Knight Piésold

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK
DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009

PREPARED FOR

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ENVIRONMENTAL BASELINE STUDIES 2009 (REF. NO. VA103-198/2-1)

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EXECUTIVE SUMMARY

The South Saskatchewan River flows over an approximately 3 m high concrete gravity weir in north central Saskatoon. The City of Saskatoon, through its electric utility Saskatoon Light & Power (SL&P) is exploring the feasibility of developing a hydropower station at the weir. In addition, the Saskatoon Whitewater Park Committee, a group of interested whitewater enthusiasts, is exploring the feasibility of developing a recreational whitewater park adjacent to the Hydropower Station.

In 2008, SL&P, on behalf of the City and Whitewater Park Committee, engaged Knight Piésold Ltd. (KPL) to carry out a concept development for a hydropower facility at the weir and a technical review of the viability of this development in conjunction with a recreational whitewater park. The overall objective of the assignment was to provide sufficient information to allow SL&P to make an informed decision on how to move forward. A specialist whitewater park design company, S2O Design and Engineering, was involved in the whitewater park aspects of the assignment

In 2009, KPL carried out baseline environmental studies and pre-feasibility engineering studies for the proposed Hydro Power and White Water Park Developments on the South Saskatchewan River weir in Saskatoon.

The Environmental baseline studies were conducted to identify sensitive species and ecosystems, and to document current ecological conditions. A literature search and review was conducted, and field data collected to fill in gaps and identify environmentally sensitive areas/issues. Environmental components investigated included hydrology, water and sediment quality, vegetation communities and wildlife habitat, fish and fish habitat, and wildlife.

Flow in the South Saskatchewan River at Saskatoon has been influenced by the Gardiner dam since its construction was completed in 1968, moderating the natural seasonal fluctuations. Water quality in the river has recently been assessed as stressed (Saskatchewan Watershed Authority, 2007), with good water quality results from this sampling, in comparison to CCME guidelines for the protection of aquatic life. Sediment is deposited upstream of the weir however immediately downstream of the weir is not a depositional environment. Vegetation communities within the study area are primarily riparian or anthropogenic. The study area is within an urban setting, in the city of Saskatoon, largely within a developed park area. Aquatic communities are heterogenously distributed in low densities and consist of periphytic growth with limited distribution of emergent macrophytes. While reptiles and amphibians within the study area are rare, numerous species of birds make use of the river and riparian areas for feeding and nesting. Terrestrial wildlife is not abundant, and consists of species tolerant of human activity.

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SECTION 1.0 - INTRODUCTION

1.1 BACKGROUND AND SCOPE

The South Saskatchewan River flows over an approximately 3m high concrete gravity weir in north central Saskatoon. The City of Saskatoon, through its electric utility Saskatoon Light & Power (SL&P) is exploring the feasibility of developing a hydropower station at the weir. In addition, the Saskatoon Whitewater Park Committee, a group of interested whitewater enthusiasts, is exploring the feasibility of developing a recreational whitewater park adjacent to the Hydropower Station.

In 2008, SL&P, on behalf of the City and Whitewater Park Committee, engaged Knight Piésold Ltd. (KPL) to carry out a concept development for a hydropower facility at the weir and a technical review of the viability of this development in conjunction with a recreational whitewater park. A specialist whitewater park design company, S2O Design and Engineering, was involved in the whitewater park aspects of the assignment

KPL submitted the report "South Saskatchewan River Green Power and White Water Park: Concept Development and Technical Review" to SL&P in 2008 (Knight Piésold, 2008). This report furnished sufficient information to allow SL&P to make an informed decision on how to move forward with this initiative. The key findings outlined in the report were as follows.

- Extensive long-term records of the flows in the South Saskatchewan River provide an excellent database for assessing the hydropower potential at the weir. Construction and commissioning of the Gardiner Dam in 1968 has modified the flows in the river such that there is less seasonal variability.
- The head available for power generation and the recreational whitewater park varies with the flow. At higher flows the head available decreases and the weir is essentially drowned out at flows above 2,500 m^3/s.
- The following key environmental considerations were raised as issues that need to be addressed with any development at the weir site:
  - Safe fish passage both upstream and downstream of the weir
  - Protection of the American White Pelican habitat
  - Protection of the bird habitat on the island upstream of the weir
  - Protection of recreational fishing
  - Protection of water quality
  - Overall aesthetic values of the site
  - Protection of the Meewasin Valley Trail and parking areas, on the west side of the river

The hydroelectric potential at the weir site can be harnessed with the installation of "pit" turbines. Preliminary concepts developments indicate an optimum installed capacity of 4.1 MW, with 3 turbines and generator units, generating an average of 24 GWh annually. If an inflatable rubber weir was used to raise the weir crest by 1 m the facility would have an installed capacity of 6.5 MW and generate an average of 37 GWh annually. The use of an inflatable rubber weir would maintain the upstream water level at a constant "high water" level.

Two types of recreational white water features were investigated at the concept stage, including a hardened by-pass channel on the east side of the weir (Concept A), and an in-stream improvement creating two large U-drop standing wave features (Concept B). Concept A would require a flow of approximately 20 m^3/s and could be readily incorporated into the weir either with or without the low impact hydro power facility. Concept B would require substantially more flow and hence would only operate at very high flows if the hydro power facility is installed.

The combination of Concept A as the preferred recreational whitewater feature, along with raising of the weir by 1 m and installation of the 6.5 MW green power facility, appeared to be the most economically viable alternative for the proposed hydropower and whitewater park on the South Saskatchewan River.

Based on the feedback received through public and stakeholder consultation, together with the results of the baseline environmental studies, the concepts proposed for both the low impact hydro power and whitewater park facilities will be further refined.

Further studies were recommended to develop the concepts and investigate the environmental impacts of the possible development including the following:

- Initiation of baseline environmental studies in and around the weir
- Initiation of community consultation and input from stakeholders
- Meeting with all regulatory agencies to establish the jurisdictions issues and permitting requirements
- Undertaking a pre-feasibility level design of the combined facility using accurate topographic and survey data, and develop a more detailed cost estimate for the overall development
- Investigating sources of funding for such a "community recreational development"

KPL was retained to help address these recommendations in 2009. Pre-feasibility design work, community consultation, meeting with regulatory agencies, and initiation of baseline environmental studies were undertaken in 2009. Results of the baseline environmental studies are reported herein.

1.2 ENVIRONMENTAL BASELINE STUDY AREA

The last glacier to flow over the Saskatoon area, the Wisconsin Glacier, began to melt and recede northward about 20,000 years ago. As it retreated it blocked the regional drainage system, forming Lake Saskatoon along its south face, covering much of the area around the present day City of Saskatoon. During the roughly 3,000 year life of the glacial lake, 200 ft of stratified clay and silt were deposited as deltas over the ancient sediments. About 10,000 years ago, a broad flow channel formed, eventually becoming part of the South Saskatchewan River. Saskatoon is located at the junction of a sandy meander plain to the south and a harder glacial till to the north, with river related sloughs, coulees,

aquifers and paired terraces. Saskatoon sits on a terrace formed 8,000 years ago (Raymond Moriyama Architects and Planners, 1978)

The Saskatoon Weir, constructed in the late 1930's was designed to control the flow in the South Saskatchewan River, which fluctuated greatly at the time. The weir is approximately one kilometre downstream of Saskatoon's city centre, and borders the downstream edge of the University of Saskatchewan campus. The Gardiner Dam, located approximately 100 km upstream of weir, was commissioned in 1967, and now regulates the flow in the South Saskatchewan River well beyond the effect of the weir.

The weir site falls within the jurisdiction of the Meewasin Valley Authority, a conservation organization with representation from the Province of Saskatchewan, the City of Saskatoon, and the University of Saskatchewan. A viewing platform was constructed at the west end of the weir, as part of the Meewasin Riverworks Weir Redevelopment in 2000. The area has been well landscaped, with a parking lot and information signs describing the natural features of the area. Interpretive signs are located on the Prince of Wales Promenade, and the Kinsmen Fishing Platform has been constructed downstream of the weir.

The conceptual power development plan presented in 2008 included a potential inflatable rubber dam which would raise the weir crest by 1 m. In the course of the pre-feasibility engineering studies, a 2 m raise of the weir crest has also been considered. As a result, a 2 m rise in the shoreline contours was considered as the boundary of the study area. The upstream limit of the study area was defined by an approximate 2 m bank contour rise from the weir crest elevation. The weir crest is at El. 472.6. The study boundary was based on the contour line El 474.5 (shown on Figure 1.1), which intersects the South Saskatchewan River approximately 6 km upstream of the weir. The downstream limit to the study area was located approximately 1 km downstream of the weir. The width of the study area was defined as the shoreline and riverbank area up to the first road or paved pathway, which marked the limit of public park land or the natural environment. Therefore the study area was approximately 7 km long and included the river and its shoreline up to a contour elevation of 474.5 or to the limit of natural environment, whichever was greater.

The study area is crossed by four road bridges and two rail bridges, one of which defines the southern limit. The Grand Trunk Rail Bridge, just downstream of the Queen Elizabeth Power Station, forms the southern (upstream) boundary of the study area. Just upstream of the weir is a large sandbar island, referred to as Goose Island. The island is situated approximately mid-river, and is about 450 m long and an average of 60 m wide.

1.3 LITERATURE REVIEW

Published and unpublished literature that is related to the study area for all environmental baseline programs was collected, reviewed, and reported. This effort also involved collecting information from local government agencies, the conservation authority, naturalist clubs, and university professors.

1.4 FIELD INVESTIGATIONS

The field investigations were timed to allow observation of a variety of weather, seasonal and flow conditions. In the past 11 years, mean daily flow has peaked in the third week of June (maintaining maximal flows through to the first week of July) (Appendix A). In 2009 the driest spring in 70 years in western Canada (Globe and Mail, June 18, 2009) resulted in less water available for release from the Gardiner Dam. Therefore in 2009, no June peak flow occurred. Mean daily flows were provisionally calculated as less than 160 m^3/s in June 2009, while the mean peak flow in the third week of June for the period of 1998 to 2008 was 380 m^3/s.

Field visits were conducted as follows:

- Early May - in order to observe migrating and nesting birds, and to observe the study area prior to full leaf out for improved visibility.
- Late June - flowering vegetation.
- Mid September - fall season observations.

As the expected late June peak flow did not occur in 2009, the study area was not surveyed in the full variety of flow conditions. This particularly affected the assessment of fish habitat, and the assessment of the wetland type vegetation communities, since these communities were not observed at high water levels as have been observed in past years. It is therefore recommended that, should the Project proceed to the next stage of development, another year of baseline data be recorded.

SECTION 2.0 - HYDROLOGY

The Saskatchewan River originates in the eastern slopes of the Rocky Mountains and flows to Lake Winnipeg, as shown in Appendix A1 (Partners for the Saskatchewan River Basin, 2009). The North and South Saskatchewan Rivers join over 150 km downstream of Saskatoon to form the Saskatchewan River. There are often two flow peaks on these rivers in Saskatchewan. The first, usually lower, peak in April or May is associated with snowmelt runoff from the prairie portion of the watershed, and the second peak in June comes from snowmelt at the higher mountain elevations combined with rainfall runoff in the foothills (Saskatchewan Watershed Authority, 2007).

The South Saskatchewan River sub-basin is considered the portion of the river from the confluence of the Bow and Oldman Rivers, downstream to the confluence with the North Saskatchewan River. Up to 90% of the annual flow of the South Saskatchewan River is generated in the Alberta Rocky Mountain headwaters, with the remainder coming from prairie runoff.

The flows in the South Saskatchewan River have been monitored by the Water Survey of Canada (WSC) of Environment Canada since 1912 with a gauge in Saskatoon that records the daily flows (WSC 05HG001). The drainage area for this monitoring location in Saskatoon is 141,000 km^2. The mean annual discharge for the entire period of record is 251 m^3/s, (Environment Canada, 2009).

In 1967 the Gardiner Dam was built on the South Saskatchewan River approximately 100 km upstream of Saskatoon, with a resulting upstream reservoir called Lake Diefenbaker. Water stored in Lake Diefenbaker is used for municipal and industrial water needs, irrigation, recreation, hydroelectric generation and maintenance of downstream flows (Partners for the Saskatchewan River Basin, 2009). This has affected the monthly distribution of flows downstream of the dam. Flows since 1968, the first full year after the dam was commissioned, are therefore representative of current river discharge patterns.

The average monthly flows available for the 40 year period since the Gardiner Dam was constructed, from 1968 to 2008, are presented in Table 2.1 and Figure 2.1. Since the construction of the Gardiner Dam there has been a significant change in the monthly flow distribution downstream of the dam, with much larger winter flows and less severe May, June, and July peak flows (Appendix A2). Peak flows have still occurred in June and July, with average monthly flows of 241 m^3/s and 235 m^3/s respectively (Figure 2.1), however the greatest magnitude of flows occurred in January in this period.

Annual average flows since the construction of the Gardiner Dam have fluctuated at the Saskatoon WSC station between a low of 85 m^3/s in 1984 and a high of 355 m^3/s in 2005, with an average annual flow of 209 m^3/s for the 40 year period of 1968 to 2008 (Table 2.1). Particularly low average monthly flows were recorded in the summer months of 2001 and 2004, with mean annual average flows of 99 and 119 m^3/s, respectively.

In the past 11 years, mean daily flow has peaked at approximately 380 m^3/s in the third week of June (maintaining maximal flows through to the first week of July) (Appendix A2). In 2009, mean daily flows were provisionally calculated as less than 160 m^3/s through this period (Environment Canada 2009, Appendix A2). No substantial high flow periods were observed in 2009, unlike 2008 when a peak mean daily flow of over 400 m^3/s was observed in June. It should be noted that the Environment Canada “real

time" data presented in Appendix A2 would be affected by the presence of ice in the winter months, and therefore would not be comparable to the data from the ice-free seasons. The historic data have been corrected for the presence of ice using discharge data from the Lake Diefenbaker outflow (Gardiner dam).

The South Saskatchewan River water level at the Saskatoon WSC station has fluctuated approximately 0.6 m during the last two years, according to Environment Canada continuous monitoring data. (Appendix A2). During the course of these field investigations, between early May and mid September 2009, a water level decrease of 0.1 m was observed, although Environment Canada data show a fluctuation of 0.2 m during this time period through the continuous monitoring station just upstream of the weir.

SECTION 3.0 - WATER AND SEDIMENT QUALITY

3.1 BACKGROUND

In the 2007 State of the Watershed Report (Saskatchewan Watershed Authority, 2007), water quality in the South Saskatchewan River was assessed as "stressed". Water quality was assessed using a Water Quality Index (WQI), derived to assess the chemical, biological, and physical constituents within water bodies and provide a means of summarizing overall water quality. Values for various water quality parameters (e.g. dissolved oxygen, nutrients, fecal coliform) were compared to the interim Surface Water Quality Objectives for Saskatchewan (Saskatchewan Environment 2006), to derive the WQI.

The South Saskatchewan River Watershed Source Water Protection Plan (2007) identifies recommendations and key actions to help ensure that source water from the South Saskatchewan River watershed is protected.

Water quality data were obtained from the Saskatoon Water Treatment Plant (2009) located within the study area, approximately 3 km upstream of the weir. The water treatment plant collects samples of river water in order to assess water treatment requirements and results. The quality of river water reported in 2008 by the City of Saskatoon was compared to Saskatchewan Surface Water Quality Objectives (SWQO) and Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of aquatic life. There were no guideline exceedances noted for data reported by the city. The City of Saskatoon Water Treatment Plant typical river water quality is presented on Table 3.1.

The CCME and the SWQO guidelines were used as a guideline for comparison with water and sediment quality analysis result from the South Saskatchewan River. Canadian water quality guidelines are intended to provide protection of freshwater (and marine) life from anthropogenic stressors such as chemical inputs or changes to physical components. Guidelines are numerical limits or narrative statements based on the most current, scientifically defensible toxicological data available for the parameter of interest. All forms of aquatic life and all aspects of the aquatic life cycles, including the most sensitive life stage of the most sensitive species would be protected when guideline values are met over the long term. Canadian water quality guidelines for aquatic life are not restricted to a particular (biotic) species. Sediment quality guidelines provide scientific benchmarks, or reference points, for evaluating the potential for observing adverse biological effects in aquatic system (CCME, 1999).

3.2 SURFACE WATER QUALITY

3.2.1 Surface Water Sample Locations and Methodology

Surface water samples were collected from the South Saskatchewan River on September 15, 2009. Samples were collected from within the baseline environmental study area upstream and downstream of the weir (Figure 3.1). Sample site SLP-1 was located upstream of the weir, at the upstream tip of Goose Island. Water depth was 0.7 m, with a sand/silt substrate and strong current. This location was selected as the closest accessible location to the weir by boat. Sample site SLP-2 was selected towards the upstream end of the study area, approximately 1 km downstream of the Grand Trunk Bridge, with similar habitat conditions to SLP-1. Water depth was 0.7 m, with a sand/silt substrate, however a weaker current then SLP-1. Samples

were collected according to standard protocols, which were adapted from the 1997 Resources Information Standards Committee (RISC) document entitled "Ambient Fresh Water and Effluent Sampling Manual" (RIC, 1997) to determine surface water characteristics.

In situ parameters (pH, conductivity, and temperature) were measured in conjunction with surface water collection with a multirange conductivity meter (Hanna Instruments HI9033) and a pH meter (Hanna Instruments HI9024C). Laboratory analysis of water samples consisted of physical and chemical parameters.

3.2.2 Water Quality Results

The surface water quality from the grab samples collected in September 2009 had no observed CCME or SWQO exceedances for physical or chemical parameters (Table 3.2). Laboratory Certificates of Analysis are contained in Appendix B1). In general, the water was alkaline, *in situ* pH of 8.0 at SLP-1 and 8.45 at SLP-2. Temperature was consistent between the upstream and downstream locations and conductivity ranged from 550 to 570 µS/cm between SPL-1 and SPL-2. The surface water was hard, with hardness values greater than 150 mg/L $CaCO_3$ and had a high buffering capacity, alkalinity greater than 20 mg/L.

3.2.3 Quality Assurance / Quality Control

The QA/QC objective is to ensure scientifically defensible, repeatable, and well documented representative data. Standard methods and protocols were developed to ensure the highest level of QA/QC. The following internal and external controls were completed to ensure QA/QC:

- Employment of fully accredited labs
- Regular calibration and maintenance of all field equipment
- Determination of analytic precision and accuracy through the interpretation of analysis reports
- The use of an integrated management system for quick and accurate analytical interpretation

Cation and anion balances, and duplicate samples completed on the remaining parameters conclude strong analytical laboratory results.

3.3 SEDIMENT QUALITY

3.3.1 Sediment Sampling Locations and Methodology

Sediment samples were collected from the previously described surface water quality sampling locations (SLP-1 and SLP-2). Additionally, sample site SLP-3 SED was selected downstream of the weir below the Canadian Pacific Rail Bridge. Water depth was 0.6 m, substrate was boulder/cobble and the current was very strong.

Samples were collected according to standard protocols, which were adapted from the 1997 Resources Information Standards Committee (RISC) document entitled "Lake and Stream

Bottom Sediment Sampling Manual" (RISC, 1997) to determine sediment quality characteristics using an Eckman grab sampler.

Laboratory analysis of sediment samples consisted parameters to meet the Canadian Council of Ministers of the Environment (CCME) aquatic habitat standards. These guidelines are expressed as both interim freshwater sediment quality guideline (ISQG) and probable effect levels (PEL). The ISQL have been derived using toxicological information and are intended to be used in conjunction with other supporting information. The PEL, expressed as a dry weight basis, is the concentration range within which adverse biological effects frequently occur (i.e. more than 50% adverse effects occur at concentrations above the PEL) (CCME, 1999).

3.3.2 Sediment Quality Results

The sediment quality from the composite samples collected in September 2009 had no observed CCME exceedances for physical or chemical parameters for location SLP-2 SED and SLP-3 SED (Table 3.3). Sample SLP-1 SED located on the upstream tip of Goose Island exceeded the ISQG and PEL for arsenic. The sample concentration was reported to be 25 µg/g while the ISQG and PEL are 5.9 and 17 µg/g respectively. The arsenic concentration of SLP-1 SED was compared to the upstream (SLP-2 SED) and downstream (SLP-3 SED) sampling locations the concentration measured at SLP1-SED was 5.5 times greater. The concern with the increased arsenic concentration measured at SLP-1 SED is the potential for acute or chronic toxicity to mammals. Some anthropogenic sources of arsenic are arsenical pesticides and industrial effluent (RISC, 1997). Further baseline monitoring at this location will assess the representativeness of this sample.

SECTION 4.0 - VEGETATION

4.1 BACKGROUND

The City of Saskatoon is in the Prairie Ecozone and the Moist and Mixed Grassland ecoregion (Saskatchewan Environment, 2005). The climate is semi arid to humid, with long, cold winters, and hot, dry summers. Temperatures extremes recorded at the Saskatoon Water Treatment Plant were -42ºC in the winter, and +40 ºC in the summer (Canadian Climate Norms 1997 - 2001). The mean annual precipitation ranges from 350 to 400 mm with the majority of the precipitation falling between May and August (Environment Canada).

The Moist and Mixed Grassland ecoregion has been heavily dominated by agriculture. The majority of the native plants: wheatgrass, chokecherry, snow berry, rose, and wolf willow are only found in lands not disturbed by agriculture (SASK Herbarium). In the course of this study, an initial literature review of existing vegetation studies in the Saskatoon area was conducted. Field studies were designed to define vegetation communities along the river banks and record observation of rare, threatened, and endangered plant species.

4.1.1 Plant Species of Concern

The plant species of concern which could potentially occur in the study area were identified and are listed below with their status according to the Species at Risk Act (SARA) registry;

Dwarf Woolly-heads (*Buchloë dactyloides*)	Special Concern
Hairy Prairie-clover (*Dalea villosa var. villosa*)	Threatened
Smooth Goosefoot (*Salix turnorii*)	Threatened
Western Spiderwort (*Tripterocalyx micranthus*)	Threatened

A full list of plant species of concern in Saskatchewan is presented in Table 4.1 (Harms, 2003).

4.1.2 Invasives and Exotics

Several invasive and exotic species have been identified in Saskatchewan, and could potentially occur in the study area.

Unwanted plant invaders started soon after settlers came to Saskatchewan with a few seeds of their favourite plants from far away lands. While many were beneficial, some of these plants came to dominate crops, pastures and native areas and now cause serious economic and environmental harm.

In Saskatchewan, some of the invasive species are governed under the *Noxious Weed Act*. Saskatchewan's noxious weeds are listed on Table 4.2. Invasive exotic species of the area were previously recorded by Godwin and Thorpe (1992), who observed smooth brome, quack grass, and reed canary grass.

4.2 PREVIOUS STUDIES

Several vegetation inventories have been conducted along the South Saskatchewan riverbank in the Saskatoon area, including:

- A Biophysical Survey of the Silverwood Riverbank Area. (Godwin and Thorpe., 1992)
- Vegetation and Wildlife Survey of the Northeast Swale near Saskatoon (Delanoy, 2001)
- Peturrson's Ravine Resource Management Plan (Golder Associates, 1995)
- Vegetation Survey of Natural Riverbank Lands North and West of the Regional Psychiatric Centre (Delanoy, 1996)
- East Bank Open Space Study (Hilderman, Feir, Witty and Associates, 1981)
- A survey of the Natural Vegetation and Flora along the South Saskatchewan River Valley within and near Saskatoon, Saskatchewan. (Lineman, 1997)

All of the above studies were conducted within about 5 km of the environmental baseline study area defined by KPL. The Silverwood Riverbank study was conducted on the west riverbank, while the others were conducted on the east riverbank. The regional Psychiatric Centre (RPC) is approximately 3.5 km downstream of the weir on the east bank. The northeast swale is located in the northeast corner of the City limits, immediately northeast of the RPC. Peturrson's ravine is immediately north of RPC, 4 km downstream from the weir.

Two studies overlapped this study area. The east bank study area extended from the Senator Sid Buckwold Bridge in the south to the city limits in the north and Maurice Lineman's (1997) study was conducted between the South and North boundaries of the City of Saskatoon, on both sides of the river.

A list of plant species and some fungi observed in the study area and adjacent habitats from these studies is presented in Table 4.3.

The biophysical survey of the Silverwood Riverbank area addresses riparian vegetation along the South Saskatchewan River between the Saskatoon Pollution Control Plant and the Wanuskewin Heritage Property, a 4.5 km study area approximately 6 to 10.5 km downstream of this study area (Godwin and Thorpe, 1992). Godwin and Thorpe (1992) described nine vegetation communities in their study. The riparian, moist forest, dry forest, shrub and slope grassland were found in this study area, described as follows:

> Riparian;
> "Early successional riparian communities occur on floodplain, riverbank, and river fan sites, as well as some low terrace sites. These sites are generally imperfectly or poorly drained, but some very poorly drained sites are included in this category. This community type has little occurrence of the upland shrubs and forbes that are found in dry and moist forest communities. Shrub species that are noticeably absent or infrequent are Saskatoon, chokecherry, pincherry, rose, snowberry, and gooseberry.
>
> The community is characterized by wetland species and species adapted to disturbances, such as commonly occur with river flooding and the associated scouring and/or deposition of

sediments by water and ice. Included in this type are herbaceous communities subjected to almost yearly disturbance by fluctuations in river level or scouring by river ice, and shrub communities disturbed at a less than yearly frequency, but at intervals frequent enough to prevent forest development "(Godwin and Thorpe, 1992).

