar and white spruce in varying quantities. Jack pine is prevalent on drier sites (Smith et al. 1998).

### 3.2 Vegetation Cover Classification

Vegetative cover classes used to represent the communities and habitats within the RSA and LSA were obtained from the LCC. The LCC is a national database map layer that has been harmonized across the major federal departments involved in land management and land change detection that includes Agriculture and Agri-Foods Canada (AAFC), the Canadian Forest Service (CFS), and the Canadian Centre for Remote Sensing (CCRS). The LCC provides vegetated and non-vegetated land cover classes that identify the primary ecological and vegetation/habitat conditions of an area. The LCC for the RSA and LSA for Route C and Route D are provided in Figure 2 and Figure 3, respectively, and a summary of the LCC information for the RSAs and LSAs is also provided in Table 2 and Table 3. The primary land cover types in both the Route C and Route D RSAs and LSAs are hay and grazing pasture grasslands, which cover nearly half of the study areas. Other major land cover types include annual and perennial croplands, scattered shrub and herb dominant wetlands, and dense broadleaf forests.

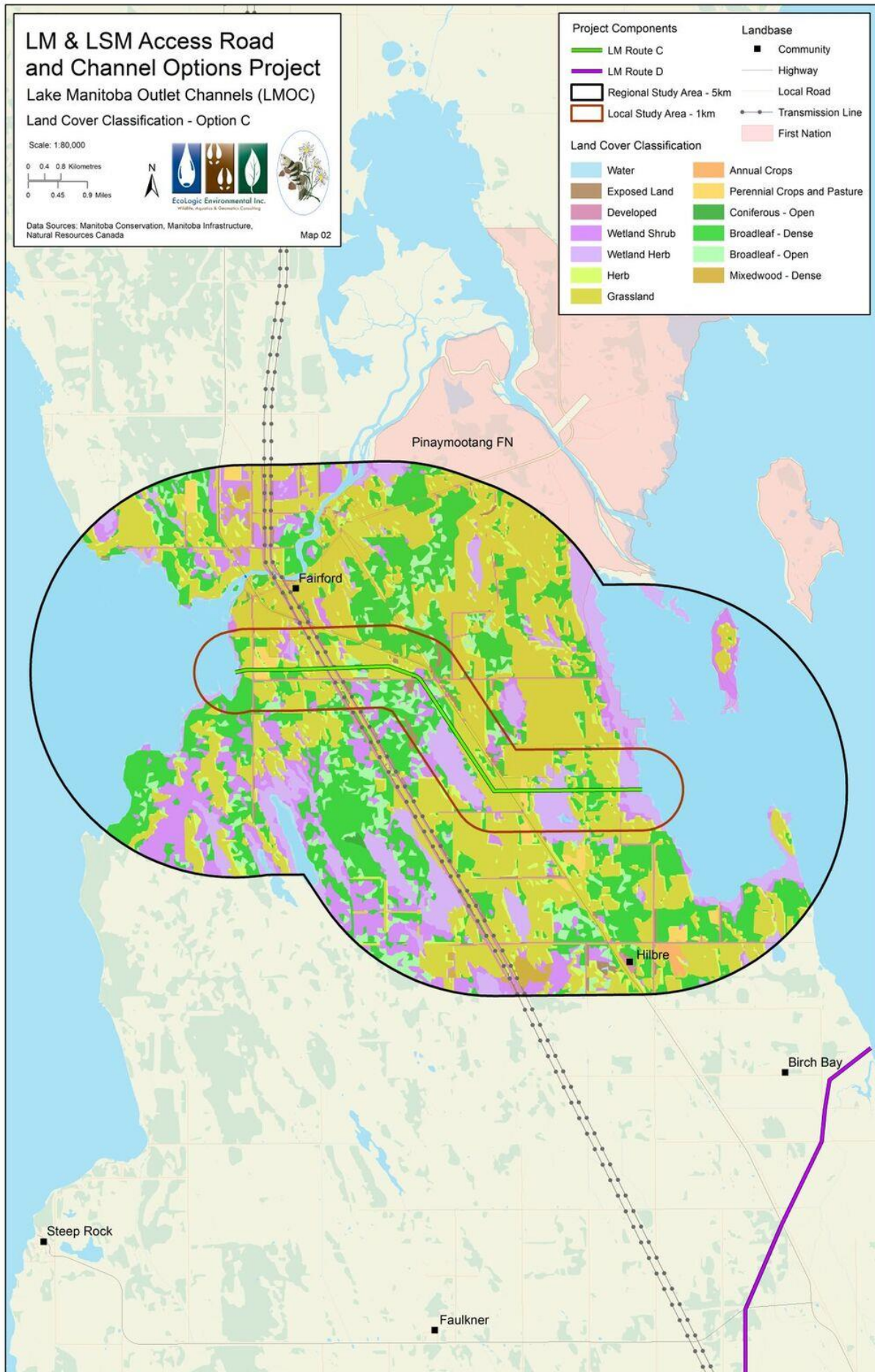


Figure 2: Route C Project Study Area Land Cover Classification (LCC)

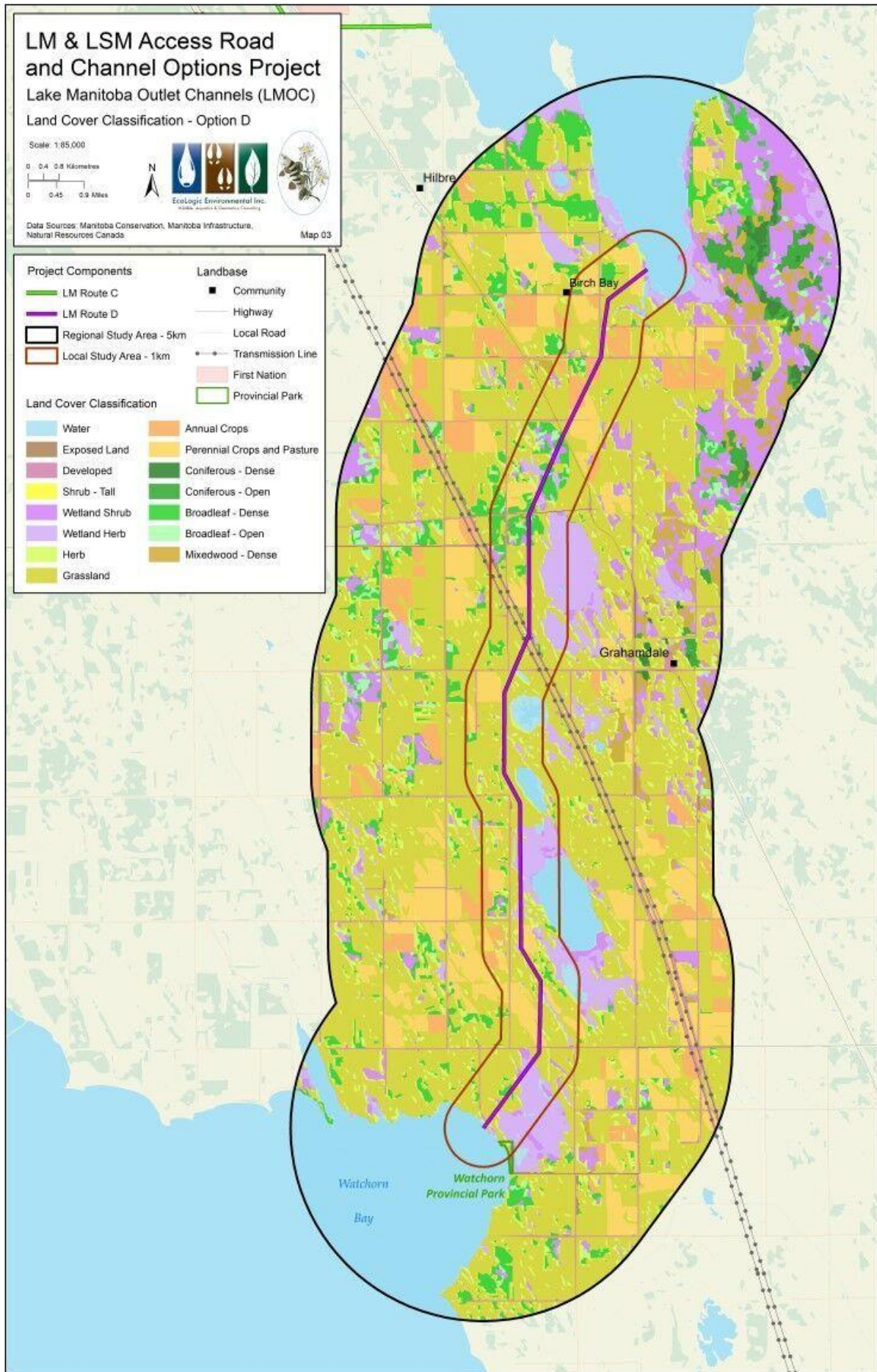


Figure 3: Route D Project Study Area Land Cover Classification (LCC)



**Table 2: Land Cover Classification for the Route C Regional Study Area and Local Study Area**

LCC Habitat Code	Habitat Class	RSA		LSA	
		Area km <sup>2</sup>	% Total	Area km <sup>2</sup>	% Total
20	Water	53.85	28.14	2.73	10.49
33	Exposed Land	1.36	0.71	0.43	1.65
34	Developed	3.65	1.91	0.62	2.40
82	Wetland Shrub	15.23	7.96	1.45	5.57
83	Wetland Herb	14.69	7.68	3.43	13.17
100	Herb	7.95	4.15	1.45	5.59
110	Grassland	51.21	26.76	9.42	36.17
121	Annual Crops	0.29	0.15	-	-
122	Perennial Crops and Pasture	1.32	0.69	0.42	1.63
212	Coniferous - Open	0.09	0.05	-	-
221	Broadleaf - Dense	33.94	17.74	4.82	18.52
222	Broadleaf - Open	7.07	3.69	1.25	4.82
231	Mixedwood - Dense	0.69	0.36	-	-
<b>Total</b>		<b>191.34</b>	<b>100.00</b>	<b>51.14</b>	<b>100.00</b>

**Table 3: Land Cover Classification for the Route D Regional Study Area and Local Study Area**

LCC Habitat Code	Habitat Class	RSA		LSA	
		Area km <sup>2</sup>	% Total	Area km <sup>2</sup>	% Total
20	Water	39.13	12.34	5.67	11.08
33	Exposed Land	1.25	0.39	0.18	0.34
34	Developed	9.11	2.87	1.49	2.92
51	Shrub - Tall	0.03	0.01	-	-
82	Wetland Shrub	24.21	7.64	1.32	2.58
83	Wetland Herb	18.00	5.68	5.98	11.69
100	Herb	19.97	6.30	3.52	6.88
110	Grassland	134.93	42.57	23.03	45.04
121	Annual Crops	12.99	4.10	1.66	3.25
122	Perennial Crops and Pasture	27.11	8.55	4.99	9.77
211	Coniferous - Dense	1.46	0.46	-	-
212	Coniferous - Open	3.30	1.04	-	-
221	Broadleaf - Dense	16.09	5.08	3.02	5.90
222	Broadleaf - Open	2.71	0.86	0.27	0.53
231	Mixedwood - Dense	6.72	2.12	0.01	0.01
<b>Total</b>		<b>316.99</b>	<b>100.00</b>	<b>51.14</b>	<b>100.00</b>

### 3.3 Wetland Classification

Wetland vegetation in prairie ponds and lakes can be grouped into zones; each zone is characterized by a different community structure and a distinct assemblage of plant species that vary in species composition in accordance with soil saturation and permeability (Stuart and Kantrud 1971). These vegetation zones are designated as follows:

- Wetland-low-prairie zone;
- Wet-meadow zone;
- Shallow-marsh zone;
- Deep-marsh zone;
- Permanent-open-water zone;
- Intermittent-alkali zone; and
- Fen (alkaline bog) zone.

