Opaskwayak Cree Nation Guide

to the Wetlands of the Saskatchewan River Delta

Alli Morrison and Iain Davidson-Hunt

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- Johnson, D., L. Kershaw, A. MacKinnon and J. Pojar. 1995. *Plants of the western Boreal Forest and Aspen Parkland*. Edmonton, AB: Lone Pine Publishing and the Canadian Forest Service.
- Lahring, H. 2003. *Water and wetland plants of the prairie provinces*. Regina, SK: Canadian Plains Research Center, University of Regina.

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1.0 Purpose of Guide

The purpose of this guide is to provide the Opaskwayak Cree Nation (OCN) with an educational tool regarding the ecologically diverse wetlands located within their traditional territory as described by the Canadian Wetland Classification System. Cultural practices related to the traditional uses of wetlands, as well as lists of species in Cree are also included to provide increasingly relevant information for the community. Accordingly, the guide acts as a cross-cultural tool that integrates information stemming from both indigenous knowledge and Western scientific methods. The continued education of OCN community members on the overall importance of wetlands in the area may contribute to achieving enhanced environmental stewardship and cultural continuity.

2.0 Saskatchewan River Delta

2.1 General Ecological Benefits

The Saskatchewan River Delta (SRD) is the largest freshwater inland delta in North America, covering over 950 000 ha. The SRD is located in the Mid-Boreal Lowland Ecoregion within the Saskatchewan River Basin, straddling the border of central Saskatchewan and Manitoba (DUC 2008; Figure 1). Approximately 81 percent of the SRD consists of a diversity of wetland ecosystems, which provide valuable ecosystem services such as carbon sequestration, water regulation, water purification, flood control and erosion reduction (DUC 2008). The area also supports a large amount of biodiversity including an abundance of plants, over 200 species of birds, 43 species of mammals and 48 species of fish (DUC 2011). The SRD has been recognized internationally as a Canadian Important Bird Area due to the role the delta plays in providing nesting and migration habitat for waterfowl populations (IBA Canada 2011; Lindgren 2001). In addition, extensive human activities are sustained by these water and wetland ecosystems including hunting, fishing, trapping, recreation and tourism (DUC 2008). As indicated, the SRD provides a variety of ecological, economic and cultural benefits to the region, the country and the continent.

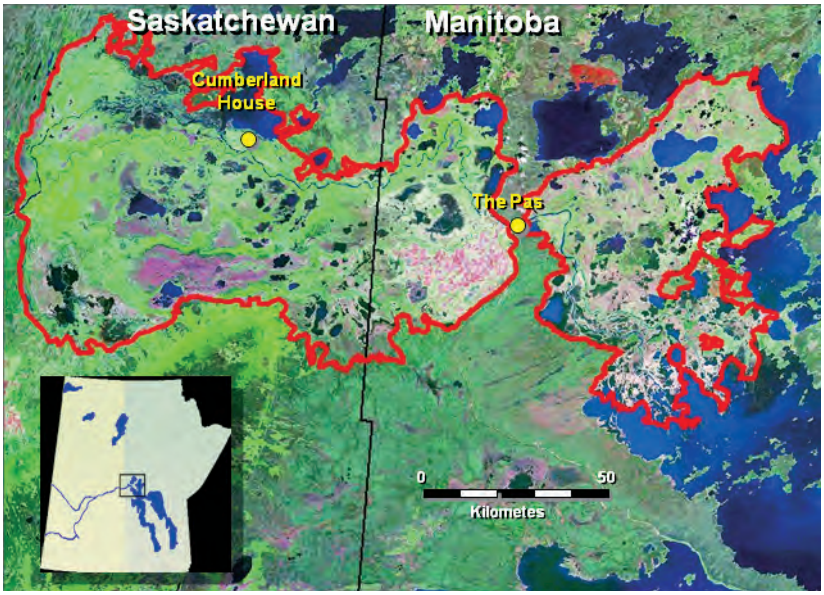

Figure 2.1 Location (inset) and extent of the Saskatchewan River Delta (red) in Saskatchewan and Manitoba (DUC 2006).

2.2 Challenges

The SRD is facing various threats due to the expansion of human influence. The SRD is fed largely by the Saskatchewan River, which supports a variety of upstream activities including hydroelectric generation, petroleum production, agricultural irrigation and drinking water (DUC 2011). For example, the E. B. Campbell Dam, which formed Tobin Lake, was completed in 1963 and is located approximately 30 km upstream of the SRD (Partners FOR the Saskatchewan River Basin 2009). The project has led to reduced sediment flows downstream within the SRD. As well, the Gardiner Dam and accompanying reservoir, Lake Diefenbaker, were completed upstream of the SRD on the South Saskatchewan River in 1967 and resulted in reduced peak water flows in the delta (Partners FOR the Saskatchewan River Basin 2009). Downstream developments have also had negative impacts on the SRD. For instance, the Grand Rapids generating station that was constructed in 1964 resulted in the permanent flooding of over 100 000 ha of the lower delta upstream of Cedar Lake (DUC 2011; Waldram 1984). Continued agricultural expansion and river diversion projects have also contributed to the deterioration of wetlands in the SRD (DUC 2011). The cumulative impacts of these upstream and downstream uses have resulted in the substantial alteration of the hydrologic regime in the SRD.

Prior to these developments, the Saskatchewan River had two annual high-water periods occurring in spring and early summer, which were important in depositing nutrients and sedimentary soils within the SRD (DUC 2011). Equally as important to the wet periods, were the natural occurrences of drought in the river, which caused wetland water levels to decrease. It has been suggested that this wet-dry cycle ensured the overall productivity and fertility of the SRD (DUC 2011). However, as a result of the aforementioned anthropogenic developments, the SRD has experienced drier conditions (Smith 2004), potentially reducing the ability of the wetlands to provide important ecosystem services and to sufficiently support wildlife populations.

Management of water levels has been occurring in the SRD since the 1930s when the provincial governments of Manitoba and Saskatchewan, the federal government and private stakeholders attempted to stabilize water levels with the hope that it would lead to an increase in muskrat populations for trapping (Baschuk 2010). Recognizing the importance of the SRD in supporting waterfowl populations, Ducks Unlimited Canada (DUC) began managing the wetlands in the 1940s using water control structures (Baschuk 2010). Initially, water management by DUC was used to stabilize water levels to provide enhanced waterfowl habitat in the summer (Baschuk 2010). However, more recent management plans have attempted to replicate the natural wet-dry cycle that has historically occurred in the SRD (Baschuk 2010). These management efforts have had varied success due to the complex ecological interactions occurring within the wetlands of the SRD (DUC 2011).

3.0 Wetland Types

According to the Canadian Wetland Classification System (Warner and Rubec 1997), wetlands are defined as "land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment." There are five major wetland classes found in the Saskatchewan River Delta (SRD) under the Canadian Wetland Classification System including bogs, fens, swamps, marshes and

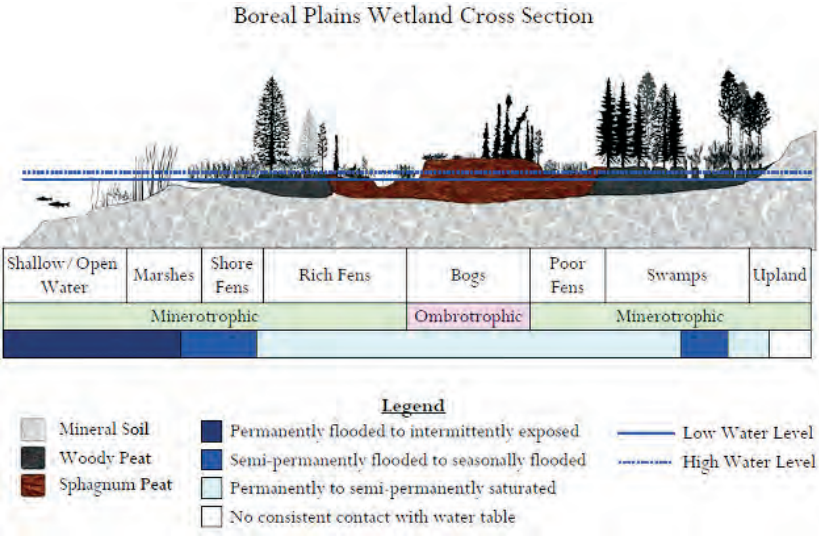

Figure 3.1 Landscape cross-section of Boreal Plains wetlands showing the relative positions of the major wetland types and the corresponding positions of water regime, soil regime and nutrient status (Smith et al. 2007, adapted to the Boreal Plains and expanded from Harris et al. 1996).

shallow open water. Aside from hydrologic processes, these wetland types can also be differentiated by soil type into peatland (organic) wetlands and mineral wetlands. Bogs, fens and some minor classes of swamps are found in peatlands while marshes, shallow open water and other minor classes of swamps occur in mineral soil wetlands (Smith et al. 2007). With the help of this guide, community members can enhance their understanding of the classification of the major wetland classes according to the Canadian Wetland Classification System based on the vegetation present within the landscape (in relation to other environmental factors including nutrient regime, hydrology and soil).

3.1 Bogs

3.1.1 Ecological Benefits

Bogs have deep organic deposits, which store large amounts of carbon and contribute to alleviating the effects of climate change. These wetlands also provide important habitat for the threatened woodland caribou. Bogs also store water during wet periods and release water in dry conditions (DUC 2012). These are the least common wetland type found within the Saskatchewan River Delta.