Godwin and Thorpe (1992) observed distinct bands of vegetation along the shore, reflecting the frequency at which the communities are disturbed with increasing vertical relief above low water level. The lowest levels are disturbed annually or more frequently, forming a mud or sand zone, largely devoid of vegetation. This is followed by perennial herbaceous vegetation bands and then woody bands. This general vegetation progression on the slope from the water occurs in most of the shoreline areas with varying degrees of compression or expansion of the width of the bands.

Moist Forest;
"The moist forest type was separated from the dry forest type based on species composition and soil moisture. While the dry forest type was found on well to moderately well drained sites, the moist forest type occupied imperfectly to poorly drained sites. The main sites with moist forest are on slopes with seepage. Balsam poplar is the dominant tree species on these sites, with paper birch being dominant on two sites with heavy seepage along the slope.

Red-osier dogwood occurs in all sites examined, in relatively high abundance. Other shrubs that occur in at least 50% of the stands in this type are poison-ivy, prickly rose, high bush cranberry, twinning honeysuckle and Saskatoon. This is the only vegetation type in the study area in which beaked hazelnut occurs.

Star flowered solomon's seal occurs in all stands, other forbs of frequent occurrence include snakeroot, meadow horsetail, sarsaparilla, late goldenrod, baneberry, American vetch, pink wintergreen, Canada anemone, and fairy bells"(Godwin and Thorpe, 1992).

Dry Forest;
"The dry forest type occurs on well to moderately well drained hillslopes, washes with colluvium in the bottoms, and some terraces. This is generally an open forest type with good shrub layer development. Green ash and Manitoba maple are the dominant tree species on the well drained sites, with hybrid poplars becoming important on some of the moderately well drained sites, Trembling aspen, the common upland forest tree species of southern Saskatchewan, was rarely recorded in this study area"(Godwin and Thorpe, 1992).

Shrub;
"The shrub vegetation type, as defined here, is strictly an upland type, and does not include the shrub bands of the riverbank, which have been included in the riparian type. All sites on which the upland shrub type occurs are well drained. The shrub type consists of two subtypes that grade into each other in species composition. One of the subtypes is characterized by wolf-willow, the second by chokecherry. Both subtypes have Saskatoon, wood's rose, and snowberry.

The wolf-willow subtype has a more open canopy and appears to be transitional between the grassland types and the more closed chokecherry subtype. The wolf-willow subtype has a scattering of grassland species in the understory, with no single grassland species occurring with regularity. Northern bedstraw is the only herb in more than 50% of the shrub type plots. However, it is in all of the wolf-willow plots, and almost absent from the chokecherry plots. The more closed chokecherry subtype has woodland herbs in its understory. Star-flowered solomon's-seal and sarsaparilla are the most frequently occurring forbs in this subtype"(Godwin and Thorpe, 1992).

Slope Grassland;

"The grassland on the valley slopes would normally be considered mixed prairie. It was distinguished from the upland mixed prairie type because of the difference in topographic position, and because of differences in species composition.

The slopes provide a much more diverse habitat than does the upland area. Variation in slope aspect results in different temperature regimes at different locations. Slope position also has a strong influence on moisture availability, as a result of run-off of precipitation on upper slopes and run-on in lower, gentler slopes. Layering of geological materials results in loss of moisture from the uplands through the bedded materials, In addition to this, constant slow erosion on the steep slopes created openings for early successional species" (Godwin and Thorpe, 1992).

Several vegetation communities were described along the east bank of the South Saskatchewan River in the East Bank Open Space Study (Hilderman, Feir, Witty and Associates, 1981). The following zones were defined; flood, willow, shrub-tree, tree clump, planted clump, prairie, and coulee.

Flood Zone;

"The flood zone is found along the shore of the river where spring floods and ice scouring kill back woody perennials every year. Cottonwood (*Populus deltoides*), sandbar willow (*Salix interior*), and yellow willow (*Salix lutea*) are found in the short sprout stage. Silt deposits between rocks provide fertile substrates for the establishment of plants. A rich variety of annuals is a distinguishing feature of annually flooded fertile substrates. Perennials such as Indian hemp (*Apocynum sibiricum*), foxtail (*Hordeum jubatum*) and couch grass (*Agropyron repens*) are found interspersed among the annuals and sprouts of woody species.

In late summer, the gravel bars become dry and the herbs die of drought on the course-textured soil. The sprouts of woody species have deeper roots which enable them to obtain moisture so that they can survive until spring. Where shallow pools persist over the major part of the summer, spike rushes (*Eloecharis palustris* and *E. acicularis,* and sedges (*Carex sp.*) dominate. In the flood zone, succession is set back to the beginning every spring, keeping this zone in an early successional stage" (Hilderman, et. al., 1981).

Willow Zone;

"The willow zone occurs in places that are frequently flooded, including the lower slopes and terraces of the riverbanks and the edges of sloughs. Along the river, there is generally a narrow

band of sandbar willow at the edge of the flood zone. Cottonwood, balsam poplar (*Populus balsamifera*) and yellow willow saplings are often associated with the sandbar willow. Examples of herbs in the understorey are goldenrod (*Solidago sp*), brome grass (*Bromus inormis*) wild licorice (*Glycyrrhiza lepidota*) and marsh horesetail (*Equisetum palustre*)" (Hilderman, et al., 1981).

Shrub Tree zone;
"The shrub-tree zone is found on the mid and upper slopes of the riverbank. These locations are more elevated than the lower slope and are therefore infrequently flooded. In the shrub-tree zone, the shrubs are dominant. Tall trees protrude from the dense shrub cover in a scattered distribution. There is generally a transition from red-osier dogwood (*Cornus stolonifera*) and wolf willow (*Elaegnus commutate*) on the mid slope to choke cherry (*Prunus virginianna*) and Saskatoon (*Amelanchier alnifolia*) on the upper slope. Rose (*Rosa sp.*) and snowberry (*Symphoricarpos sp*.) form a low shrub layer on both the mid and upper slopes." (Hilderman, et. al., 1981).

Tree Clump zone;
"In the tree clump zone, trees are abundant and dominate the shrub layer, if indeed a shrub layer exists at all. Overstorey species consist of trembling aspen, green ash and Manitoba maple." (Hilderman et. al., 1981).

Planted Clump zone;
This includes various plantings and hedgerows.

Prairie disturbed zone;
Areas which have been disturbed and recolonized by natural prairie species.

Coulee Zone;
"The slopes of the coulees have vegetation similar to that in the shrub-tree zone, although the vegetation in the coulee bottoms varies. At the bottom of the coulees at Devils Dip and Ski Jump Hill, there are pools of water with cattails (*Typha latifolia*) and willows. The pool in the Ski Jump Hill coulee is brackish and there are a number of halophytic species present." (Hilderman et. al., 1981).

A study was conducted to investigate the effects of South Saskatchewan River water level control by the Gardiner Dam on cottonwood tree populations, and found a 19% decline in cottonwood populations downstream of the dam (Begg, 1997).

4.3 FIELD INVESTIGATIONS

4.3.1 Methods

Vegetation communities along the river banks were assessed and described. Rare, threatened, and endangered plant species as well as invasive and exotic species were noted when encountered.

Aerial photos were used to identify and map broad plant community types, or habitat types, within the riparian zone on each side of the river. Vegetation units were mapped from the South Saskatchewan River wetted edge upslope to a limit defined by man made features such as roads, buildings, paved pathways or mowed parkland, including the 474.5 contour line as a minimum, as deemed appropriate in the field. The communities were mapped from upstream limit defined by an approximate 2 m bank contour rise from the weir crest elevation, 6 km upstream of the weir, to a downstream limit approximately 1 km downstream of the weir

Field reconnaissance of the mapped units was conducted to verify and adjust the habitat type boundaries, and record dominant plant species and habitat conditions (surficial geology, moisture regime, aspect, slope). A vegetation community sampling site was established in each of the mapped units. Vegetation community sample locations are shown on Figure 4.1.

Field work was conducted in May, June, and September 2009. Location, slope (degree and aspect), soil texture, drainage and moisture were recorded at each sampling location. A photographic record of each sample site was taken, including, at a minimum, overview and close up photos, as well as photos of particular plants and wildlife observed. Plant species were recorded by form; trees, shrubs, herbs/forbs and aquatic. Sensitive species, invasives and wildlife were also recorded. Plant species were identified in the field using the field guide Plants of the Western Boreal Forest and Aspen Parkland (Johnson et. al., 1995).

Vegetation community units were defined and described based on field observations. The community descriptions were also based on vegetation communities defined in previous studies, as described above.

4.3.2 Results

Thirty three sites were sampled, as shown on Figure 4.1, and summarized in Appendix B2. Photos were taken at each sample site and are included in Appendix B2. Vegetation community unit descriptions were developed based on field observations, and are presented below. The study area was described using the units developed, and the community units were mapped using a combination of the aerial photo interpretation and field verification.

The vegetation study area encompassed land from the wetted edge of the river to an upslope boundary determined in the field to encompass all lands which could potentially be affected by the proposed hydropower and whitewater park project, and adjacent lands. The boundary was based on the presence of man made features such as roads, buildings, paved pathways, as deemed appropriate. The extent of the vegetation community study area determined in the field is shown on Figure 4.1, covering an area of 103.82 ha. Only one section of the riverbank was excluded, since it comprised private land, and was not accessible.

The study area was within the riparian area of the South Saskatchewan River. A riparian area is the interface between terrestrial and aquatic ecosystems, including the terrestrial areas adjacent to water bodies with permanent vegetation.

Exotic species observed in the course of the field studies included caragana shrubs (*Caragana arborescens*) throughout the east bank area. Additionally, much of the open area of Gabriel Dumont park was covered with alfalfa.

4.4 VEGETATION COMMUNITIES

The study area was classified into nine units, eight of them natural vegetation communities, and one including all heavily human influenced areas. The nine categories were determined based on field observations, and mapped using a combination of photo interpretation and field verification. The vegetation community mapping is shown on Figures 4.2 to 4.6.

The following 9 unit descriptions were developed for this study:

Community	Code	Slope	Moisture Regime
Aquatic	AQ	na	wetland
Floodplain	FP	0	wetland
Floodplain shrub swamp	FPS	0	wetland
Riverside shrub swamp	RSS	0	wetland
Grassy Riverside Flat	GRF	0	w/u
Moist Forest/Stream Valley	MF	ø	w/u
Shrub Slope	SS	ø	upland
Dry forest	DF	ø	upland
Human Environment	HU	na	upland

The communities are described below, in order of wettest to driest:

Aquatic: Aquatic vegetation is comprised of vascular plants rooted where the water table is permanently above the soil surface. There are limited aquatic vegetation communities in the study area due to the steeply sloped littoral zone, and the effects of fluctuating water level and ice scour which remove much of the potential vegetation.

Floodplain: These are the primarily un-vegetated seasonally flooded margins of the river. Some small annuals may be seen in these areas by the end of the growing season, removed by ice scour each winter. These communities are primarily located at the upstream end of the study area, closer to the Grand Trunk Railway Bridge.

Floodplain Shrub Swamp: Wetter, willow dominated, seasonally inundated, although not every year, with a sand and silty depositional substrate. This community has an approximate 1:10 year inundation return period. This community was found on sandbar islands in the river, the primary one being Goose Island just upstream of the weir.

Riverside Shrub Swamp: This community has moist hydric soil, with little or no slope. It is primarily shrub dominated with some trees or sometimes tree dominated, with hydrophilic vegetation. These communities are rarely inundated by the river, but have persistently moist soil conditions.

Grassy Riverside Flat: This community is dominated by grasses and sedges, with some seedling shrubs. It is not seasonally inundated with well drained soil, adjacent to the river.

Moist Forest/Stream Valley: This is a shrub dominated community, often with a large tree component, on moist soil. The soil is kept moist through underground seeps or poor drainage. In the study area, these are within small stream valleys

Shrub Slope: These shrub dominated well drained steeply sloping sites generally aspect toward the river. Some trees occur in these sites, with abundant herbaceous undergrowth.

Dry forest: The dry forest type occurs on well to moderately well drained hillslopes. This open forest type shows good shrub layer development. Dominant tree species are green ash and Manitoba maple with some hybrid poplars on moderately well drained sites.

Human Environment: A significant portion of the riverbank and study area has been so affected by human activity that it bears little resemblance to the original natural environment. Included in this category are the parklands where paved pathways, mowing and horticulture have greatly altered the environment. Some built environment is included in this category also, such as riverside development in downtown Saskatoon and the weir area.

Although the study area did not include the built environment of the City of Saskatoon, it was dominated by the human influenced environment, primarily parkland, which covered almost 50% of the study area. Drier vegetation communities covered approximately 30% of the study area, including the shrub slope and dry forest vegetation communities. The hydrophilic riverside shrub communities, along with floodplain comprise most of the remaining 20% of the study area.

The area of each vegetation community type in the study area was measured in hectares as follows;

Community	Code	Area (ha)	% of Study Area
Aquatic	AQ	1.14	1.1%
Floodplain	FP	3.07	3.0%
Floodplain shrub swamp	FPS	5.86	5.6%
Riverside shrub swamp	RSS	8.54	8.2%
Grassy Riverside Flat	GRF	0.40	0.4%
Moist Forest/Stream Valley	MF	2.36	2.3%
Shrub Slope	SS	17.72	17.1%
Dry forest	DF	14.48	13.9%
Human Environment	HU	50.26	48.4%

4.4.1 East Bank

At the upstream end of the study area at Diefenbaker Park, steep embankments with dry forest community slope down to a riverside park, classified as human environment due to mowing of the vegetation, and presence of cultivar species. At the shoreline are floodplain shrub swamps, extending out onto a series of nearshore sandbar islands. The largest of the rare areas of emergent aquatic vegetation in the study area is found here. The riverbank was modified by Meewasin Valley Authority (and Ducks Unlimited) to create a marsh habitat by building a rock spur into the river. The park above the riverbank slopes toward the South Saskatchewan River. Water flows over the land and through the soil as ground water. When ground water meets the bank it seeps through the exposed riverbank slope. Water collects at the base of this slope maintaining moist conditions. The soil is a mix of concentrated organic and mineral material supporting the growth of cattails, sedges and willows.

Moving downriver, Diefenbaker Park is directly adjacent to Gabriel Dumont Park. Next to that are a number of riverside residences on privately owned shoreline, with landscaping and constructed shoreline features such as docks, boathouses, armoured banks, boat ramps and retaining walls. On the downriver side of the Senator Sid Buckwold Bridge is the Rotary Park, with a very narrow strip of riverside shrub along the shoreline, the remainder being landscaped park.

Downriver, beyond Broadway Bridge, is Cosmopolitan Park, which has a riverside shrub community next to the river, with shrub slope or dry forest community.

North of the University Bridge the river bank is quite steep and high, with the University of Saskatchewan at the top of the slope. The bank is primarily shrub slope almost to the waterline, with riverside shrub communities in some locations. This pattern continues past the weir to the downstream end of the study area, with a small floodplain shrub swamp community near the rail bridge.

4.4.2 West Bank

At the upstream end of the study area, the west bank is a relatively narrow band of floodplain and shrub slope community between the river and Spadina Crescent, from the Grand Trunk rail bridge to the Water Treatment Facility. Victoria Park and boathouse, a fully human influenced habitat, extends to the Riverfront Development Project, which has resulted in a constructed shoreline. The north and west side of the river is occupied by the urban areas of downtown Saskatoon for approximately the next kilometre, with Friendship Park and Kiwanis Memorial Park adjacent to the river. In addition to the human influenced park vegetation, there is also riverside shrub swamp community on an alluvially deposited shoreline sandbar. This riverside shrub community is very similar to the floodplain shrub swamp communities, being just slightly drier. An aquatic community is located in a tributary channel beside the riverbank.

The river then flows past the Mendel Art Gallery and a park area, comprised of riverside shrub swamp and human environment, with a small aquatic community. Goose Island is situated

approximately mid-river. It is a large sandbar approximately 450 m long and with an average width of 60 m. The island is covered in a floodplain shrub swamp community, primarily of sandbar willow with little herbaceous undergrowth. A seasonally inundated aquatic community provides habitat for Canada geese and other waterfowl.

The weir area has been landscaped, with a constructed viewing platform. Downstream of the CPR Bridge, the riverside park and trail continues, with floodplain and shrub slope communities with numerous trees.

SECTION 5.0 - FISH AND FISH HABITAT

5.1 BACKGROUND

5.1.1 Fish Species of the South Saskatchewan River

The South Saskatchewan River reach from Gardiner Dam to Saskatoon is not particularly good fish habitat, in part because of the effects of the dam (Partners for the Saskatchewan River Basin, 2009). The river's thermal regime has been altered, nutrient content is low, and riffle habitat is rare. From Saskatoon to the confluence with the North Saskatchewan River, Pike, walleye and several species of sucker dominate (Partners for the Saskatchewan River Basin, 2009).

A total of 34 fish species have been recorded in the South Saskatchewan River (Atton and Merkowsky, 1983; Miles and Sawchyn, 1988; SPRR, 1991; Reed, 1962, Merkowsky, 1999). Fish species known to occur in the South Saskatchewan River are as listed on Table 5.1.

Prior to the completion of the Gardiner Dam, Reed (1962) recorded the presence of 30 fish species in the South Saskatchewan River. In 1988, 27 of the 30 originally recorded species were captured downstream of the Gardiner Dam (Miles and Sawchyn, 1988). The three exceptions were; pearl dace (*Semotilus margarita*), mountain sucker (*Catostomus platyrhynchus*) and silver redhorse (*Moxostoma anisurum*). Catches near Saskatoon during the Miles and Sawchyn study in 1988 were dominated by various sucker species, followed by walleye and northern pike. Sauger (*Stizostedion canadense*) and goldeye (*Hoidon alosoides*) appeared to be scarce and lake whitefish (*Coregonus clupeaformis*), yellow perch (*Perca flavescens*), and lake sturgeon (*Acipenser fulvescens*) were not collected near the Saskatoon area at that time (Miles and Sawchyn, 1988), although these species have been subsequently confirmed in the Saskatoon area (Merkowsky, 1999, and Star Phoenix, 2003).

An additional four species were noted in 1991; Common Shiner (*Luxilus cornutus)*, Blacknose Dace (*Rhinichthys atratulus)*, Finescale Dace (*Phoxinus neogaeus)* and Slimy Sculpin (*Cottus cognatus)* (SPRR,1991).

In 1997, Merkowsky (1999) confirmed the presence of 15 of the species known to occur in the South Saskatchewan River within the Saskatoon area, listed on Table 5.1. Lake sturgeon have been reported below the Saskatoon Weir (Star Phoenix 2003).

Electrofishing conducted in the South Saskatchewan River at Saskatoon upstream of the weir as part of fisheries baseline studies for the Saskatoon River Landing development resulted in the capture of six fish species, including white sucker (*Catostomus commersoni*), longnose sucker (*Catostomus catostomus*), northern pike (*Esox lucius*), cisco (*Coregonus artedii*), spottail shiner (*Notropis hudsonius*), and trout-perch (*Percopsis omiscomaycus*) (CanNorth 2004, CanNorth 2007).

In 2005, lake sturgeon yearlings (eight) were released by school children into the South Saskatchewan River from Meewasin Valley Park in Saskatoon (downstream of the Saskatoon Weir).

The presence of game fish makes the area of the Saskatoon Weir popular for angling. Small fish and minnows caught in the turbulence below the weir attract pelicans and other piscivorous birds, as well as larger fish. Species commonly caught there consist of walleye, sauger and sturgeon (Phillips, 2009). The Saskatchewan record sturgeon of 270 lbs was caught at the weir in 1962 (Merkowsky, 1999).

5.1.2 Recent Fish Habitat Studies

Fish habitat assessments were conducted within the weir environmental baseline study area. In September 2005, Canada North Environmental Services (CanNorth) conducted a study on the northwest side of the South Saskatchewan River from the Senator Sid Buckwold Bridge to the limits of the Phase 2 Riverfront Development boundary approximately 580 m upstream (CanNorth, 2007). The assessment included the evaluation of existing fish habitat, measurement of limnological parameters, bathymetric mapping and boat electrofishing.

Bathymetric transects in the area of the Senator Sid Buckwold Bridge showed the river channel was generally deeper along the northwest bank with a maximum depth of 4.5 m. The habitat assessment found that areas of silt and sand were most common (87% of the available habitat). Gravel, cobble, and boulder substrate represented 2% and rip rap represented 0.7% of the available habitat. The remaining area (10.3%) contained a mix of primarily sand and silt with some boulders and/or cobble and gravel.

Electrofishing resulted in the capture of 43 fish from six species, including white sucker (*Catostomus commersoni)*, longnose sucker *(Catostomus catostomus*), northern pike (*Esox lucius*), cisco (*Coregonus artedii*), spottail shiner (*Notropis hudsonius*), and trout-perch (*Percopsis omiscomaycus*). Most fish captured were white suckers (30). Previous investigations of the South Saskatchewan River indicate that sucker, walleye, and northern pike dominate the area (CanNorth, 2007).

5.2 FIELD INVESTIGATIONS

Fish habitat assessment was focussed on large-bodied fish species of commercial and recreational importance, as well as some non-commercial species known to inhabit the South Saskatchewan River, including the following:

- Lake Sturgeon (*Acipenser fulvescens*)
- Cisco/Lake Whitefish (*Coregonus sp.)*
- Goldeye (Hiodon alosoides)
- Northern Pike (*Esox lucius*)
- Longnose sucker (*Catostomus catostomus)*
- White sucker (*Catostomus commersoni)*

- Shorthead redhorse (*Moxostoma macrolepidotum*)
- Yellow perch (*Perca flavescens*)
- Sauger (*Stizostedion canadense*)
- Walleye (*Stizostedion vitreum)*

The suitability of river habitat as critical fish habitat, particularly spawning habitat, was assessed for the study area. Assessment methods were based on the study completed by CanNorth on the South Saskatchewan River at the Riverfront Development site in Saskatoon (CanNorth, 2007) described earlier. The classification system used was modified from the classification system developed by the U.S. Fish and Wildlife Service (Cowardin et al. 1979; Busch and Sly 1992) and others (Orth 1989; Ontario Ministry of Natural Resources 1989; Plafkin et al. 1989).

A variety of habitat types along the east and west shorelines of the South Saskatchewan River within the study area were described. One sampling site at minimum was located within each distinct habitat type. The habitat data collection form (located in Appendix B3) was developed based on Ontario Ministry of Natural Resources (OMNR) Stream survey and the CanNorth study, and includes a description of the following:

Riparian Zone

- Bank slope (gentle, moderate, or steep slope)
- Bank stability (stable, slightly unstable, moderately unstable, and highly unstable)
- Riparian vegetation (tree, shrub, wetland, aquatic)
- Bank cover/canopy overhang

Shoreline Habitat Features

- Instream cover (large woody debris, boulder, aquatic vegetation)
- Stream cover (terrestrial vegetation, undercut)
- Substrate composition (silt/clay (<0.0063 cm), sand (0.0063 - 0.2 cm), gravel (0.2 cm), cobble (6.4 - 25.6 cm), boulder (>25.6 cm), bedrock, organic, and large woody debris)
- Aquatic/wetland vegetation
- Bottom slope

Spawning Habitat Suitability Index

Suitability as spawning habitat was rated for each of the focus species based on known spawning habitat characteristics. Spawning habitat characteristics for each of the focus species are summarized in Table 5.2. Spawning habitat was rated as not suitable, marginal, moderate, or most suitable.

Fish habitat characteristics were recorded at 20 sites within the study area along the South Saskatchewan River shoreline (Figure 5.1). Most of these were shoreline sites, however four were in mid-river shallows. A summary of the data collected is in Appendix B3, as well as a photographic record of each site.

5.3 FISH HABITAT

The South Saskatchewan River is sediment laden with poor visibility as it passes through Saskatoon. The river thalweg meanders between the banks, resulting in a deeper channel with sandbars and channels to one or both sides. The depth of the deepest point of the riverbed has been measured at 4.5 m (CanNorth 2007), however this would vary with river water level and thalweg configuration. It is believed that the sandbar configuration could change from year to year. The assumed thalweg location based on 2009 field studies is shown on Figure 5.1

Immediately below the Saskatoon Weir are shallow rapids with boulder cobble substrate and high flow velocity. At the base of the weir the water is very turbulent. Further upstream, near the University Bridge, the east bank is very steep, through Cosmopolitan Park, showing some slumping, while the west bank, where the downtown core is situated, is shallow, with sandbars just off shore. At the Broadway Bridge, a wall has been constructed at the west shoreline as part of the Riverfront development. The east bank is less steep, with maintained parkland (Rotary Park). The west bank, through Victoria Park, shows some slumping, with a narrow floodplain and then a drop off. The east bank with a short steep bouldery bank and drop off which has been artificially created with fill material to create Gabriel Dumont Park. The west bank from Victoria Park to the Grand Trunk Rail Bridge is very shallow with many sandbars just off shore.

The South Saskatchewan River shoreline was classified into the following five general fish habitat categories within the study area, as shown on Figure 5.1:

1. Shallow rapids with boulder substrate
2. Steep drop off with silt/sand substrate
3. Steep drop off with boulder bank and substrate
4. Shallow slope, sandbars with sand substrate and submergent vegetation
5. Shallow with emergent aquatic vegetation

Areas of shoreline with emergent aquatic vegetation were very scarce and are shown on Figure 5.1 as point locations since they were so small.