Wetlands may only have one zone, or could contain two or more zones. These vegetation zones can occupy the central area of a depression or they may form a peripheral band around a deeper zone (Stuart and Kantrud 1971). The presence or absence and the distributional pattern of the zones are the primary factors used in distinguishing the seven major classes of wetlands, as detailed below:

Class I - Ephemeral Wetlands typically have surface water for only a short period of time after snowmelt or storm events in early spring. They may be periodically covered by standing or slow moving water. Water is retained long enough to establish some wetland or aquatic processes. They are typically dominated by Kentucky bluegrass (*Poa pratensis*), goldenrod (*Solidago* spp.) and other wetland or low prairie species (Stuart and Kantrud 1971).

Class II - Temporary Wetlands are periodically covered by standing or slow moving water. They typically have open water for only a few weeks after snowmelt or several days after heavy storm events. Water is retained long enough to establish wetland or aquatic processes. They are dominated by wet meadow vegetation such as fine-stemmed grasses, sedges and associated forbs (Stuart and Kantrud 1971).

Class III - Seasonal Ponds and Lakes are characterized by shallow marsh vegetation, which generally occurs in the deepest zone (usually dry by midsummer). These wetlands are typically dominated by emergent wetland grasses, sedges and rushes (Stuart and Kantrud 1971).

Class IV - Semi-permanent Ponds and Lakes are characterized by marsh vegetation, which dominates the central zone of the wetland, as well as emergent or submerged plants, including cattails, bulrushes and pondweeds (*Potamogeton* spp.). These wetlands frequently maintain surface water throughout the growing season (i.e., May to September) (Stuart and Kantrud 1971).

Class V - Permanent Ponds and Lakes have permanent open water in a central zone that is generally devoid of vegetation. Submerged plants may be present in the deepest zone, while emergent plants are found along the edges (Stuart and Kantrud 1971).

Class VI - Alkali Ponds and Lakes are wetlands where deep water is typically not permanently present. Alkali wetlands are characterized by a pH above 7 and a high concentration of salts. The dominant plants are generally salt tolerant and include red swampfire and spiral ditchgrass (Stuart and Kantrud 1971).

Class VII - Fen Ponds are wetlands in which fen vegetation dominates the deepest portion, often with wet meadow and low prairie vegetation present on the periphery. The soils are normally saturated by alkaline groundwater seepage. Fen ponds often have floating mats of emergent vegetation, which includes sedges, grasses and other herbaceous plants (Stuart and Kantrud 1971).

### 3.4 Plant Species of Conservation Concern

Based on desktop review, there are seven vascular plant species at risk that occur in the Interlake Plain Ecoregion and none in the Mid-Boreal Lowland Ecoregion. However, no plant listed under MESEA, SARA, or that having a special designation by COSEWIC are known or expected to occur in the RSA (GC 2015; MC 2012). The small white lady's-slipper (*Cypripedium candidum*) and the rough agalinis (*Agalinis aspera*), are both Federally and Provincially Endangered, and have known distributions 100 km south of the RSA, close to St. Laurent, MB (MC 2015; EC 2015). Based on the known distribution and specialized habitat requirements of these species, there is an extremely low probability for these species to occur in the RSA (MC 2015; EC 2015).

The MBCDC lists 108 vascular plant species of conservation concern within the Interlake Plain Ecoregion (**Appendix A**) that have a provincial status of S1, S2 or S3. A search of the MBCDC database for recorded occurrences of rare species in the RSA and LSA found occurrences of three species of conservation concern in both the RSA and LSA, the ram's-head lady's-slipper (*Cypripedium arietinum*) (S2S3), long-fruited parsley (*Lomatium macrocarpum*) (S3), and hairy-fruited parsley (*Lomatium foeniculaceum*) (S3). Narrow-leaved milkvetch (*Astragalus pectinatus*) (S3S4) is within 20 km of the LSA (Friesen 2015, pers. comm.). The ram's-head lady's-slipper can be found in black spruce and tamarack sphagnum bogs and less so in drier upland coniferous forests (Foster and Reimer 2007). The long-fruited parsley, hairy-fruited parsley and narrow-leaved milkvetch prefer dry upland prairie habitats, often along hillsides (Jennings 2007). The long-fruited parsley and hairy-fruited parsley have been previously found along the Lake Manitoba shoreline near the town of Steeprock, Manitoba (Friesen and Murray 2010).

### 3.5 Plant Species of Significance to First Nations

MI and First Nations consultations were ongoing at the time of this writing, and a list of species important to the local First Nation communities had yet to be compiled. It is recognized that there are many plant species of significance to many First Nations peoples, and that the plant species of significance will vary by the practices of each First Nation, and their gathering locations. It is recognized that First Nations people have a special relationship with the earth and all living things in it. This relationship is based on a profound spiritual connection to the environment that guided indigenous peoples to practice reverence, humility and

reciprocity. First Nations people have been sustainably harvesting plants based on subsistence needs and values extending back thousands of years.

However, it is known that Seneca root is gathered in the area and is an important plant used for medicinal and ceremonial purposes (NLHS 2015). The First Nations also used to gather various species of edible berries such as gooseberries, as well as medicinal plants such as sweet flag (*Acorus calamus*), which is chewed for sore throats and to prevent colds, and found along riverbanks and wetland habitats (Traverse 1999).

### **3.6 Invasive Species**

There was no historical information found on invasive species within the LSA or RSA. However, due to the level of human and livestock disturbance and activity along the Route C and Route D alignments, it is expected that invasives have been introduced and are present within the LSA. Common dandelion, perennial sow thistle and Canada thistle are commonly found in grazing pastures where livestock traffic facilitates spread, as well as along disturbed roadsides. Scentsless chamomile is also commonly found within disturbed pastures, roadsides and croplands. Invasive phragmites (*Phragmites australis* sub. *australis*) is a wetland invader that spreads quickly and outcompetes native species for water and nutrients. Invasive phragmites is commonly found in disturbed wet roadside ditches and can quickly crowd out native wetland vegetation, resulting in decreased plant diversity. There has been no known occurrences of invasive phragmites within the RSA, though it may pose a potential threat in the future, as much of the RSA is located in low-lying wet habitats that could be vulnerable to invasive phragmites establishment.

## 4.0 VEGETATION SURVEY RESULTS

A total of 141 plant species were identified along Route C during the spring and summer field surveys, including: one non-vascular species, 18 graminoids (sedges, grasses, rushes), 25 shrubs, seven trees and 90 herbaceous species. A total of 143 plant species were identified along Route D during the spring and summer field surveys, including: one non-vascular species, 27 graminoids (sedges, grass, rushes), 29 shrubs, six trees and 80 herbaceous species. Complete lists of species found along Route C and Route D are provided in **Appendix C**. Forest communities were classified by ‘V-type’ based on the Forest Ecosystem Classification (FEC) system for Manitoba developed by the CFS (Zoladeski et al. 1995).

Four prominent land cover types were identified within the project area: modified grassland, tilled cropland, marsh wetlands and aspen dominant hardwood stands. Land use in the area is predominantly agricultural, consisting mainly of grazing and hay pastures with some cultivated croplands.

### 4.1.1 Route C

Route C is approximately 11.6 km long and starts from Portage Bay in Lake Manitoba. The channel alignment is generally to the east direction for 5 km before turning southeast along Provincial Trunk Highway (PTH) 6 for approximately 3 km. The channel then heads back east to cross PTH 6 and enters LSM approximately 3.5 km downstream.

The inlet of the proposed Route C alignment is located along a rocky and sandy shoreline of Lake Manitoba (Plot 1). A riparian buffer composed of Manitoba maple (*Acer negundo*), trembling aspen and American elm (*Ulmus americana*) bordered the rocky coast. The shoreline vegetation was dominated by sedges and other wet tolerant species (Photo 1).

Smooth brome tame hayfields dominated the landscape as the channel heads inland (Plots 2, 6, 7 and 8). Some small permanent, semi-permanent, and seasonal wetlands are scattered throughout the hayfields (Photo 2). Cattails (*Typha latifolia*) and bulrushes (*Schoenoplectus spp.*) dominate the shallow to deep marsh zone of these wetlands, while sedges and mint species comprise the wet meadow and low-prairie zones. Other species present within these hayfields include a mix of native grassland species such as smooth blue aster (*Symphotrichum laeve*), common blue-eyed grass (*Sisyrinchium montanum*), field pussytoe (*Antennaria neglecta*), and big bluestem (*Andropogon gerardii*), as well as some minor and moderate invasive species (e.g. perennial sow thistle, Canada thistle and common dandelion).

Large open aspen hardwood stands breakup the hayfields (Photo 3). The understory within these aspen forests consisted of shrub species such as beaked hazel (*Corylus cornuta*), Saskatoon serviceberry (*Amelanchier alnifolia*) and red osier dogwood (*Cornus sericea*). Small seasonal wetlands (Class III) were scattered throughout the forest landscape. Networks of trails and human activity have resulted in the spread of invasives such as great burdock (*Arctium lappa*), sweet clover (*Melilotus spp.*), Canada thistle and common dandelion (Plots 3, 4 and 5).

As the Route C channel alignment heads south and parallels PTH 6, it passed through a low-lying open aspen hardwood forest with numerous pockets of seasonal (Class III), semi-permanent (Class IV) and permanent (Class V) marsh and swamp wetlands (Plot 13) (Photo 4). As it continues south, the aspen forest gave way to tame smooth brome grazing pastures with lots of Seneca root and small communities of native grassland species (e.g. Canadian anemone [*Anemone canadensis*], field pussytoe). Sedge dominant ephemeral (Class II) and seasonal (Class III) wet meadows are scattered throughout the tame pasture (Plot 14 and 15). Several invasive species were also present within the tame pasture, including scentless chamomile as well as other minor to moderate invasives.

As the proposed channel alignment crosses PTH 6 and heads east towards Lake St. Martin, the channel passed through more tame hayfields (Plot 16) with treed windrows of aspen hardwood forest habitat (Plot 17). Hayfields were composed of a mix of tame species such as timothy (*Phleum pretense*), smooth brome and alfalfa (*Medicago sativa*) with a mix native grassland species (e.g. common blue eyed grass, field pussytoe). Seneca root was also abundant throughout these hayfields. Minor invasive species such as sweet clover, common dandelion and Kentucky blue grass were common within the pastures. About 1 km from Lake St. Martin, Route C crosses a large permanent marsh wetland complex (Class V) (Plot 18). The wetland complex had a large willow dominant shrubby riparian zone (Photo 5) and a diverse wet meadow zone dominated by sedges, mint species and water hemlock (*Cicuta maculata*).

East of the large wetland, the area was comprised of a mix of aspen hardwood stands (Plot 19) and smooth brome tame grazing pastures (Plot 20) right up to the proposed channel outlet at Lake St. Martin (Plot 22) (Photo 6). The area had a high level of disturbance due to cattle grazing activity, which has led to the spread and distribution of invasive species as evident by the widespread presence of Canada thistle, common dandelion and sweet clover. Scentless chamomile was also common here, likely due to the spread by livestock.