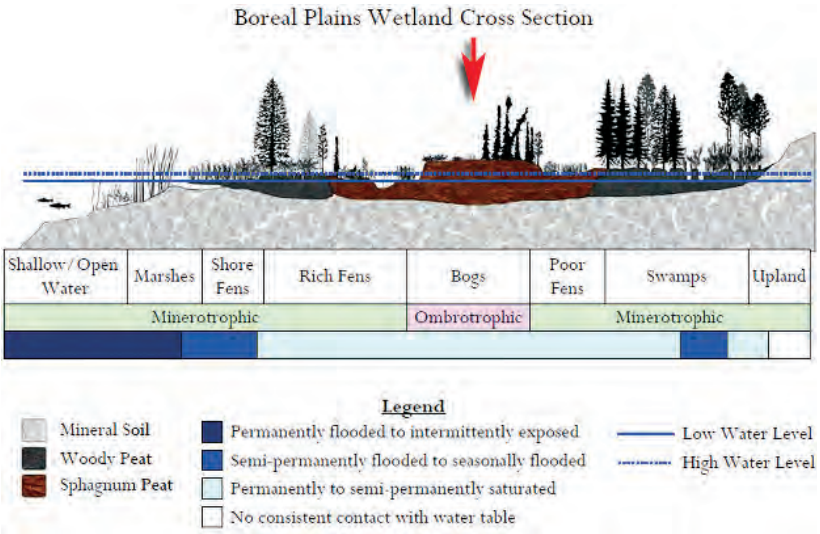

Figure 3.2 Landscape cross-section of Boreal Plains wetlands showing the relative position of bogs and the corresponding positions of water regime, soil regime and nutrient status (Smith et al. 2007, adapted to the Boreal Plains and expanded from Harris et al. 1996).

3.1.2 Nutrient Regime

As bogs tend to be isolated from mineral-rich water and groundwater, the nutrient regimes of bogs range from very poor to poor and are acidic in nature (pH <4.0 to 5.0).

3.1.3 Hydrology

Bogs attain water primarily from precipitation in the form of snow and rain. Even though bogs tend to be raised when compared to the surrounding terrain, the water table remains at or below the surface of the bog because of the capillary action of *Sphagnum* moss (Smith et al. 2007).

3.1.4 Soil

Bogs are peatland wetlands with peat deposits greater than 40 cm consisting of weakly decomposed *Sphagnum* and other mosses and sedges. Peat deposits accumulate over time due to slow decomposition occurring in a wet, cool and anoxic (oxygen-deprived) environment. Due to the accumulation of peat, the surface of bogs tends to be elevated when compared to the surrounding landscape (Smith et al. 2007).

3.1.5 Vegetation

Bogs have low plant diversity due to poor nutrient regime and can be treed, shrubby or open. **Treed bogs** consist of stunted black spruce less than 10 m in height (25-60% canopy closure) with *Sphagnum* moss ground cover (>20%). The *absence* of other tree species such as tamarack (*Larix laricina*) that are more common to fens is a good indicator of bogs. **Shrubby bogs** consist of low-lying shrubs (e.g., Labrador tea, northern bog-laurel, bog cranberry >25%) with *Sphagnum* moss (>20%) and less than 25% tree cover. **Open bogs** are dominated by *Sphagnum* moss with a few herbs/forbs such as cotton grass and sedges and less than 25% tree and shrub cover (DUC 2012).

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3.1.5.1 Black Spruce ***(Picea mariana)* / ᒥᓈᔦᑯᐱᑫᐚᑎᐠ / *menayekopekewatek***

Black spruce is a small, often shrubby evergreen tree, 7-10 m tall (up to 15 m); in older trees, lower branches may droop with the lowest often rooting into the ground; short **uppermost branches clustered** (Jonhson et al. 1995). Due to the nutrient-poor conditions in bogs, black spruce occurs in its lowland form and is stunted (<10 m tall) with branches close to the narrow trunk and with a bulbous dense crown (Smith et al. 2007). The bark is dark greyish to reddish brown with the inner bark having a greenish yellow tinge; **young twigs have tiny rusty hairs**.

- The **leaves** consist of **short needles** (1-2 cm long), 4-sided, stand out on all sides of the branchlets or mostly point upwards.
- **Pollen cones** are dark red with **small seed cones** (1.5-3 cm long) that are egg-shaped to almost spherical and **purplish** (Johnson et al. 1995).

A. Morrison

3.1.5.2 Labrador Tea *(Rhododendron groenlandicum)* / ᒪᐢᑫᑯᐹᑲᐧ / *muskākopakwu*

Labrador tea is an erect evergreen shrub (30-80 cm tall); spicy fragrance; many branches with dense rusty hairs that are predominantly on the underside of the leaves.

- The **leaves** are oblong to narrowly oblong, 1-5 cm long, leathery, deep green on top, **rusty below with dense woolly hairs** and edges rolled under.
- **Flowers** are found in loose, umbrella-like clusters at the tip of branches, **white**, 5-8 mm long.
- The **fruits** are drooping, 5-parted, dry, finely hairy capsules (5-7 mm long) found in clusters at the tips of branches (Johnson et al. 1995).

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3.1.5.3 Northern Bog-Laurel *(Kalmia polifolia)*

Northern bog-laurel is an erect or matted evergreen shrub that is usually 30-40 cm tall with slender 2-edged branches.

- The **leaves** are **opposite**, narrowly lance-shaped, 2-4 cm long and dark green; leathery above with dense, short, **white hairs below**; **edges rolled under**.
- The **flowers** are 15-20 mm long, **rose-pink, saucer-shaped** and found in loose clusters at branch tips; appear in May to June.
- The **fruits** are 5-valved, egg-shaped to round capsules (6 mm long) (Johnson et al. 1995).

A. Morrison

3.1.5.4 Bog Cranberry *(Vaccinium vitis-idaea)* / ᒫᐢᑫᑯᒥᓇ / *maskākomenu*

Bog cranberry is a dwarf, mat-forming **evergreen** shrub that is 10-20 cm tall with many creeping or trailing branches.

- The **leaves** are leathery, narrowly elliptic to egg-shaped, 6-15 mm long, rounded at the tip, shiny, dark green above and pale with **dark dots below**; **edges of leaves are smooth** and rolled under.
- The **flowers** are few and found in short clusters at branch tips; drooping, pinkish, cup-shaped with **4 short lobes** and approximately 5 mm long; appear from late May to July.
- **Fruits** consist of edible but acidic red berries that are 5-10 mm wide (Johnson et al. 1995).

3.2 Fens

3.2.1 Ecological Benefits

Fens are known as the "green rivers" of the boreal due to the large volume of water and nutrients that they transport throughout the landscape. These wetlands assist in preventing downstream flooding by absorbing excess precipitation and surface run-off. Similar to bogs, fens have deep peat deposits that store carbon and help to moderate climate change. Fens also provide habitat for woodland caribou (DUC 2012).

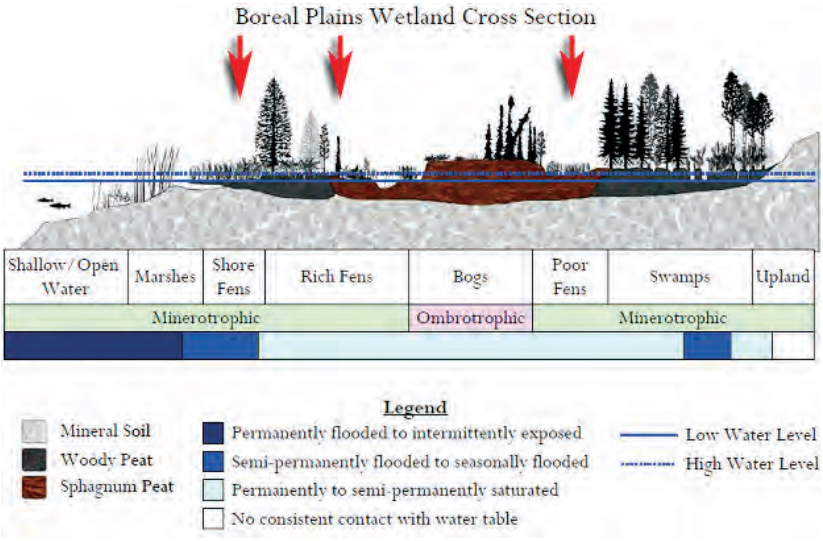

Figure 3.3 Landscape cross-section of Boreal Plains wetlands showing the relative positions of fens and the corresponding positions of water regime, soil regime and nutrient status (Smith et al. 2007, adapted to the Boreal Plains and expanded from Harris et al. 1996).

3.2.2 Nutrient Regime

The nutrient regime of fens may range from poor (isolated from mineral-rich water) to rich (contact with surface water) depending on varying amounts of peat accumulation, hydrologic inputs and nutrient availability (Smith et al. 2007).

3.2.3 Hydrology

Fens attain water from precipitation, surface run-off and sometimes groundwater. The water table in fens tends to fluctuate at or near the surface of the surrounding terrain. Poor fens have a hydrology similar to bogs while rich fens have increased contact with mineral rich water (Smith et al. 2007).

3.2.4 Soil

Fens are the second type of peatland wetlands with peat deposits greater than 40 cm that is made up of decomposing sedges, mosses and some woody material. In contrast to bogs, the surface of fens is typically level with the surrounding terrain (Smith et al. 2007).

3.2.5 Vegetation

The plant species found in fens reflect a diversity of nutrient and moisture gradients. Nutrient-poor fens have similar plant communities as those found in bogs while nutrient-rich fens have more diverse vegetation types. Fens can be treed, shrubby or open. **Treed fens** consist of trees with heights of less than 10 m (25-60% canopy closure) and are dominated by tamarack. Black spruce can also be present but is not dominant and occurs only in treed poor fens. **Shrubby fens** have greater plant diversity than bogs and consist of shrubs that are less than 2 m in height (e.g., bog birch, dwarf birch, sweet gale >25%) with less than 25% tree cover. **Open fens** are dominated by sedges, mosses and buckbean (DUC 2012).

A. Morrison

3.2.5.1 Tamarack *(Larix laricina)* / ᐊᐧᑭᓇᑎ / *wakenatek*

Tamarack is a small deciduous tree that ranges in size from 6-15 m tall (Johnson et al. 1995). However, in fens, tamarack is found at heights of less than 10 m (Smith et al. 2007). The bark is thin, scaly and reddish brown in colour (Johnson et al. 1995).