Most of the study area was not suitable spawning habitat for any of the focus species. The only habitat which was rated as most suitable was the area of the river just downstream of the weir, where a clean cobble and boulder substrate, combined with 0.5 to 1.5 m depth of water and a strong current form a riffle suitable for lake sturgeon, walleye, sauger and sucker spawning. Another location with a boulder cobble substrate (FH10 on Figure 5.1) was considered moderately suitable for these species. One location, at a tributary inflow (FH3 on Figure 5.1), was considered moderately suitable for northern pike and yellow perch.

SECTION 6.0 - WILDLIFE

6.1 REPTILES AND AMPHIBIANS

6.1.1 Background

Saskatchewan has representatives of two orders of amphibians: the Caudata (tailed salamanders) and the Anura (frogs and toads which lack tails as adults) (Appendix C1). The tiger salamander (*Ambystoma tigrinum*) has been reported in the Saskatoon area (Table 6.1). It is a fairly large salamander which is usually olive-green with black blotches or specks. The aquatic larva, found in prairie sloughs, is also large with four well-developed legs and bushy gills (COSEWIC).

Of the anuran species found in Saskatchewan, the Plains spadefoot and Great Plains toad are limited to the dry Prairies of the southwestern corner of the province, and have not been reported in the Saskatoon area.

The other species of Saskatchewan anurans may be may be expected to be found in the Saskatoon area in suitable habitats, from temporary sloughs in the prairies to small ponds in the boreal forest (Encyclopaedia of Saskatchewan on-line). These include boreal chorus frog (*Pseudoacris triseriata maculata*) northern leopard frog *Rana pipiens* western chorus frog *Pseudacris triseriata* wood frog *Rana sylvatica* and Canadian toad *Bufo hemiophrys.* Of these, the boreal chorus frog and the northern leopard frog have been recorded in the Saskatoon area (Table 6.1).

Some of the Saskatchewan amphibians, such as the northern leopard frog, are reduced in their distribution and numbers from earlier records. The northern leopard frog is considered of “Special Concern” under both the Species at Risk Act (SARA) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Northern leopard frog habitat is typically associated with clear water that is relatively fresh to moderately saline. Breeding occurs in shallow and warm standing water associated with permanent and semi-permanent wetlands, springs, dugouts, borrow pits, lakes, beaver ponds, and the backwaters and oxbows of rivers. Temporary ponds and shallow lakes unsuitable for fish, flooded until August, containing a mixture of open water and emergent vegetation are the most favourable spawning sites. Summer feeding areas are located along the margins of water bodies in open and semi-open areas with shorter vegetation. Areas with tall, dense marsh vegetation, grasses or extensive shrub cover are also avoided, particularly by smaller frogs. Overwintering frogs require well-oxygenated water that does not freeze to the bottom during the winter, and are most often located in springs, streams, spillways below dams, or in deeper lakes and ponds. Frogs have been found hibernating under rocks, logs, leaf litter or vegetation, or in depressions in sand or mud. (Alberta Sustainable Resource Development, 1997).

Saskatchewan has representatives of three kinds of reptiles: two species of turtles, one lizard and nine snakes (Appendix C1). All of these reptiles are active only in the warm spring and summer

months, and spend the cold time of the year below the frost-line underground. The province is at the boundary of the eastern woodlands fauna (snapping turtle, red-bellied snake) and the western plains fauna (short-horned lizard, bullsnake, western rattlesnake). Since all of the species in Saskatchewan are on the northern margins of their distributions, only three species of snake are expected to be observed in the Saskatoon area, the bullsnake, plains garter snake and redsided garter snake (Table 6.1)

The garter snakes have a yellow or orange mid-dorsal stripe. They are often found around water, where they feed on frogs, fish, leeches and insects, as well as small rodents. The plains garter snake is the most common reptile species in the province, famous for setting up overwintering dens in rural house basements. (Encyclopaedia of Saskatchewan on-line).

6.1.2 Field Observations

During the course of the field studies in 2009, one plains garter snake was observed in the study area, on the east bank between the weir and University Bridge. One amphibian species was also observed, a northern leopard frog (photo in Appendix B4) on the east bank near the south end of the study area, in the river.

6.2 BIRDS

6.2.1 Avifauna

The Province of Saskatchewan has a rich ornithological history, beginning with observers during the time of the Hudson's Bay Company in 1745 (Smith, 1996). The province provides breeding territory for numerous species, as well as migratory stopover and year round habitat. Three hundred and eighty two species have been recorded in the province, as listed on Table 6.2, although about 70 species are considered rare or accidental visitors to Saskatchewan. Eight species are ranked as endangered by COSEWIC (Appendix C3, Table 6.2). The Greater Prairie Chicken (*Tympanuchus cupido)* and Eskimo Curlew (*Numenius borealis)* are listed as extirpated by the Wildlife Act, 1998 and four species; Burrowing Owl (*Athene cunicularia)* , Piping Plover (*Charadrius melodus)*, Sage Grouse (*Centrocercus urophasianus)*, Whooping Crane (*Grus Americana)*, are listed as endangered. Mountain Plover, Red Knot and Sage Thrasher are not mentioned in the Wildlife Act, although they are listed as endangered by COSEWIC. Mountain Plover and Sage Thrasher are listed as endangered in the SARA registry, but Red Knot is listed as "No Status".

The Saskatoon Nature Society compiled a checklist of 321 avian species expected in the Saskatoon, Saskatchewan district (Saskatoon Nature Society, 2007). The checklist was primarily compiled from records published in *Birds of the Saskatoon Area* (2002) and is maintained by the records committee of the Saskatoon Nature Society. These birds are listed in Table 6.3.

The location on the riverbank overlooking the weir provides a good opportunity for observing waterfowl. Warmer water returned to the river from the Queen Elizabeth Generating Station

prevents ice from forming locally on the river and common goldeneye can often be seen at the weir in the winter.

There are often concentrations of gulls at the weir and American white pelicans (*Pelecanus erythrorhyncos*) are commonly seen feeding there as well. Saskatoon has a permanent resident population of merlins (Hilderman, Feir, Witty and Associates, 1981)

6.2.2 American White Pelican (*Pelecanus erythrorhynchos*)

The American White Pelican, once considered a red listed species, is highly mobile and adaptable (McGaugh 1998). They are considered one of the largest birds on the continent weighing 7-10 kg and having a wing span of up to 3 m. They have white plumage with black tips and orange bills with gular pouches. Juvenile birds have a grey patch on their head and back of neck. Breeding birds, male and female, develop a nuptial tubercle on their bill that falls off after breeding season (McGaugh, 1998).

American White Pelican nest in colonies on islands in lakes, reservoirs, or large rivers (MELP 1993). Colony locations are in areas where there is minimal disturbance, habitat stability, and adequate foraging area (McGaugh, 1998). Pelicans observed at the weir are likely from New Tern Island in Redberry Lake, a Provincial Wildlife Reserve and Federal Migratory Bird Sanctuary (Alisauskas et al., 2006) approximately 68 km from the Saskatoon Weir (Saskatoon Nature Society, 2009). Goose Island directly above the weir is not believed to be a colony location, (Bortolotti, 2009; Wall, 2009) mostly like because of its urban area setting near the City of Saskatoon and potential for disturbance.

Nests are generally constructed approximately one metre from neighbouring nests in flat areas, with no trees or shrubs and limited fluctuation in water levels. Nests are made of island substrate, plants, and debris with a central unlined hollow (McGaugh, 1998). Average nest size is two eggs.

Male and female pelicans share the role of incubating and foraging. Incubation ranges from 29 to 36 days and once the eggs have hatched parents will look after the young for two to three weeks (McGough, 1998). Once the young have matured, they will leave the nest and join crèches of other young pelicans until they are mature enough to start foraging.

The American White Pelican is not a diving bird. They capture their food by dipping their bills under water and scooping up fish (McGaugh, 1998). Their diet mainly consists of fish found in shallow waters (MELP, 1993). Waters can be oligotrophic, clear, eutrophic, or turbid (McGaugh, 1998). Foraging is done in groups early in the morning and sometimes in the evening during breeding seasons and may be many miles away from the colony (McGaugh, 1998).

The Saskatoon Weir is a foraging attractant for the American White Pelican. The strong spiral currents created at the weir entrain fish. Smaller fish that cannot defy the turbulence are particularly susceptible to entrainment below the weir allowing easy foraging.

The American White Pelican is a migratory bird. They often arrive to the Saskatoon Weir in mid to late April and leave in September before the river freezes. The pelicans migrate as far as California, Florida, Mexico and Guatemala for overwintering (Meewasin Valley Authority, 2009). By the beginning of May (according to the May Day count), pelican numbers usually range from 75 to 222. Numbers (mean annual number) have been increasing over the past four decades:

- 1960s - 0.9
- 1970s - 8.0
- 1980s - 81.0
- 1990s - 133.0 (Leighton et. al., 2002)

6.2.3 Water Birds and Shore Birds in Saskatoon

A list of shore and water bird species present in Saskatoon was compiled from the "Birds of Saskatoon" book produced by the Saskatoon Nature Society (2002). Table 6.4 lists these species as well as providing the earliest spring arrival dates and seasonal residence information. Some of the species are migratory transients, visiting the Saskatoon area either during spring migration or fall migration, or both. Some transient species are not consistently observed in Saskatoon each year. The season of residence of each species is noted, shore and water birds are present spring, summer and fall, although occasionally some will be observed lagging behind the peak migration into the winter where open water can be found.

6.2.4 Field Observations

Birds and bird habitat were surveyed during spring migration, the breeding season, and during fall migration. Birds were identified in the field using "The Sibley field guide to birds of Western North America" (Sibley, 2007).

It was expected that birds observed near the study area would primarily comprise shore and water birds using the river and banks for habitat. A review of the "Birds of Saskatoon" (Leighton et. al., 2002) was completed to determine when the most effective date would be to conduct field observations of birds in Saskatoon (Table 6.4). It was determined that the majority of birds would have arrived by early May, and initiated their breeding behaviours (mating and territorial displays). The species accounts in the "Birds of Saskatoon" were also reviewed to determine which bird species had been observed in the weir area (Table 6.5). The earliest spring arrival dates, residence information and evidence of breeding is also compiled on Table 6.5.

The habitat preferences and nesting habitat of birds observed near the weir are summarized on Table 6.6.

May

In May, the approximately 20 American White Pelicans were observed catching fish at the weir, in the downstream turbulence. The majority of pelicans were feeding at the western end of the weir, although some made use of the fish ladder pools at the east end of the weir to assist with fish capture. The birds all displayed nuptial tubercles, indicating that they were adults, mature

enough to breed. One of the observed fish captures is tentatively identified as a white sucker. The pelicans were also loafing on sand bars downstream of the weir.

The following species were observed in May:

- American Robin (*Turdus migratorius*)
- American White Pelican (*Pelecanus erythrorhynchos*)
- Black-Billed Magpie (*Pica hudsonia*)
- Black-Capped Chickadee (*Poecile atricapillus*)
- Canada Goose (*Branta canadensis*)
- Chipping Sparrow (*Spizella passerine*)
- Common Merganser (*Mergus merganser*)
- Dark-Eyed Junco (*Junco hyemalis*)
- Glaucous Gull (*Larus hyperboreus*)
- Mallard (*Anas platyrhynchos*)
- Olive-Sided Flycatcher (*Contopus cooperi*)
- Red-Winged Blackbird (*Agelaius phoeniceus*)
- Spotted Sandpiper (*Actitis macularius*)
- Western Grebe (*Aechmophorus occidentalis*)
- Grackle (*Quiscalus quiscula*)
- White-Throated Sparrow (*Zonotrichia albicollis)*
- Raven (*Corvus corax*)
- Rock Dove (*Columbia livia*)
- House Sparrow (*Passer domesticus*)

Mating behaviours (pairs, nest, defensive) were observed in the Canada geese, American robins, and mallards. Very intense Canada goose nesting activity was observed on the mid-channel island upstream of the weir (Goose Island). Geese were observed on nests within a few feet of each other. Due to the intense activity of the geese, it is unlikely that other birds would be nesting on the island in early May, although it is possible that passerines may nest in the willows in June. A mallard pair was observed near the island.

June

Approximately 30 Pelicans were observed catching fish at the west end of the weir, or loafing on the sandbars (photos in Appendix B4. River flow over the weir appeared similar to that observed at the beginning of May. In order to determine if the pelicans flew back to Redberry Lake, as has been reported, the weir was observed just prior to dawn on June 18 (4:43 am). Conditions were very misty with visibility less than 100 m. Three Canada geese were observed on the cement beside the weir, and approximately 10 pelicans were roosting on a sandbar about 50 m offshore, downstream of the weir. It was presumed that these birds were not returning to Redberry Lake overnight, and therefore were unlikely to be breeding birds. It is unknown if they returned to Redberry Lake in the day.

In addition to the species observed in May, the following species were observed in June:

- Common Tern (*Sterna hirundo*)
- Cedar Waxwing (*Bombycilla cedrorum*)
- Eastern Kingbird (*Tyrannus tyrannus*)
- Gulls (*Leucophaeus sp.*)
- Common yellowthroat (*Geothlypis trichas*)
- Yellow warbler (*Dendroica petechia*)
- Franklin's gull (*Leucophaeus pipixcan*)

Canada goose and mallard hatchings were observed in family groups.

September
The following species were observed:

- Western Grebe (*Aechmophorus occidentalis*) feeding below weir
- American Robin (*Turdus migratorius*) - in park
- American White Pelican (*Pelecanus erythrorhynchos*) - one feeding below weir
- Black-Billed Magpie (*Pica hudsonia*)
- Black-Capped Chickadee (*Poecile atricapillus*
- Canada Goose (*Branta canadensis*) - 100 on and around goose island
- Chipping Sparrow (*Spizella passerine*
- Glaucous Gull (*Larus hyperboreus*)
- Mallard (*Anas platyrhynchos*)
- Red-Winged Blackbird (*Agelaius phoeniceus*)
- Raven (*Corvus corax*)
- Rock Dove (*Columbia livia*) - under bridges and throughout
- House Sparrow (*Passer domesticus*)
- Tern (*Sterna hirundo*)- near weir

The island just upstream of the weir, Goose Island, was investigated. No signs of human activity were noted on this island. It appeared to be a prolific nesting site for Canada geese, many nesting depressions, shell fragments and dead eggs were observed, singly and in clutches of 8 or 10. Many geese, estimated in the 100's, were either swimming in the vicinity of the island, or loafing within the aquatic portion of the island. Maximum elevation of the island was less than 2 m above the low water level observed September 15, 2009. The island did not appear to be completely inundated each year; an inundation cycle of 5 or 10 years is estimated.

6.3 MAMMALS

6.3.1 Background

There are seventy-two species of wild mammals found in Saskatchewan. There are representatives of six orders of mammals: Insectivora (shrews), Chiroptera (bats), Lagomorpha

(hares and rabbits), Rodentia (rodents), Carnivora (carnivores) and Artiodactyla (including deer, bison and pronghorns). There are no species of mammals unique to Saskatchewan.

The climate of Saskatchewan is continental, with long cold winters and short warm summers. Only mammal species adapted to survive these winters inhabit Saskatchewan. For example, most bats migrate south during the winter; caribou migrate through the boreal area looking for patches of lichens and vegetation; several types of rodents hibernate; and black bears go into a deep sleep.

The Swift Fox (*Vulpes velox)* has been identified in the Saskatoon area as an endangered species under the Saskatchewan Wildlife Act, SARA, and as threatened by COSEWIC. The Swift Fox is found in grassland habitats of the Prairies. It is small in size with an average height of 30 cm at the shoulders and a weight of 2.45 kg for males and 2.25 kg for females (SARA).

The City of Saskatoon is within the Moist and Mixed Grassland ecoregion. Wildlife in the parklands include moose (*Alces americanus*), white-tailed deer (*Odocoileus virginianus*), black bears (*Ursus americanus*), coyotes (*Canis latrans*), pocket gophers (*Thomomys talpoides*), thirteen-lined ground squirrels (*Spermophilus tridecemlineatus*), Richardson's ground squirrels (*Citellus richardsoni*), beavers (*Aplodontia sp.*), snowshoe hares (*Lepus americanus*), weasels (*Mustela sp.*), and grey wolves (*Canis lupus*).

Burrowing rodents such as Richardson's ground squirrels, thirteen-lined ground squirrels, and pocket gophers play a major role in the balance between the aspen groves and the grassland. These burrowing mammals make mounds of fresh soil which are ideal locations for the germination of poplar seeds. Once established, these trees spread by suckering, thus creating new aspen groves.

Nineteen mammal species were observed in the East Bank study area, an area slightly larger but fully encompassing the east bank portion of this study area (Hilderman, Feir, Witty and Associates, 1981). The species trapped or observed included:

- Masked shrew
- Least weasel (*Mustela nivalis*)
- Long-tailed weasel (*Mustela frenata*)
- Striped skunk (*Mephitis mephitis*)
- White-tailed jack rabbit (*Lepus townsendii*)
- Snowshoe hare (*Lepus americanus*
- Woodchuck (*Marmota monax*)
- Richardson's ground squirrel (*Citellus richardsoni*)
- Thirteen-lined squirrel (*Spermophilus tridecemlineatus*)
- Franklin's ground squirrel (*Spermophilus franklinii*)
- Least chipmunk (*Neotamias minimus*)
- Red squirrel (*Tamiasciurus hudsonicus*)
- Deer mouse (*Perognathus sp.*)
- Gapper's red-backed vole (*Clethrionomys gapperi)*

- Meadow vole (*Microtus pennsylvanicus*)
- Norway rat (*Rattus norvegicus*)
- House mouse (*Mus musculus*)
- Beaver (*Aplodontia sp.*)
- Muskrat (*Ondatra zibethicus*)

An additional four small mammals were not observed but expected to likely be there, including short-tailed shrew, northern pocket gopher, prairie vole and meadow jumping mouse.

Larger mammals with transient occupation of the east bank include red fox, coyote, badger, porcupine and white tailed deer.

More recent studies and species lists compiled in the Saskatoon area supplement the East Bank species listed above (Delanoy, 2001; Jonker and Gollop, 2000), as listed on Table 6.7.

6.3.2 Field Observations

Since the study area is within an urban area, larger mammals such as bears are not expected. The vegetated riparian buffer zone could potentially provide a forested corridor for some large forest mammals, however it is not continuous from north to south on either river bank, being disrupted by both bridges and parklands (Figure 4.1).

The vegetation community mapping reveals the available habitat for mammals (Figure 4.1 - 4.6). The vegetated riparian buffers provide sufficient habitat size for small mammals.

The following mammals or sign were observed in the course of these field visits:

Beaver	*Castor canadensis*
Richardson's Ground Squirrel	*Citellus richardsoni*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Raccoon	*Procyon lotor*
Deer	*Odocoileus sp.*

Two beaver lodges were observed, one on Goose Island (photo in Appendix B4) and one on the west bank near downtown Saskatoon.

The thirteen-lined ground squirrel lives in open areas with short grass and well-drained sandy or loamy soils for burrows, avoiding wooded areas. Mowed lawns, golf courses, cemeteries, well-grazed pastures, parks and roadsides are common habitats. The squirrel is omnivorous, particularly feeding on seeds and insects (Burt and Grossenheider, 1976).

Richardson’s ground squirrel lives in grasslands, usually near water and herbaceous growth. It is also omnivorous, feeding on meat, insects and green vegetation (Burt and Grossenheider, 1976).

Raccoons are omnivores, feeding along streams and lakes, and thrive in anthopogenic environments. Beavers construct stick and mud lodges at the edge of streams and lakes, and feed on trees and alders (Burt and Grossenheider, 1976).

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SECTION 8.0 - CERTIFICATION

This report was prepared, reviewed and approved by the undersigned.

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TABLE 2.1

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
AVERAGE MONTHLY FLOWS AT SASKATOON WEIR (m^3/s) (1968-2008)

Print Feb/15/10 14:09:48

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	366	138	152	49	36	39	42	56	49	172	224	242	**131**
1969	371	388	357	307	312	306	758	231	184	203	270	342	**336**
1970	371	326	197	134	130	191	193	184	148	224	222	325	**220**
1971	348	377	315	259	237	349	140	81	84	130	245	326	**240**
1972	321	308	358	309	201	306	453	325	241	215	257	346	**304**
1973	378	374	228	108	91	143	134	115	174	182	221	328	**205**
1974	327	294	351	346	329	482	294	218	194	151	209	271	**289**
1975	318	316	229	156	205	568	396	149	116	212	271	303	**269**
1976	357	319	263	180	81	80	77	215	216	230	212	327	**213**
1977	354	264	126	74	50	52	49	49	47	53	160	216	**124**
1978	219	175	183	141	56	243	166	133	237	230	227	238	**187**
1979	358	384	304	139	160	196	73	77	51	124	162	193	**184**
1980	241	344	186	111	68	152	141	59	98	169	256	267	**174**
1981	318	293	180	177	127	492	384	491	272	227	244	232	**286**
1982	354	318	250	191	99	58	62	104	120	163	206	276	**183**
1983	333	322	217	137	128	68	71	83	113	145	136	232	**165**
1984	201	112	95	80	52	55	51	51	53	48	113	104	**85**
1985	103	113	57	76	117	70	48	50	48	52	145	222	**92**
1986	248	250	187	71	76	217	169	191	149	317	271	274	**202**
1992	232	261	162	75	53	48	49	57	111	138	243	221	**137**
1993	254	154	76	95	139	189	662	577	446	388	351	251	**300**
1994	328	340	257	230	233	98	85	109	119	110	169	229	**191**
1995	262	234	179	105	84	540	611	343	254	277	299	260	**288**
1996	336	319	273	273	396	317	276	177	191	243	251	271	**277**
1997	362	269	278	241	367	380	203	127	100	192	213	218	**246**
1998	241	238	144	88	95	202	630	212	145	141	196	217	**213**
1999	303	301	251	129	100	108	109	215	199	193	214	238	**196**
2000	259	288	221	146	121	107	102	99	97	98	162	206	**158**
2001	206	153	98	80	67	65	58	61	66	71	120	146	**99**
2002	136	87	68	55	50	212	282	135	138	170	260	230	**152**
2003	224	247	218	183	303	349	162	202	112	111	172	184	**205**
2004	206	149	90	85	68	63	63	63	60	101	236	243	**119**
2005	241	273	239	142	141	836	661	238	449	419	369	253	**355**
2006	333	385	344	233	242	323	222	149	122	128	197	239	**242**
2007	239	243	276	188	313	406	280	161	150	148	198	224	**236**
2008	275	268	157	90.9	115	356	316	183	179	212	210	200	**213**
Average	**287**	**267**	**210**	**152**	**151**	**241**	**235**	**166**	**154**	**177**	**220**	**247**	**209**
Maximum	**378**	**388**	**358**	**346**	**396**	**836**	**758**	**577**	**449**	**419**	**369**	**346**	**355**
Minimum	**103**	**87**	**57**	**49**	**36**	**39**	**42**	**49**	**47**	**48**	**113**	**104**	**85**

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev A\Tables\[2.1 and Figure 2.1.xls]Table 2.1

NOTES:

1. DATA OBTAINED FROM ENVIRONMENT CANADA (WSC 05HG001).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

TABLE 3.1

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
WATER QUALITY DATA FROM WATER TREATMENT PLANT

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Parameter	CCME Guidelines [1]	River Water Quality [2]	
	Concentration (µg/L)	Units	Value
A. Physical Characteristics			
Color (apparent)	Narrative	APHA	6
Conductivity at 25°C		umhos/cm	411
pH	6.5–9		8.3
Temperature	Narrative	C	11
Turbidity	Narrative	NTU	4.6
B. Inorganic Constituents			
Aluminum	100 [3]	mg Al/L	0.016
Arsenic	5	mg As/L	0.0007
Barium		mg Ba/L	0.083
Boron		mg B/L	0.03
Cadmium	0.017	mg Cd/L	<0.001
Calcium		mg Ca/L	44
M-Alkalinity		mg $CaCO_3$/L	144
P-Alkalinity		mg $CaCO_3$/L	1.3
Carbonate		mg $CaCO_3$/L	1.3
Bicarbonate		mg $CaCO_3$/L	174
Total Hardness		mg $CaCO_3$/L	173
Chloride		mg Cl/L	7
Chlorine Residual		mg Cl2/L	NR*
Chromium	9.9 [4]	mg Cr/L	0.001
Copper	3 [5]	mg Cu/L	0.004
Cyanide	5 (as free CN)	mg CN/L	NR*
Fluoride		mg F/L	0.22
Iron	300	mg Fe/L	0.069
Lead	4 [6]	mg Pb/L	<0.002
Magnesium		mg Mg/L	16
Manganese		mg Mn/L	0.0178
Mercury	0.026 [7]	mg Hg/L	<0.00005
Potassium		mg K/L	2.9
Selenium	1	mg Se/L	NR*
Silver	0.1	mg Ag/L	<0.001
Sodium		mg Na/L	21
Sulfate		mg SO4/L	65
Uranium		mg U/L	NR*
Zinc	30	mg Zn/L	<0.005
C. Nutrient Constituents			
Ammonia	0.2744 [8]	mg N/L	0.05
Nitrate (& Nitrite)	13060 [9]	mg N/L	0.7
Total Kjeldahl Nitrogen		mg N/L	0.25
Soluble Ortho Phosphate		mg P/L	0.02
Total Phosphate		mg P/L	0.04
D. Organic Constituents			
BOD 5 day		mg /L	1
Phenolics	4 [10]	mg Phenol/L	0.0007
Soluble Organic Carbon		mg C/L	3.6
Total Dissolved Solids		mg /L	330
Total Suspended Solids	narrative	mg /L	8.7
Volatile Suspended Solids		mg /L	2.5
E. Microbiological			
Chlorophyll-a		mg /L	0.0025
Fecal Coliform		CFU/100ml	37
Fecal Streptococcus		CFU/100ml	40
HPC		CFU/mL	747
Total Coliform		CFU/100ml	108
F. Total Trihalomethanes		mg/L THM	NR
G. Pesticide Scan, H. Organic Scan, I. Radiochemicals [11]			