**Table 4: Summary of Habitat Encountered within the PF of Option C during the Vegetation Surveys**

Plot	LCC Data	Habitat Type (FEC V-Type if applicable)	Wetland Classification (Stuart and Kantrud 1971)
Plot 1	Wetland Shrub (82)/Open Water (20)	Shoreline/Tame Hayfield	N/A
Plot 2	Perennial Crops and Pasture (122)	Tame Hayfield	N/A
Plot 3	Broadleaf - Dense (221)	Aspen Hardwood (V5)	N/A
Plot 4	Broadleaf - Dense (221)	Aspen Hardwood (V5)	Seasonal Wetland (Class III)
Plot 5	Broadleaf - Dense (221)	Aspen Hardwood (V5)	Semi-permanent Wetland (Class IV)
Plot 6	Grassland (110)	Tame Hayfield/Trembling Aspen Mixedwood (V9)	N/A
Plot 7	Herb (100)	Tame Hayfield	N/A
Plot 8	Grassland (110)	Tame Hayfield	Ephemeral Wetland (Class II)
Plot 9	Broadleaf - Open (222)	Trembling Aspen Mixedwood (V9)	N/A
Plot 10	Grassland (110)	Aspen Hardwood (V5)	N/A
Plot 11	Herb (100)	Aspen Hardwood (V5)	N/A
Plot 12	Wetland Shrub (82)	Aspen Hardwood (V5)	N/A
Plot 13	Wetland Shrub (82)	Aspen Hardwood (V5)	Permanent Wetland (Class V)
Plot 14	Grassland (110)	Tame Pasture	Ephemeral Wetland (Class II)
Plot 15	Grassland (110)	Tame Pasture	Seasonal Wetland (Class III)
Plot 16	Perennial Crops and Pasture (122)	Tame Hayfield	N/A
Plot 17	Broadleaf - Dense (221)	Aspen Hardwood (V5)	N/A
Plot 18	Wetland Herb (83)	Wetland	Permanent Wetland (Class V)
Plot 19	Broadleaf - Dense (221)	Aspen Hardwood (V5)	N/A
Plot 20	Grassland (110)	Tame Pasture	N/A
Plot 21	Grassland (110)/Broadleaf - Dense (221)	Aspen Hardwood (V5)	N/A
Plot 22	Herb (100)/Wetland Shrub (82)/Open Water (20)	Tame Pasture/Coastal Marsh	Permanent Wetland (Class V)



#### 4.1.2 Route D

The Route D outlet channel connects Watchorn Bay on Lake Manitoba to the outlet of Birch Creek on Lake St. Martin. The proposed alignment is approximately 24.0 km long and is adjacent to low-lying terrain between Lake Manitoba and Lake St. Martin where numerous marshes and small lakes exist.

The habitat at the inlet of the proposed Route D alignment was similar to that of Route C with a narrow strip of rocky and sandy shoreline and a small treed riparian buffer (Plot 1). A riparian buffer composed of Manitoba maple, trembling aspen and American elm bordered the rocky coast (Photo 7). The shoreline here was rockier than at Route C and almost void of vegetation. Smooth brome tame hayfields extended inland beyond the treed riparian buffer. Much of the area was heavily disturbed from human activity resulting in the spread of many minor and moderate invasive species including Canada thistle, absinthe, yellow sweet clover and field bindweed (*Convolvulus arvensis*).

For the first several kilometers the alignment passed through a large permanent marsh wetland (Class V) network, with some upland pockets of croplands and smooth brome and alfalfa tame hayfields (Plot 2). As the channel continued north, the alignment followed an upland habitat along the western edge of this large wetland complex. The habitat consisted of tame hayfields and cattle grazed pastures (Plot 8 and 9) with scattered open bluffs of aspen and bur oak (*Quercus macrocarpa*) (Plot 4) (Photo 8). The large wetland had a deep open water zone with a wide shallow to deep marsh zone dominated by cattails and rushes (Plot 6 and 7). The wet meadow zones surrounding the wetland varied in width and were composed of sedges, rushes and mint species (Plot 5). Some smaller permanent (Class V), semi-permanent, (Class IV) seasonal (Class III) and temporary (Class II) wetlands were also scattered throughout the landscape. Many of the seasonal and temporary wetlands are heavily shrubbed with willows.

As the channel alignment headed northward, upland habitats became more prevalent and a mix of cultivated cropland and tame smooth brome and alfalfa hayfields dominated the landscape (Photo 9). Although the terrain was generally not as wet as it is further south along the alignment, some smaller permanent (Class V), semi-permanent (Class IV) and seasonal (Class III) wetlands were scattered across the landscape (Plot 13 and 14).

Just south of Provincial Road (PR) 239, the habitat shifted from tame pastures to an aspen dominant hardwood forest with a thick beaked hazel dominating shrub layer. The herbaceous ground cover was typical of moist forest and was composed of species such as star-flowered false Solomon's seal (*Maianthemum stellatum*) and wild sarsaparilla (*Apocynum androsaemifolium*) (Plot 16). Several pockets of seasonal (Class III), semi-permanent (Class IV) and permanent (Class V) marsh and swamp wetlands are scattered throughout the aspen stand (Plot 17) (Photo 10).

Between PR 239 and PTH 6, the aspen hardwood forest continued to dominate the landscape with some pockets of tame hayfields surrounding a large permanent wetland complex that is connected to the Goodison Lake wetland (Plot 18 and 19). Seneca root was widespread within the hayfields and found mainly adjacent

to the sedge dominant wet meadow zone of the wetland. Within the aspen stand just south of PTH 6, several permanent, semi-permanent and seasonal wetlands were present, including a shrubby sphagnum bog (Plot 20) (Photo 11). The bog habitat was dominated by a shrub layer of bog birch and bog willow with some Labrador tea and three-leaved false Solomon's seal (*Maianthemum trifolium*) as ground cover amongst the sphagnum moss.

North of PTH 6 and up to Lake St. Martin, the landscape consisted of cultivated croplands as well as alfalfa and smooth brome tame hayfields and pastures (Plot 21) (Photo 12). The habitat at the channel outlet consisted of cattle grazed smooth brome pasture with a coastal marsh wetland (Plot 22) (Photo 13). Cattails and bulrushes dominated the deep and shallow marsh zones of the wetland, whereas mints and sedges dominated the wet meadow zone.

**Table 5: Summary of Habitat Encountered within the PF of Option C during the Vegetation Surveys**

Plot	LCC Data	Habitat Type (FEC V-Type if applicable)	Wetland Classification (Stuart and Kantrud 1971)
Plot 1	Wetland Herb (83)/Open Water (20)	Shoreline/riparian	N/A
Plot 2	Broadleaf - Dense (221)	Tame Hayfield/ Aspen Hardwood (V5)	N/A
Plot 3	Wetland Herb (83)	wetland	Permanent Wetland (Class V)
Plot 4	Grassland (110)	Tame Pasture/aspen-oak bluffs	Seasonal Wetland (Class III)
Plot 5	Grassland (110)/Herb (100)	Tame Pasture	N/A
Plot 6	Grassland (110)/Wetland Herb (83)	Tame Pasture/aspen-oak bluffs	Permanent Wetland (Class V)
Plot 7	Grassland (110)/Wetland Herb (83)	Tame Pasture/aspen-oak bluffs	Semi-permanent Wetland (Class IV)/Permanent Wetland (Class V)
Plot 8	Grassland (110)	Tame Pasture/aspen-oak bluffs	Semi-permanent Wetland (Class IV)
Plot 9	Grassland (110)	Tame Pasture	N/A
Plot 10	Grassland (110)	Tame Pasture	N/A
Plot 11	Grassland (110)/Herb (100)	Tame Hayfield	Semi-permanent Wetland (Class IV)
Plot 12	Perennial Crops and Pasture (122)/Grassland (110)	Tame Hayfield	Seasonal Wetland (Class III)
Plot 13	Grassland (110)/Wetland Shrub (82)	Tame Hayfield	Semi-permanent Wetland (Class IV)
Plot 14	Grassland (110)/Herb (100)	Tame Hayfield	N/A
Plot 15	Grassland (110)	Tame Hayfield	Semi-permanent Wetland (Class IV)
Plot 16	Broadleaf - Dense (221)/Wetland Shrub (82)	Aspen Hardwood (V5)	N/A
Plot 17	Broadleaf - Dense (221)	Aspen Hardwood (V5)	Permanent Wetland (Class V)
Plot 18	Wetland Herb (83)	Tame Hayfield	Permanent Wetland (Class V)
Plot 19	Broadleaf - Dense (221)	Tame Hayfield/ Aspen Hardwood (V5)	N/A
Plot 20	Wetland Shrub (82)	Aspen Hardwood (V5)	Seasonal Wetland (Class III)/ Permanent Wetland - bog (Class V)
Plot 21	Grassland (110)	Tame Hayfield	N/A
Plot 22	Wetland Shrub (82)/Open Water (20)	Tame Pasture/Coastal Marsh	Permanent Wetland (Class V)