- The **leaves** are needles occurring on woody projections, in small **clusters of 10-20**, 1-2 cm long, mostly flat, soft, pale green to blue-green, turn yellow in the fall and drop off (**deciduous**).
- The **pollen cones** are small, egg-shaped while the **seed cones** are erect, 10-20 mm long, broadly egg-shaped, dark red when flowering and become leathery and brown with age; seeds are winged (Johnson et al. 1995).

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3.2.5.2 Bog Birch *(Betula glandulosa)*

Bog birch is a spreading to erect shrub, usually 0.3-2 m tall; twigs resinous, covered with **wart-like resin glands** that look like octopus suckers, and inconspicuous fine hairs.

- The **leaves** are **nearly circular**, 1-2 cm long with 2-3 side veins and 6-10 rounded teeth per side, somewhat **thick and leathery**, dotted with glands, green on both sides, scarlet to red brown in autumn.
- **Flowers** occur in small catkins, appear in spring at same time as leaves.
- **Fruits** are small, round, slightly winged nutlets in upright catkins (Johnson et al. 1995).

A closely related species found in fens is dwarf birch (*Betula pumila*), which is differentiated from bog birch (*Betula glandulosa*) by having less glandular twigs and an overall taller size (Lahring 2003).

3.2.5.3 Labrador Tea *(Rhododendron groenlandicum)* / ᒪᐢᑫᑯᐹᑿ / *muskākopakwu*

Refer to plant description on Page 10.

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3.2.5.4 Sweet Gale *(Myrica gale)*

Sweet gale is a low-lying shrub that is 0.5-1.5 m tall and spreads by suckers. The branches are slender, ascending and brown.

- The **leaves** are firm, **fragrant**, 2-6 m long, **dotted above and below with bright yellow wax-glands**; whitish underneath; lance-shaped but broadest and rounded at the tip. Wedge-shaped at the base; **edges toothed on upper third**.
- **Flowers** occur in greenish yellow, wavy catkins, appear before leaves; **sexes on separate plants**; male catkins to 2 cm long; female catkins to 5 cm long.
- **Fruits** are small nutlets, egg-shaped, 2.5-3 mm long, coated with resinous wax with 2 wing-like scales; **in erect, brown, cone-like catkins** that are 8-10 mm long (Johnson et al. 1995).

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3.2.5.5 Shrubby Cinquefoil *(Dasiphora fruticosa)*

Shrubby cinquefoil is a spreading to erect, freely branching shrub, 20-100 cm tall (sometimes to 1.5 m); silky hairs on young branches; **bark reddish brown, shredding**.

- The **leaves** are compound, **3-7 closely crowded leaflets** (usually 5); lightly hairy, **greyish green**; edges often rolled under.
- **Flowers** are single or in small clusters near branch tips; **golden yellow, buttercup-like**, 2-3 cm across; appear from June to September.
- **Fruits** are densely hair achenes, in compact clusters (Johnson et al. 1995).

3.3 Swamps

3.3.1 Ecological Benefits

Swamps moderate floods by slowing water flow. They also contain fertile soils that support a large diversity of plants. Vegetation along shorelines protects these sensitive habitats from erosion and sedimentation. The variety of swamp wetland types provide important habitat for a diversity of wildlife species (DUC 2012).

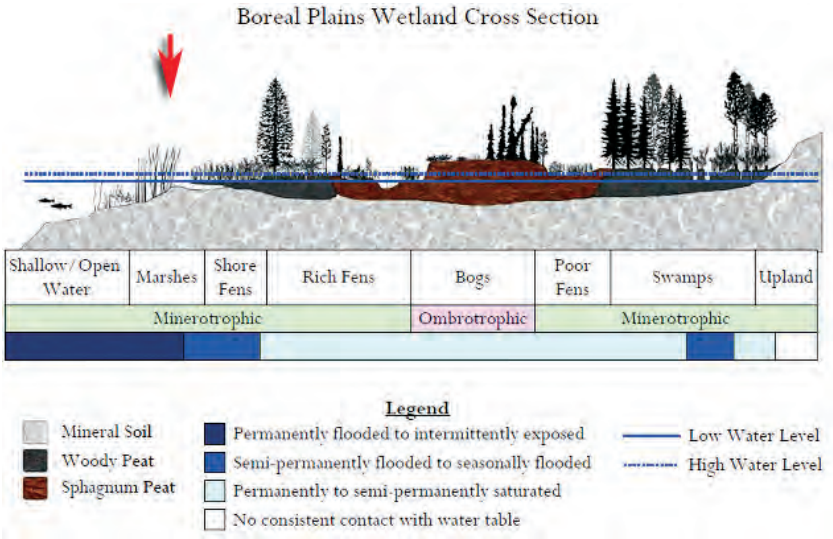

Figure 3.4 Landscape cross-section of Boreal Plains wetlands showing the relative positions of swamps and the corresponding positions of water regime, soil regime and nutrient status (Smith et al. 2007, adapted to the Boreal Plains and expanded from Harris et al. 1996).

3.3.2 Nutrient Regime

Swamps have a nutrient regime that ranges from rich to poor and is dependent on the amount of contact with nutrient-rich mineral water (Smith et al. 2007).

3.3.3 Hydrology

The water table in swamps fluctuates seasonally and pools of water are often present in the hummocky ground surface. Water availability is high in the lower portions of the rooting zone that is continually saturated (Smith et al. 2007).

3.3.4 Soil

Swamps can occur in both peat and mineral soil types. However, swamps that are described as peatlands do not have an accumulation of weakly decomposed sedge or *Sphagnum* peat but rather the substrate is woody and well decomposed. Mineral swamps occur where there is excess water but with little (<40 cm) or no peat formation. The soil in swamps tends to be well aerated with a hummocky surface (Smith et al. 2007).

3.3.5 Vegetation

Swamps are differentiated from other wetland types in that they are dominated by woody vegetation (>30% to 100% of the canopy) due to increased nutrients, aerated soils and high availability of water. Treed vegetation (>10 m) in swamps can be conifer (black spruce or tamarack), deciduous (*Betula* sp.) or mixed. Shrub vegetation (>2 m) is in its tall form and typically consists of willows (*Salix* spp.) and alders (*Alnus rugosa*). Peatland swamps are typically black spruce or tamarack swamps while mineral swamps tend to be mixedwood, shrub or hardwood swamps (Smith et al. 2007).

3.3.5.1 Tamarack *(Larix laricina)* / ᐚᑫᓈᑎᐠ / *wakenatek*

Found in tamarack swamps, tamarack occurs in its high vigour form with a height greater than 10 m. Refer to general plant description on Page 15.

3.3.5.2 Black Spruce *(Picea mariana)* / ᒣᓈᔦᑯᐯᑫᐚᑎᐠ / *menayekopekewatek*

Found in conifer swamps, black spruce occurs in its high vigour form with a height greater than 10 m (Smith et al. 2007). Refer to general plant description on Page 9.

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3.3.5.3 White Birch *(Betula papyrifera)* / ᐊᐢᑲᑲᔨᑎᐤ / *waskwayatek*

White birch is the major deciduous species in many hardwood and mixed-wood swamps (Smith et al. 2007). White birch is a small to medium sized deciduous tree, usually growing to be 15 m tall (sometimes up to 30 m); **bark peels in papery strips**, usually **white to yellowish or copper brown**, smooth, marked with brown horizontal lines of raised pores; twigs brown, slender, hairy.

- **Leaves** are egg- to diamond-shaped, 4-8.5 cm long (sometimes to 10 cm); **sharp-pointed**; greener above than below; lower surface with long hairs, usually with tufts of angles of larger veins; edges sharply double-toothed.
- **Flowers** are male or female occurring in separate catkins on same tree, 2-3 cm long (sometimes to 4 cm), appear with or before leaves; **catkins break up at maturity**.
- **Fruits** are broadly oval nutlets with wing broader than body (Johnson et al. 1995).

C. Woodward

3.3.5.4 Balsam Poplar *(Populus balsamifera)* / ᓇᐸᑭᓯᒼ ᒥᑐᐣ / *nupukeseta metos*

Balsam poplar is generally only found in hardwood swamps that are located in floodplains near river systems (Smith et al. 2007). Balsam poplar is a deciduous tree growing up to 25 m tall (usually 10-15 m); buds are very sticky and **fragrant with resin**; old bark is dark and **deeply furrowed**.

- The **leaves** are thick, egg-shaped to nearly lance-shaped, 4-9 cm long, rounded to heart-shaped at base, sharp-pointed at tip; deep green above, pale or whitish below; edge finely round-toothed; **leaf stalk round**, 2-5 cm long and often with a pair of glands at the base of the blade.
- The sexes of **flowers** occur on separate trees, both in catkins and appear before leaves; female flowers have 2 stigmas; male flowers have 20-30 stamens.
- The **fruits** are 2-valved, smooth capsules; seeds small with **tuft of cottony hairs** (Johnson et al. 1995).

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3.3.5.5 Willows / ᓂᐱᐢᑭ / *nepese*

Example A. Beaked Willow (*Salix bebbiana*)

Beaked willow is an example of a common *Salix* spp. found in shrub swamps. Beaked willow is a shrub or small tree, 0.5-5 m tall (Johnson et al. 1995). However, in shrub swamps, beaked willow occurs at heights greater than 2 m on average (Smith et al. 2007). The branches of beaked willow are usually widely divergent, reddish brown; twigs have dense to straggly hairs (Johnson et al. 1995).

- **Leaves** are elliptic to obovate, 2-6 cm long; edges smooth to scalloped; dull green above; **grey below, covered with whitish bloom, prominent venation; sparsely hairy on both sides**; stalks 2-9 mm long; stipules small, fall off early.
- **Flowers** occur in catkins on short leafy shoots; appear **just before or with leaves**; female catkins 2-5 cm long, loosely flowered; pistils finely silky; **bracts pale**.
- **Fruits** are **sparsely hairy** capsules, 6-9 mm long; stalk 2-5 mm long (Johnson et al. 1995).