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[Table 3.1.xls]3.1 WTP

NOTES:

1. WATER QUALITY GUIDELINES ARE NUMERICAL CONCENTRATION OR NARRATIVE STATEMENT RECOMMENDED TO SUPPORT AND MAINTAIN A DESIGNATED WATER USE. OBTAINED FROM CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT, CANADIAN WATER QUALITY GUIDELINES FOR THE PROTECTION OF AQUATIC (FRESHWATER) LIFE, 1999.
2. VALUES ARE TYPICAL RIVER WATER QUALITY CHARACTERISTICS OBTAINED FROM CITY OF SASKATOON WATER TREATMENT PLANT.
3. CCME GUIDELINE FOR ALUMINUM AT PH ≥6.5.
4. CCME GUIDELINE FOR CHROMIUM IS SUM OF HEXAVALENT AND TRIVALENT CHROMIUM.
5. CCME GUIDELINE FOR COPPER AT WATER HARDNESS OF 120-180 MG/L (HARD) AS $CaCO_3$.
6. CCME GUIDELINE FOR LEAD AT WATER HARDNESS OF 120-180 MG/L (HARD) AS $CaCO_3$.
7. CCME GUIDELINE FOR INORGANIC MERCURY.
8. WQGL FOR AMMONIA DETERMINED BY MULTIPLYING THE VALUE FOR TOTAL AMMONIA AT A TEMPERATURE OF 10° C AND A PH of 8.5 by 0.8 IN ORDER TO CONVERT TO TOTAL AMMONIA NITROGEN TO ALLOW FOR COMPARISON TO REPORTED VALUE AS PER THE CCME CANADIAN WATER QUALITY GUIDELINES FOR THE PROTECTION OF AQUATIC LIFE AMMONIA FACTSHEET, 2000.
9. CCME GUIDELINE FOR NITRATE AND NITRITE IS THE SUM OF GUIDELINE VALUES FOR NITRATE AND NITRITE.
10. CONCENTRATION OF PHENOLICS COMPARED TO CCME GUIDELINE FOR MONO AND DIHYDRIC PHENOLS.
11. CONCENTRATIONS LESS THAN DETECTION LIMITS FOR ALL CONSTITUENTS TESTED OR BELOW THE PROVINCIAL PERMIT TO OPERATE LIMITS.
12. NR NOT REQUIRED OR NOT APPLICABLE BY SASKATCHEWAN PROVINCIAL PERMIT TO OPERATE.
13. DATA SOURCE; http://www.saskatoon.ca/DEPARTMENTS/Utility Services/Water and Wastewater Treatment/Water Treatment Plant/Treatment Process/WaterQualityDetails.aspx.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 3.2

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
WATER ANALYSIS RESULTS

Print Feb/15/10 14:45:43

Date Sampled	Units	15-Sep-09	15-Sep-09	SWQO [1]	CCME [2]
Time Sampled		9:00 AM	11:22 AM		
Sample Location		SPL-1	SPL-2		
In Situ Parameters					
pH		8	8.45		6.5 to 9
Specific Conductivity	µS/cm	550	570		
Temperature	°C	18.2	18.2		
Physical Tests					
Alkalinity	mg/L $CaCO_3$	253	158		
Biochemical Oxygen Demand		<2	<2		
Color	TCU	7	6		
Conductivity	µS/cm	542	470		
Hardness (Dissolved)	mg/L $CaCO_3$	172	170		
Hardness (Total)	mg/L $CaCO_3$	184	190		
pH		7.86	8.36		6.5 to 9
Total Dissolved Solids	mg/L	260	277		
Dissolved Anions					
Bromide	mg/L	<0.3	<0.3		
Chloride	mg/L	8.2	9.6		
Sulphate	mg/L	67	69		
Nutrients					
Nitrate (Dissolved)	mg/L	0.18	0.17		13
Nitrate+Nitrite (Dissolved)	mg/L	<0.1	<0.1		
Nitrite (Dissolved)	mg/L	<0.06	<0.06		0.06
Nitrogen Kjeldahl (Total)	mg/L	<0.5	<0.5		
Phosphorus (Dissolved)	mg/L	<0.01	<0.01		
Phosphorus (Total)	mg/L	<0.01	<0.01		
Dissolved Metals					
Aluminum	mg/L	0.02	0.01	0.005 to 0.1	0.005 to 0.1 [6]
Antimony	mg/L	<0.0002	<0.0002		
Arsenic	mg/L	0.0007	0.0008	0.005	0.005
Barium	mg/L	0.0805	0.0818		
Beryllium	mg/L	<0.00002	<0.00002		
Bismuth	mg/L	<0.00001	0.00002		
Boron	mg/L	0.0229	0.024		
Cadmium	mg/L	0.000011	<0.000003	0.000017 to 0.0001 [7]	$10^{(0.86*(\log[\text{Hardness (Dissolved)}])-3.2)}/1000$ [7]
Calcium	mg/L	41.6	41.1		
Chromium	mg/L	<0.0005	<0.0005		
Cobalt	mg/L	0.0001	0.000195		
Copper	mg/L	0.0011	0.0019		0.002 to 0.004 [7]
Iron	mg/L	0.01	<0.01		0.3
Lead	mg/L	0.00014	0.00017		0.001 to 0.007 [7]
Lithium	mg/L	<0.002	<0.002		
Magnesium	mg/L	16.6	16.4		
Manganese	mg/L	0.00073	0.00174		
Molybdenum	mg/L	0.00141	0.00144		0.073
Nickel	mg/L	0.0021	0.0019		0.025 to 0.15 [7]
Potassium	mg/L	2.46	2.39		
Selenium	mg/L	<0.001	<0.001		0.001
Silicon	mg/L	0.59	0.64		
Silver	mg/L	<0.00001	<0.00001		0.0001
Sodium	mg/L	22.2	22.4		
Strontium	mg/L	0.258	0.255		
Thallium	mg/L	<0.0002	<0.0002		0.0008
Tin	mg/L	0.00008	0.00001		
Titanium	mg/L	0.0001	0.0002		
Tungsten	mg/L	<0.00003	<0.00003		
Uranium	mg/L	0.00118	0.00118		
Vanadium	mg/L	0.00066	0.00082		
Zinc	mg/L	0.002	0.002		0.03
Total Metals					
Aluminum	mg/L	0.04	0.03		0.005 to 0.1 [6]
Antimony	mg/L	<0.0002	<0.0002		
Arsenic	mg/L	0.0008	0.0008		0.005
Barium	mg/L	0.0858	0.0883		
Beryllium	mg/L	<0.00002	<0.00002		
Bismuth	mg/L	<0.00001	0.00001		
Boron	mg/L	0.0244	0.0265		
Cadmium	mg/L	0.000011	0.000017		$10^{(0.86*(\log[\text{Hardness (Dissolved)}])-3.2)}/1000$ [7]
Calcium	mg/L	45.5	46.9		
Chromium	mg/L	<0.0005	<0.0005		
Cobalt	mg/L	0.000162	0.000156		
Copper	mg/L	0.0016	0.0018		0.002 to 0.004 [7]
Iron	mg/L	0.08	0.05	0.3	0.3
Lead	mg/L	0.0003	0.00026	0.001 to 0.007 [7]	0.001 to 0.007 [7]
Lithium	mg/L	<0.002	<0.002		
Magnesium	mg/L	17.1	17.6		
Manganese	mg/L	0.0113	0.0104		
Mercury	mg/L	<0.0001	<0.0001		0.000026
Molybdenum	mg/L	0.00151	0.0016		0.073
Nickel	mg/L	0.0016	0.0016	0.025 to 0.15 [7]	0.025 to 0.15 [7]
Potassium	mg/L	2.92	3.05		
Selenium	mg/L	<0.001	<0.001	0.001	0.001
Silicon	mg/L	0.75	0.81		
Silver	mg/L	<0.00001	0.00001	0.0001	0.0001
Sodium	mg/L	26.4	28.3		
Strontium	mg/L	0.277	0.287		
Thallium	mg/L	<0.0002	<0.0002		0.0008
Tin	mg/L	0.00007	0.00012		
Titanium	mg/L	0.0012	0.0009		
Tungsten	mg/L	<0.00003	<0.00003		
Uranium	mg/L	0.00121	0.0012	0.015	
Vanadium	mg/L	0.00055	0.00049		
Zinc	mg/L	0.003	0.003	0.03	0.03
Microbiological					
Total Coliform	cfu/100mL	96 [8]	70 [8]		
E. coli	cfu/100mL	44 [8]	30 [8]		
Chlorophyl A	mg/L	--- [9]	<0.001		
Organics					
Carbon Organic (Dissolved)	mg/L	2.2	2.7		
Carbon Organic (Total)	mg/L	2.8	2.6		
Diquat	µg/L	<1	<1		
Paraquat	µg/L	<1	<1		
Glyphosate	µg/L	<6	<6	65	65
PCB	µg/L	< 0.1	< 0.1		
Benzo(a)pyrene	µg/L	<0.01	<0.01		0.015
2,4-dichlorophenol	µg/L	<1	<1		0.2
2,4,6-trichlorophenol	µg/L	<0.25	<0.25		18
2,3,4,6-tetrachlorophenol	µg/L	<1	<1		1
4AAP - Phenols	mg/L	<0.002	<0.002	4	4
Pentachlorophenol	µg/L	<0.5	<0.5	0.5	0.5
Alachlor	µg/L	< 0.11	< 0.11		
Aldicarb	µg/L	< 0.30	< 0.30		1
Aldrin + Dieldrin	µg/L	< 0.067	< 0.067		
Aldrin	µg/L	< 0.060	< 0.060		
Dieldrin	µg/L	< 0.067	< 0.067		

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TABLE 3.2

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
WATER ANALYSIS RESULTS

Print Feb/15/10 14:45:43

Date Sampled	Units	15-Sep-09	15-Sep-09	SWQO [1]	CCME [2]
Time Sampled		9:00 AM	11:22 AM		
Sample Location		SPL-1	SPL-2		
Atrazine + N-dealkylated metabolites	µg/L	< 0.12	< 0.12		
Atrazine	µg/L	< 0.11	< 0.11		1.8
Desethyl atrazine	µg/L	< 0.12	< 0.12		
Azinphos-methyl	µg/L	< 0.21	< 0.21		
Bendiocarb	µg/L	< 0.13	< 0.13		
Carbaryl	µg/L	< 0.16	< 0.16		0.2
Carbofuran	µg/L	< 0.37	< 0.37		1.8
Chlordane (Total)	µg/L	< 0.11	< 0.11		
a-chlordane	µg/L	< 0.069	< 0.069		
g-chlordane	µg/L	< 0.063	< 0.063		
Oxychlordane	µg/L	< 0.11	< 0.11		
Chlorpyrifos	µg/L	< 0.18	< 0.18		0.0035
Cyanazine	µg/L	< 0.18	< 0.18		2
Diazinon	µg/L	< 0.081	< 0.081		
(DDT) + Metabolites	µg/L	< 0.14	< 0.14		
op-DDT	µg/L	< 0.095	< 0.095		
pp-DDD	µg/L	< 0.098	< 0.098		
pp-DDE	µg/L	< 0.075	< 0.075		
pp-DDT	µg/L	< 0.14	< 0.14		
Dimethoate	µg/L	< 0.12	< 0.12	6.2	6.2
Diuron	µg/L	< 0.087	< 0.087		
Heptachlor + Heptachlor Epoxide	µg/L	< 0.11	< 0.11		
Heptachlor	µg/L	< 0.061	< 0.061		
Heptachlor epoxide	µg/L	< 0.11	< 0.11		
Lindane	µg/L	< 0.056	< 0.056	0.01	0.01
Malathion	µg/L	< 0.091	< 0.091		
Methoxychlor	µg/L	< 0.14	< 0.14		
Metolachlor	µg/L	< 0.092	< 0.092		7.8 [10]
Metribuzin	µg/L	< 0.12	< 0.12		1 [10]
Parathion	µg/L	< 0.18	< 0.18		
Phorate	µg/L	< 0.11	< 0.11		
Prometryne	µg/L	< 0.23	< 0.23		
Simazine	µg/L	< 0.15	< 0.15		10
Temephos	µg/L	< 0.31	< 0.31		
Terbufos	µg/L	< 0.12	< 0.12		
Triallate	µg/L	< 0.10	< 0.10	0.24	0.24 [10]
Trifluralin	µg/L	< 0.12	< 0.12	0.2	0.2
2,4-dichlorophenoxyacetic acid (2,4-D)	µg/L	< 0.19	< 0.19		4
2,4,5-trichlorophenoxyacetic acid (2,4,5-T)	µg/L	< 0.22	< 0.22		4
Bromoxynil	µg/L	< 0.33	< 0.33	5	5
Dicamba	µg/L	< 0.20	< 0.20	10	10 [10]
Diclofop-methyl	µg/L	< 0.40	< 0.40	6.1	6.1
Dinoseb	µg/L	< 0.36	< 0.36		0.05
Picloram	µg/L	< 0.25	< 0.25	29	29
Benzene	µg/L	< 0.5	< 0.5		370 [10]
Bromodichloromethane	µg/L	< 0.5	< 0.5		
Bromoform	µg/L	< 0.5	< 0.5		
Bromomethane	µg/L	< 0.5	< 0.5		
Carbon tetrachloride	µg/L	< 0.2	< 0.2		13.3 [10]
Chlorobenzene	µg/L	< 0.5	< 0.5		1.3 [10]
Chloroethane	µg/L	< 5	< 5		
Chloroform	µg/L	< 0.5	< 0.5		1.8 [10]
Chloromethane	µg/L	< 5	< 5		
Dibromochloromethane	µg/L	< 0.5	< 0.5		
1,2-Dichlorobenzene	µg/L	< 0.5	< 0.5		0.7 [10]
1,3-Dichlorobenzene	µg/L	< 0.5	< 0.5		150 [10]
1,4-Dichlorobenzene	µg/L	< 0.5	< 0.5		26 [10]
1,1-Dichloroethane	µg/L	< 0.5	< 0.5		
1,2-Dichloroethane	µg/L	< 0.5	< 0.5		100 [10]
1,1-Dichloroethylene (vinylidene chloride)	µg/L	< 0.5	< 0.5		
1,2-Dichloropropane	µg/L	< 0.5	< 0.5		
cis-1,2-Dichloroethene	µg/L	< 0.5	< 0.5		
trans-1,2-Dichloroethene	µg/L	< 0.5	< 0.5		
cis-1,3-Dichloropropene	µg/L	< 0.5	< 0.5		
trans-1,3-Dichloropropene	µg/L	< 0.5	< 0.5		
Ethylbenzene	µg/L	< 0.5	< 0.5		90 [10]
Ethylenedibromide	µg/L	< 0.2	< 0.2		
Dichloromethane	µg/L	< 2	< 2		98.1 [10]
Styrene	µg/L	< 0.5	< 0.5		72 [10]
1,1,2,2-Tetrachloroethane	µg/L	< 0.5	< 0.5		
Tetrachloroethene	µg/L	< 0.5	< 0.5		111 [10]
Toluene	µg/L	< 0.5	< 0.5		2 [10]
Trichloroethylene	µg/L	< 0.5	< 0.5		21 [10]
Vinyl Chloride	µg/L	< 0.5	< 0.5		
Trichlorofluoromethane	µg/L	< 5	< 5		
1,1,1-Trichloroethane	µg/L	< 0.5	< 0.5		
1,1,2-Trichloroethane	µg/L	< 0.5	< 0.5		
Xylene (Total)	µg/L	< 0.5	< 0.5		
o-xylene	µg/L	< 0.5	< 0.5		
m/p-xylene	µg/L	< 0.5	< 0.5		
1,1,1,2-Tetrachloroethane	µg/L	< 0.5	< 0.5		
F1 (C6-C10) - water	µg/L	< 25	< 25		
F2 (C10-C16) - water	µg/L	< 100	< 100		
F3 (C16-C34) - water	µg/L	< 500	< 500		
F4 (C34-C50) - water	µg/L	< 500	< 500		
Baseline at nC50 (Yes/No)	µg/L	Yes	Yes		

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[Tables 3.2 and 3.3.xls]Table 3.2

NOTES:

1. SWQO - SASKATCHEWAN SURFACE WATER QUALITY OBJECTIVES FOR THE PROTECTION OF FRESHWATER AQUATIC LIVE (MODIFIED FROM CCME 1999) INTERIM EDITION, EPB 356, JULY 2006.
2. CCME - CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT, CANADIAN ENVIRONMENTAL QUALITY GUIDELINES - FRESHWATER GUIDELINES FOR THE PROTECTION OF AQUATIC LIFE, UPDATED DECEMBER 2006.
3. **BOLD** INDICATES THAT THE VALUE EXCEEDS THE SWQO LIMIT FOR THAT PARAMETER.
4. **BOLD** INDICATES THAT THE VALUE EXCEEDS THE CCME LIMIT FOR THAT PARAMETER.
5. **BOLD** INDICATES THAT THE VALUE EXCEEDS BOTH THE SWQO AND CCME LIMIT FOR THAT PARAMETER.
6. pH (*IN SITU*) DEPENDENT.
7. HARDNESS (DISSOLVED) DEPENDENT.
8. SAMPLES EXCEEDED 48 HOUR HOLDING TIME

0	PROFOR	ISSUED WITH REPORT VA101-198/2-1	ALL	CB	CB
0	PROFOR	ISSUED WITH REPORT	PREP'D	CHK'D	APP'D

9. SAMPLE WAS LOST DURING SHIPMENT.
10. CCME INTERIM GUIDELINE.

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TABLE 3.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SEDIMENT ANALYSIS RESULTS

Print Feb/15/10 14:46:14

Date Sampled	15-Sep-09	15-Sep-09	15-Sep-09	CCME [2]	CCME [3]
Time Sampled	9:00 AM	3:20 PM	11:22 AM		
Sample Location	SLP-1 SED	SLP-2 SED	SLP-3 SED		
Physical Tests					
Alkalinity (as mg/L $CaCO_3$)	42	100	36		
Moisture (%)	30.6	25.9	24.9		
Nutrients					
Nitrate+Nitrite (%)	<0.01	<0.01	<0.01		
Nitrogen Kjeldahl (Total) (%)	0.02	<0.01	<0.01		
Sulphur (Total) (%)	0.046	0.013	0.013		
Dissolved Metals					
Lead (Dissolved)	0.01	0.0044	0.0046		
Sediment Metals					
Aluminum (Sediment) (µg/g)	2500	1900	1500		
Antimony (Sediment) (µg/g)	0.1	<0.1	<0.1		
Arsenic (Sediment) (µg/g)	**25**	4.9	4.8	5.9	17
Barium (Sediment) (µg/g)	88	61	49		
Beryllium (Sediment) (µg/g)	0.23	0.16	0.12		
Bismuth (Sediment) (µg/g)	0.31	<0.09	<0.09		
Boron (Sediment) (µg/g)	3	2	2		
Cadmium (Sediment) (µg/g)	0.15	0.09	0.06	0.6	3.5
Calcium (Sediment) (µg/g)	30000	19000	18000		
Chromium (Sediment) (µg/g)	5.2	3.9	5.4	37.3	90
Cobalt (Sediment) (µg/g)	17	4.9	4.4		
Copper (Sediment) (µg/g)	7.9	2.9	2	35.7	197
Iron (Sediment) (µg/g)	8300	7400	8600		
Lithium (Sediment) (µg/g)	6	5	4		
Magnesium (Sediment) (µg/g)	5100	4500	3800		
Manganese (Sediment) (µg/g)	220	190	160		
Mercury (Sediment) (µg/g)	<0.1	<0.1	<0.1	0.17	0.486
Molybdenum (Sediment) (µg/g)	0.2	0.2	0.2		
Nickel (Sediment) (µg/g)	29	10	9		
Phosphorus (Sediment) (µg/g)	320	350	390		
Potassium (Sediment) (µg/g)	600	400	200		
Selenium (Sediment) (µg/g)	<0.7	<0.7	<0.7		
Silver (Sediment) (µg/g)	0.81	0.07	0.06		
Sodium (Sediment) (µg/g)	90	67	43		
Strontium (Sediment) (µg/g)	50	25	20		
Thallium (Sediment) (µg/g)	0.07	0.05	0.02		
Tin (Sediment) (µg/g)	<0.5	<0.5	<0.5		
Titanium (Sediment) (µg/g)	51	51	61		
Tungsten (Sediment) (µg/g)	0.11	<0.04	<0.04		
Uranium (Sediment) (µg/g)	0.49	0.41	0.6		
Vanadium (Sediment) (µg/g)	11	8	12		
Zinc (Sediment) (µg/g)	27	21	15	123	315
Microbiological					
Coliform (Total) (CFU/100mL)	16000 [7]	4000[7]	100000[7]		
Escherichia Coli (CFU/100mL)	8000 [7]	1000[7]	6000[7]		
Organics					
Carbon Organic (Total) (%)	0.649	0.351	0.297		
PCB	< 1	< 1	< 1	0.0346	0.391
Naphthalene	< 0.05	< 0.05	< 0.05	0.00587	0.128
Acenaphthylene	< 0.05	< 0.05	< 0.05	0.00671	0.0889
Acenaphthene	< 0.05	< 0.05	< 0.05	0.0212	0.144
Fluorene	< 0.05	< 0.05	< 0.05	0.0419	0.515
Phenanthrene	< 0.05	< 0.05	< 0.05	0.0469	0.245
Anthracene	< 0.05	< 0.05	< 0.05	0.111	2.355
Fluoranthene	< 0.05	< 0.05	< 0.05	0.053	0.875
Pyrene	< 0.05	< 0.05	< 0.05	0.0317	0.385
Benzo(a)anthracene	< 0.05	< 0.05	< 0.05	0.0571	0.862
Chrysene	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	< 0.05	< 0.05	< 0.05	0.0319	0.782
Benzo(a)pyrene	< 0.05	< 0.05	< 0.05	0.00622	0.135
Dibenzo(a,h)anthracene	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	< 0.1	< 0.1	< 0.1		
Indeno(1,2,3-cd)pyrene	< 0.1	< 0.1	< 0.1		
1,1,1,2-Tetrachloroethane	< 0.005	< 0.005	< 0.005		
1,1,2,2-Tetrachloroethane	< 0.005	< 0.005	< 0.005		
1,1,1-Trichloroethane	< 0.002	< 0.002	< 0.002		
1,1,2-Trichloroethane	< 0.002	< 0.002	< 0.002		
1,1-Dichloroethane	< 0.002	< 0.002	< 0.002		
1,1-Dichloroethylene	< 0.002	< 0.002	< 0.002		
1,2-Dichlorobenzene	< 0.002	< 0.002	< 0.002		
1,2-Dichloroethane	< 0.002	< 0.002	< 0.002		
1,2-Dichloropropane	< 0.002	< 0.002	< 0.002		
cis-1,3-dichloropropene	< 0.002	< 0.002	< 0.002		
trans-1,3-dichloropropene	< 0.002	< 0.002	< 0.002		
1,3-Dichlorobenzene	< 0.002	< 0.002	< 0.002		
1,4-Dichlorobenzene	< 0.002	< 0.002	< 0.002		
Bromoform	< 0.002	< 0.002	< 0.002		

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TABLE 3.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SEDIMENT ANALYSIS RESULTS