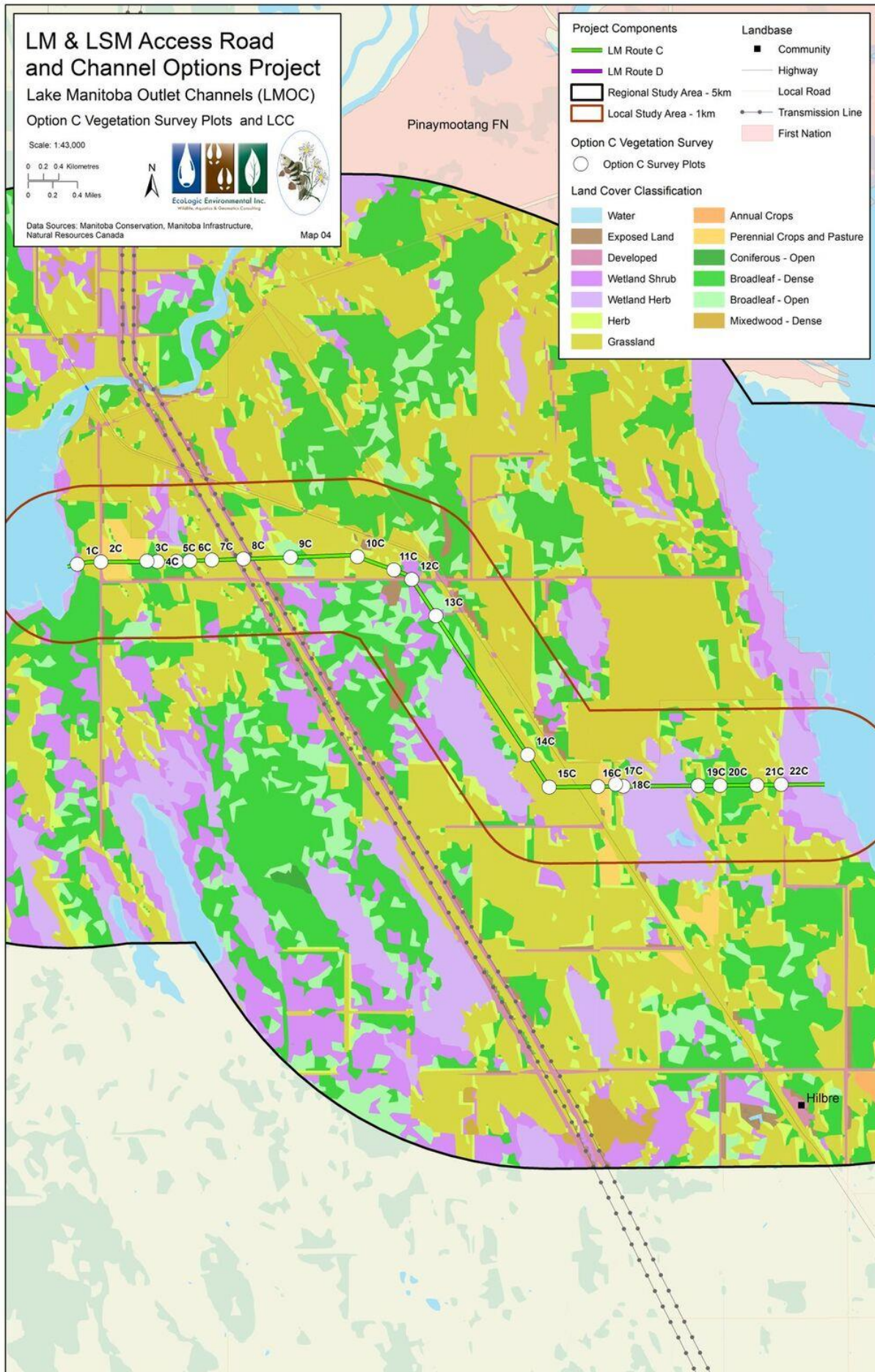


Figure 4: Vegetation Survey Plot Locations along Route C

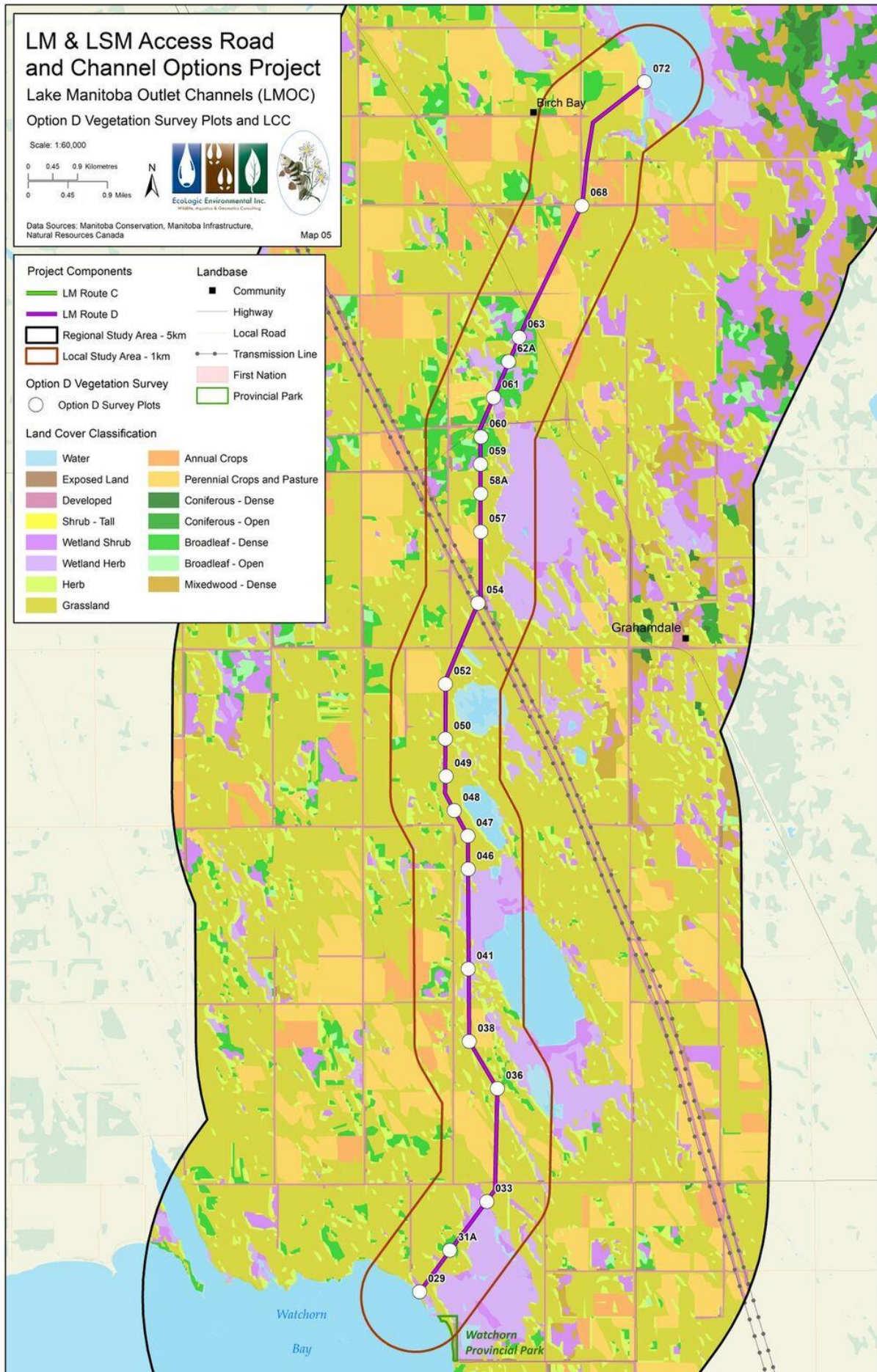


Figure 5: Vegetation Survey Plot Locations along Route D



**Photo 1: Western view of the proposed Route C inlet at Lake Manitoba at Plot 1 (taken on August 5, 2016)**



**Photo 2: Western view of the Route C alignment crossing the Hydro line within a tame hayfield at Plot 8 (taken on August 5, 2016)**



**Photo 3: Western view of the Route C alignment within an aspen hardwood forest at Plot 9 (taken on June 6, 2016)**



**Photo 4: Northern view of the Route C alignment showing a small permanent wetland within the damp aspen hardwood forest at Plot 13 (taken on August 5, 2016)**



**Photo 5: Eastern view of the Route C alignment within a willow dominant shrubby riparian zone surrounding a permanent wetland at Plot 18 (taken on August 5, 2016)**



**Photo 6: Eastern view of the Route C channel outlet into Lake St. Martin at Plot 22 (taken on June 10, 2016)**





**Photo 7: Northern view of the Route D alignment showing the riparian buffer along the Lake Manitoba shoreline at Plot 1 (taken on June 10, 2016)**



**Photo 8: Southern view of the Route D alignment within an open aspen and oak bluff at Plot 8 (taken on June 05, 2016)**



**Photo 9: Northern view of the Route D alignment within a tame hayfield at Plot 11 (taken on August 4, 2016)**



**Photo 10: Northern view of the Route D alignment within permanent swamp wetland inside an aspen hardwood forest at Plot 17 (taken on June 5, 2016)**



**Photo 11: Southern view of the Route D alignment within a seasonal wetland in an aspen hardwood forest at Plot 20 (taken on August 4, 2016)**



**Photo 12: Northern view of the Route D alignment within a tame alfalfa hayfield and apiary at Plot 21 (taken on August 4, 2016)**



**Photo 13: Western view of the Route D channel outlet into Lake St. Martin at Plot 22 (taken on June 9, 2016)**

#### ***4.1.3 Species of Conservation Concern***

No federally or provincially listed species, or any species listed by the MBCDC having conservation concern were observed during the vegetation surveys of the LMOC route options. One sphagnum bog habitat observed along Route D could provide habitat for rare orchids (e.g. ram's head ladyslipper), though none were observed. The rocky coastal habitat along Lake Manitoba at both the Route C and Route D alignments has a similar habitat to the shoreline at the town of Steeprock, where historic observations of long-fruited and hairy-fruited parsley were made. However, neither of these species were found during the 2016 spring and summer surveys.

#### ***4.1.4 First Nation Species of Significance***

Seneca root was found at several locations along the Route C alignment (Plots 4, 6, 9, 11, 12, 15, and 16). The species was mainly found in clusters amongst other native grassland species adjacent to wet meadows and along forest edges within the tame hayfields and grazed pastures. Some pasture sage was found within some grassland openings at **Plots 11 and 12** and within grazed tame pastures near the proposed outlet at Lake St. Martin (Plots 21 and 22).

Seneca root was only found in one area, albeit in abundance, along the proposed Route D alignment within a smooth brome dominated hay field adjacent to a wet meadow zone of a large permanent wetland (Plot 18).



**Photo 14: View of Seneca root (*Polygala senega*) within a tame hayfield along Route C at plot 16 (taken on June 10, 2016)**

#### **4.1.5 Invasive Species**

During the 2016 spring and summer vegetation surveys, there were 23 species which are invasive to Manitoba that were identified within the LSA of Route C (Table 6) and 19 invasive species identified within the LSA of Route D (Table 7). These species were mainly found along disturbed roadside habitat and within tame hayfields and grazed pastures where livestock activity and human disturbance is frequent.

No Category 1 listed species were identified during the field surveys. Scentless chamomile and ox-eyed daisy are considered tier 2 noxious weeds by the NWA and are EDRR category 2 listed species by the ISCM. Both species were identified within several hayfields and pastures along both Route C and Route D. All infestation sites were less than five acres in size. All efforts will need to be made to destroy all individuals encountered during construction in order to control the spread of these species. These species are well adapted to a variety of habitats, including wet, moist soils and periodic flooding, as well as drier areas and perennial forage fields. This adaptability allows them to colonize disturbed areas rapidly and outcompete native species.

Several species identified as moderate invasives by Environment Canada (EC 1999) were also found along both Route C and Route D alignments. Smooth brome was the dominant tame grass species in most hayfields and grazed pastures within the study areas. Although used as a tame grass species, smooth brome is considered a moderate invasive species to native habitats. Canada thistle and yellow and white sweet clover were fairly common throughout the hayfields and grazing pastures where human or livestock activity was present.

Other minor invasives plant species such as Kentucky bluegrass, absinthe, nodding thistle and common dandelion were also observed at several locations along both alignments, predominantly along roadsides and access trails. Alfalfa was a dominant tame legume species in some pastures and is considered a minor invasive to native habitats. Pasture sage is declared as a noxious weed in Manitoba (Government of Manitoba 2016) and was observed within several high traffic grassland areas along Route C.

Invasive species vary in aggressiveness and are well adapted to a variety of habitats. They can quickly establish in disturbed areas and propagate by seed, so can be easily spread. Preventing seed production and spreading using an integrated approach of combining herbicide and/or mechanical treatment with competition from desirable native plants is an effective way of controlling these species. Another important method to prevent the spread of invasive species is the use of clean native seeds in seeding rights-of-way (Parks 2010).

**Table 6: Summary of Invasive Plant Species Found within the LSA of Route C during the Vegetation Surveys**

Scientific Name	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22
<b>Graminoids</b>																							
<i>Bromus inermis</i>	smooth brome	X	X	-	-	-	-	X	X	-	-	-	-	-	-	X	X	-	-	-	X	X	X
<i>Poa pratensis</i>	Kentucky blue grass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	X
<b>Herbaceous Species</b>																							
<i>Apocynum androsaemifolium</i>	spreading dogbane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	X	-
<i>Arctium lappa</i>	great burdock	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
<i>Artemisia absinthium</i>	absinthe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
<i>Artemisia frigida</i>	pasture sage	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	X	X
<i>Asclepias syriaca</i>	common milkweed	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
<i>Cerastium arvense</i>	field chickweed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
<i>Cerastium nutans</i>	nodding chickweed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-
<i>Cicuta maculata</i>	water hemlock	X	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-	-	-	-
<i>Cirsium arvense</i>	Canada thistle	X	-	X	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-	X	X
<i>Galeopsis tetrahit</i>	hemp nettle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
<i>Leucanthemum vulgare</i>	ox-eyed daisy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-
<i>Lotus corniculatus</i>	bird's foot trefoil	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X	-	-

Scientific Name	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22
<i>Medicago sativa</i>	alfalfa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Melilotus officinalis</i>	yellow sweet clover	X	-	X	-	-	X	X	-	X	-	X	X	-	X	-	X	-	-	-	-	X	X
<i>Pastinaca sativa</i>	wild parsnip	-	-	X	X	-	X	X	-	X	-	-	-	-	X	-	-	-	-	X	-	-	-
<i>Plantago major</i>	common plantain	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	X
<i>Ranunculus acris</i>	meadow buttercup	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
<i>Sonchus arvensis</i>	perennial sow thistle	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Taraxacum officinale</i>	common dandelion	-	-	-	-	X	-	-	-	-	-	X	X	-	X	-	X	-	-	-	-	X	X
<i>Tripleurospermum perforata</i>	scentless chamomile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	-	-
<i>Urtica dioica</i>	stinging nettle	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-



**Table 7: Summary of Invasive Plant Species Found within the LSA of Route D during the Vegetation Surveys**

Scientific Name	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22
<b>Graminoids</b>																							
<i>Bromus inermis</i>	smooth brome	X	-	-	-	-	-	-	-	-	X	-	X	-	-	X	-	-	-	-	-	X	X
<i>Poa pratenses</i>	Kentucky blue grass	X	-	-	-	-	X	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-
<b>Herbaceous Species</b>																							
<i>Arctium lappa</i>	great burdock	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
<i>Artemisia absinthium</i>	absinthe	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-
<i>Carduus nutans</i>	nodding thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-
<i>Cicuta maculata</i>	water hemlock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X
<i>Cirsium arvense</i>	Canada thistle	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
<i>Convolvulus arvensis</i>	field bindweed	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Galeopsis tetrahit</i>	hemp nettle	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Leucanthemum vulgare</i>	ox-eyed daisy	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Medicago sativa</i>	alfalfa	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	X	-
<i>Melilotus albus</i>	white sweet clover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X
<i>Melilotus officinalis</i>	yellow sweet clover	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X

Scientific Name	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22
<i>Pastinaca sativa</i>	wild parsnip	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	X	-	-	X	-	-	-
<i>Ranunculus acris</i>	meadow buttercup	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X
<i>Sonchus arvensis</i>	perennial sow thistle	-	-	-		x	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Taraxacum officinale</i>	common dandelion	-	-	-	X	X	X	-	-	-	X	-	-	-	X	-	-	X	-	-	X	-	X
<i>Tripleurospermum perforata</i>	scentless chamomile	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Urtica dioica</i>	stinging nettle	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-

## 5.0 SUMMARY

This study was conducted to determine the existing vegetation and delineate the vegetation habitat types within the proposed LMOC project area. Four prominent land cover types were identified within the 5 km RSA for the proposed LMOC: modified grassland, tilled cropland, marsh wetlands and aspen dominant hardwood stands. Land use in the area is predominantly agricultural, consisting mainly of grazing and hay pastures with some cultivated croplands.