C. Woodward

3.3.5.6 River Alder *(Alnus rugosa)* / ᓭᐱ ᐊᑐᓱᐱ / *sepe atospe*

River alder is a coarse shrub or small tree, 2-8 m tall, often in clumps; twigs hairless to woolly; **buds club-shaped with short stalks**; bark yellow-brown with distinct raised pores.

- The **leaves** are elliptic, 4-10 cm long, base rounded to somewhat heart-shaped; pale and hairy below, not sticky; green through much of autumn; **edges wavy-lobed**, double-toothed; ladder-like pattern between main side veins.
- **Flowers** occur in small catkins on previous year's twigs, **appear before leaves**.
- **Fruits** are small nutlets, **wingless with narrow ridge around edge**; in 1-2 cm long, short-stalked seed cones (Johnson et al. 1995).

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3.3.5.7 Red-osier Dogwood or Red Willow *(Cornus stolonifera)* / ᒥᑫᐧᐊᐸᑲᒪᑎᐢ / *mekwapākamatek*

Red-osier dogwood is an erect to spreading shrub, 1-3 m tall (Johnson et al. 1995). In swamps, red-osier dogwood is taller than 2 m on average (Smith et al. 2007). The branches are opposite; lower branches often root in ground; young stems are **usually bright red** but sometimes greenish to purplish.

- The **leaves** are **opposite**, oval to egg- or lance-shaped, 2-8 cm long; usually rounded at base and pointed at tip; **5-7 prominent parallel veins** converge towards the tip; filmy white threads running through veins can be seen if leaf is split crosswise and gently pulled apart.
- **Flowers** occur in many-flowered, **dense, flat-topped clusters** (2-5 cm across) **at branch tips; white to greenish**, small; petals 2-3 mm long; appear in late May to July.
- **Fruits** are berry-like drupes, **white** (occasionally blush), 5-6 mm across, juicy but bitter; stones somewhat flattened (Johnson et al. 1995).

3.4 Marshes

3.4.1 Ecological Benefits

Marshes are the most biologically diverse wetland type located in the boreal. These wetlands moderate flooding and minimize soil erosion. Marshes act to filter and trap nutrients while neutralizing contaminants. These wetlands also provide important habitat for a variety of wildlife including waterfowl, moose, beaver and muskrat (DUC 2012).

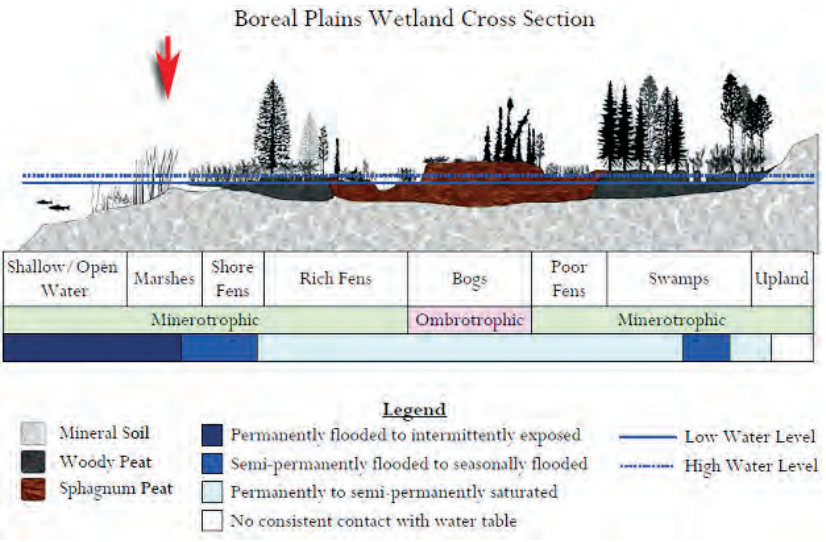


Figure 3.5 Landscape cross-section of Boreal Plains wetlands showing the relative positions of marshes and the corresponding positions of water regime, soil regime and nutrient status (Smith et al. 2007, adapted to the Boreal Plains and expanded from Harris et al. 1996).

3.4.2 Nutrient Regime

Marshes have high nutrient availability due to the presence of mineral soils, which contributes to the high productivity of marsh vegetation (Smith et al. 2007).

3.4.3 Hydrology

Water in marshes comes from a variety of sources including groundwater, surface runoff, streams and precipitation. The permanence of standing water is an important factor in marsh hydrology. The water table is highly variable and fluctuates seasonally at or above the surface but can also dry out during drought periods (Smith et al. 2007).

3.4.4 Soil

Marshes occur in a diversity of soil substrates. Mineral soils are commonly found in marshes although a mixture of mineral and surface layers of peat (<40 cm) can also occur (Smith et al. 2007). Soils are nutrient rich due to periods of drying out and exposure to oxygen (DUC 2012).

3.4.5 Vegetation

Vegetation in marshes tends to be dynamic based on changes in seasonal hydrology. Marshes can contain either emergent or meadow (graminoid) species of vegetation. Emergent marshes are dominated by flood tolerant species such as cattails and bulrushes and tend to occur between deeper open water and meadow marshes. Meadow marshes are dominated by sedges and grasses and are less flood tolerant, occupying areas with shallow water (DUC 2012). Emergent vegetation (e.g., cattail, bulrush and sedges) in marshes occupies greater than 25% of the area that is interspersed with open water. Floating vegetation (e.g., small yellow pond lily, water smartweed, pondweeds and milfoil) is located in open water (DUC 2012).

A. Morrison

3.4.5.1 Free Floating or Floating-leaved
Example A. Small Yellow Pond Lily *(Nuphar variegatum)* / ᐊᐢᑕᒃᑲᓇᐢᑲᐠ / *astakwanaskwak*

Small yellow pond lily is an aquatic perennial with stout, creeping rhizomes.

- The **leaves** are simple, **floating**, rounded heart-shaped, 10-30 cm long, 8-15 cm wide and located on long, slender, **flattened** stocks.
- **Flowers** are single on long stalks held above water; yellow, 4-7 cm across; **usually 6 sepals**, leathery; many small, inconspicuous petals; many **yellow anthers**.
- **Fruits** are many-seeded, leathery, berry-like capsules, 4 cm long; split irregularly (Johnson et al. 1995).

A. Morrison

Example B. Water Smartweed *(Polygonum amphibium)*
Water smartweed is an aquatic to terrestrial perennial with running, branched rhizomes; stems leafy, **prostrate or ascending**, **floating when aquatic**, 0.5-1 m long.

- The **leaves** are alternate, many, usually floating, variable, **narrowly elliptic to oblong lance-shaped**, 5-15 cm long, long stalked, somewhat leathery; **stipules sheathing**, cylindrical, 1-2 cm long, often with spreading collar.
- **Flowers** are many, in 1 or 2 upright, **oblong or egg-shaped**, 1-3 cm long spikes at tip of hairless stem; 5 petal-like segments, **bright pink** to scarlet, 4-5 mm long.
- **Fruits** are achenes, lens-shaped, 2.5-3 mm long, dark brown, smooth (Johnson et al. 1995).

C. Szczerski

C. Szczerski

3.4.5.2 Submerged
Example A. Spiked Water Milfoil (*Myriophyllum spicatum var. exalbescens*)

Spiked water milfoil is an aquatic perennial from rhizomes; stems leafy, limp, 2-3 mm thick, 30-100 cm long, purple, dry whitish.

- **Leaves** occur **in whorls** of 3-4, 1-3 cm long, **feather-like, pinnately divided** into 13-21 **thread-like segments**.
- **Flowers** are whorled in 2-8 cm long **spike-like clusters at stem tips** that usually stick out of water; 4 petals, 2.5 mm long, soon fall off; sexes separate on same plant; male flowers usually uppermost, 8 stamens; female flowers usually lower, 4 feathery styles.
- **Fruits** are nut-like, split into 4, 1-seeded, rounded achenes, 2-3 mm long (Johnson et al. 1995).

A. Morrison

Example B. Hornwort / Coontail *(Ceratophyllum demersum)* / ᒫᒋ ᒫᐢᑯᓯᔮ / *mache maskoseya*

Hornwort is a submerged, non-rooted aquatic with slender, freely-branched stems, 30-150 cm long.

- The **leaves** are rigid, 0.5-2.5 cm long, **2-3 times forked into slender, often spiny-toothed segments**, in whorls of 5-12, often coated with lime.
- **Flowers** occur singly in leaf axils; tiny, inconspicuous, stalkless; **sexes in separate flowers on same plant; no sepals or petals; surrounded by 8-12 bracts**.
- **Fruits** are flattened, elliptic achenes, 4-6 mm long; **style at tip**, 6-12 mm long; **2 divergent spines at base**, 1-6 mm long (Johnson et al. 1995).

A. Morrison

3.4.5.3 Emergent

Example A. Common Cattail *(Typha latifolia)* / ᐹᓴᑳᓇᕽ / *pasākanak*

Common cattail is a perennial from coarse rhizomes; stems **pithy**, cylindrical. 1-2 m high.