Print Feb/15/10 14:46:14

Date Sampled	15-Sep-09	15-Sep-09	15-Sep-09	CCME [2]	CCME [3]
Time Sampled	9:00 AM	3:20 PM	11:22 AM		
Sample Location	SLP-1 SED	SLP-2 SED	SLP-3 SED		
Bromomethane	< 0.05	< 0.05	< 0.05		
Carbon tetrachloride	< 0.002	< 0.002	< 0.002		
Chlorobenzene	< 0.002	< 0.002	< 0.002		
Chloroform	< 0.002	< 0.002	< 0.002		
Chloroethane	< 0.05	< 0.05	< 0.05		
Chloromethane	< 0.05	< 0.05	< 0.05		
Dibromochloromethane	< 0.002	< 0.002	< 0.002		
Ethylenedibromide	< 0.002	< 0.002	< 0.002		
Dichloromethane	< 0.005	< 0.005	< 0.005		
Tetrachloroethylene	< 0.002	< 0.002	< 0.002		
cis-1,2-Dichloroethylene	< 0.002	< 0.002	< 0.002		
trans-1,2-Dichloroethylene	< 0.002	< 0.002	< 0.002		
Trichloroethylene	< 0.002	< 0.002	< 0.002		
Vinyl Chloride	< 0.002	< 0.002	< 0.002		
Bromodichloromethane	< 0.002	< 0.002	< 0.002		
Styrene	< 0.005	< 0.005	< 0.005		
Trichlorofluoromethane	< 0.05	< 0.05	< 0.05		
Moisture Content	30.6	24.9	25.9		
F1 (C6-C10)	< 10	< 10	< 10		
F2 (C10-C16)	< 10	< 10	< 10		
F3 (C16-C34)	< 50	< 50	< 50		
F4 (C34-C50)	< 50	< 50	< 50		
Baseline at nC50 (Yes/No)	NO	YES	YES		
Benzene	< 0.002	< 0.002	< 0.002		
Toluene	< 0.002	< 0.002	< 0.002		
Ethylbenzene	< 0.002	< 0.002	< 0.002		
Xylene total	< 0.005	< 0.005	< 0.005		
o-xylene	< 0.005	< 0.005	< 0.005		
m/p-xylene	< 0.005	< 0.005	< 0.005	0.00354	0.00851
pp-DDD	< 0.05	< 0.05	< 0.05	0.00142	0.00675
pp-DDE	< 0.05	< 0.05	< 0.05	0.00119	0.00477
pp-DDT	< 0.05	< 0.05	< 0.05	0.00119	0.00477
op-DDT	< 0.05	< 0.05	< 0.05	0.0045	0.00887
alpha-Chlordane	< 0.05	< 0.05	< 0.05	0.00285	0.00667
Dieldrin	< 0.05	< 0.05	< 0.05		
Endosulfan I	< 0.04	< 0.04	< 0.04		
Endosulfan II	< 0.04	< 0.04	< 0.04	0.00267	0.0624
Endrin	< 0.04	< 0.04	< 0.04		
gamma-BHC	< 0.01	< 0.01	< 0.01	0.0045	0.00887
gamma-Chlordane	< 0.05	< 0.05	< 0.05		
Heptachlor	< 0.01	< 0.01	< 0.01	0.0006	0.00274
Heptachlor epoxide	< 0.01	< 0.01	< 0.01		
Hexachlorobenzene	< 0.01	< 0.01	< 0.01		
Hexachlorobutadiene	< 0.01	< 0.01	< 0.01		
Hexachloroethane	< 0.01	< 0.01	< 0.01		
Methoxychlor	< 0.05	< 0.05	< 0.05		

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[Tables 3.2 and 3.3.xls]Table 3.3

NOTES:

1. UNITS ARE IN µg/g, UNLESS OTHERWISE STATED.
2. CCME - CCME: SEDIMENT: FRESH (ISQG) - CANADIAN ENVIRONMENTAL GUIDELINES FOR SEDIMENT IN FRESHWATER (ISQG) (2002).
3. CCME - CCME: SEDIMENT: FRESH (PEL) - CANADIAN ENVIRONMENTAL GUIDELINES FOR SEDIMENT IN FRESHWATER (PEL) (2002).
4. **BOLD** INDICATES THE VALUE EXCEEDS THE CCME: SEDIMENT: FRESH (ISQG) LIMITS.
5. **BOLD** INDICATES THE VALUE EXCEEDS THE CCME: SEDIMENT: FRESH (PEL) LIMITS.
6. **BOLD** INDICATES THE VALUE EXCEEDS THE CCME: SEDIMENT: FRESH (ISQG) AND SEDIMENT: FRESH (PEL) LIMITS.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	ALL	CB	CB

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TABLE 4.1

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
PLANT SPECIES OF CONCERN IN SASKATOON

Print Feb/15/10 15:07:24

Scientific Name	Common Name	Status
Achillea millefolium var. megacephalum	Athabasca Thrift	Special Concern
Armeria maritima ssp. interior	Buffalograss	Threatened
Buchloë dactyloides	Dwarf Woolly-heads	Special Concern
Chenopodium subglabrum	Felt-leaf Willow	Special Concern
Cryptantha minima	Floccose Tansy	Special Concern
Dalea villosa var. villosa	Hairy Prairie-clover	Threatened
Deschampsia mackenzieana	Large-headed Woolly Yarrow	Special Concern
Halimolobos virgata	Mackenzie Hairgrass	Special Concern
Psilocarphus brevissimus	Sand-dune Short-capsuled Willow	Special Concern
Salix brachycarpa var. psammophila	Slender Mouse-ear-cress	Threatened
Salix silicicola	Small-flowered Sand-verbena	Endangered
Salix turnorii	Smooth Goosefoot	Threatened
Tanacetum huronense var. floccosum	Tiny Cryptanthe	Endangered
Tradescantia occidentalis	Turnor's Willow	Special Concern
Tripterocalyx micranthus	Western Spiderwort	Threatened

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[4-1, 4-2, 4-3, Plant_Species.xls]Species of Concern

NOTES:

1. HARMS, V. L. 2003. CHECKLIST OF THE VASCULAR PLANTS OF SASKATCHEWAN AND THE PROVINCIALLY AND NATIONALLY RARE NATIVE PLANTS IN SASKATCHEWAN. UNIVERSITY EXTENSION PRESS, UNIVERSITY OF SASKATCHEWAN, SASKATOON, SK. UNIVERSITY OF SASKATCHEWAN, SASKATOON, SK.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 4.2

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SASKATCHEWAN NOXIOUS WEEDS

Print Feb/15/10 15:04:11

Scientific Name	Common Name
Acroptilon repens	Russian Knapweed
Agrostemma githago	Purple Cockle
Ambrosia artemisiifolia var. elatior	Annual Ragweed
Avena fatua	Wild Oat
Berberis vulgaris	Common Barberry
Brassica rapa	Bird's Rape
Bromus japonicus	Japanese Chess
Bromus tectorum	Downy Chess
Camelina microcarpa	Small-seeded False Flax
Cardaria draba	Heart-podded Hoary Cress
Carduus nutans	Nodding Thistle
Centaurea biebersteinii	Spotted Knapweed
Centaurea diffusa	Diffuse Knapweed
Cirsium arvense	Canada Thistle
Conringia orientalis	Hare's-ear Mustard
Convolvulus arvensis	Field Bindweed
Elytrigia repens	Creeping Wild Rye
Euphorbia esula	Leafy Spurge
Fagopyrum tataricum	Tartary Buckwheat
Galium aparine	Cleavers
Iva axillaris	Poverty-weed
Lappula squarrosa	Blue-bur
Linaria vulgaris	Yellow Toad-flax
Lolium persicum	Persian Darnel
Lythrum salicaria	Purple Loosestrife
Malva rotundifolia	Running Cheeseweed
Matricaria erforate	Scentless Chamomile
Neslia paniculata	Ball Mustard
Polygonum convolvulus	Wild Buckwheat
Salsola australis	Russian-thistle
Setaria viridis	Green Foxtail
Silene latifolia	White Cockle
Silene noctiflora	Night-flowering Catchfly
Silene vulgaris	Bladder Campion
Sinapis arvensis	Wild Mustard
Sisymbrium altissimum	Tumbling Mustard
Sonchus arvensis	Perennial Sow-thistle
Sonchus oleraceus	Annual Sow-thistle
Taraxacum officinale	Common Dandelion
Thlaspi arvense	Stinkweed
Vaccaria hispanica	Cowcockle

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[4-1, 4-2, 4-3, Plant_Species.xls]New table - Noxious weeds

NOTES:

1. FROM SASKATCHEWAN NOXIOUS WEEDS ACT, 1984.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 4.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
PLANT SPECIES AND SOME FUNGI LIKELY TO OCCUR IN THE STUDY AREA AND ADJACENT HABITATS

Print Feb/15/10 14:22:31

Scientific Name	Common Name	Location	Source	Status
TREES				
Acer negundo	Manitoba Maple	NE Swale	MVA	
Betula occidentalis	**River Birch**	**NE Swale; SW Riverbank**	**MVA; SRC**	
Betula papyrifera	**White Birch**	**Saskatoon; SW Riverbank**	**SNS; SRC**	
Betula pendula	Weeping Birch	Saskatoon	SNS	
Picea glauca	White Spruce	Saskatoon	SNS	
Pinus sylvestris	Scotch Pine	Saskatoon	SNS	
Populus balsamifera	**Balsam/Black poplar**	**NE Swale; SW Riverbank**	**MVA; SRC**	
Populus deltoides	Western/Plains Cottonwood	NE Swale	MVA	
Populus tremuloides	Trembling Aspen	NE Swale	MVA	
Quercus macrocarpa	Bur Oak	Saskatoon	SNS	
*Sorbus aucuparia**	European Mountain Ash	NE Swale	MVA	exotic
Ulmus americana	American Elm	Saskatoon	SNS	
*Ulmus pumila**	Manchurian/Siberian Elm	NE Swale	MVA	exotic
SHRUBS				
Amelanchier alnifolia	Saskatoon	NE Swale	MVA	
Arctostaphylos uva-ursi	Bearberry	Saskatoon	SNS	
*Caragana arborescens**	Caragana	NE Swale	MVA	exotic
Cornus sericea	**Red-osier Dogwood**	**SW Riverbank**	**SRC**	
***Cornus* spp.**	**Dogwood**	**SW Riverbank**	**SRC**	
Crataegus chrysocarpa	Round-leaved/FirebellyHawthorn	NE Swale	MVA	
***Crataegus* spp.**	**Hawthorn**	**SW Riverbank**	**SRC**	
Disporum trachycarpum	Fairy Bells	NE Swale	MVA	
Eleagnus commutata	Wolf Willow	NE Swale	MVA	
Franxinus pensylvanica	**Green Ash**	**NE Swale/SW Riverbank**	**MVA**	
Gutierrezia sarothrae	Common Broomweed	NE Swale	MVA	
Juniperus horizontalis	Creeping Juniper	Saskatoon	SNS	
Lonicera dioica var. *glaucescens*	Twining Honeysuckle	NE Swale	MVA	
*Lonicera tartarica**	Tartarian Honeysuckle	NE Swale	MVA	exotic
Opuntia polyacantha	Pricklypear	Saskatoon	SNS	
Populus deltoides	**Cottonwood (shrub)**	**SW Riverbank**	**SRC**	
Populus trichocarpa x Populus deltoides	**Hybrid poplar (shrub)**	**SW Riverbank**	**SRC**	
Prunus pensylvanica	Pincherry	NE Swale	MVA	
Prunus virginiana	Choke Cherry	NE Swale	MVA	
Rhamnus alnifolia	**Alder-leaved Buckthorn**	**SW Riverbank**	**SRC**	
*Rhamnus cathartica**	European Buckthorn	NE Swale	MVA	exotic
Rhus radicans var. *rydbergii*	Poison Ivy	NE Swale	MVA	
Ribes aureum	Golden Currant	NE Swale	MVA	
Ribes oxyacanthoides	**Northern/Canada Gooseberry**	**NE Swale; SW Riverbank**	**MVA; SRC**	
Rosa acicularis	**Prickly Rose**	**SW Riverbank**	**SRC**	
Rosa arkansana	**Low Prairie Rose**	**NE Swale; SW Riverbank**	**MVA; SRC**	
Rosa woodsii	Wood's Rose	NE Swale; Saskatoon	MVA	
Rubus idaeus	Wild-Red Raspberry	NE Swale	MVA	
Rubus pubescens	Dewberry	NE Swale	MVA	
Salicornia rubra	Red Samphire	Saskatoon	SNS	
Salix bebbiana	Beaked Willow	NE Swale	MVA	
Salix discolor	Pussy Willow	Saskatoon	SNS	
Salix lutea	**Yellow Willow**	**SW Riverbank**	**SRC**	
Salix petiolaris	Basket Willow	NE Swale	MVA	
Salix sessilifolia	**Sandbar Willow**	**SW Riverbank**	**SRC**	
*Salsola kali tenuifolia**	Russian Thistle	NE Swale	MVA	exotic
Sambucus spp.	Elderberry	Saskatoon	SNS	
Shepherdia argentea	Thorny Buffaloberry	Saskatoon	SNS	
Shepherdia canadensis	Canada Buffaloberry	NE Swale	MVA	
Symphoricarpos albus	Northern Snowberry	NE Swale	MVA	
Symphoricarpos occidentalis	**Western Snowberry**	**SW Riverbank**	**SRC**	
Symphyotrichum ciliolatum	**Lindley's Aster**	**SW Riverbank**	**SRC**	
Viburnum edule	**High Bush-cranberry**	**SW Riverbank**	**SRC**	
FORBS/HERBS				
Achillea millefolium	Common Yarrow	NE Swale	MVA	
Achillea sibirica	Siberian Yarrow	NE Swale	MVA	
Achillea lewisii	**Woolly Yarrow**	**SW Riverbank**	**SRC**	
***Actaea* spp.**	**Baneberry**	**SW Riverbank**	**SRC**	
Agoseris glauca	False Dandelion	NE Swale	MVA	

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TABLE 4.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
PLANT SPECIES AND SOME FUNGI LIKELY TO OCCUR IN THE STUDY AREA AND ADJACENT HABITATS

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Scientific Name	Common Name	Location	Source	Status
Allium stellatum	Pink Flowered Onion	NE Swale	MVA	
Allium textile	Prairie Onion	NE Swale	MVA	
Androsace septentrionalis	Pygmy Flower	NE Swale	MVA	
Anemone canadensis	Canada Anemone	NE Swale	MVA	
Anemone cylindrica	Long-fruited Anemone	NE Swale	MVA	
Anemone multifida	Cut-leaved Anemone	NE Swale	MVA	
Anemone patens	Prairie Crocus	NE Swale	MVA	
Antennaria parvifolia	Small-leaved Pussytoes	NE Swale	MVA	
Apocynum androsaemifolium	**Spreading Dogbane**	**NE Swale/SW Riverbank**	**MVA**	
Apocynum cannabinum	Indian Hemp	NE Swale	MVA	
Arabis divaricarpa	Purple Rock-cress	NE Swale	MVA	
Arabis hirsuta	Hirsute Rock-cress	NE Swale	MVA	
Arabis holbelii	Reflexed Rock-cress	NE Swale	MVA	
Aralia nudicaulis	**Sarsaparilla**	**SW Riverbank**	**SRC**	
Arenaria lateriflora	Blunt-leaved Sandwort	NE Swale	MVA	
Artemisia biennis	Sagewort	NE Swale	MVA	
Artemisia campestris	Plains Wormwood	NE Swale	MVA	
Artemisia dracunculus	Linear Leaved Wormwood	NE Swale	MVA	
Artemisia frigida	Pasture Sage	NE Swale	MVA	
Artemisia ludoviciana	Prairie Sage	NE Swale	MVA	
Aster brachyactis	Rayless Aster	NE Swale	MVA	
Aster ciliolatus	Lindley's Blue	NE Swale	MVA	
Aster ericoides	Many-flowered Aster	NE Swale	MVA	
Aster falcatus commutatus	White Prairie/Heath Aster	NE Swale	MVA	
Aster hesperius	Western Willow Aster	NE Swale	MVA	
Aster laevis	Smooth Blue Aster	NE Swale	MVA	
Aster pansus	Tufted White Prairie Aster	NE Swale	MVA	
Astragalus adsurgens	Ascending Purple Milk-vetch	NE Swale	MVA	
Astragalus bisulcatus	Two-grooved Milk-vetch	NE Swale	MVA	
Astragalus canadensis	Canadian Milk-vetch	NE Swale	MVA	
Astragalus crassicarpus	Ground Plum	NE Swale	MVA	
Astragalus flexuosus	Slender Milk-vetch	NE Swale	MVA	
Astragalus goniatus	Purple Milk-vetch	NE Swale	MVA	
Astragalus pectinatus	Narrow-leaved Milk-Vetch	NE Swale	MVA	
Atriplex nuttallii	Nuttall's Atriplex	NE Swale	MVA	
Avena fatua	Wild Oat	NE Swale	MVA	
*Axyris amaranthoides**	Russian Pigweed	NE Swale	MVA	exotic
Bidens cernua	Nodding/Smooth Beggarticks	NE Swale	MVA	
Campanula rotundifolia	Harebell	NE Swale	MVA	
*Capsella burasa-pastoris**	Shepherd's Purse	NE Swale	MVA	exotic
Cerastium arvense	Field Chickweed	NE Swale	MVA	
Ceratoides lanata	**Winterfat**	**SW Riverbank**	**SRC**	
Chamaerhodos erecta	Bunge	NE Swale	MVA	
*Chenopodium album**	Lamb's Quarters	NE Swale	MVA	exotic
Chenopodium rubrum	Red Goosefoot	NE Swale	MVA	
Chenopodium salinum	Oak-leaved Goosefoot	NE Swale	MVA	
Chenopodium subglabrum	Arid Goosefoot	NE Swale	MVA	special concern
Cirsium arvense	**Thistle species**	**SW Riverbank**	**SRC**	
*Cirsium arvense**	Canada Thistle	NE Swale	MVA	exotic
Cirsium flodmanii	Flodman's Thistle	NE Swale	MVA	
Comandra umbellata	Pale Comandra - BastardToad Flax	NE Swale	MVA	
*Convolvulus arvensis**	Field Bindweed	NE Swale	MVA	exotic
Corispermum hyssopifolium	Bugseed	NE Swale	MVA	
Corispermum orientale	Villose Bugseed	NE Swale	MVA	
Cornus canadensis	Bunchberry	Saskatoon	SNS	
Crepis runcinata	Scapose Hawk's Beard	NE Swale	MVA	
*Crepis tectorum**	Narrow-leaved Hawk's Beard	NE Swale	MVA	exotic
Cruciferae spp.*	Mustard species	NE Swale	MVA	exotic
Cypripedium spp.	Lady's slipper orchid	Saskatoon	SNS	
Descurainia richardsonii	Gray Tansy Mustard	NE Swale	MVA	
*Descurainia sophia**	Flix-weed	NE Swale	MVA	exotic
Dodecatheon pauciflorum	Saline Shooting-star	NE Swale	MVA	
Dracocephalum parviflorum	American Dragonhead	NE Swale	MVA	
Epilobium angustifolium	Fireweed	NE Swale	MVA	
Epilobium palustre	Marsh Willow-herb	NE Swale	MVA	
Erigeron asper	Rough Fleabane	NE Swale	MVA	

Knight Piésold CONSULTING

TABLE 4.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
PLANT SPECIES AND SOME FUNGI LIKELY TO OCCUR IN THE STUDY AREA AND ADJACENT HABITATS

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Scientific Name	Common Name	Location	Source	Status
Erigeron caespitosus	Tufted Fleabane	NE Swale	MVA	
Erigeron canadensis	Canada Fleabane	NE Swale	MVA	
Erigeron glabellus	Smooth Fleabane	NE Swale	MVA	
Erigeron lonchophyllus	Hirsute Fleabane	NE Swale	MVA	
Erigeron philadelphicus	Philadelphia Fleabane	NE Swale	MVA	
*Erucastrum gallicum**	Dog Mustard	NE Swale	MVA	exotic
Eryngium cuneifolium	**Snakeroot**	**SW Riverbank**	**SRC**	
Erysimum inconspicuum	Small-flowered Prairie Rocket	NE Swale	MVA	
*Euphorbia esula**	Leafy Spurge	NE Swale	MVA	exotic
Fagopyrum esculentum	Wild Buckwheat	NE Swale	MVA	
Fragaria vesca	American Wild Strawberry	NE Swale	MVA	
Fragaria virginiana glauca	Smooth Wild Strawberry	NE Swale	MVA	
Gaillardia aristata	Gaillardia	NE Swale	MVA	
Galium boreale	Northern Bedstraw	NE Swale	MVA	
Galium triflorum	Sweet Scented Bedstraw	NE Swale	MVA	
Gaura coccinea	Scarlet Gaura	NE Swale	MVA	
Gaura macrocarpa	**Butterflyweed**	**SW Riverbank**	**SRC**	
Gentiana affinis	Prairie Gentian	NE Swale	MVA	
Gentianella amarella var. *acuta*	Northern Gentian	NE Swale	MVA	
Geum aleppicum	Old Man's Whiskers	NE Swale	MVA	
Geum triflorum	Three Flowered Avens	NE Swale	MVA	
Glaux maritima	Sea-milkwort	NE Swale	MVA	
Glycyrrhiza lepidota	**Wild Licorice**	**NE Swale/SW Riverbank**	**MVA**	
Grindelia squarrosa	Curly-Cup Gumweed	NE Swale	MVA	
Gutierrezia sarothrae	**Broomweed**	**SW Riverbank**	**SRC**	
Happlopapus spinulosus	Spiny Ironplant	NE Swale	MVA	
Helenium autumnale	Sneezeweed	NE Swale	MVA	
Helianthus laetiflorus var. *subrhomboideus*	Beautiful Sunflower	NE Swale	MVA	
Helianthus nuttallii	Common Tall Sunflower	NE Swale	MVA	
Helianthus petiolaris	Shining Sunflower	NE Swale	MVA	
Heterotheca villosa	Hairy Golden-aster	NE Swale	MVA	
Heuchera richardsonii	Alum Root	NE Swale	MVA	
Hieracium umbellatum	Canada Hawkweed	NE Swale	MVA	
Hordeum jubatum	Wild Barley	NE Swale	MVA	
Labiatae spp.	Mint species	NE Swale	MVA	
Lactuca pulchella	Blue Lettuce	NE Swale	MVA	
*Lactuca serriola**	Lobed Prickly Lettuce	NE Swale	MVA	exotic
Lappula echinata	Bluebur	NE Swale	MVA	
Lappula redowskii occidentalis	Western Bluebur	NE Swale	MVA	
Lathyrus venosus	Wild Pea Vine	NE Swale	MVA	
Lesquerella arenosa	Sand Bladderpod	NE Swale	MVA	
Liatris punctata	**Punctate Blazing-star**	**NE Swale; SW Riverbank**	**MVA; SRC**	
Lilium philadelphicum	Western Red Lily	NE Swale	MVA	
Linnaea borealis	Twinflower	Saskatoon	SNS	
Linum lewisii	Wild Blue Flax	NE Swale	MVA	
Linum rigidum	Yellow Flax	NE Swale	MVA	
Lithospermum incisum	Narrow-leaved Puccoon	NE Swale	MVA	
Lobelia kalmii	Kalm's Lobelia	NE Swale	MVA	
Lomatium foeniculaceum	**Hairy-Fruited Parsley**	**SW Riverbank**	**SRC**	
Lycopus asper	Western Water Horehound	NE Swale	MVA	
Lygodesmia juncea	Skeleton Weed	NE Swale	MVA	
Lysimachia ciliata	Fringed Loosestrife	NE Swale	MVA	
Maianthemum dilatatum	**Two-leaved Solomon's Seal**	**SW Riverbank**	**SRC**	
Malvastrum coccineum	Scarlet Mallow	NE Swale	MVA	
Mamillaria vivipara	Cushion Cactus	Saskatoon	SNS	
Medicago lupilina	Black Medic	NE Swale	MVA	
Medicago sativa ssp. *falcata**	Yellow Alfalfa	NE Swale	MVA	exotic
Medicago sativa ssp. *sativa**	Alfalfa	NE Swale	MVA	exotic
*Melilotus alba**	White Sweet-clover	NE Swale	MVA	exotic
Melilotus indicus	**Sweetclover**	**SW Riverbank**	**SRC**	
*Melilotus officinalis**	Yellow Sweet-clover	NE Swale	MVA	exotic
Mentha arvense	Wild Mint	NE Swale	MVA	
Menyanthes trifoliata	Buck-Bean	Saskatoon	SNS	
Mirabilis hirsuta	Umbrellawort	NE Swale	MVA	

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TABLE 4.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
PLANT SPECIES AND SOME FUNGI LIKELY TO OCCUR IN THE STUDY AREA AND ADJACENT HABITATS