No species at risk or species of conservation concern were observed along the Route C and Route D alignments during the 2016 field surveys. However, the shoreline habitat of Lake Manitoba at both the Route C and Route D inlets were characteristic of the rocky shorelines at Steeprock, where previous observations of long-fruited parsley and hairy-fruited parsley have been recorded. A small shrubby sphagnum bog along Route D alignment also provides habitat suitable for rare orchid species that have known occurrences within the RSA (i.e. ram's-head lady's-slipper), though none were observed.

Seneca root and pasture sage were two species of significance to First Nations found during the 2016 field surveys. Seneca root was widespread and abundant within the hayfields and grazed pastures along the Route C alignment, and was found mainly adjacent to wet meadows and along forest edges. Pasture sage was only found at a few locations within open grasslands habitat and within the heavily grazed pastures near the proposed outlet at Lake St. Martin. Seneca root was only found in one area along the proposed Route D alignment within a smooth brome hayfield adjacent to a wet meadow zone of a large permanent wetland complex.

Twenty-three and nineteen invasive species were identified along Route C and Route D, respectively. No principal invasives, tier 1 or category 1 invasive species were observed along either of the alignment options. Scentless chamomile and ox-eyed daisy are NWA tier 2 weeds and category 2 listed species by the ISCM and were identified within several hayfields and pastures. Other moderate and minor invasive species were observed along both channel alignments along roadsides and within tame hayfields and grazing pastures where livestock activity and human disturbance is frequent. The frequency and abundance of invasive species varied with the degree of disturbance.

Information collected during this baseline assessment will be used for future environmental assessment initiatives, to help in the selection process of the preferred alignment, and to establish subsequent mitigation strategies for the construction of the LMOC.

## **6.0 CLOSURE**

We trust that the above information meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

Respectfully submitted,

**SG Environmental Services Inc.**



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Prepared by:

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**Appendix A**  
**Potential Plant Species of Conservation**  
**Concern for the Interlake Plain Ecoregion**

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**Appendix A: Potential Plant Species of Conservation Concern for the Interlake Plain Ecoregion**

Scientific Name	Common Name	Provincial Conservation Status
<i>Achnatherum richardsonii</i>	Richardson Needle Grass	S1S2
<i>Agalinis aspera</i>	Rough Purple False-foxglove	S1S2
<i>Agalinis tenuifolia</i>	Narrow-leaved Gerardia	S2S3
<i>Agrimonia gryposepala</i>	Common Agrimony	S1S2
<i>Alisma gramineum</i>	Narrow-leaved Water-plantain	S1
<i>Amorpha fruticosa</i>	False Indigo	S1S2
<i>Arabis lyrata</i>	Lyre-leaved Rock Cress	S2?
<i>Aralia racemosa</i>	Spikenard	S2
<i>Arethusa bulbosa</i>	Dragon's Mouth Orchid	S2
<i>Asarum canadense</i>	Wild Ginger	S3S4
<i>Asclepias verticillata</i>	Whorled Milkweed	S3
<i>Astragalus australis</i>	Indian milkvetch	S1?
<i>Astragalus neglectus</i>	Milkvetch	S1
<i>Astragalus pectinatus</i>	Narrow-leaved Milkvetch	S2S3
<i>Boltonia asteroides var. recognita</i>	White Boltonia	S2S3
<i>Botrychium campestre</i>	Prairie Moonwort	S1
<i>Botrychium lunaria</i>	Common Moonwort	S3S4
<i>Botrychium matricariifolium</i>	Daisy-leaf Moonwort	S1?
<i>Botrychium multifidum</i>	Leathery Grape-fern	S3
<i>Bouteloua curtipendula</i>	Side-oats Grama	S2S3
<i>Bromus porteri</i>	Porter's Chess	S3?
<i>Bromus pubescens</i>	Canada Brome Grass	SNA
<i>Calopogon tuberosus</i>	Swamp-pink	S2
<i>Canadanthus modestus</i>	Large Northern Aster	S2
<i>Cardamine bulbosa</i>	Spring Cress	SH
<i>Carex conoidea</i>	Field Sedge	S1
<i>Carex douglasii</i>	Douglas Sedge	S3?
<i>Carex flava</i>	Yellow Sedge	S2S3
<i>Carex hystericina</i>	Porcupine Sedge	S3?
<i>Carex livida</i>	Livid Sedge	S3
<i>Carex parryana</i>	Parry's Sedge	S3?
<i>Carex pedunculata</i>	Stalked Sedge	S3?
<i>Carex sterilis</i>	Dioecious Sedge	S2
<i>Carex supina var. spaniocarpa</i>	Weak Sedge	S2?
<i>Carex tetanica</i>	Rigid Sedge	S2
<i>Carex vulpinoidea</i>	Fox Sedge	S3?
<i>Caulophyllum thalictroides</i>	Papoose-root	S2
<i>Ceanothus herbaceus</i>	New Jersey Tea	S3
<i>Chrysosplenium iowense</i>	Iowa Golden-saxifrage	S1?
<i>Cladium mariscoides</i>	Twig Rush	S2

## Appendix A: Potential Plant Species of Conservation Concern for the Interlake Plain Ecoregion

Scientific Name	Common Name	Provincial Conservation Status
<i>Clematis ligusticifolia</i>	Western Virgin's-bower	S1
<i>Clematis virginiana</i>	Virgin's-bower	S2
<i>Corallorhiza striata</i>	Striped Coralroot	S3S4
<i>Corispermum villosum</i>	Hairy Bugseed	S1S2
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	S3
<i>Cyperus erythrorhizos</i>	Red-root Flatsedge	S1
<i>Cyperus houghtonii</i>	Houghton's Umbrella-sedge	S2
<i>Cypripedium arietinum</i>	Ram's Head Lady's-slipper	S2S3
<i>Cypripedium candidum</i>	Small White Lady's-slipper	S2
<i>Desmodium canadense</i>	Beggar's-lice	S2
<i>Drosera anglica</i>	Oblong-leaved Sundew	S3
<i>Festuca hallii</i>	Plains Rough Fescue	S3
<i>Fraxinus nigra</i>	Black Ash	S3
<i>Gentiana rubricaulis</i>	Closed Gentian	S2S3
<i>Geranium maculatum</i>	Wild Crane's-bill	S1
<i>Helianthus pauciflorus ssp. pauciflorus</i>	Stiff Sunflower	SU
<i>Hudsonia tomentosa</i>	False Heather	S3
<i>Hypoxis hirsuta</i>	Yellow Stargrass	S4
<i>Krigia biflora</i>	Cynthia	S2
<i>Lactuca floridana</i>	Woodland Lettuce	SH
<i>Lechea intermedia</i>	Pinweed	S1
<i>Leucophysalis grandiflora</i>	Large White-flowered Ground-cherry	S3
<i>Linum sulcatum</i>	Grooved Yellow Flax	S3
<i>Liparis loeselii</i>	Yellow Twayblade	S3S4
<i>Lomatium foeniculaceum</i>	Hairy-fruited Parsley	S3
<i>Lomatium macrocarpum</i>	Long-fruited Parsley	S3
<i>Lysimachia quadriflora</i>	Whorled Loosestrife	S2
<i>Malaxis monophyllos</i>	White Adder's-mouth	S2?
<i>Malaxis paludosa</i>	Bog Adder's-mouth	S1
<i>Malaxis unifolia</i>	Green Adder's-mouth	S2?
<i>Muhlenbergia andina</i>	Foxtail Muhly	S1
<i>Nassella viridula</i>	Green Needle Grass	S3
<i>Oenothera perennis</i>	Sundrops	S1S2
<i>Onoclea sensibilis</i>	Sensitive Fern	S3S4
<i>Ophioglossum pusillum</i>	Northern Adder's-tongue	S1
<i>Orobanche ludoviciana</i>	Louisiana Broom-rape	S2
<i>Osmunda claytoniana</i>	Interrupted Fern	S3
<i>Oxytropis lambertii</i>	Purple Locoweed	S3S4
<i>Parnassia palustris var. parviflora</i>	Small Grass-of-parnassus	S1

## Appendix A: Potential Plant Species of Conservation Concern for the Interlake Plain Ecoregion

Scientific Name	Common Name	Provincial Conservation Status
<i>Pellaea gastonyi</i>	Gastony's Cliffbrake	S1
<i>Pellaea glabella ssp. occidentalis</i>	Cliff-brake	S2
<i>Penthorum sedoides</i>	Ditch-stonecrop	S1S2
<i>Physostegia virginiana</i>	False Dragonhead	SU
<i>Platanthera hookeri</i>	Hooker's Orchid	S2
<i>Platanthera orbiculata</i>	Round-leaved Bog Orchid	S3
<i>Platanthera praecleara</i>	Western Prairie Fringed Orchid	S1
<i>Polygala verticillata</i>	Whorled Milkwort	S2
<i>Pyrola americana</i>	Round-leaved Pyrola	S2
<i>Ranunculus hispidus var. caricetorum</i>	Bristly Buttercup	S2
<i>Rhynchospora alba</i>	White Beakrush	S3?
<i>Rhynchospora capillacea</i>	Horned Beakrush	S2
<i>Selaginella densa</i>	Prairie Spike-moss	S3
<i>Selaginella selaginoides</i>	Northern Spike-moss	S4
<i>Sisyrinchium campestre</i>	White-eyed Grass	SU
<i>Solidago juncea</i>	Sharp-toothed Goldenrod	S2
<i>Solidago riddellii</i>	Riddell's Goldenrod	S2
<i>Spiranthes magnicamporum</i>	Great Plains Ladies'-tresses	S1S2
<i>Symphyotrichum ericoides var. ericoides</i>	White heath aster	S3?
<i>Symphyotrichum sericeum</i>	Western Silvery Aster	S2S3
<i>Taxus canadensis</i>	Canada Yew	S3
<i>Teucrium canadense</i>	American Germander	S3S4
<i>Thalictrum revolutum</i>	Waxleaf Meadow-rue	S1
<i>Utricularia cornuta</i>	Horned Bladderwort	S3
<i>Utricularia minor</i>	Lesser Bladderwort	S3
<i>Vaccinium caespitosum</i>	Dwarf Bilberry	S3
<i>Veronicastrum virginicum</i>	Culver's-root	S1
<i>Viola conspersa</i>	Dog Violet	S3?
<i>Vitis riparia</i>	Riverbank Grape	S3S4

Source: MBCDC 2013

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**Appendix C**  
**List of Plant Species Observed During the 2016**  
**Spring and Summer Field Surveys**

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**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