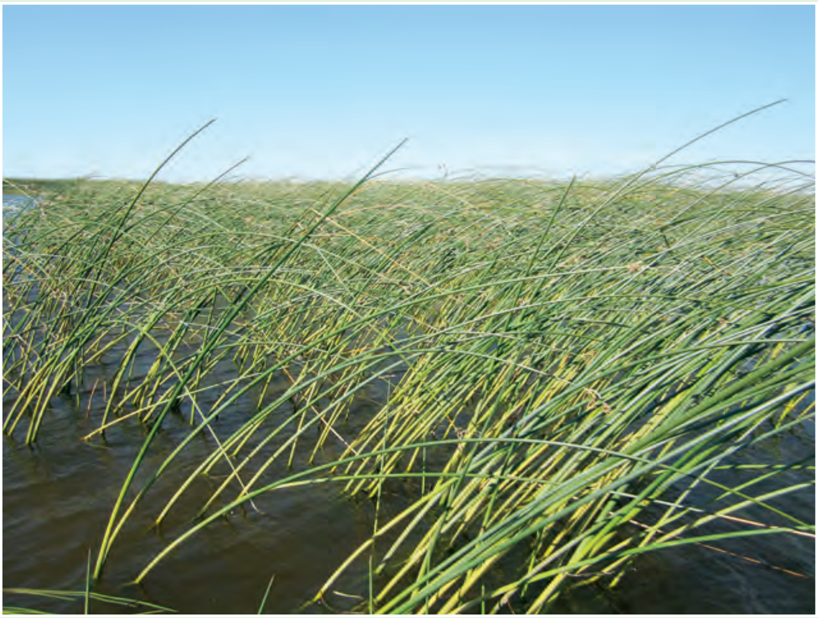
- **Leaves** are alternate, upright, grass-like, somewhat spongy, **1-2 cm wide**, greyish green; bases sheathe stem.
- **Flowers** are **tiny, many**, in dense **cylindrical spike** at stem tip (looks like fast-food corndog); lower, dark brown female portion, 15-20 cm long, 1-3 cm thick, remains all year; upper male portion smaller, yellowish, cone-shaped, disintegrates early; no petals or sepals; female flowers have 1-chambered ovary on hairy stalk; male flowers have 1-7 (usually 3) stamens and several hairs.
- **Fruits** are elliptic **achenes**, about 1 mm long, with many**, long, slender hairs** at base, designed to float (Johnson et al. 1995).

A. Morrison

Example B. Sweet Flag *(Acorus calamus)* / ᐃᐧᑫᐢ *wekās*

Sweet flag, also known as ratroot, is a slender, **aromatic** plant with acrid, watery juice and thick, creeping rhizomes; **erect stems resemble leaves** but have flower spikes and extend above spike in leaf-like bract.

- **Leaves** are **sword-shaped**, 40-80 cm long, 1-2 cm wide, crowded at base of plant.
- **Flowers** are many, in dense, **cylindrical, yellow-brown spike**, 3-10 cm long, about 1 cm thick; no petals; 6 sepals, tiny, brownish.
- **Fruits** are berry-like, hard, dry outside, gelatinous inside (Johnson et al. 1995).



A. Morrison

Example C. Hardstem Bulrush *(Scirpus acutus)* / ᐅᓵᑭᒥᐁᐧᓯᐚᐠ / *osakemewāsewak*

Hardstem bulrush is a perennial that grows from a thick, spongy rhizome.

- The **leaves** are stiff, erect, circular, 0.5-3 m tall.
- **Flowers** are compact, erect clusters of 2-7 spikelets (8-10 mm long), 3-40 flowered.
- **Fruits** are light brown achenes (1.5-3 mm long); become shiny, black at maturity (Lahring 2003).

3.5 Shallow Open Water

3.5.1 Ecological Benefits

Shallow open water (<2 m in depth) wetlands retain and store water, which contributes to flood moderation, groundwater recharge and the maintenance of steam flow (DUC 2012)

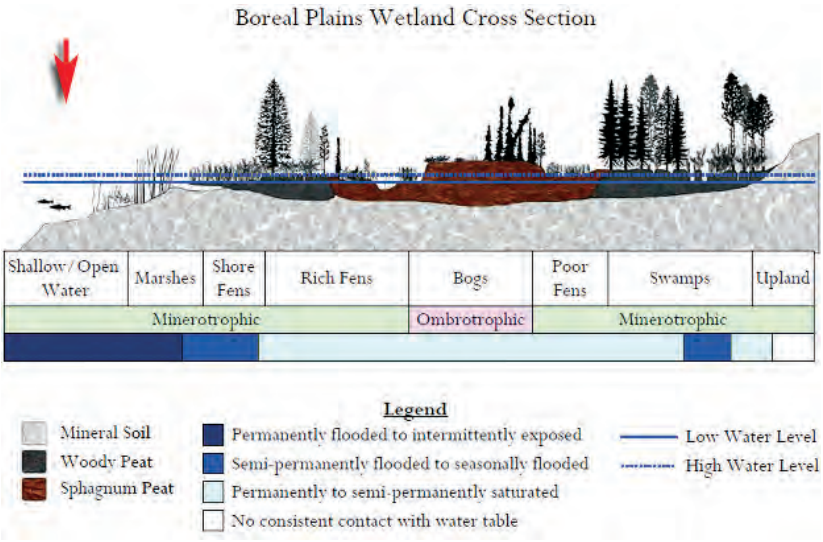


Figure 3.6 Landscape cross-section of Boreal Plains wetlands showing the relative positions of shallow open water and the corresponding positions of water regime, soil regime and nutrient status (Smith et al. 2007, adapted to the Boreal Plains and expanded from Harris et al. 1996).

3.5.2 Nutrient Regime

The nutrient regime in shallow open water wetlands is wide-ranging due to a variety of factors including soil type, water chemistry, water depth, source of water, and landscape position (DUC 2012).

3.5.3 Hydrology

Water sources in shallow open water wetlands include precipitation, surface run-off, groundwater and streams. The water levels are generally permanent but may fluctuate seasonally, exposing mudflats (DUC 2012).

3.5.4 Soil

Soil is poorly developed because of high water levels and lack of exposure to oxygen. The soil substrate in these wetlands is diverse and may consist of silt, gravel or combinations of both mineral and organic deposits (DUC 2012).

3.5.5 Vegetation

Types of shallow open water wetland include open water (<25% aquatic vegetation on the water), aquatic bed (>25% vegetation on the water) and mudflats (a temporary condition when water levels are low). Vegetation is either submerged (e.g., milfoil, some pondweeds, waterweed) or floating (e.g., small yellow pond lily, duckweeds, pondweeds). The permanent water is too deep for emergent plants such as cattails and bulrushes to establish (DUC 2012).

T. Lwiwski

3.5.5.1 Free Floating or Floating-leaved
Example A. Common Duckweed *(Lemna minor)*

Common duckweed is a tiny, colonial, aquatic perennial, **not differentiated into leaf and stem**; small disc-like, leafy, floating fronds, 2-5 mm long; usually **1 short rootlet** hanging from lower surface.

- The **flowers** are very small, usually 3, single-sexed, without sepals or petals; 2 male flowers with 1 stamen, 1 female flower with flask-shaped ovary.
- **Fruits** are small, thin-walled, bladder-like (utricle); 1-7 seeds (Johnson et al. 1995).

A. Morrison

Example B. Floating Leafed Pondweed *(Potamogeton natans)*

Floating leafed pondweed is a perennial that reproduces freely from creeping underground rhizomes and broken-off sections of stem.

- The **leaves** are elliptic to oval, 4-9 cm long, 2-6 cm wide, many-veined, leathery with a waxy texture on the upper surface, bronzy green.
- The **flowers** are arranged in whorls along a 2-5 cm spike at the tip of the stem; flowers are small with both male and female parts present; 4 sepal-like bracts at base, 4 stamens and 4 separate ovaries.
- The **fruit** is drupe-like, 3-5 mm long with a small nutlet inside (Lahring 2003).

C. Woodward

3.5.5.2 Submerged

Example A. Clasping-leaf Pondweed (*Potamogeton richardsonii*)

Clasping-leaf pondweed is an aquatic perennial from slender rhizomes; stems submerged, leafy, round, green to brownish, branched, 1-2 mm thick, 0.3-1 m long.

- **Leaves** are alternate, **all submerged**, many, **lance-egg-shaped**, 3-12 cm long, 13-25 veined (with 5-7 strong veins), dark green, stalkless; heart-shaped base clasps stem; **edges wavy**; stipules separate from rest of leaf, white to brownish, soon **disintegrate into tufts of white threads**.
- **Flowers** occur in dense, stalked, 1.5-3 cm long spike of 4-12 closely crowded whorls; tiny inconspicuous, stalkless, 4-parted; no petals or sepals.
- **Fruits** are achenes, 2.5-3.5 mm long, semi-fleshy at first, then dry and hard, short-beaked (Johnson et al. 1995).

C. Woodward

C. Woodward

Example B. Canada Waterweed (*Elodea canadensis*)

Canada waterweed is a rooted, submerged aquatic plant that grows long, bright green (when young), branched, leafy strands upwards from the pond or lake bottom. Stems are round with many whorls of 3 (2-4) leaves along its length. The whorled spacing becomes tighter towards the stem tip and stems often form long fibrous roots at the leaf nodes.

- The **leaves** are narrow (up to 2 mm) and 1-1.5 cm long with very small serrations along their margin and taper to an abrupt, blunt point; male plants have lance-shaped leaves; female plants have more linear-shaped leaves
- The **flowers** are very small and found in the upper leaf axils; female flowers are raised to the surface by 3-20 cm long thread-like stalk, male flowers are long-stalked, floating with sepals longer than the female flowers.
- **Fruits** are oval, beaked capsules, 6 mm long and contain 6 narrow, cylindrical seeds (Lahring 2003).

4.0 Traditional Uses

A variety of traditional indigenous harvesting practices take place in or are dependent on wetland ecosystems including trapping, moose hunting, waterfowl hunting, plant gathering and fishing. Figure 4.1 represents the seasonality of the harvesting activities that have been or continue to be practiced by the Opaskwayak Cree Nation (OCN) in the Saskatchewan River Delta (SRD) over a twelve-month period. Due to changes from year to year in terms of snowfall and when freeze up occurs, for instance, the temporal boundaries of the traditional harvesting activities should not be considered fixed. This visual tool represents the approximate time of year these activities have traditionally been carried out according to OCN community members who participated in this research project.

4.1 Diversity of Wetlands

Spatial information that was collected during site visits or interviews was overlaid on a map provided by Ducks Unlimited Canada (DUC) (2003) depicting the major wetland classes of bogs, fens, swamps and marshes. The shallow open water wetland class was not distinguished from water bodies of greater than two meters and is included within the 'open water' category on the figures. The data were differentiated according to wetland-based practices including trapping, moose hunting, waterfowl hunting and fishing (Figures 4.2 to 4.5). A map of the locations of important plant harvesting areas was not produced to maintain the anonymity of these culturally sensitive areas.

The figures demonstrate that a diversity of wetland types are used in the traditional harvesting practices of the OCN. Important fishing locations include the Saskatchewan River and the deeper open water of major lakes.