Print Feb/15/10 14:22:31

Scientific Name	Common Name	Location	Source	Status
Monarda fistulosa var. *menthaefolia*	Western Wild Bergamot	NE Swale	MVA	
Monolepis nuttalliana	Spear-leaved Goosefoot	NE Swale	MVA	
Musineon divaricatum	Leafy Musineon	NE Swale	MVA	
Oenothera biennis	Yellow Evening-Primrose	NE Swale	MVA	
Oenothera nuttallii	White Evening-Primrose	NE Swale	MVA	
Orthilia secunda	**One-Sided Wintergreen**	**SW Riverbank**	**SRC**	
Orthocarpus luteus	Owl's Clover	NE Swale	MVA	
Oxytropis campestris var. *gracilis*	Late Yellow Locoweed	NE Swale	MVA	
Oxytropis sericea	Early Yellow Locoweed	NE Swale	MVA	
Pediomelum aromaticum	Indian Breadroot	Saskatoon	SNS	
Penstemon gracilis	Lilac-flowered Beardtongue	NE Swale	MVA	
Penstemon nitidus	Smooth Blue Beardtongue	NE Swale	MVA	
Penstemon procerus	Slender Beardtongue	NE Swale	MVA	
Petalostemon candidum	White Prairie Clover	NE Swale	MVA	
Petalostemon purpureum	Purple Prairie Clover	NE Swale	MVA	
Phlox hoodii	Moss Phlox	NE Swale	MVA	
Physostegia parviflorum	False Dragonhead	NE Swale	MVA	
*Plantago major**	Common Plantain	NE Swale	MVA	exotic
Platanthera hyperborea	Green Bog Orchid	NE Swale	MVA	
Polygonum coccineum	Marsh Smartweed	Saskatoon	SNS	
*Polygonum convolvulus**	Black Bindweed	NE Swale	MVA	exotic
Potentilla anserina	Silverweed	NE Swale	MVA	
Potentilla arguta	White Cinquefoil	NE Swale	MVA	
Potentilla concinna	Early Cinquefoil	NE Swale	MVA	
Potentilla gracilis	Graceful Cinquefoil	NE Swale	MVA	
Potentilla hippiana	Wooly Cinquefoil	NE Swale	MVA	
Potentilla pensylvanica	Prairie Cinquefoil	NE Swale	MVA	
Psoralea argophylla	Silver-leaf Psoralea	NE Swale	MVA	
Psoralea esculenta	Indian Breadroot	NE Swale	MVA	
Psoralea lanceolata	Lance Leaved Psoralea	NE Swale	MVA	
Pyrola aserifolia	Pink Flowered Wintergreen	NE Swale	MVA	
Ranunculus cymbalaria	Alkali Buttercup	NE Swale	MVA	
Rumex acetosa	Green Sorrel	NE Swale	MVA	
Rumex pseudonatronatus	Field Dock	NE Swale	MVA	
Schizachne scoparium	Little Bluestem	NE Swale	MVA	
Scutellaria galericulata	Skull-cap	NE Swale	MVA	
Selaginella densa	Prairie selaginella/Spikemoss	NE Swale	MVA	
Senecio canus	Silvery Groundsel	NE Swale	MVA	
Senecio integerrimus integerrimus	Entire-leaved Groundsel	NE Swale	MVA	
*Sisymbrium loeselii**	Tall Hedge	NE Swale	MVA	exotic
Smilacina stellata	Star Flowered Solomon's Seal	NE Swale	MVA	
Solanum triflorum	Wild Tomato	NE Swale	MVA	
Solidago canadensis v.canadensis	Canada Goldenrod	NE Swale	MVA	
Solidago gigantea	**Late Goldenrod**	**SW Riverbank**	**SRC**	
Solidago missouriensis	Low Goldenrod	NE Swale	MVA	
Solidago mollis	Velvety Goldenrod	NE Swale	MVA	
Solidago nemoralis longipetiolata	Showy Goldenrod	NE Swale	MVA	
Solidago ptarmicoides	Upland White Goldenrod	NE Swale	MVA	
Solidago rigida humilis	Rigid Goldenrod	NE Swale	MVA	
Solidago spathulata var. *neomexicana*	Mountain Goldenrod	NE Swale	MVA	
*Sonchus arvensis**	Perennial Sow-thistle	NE Swale	MVA	exotic
Sonchus oleraceus	**Sow-thistle**	**SW Riverbank**	**SRC**	
Spiraea alba	Narrow-leaved Meadowsweet	NE Swale	MVA	
Stachys palustris	Marsh Hedge-nettle	NE Swale	MVA	
Stapelia gigantea	**Carrion Flower**	**SW Riverbank**	**SRC**	
Stellaria spp.	Stitchwort species	NE Swale	MVA	
Suaeda depressa	Western Sea Blite	NE Swale	MVA	
Symphoricarpos occidentalis	Western Snowberry	NE Swale	MVA	
Taraxacum officinale*	**Common Dandelion**	**NE Swale: SW Riverbank**	**MVA; SRC**	exotic
Thalictrum venulosum	Early Meadow Rue	NE Swale	MVA	
Thalictrum venulosum* var. *confine	**Veiny meadowrue**	**SW Riverbank**	**SRC**	
Thermopsis rhombifolia	Golden-bean	NE Swale	MVA	
*Thlaspi arvense**	Stinkweed	NE Swale	MVA	exotic
*Tragopogon dubius**	Yellow Goat's-beard	NE Swale	MVA	exotic
Typha latifolia	Common Cattail	NE Swale	MVA	
Urtica dioica	**Common Nettle**	**NE Swale; SW Riverbank**	**MVA; SRC**	

TABLE 4.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
PLANT SPECIES AND SOME FUNGI LIKELY TO OCCUR IN THE STUDY AREA AND ADJACENT HABITATS

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Scientific Name	Common Name	Location	Source	Status
Utricularia vulgaris	Common Bulrush	Saskatoon	SNS	
Vicia americana	American Vetch	NE Swale	MVA	
Vicia americana var. *minor*	Narrow Leaved Vetch	NE Swale	MVA	
Viola adunca	Early Blue Violet	NE Swale	MVA	
Viola canadensis	**Canada Violet**	**SW Riverbank**	**SRC**	
Viola nephrophylla	Bog Violet	NE Swale	MVA	
Viola rugulosa	Western Canada Violet	NE Swale	MVA	
Zizia aptera	Heart-leaved Alexander	NE Swale	MVA	
Zygadenus elegans	Smooth Camas	NE Swale	MVA	
Eriogonum flavum	**Yellow Umbrella-Plant**	**SW Riverbank**	**SRC**	
GRAMINOIDS AND EQUISITUM SPP.				
Aciphylla squarrosa	**Common Speargrass**	**SW Riverbank**	**SRC**	
*Agropyron cristatum**	Crested Wheatgrass	NE Swale	MVA	exotic
Agropyron dasystachyum	Northern Wheatgrass	NE Swale	MVA	
Agropyron repens*	**Quack Grass**	**NE Swale; SW Riverbank**	**MVA**	exotic
Agropyron smithii	Western Wheat Grass	NE Swale	MVA	
Agropyron subsecundum	Awned Wheatgrass	NE Swale	MVA	
Agropyron trachycaulum	Slender Wheatgrass	NE Swale	MVA	
Agropyron trachycaulus	Slender Wheat Grass	Saskatoon	SNS	
Agrostis scabra	Rough Hair Grass	NE Swale	MVA	
Beckmannia syzigachne	Slough Grass	NE Swale	MVA	
Bouteloua gracilis	Blue Grama	NE Swale	MVA	
Bromus ciliatus	Fringed Brome	NE Swale	MVA	
Bromus inermis*	**Smooth Brome**	**NE Swale; SW Riverbank**	**MVA**	exotic
Calamagrostis canadensis	Marsh Reed-grass	NE Swale	MVA	
Calamagrostis inexpansa	Northern Reed Grass	NE Swale	MVA	
Calamagrostis montanensis	Plains Reed Grass	NE Swale	MVA	
Calamovilfa longifolia	Sand Grass	NE Swale	MVA	
Carex aquatilus	Water Sedge	NE Swale	MVA	
Carex aurea	Colden's Sedge	NE Swale	MVA	
Carex bebii	Bebb's Sedge	NE Swale	MVA	
Carex caryophyllea	**Spring's sedge**	**SW Riverbank**	**SRC**	
Carex eleocharis	Low Sedge	NE Swale	MVA	
Carex filifolia	Thread-leaved Sedge	NE Swale	MVA	
Carex lanuginosa	Woolly Sedge	NE Swale	MVA	
Carex obtusata	Blunt Sedge	NE Swale	MVA	
Carex pennsylvanica	Sun-loving Sedge	NE Swale	MVA	
Carex praegracilis	Graceful Sedge	NE Swale	MVA	
Carex praticola	Pasture Sedge	NE Swale	MVA	
Carex retrosa	Turned Sedge	NE Swale	MVA	
Carex rosrata	Beaked Sedge	NE Swale	MVA	
Carex siccata	Hay Sedge	NE Swale	MVA	
Deschampsia caespitosa	Tufted Hair Grass	NE Swale	MVA	
Deschampsia spp.	Hair Grass species	NE Swale	MVA	
Distichlis stricta	Salt Grass	Saskatoon	SNS	
Distichlis stricta	Alkali Grass	NE Swale	MVA	
*Echinochloa crusgalli**	Barnyard Grass	NE Swale	MVA	exotic
Eleocharis palustris	Creeping Spike Rush	NE Swale	MVA	
Elymus canadensis	Canada Wild Rye	NE Swale	MVA	
Equisetum arvense	Common Horsetail	NE Swale	MVA	
Equisetum hyemale var. *affine*	Common Scouring Rush	NE Swale	MVA	
Equisetum laevigatum	Smooth Scouring Rush	NE Swale	MVA	
Equisetum pratense	**Meadow horsetail**	**SW Riverbank**	**SRC**	
Festuca altaica ssp. *hallii*	Plains Rough Fescue	NE Swale	MVA	
Festuca altaica* ssp. *scabrella	**Rough Fescue**	**SW Riverbank**	**SRC**	
*Festuca ovina**	Sheep Fescue	NE Swale	MVA	exotic
Glyceria striata	Fowl Manna Grass	NE Swale	MVA	
Helictotrichon hookeri	Hooker's Oat-grass	NE Swale	MVA	
Juncus balticus	Baltic Rush	NE Swale; Saskatoon	MVA: SNS	
Juncus longistylis	Long-styled Rush	NE Swale	MVA	
Koeleria cristata	June Grass	NE Swale	MVA	
*Lepidium densiflorum**	Common Pepper-grass	NE Swale	MVA	exotic
*Lepidium ramosissimum**	Branched Pepper-grass	NE Swale	MVA	exotic
Lolium perenne	Perennial Rye Grass	NE Swale	MVA	
Muhlenbergia cuspidata	Prairie Muhly	NE Swale	MVA	
Muhlenbergia racemosa	Mat Muhly	NE Swale	MVA	
Opuntia polyacantha	Prickly Pear	Saskatoon	SNS	

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TABLE 4.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
PLANT SPECIES AND SOME FUNGI LIKELY TO OCCUR IN THE STUDY AREA AND ADJACENT HABITATS

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Scientific Name	Common Name	Location	Source	Status
Oryzopsis asperifolia	White Grained Mountain Rice Grass	NE Swale	MVA	
Oryzopsis hymenoides	Indian Rice Grass	NE Swale	MVA	
Phalaris arundinacea	**Reed Canary Grass**	**NE Swale; SW Riverbank**	**MVA**	
Phragmites australis	Giant Reed Grass	Saskatoon	SNS	
Poa canbyi	Canby Blue Grass	NE Swale	MVA	
Poa compressa	Canada Blue Grass	NE Swale	MVA	
Poa cusickii	Early Bluegrass	NE Swale	MVA	
Poa palustris	Sandberg's Bluegrass	NE Swale	MVA	
*Poa pratensis**	Kentucky Bluegrass	NE Swale	MVA	exotic
Poe palustris	Fowl Blue Grass	Saskatoon	SNS	
Puccinellia nutalliana	Nuttall's Salt-meadow Grass	NE Swale: Saskatoon	MVA; SNS	
Schizachne purpurascens	Purple Oat Grass	NE Swale	MVA	
Scirpus acutus	Hardstem Bulrush	Saskatoon	SNS	
Scirpus acutus	Viscid/Hard-stem Bulrush	NE Swale	MVA	
Scirpus microcarpus	**Small-fruited bulrush**	**SW Riverbank**	**SRC**	
Scirpus paludosus	Prairie Bulrush	Saskatoon	SNS	
Scirpus pungens	Three-Square Bulrush	Saskatoon	SNS	
Scirpus validus	Great Bulrush	NE Swale	MVA	
Scolochloa festucacea	Spangletop	Saskatoon	SNS	
Sisyrinchium montanum	Blue-Eyed Grass	NE Swale	MVA	
Sphenopholis obtusata	Prairie Wedge Grass	NE Swale	MVA	
Sporobolus cryptandrus	Sand Dropseed	NE Swale	MVA	
Stipa comata	Needle and Thread Grass	NE Swale	MVA	
Stipa spartea var. *curtiseta*	Western Porcupine Grass	NE Swale	MVA	
Stipa viridula	Green Needle Grass	NE Swale	MVA	
Triglochin maritima	Seaside Arrow Grass	NE Swale	MVA	
Triglochin palustris	Marsh/Slender Arrow Grass	NE Swale	MVA	
AQUATIC				
Alisma plantago-aquatica	Water Plantain	Saskatoon	SNS	
Lemma spp.	Duckweed	Saskatoon	SNS	
Nuphar variegatum	Yellow Pond Lily	Saskatoon	SNS	
Potamogeton pectinatus	Sago Pondweed	Saskatoon	SNS	
Rumex occidentalis	Western Dock	Saskatoon	SNS	
Sagittaria spp.	Arrowhead	Saskatoon	SNS	
FUNGI				
Agariscus species	Agaricus	NE Swale	MVA	
Amanita virosa	Destroying Angel	NE Swale	MVA	
Coprinus species	Inky Cap	NE Swale	MVA	
Leccinnum insigne	Aspen Rough Stem	NE Swale	MVA	
Lycoperdon species	Puffball	NE Swale	MVA	
Marasmius oreades	Fairy Ring	NE Swale	MVA	
Pholiota squarrosa	Shaggy Pholiota,	NE Swale	MVA	
Russula species	Russula	NE Swale	MVA	
Stropharia semiglobata	Dung Roundhead	NE Swale	MVA	

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[4-1, 4-2, 4-3, Plant_Species.xls]Plant Species List

NOTES:

1. EXOTIC SPECIES * (FROM MVA).
2. MVA = MEEWASIN VALLEY AUTHORITY. (GODWIN AND THORPE, 1992).
3. SNS = SASKATOON NATURE SOCIETY. (LEIGHTON et. al. 2002)
4. SRC = SASKATCHEWAN RESEARCH COUNCIL. (DELANOY, 2001)
5. RIPARIAN (RIVERBANK) PLANTS ARE IN BOLD FONT.
6. DELANOY, L. 2001. VEGETATION AND WILDLIFE SURVEY OF THE NORTHEAST SWALE NEAR SASKATOON. UNPUBLISHED REPORT, MEEWASIN VALLEY AUTHORITY, SASKATOON, SASKATCHEWAN.
7. GODWIN, B. AND J. THORPE. 1992. A BIOPHYSICAL INVENTORY OF THE SILVERWOOD RIVERBANK AREA. PREPARED FOR THE MEEWASIN VALLEY AUTHORITY BY THE SASKATCHEWAN RESEARCH COUNCIL, PUBL. NO. E-2550-1-E-92, SASKATOON, SK.
8. LEIGHTON, A. L., J. HAY, C. S. HOUSTON, J. F. ROY, AND S. SHADICK. 2002. BIRDS OF THE SASKATOON AREA. NO. 5, MANLEY CALLIN SERIES, SPECIAL PUBLICATION NO. 23, SASKATCHEWAN NATURAL HISTORY SOCIETY, REGINA, SK.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 5.1

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
FISH SPECIES KNOWN TO OCCUR IN THE SOUTH SASKATCHEWAN RIVER

Print Feb/15/10 14:26:17

Scientific Name	Common Name	1997 Merkowsky	Source
Cottus ricei	Spoonhead Sculpin	x	Miles & Sawchyn 1988
Cottus cognatus	Slimy Sculpin		SPRR 1991
Acipenser fulvescens	Lake Sturgeon[1]		Miles & Sawchyn 1988; SPRR 1991
Salmo gairdneri	Rainbow Trout		Miles & Sawchyn 1988; SPRR 1991
Salvelinus fontinalis	Brook Trout		Miles & Sawchyn 1988; SPRR 1991
Coregonus artedii	Cisco		Miles & Sawchyn 1988; SPRR 1991
Coregonus clupeaformis	Lake Whitefish	x	Miles & Sawchyn 1988; SPRR 1991
Hoidon alosoides	Goldeye	x	Miles & Sawchyn 1988; SPRR 1991
Hiodon tergisus	Mooneye		Miles & Sawchyn 1988; SPRR 1991
Esox lucius	Northern Pike	x	Miles & Sawchyn 1988; SPRR 1991
Couesius plumbeus	Lake Chub		Miles & Sawchyn 1988; SPRR 1991
Notropis atherinoides	Emerald Shiner	x	Miles & Sawchyn 1988; SPRR 1991
Notropis blennius	River Shiner		Miles & Sawchyn 1988; SPRR 1991
Notropis hudsonius	Spottail Shiner		Miles & Sawchyn 1988; SPRR 1991
Pimephales promelas	Fathead Minnow		Miles & Sawchyn 1988; SPRR 1991
Hybopsis gracilis	Flathead Chub		Miles & Sawchyn 1988; SPRR 1991
Rhinichthys cataractae	Longnose Dace		Miles & Sawchyn 1988; SPRR 1991
Carpiodes cyprinus	Quillback Sucker	x	Miles & Sawchyn 1988; SPRR 1991
Catostomus catostomus	Longnose Sucker		Miles & Sawchyn 1988; SPRR 1991
Castostomus commersoni	White Sucker	x	Miles & Sawchyn 1988; SPRR 1991
Moxostoma macrolepidotum	Shorthead Redhorse / Northern Redhorse Sucker	x	Miles & Sawchyn 1988; SPRR 1991
Lota lota	Burbot	x	Miles & Sawchyn 1988; SPRR 1991
Culaea inconstans	Brook Stickleback	x	Miles & Sawchyn 1988; SPRR 1991
Percopsis omiscomaycus	Trout-perch	x	Miles & Sawchyn 1988; SPRR 1991
Perca flavescens	Yellow Perch	x	Miles & Sawchyn 1988; SPRR 1991
Stizostedion canadense	Sauger	x	Miles & Sawchyn 1988; SPRR 1991
Stizostedion vitreum	Walleye	x	Miles & Sawchyn 1988; SPRR 1991
Etheostoma exile	Iowa Darter	x	Miles & Sawchyn 1988; SPRR 1991
Catostomus platyrhynchus	Mountain Sucker		Reed 1962
Margariscus margarita	Pearl Dace		Reed 1962, SPRR 1991
Moxostoma anisurum	Silver Redhorse		Reed 1962, SPRR 1991
Luxilus cornutus	Common Shiner		SPRR 1991
Rhinichthys atratulus	Blacknose Dace		SPRR 1991
Phoxinus neogaeus	Finescale Dace		SPRR 1991

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NOTES:

1. CLASSIFIED AS ENDANGERED BY COSEWIC, NOVEMBER 2006.
2. MERKOWSKY, J. 1999. SPORT FISH MANAGEMENT STUDY, SOUTH SASKATCHEWAN RIVER, SASKATOON AREA. MEMO, SASKATCHEWAN ENVIRONMENT AND RESOURCE MANAGEMENT, SASKATOON, SK.
3. MILES, B. L. AND W. W. SAWCHYN. 1988. FISHERY SURVEY OF THE SOUTH SASKATCHEWAN RIVER AND ITS TRIBUTARIES IN SASKATCHEWAN. SASKATOON PARKS, RECREATION AND CULTURE, FISH TECH. REP. 88-6.
4. SPRR 1991 = SASKATCHEWAN PARKS AND RENEWABLE RESOURCES, FISHERIES BRANCH, TECHNICAL REPORT 91-7, 1991.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 5.2

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
HABITAT OF GAME FISH FOUND IN THE SOUTH SASKATCHEWAN RIVER

Print Feb/15/10 14:27:20

Family	Scientific Name	Common Name	Spawning Habitat			
			Not Suitable	Marginal	Moderate	Most Suitable
Acipenseridae	*Acipenser fulvescens*	Lake Sturgeon	organic or silt bottom substrate; with aquatic plant debris; little or no current	sand and/or silt bottom substrate; free of aquatic plant debris; particularly with some current	clean gravel, cobble, and boulder substrate; >0.6 m of water; spaces or crevices between the rock; some current	areas similar to moderate but found in riffles with a moderate to strong current
Salmonidae	*Coregonus artedii*	Cisco	organic or silt substrate; particularly with aquatic plant debris	sand and/or silt substrate; free of aquatic plant debris	clean cobble and boulder substrate; <3 m of water; spaces or crevices between the rocks	similar to moderate but found in a shoal, reef, or stream; some water movement during the over-winter incubation of spawned eggs
	Coregonus clupeaformis	Lake Whitefish	organic or silt substrate; particularly with aquatic plant debris	sand and/or silt substrate; free of aquatic plant debris	clean cobble and boulder substrate; <3 m of water; spaces or crevices between the rocks	similar to moderate but found in a shoal, reef, or stream; some water movement during the over-winter incubation of spawned eggs
Hiodontidae	*Hoidon alosoides*	Goldeye	moderate to strong current; unconsolidated substrate and/or dense aquatic plant growth	quiet pool or backwater in a river; unconsolidated substrate with some aquatic vegetation	quiet pool or backwater; firm substrate lacking aquatic vegetation; relatively clear river	quiet pool or backwater; firm substrate lacking aquatic vegetation; turbid river
Esocidae	*Esox lucius*	Northern Pike	rock or sand substrate; no aquatic plants	sparse growth of aquatic plants; usually *Carex*	moderate to dense aquatic plant growth	<.5 m water depth; little to no current; substrate covered with aquatic plant material (live & dead)
Catostomidae	*Catostomus catostomus*	Longnose sucker	organic, silt, or sand substrate; particularly with aquatic plant debris	predominantly sand and/or silt substrate with some gravel and/or cobble; free of aquatic plant debris	clean gravel and/or cobble substrate; <0.5 m of water with some water movement	clean gravel substrate particularly in a stream; in <0.3 m of water; good water movement due to currents.
	Castostomus commersoni	White sucker	organic, silt, or sand substrate; particularly with aquatic plant debris	predominantly sand and/or silt substrate with some gravel and/or cobble; free of aquatic plant debris	clean gravel and/or cobble substrate; <0.5 m of water with some water movement	clean gravel substrate particularly in a stream; in <0.3 m of water; good water movement due to currents.
	Moxostoma macrolepidotum	Shorthead redhorse	organic, silt, or sand substrate; particularly with aquatic plant debris	predominantly sand and/or silt substrate with some gravel and/or cobble; free of aquatic plant debris	clean gravel and/or cobble substrate; <0.5 m of water with some water movement	clean gravel substrate particularly in a stream; in <0.3 m of water; good water movement due to currents.
Percidae	*Perca flavescens*	Yellow perch	no aquatic plant growth; cobble or boulder substrate; moderate or strong current	relatively shallow area; no aquatic plant growth; sand or gravel substrate; little or no current	inshore area; sparse rooted aquatic plant growth; some submerged brush and/or fallen trees; little or no current;	inshore area; moderate to dense rooted aquatic plant growth; significant amounts of submerged brush and/or fallen trees; little or no current.
	Stizostedion canadense	Sauger	organic or silt substrate; particularly with aquatic plant debris	and consists of a sand or gravel substrate with little or no current;	clean gravel, cobble, and boulder substrate; <1.5 m of water; with spaces or crevices between the rock	similar to moderate conditions but found in a shoal or reef area of a lake or riffle of a stream; good water circulation or movement from wave action or current
	Stizostedion vitreumq	Walleye	organic or silt substrate; particularly with aquatic plant debris	sand and/or silt substrate; free of aquatic plant debris	clean gravel, cobble, and boulder substrate; <1.5 m of water; with spaces or crevices between the rock	similar to moderate conditions but found in a shoal or reef area of a lake or riffle of a stream; good water circulation or movement from wave action or current

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NOTES:
1. SOURCE; CANADA NORTH ENVIRONMENTAL SERVICES 2007.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 6.1

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
HERPETILES OBSERVED IN THE SASKATOON AREA

Print Feb/15/10 15:05:29

Scientific Name	Common Name	Source	Location	Habitat	Conservation Status
Amphibians					
Ambystoma tigrinum	Tiger Salamander	Jonker and Gollop	NE Swale	arid sagebrush plains; pine barrens; mountain forests; damp meadows where ground is easily burrowed; also in mammal and invertebrate burrows (Behler & King 1995)	
Pseudoacris triseriata maculata	Boreal Chorus Frog	Jonker and Gollop	NE Swale	grassy areas from dry to swampy to agricultural; suburbs where pollution and pesticides are not a problem; woodlands; river swamps (Behler & King 1995)	
Rana pipiens	Northern Leopard Frog	Knight Piésold			Special Concern
Pseudacris triseriata	Western Chorus Frog	Saskatchewan Amphibians			
Rana sylvatica	Wood Frog	Saskatchewan Amphibians			
Bufo hemiophrys	Canadian Toad	Saskatchewan Amphibians			
Reptiles					
Pituophis catenifer	Bullsnake	Saskatchewan Reptiles			
Thamnophys radix	Plains Garter Snake	Saskatchewan Reptiles			
Thamnopsis sirtalis parietalis	Common or Red Sided Garter Snake	Jonker and Gollop, MVA	NE Swale	near water - wet meadows, marshes, prairie swales, irrigation and drainage ditches; damp woodland; farms; parks	

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[6-1 Herpetiles.xls]6.1

NOTES:

1. JONKER, P. AND B. GOLLOP. 2000. A GUIDE TO NATURE VIEWING SITES IN AND AROUND SASKATOON. SASKATOON NATURAL HISTORY SOCIETY, SASKATOON, SASKATCHEWAN.
2. MVA = DELANOY, L. 2001. VEGETATION AND WILDLIFE SURVEY OF THE NORTHEAST SWALE NEAR SASKATOON. UNPUBLISHED REPORT, MEEWASIN VALLEY AUTHORITY, SASKATOON, SASKATCHEWAN.
3. SASKATCHEWAN AMPHIBIANS - http://esask.uregina.ca/entry/amphibians.html.
4. SASKATCHEWAN REPTILES - http://esask.uregina.ca/entry/reptiles.html.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 6.2