Table i: Species List by Conservation Status – Route C

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
Vascular Plant Species					
<b>Fern and Fern Allies</b>					
<i>Athyrium spp</i>	fern species	-	-	-	-
<i>Equisetum arvense</i>	common horsetail	S5	-	-	-
<i>Equisetum fluviatile</i>	swamp horsetail	S5	-	-	-
<b>Graminoids</b>					
<i>Andropogon gerardii</i>	big bluestem	S5	-	-	-
<i>Bromus inermis</i>	smooth brome	S5	-	-	-
<i>Carex atherodes</i>	awned sedge	S5	-	-	-
<i>Carex lenticularis</i>	lakeshore sedge	S5	-	-	-
<i>Carex spp.</i>	sedge species	-	-	-	-
<i>Carex viridula</i>	green sedge	S4	-	-	-
<i>Eleocharis palustris</i>	common spike rush	S5	-	-	-
<i>Elymus trachycaulus</i>	slender wild rye	S5	-	-	-
<i>Eriophorum angustifolium</i>	tall cotton-grass	S5	-	-	-
<i>Glyceria striata</i>	fowl mannagrass	S5	-	-	-
<i>Juncus balticus</i>	wirerush	S5	-	-	-
<i>Phleum pratense</i>	timothy	S5	-	-	-
<i>Poa palustris</i>	fowl blue grass	S5	-	-	-
<i>Poa pratenses</i>	Kentucky blue grass	S5	-	-	-
<i>Schoenoplectus acutus</i>	hardstem bulrush	S5	-	-	-
<i>Triglochin maritima</i>	seaside arrow grass	S5	-	-	-
<b>Woody Species - Trees</b>					
<i>Acer negundo</i>	Manitoba maple	S5	-	-	-
<i>Betula papyrifera</i>	white birch	S5	-	-	-
<i>Picea glauca</i>	white spruce	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Populus balsamifera</i>	balsam poplar	S5	-	-	-
<i>Populus tremuloides</i>	trembling aspen	S5	-	-	-
<i>Quercus macrocarpa</i>	burr oak	S5	-	-	-
<i>Ulmus americana</i>	American elm	S5	-	-	-
<b>Woody Species - Shrubs</b>					
<i>Acer spicatum</i>	mountain maple	S5	-	-	-
<i>Alnus viridis</i>	green alder	S5	-	-	-
<i>Amelanchier alnifolia</i>	saskatoon serviceberry	S5	-	-	-
<i>Arctostaphylos uva-ursi</i>	bearberry	S5	-	-	-
<i>Betula glandulosa</i>	bog birch	S5	-	-	-
<i>Cornus sericea</i>	red osier dogwood	S5	-	-	-
<i>Corylus cornuta</i>	beaked hazel	S5	-	-	-
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	S5	-	-	-
<i>Elaeagnus commutata</i>	wolf willow	S5	-	-	-
<i>Lonicera dioica</i>	twinning honeysuckle	S5	-	-	-
<i>Prunus pensylvanica</i>	pin cherry	S5	-	-	-
<i>Prunus virginiana</i>	chokecherry	S5	-	-	-
<i>Rhamnus alnifolia</i>	alder leaved buckthorn	S5	-	-	-
<i>Ribes americanum</i>	wild black currant	S5	-	-	-
<i>Ribes idaeus</i>	raspberry	S5	-	-	-
<i>Ribes lacustre</i>	black gooseberry	S5	-	-	-
<i>Ribes triste</i>	wild red current	S5	-	-	-
<i>Rosa spp.</i>	prickly rose	S5	-	-	-
<i>Salix bebbiana</i>	beaked willow	S5	-	-	-
<i>Salix exigua</i>	sandbar willow	S5	-	-	-
<i>Salix lutea</i>	yellow willow	S5	-	-	-
<i>Salix spp.</i>	willow	S5	-	-	-
<i>Symphoricarpos albus</i>	common snowberry	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Viburnum edule</i>	low-bush cranberry	S5	-	-	-
<i>Viburnum sp.</i>	viburnum spp.	S5	-	-	-
<b>Herbaceous Species</b>					
<i>Achillea millefolium</i>	common yarrow	S5	-	-	-
<i>Actaea rubra</i>	red baneberry	S5	-	-	-
<i>Agastache scrophulariifolia</i>	giant hyssop	S5	-	-	-
<i>Anemone canadensis</i>	canadian anemone	S5	-	-	-
<i>Antennaria neglecta</i>	field pussytoe	S5	-	-	-
<i>Apocynum androsaemifolium</i>	wild sarsparilla	S5	-	-	-
<i>Apocynum androsaemifolium</i>	spreading dogbane	S5	-	-	-
<i>Arctium lappa</i>	great burdock	S5	-	-	-
<i>Argentina anserina</i>	silverweed	S5	-	-	-
<i>Artemisia absinthium</i>	absinth	S5	-	-	-
<i>Artemisia frigida</i>	pasture sage	S5	-	-	-
<i>Asclepias syriaca</i>	common milkweed	S5	-	-	-
<i>Caltha palustris</i>	marsh marigold	S5	-	-	-
<i>Campanula aparinoides</i>	marsh bellflower	S5	-	-	-
<i>Campanula rotundifolia</i>	harebell	S5	-	-	-
<i>Cerastium arvense</i>	field chickweed	S5	-	-	-
<i>Cerastium nutans</i>	nodding chickweed	S5	-	-	-
<i>Chamerion angustifolium</i>	common fireweed	S5	-	-	-
<i>Cicuta maculata</i>	water hemlock	S5	-	-	-
<i>Cirsium arvense</i>	Canada thistle	S5	-	-	-
<i>Coeloglossum viride</i>	bracted bog orchid	S5	-	-	-
<i>Corallorhiza maculata</i>	spotted coralroot	N/A	-	-	-
<i>Cornus canadensis</i>	bunchberry	S5	-	-	-
<i>Cypripedium parviflorum</i>	yellow lady slipper	S5	-	-	-
<i>Erigeron philadelphicus</i>	philadelphia fleabane	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Fragaria vesca</i>	woodland strawberry	S5	-	-	-
<i>Fragaria virginiana</i>	common strawberry	S5	-	-	-
<i>Galeopsis tetrahit</i>	hemp nettle	S5	-	-	-
<i>Galium boreale</i>	northern bedstaw	S5	-	-	-
<i>Galium trifidum</i>	small bedstraw	S5	-	-	-
<i>Galium triflorum</i>	sweet scented bedstraw	S5	-	-	-
<i>Gentiana crinita</i>	fringed gentin	S5	-	-	-
<i>Geocaulon lividum</i>	false toadflax	S5	-	-	-
<i>Geum rivale</i>	purple avens	S5	-	-	-
<i>Halenia deflexa</i>	spurred gentian	S5	-	-	-
<i>Helianthus annuus</i>	annual sunflower	S5	-	-	-
<i>Iris versicolor</i>	blue flag iris	S5	-	-	-
<i>Lathyrus ochroleucus</i>	creamy peavine	S5	-	-	-
<i>Leucanthemum vulgare</i>	oxeye daisy	S5	-	-	-
<i>Lobelia kalmii</i>	kalm's lobelia	S5	-	-	-
<i>Lotus corniculatus</i>	birds foot trefoil	S5	-	-	-
<i>Lycopus uniflorus</i>	northern water-horehound	S5	-	-	-
<i>Lysimachia ciliata</i>	fringed loosetrife	S5	-	-	-
<i>Lysimachia thyrsoiflora</i>	tuft loosetrife	S5	-	-	-
<i>Maianthemum canadense</i>	wild lily-of-the-valley	S5	-	-	-
<i>Maianthemum stellatum</i>	star flowered false solomon's seal	S5	-	-	-
<i>Medicago sativa</i>	alfalfa	S5	-	-	-
<i>Melilotus officinalis</i>	yellow sweet clover	S5	-	-	-
<i>Mentha arvensis</i>	wild mint	S5	-	-	-
<i>Mitella nuda</i>	common mitrewort	S5	-	-	-
<i>Moehringia lateriflora</i>	blunt-leaved sandwort	S5	-	-	-
<i>Oenothera biennis</i>	yellow evening primrose	S5	-	-	-
<i>Oxytropis sericea</i>	early yellow locoweed	S5	-	-	-



**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Pastinaca sativa</i>	wild parsnip	S5	-	-	-
<i>Petasite palmatus</i>	palmate-leaved coltsfoot	S5	-	-	-
<i>Petasite sagittatus</i>	arrow-leaved coltsfoot	S5	-	-	-
<i>Physostegia virginiana</i>	false dragonhead	SU	-	-	-
<i>Plantago eriopoda</i>	saline plantain	S5	-	-	-
<i>Plantago major</i>	common plantain	S5	-	-	-
<i>Polygala senega</i>	Seneca root	S5	-	-	-
<i>Primula incana</i>	mealy primrose	S5	-	-	-
<i>Ranunculus acris</i>	meadow buttercup	S5	-	-	-
<i>Ranunculus gmelinii</i>	yellow water crowfoot	S5	-	-	-
<i>Ranunculus macounii</i>	macoun's buttercup	S5	-	-	-
<i>Ranunculus sceleratus</i>	celery-leaved buttercup	S5	-	-	-
<i>Rubus pubescens</i>	dew berry	S5	-	-	-
<i>Rumex occidentalis</i>	western dock	S5	-	-	-
<i>Sanicula marilandica</i>	black sanicle	S5	-	-	-
<i>Schizachne purpurascens</i>	false melic grass	S5	-	-	-
<i>Scutellaria galericulata</i>	marsh skullcap	S5	-	-	-
<i>Sisyrinchium montanum</i>	common blue-eyed grass	S5	-	-	-
<i>Sium suave</i>	water parsnip	S5	-	-	-
<i>Solidago canadensis</i>	Canada goldenrod	S5	-	-	-
<i>Solidago graminifolia</i>	flat top goldenrod	S5	-	-	-
<i>Solidago rigida</i>	stiff goldenrod	S5	-	-	-
<i>Sonchus arvensis</i>	perennial sow thistle	S5	-	-	-
<i>Symphotrichum ericoides</i>	many-flowered aster	S5	-	-	-
<i>Symphotrichum laeve</i>	smooth blue aster	S5	-	-	-
<i>Taraxacum officinale</i>	common dandelion	S5	-	-	-
<i>Thalictrum dasycarpum</i>	tall meadow rue	S5	-	-	-
<i>Thalictrum venulosum</i>	veiny meadow rue	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Trientalis borealis</i>	northern star flower	S5	-	-	-
<i>Trifolium hybridum</i>	alsike clover	S5	-	-	-
<i>Trifolium pratense</i>	red clover	S5	-	-	-
<i>Tripleurospermum perforata</i>	scentless chamomile	S5	-	-	-
<i>Typha latifolia</i>	common cattail	S5	-	-	-
<i>Urtica dioica</i>	stinging nettle	S5	-	-	-
<i>Vicia americana</i>	american vetch	S5	-	-	-
<i>Viola adunca</i>	early blue violet	S5	-	-	-
<i>Viola candensis</i>	Canadian white violet	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