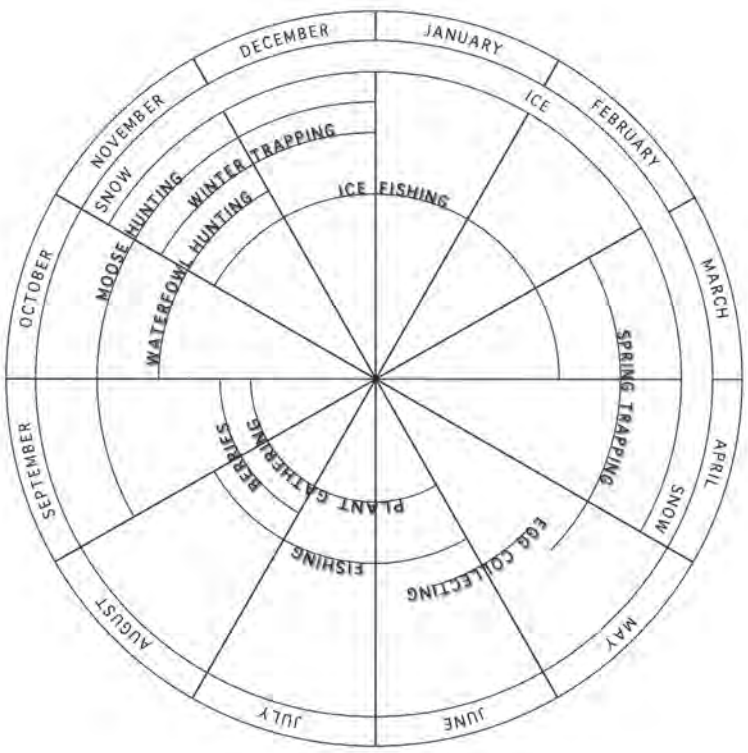


Figure 4.1 Seasonal calendar representing the approximate time of year harvesting activities are carried out in wetlands of the Saskatchewan River Delta by the Opaskwayak Cree Nation.

Waterfowl hunting also takes place mostly in areas of open water due to the tendency to hunt from boats. However, some wetlands including swamps, marshes and fens are also important bird harvesting locations. Areas used for trapping and moose hunting purposes tend to overlap and occur in wetlands consisting of marshes, swamps and fens, as well as in open water. Due to observations in the field and because of the importance of these wetlands in providing habitat for wildlife, marshes appeared to be the most frequented wetland types by the OCN in their traditional activities. Although not demonstrated in a figure to maintain the anonymity of these culturally sensitive areas, plant gathering occurs within all five wetland types found within the SRD due to the varying nutrient regimes and hydrologic requirements of the plant species that have traditionally been harvested.

According to the figures, the use of bogs in traditional harvesting practices of the OCN was minimal. The limited biological diversity supported by these wetland types could explain the low rates of visitation. However, the low usage of bogs by the OCN is more likely a result of the lower occurrence of this wetland type in the areas of the SRD most commonly used by the community in resource harvesting activities. Poor access to these wetlands could also contribute to their limited use because the majority of bogs appear to be located in areas away from the major transportation routes of rivers and lakes.

These observations could have management implications for the SRD in ensuring that a diversity of wetland types are maintained in order to support both the biodiversity that inhabits the region and the traditional livelihood activities of the community. An abundance of healthy wetland ecosystems will help to ensure that future generations will have the opportunity to take part in culturally important activities.

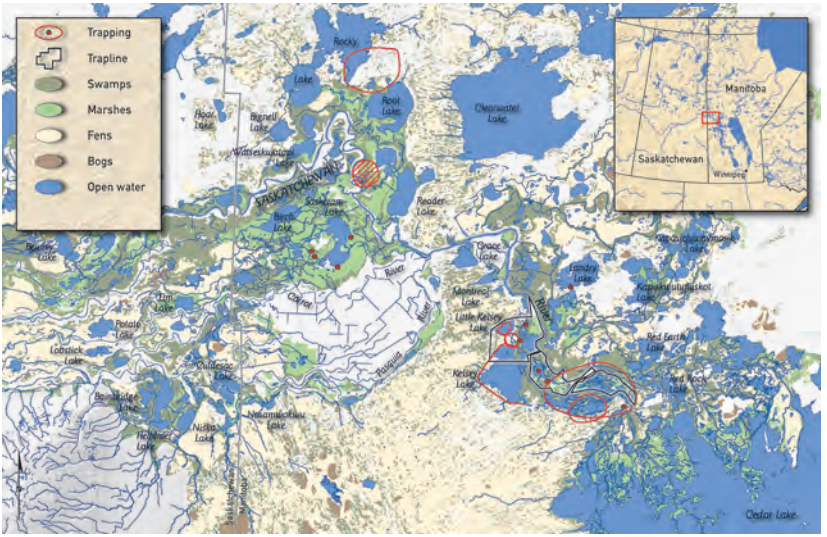


Figure 4.2 Trapping locations of the Opaskwayak Cree Nation (Base map modified from DUC 2003; OCN 2010, 2011).

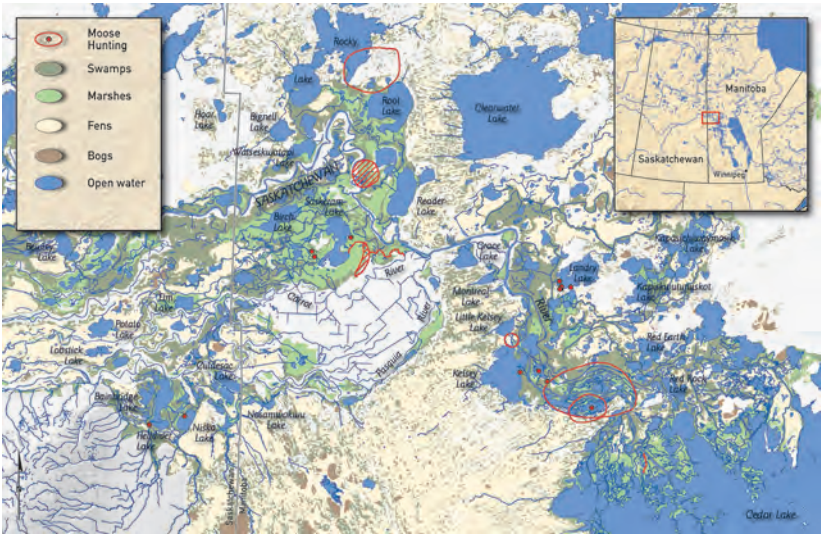


Figure 4.3 Moose hunting locations of the Opaskwayak Cree Nation (Base map modified from DUC 2003; OCN 2010, 2011).

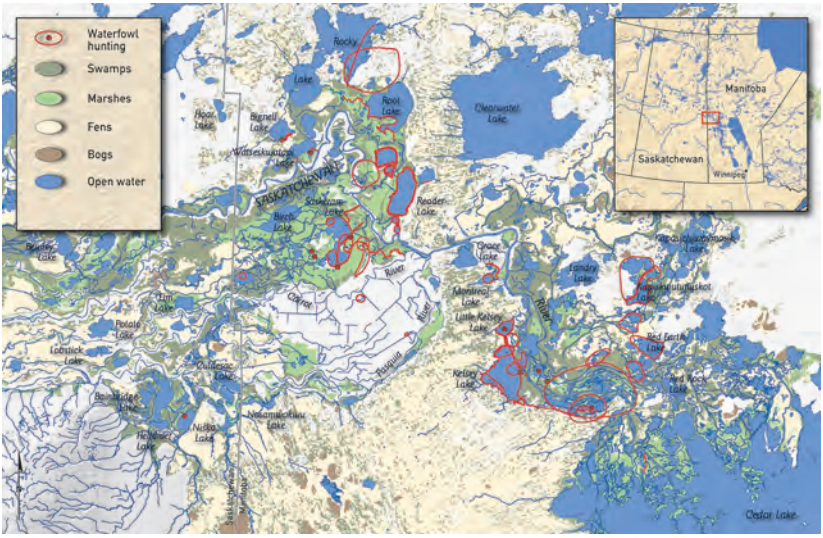


Figure 4.4 Waterfowl hunting locations of the Opaskwayak Cree Nation (Base map modified from DUC 2003; OCN 2010, 2011).

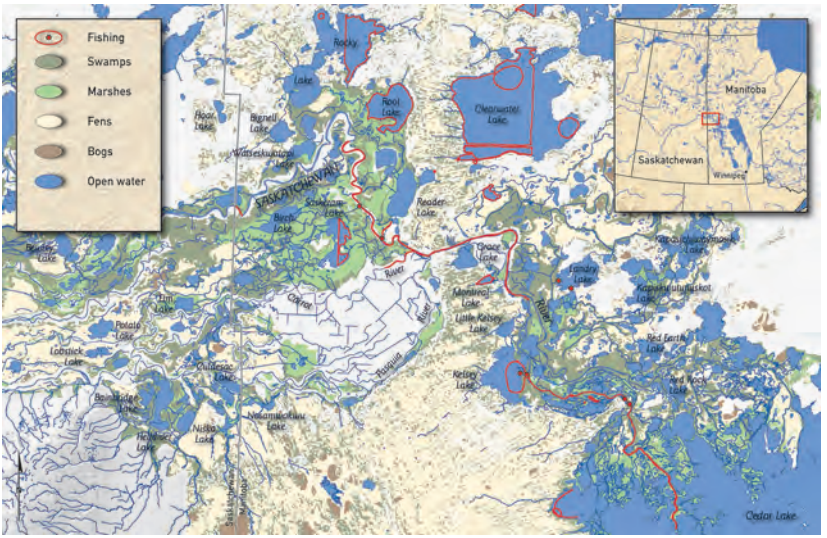


Figure 4.5 Fishing locations of the Opaskwayak Cree Nation (Base map modified from DUC 2003; OCN 2010, 2011).