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
BIRD SPECIES KNOWN TO OCCUR IN SASKATCHEWAN

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GALLIFORMES: Phasianidae		
Wild Turkey	*Meleagris gallopavo*	Introduced species
Ruffed Grouse	*Bonasa umbellus*	
Spruce Grouse	*Falcipennis canadensis*	
Sage Grouse	*Centrocercus urophasianus*	Endangered (Civi vrophdsinus)
Sharp-tailed Grouse	*Tympanuchus phasianellus*	
Greater Prairie Chicken	*Tympanuchus cupido*	Extirpated
Rock Ptarmigan	*Lagopus muta*	Rare/Accidental
Willow Ptarmigan	*Lagopus lagopus*	
Chukar Partridge	*Alectoris chukar*	
Grey Partridge	*Perdix perdix*	Introduced species
Common Pheasant	*Phasianus colchicus*	Introduced species
ANSERIFORMES: Anatidae		
Greater White-fronted Goose	*Anser albifrons*	
Snow Goose	*Chen caerulescens*	
Ross's Goose	*Chen rossii*	
Emperor Goose	*Chen canagica*	Near-threatened
Canada Goose	*Branta canadensis*	
Cackling Goose	*Branta hutchinsii*	
Brant Goose	*Branta bernicla*	Rare/Accidental
Barnacle Goose	*Branta leucopsis*	
Mute Swan	*Cygnus olor*	
Trumpeter Swan	*Cygnus buccinator*	
Tundra Swan	*Cygnus columbianus*	
Wood Duck	*Aix sponsa*	
Gadwall	*Anas strepera*	
Eurasian Wigeon	*Anas penelope*	Rare/Accidental
American Wigeon	*Anas americana*	
American Black Duck	*Anas rubripes*	
Mallard	*Anas platyrhynchos*	
Blue-winged Teal	*Anas discors*	
Cinnamon Teal	*Anas cyanoptera*	
Northern Shoveler	*Anas clypeata*	
Northern Pintail	*Anas acuta*	
Garganey	*Anas querquedula*	Rare/Accidental
Green-winged Teal	*Anas carolinensis*	
Canvasback	*Aythya valisineria*	
Redhead	*Aythya americana*	
Common Pochard	*Aythya ferina*	
Ring-necked Duck	*Aythya collaris*	
Greater Scaup	*Aythya marila*	
Lesser Scaup	*Aythya affinis*	
King Eider	*Somateria spectabilis*	Rare/Accidental
Common Eider	*Somateria mollissima*	Rare/Accidental
Harlequin Duck	*Histrionicus histrionicus*	Rare/Accidental
Surf Scoter	*Melanitta perspicillata*	
White-winged Scoter	*Melanitta deglandi*	
American Scoter	*Melanitta americana*	
Long-tailed Duck	*Clangula hyemalis*	
Bufflehead	*Bucephala albeola*	
Common Goldeneye	*Bucephala clangula*	
Barrow's Goldeneye	*Bucephala islandica*	
Smew	*Mergellus albellus*	
Hooded Merganser	*Lophodytes cucullatus*	
Common Merganser	*Mergus merganser*	
Red-breasted Merganser	*Mergus serrator*	
Ruddy Duck	*Oxyura jamaicensis*	

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GAVIIFORMES: Gaviidae		
Red-throated Loon	*Gavia stellata*	
Pacific Loon	*Gavia pacifica*	
Great Northern Loon	*Gavia immer*	
Yellow-billed Loon	*Gavia adamsii*	Rare/Accidental
PODICIPEDIFORMES: Podicipedidae		
Pied-billed Grebe	*Podilymbus podiceps*	
Red-necked Grebe	*Podiceps grisegena*	
Horned Grebe	*Podiceps auritus*	
Black-necked Grebe	*Podiceps nigricollis*	
Western Grebe	*Aechmophorus occidentalis*	
Clark's Grebe	*Aechmophorus clarkii*	
PELECANIFORMES: Threskiornithidae		
White-faced Ibis	*Plegadis chihi*	Rare/Accidental
PELECANIFORMES: Ardeidae		
American Bittern	*Botaurus lentiginosus*	
Least Bittern	*Ixobrychus exilis*	Rare/Accidental
Black-crowned Night Heron	*Nycticorax nycticorax*	
Yellow-crowned Night Heron	*Nyctanassa violacea*	Rare/Accidental
Green Heron	*Butorides virescens*	Rare/Accidental
Western Cattle Egret	*Bubulcus ibis*	
Great Blue Heron	*Ardea herodias*	
Western Great Egret	*Ardea alba*	
Little Blue Heron	*Egretta caerulea*	Rare/Accidental
Snowy Egret	*Egretta thula*	Rare/Accidental
PELECANIFORMES: Pelecanidae		
American White Pelican	*Pelecanus erythrorhynchos*	
Brown Pelican	*Pelecanus occidentalis*	
PELECANIFORMES: Phalacrocoracidae		
Double-crested Cormorant	*Phalacrocorax auritus*	
ACCIPITRIFORMES: Cathartidae		
Turkey Vulture	*Cathartes aura*	
ACCIPITRIFORMES: Pandionidae		
Western Osprey	*Pandion haliaetus*	
ACCIPITRIFORMES: Accipitridae		
Mississippi Kite	*Ictinia mississippiensis*	Rare/Accidental
Bald Eagle	*Haliaeetus leucocephalus*	
Northern Harrier	*Circus cyaneus*	
Sharp-shinned Hawk	*Accipiter striatus*	
Cooper's Hawk	*Accipiter cooperii*	
Northern Goshawk	*Accipiter gentilis*	
Broad-winged Hawk	*Buteo platypterus*	
Swainson's Hawk	*Buteo swainsoni*	
Red-tailed Hawk	*Buteo jamaicensis*	
Ferruginous Hawk	*Buteo regalis*	
Rough-legged Buzzard	*Buteo lagopus*	
Golden Eagle	*Aquila chrysaetos*	
FALCONIFORMES: Falconidae		
American Kestrel	*Falco sparverius*	
Merlin	*Falco columbarius*	
Gyrfalcon	*Falco rusticolus*	
Prairie Falcon	*Falco mexicanus*	
Peregrine Falcon	*Falco peregrinus*	
GRUIFORMES: Rallidae		
Yellow Rail	*Coturnicops noveboracensis*	
Virginia Rail	*Rallus limicola*	
Sora	*Porzana carolina*	
American Coot	*Fulica americana*	

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HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

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GRUIFORMES: Gruidae		
Sandhill Crane	*Grus canadensis*	
Common Crane	*Grus grus*	Rare/Accidental
Whooping Crane	*Grus americana*	Endangered
CHARADRIIFORMES: Recurvirostridae		
Black-necked Stilt	*Himantopus mexicanus*	Rare/Accidental
American Avocet	*Recurvirostra americana*	
CHARADRIIFORMES: Charadriidae		
American Golden Plover	*Pluvialis dominica*	
Grey Plover	*Pluvialis squatarola*	
Semipalmated Plover	*Charadrius semipalmatus*	
Killdeer	*Charadrius vociferus*	
Piping Plover	*Charadrius melodus*	Endangered
Mountain Plover	*Charadrius montanus*	Endangered
Snowy Plover	*Charadrius nivosus*	Rare/Accidental
CHARADRIIFORMES: Scolopacidae		
American Woodcock	*Scolopax minor*	Rare/Accidental
Wilson's Snipe	*Gallinago delicata*	
Short-billed Dowitcher	*Limnodromus griseus*	
Long-billed Dowitcher	*Limnodromus scolopaceus*	
Hudsonian Godwit	*Limosa haemastica*	
Marbled Godwit	*Limosa fedoa*	
Eskimo Curlew	*Numenius borealis*	Extirpated / Endangered
Whimbrel	*Numenius phaeopus*	
Long-billed Curlew	*Numenius americanus*	
Upland Sandpiper	*Bartramia longicauda*	
Spotted Redshank	*Tringa erythropus*	Rare/Accidental
Greater Yellowlegs	*Tringa melanoleuca*	
Lesser Yellowlegs	*Tringa flavipes*	
Solitary Sandpiper	*Tringa solitaria*	
Willet	*Tringa semipalmata*	
Spotted Sandpiper	*Actitis macularius*	
Ruddy Turnstone	*Arenaria interpres*	
Red Knot	*Calidris canutus*	Endangered (subspecies *rufa*)
Sanderling	*Calidris alba*	
Semipalmated Sandpiper	*Calidris pusilla*	
Western Sandpiper	*Calidris mauri*	Rare/Accidental
Least Sandpiper	*Calidris minutilla*	
White-rumped Sandpiper	*Calidris fuscicollis*	
Baird's Sandpiper	*Calidris bairdii*	
Pectoral Sandpiper	*Calidris melanotos*	
Dunlin	*Calidris alpina*	
Stilt Sandpiper	*Calidris himantopus*	
Buff-breasted Sandpiper	*Tryngites subruficollis*	Near-threatened
Ruff	*Philomachus pugnax*	Rare/Accidental
Wilson's Phalarope	*Phalaropus tricolor*	
Red-necked Phalarope	*Phalaropus lobatus*	
Red Phalarope	*Phalaropus fulicarius*	Rare/Accidental
CHARADRIIFORMES: Laridae		
Black-legged Kittiwake	*Rissa tridactyla*	Rare/Accidental
Sabine's Gull	*Xema sabini*	Rare/Accidental
Bonaparte's Gull	*Chroicocephalus philadelphia*	
Little Gull	*Hydrocoloeus minutus*	Rare/Accidental
Franklin's Gull	*Leucophaeus pipixcan*	
Mew Gull	*Larus canus*	
Ring-billed Gull	*Larus delawarensis*	
California Gull	*Larus californicus*	
Great Black-backed Gull	*Larus marinus*	Rare/Accidental

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Western Gull	*Larus occidentalis*	Rare/Accidental
Glaucous Gull	*Larus hyperboreus*	
Thayer's Gull	*Larus thayeri*	
American Herring Gull	*Larus smithsonianus*	
Slaty-backed Gull	*Larus schistisagus*	Rare/Accidental
Lesser Black-backed Gull	*Larus fuscus*	Rare/Accidental
Caspian Tern	*Hydroprogne caspia*	
Least Tern	*Sternula antillarum*	Rare/Accidental
Common Tern	*Sterna hirundo*	
Arctic Tern	*Sterna paradisaea*	
Forster's Tern	*Sterna forsteri*	
Black Tern	*Chlidonias niger*	
CHARADRIIFORMES: Stercorariidae		
Pomarine Skua	*Stercorarius pomarinus*	Rare/Accidental
Parasitic Jaeger	*Stercorarius parasiticus*	Rare/Accidental
Long-tailed Jaeger	*Stercorarius longicaudus*	Rare/Accidental
CHARADRIIFORMES: Alcidae		
Black Guillemot	*Cepphus grylle*	Rare/Accidental
Ancient Murrelet	*Synthliboramphus antiquus*	Rare/Accidental
COLUMBIFORMES: Columbidae		
Common Pigeon	*Columba livia*	Introduced species
Band-tailed Pigeon	*Patagioenas fasciata*	Rare/Accidental
Eurasian Collared Dove	*Streptopelia decaocto*	Introduced species
Mourning Dove	*Zenaida macroura*	
CUCULIFORMES: Cuculidae		
Black-billed Cuckoo	*Coccyzus erythropthalmus*	
STRIGIFORMES: Tytonidae		
Western Barn Owl	*Tyto alba*	
STRIGIFORMES: Strigidae		
Eastern Screech Owl	*Megascops asio*	
Snowy Owl	*Bubo scandiacus*	
Great Horned Owl	*Bubo virginianus*	
Barred Owl	*Strix varia*	
Great Grey Owl	*Strix nebulosa*	
Northern Hawk-Owl	*Surnia ulula*	
Burrowing Owl	*Athene cunicularia*	Endangered
Boreal Owl	*Aegolius funereus*	
Northern Saw-whet Owl	*Aegolius acadicus*	
Long-eared Owl	*Asio otus*	
Short-eared Owl	*Asio flammeus*	
CAPRIMULGIFORMES: Caprimulgidae		
Common Nighthawk	*Chordeiles minor*	
Common Poorwill	*Phalaenoptilus nuttallii*	
Whip-poor-will	*Caprimulgus vociferus*	
APODIFORMES: Apodidae		
Chimney Swift	*Chaetura pelagica*	
APODIFORMES: Trochilidae		
Ruby-throated Hummingbird	*Archilochus colubris*	
Anna's Hummingbird	*Calypte anna*	Rare/Accidental
Rufous Hummingbird	*Selasphorus rufus*	Rare/Accidental
Calliope Hummingbird	*Stellula calliope*	Rare/Accidental
CORACIIFORMES: Alcedinidae		
Belted Kingfisher	*Megaceryle alcyon*	
PICIFORMES: Picidae		
Lewis's Woodpecker	*Melanerpes lewis*	Rare/Accidental
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Near-threatened
Red-bellied Woodpecker	*Melanerpes carolinus*	Rare/Accidental
Williamson's Sapsucker	*Sphyrapicus thyroideus*	Rare/Accidental

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HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

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Yellow-bellied Sapsucker	*Sphyrapicus varius*	
Red-naped Sapsucker	*Sphyrapicus nuchalis*	
Downy Woodpecker	*Picoides pubescens*	
Hairy Woodpecker	*Picoides villosus*	
American Three-toed Woodpecker	*Picoides dorsalis*	
Black-backed Woodpecker	*Picoides arcticus*	
Northern Flicker	*Colaptes auratus*	
Pileated Woodpecker	*Dryocopus pileatus*	
PASSERIFORMES: Tyrannidae		
Eastern Phoebe	*Sayornis phoebe*	
Say's Phoebe	*Sayornis saya*	
Olive-sided Flycatcher	*Contopus cooperi*	Near-threatened
Western Wood Pewee	*Contopus sordidulus*	
Eastern Wood Pewee	*Contopus virens*	
Yellow-bellied Flycatcher	*Empidonax flaviventris*	
Willow Flycatcher	*Empidonax traillii*	
Alder Flycatcher	*Empidonax alnorum*	
Least Flycatcher	*Empidonax minimus*	
American Dusky Flycatcher	*Empidonax oberholseri*	
Western Kingbird	*Tyrannus verticalis*	
Scissor-tailed Flycatcher	*Tyrannus forficatus*	Rare/Accidental
Eastern Kingbird	*Tyrannus tyrannus*	
Great Crested Flycatcher	*Myiarchus crinitus*	
PASSERIFORMES: Laniidae		
Loggerhead Shrike	*Lanius ludovicianus*	
Great Grey Shrike	*Lanius excubitor*	
PASSERIFORMES: Vireonidae		
White-eyed Vireo	*Vireo griseus*	Rare/Accidental
Yellow-throated Vireo	*Vireo flavifrons*	
Cassin's Vireo	*Vireo cassinii*	Rare/Accidental
Blue-headed Vireo	*Vireo solitarius*	
Warbling Vireo	*Vireo gilvus*	
Philadelphia Vireo	*Vireo philadelphicus*	
Red-eyed Vireo	*Vireo olivaceus*	
PASSERIFORMES: Corvidae		
Grey Jay	*Perisoreus canadensis*	
Blue Jay	*Cyanocitta cristata*	
Steller's Jay	*Cyanocitta stelleri*	Rare/Accidental
Black-billed Magpie	*Pica hudsonia*	
Clark's Nutcracker	*Nucifraga columbiana*	Rare/Accidental
American Crow	*Corvus brachyrhynchos*	
Northern Raven	*Corvus corax*	
PASSERIFORMES: Bombycillidae		
Bohemian Waxwing	*Bombycilla garrulus*	
Cedar Waxwing	*Bombycilla cedrorum*	
PASSERIFORMES: Paridae		
Black-capped Chickadee	*Poecile atricapillus*	
Mountain Chickadee	*Poecile gambeli*	Rare/Accidental
Boreal Chickadee	*Poecile hudsonicus*	
PASSERIFORMES: Alaudidae		
Horned Lark	*Eremophila alpestris*	
PASSERIFORMES: Hirundinidae		
Sand Martin	*Riparia riparia*	
Tree Swallow	*Tachycineta bicolor*	
Violet-green Swallow	*Tachycineta thalassina*	
Purple Martin	*Progne subis*	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	

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Barn Swallow	*Hirundo rustica*	
American Cliff Swallow	*Petrochelidon pyrrhonota*	
PASSERIFORMES: Regulidae		
Golden-crowned Kinglet	*Regulus satrapa*	
Ruby-crowned Kinglet	*Regulus calendula*	
PASSERIFORMES: Troglodytidae		
Rock Wren	*Salpinctes obsoletus*	
Sedge Wren	*Cistothorus platensis*	
Marsh Wren	*Cistothorus palustris*	
Winter Wren	*Troglodytes troglodytes*	
House Wren	*Troglodytes aedon*	
PASSERIFORMES: Sittidae		
Red-breasted Nuthatch	*Sitta canadensis*	
White-breasted Nuthatch	*Sitta carolinensis*	
PASSERIFORMES: Certhiidae		
Brown Creeper	*Certhia americana*	
PASSERIFORMES: Mimidae		
Grey Catbird	*Dumetella carolinensis*	
Northern Mockingbird	*Mimus polyglottos*	
Sage Thrasher	*Oreoscoptes montanus*	Endangered
Brown Thrasher	*Toxostoma rufum*	
PASSERIFORMES: Sturnidae		
Common Starling	*Sturnus vulgaris*	Introduced species
PASSERIFORMES: Turdidae		
Varied Thrush	*Ixoreus naevius*	Rare/Accidental
Eastern Bluebird	*Sialia sialis*	
Mountain Bluebird	*Sialia currucoides*	
Townsend's Solitaire	*Myadestes townsendi*	
Veery	*Catharus fuscescens*	
Grey-cheeked Thrush	*Catharus minimus*	
Swainson's Thrush	*Catharus ustulatus*	
Hermit Thrush	*Catharus guttatus*	
Wood Thrush	*Hylocichla mustelina*	Rare/Accidental
American Robin	*Turdus migratorius*	
PASSERIFORMES: Cinclidae		
American Dipper	*Cinclus mexicanus*	Rare/Accidental
PASSERIFORMES: Passeridae		
House Sparrow	*Passer domesticus*	Introduced species
PASSERIFORMES: Motacillidae		
White Wagtail	*Motacilla alba*	Rare/Accidental
Buff-bellied Pipit	*Anthus rubescens*	
Sprague's Pipit	*Anthus spragueii*	Vulnerable
PASSERIFORMES: Fringillidae		
Brambling	*Fringilla montifringilla*	Rare/Accidental
Pine Siskin	*Carduelis pinus*	
American Goldfinch	*Carduelis tristis*	
Common Redpoll	*Carduelis flammea*	
Arctic Redpoll	*Carduelis hornemanni*	
Grey-crowned Rosy Finch	*Leucosticte tephrocotis*	
Purple Finch	*Carpodacus purpureus*	
House Finch	*Carpodacus mexicanus*	Introduced species
Pine Grosbeak	*Pinicola enucleator*	
Red Crossbill	*Loxia curvirostra*	
Two-barred Crossbill	*Loxia leucoptera*	
Evening Grosbeak	*Hesperiphona vespertina*	
PASSERIFORMES: Parulidae		
Golden-winged Warbler	*Vermivora chrysoptera*	Rare/Accidental Near-threatened
Blue-winged Warbler	*Vermivora pinus*	Rare/Accidental

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Tennessee Warbler	*Vermivora peregrina*	
Orange-crowned Warbler	*Vermivora celata*	
Nashville Warbler	*Vermivora ruficapilla*	
Northern Parula	*Parula americana*	Rare/Accidental
Chestnut-sided Warbler	*Dendroica pensylvanica*	
American Yellow Warbler	*Dendroica aestiva*	
Blackpoll Warbler	*Dendroica striata*	
Bay-breasted Warbler	*Dendroica castanea*	
Blackburnian Warbler	*Dendroica fusca*	
Magnolia Warbler	*Dendroica magnolia*	
Cape May Warbler	*Dendroica tigrina*	
Black-throated Blue Warbler	*Dendroica caerulescens*	Rare/Accidental
Yellow-rumped Warbler	*Dendroica coronata*	
Black-throated Grey Warbler	*Dendroica nigrescens*	Rare/Accidental
Black-throated Green Warbler	*Dendroica virens*	
Townsend's Warbler	*Dendroica townsendi*	Rare/Accidental
Prairie Warbler	*Dendroica discolor*	Rare/Accidental
Pine Warbler	*Dendroica pinus*	Rare/Accidental
Palm Warbler	*Dendroica palmarum*	
Black-and-white Warbler	*Mniotilta varia*	
American Redstart	*Setophaga ruticilla*	
Prothonotary Warbler	*Protonotaria citrea*	Rare/Accidental
Worm-eating Warbler	*Helmitheros vermivorum*	Rare/Accidental
Ovenbird	*Seiurus aurocapilla*	
Northern Waterthrush	*Seiurus noveboracensis*	
Connecticut Warbler	*Oporornis agilis*	
Mourning Warbler	*Oporornis philadelphia*	
MacGillivray's Warbler	*Oporornis tolmiei*	
Common Yellowthroat	*Geothlypis trichas*	
Hooded Warbler	*Wilsonia citrina*	Rare/Accidental
Wilson's Warbler	*Wilsonia pusilla*	
Canada Warbler	*Wilsonia canadensis*	
PASSERIFORMES: Incertae Sedis		
Yellow-breasted Chat	*Icteria virens*	
PASSERIFORMES: Icteridae		
Orchard Oriole	*Icterus spurius*	
Baltimore Oriole	*Icterus galbula*	
Bullock's Oriole	*Icterus bullockii*	
Brown-headed Cowbird	*Molothrus ater*	
Red-winged Blackbird	*Agelaius phoeniceus*	
Rusty Blackbird	*Euphagus carolinus*	Vulnerable
Brewer's Blackbird	*Euphagus cyanocephalus*	
Common Grackle	*Quiscalus quiscula*	
Eastern Meadowlark	*Sturnella magna*	Rare/Accidental
Western Meadowlark	*Sturnella neglecta*	
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	
Bobolink	*Dolichonyx oryzivorus*	
PASSERIFORMES: Emberizidae		
Lark Bunting	*Calamospiza melanocorys*	
Fox Sparrow	*Passerella iliaca*	
Song Sparrow	*Melospiza melodia*	
Lincoln's Sparrow	*Melospiza lincolnii*	
Swamp Sparrow	*Melospiza georgiana*	
Harris's Sparrow	*Zonotrichia querula*	
White-crowned Sparrow	*Zonotrichia leucophrys*	
White-throated Sparrow	*Zonotrichia albicollis*	
Golden-crowned Sparrow	*Zonotrichia atricapilla*	Rare/Accidental
Dark-eyed Junco	*Junco hyemalis*	

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TABLE 6.2

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
BIRD SPECIES KNOWN TO OCCUR IN SASKATCHEWAN

Print Feb/15/10 14:30:56

Savannah Sparrow	*Passerculus sandwichensis*	
Nelson's Sparrow	*Ammodramus nelsoni*	
Le Conte's Sparrow	*Ammodramus leconteii*	
Baird's Sparrow	*Ammodramus bairdii*	
Grasshopper Sparrow	*Ammodramus savannarum*	
American Tree Sparrow	*Spizella arborea*	
Chipping Sparrow	*Spizella passerina*	
Field Sparrow	*Spizella pusilla*	Rare/Accidental
Clay-colored Sparrow	*Spizella pallida*	
Brewer's Sparrow	*Spizella breweri*	
Vesper Sparrow	*Pooecetes gramineus*	
Lark Sparrow	*Chondestes grammacus*	
Black-throated Sparrow	*Amphispiza bilineata*	Rare/Accidental
Green-tailed Towhee	*Pipilo chlorurus*	Rare/Accidental
Spotted Towhee	*Pipilo maculatus*	
Eastern Towhee	*Pipilo erythrophthalmus*	
PASSERIFORMES: Thraupidae		
Summer Tanager	*Piranga rubra*	Rare/Accidental
Scarlet Tanager	*Piranga olivacea*	
Western Tanager	*Piranga ludoviciana*	
PASSERIFORMES: Calcariidae		
McCown's Longspur	*Calcarius mccownii*	
Lapland Longspur	*Calcarius lapponicus*	
Smith's Longspur	*Calcarius pictus*	
Chestnut-collared Longspur	*Calcarius ornatus*	Near-threatened
Snow Bunting	*Plectrophenax nivalis*	
PASSERIFORMES: Cardinalidae		
Dickcissel	*Spiza americana*	Rare/Accidental
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	
Black-headed Grosbeak	*Pheucticus melanocephalus*	
Northern Cardinal	*Cardinalis cardinalis*	Rare/Accidental
Indigo Bunting	*Passerina cyanea*	
Lazuli Bunting	*Passerina amoena*	
Painted Bunting	*Passerina ciris*	Rare/Accidental Near-threatened

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NOTES:

1. SOURCE: AVIBASE - BIRD CHECKLISTS OF THE WORLD..http://avibase.bsc-eoc.org/checklist.jsp?region=cask&list=ioc&lang=EN&synlang=none
2. "ENDANGERED" ASSESSMENT FROM COSEWIC http://www.cosewic.gc.ca/eng/sct0/rpt/dsp_booklet_e.htm.
3. BIRD CHECKLISTS OF THE WORLD IS PART OF AVIBASE AND BIRD LINKS TO THE WORLD, WHICH ARE DESIGNED AND MAINTAINED BY DENIS LEPAGE, AND HOSTED BY BIRD STUDIES CANADA, WHICH IS A CO-PARTNER OF BIRDLIFE INTERNATIONAL

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 6.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SASKATOON AREA BIRD LIST