Table ii: Species List by Conservation Status – Route D

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
Non Vascular Species					
<i>Sphagnum spp.</i>	sphagnum moss	-	-	-	-
Vascular Plant Species					
<b>Fern and Fern Allies</b>					
<i>Equisetum arvense</i>	common horsetail	S5	-	-	-
<i>Equisetum fluviatile</i>	swamp horsetail	S5	-	-	-
<i>Equisetum hyemale</i>	scouring rush	S5	-	-	-
<b>Graminoids</b>					
<i>Alopecurus aequalis</i>	short awned foxtail	S5	-	-	-
<i>Bromus inermis</i>	smooth brome	S5	-	-	-
<i>Carex atherodes</i>	awned sedge	S5	-	-	-
<i>Carex lacustris</i>	water sedge	S5	-	-	-
<i>Carex lenticularis</i>	lakeshore sedge	S5	-	-	-
<i>Carex rostrata</i>	beaked sedge	S4	-	-	-
<i>Carex spp.</i>	sedge species	-	-	-	-
<i>Carex viridula</i>	green sedge	S4	-	-	-
<i>Eleocharis palustris</i>	common spike rush	S5	-	-	-
<i>Elymus trachycaulus</i>	slender wheatgrass	S5	-	-	-
<i>Eriophorum angustifolium</i>	tall cotton-grass	S5	-	-	-
<i>Eriophorum gracile</i>	slender cotton grass	S5	-	-	-
<i>Glyceria striata</i>	fowl mannagrass	S5	-	-	-
<i>Hierochloa odorata</i>	common sweet-grass	S5	-	-	-
<i>Juncus balticus</i>	wirerush	S5	-	-	-
<i>Koeleria macrantha</i>	junegrass	S5	-	-	-
<i>Phleum pratense</i>	timothy	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Phragmites australis</i>	common reed grass	S5	-	-	-
<i>Poa palustris</i>	fowl blue grass	S5	-	-	-
<i>Poa pratenses</i>	Kentucky blue grass	S5	-	-	-
<i>Schoenoplectus acutus</i>	hardstem bulrush	S5	-	-	-
<i>Schoenoplectus tabernaemontani</i>	softstem bulrush	S5	-	-	-
<i>Scirpus cyperinus</i>	woolgrass	S4	-	-	-
<i>Triglochin maritima</i>	seaside arrow grass	S5	-	-	-
<b>Woody Species - Trees</b>					
<i>Abies balsamea</i>	balsam fir	S5	-	-	-
<i>Acer negundo</i>	Manitoba maple	S5	-	-	-
<i>Betula papyrifera</i>	white birch	S5	-	-	-
<i>Populus tremuloides</i>	trembling aspen	S5	-	-	-
<i>Quercus macrocarpa</i>	bur oak	S5	-	-	-
<i>Ulmus americana</i>	American elm	S5	-	-	-
<b>Woody Species - Shrubs</b>					
<i>Acer spicatum</i>	mountain maple	S5	-	-	-
<i>Alnus vincana</i>	green alder	S5	-	-	-
<i>Amelanchier alnifolia</i>	saskatoon serviceberry	S5	-	-	-
<i>Betula glandulosa</i>	bog birch	S5	-	-	-
<i>Cornus sericea</i>	red osier dogwood	S5	-	-	-
<i>Corylus cornuta</i>	beaked hazel	S5	-	-	-
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	S5	-	-	-
<i>Diervilla sp.</i>	bush honeysuckle	S5	-	-	-
<i>Elaeagnus commutata</i>	wolf willow	S5	-	-	-
<i>Lonicera dioica</i>	twining honeysuckle	S5	-	-	-
<i>Prunus pensylvanica</i>	pin cherry	S5	-	-	-
<i>Prunus virginiana</i>	chokecherry	S5	-	-	-
<i>Rhamnus alnifolia</i>	alder leaved buckthorn	S5	-	-	-
<i>Ribes americanum</i>	wild black currant	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Ribes hudsonianum</i>	northern black currant	S5	-	-	-
<i>Rubus idaeus</i>	raspberry	S5	-	-	-
<i>Ribes lacustre</i>	black gooseberry	S5	-	-	-
<i>Ribes triste</i>	wild red current	S5	-	-	-
<i>Rosa spp.</i>	prickly rose	-	-	-	-
<i>Salix bebbiana</i>	beaked willow	S5	-	-	-
<i>Salix exigua</i>	sandbar willow	S5	-	-	-
<i>Salix lutea</i>	yellow willow	S5	-	-	-
<i>Salix myrtilifolia</i>	myrtle leaved willow	S5	-	-	-
<i>Salix pedicellaris</i>	bog willow	S5	-	-	-
<i>Salix spp.</i>	willow	S5	-	-	-
<i>Symphoricarpos albus</i>	common snowberry	S5	-	-	-
<i>Viburnum edule</i>	low-bush cranberry	S5	-	-	-
<i>Viburnum rafinesqueanum</i>	downy arrowwood	S5	-	-	-
<b>Herbaceous Species</b>					
<i>Achillea millefolium</i>	common yarrow	S5	-	-	-
<i>Actaea rubra</i>	red baneberry	S5	-	-	-
<i>Agastache scrophulariifolia</i>	giant hyssop	S5	-	-	-
<i>Anemone canadensis</i>	Canada anemone	S5	-	-	-
<i>Antennaria neglecta</i>	field pussytoe	S5	-	-	-
<i>Apocynum androsaemifolium</i>	wild sarsparilla	S5	-	-	-
<i>Arctium lappa</i>	great burdock	S5	-	-	-
<i>Argentina anserina</i>	silverweed	S5	-	-	-
<i>Arnica chamissonis</i>	leafy arnica	S5	-	-	-
<i>Artemisia absinthium</i>	absinth	S5	-	-	-
<i>Caltha palustris</i>	marsh marigold	S5	-	-	-
<i>Campanula rotundifolia</i>	harebell	S5	-	-	-
<i>Carduus nutans</i>	nodding thistle	S5	-	-	-
<i>Chamerion angustifolium</i>	common fireweed	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Cicuta maculata</i>	water hemlock	S5	-	-	-
<i>Cirsium arvense</i>	Canada thistle	S5	-	-	-
<i>Comarum palustre</i>	marsh cinquefoil	S5	-	-	-
<i>Convolvulus arvensis</i>	field bindweed	S5	-	-	-
<i>Corallorhiza maculata</i>	spotted coralroot	N/A	-	-	-
<i>Cornus canadensis</i>	bunchberry	S5	-	-	-
<i>Cypripedium parviflorum</i>	yellow lady slipper	S5	-	-	-
<i>Dodecatheon pulchellum</i>	saline shooting star	S5	-	-	-
<i>Erigeron glabellus</i>	smooth fleabane	S5	-	-	-
<i>Fragaria vesca</i>	woodland strawberry	S5	-	-	-
<i>Fragaria virginiana</i>	common strawberry	S5	-	-	-
<i>Galeopsis tetrahit</i>	hemp nettle	S5	-	-	-
<i>Galium triflorum</i>	sweet scented bedstraw	S5	-	-	-
<i>Gentiana crinita</i>	fringed gentian	S5	-	-	-
<i>Geocaulon lividum</i>	false toadflax	S5	-	-	-
<i>Geum rivale</i>	purple avens	S5	-	-	-
<i>Glycyrrhiza lepidota</i>	wild licorice	S5	-	-	-
<i>Halenia deflexa</i>	spurred gentian	S5	-	-	-
<i>Helianthus annuus</i>	annual sunflower	S5	-	-	-
<i>Lactuca tatarica</i>	common blue lettuce	S5	-	-	-
<i>Lathyrus ochroleucus</i>	creamy peavine	S5	-	-	-
<i>Leucanthemum vulgare</i>	oxeye daisy	S5	-	-	-
<i>Lobelia kalmii</i>	kalm's lobelia	S5	-	-	-
<i>Lycopus uniflorus</i>	northern water-horehound	S5	-	-	-
<i>Lysimachia thyrsoiflora</i>	tuft loosetrife	S5	-	-	-
<i>Maianthemum canadense</i>	wild lily-of-the-valley	S5	-	-	-
<i>Maianthemum stellatum</i>	star flowered false solomon's seal	S5	-	-	-
<i>Maianthemum trifolium</i>	three-leaved false solomon's seal	S5	-	-	-
<i>Medicago sativa</i>	alfalfa	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Melilotus albus</i>	white sweet clover	S5	-	-	-
<i>Melilotus officinalis</i>	yellow sweet clover	S5	-	-	-
<i>Mentha arvensis</i>	wild mint	S5	-	-	-
<i>Moehringia lateriflora</i>	blunt-leaved sandwort	S5	-	-	-
<i>Oxytropis monticola</i>	late yellow locoweed	S5	-	-	-
<i>Pastinaca sativa</i>	wild parsnip	S5	-	-	-
<i>Petasites frigidus var. sagittatus</i>	arrow-leaved coltsfoot	S5	-	-	-
<i>Physostegia virginiana</i>	false dragonhead	SU	-	-	-
<i>Polygala senega</i>	Seneca root	S5	-	-	-
<i>Polygonum amphibium</i>	water smartweed	S5	-	-	-
<i>Ranunculus abortivus</i>	small flowered buttercup	S5	-	-	-
<i>Ranunculus acris</i>	meadow buttercup	S5	-	-	-
<i>Ranunculus gmelinii</i>	yellow water crowfoot	S5	-	-	-
<i>Ranunculus sceleratus</i>	celery-leaved buttercup	S5	-	-	-
<i>Rudbeckia hirta</i>	black-eyed susan	S5	-	-	-
<i>Sanicula marilandica</i>	black sanicle	S5	-	-	-
<i>Scutellaria galericulata</i>	marsh skullcap	S5	-	-	-
<i>Senecio congestus</i>	marsh ragwort	S5	-	-	-
<i>Sisyrinchium montanum</i>	common blue-eyed grass	S5	-	-	-
<i>Sium suave</i>	water parsnip	S5	-	-	-
<i>Solidago canadensis</i>	Canada goldenrod	S5	-	-	-
<i>Solidago graminifolia</i>	flat top goldenrod	S5	-	-	-
<i>Solidago rigida</i>	stiff goldenrod	S5	-	-	-
<i>Sonchus arvensis</i>	perennial sow thistle	S5	-	-	-
<i>Stellaria calycantha</i>	northern stitchwort	S5	-	-	-
<i>Symphyotrichum ericoides</i>	many-flowered aster	S5	-	-	-
<i>Symphyotrichum laeve</i>	smooth blue aster	S5	-	-	-
<i>Taraxacum officinale</i>	common dandelion	S5	-	-	-
<i>Thalictrum dasycarpum</i>	tall meadow rue	S5	-	-	-

**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

<i>Scientific Name</i>	Common Name	Provincial Conservation Status	SARA	COSEWIC	Manitoba Endangered Species List
<i>Thalictrum venulosum</i>	veiny meadow rue	S5	-	-	-
<i>Trifolium hybridum</i>	alsike clover	S5	-	-	-
<i>Tripleurospermum perforata</i>	scentless chamomile	S5	-	-	-
<i>Typha latifolia</i>	common cattail	S5	-	-	-
<i>Urtica dioica</i>	stinging nettle	S5	-	-	-
<i>Valeriana dioica</i>	northern valerian	S5	-	-	-
<i>Vicia americana</i>	american vetch	S5	-	-	-
<i>Viola adunca</i>	early blue violet	S5	-	-	-
<i>Viola canadensis</i>	Canadian white violet	S5	-	-	-



**Appendix B: List of Plant Species Observed During the 2016 Spring and Summer Field Surveys**

Table iii: List of Plant Species Observed by Survey Plot – Route C

<i>Scientific Name</i>	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22	
Vascular Plant Species																								
<b>Fern and Fern Allies</b>																								
<i>Athyrium spp</i>	fern species	-	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Equisetum arvense</i>	common horsetail	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Equisetum fluviatile</i>	swamp horsetail	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Graminoids</b>																								
<i>Andropogon gerardii</i>	big bluestem	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Bromus inermis</i>	smooth brome	X	X	-	-	-	-	X	X	-	-	-	-	-	-	X	X	-	-	-	X	X	X	X
<i>Carex atherodes</i>	awned sedge	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Carex lenticularis</i>	lakeshore sedge	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Carex spp.</i>	sedge species	X	-	-	X	-	X	X	X	-	-	-	-	X	-	X	-	-	X	-	-	-	-	X
<i>Carex viridula</i>	green sedge	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Eleocharis palustris</i>	common spike rush	X	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X
<i>Elymus trachycaulus</i>	slender wild rye	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
<i>Eriophorum angustifolium</i>	tall cotton-grass	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Glyceria striata</i>	fowl mannagrass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X
<i>Juncus balticus</i>	wirerush	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X
<i>Phleum pratense</i>	timothy	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	X	-	-	-	X	-	-	-
<i>Poa palustris</i>	fowl blue grass	-	-	-	-	X	X	-	-	X	-	X	X	X	-	X	X	-	-	X	X	X	X	-
<i>Poa pratensis</i>	Kentucky blue grass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	X