5.0 Species Lists

During fieldwork and through participation in traditional harvesting activities, a variety of wildlife and vegetation were encountered or discussed. As a result, Cree language vocabulary lists were generated of various plants, mammals, birds and fish commonly found in the Saskatchewan River Delta (SRD), not limited to wetlands (Tables 5.1 to 5.4).

Table 5.1 Plant species present within the Saskatchewan River Delta and associated uses.

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific	Use Category
ᒥᓈᔦᐠ	menayek	White Spruce	*Picea glauca*	Medicine, Building Material
ᒥᓈᔦᑯᐱᑭᐚ·ᑎᐠ	menayekopekewatek	Black Spruce	*Picea mariana*	Medicine, Building Material
ᐚ·ᑭᓈᑎᐠ	wakenatek	Tamarack	Larix laricina	Medicine, Building Material
ᐅᐢᑳᑎᐠ	oskatek	Jack Pine	*Pinus banksiana*	Medicine, Building Material
ᐊᒌᐹᐢᐠ	uchapask	American Elm	*Ulmus americana*	Medicine
ᓱᑳᐚ·ᑎᐠ	sokawatek	Manitoba Maple	*Acer negundo*	Food
ᓄᐸᑭᓭᑖ ᒥᑐᐢ	nupukeseta metos	Balsam Poplar	Populus balsamifera	Medicine, Building Material
ᒥᑐᐢ	metos	Trembling Aspen	*Populus tremuloides*	Medicine
ᒫᐢᑭᑭᐢ	maskekes	Eastern White Cedar	*Thuja occidentalis*	Medicine, Tool, Building Material
ᐚ·ᐢᑳ·ᔮᑎᐠ	waskwayatek	White Birch	*Betula papyrifera*	Medicine, Building Material
ᐊᐢᑭᑖᑯᓭ ᐋᑐᐢᐱ	usketakose atospe	Green Alder	Alnus crispa	Tool
ᓭᐱ ᐋᑐᐢᐱ	sepe atospe	River Alder	*Alnus rugosa*	Tool
ᓂᐱᓭ	nepese	Willow	*Salix spp.*	Medicine
ᒥᑳ·ᐯᑳᒫᑎᐠ	mekwapākamatek	Red-osier Dogwood / Red Willow	*Cornus stolonifera*	Medicine, Tool
ᑭᓀᐱᑯᒥᓈᑎᐠ	kenāpekomenatek	Canada Buffaloberry	Shepherdia canadensis	Medicine
ᒥᓵᐢᑳᑐᒥᓈ	mesaskatomena	Saskatoon	*Amelanchier alnifolia*	Food, Medicine, Craft
ᐅᑭᓂᐚ·ᐱᑳ·ᓂ	okenewapekwane	Prickly Rose Flower	*Rosa acicularis*	Food, Medicine
ᐅᑭᓂᐚ·ᑎᐠ	okenewatek	Prickly Rose Stem	*Rosa acicularis*	
ᑲᐢᑭᑌᒥᓈ	kusketāmena	Northern Black Currant	Ribes hudsonianum	Food, Craft
ᒥᑯᓭᑳᑯᒥᓈ	mekosekakomena	Wild Red Currant	*Ribes triste*	Food, Craft
ᒧᓱᒥᓈᓈ / ᐃ·ᓵᑭᒥᓈ	mosomenana / wesakemena	Low Bush-Cranberry	*Viburnum edule*	Food, Craft

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific	Use Category
ᓂᐱᒋᓇ	nepemenanu	High Bush-Cranberry	*Vibumum opulus*	Food, Craft
ᓯᐱᐧᒋᓇ	sepekomenu	Common Blueberry	Vaccinium myrtilloides	Food, Craft
ᒪᐢᑫᐧᐸᑊ·	muskākopakwu	Labrador Tea	*Rhododendrum groenlandicum*	Medicine, Beverage
ᐃᐢᑫᐧᒋᓇ	maskākomenu	Small Bog Cranberry	*Oxycoccus microcarpus*	Food, Beverage
ᐃᐢᑫᐧᒋᓇ	maskākomenu	Bog Cranberry	*Vaccinium vitis-idaea*	Food, Beverage
ᒪᐢᐧᒋᓇ	muskomenu	Common Bearberry	Arctostaphylos uva-ursi	Medicine, Animals
ᑳᑳᑭᒋᐣᐠ	kakakemenatek	Common Juniper	Juniperus communis	Craft
ᐊᔨᒋᓀ”ᐊᐣᐠ	asāmenahatek	Creeping Juniper	*Juniperus horizontalis*	
ᔕᐣ·ᓀᑲᐢ ᐊ·ᐱᑲ·ᓂ	sāwonakan wapekwane	Fairybells	*Disporum trachycarpum*	
ᓯᓯᐃ·ᐸᑲ·	sosowepukwa	Star-Flowered False Solomon's Seal	Smilacina stellata	
ᒥᐢᑭᐱᐧᒋᓇ	meskesekomenu	Dewberry	*Rubus pubescens*	Food, Craft
ᐅᑌᒋ	otāmen	Wild Strawberry	Fragaria virginiana	Food
ᐃᐢᑫᑌ ᐊ·ᐱᑲ·ᓂ	eskotā wapekwane	Fireweed	*Epilobium angustifolium*	
ᓯᓯᐯᑲᐊ·ᐱᑲ·ᓂ	sosopākawapekwane	Common Red Paintbrush	*Castilleja miniata*	
ᑲᒋᓀᑲᓯ	kumenakuse	Canada Thistle	Cirsium arvense	
ᒥᐢᑕᐢᑭᐊ·ᐣᐠ	mestaskewusk	Aster	*Aster spp.*	
ᐃᔨᐣ	masan	Stinging Nettle	*Urtica dioica*	Medicine
ᐱᓂᐃ·ᒥᐣ	penāwemen	Bunchberry	*Cornus canadensis*	Food
ᐃ·ᐣᒋᕿᐢ	wenchekās	Seneca Snakeroot	Polygala senega	Medicine
ᐃ·ᑲᐢᐠ	wekask	Wild Ginger	*Asarum canadensis*	Medicine
ᐅᔨᑭᒋᐁ·ᓯᐧᐃ·ᐠ	osakemewāsewak	Bulrush	*Scirpus lacustris ssp. validus*	Food, Animal
ᐅᔨᕿᒣᓯᐧᐃ·ᐠ	osakāmāsewak	Giant Bur-reed	*Sparganium eurycarpum*	
ᐸᔨᑲᓀᐠ	pasākanak	Common Cattail	Typha latifolia	Tool
ᐃ·ᕿᐢ	wekās	Sweet Flag / Ratroot	*Acorus calamus*	Medicine, Animal
ᐞᐢ ᒪᐢᐧᔨᔭ	mache maskoseya	Hornwort / Coontail	*Ceratophyllum demersum*	
ᐊᐢᑦᒉ·ᓀᐢᒉ·ᐠ	astakwanaskwak	Small Yellow Pond Lily	Nuphar variegatum	
ᐊ·ᑦᐱ	watape	Small Yellow Pond Lily Root		Medicine

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific	Use Category
ᒫᐢᑯᓯᔦ	maskoseyu	Sedges	*Carex spp.*	
ᒫᐢᑯᓯᔦ	maskoseyu	Grass		
ᒫᐢᑯᓯᔦ	maskoseyu	Blue Joint / Marsh Reed Grass	Calamagrostis canadensis	
ᒫᐢᑯᓯᔦ	maskoseyu	Common Reed Grass	*Phragmites australis*	
ᒪᐢᑯᓯᒥᓇ	muskosemenu	Northern Wild Rice	*Zizania palustris*	Food
ᑲᑲᑫᒥᓈᑎᐠ	kukukāmenatek	Fern		
ᒥᐢᑖᑎᒧᓱ:	mestatemosoy	Horsetail	Equisetum spp.	
ᐊᐢᑭᔦ	uskeyu	Moss		Tool
ᐋᑎᑯᒥᒋᐄᐧᐣ	atekomechewen	Reindeer Lichen	*Cladina rangifera*	Animal

Table 5.2 Mammal species present within the Saskatchewan River Delta.

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific
ᐋᐯᓯᒧᓱᐢ	apesemosos	White-tailed Deer	*Odocoileus virginianus*
ᒧᓵ	mosa	Moose	*Alces alces*
ᐋᑎᐠ	atek	Caribou	*Rangifer tarandus*
ᐯᓯᐤ	pesew	Lynx	*Lynx canadensis*
ᐯᑳᐧᒋ ᐳᓯᐢ	pekwache poses	Bobcat	*Lynx rufus*
ᓯᑳᐠ	sekak	Striped Skunk	*Mephitis mephitis*
ᐋᐧᐯᐢᒑᓂᐢ	wapeschanes	American Marten	*Martes americana*
ᐅᒉᐠ	ochāk	Fisher	*Martes pennanti*
ᓯᑯᓯᐢ	sekoses	Weasel	*Mustela spp.*
ᓵᑫᐧᓯᐤ	sakwāsew	American Mink	*Neovison vison*
ᓂᑭᐠ	nekek	Northern River Otter	*Lontra canadensis*
ᐄᐧᓂᐹᒑᑊ	wenepachap	Common Racoon	*Procyon lotor*
ᑲᐢᑭᑌ ᒪᐢᑳᐧ	kusketā muskwa	Black Bear	*Ursus americanus*
ᒣᐢᒐᒑᑲᓂᐢ	māschuchakunes	Coyote	*Canis latrans*
ᒫᔦᑳᐣ	mayekan	Grey Wolf	*Canis lupus*
ᒫᑫᓯᐢ	makāses	Red Fox	*Vulpes vulpes*
ᑳᑳᐧ	kakwa	Porcupine	*Erethizon dorsatum*
ᐋᐸᑯᓯᐢ	apukoses	Mouse	
ᐊᐧᒐᐢᐠ	wuchusk	Muskrat	*Ondatra zibethicus*
ᐊᒥᐢᐠ	umesk	American Beaver	*Castor canadensis*
ᓵᓵᑲᐋᐧᐱᐢᑯᐢ	sasakuwapeskos	Eastern Chipmunk	*Tamias striatus*

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific
ᐃᐧᓇᐢᐠ	wenusk	Woodchuck	*Marmota monax*
ᒥᑯᓂ ᐊᓂᑲᐧᒑᐢ	mekone unekwuchas	Red Squirrel	*Tamiasciurus hudsonicus*
ᑕᓴᑲᓂᑲᐧᒑᐢ	tusākunekwuchas	Northern Flying Squirrel	*Glaucomys sarbinus*
ᐚᐳᐢ	wapos	Rabbit	*Lepus americanus*
ᐚᐱᑳᐧᓈᒋᐢ	wapekwanaches	Northern Bat	*Myotis septentrionalis*
ᐊᑖᑦᐯᐠ ᐚᐹᑯᓯᐢ	utampāk apakoses	Water Shrew	*Sorex palustris*

Table 5.3 Bird species present within the Saskatchewan River Delta.

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific
ᒧᑲᐧ	mokwu	Common Loon	*Gavina immer*
ᒐᑫᑯᓯᐢ	chukākoses	Grebe	
ᐅᒑᒑᑭᐤ	ochachakew	American White Pelican	*Pelecanus erythrorhynchos*
ᑳᑫᑭᓯᑊ	kakākesep	Double-crested Cormorant	*Phalacrocorax auritus*
ᒧᐢᑳᐅᓯᐤ	moska-osew	American Bittern	*Botarus lentiginosus*
ᒥᐢᑎᒧᐢᑳᐅᓯᐤ	mestemoska-osew	Great Blue Heron	*Ardea herodias*
ᓂᐢᑲ	nesku	Canada Goose	*Branta canadensis*
ᐁᐧᐁᐧᐃᐧᐤ	wāwāwew	Snow Goose	*Chen caerulescens*
ᐹᐹᒉᐹᓴᐤ	papachāpasāw	Laugher	
ᐃᓂᓂᓯᑊ	enenesep	Mallard	*Anas platyrhynchos*
ᑭᓄᑫᑭᑫᓯᑊ	kenokākekāsep	Northern Pintail	*Anas acuta*
ᐚᐱᐢᑭᒉᓯᑊ	wapeskechāsep	American Wigeon	*Anas americana*
ᒥᐢᒋᑯᓯᑊ	meschekosep	Common Goldeneye	*Bucephala clangula*
ᓂᑭᓯᐱᐢ	nekesepes	Bufflehead	*Bucephala albeola*
ᐅᓄᒋᓇᓯᐢ	onochenāses	Osprey	*Pandion haliaetus*
ᐱᐢᐠ	pesk	Sparrowhawk	*Accipiter spp.*
ᐚᐱᐢᑎᑳᐧᓇᐃᐧ ᒥᑭᓯᐤ	wapestekwanāwe mekesew	Bald Eagle	*Haliaeetus leucocephalus*
ᐅᓵᐃᐧᓯᓈᓱ ᒥᑭᓯᐤ	osawesenaso mekesew	Golden Eagle	*Aquila chrysaetos*
ᐅᓄᒋᓇᓯᐤ	onochenāsew	Falcon	*Falco spp.*
ᐋᑳᐢᑯ	akasko	Ruffed Grouse	*Bonasa umbellus*
ᒐᑫᐠ	chukāk	American Coot / Mudhen	*Fulica americana*
ᐅᒋᒑᐠ	ochechak	Sandhill Crane	*Grus canadensis*
ᒑᐱᐢᑳᑳᓇᓯᐢ	chapeskakanāses	Killdeer	*Charadrius vociferus*

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific
ᐅᑭᒧᓈᑫᓯᐢ	okemonakāses	Sandpiper	*Calidris spp.*
ᑭᔮᐢᐠ	keyask	Gulls	*Larus spp.*
ᑲᐢᑭᑌᐚᒑᓴᐠ	kusketāwachasuk	Terns	*Sterna spp.*
ᒥᐢᑎ ᑯᑯᑳᐅ	meste kokoka-o	Great Horned Owl	*Bubo virginianus*
ᐚᐱᑳᓄ	wapekano	Snowy Owl	*Nyctea scandiaca*
ᒥᐢᑎ ᑯᑯᑳᐅ	meste kokoka-o	Great Grey Owl	*Strix nebulosa*
ᐱᐢᐠ	pesk	Common Nighthawk	*Chordeiles minor*
ᐅᑭᐢᑭᒫᓀᓯᐤ	okeskemanāsew	Belted Kingfisher	*Ceryle alcyon*
ᐹᐹᐢᒋᐤ	papaschew	Woodpecker	
ᑭ·ᑭ·ᓯᐤ	kwekwesew	Gray Jay	*Perisoreus canadensis*
ᐋᐱᐢᒋᑳᑳᑭᐤ	apeschekakakew	Magpie	*Pica hudsonia*
ᐋᐋᓯᐤ	aasew	American Crow	*Corvus brachyrhynchos*
ᑳᑳᑭᐤ	kakakew	Common Raven	*Corvus corax*
ᐚᐢᑳᔦᑳᓂ ᐱᓀᓯᐢ	waskayekane penāses	Swallow	
ᑭᒋᑳᓀᓯᐢ	kechekanāses	Chickadee	*Poecile spp.*
ᐱᐱᒋᐤ	pepechew	American Robin	*Turdus migratorius*
ᐱᐱᑭᓯᐢ	pepekeses	Sparrow	
ᒥᑯᒑᒑᑲᓄ	mekochachakano	Red-winged Blackbird	*Agelaius phoeniceus*

Table 5.4 Fish species present within the Saskatchewan River Delta.

Cree (Syllabics)	Cree (Roman)	English (Common)	Scientific
ᐅᑳᐤ	okaw	Walleye/Pickerel	*Sander vitreus*
ᐃᓈᑐ ᑭᓄᓭᐤ	enato kenosāw	Northern Pike	*Esox lucius*
ᐅᑳᓯᓴᐠ	okasesuk	Yellow Perch	*Perca flavescens*
ᓇᒣᑯᐢ	numākos	Lake Trout	*Salvelinus namaycush*
ᓇᒣᐤ	numāw	Lake Sturgeon	*Acipenser fulvescens*
ᐃ·ᐱᒋᓯᐢ	wepecheses	Goldeye	*Hiodon alosoides*
ᓈᒣᐱᐣ	namāpen	Sucker	*Catostomidae* spp.
ᒥᓈ·	menay	Burbot	*Lota lota*
ᐋᑎᑳᒣᐠ	atekamāk	Lake Whitefish	*Coregonus clupeaformis*
ᐅᒍᓈᐱᐢ	ochonapes	Cisco / Tullibee	*Coregonus artedi*
ᑭᓄᓭᓯᓴᐠ	kenosāsesuk	Minnows	*Cyprinidae spp.*

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Appendix A: Glossary

achene: a small, dry, 1-seeded, nut-like fruit

alternate: situated singly at each node

anther: the pollen bearing part of a stamen

aquatic: living or growing in water

ascending: growing obliquely upwards

berry: a fruit, fleshy throughout, usually containing several or many seeds

blade: the broad, flat part of a leaf or petal

bract: a reduced or specialized leaf associated with, but not part of, a flower or flower cluster; in conifers, an appendage of the central stalk of a cone

branchlet: a small branch

capsule: a dry fruit tat splits open at maturity and is composed of more than 1 carpel (in seed plants); the spore-containing sac (in bryophytes)

catkins: a linear cluster of small flowers, usually of 1 sex that lack petals but usually have surrounding bracts

clasping: holding or surrounding tightly

compound: divided into smaller parts: leaves, divided into leaflets; flower clusters divided into smaller clusters

coniferous: bearing its reproductive organs in cones

drupe: a fleshy or pulpy, 1-seeded fruit in which the seed has a stony covering (e.g., a cherry)

deciduous: falling after completion of its normal function, often at the approach of a dormant season

elliptic: shaped like an ellipse, oval or oblong with the ends rounded and widest in the middle

fruit: a ripened ovary, together with any other structures that ripen with it as a unit

glandular: with glands

inflorescence: a flower cluster

leaflet: a single segment of a compound leaf

lobe: a rounded or strap-shaped division of the thallus of a lichen or liverwort: or a rounded division of the leaf of a liverwort or vascular plant

nutlet: a small nut; a very thick-walled achene

oblong: shaped more or less like a rectangle (other than a square) with rounded corners

obovate: shaped like a long section through a hen's egg, broadest near the tip

opposite: situated across from each other, not alternate or whorled; or, situated directly in front of organs of another kind

ovary: the structure at the base of a pistil that contains the young, undeveloped seeds

perennial: growing for 3 or more years, usually flowering and producing fruit each year

petal: a member of the inside ring of modified flower leaves, usually white or brightly coloured

pinnate: feather-formed; of a compound leaf in which the leaflets are placed on each side of the common axis

pistil: the female organ of a flower, usually consisting of an ovary, style and stigma

rhizome: an underground, often lengthened stem; distinguished from a root by the presence of nodes and buds or scale-like leaves

sepal: a member of the outermost ring of modified flower leaves; usually green and more or less leafy in texture

sheath: an organ which partly or completely surrounds another organ, as the sheath of a grass leaf surrounds the stem

simple: not divided or subdivided

spike: a more or less elongate inflorescence with non-stalked flowers

spikelet: a small or secondary spike in a panicle; the floral unit, or ultimate cluster, of a grass flower cluster

stamen: the pollen-bearing (male) organ of a flower consisting of an anther and a filament

stigma: the tip of the female organ (pistil) in plants, where the pollen lands

stipule: a leaf-like appendage at the base of a leaf stalk

tuber: a thickening, usually at the end of a rhizome, serving in food storage and often also in reproduction; sometimes loosely applied to tuberous roots

utricle: small, thin-walled, 1-seeded, inflated fruits

whorl: a ring of 3 or more similar structures (e.g., leaves around a node on a stem)

wing: a thin, flat extension or projection from the side or tip; one of the 2 side petals in a flower of the pea family

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