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<i>Scientific Name</i>	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22
<i>Schoenoplectus acutus</i>	hardstem bulrush	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	-	-	-	X
<i>Triglochin maritima</i>	seaside arrow grass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
<b>Woody Species - Trees</b>																							
<i>Acer negundo</i>	Manitoba maple	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Betula papyrifera</i>	white birch	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Picea glauca</i>	white spruce	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Populus balsamifera</i>	balsam poplar	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Populus tremuloides</i>	trembling aspen	X	-	X	X	X	X	-	-	X	X	X	X	X	X	-	-	X	-	X	X	X	-
<i>Quercus macrocarpa</i>	burr oak	-	-	X	-	-	-	-	-	-	X	X	X	-	-	-	-	X	-	-	-	-	X
<i>Ulmus americana</i>	American elm	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Woody Species - Shrubs</b>																							
<i>Acer spicatum</i>	mountain maple	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Alnus viridis</i>	green alder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Amelanchier alnifolia</i>	saskatoon serviceberry	-	-	X	X	-	-	-	-	-	-	X	X	X	-	-	-	X	-	-	-	-	-
<i>Arctostaphylos uva-ursi</i>	bearberry	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
<i>Betula glandulosa</i>	bog birch	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-
<i>Cornus sericea</i>	red osier dogwood	-	-	X	X	X	X	-	-	X	X	X	X	-	X	-	-	-	X	X	-	X	-
<i>Corylus cornuta</i>	beaked hazel	-	-	X	X	X	X	-	-	X	-	X	X	X	X	-	-	X	-	X	-	X	-
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	-	-	-	-	-	-	X	-	-	-	X	X	-	-	-	-	-	X	-	-	-	-
<i>Elaeagnus commutata</i>	wolf willow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-





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<i>Scientific Name</i>	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22
<i>Cornus canadensis</i>	bunchberry	-	-	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cypripedium parviflorum</i>	yellow lady slipper	-	-	-	-	-	X	-	-	X	-	X	X	X	-	-	X	-	-	X	-	-	-
<i>Erigeron philadelphicus</i>	philadelphia fleabane	X	-	-	-	-	X	X	-	-	-	X	X	-	-	-	-	-	-	-	-	-	X
<i>Fragaria vesca</i>	woodland strawberry	-	-	-	X	X	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-
<i>Fragaria virginiana</i>	common strawberry	-	-	-	-	-	X	X	-	-	-	X	X	-	X	X	-	-	-	X	-	X	-
<i>Galeopsis tetrahit</i>	hemp nettle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
<i>Galium boreale</i>	northern bedstaw	-	-	-	-	-	X	-	-	X	-	-	-	X	X	X	-	-	X	X	-	X	-
<i>Galium trifidum</i>	small bedstraw	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Galium triflorum</i>	sweet scented bedstraw	-	-	-	-	X	-	-	-	-	-	X	X	X	-	-	X	-	-	X	X	X	-
<i>Gentiana crinita</i>	fringed gentin	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Geocaulon lividum</i>	false toadflax	-	-	-	-	-	-	X	-	-	-	X	X	-	X	X	X	-	-	-	-	-	-
<i>Geum rivale</i>	purple avens	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
<i>Halenia deflexa</i>	spurred gentian	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Helianthus annuus</i>	annual sunflower	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
<i>Iris versicolor</i>	blue flag iris	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lathyrus ochroleucus</i>	creamy peavine	-	-	-	-	X	X	-	-	-	-	X	X	X	X	-	-	-	-	-	-	X	-
<i>Leucanthemum vulgare</i>	oxeye daisy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-
<i>Lobelia kalmii</i>	kalm's lobelia	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Lotus corniculatus</i>	birds foot trefoil	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X	-	-

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<i>Lycopus uniflorus</i>	northern water-horehound	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
<i>Lysimachia ciliata</i>	fringed loosetrife		-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lysimachia thysiflora</i>	tuft loosetrife	X	-	-	-	-	-	-	-	-	X	-	-	X	-	-	-	X	-	-	-	-	-
<i>Maianthemum canadense</i>	wild lily-of-the-valley	-	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-	-	-	-	-	-
<i>Maianthemum stellatum</i>	star flowered false solomon's seal	-	-	-	X	-	-	-	-	X	X	X	X	X	-	-	-	-	X	X	-	X	-
<i>Medicago sativa</i>	alfalfa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Melilotus officinalis</i>	yellow sweet clover	X	-	X	-	-	X	X	-	X	-	X	X	-	X	-	X	-	-	-	-	X	X
<i>Mentha arvensis</i>	wild mint	X	-	X	-	-	-	-	-	-	X	-	-	-	X	-	-	-	X	X	-	-	-
<i>Mitella nuda</i>	common mitrewort	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Moehringia lateriflora</i>	blunt-leaved sandwort		-	-	-	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Oenothera biennis</i>	yellow evening primrose		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
<i>Oxytropis sericea</i>	early yellow locoweed		-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
<i>Pastinaca sativa</i>	wild parsnip	-	-	X	X	-	X	X	-	X	-	-	-	-	X	-	-	-	-	X	-	-	-
<i>Petasite palmatus</i>	palmate-leaved coltsfoot	-	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-
<i>Petasite sagittatus</i>	arrow-leaved coltsfoot	-	-	-	X	-	-	-	-	X	-	-	-	X	X	-	-	-	X	-	-	-	-
<i>Physostegia virginiana</i>	false dragonhead	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-











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<i>Acer negundo</i>	Manitoba Maple	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Betula papyrifera</i>	white birch	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Populus tremuloides</i>	trembling aspen	X	-	-	X	-	X	X	X	-	-	X	-	-	-	-	X	X	-	X	X	-	-
<i>Quercus macrocarpa</i>	burr oak	X	-	-	X	-	X	X	X	-	-	-	-	-	-	-	-	X	-	-	X	-	-
<i>Ulmus americana</i>	American Elm	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Woody Species - Shrubs</b>																							
<i>Acer spicatum</i>	mountain maple	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Alnus viridis</i>	green alder	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
<i>Amelanchier alnifolia</i>	saskatoon serviceberry	X	-	-	X	-	X	-	-	-	-	-	-	-	-	-	X	X	-	X	X	-	-
<i>Betula glandulosa</i>	bog birch	-	-	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-	-	-	X	-	-
<i>Cornus sericea</i>	red osier dogwood	X	X	-	X	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-
<i>Corylus cornuta</i>	beaked hazel	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	X	X	-	X	X	-	-
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Diervilla sp.</i>	bush honeysuckle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Elaeagnus commutata</i>	wolf willow	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lonicera dioica</i>	twining honeysuckle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Prunus pensylvanica</i>	pin cherry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Prunus virginiana</i>	chokecherry	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Rhamnus alnifolia</i>	alder leaved buckthorn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-

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<i>Ribes americanum</i>	wild black currant	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Ribes hudsonianum</i>	northern black currant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Rubus idaeus</i>	raspberry	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
<i>Ribes lacustre</i>	black gooseberry	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ribes triste</i>	wild red current	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Rosa spp.</i>	prickly rose	X	X	-	-	-	X	-	-	-	X	-	-	-	-	-	X	-	-	-	X	-	-
<i>Salix bebbiana</i>	beaked willow	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	X	X	-	-
<i>Salix exigua</i>	sandbar willow	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	X	-	-
<i>Salix lutea</i>	yellow willow	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-	-	-	-	-	-	-
<i>Salix myrtilifolia</i>	myrtle leaved willow	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Salix pedicellaris</i>	bog willow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
<i>Salix spp.</i>	willow	X	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X	X	-	-
<i>Symphoricarpos albus</i>	common snowberry	X	-	-	-	-	X	-	-	-	X	X	-	X	X	-	-	X	-	-	-	-	-
<i>Viburnum edule</i>	low-bush cranberry	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Viburnum rafinesqueanum</i>	downy arrowwood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
<b>Herbaceous Species</b>																							
<i>Achillea millefolium</i>	common yarrow	-	-	-	-	-	-	-	-	-	X	-	-	X	-	X	-	-	-	-	X	-	-
<i>Actaea rubra</i>	red baneberry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
<i>Agastache scrophulariifolia</i>	giant hyssop	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-

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<i>Anemone canadensis</i>	Canadian anemone	X	-	X	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	
<i>Antennaria neglecta</i>	field pussytoe	-	-	-	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Apocynum androsaemifolium</i>	wild sarsparilla	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-	
<i>Arctium lappa</i>	great burdock	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	
<i>Argentina anserina</i>	silverweed	X	-	-	-	X	X	X	X	X	-	X	-	-	X	-	-	-	-	-	-	-	-	X
<i>Arnica chamissonis</i>	leafy arnica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	
<i>Artemisia absinthium</i>	absinth	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	
<i>Caltha palustris</i>	marsh marigold	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	
<i>Campanula rotundifolia</i>	harebell	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	
<i>Carduus nutans</i>	nodding thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	
<i>Chamerion angustifolium</i>	common fireweed	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Cicuta maculata</i>	water hemlock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	
<i>Cirsium arvense</i>	Canada thistle	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
<i>Comarum palustre</i>	marsh cinquefoil	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Convolvulus arvensis</i>	field bindweed	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<i>Corallorhiza maculata</i>	spotted coralroot	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	
<i>Cornus canadensis</i>	bunchberry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	
<i>Cypripedium parviflorum</i>	yellow lady slipper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X	-	-	

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<i>Scientific Name</i>	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	Plot 13	Plot 14	Plot 15	Plot 16	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22
<i>Dodecatheon pulchellum</i>	saline shooting star	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-
<i>Erigeron glabellus</i>	smooth fleabane	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
<i>Fragaria vesca</i>	woodland strawberry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-
<i>Fragaria virginiana</i>	common strawberry	-	X	-	-	-	-	-	x	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Galeopsis tetrahit</i>	hemp nettle	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Galium triflorum</i>	sweet scented bedstraw	X	X	-	-	-	-	-	-	-	X	-	-	-	X	-	-	X	-	-	-	-	-
<i>Gentiana crinita</i>	fringed gentian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-
<i>Geocaulon lividum</i>	false toadflax	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X	-	X	-	-	-
<i>Geum rivale</i>	purple avens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Glycyrrhiza lepidota</i>	wild licorice	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Halenia deflexa</i>	spurred gentian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
<i>Helianthus annuus</i>	annual sunflower	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Lactuca tatarica</i>	common blue lettuce	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
<i>Lathyrus ochroleucus</i>	creamy peavine	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	X	-	-	X	-	-
<i>Leucanthemum vulgare</i>	oxeye daisy	-	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lobelia kalmii</i>	kalm's lobelia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-
<i>Lycopus uniflorus</i>	northern water-horehound	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-



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<i>Ranunculus acris</i>	meadow buttercup	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X
<i>Ranunculus gmelinii</i>	yellow water crowfoot	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ranunculus sceleratus</i>	celery-leaved buttercup	-	-	X	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Rudbeckia hirta</i>	black-eyed susan	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Sanicula marilandica</i>	black sanicle	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X	-	-
<i>Scutellaria galericulata</i>	marsh skullcap	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Senecio congestus</i>	marsh ragwort	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Sisyrinchium montanum</i>	common blue-eyed grass	-	-	X	X	X	X	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-
<i>Sium suave</i>	water parsnip	-	-	-	-	-	-	-	X	-	-	-	X	-	-	-	-	X	-	-	-	-	-
<i>Solidago canadensis</i>	Canada goldenrod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Solidago graminifolia</i>	flat top goldenrod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Solidago rigida</i>	stiff goldenrod	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Sonchus arvensis</i>	perennial sow thistle	-	-	-	-	x	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
<i>Stellaria calycantha</i>	northern stitchwort	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Symphyotrichum ericoides</i>	many-flowered aster	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	-	-	-	-	-
<i>Symphyotrichum laeve</i>	smooth blue aster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-



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<i>Taraxacum officinale</i>	common dandelion	-	-	-	X	X	X	-	-	-	X	-	-	-	X	-	-	X	-	-	X	-	X
<i>Thalictrum dasycarpum</i>	tall meadow rue	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-	X	-	-
<i>Thalictrum venulosum</i>	veiny meadow rue	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-
<i>Trifolium hybridum</i>	alsike clover	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
<i>Tripleurospermum perforata</i>	scentless chamomile	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Typha latifolia</i>	common cattail	-	-	X	-	-	-	-	-	-	X	X	-	-	-	X	-	X	-	-	-	-	-
<i>Urtica dioica</i>	stinging nettle	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
<i>Valeriana dioica</i>	northern valerian	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
<i>Vicia americana</i>	american vetch	X	-	X	-	-	X	-	-	-	X	X	-	X	X	-	-	X	-	X	X	-	X
<i>Viola adunca</i>	early blue violet	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X	-	-	-
<i>Viola canadensis</i>	Canadian white violet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-

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