Print Feb/15/10 14:32:07

Geese & Swans	**Bitterns, Herons & Ibis**	**Shorebirds**
Greater White-fronted Goose	American Bittern	Baird's Sandpiper
Snow Goose	Least Bittern (~1920) T	Pectoral Sandpiper
Ross's Goose	Great Blue Heron	Dunlin
Brant	Great Egret	Stilt Sandpiper
Cackling Goose	Snowy Egret	Buff-breasted Sandpiper
Canada Goose	Cattle Egret	Ruff
Tundra Swan	Black-crowned Night-Heron	Short-billed Dowitcher
Dabbling Ducks	White-faced Ibis	Long-billed Dowitcher
Wood Duck	**Vulture, Eagles, Harrier & Hawks**	Wilson's Snipe
Gadwall	Turkey Vulture	Wilson's Phalarope
Eurasian Wigeon	Osprey	Red-necked Phalarope
American Wigeon	Bald Eagle	**Jaeger & Gulls**
American Black Duck	Northern Harrier	Parasitic Jaeger
Mallard	Sharp-shinned Hawk	Franklin's Gull
Blue-winged Teal	Cooper's Hawk	Little Gull
Cinnamon Teal	Northern Goshawk	Bonaparte's Gull
Northern Shoveler	Broad-winged Hawk	Mew Gull
Northern Pintail	Swainson's Hawk	Ring-billed Gull
Green-winged Teal	Red-tailed Hawk	California Gull
Diving Ducks	Ferruginous Hawk SC	Herring Gull
Canvasback	Rough-legged Hawk	Thayer's Gull
Redhead	Golden Eagle	Iceland Gull
Ring-necked Duck	**Falcons**	Lesser Black-backed Gull
Greater Scaup	American Kestrel	Glaucous Gull
Lesser Scaup	Merlin	Sabine's Gull
King Eider	Gyrfalcon	**Terns**
Common Eider	Peregrine Falcon T	Least Tern
Harlequin Duck	Prairie Falcon	Caspian Tern
Surf Scoter	**Rails, Coot & Cranes**	Common Tern
White-winged Scoter	Yellow Rail SC	Black Tern
Black Scoter	Virginia Rail	Arctic Tern
Long-tailed Duck	Sora	Forster's Tern
Bufflehead	American Coot	**Pigeons, Doves & Cuckoo**
Common Goldeneye	Sandhill Crane	Rock Pigeon
Barrow's Goldeneye	Whooping Crane E (nest 1912)	Band-tailed Pigeon
Hooded Merganser	**Shorebirds**	Eurasian Collared-Dove
Common Merganser	Black-bellied Plover	Mourning Dove
Red-breasted Merganser	American Golden-Plover	Black-billed Cuckoo
Ruddy Duck	Semipalmated Plover	**Owls**
Upland Game Birds	Piping Plover E	Great Horned Owl
Chukar	Killdeer	Snowy Owl
Gray Partridge	Black-necked Stilt	Northern Hawk Owl
Ring-necked Pheasant	American Avocet	Burrowing Owl E
Ruffed Grouse	Spotted Sandpiper	Barred Owl
Sharp-tailed Grouse	Solitary Sandpiper	Great Gray Owl
Greater Prairie-Chicken (1946)	Greater Yellowlegs	Long-eared Owl
Loons & Grebes	Willet	Short-eared Owl SC
Red-throated Loon	Lesser Yellowlegs	Boreal Owl
Pacific Loon	Upland Sandpiper	Northern Saw-whet Owl
Common Loon	Whimbrel	**Nighthawk, Hummingbirds & Kingfisher**
Yellow-billed Loon	Long-billed Curlew SC	Common Nighthawk
Pied-billed Grebe	Hudsonian Godwit	Rufous Hummingbird
Horned Grebe	Marbled Godwit	Ruby-throated Hummingbird
Red-necked Grebe	Ruddy Turnstone	Belted Kingfisher
Eared Grebe	Red Knot	
Western Grebe	Sanderling	
Clark's Grebe	Semipalmated Sandpiper	
Pelican & Cormorant	Western Sandpiper	
American White Pelican	Least Sandpiper	
Double-crested Cormorant	White-rumped Sandpiper	

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TABLE 6.3

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SASKATOON AREA BIRD LIST

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Woodpeckers	**Thrushes**	**Towhee, Sparrows & Junco**
Lewis's Woodpecker SC	Eastern Bluebird	Spotted Towhee
Red-headed Woodpecker SC	Mountain Bluebird	American Tree Sparrow
Yellow-bellied Sapsucker	Townsend's Solitaire	Chipping Sparrow
Downy Woodpecker	Veery	Clay-colored Sparrow
Hairy Woodpecker	Swainson's Thrush	Field Sparrow
American Three-toed Woodpecker	Wood Thrush	Vesper Sparrow
Black-backed Woodpecker	American Robin	Lark Sparrow
Northern Flicker	Gray-cheeked Thrush	Lark Bunting
Pileated Woodpecker	Varied Thrush	Savannah Sparrow
Flycatchers	Hermit Thrush	Grasshopper Sparrow
Olive-sided Flycatcher	**Catbird & Allies**	Baird's Sparrow
Western Wood-Pewee	Gray Catbird	Le Conte's Sparrow
Eastern Wood-Pewee	Northern Mockingbird	Nelson's Sharp-tailed Sparrow
Yellow-bellied Flycatcher	Brown Thrasher	Fox Sparrow
Alder Flycatcher	Curve-billed Thrasher	Song Sparrow
Willow Flycatcher	**Starling, Pipits & Waxwings**	Lincoln's Sparrow
Least Flycatcher	European Starling	Swamp Sparrow
Eastern Phoebe	American Pipit	White-throated Sparrow
Say's Phoebe	Sprague's Pipit T	Harris's Sparrow
Great Crested Flycatcher	Bohemian Waxwing	White-crowned Sparrow
Western Kingbird	Cedar Waxwing	Golden-crowned Sparrow
Eastern Kingbird	**Wood Warblers**	Dark-eyed Junco
Scissor-tailed Flycatcher	Tennessee Warbler	**Longspurs & Snow Bunting**
Shrikes	Orange-crowned Warbler	McCown's Longspur
Loggerhead Shrike	Nashville Warbler	Lapland Longspur
Northern Shrike	Northern Parula	Smith's Longspur
Vireos	Yellow Warbler	Chestnut-collared Longspur
Blue-headed Vireo	Chestnut-sided Warbler	Snow Bunting
Warbling Vireo	Magnolia Warbler	Summer Grosbeaks
Philadelphia Vireo	Cape May Warbler	Northern Cardinal
Red-eyed Vireo	Black-throated Blue Warbler	Rose-breasted Grosbeak
Jays & Crows	Yellow-rumped Warbler	Black-headed Grosbeak
Gray Jay	Black-throated Green Warbler	**Buntings & Allies**
Blue Jay	Blackburnian Warbler	Lazuli Bunting
Clark's Nutcracker	Yellow-throated Warbler	Indigo Bunting
American Crow	Prairie Warbler	Dickcissel
Black-billed Magpie	Palm Warbler	Bobolink
Common Raven	Bay-breasted Warbler	**Blackbirds & Meadowlark**
Lark & Swallows	Blackpoll Warbler	Red-winged Blackbird
Horned Lark	Black-and-white Warbler	Western Meadowlark
Purple Martin	American Redstart	Yellow-headed Blackbird
Tree Swallow	Prothonotary Warbler E	Rusty Blackbird
Northern Rough-winged Swallow	Ovenbird	Brewer's Blackbird
Bank Swallow	Northern Waterthrush	Common Grackle
Cliff Swallow	Connecticut Warbler	Brown-headed Cowbird
Barn Swallow	Mourning Warbler	**Orioles**
Chickadees, Nuthatches & Creeper	Common Yellowthroat	Orchard Oriole
Black-capped Chickadee	Hooded Warbler T	Baltimore Oriole
Boreal Chickadee	Wilson's Warbler	**Finches & House Sparrow**
Red-breasted Nuthatch	Canada Warbler	Brambling
White-breasted Nuthatch	Yellow-breasted Chat	Gray-crowned Rosy-Finch
Brown Creeper	**Tanagers**	Pine Grosbeak
Wrens, Dipper & Kinglets	Summer Tanager	Purple Finch
Rock Wren	Scarlet Tanager	House Finch
House Wren	Western Tanager	Red Crossbill
Winter Wren		White-winged Crossbill
Sedge Wren		Common Redpoll
Marsh Wren		Hoary Redpoll
American Dipper		Pine Siskin
Golden-crowned Kinglet		American Goldfinch
Ruby-crowned Kinglet		Evening Grosbeak
		House Sparrow

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NOTES:

1. REFERENCE: SASKATOON NATURE SOCIETY 2007, SASKATOON AREA BIRDS - A SEASONAL CHECKLIST APPENDIX C.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 6.4

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SHORE AND WATER BIRD SPECIES PRESENT IN THE SASKATOON AREA

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Species-scientific	Species-common	ESA1	ESA2	ESA3	Resident				Transient
					Spring	Summer	Fall	Winter	
Recurvirostra americana	American Avocet	12-Apr	15-Apr	16-Apr		common			common spring/fall
Botaurus lentiginosus	American Bittern	23-Apr	26-Apr	2-May		uncommon			
Anas rubripes	American Black Duck	30-Apr	11-May	24-May	irregular	irregular	irregular		
Fulica americana	American Coot	1-Apr	9-Apr	11-Apr		common			abundant spring/fall
Pluvialis dominica	American Golden Plover	13-Apr	1-May	3-May	common		rare		transient
Pelecanus erythrorhynchos	American White Pelican	8-Apr	10-Apr	11-Apr		common visitor			
Anas americana	American Wigeon	24-Mar	25-Mar	28-Mar		common		irregular laggard	common
Calidrius bairdii	Baird's Sandpiper	22-Apr	26-Apr	29-Apr					common
Bucephala islandica	Barrow's Goldeneye	na	na	na					
Melanitta nigra	Black Scoter	na	na	na					vagrant
Pluvialis sqiatarola	Black-bellied Plover	7-May	8-May	9-May					common
Nycticorax nycticorax	Black-crowned Night Heron	8-Apr	21-Apr	23-Apr					
Himantopus mexicanus	Black-necked stilt	na	na	na					vagrant
Anas discors	Blue-winged Teal	5-Apr	10-Apr	12-Apr	common				common
Branta bernicla	Brant	na	na	na					vagrant
Tryngites subruficollis	Buff-breasted Sandpiper	11-May	15-May	19-May	rare		irregular		transient
Bucephala albeola	Bufflehead	5-Apr	9-Apr	10-Apr		uncommon		irregular laggard	common
Branta canadensis	Canada Goose	na	na	na		common		winter laggard	abundant
Aythya valisineria	Canvasback	1-Apr	8-Apr	9-Apr		fair common		irregular laggard	common
Bubulcus ibis	Cattle Egret	na	na	na					Irregular visitor
Anas cyanoptera	Cinnamon Teal	2-May	5-May	7-May	rare	irregular	irregular		visitor
Aechmophorus clarkii	Clark's Grebe	na	na	na					vagrant
Somateria mollissima	Common Eider	na	na	na					vagrant
Bucephala clangula	Common Goldeneye	na	na	na	fairly common	rare	common	fairly common	
Gavia immer	Common Loon	15-Apr	19-Apr	20-Apr		rare			uncommon
Mergus merganser	Common Merganser	3-Mar	6-Mar	15-Mar					
Anas crecca	Common Teal	28-Mar	2-Apr	3-Apr					
Phalacrocorax auritus	Double-crested Cormorant	10-Apr	11-Apr	15-Apr		uncommon visitor			common spring/fall
Calidrius alpina	Dunlin	6-May	12-May	14-May	rare		irregular		transient
Podiceps nigricollis	Eared Grebe	17-Apr	19-Apr	20-Apr		common		irregular laggard	common
Anas penelope	Eurasian Wigeon	na	na	na					vagrant
Anas strepera	Gadwall	20-Mar	31-Mar	3-Apr		common		irregular laggard	common
Ardea herodias	Great Blue Heron	6-Apr	8-Apr	9-Apr		common			uncommon
Ardea alba	Great Egret	na	na	na					vagrant
Aythya marila	Greater Scaup	na	na	na				irregular laggard	uncommon
Anser albifrons	Greater White-fronted Goose	22-Mar	23-Mar	25-Mar					abundant
Tringa melanoleuca	Greater Yellowlegs	9-Apr	11-Apr	12-Apr		irregular laggard			common fall
Histrionicus histrionicus	Harlequin Duck	na	na	na					vagrant
Lophodytes cucullatus	Hooded Merganser	25-Mar	4-Apr	15-Apr		irregular		irregular laggard	rare
Podiceps auritus	Horned Grebe	15-Apr	16-Apr	17-Apr		common	uncommon	irregular laggard	common spring

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TABLE 6.4

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SHORE AND WATER BIRD SPECIES PRESENT IN THE SASKATOON AREA

Print Feb/15/10 14:32:46

Species-scientific	Species-common	ESA1	ESA2	ESA3	Resident				Transient
					Spring	Summer	Fall	Winter	
Limosa haemastica	Hudsonian Godwit	21-Apr	23-Apr	26-Apr	uncommon		common		transient
Charadrius vociferus	Killdeer	23-May	26-May	29-May		common			common
Somateria spectabilis	King Eider	na	na	na					vagrant
Ixobrychus exilis	Least Bittern	na	na	na					vagrant
Calidrius minutilla	Least Sandpiper	29-Apr	1-May	3-May					common
Aythya affinis	Lesser Scaup	31-Mar	4-Apr	5-Apr		fairly common		irregular laggard	common
Tringa flavipe	Lesser Yellowlegs	1-Apr	8-Apr	10-Apr		irregular laggard			common
Numenius americanus	Long-billed Curlew	1-Apr	12-Apr	15-Apr		uncommon			
Limnodromus scolopaceus	Long-billed Dowitcher	21-Apr	23-Apr	24-Apr		rare laggard			common
Clangula hyemalis	Long-tailed Duck	na	na	na	irregular		irregular	irregular laggard	abundant
Anas platyrhynchos	Mallard	29-Mar	31-Mar	2-Apr		common		rare	abundant
Limosa fedoa	Marbled Godwit	10-Apr	13-Apr	14-Apr		common			common
Charadrius montanus	Mountain Plover	na	na	na					hypothetical
Anas acuta	Northern Pintail	19-Mar	20-Mar	22-Mar		fairly common		irregular laggard	common
Anas clypeata	Northern Shoveler	25-Mar	31-Mar	1-Apr		common		irregular laggard	common
Gavia pacifica	Pacific Loon or Diver	na	na	na			rare		
Calidrius melanotos	Pectoral Sandpiper	25-Apr	29-Apr	30-Apr					common
Podilymbus podiceps	Pied-billed Grebe	10-Apr	14-Apr	21-Apr		common		irregular laggard	common
Charadrius melodus	Piping Plover	22-Apr	29-Apr	30-Apr		rare			
Calidris canutus	Red Knot	6-May	13-May	14-May	rare		irregular		transient
Phalaropus fulicarius	Red Phalarope	na	na	na					Hypothetical
Mergus serrator	Red-breasted Merganser	27-Mar	7-Apr	10-Apr	rare		irregular	irregular laggard	transient
Aythya americana	Redhead	30-Mar	4-Apr	5-Apr		fairly common		irregular laggard	common
Podiceps grisegena	Red-necked Grebe	21-Apr	23-Apr	28-Apr		common			common
Phalaropus lobatus	Red-necked phalarope	6-May	7-May	10-May		irregular laggard			abundant
Gavia stellata	Red-throated Loon	na	na	na					vagrant
Aythya collaris	Ring-necked Duck	8-Apr	9-Apr	10-Apr		rare		irregular laggard	uncommon
Chen rossii	Ross's Goose	12-Apr	15-Apr	17-Apr	common	common			
Oxyura jamaicensis	Ruddy Duck	15-Apr	16-Apr	17-Apr		common			common
Arenaria interpres	Ruddy Turnstone	14-May	15-May	16-May	uncommon		rare		transient
Philomachus pugnax	Ruff	na	na	na					vagrannt
Calidris alba	Sanderling	30-Apr	3-May	6-May					common
Grus canadensis	Sandhill Crane	29-Mar	31-Mar	1-Apr		uncommon			abundant spring/fall
Grus canadensis	Sandhill Crane	29-Mar	31-Mar	1-Apr		uncommon			abundant spring/fall
Charadrius semipalmatus	Semipalmated Plover	10-Apr	28-Apr	29-Apr					common
Calidris pusilla	Semipalmated Sandpiper	24-Apr	30-Apr	3-May					abundant
Limnodromus grisus	Short-billed dowitcher	na	na	na					
Chen caerulescens	Snow Goose	23-Mar	1-Apr	7-Apr					abundant
Egretta thula	Snowy Egret	na	na	na					vagrant
Tringa solitaria	Solitary Sandpiper	26-Apr	29-Apr	30-Apr					uucommon

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TABLE 6.4

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
SHORE AND WATER BIRD SPECIES PRESENT IN THE SASKATOON AREA

Print Feb/15/10 14:32:46

Species-scientific	Species-common	ESA1	ESA2	ESA3	Resident				Transient
					Spring	Summer	Fall	Winter	
Porzana carolina	Sora Rail	24-Apr	27-Apr	1-May		common			common
Actitis macularia	Spotted Sandpiper	8-Apr	26-Apr	29-Apr		common			common
Calidrius himantopus	Stilt Sandpiper	21-Apr	5-May	7-May					abundant
Melanitta perspicillata	Surf Scoter	na	na	na	irregular		uncommon		Transient
Cygnus buccinator	Trumpeter Swan	na	na	na					hypothetical
Cygnus columbianus	Tundra Swan	20-Mar	23-Mar	1-Apr				irregular laggard	abundant
Bartramia longicauda	Upland Sandpiper	29-Apr	2-May	3-May		uncommon			uncommon
Rallus limicola	Virgin Rail	3-May	9-May	10-May		rare			rare
Aechmophorus occidentalis	Western Grebe	15-Apr	20-Apr	23-Apr		common			abundant
Calidrius mauri	Western Sandpiper	na	na	na					irregular
Numenius phaeopus	Whimbrel	3-May	17-May	21/5					irregular spring
Calidrius fusciollis	White-rumped Sandpiper	10-May	11-May	13-May	common		irregular		transient
Melanitta fusca	White-winged Scoter	6-Apr	10-Apr	8-May		rare		irregular laggard	uncommon spring/fall
Grus americana	Whooping Crane	11-Apr	14-Apr	15-Apr		irregular laggard			rare
Catoptrophorus semipalmatus	Willet	11-Apr	17-Apr	22-Apr		common			common
Phalaropus tricolor	Wilson's Phalarope	25-Apr	27-Apr	29-Apr		common			common
Gallinago delicata	Wilson's Snipe	10-Apr	13-Apr	16-Apr		common		irregular laggard	common
Aix sponsa	Wood Duck	25-Apr	13-May	17-May	rare	irregular	rare		visitor
Coturnicops noveboracensis	Yellow Rail	na	na	na		rare			rare
Gavia adamsii	Yellow-billed Loon	na	na	na					vagrant

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NOTES:

1. ESA=EARLIST SPRING ARRIVAL DATE.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 6.5

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
BIRD SPECIES OBSERVED AND KNOWN TO OCCUR IN THE WEIR AREA

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Species-scientific	Species-common	2009	ESA1	ESA2	ESA3	Resident				Transient	Evidence of Breeding		
		Obs.				Spring	Summer	Fall	Winter		Mating Display/Singing	Nest/Eggs	Yearling Present
Corus brachyhynchos	American Crow		4-Mar	11-Mar	12-Mar		common		irregular laggard	spring/fall			
Cinclus mexicanus	American Dipper		na	na	na					vagrant	na	na	na
Carduelis trislis	American Goldfinch		25-Apr	3-May	7-May		common		irregular laggard	common spring/fall		mid-July	early August
Setophaga ruticilla	American Redstart		8-May	9-May	14-May		uncommon			common		mid June/early August	
Turdus migratorius	American Robin	x	18-Mar	21-Mar	24-Mar		common		irregular laggard	common		mid May - mid July	June-mid July
Spizella arborea	American Tree Sparrow		3-Mar	14-Mar	16-Mar				irregular laggard	common	na	na	na
Pelecanus erythrorhynchos	American White Pelican	x	8-Apr	10-Apr	11-Apr		common visitor						
Haliaeetus leucocephalus	Bald-Eagle		10-Mar	11-Mar	13-Mar				irregular laggard	common	na	na	na
Icterus galbula	Baltimore Oriole		1-May	2-May	7-May		common			common			
Hirundo rustica	Barn Swallow		20-Apr	22-Apr	26-Apr		common			common		late June/early July	late July/mid-August
Ceryle alcyon	Belted Kingfisher		12-Apr	13-Apr	18-Apr	uncommon	common			fall transient		end of June	
Mniotilta varia	Black and White Warbler		2-May	4-May	5-May					common	na	na	end of July
Pica hudsonia	Black-Billed Magpie	x	permanent resident								late March	mid-April/May	mid-late June
Poecile atricapilla	Black-Capped Chickadee	x	permanent resident								na	na	na
Cyanocitta cristata	Blue Jay		permanent resident									May to July	June-August
Bombycilla garrulus	Bohemian Waxing		7-Sep	12-Sep	27-Sep		irregular laggard		visitor	common spring/fall	na	na	na
Certhia americana	Brown Creeper		1-Mar	13-Mar	23-Mar				irregular visitor	uncommon	na	na	na
Toxostoma rufum	Brown Thrasher		4-May	6-May	10-May					Hypothetical		na	na
Molothrus ater	Brown-Headed Cowbird		26-Apr	27-Apr	28-Apr		common		irregular laggard	common spring/rare fall			end of June
Larus californicus	California Gull		14-Mar	20-Mar	23-Mar		common			common		mid-May	end June/mid-July
Branta canadensis	Canada Goose	x	na	na	na		common		winter laggard	abundant		1st week of April	late spring/early summer
Dendroica canadensis	Canada Warbler		31-May	2-Jun	4-Jun					rare	na	na	na
Bombycilla cedrorum	Cedar Waxing	x					common		uncommon	common		end of May/early August	end of July/August
Dendroica pensylvanica	Chestnut-Sided Warbler		23-May	24-May	27-May					irregular	na	na	na
Spizella passerina	Chipping Sparrow	x	26-Apr	28-Apr	29-Apr		common			common		mid May/mid-July	June
Spizella pallida	Clay-Colored Sparrow		19-Apr	22-Apr	30-Apr		common			common		early June/mid-July	
Bucephala clangula	Common Goldeneye		na	na	na	fairly common	rare	common	fairly common		Early April	late May/early June	Late June
Quiscalus quiscula	Common Grackle	x											
Gavia immer	Common Loon		15-Apr	19-Apr	20-Apr		rare			uncommon	na	na	na

Knight Piésold CONSULTING

TABLE 6.5

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
BIRD SPECIES OBSERVED AND KNOWN TO OCCUR IN THE WEIR AREA

Print Feb/15/10 14:32:46

Species-scientific	Species-common	2009	ESA1	ESA2	ESA3	Resident				Transient	Evidence of Breeding		
		Obs.				Spring	Summer	Fall	Winter		Mating Display/Singing	Nest/Eggs	Yearling Present
Corus brachyhynchos	American Crow		4-Mar	11-Mar	12-Mar		common		irregular laggard	spring/fall			
Mergus merganser	Common Merganser	x	3-Mar	6-Mar	15-Mar						na	na	na
Carduelis flammea	Common Redpoll		22-Aug	8-Sep	20-Sep		irregular		common		na	na	na
Sterna hirundo	Common Tern	x	25-Apr	26-Apr	27-Apr		common			common		mid June/July	
Junco hyemalis	Dark-Eyed Junco	x	9-Mar	10-Mar	18-Mar		irregular visitor		rare winter laggard	common	na	end of May (?)	
Phalacrocorax auritus	Double-Crested Cormorant		10-Apr	11-Apr	15-Apr		uncommon visitor			common spring/fall	na	na	na
Podiceps nigricollis	Eared Grebe		17-Apr	19-Apr	20-Apr		common		irregular laggard	common	midlle of May	end of May/early June	July
Tyrannus tyrannus	Eastern Kingbird	x	29-Apr	3-May	10-May		common			common		end of June/mid July	end of July/mid August
Passerella iliaca	Fox Sparrow		11-Apr	15-Apr	17-Apr				irregular laggard	uncommon	na	na	na
Larus Pipixcan	Franklin's Gull		24-Mar	29-Mar	30-Mar		common			common		June/early July	July
Larus hyperboreus	Glaucous Gull	x	1-Apr	19-Apr	10-May				irregular visitor	irregular spring/fall			
Dumetella carolinensis	Gray Catbird		17-Apr	3-May	14-May		common			common		end of May/early August	end of June/mid-July
Catharus minimus	Gray-Checked Thrush		21-Apr	23-Apr	25-Apr					uncommon	na	na	na
Ardea herodias	Great Blue Heron		6-Apr	8-Apr	9-Apr		common			uncommon		end of May/mid June	Late June/Early July
Bubo virginianus	Great Horned Owl		permanent resident									mid March	April
Aythya marila	Greater Scaup		na	na	na				irregular laggard	uncommon			
Catharus fuscescens	Grive Fauve		9-May	10-May	12-May		common			common		early June/July	
Picoides villosus	Hairy Woodpecker										end of March	early April/May	end of June
Histrionicus histrionicus	Harlequin Duck		na	na	na					vagrant	na	na	na
Zonotrichia querula	Harris' Sparrow		1-May	3-May	5-May				irregular laggard	uncommon	na	na	na
Catharus guttatus	Hermit Thrush		4-Apr	16-Apr	18-Apr		rare summer resident			uncommon		end of May	
Larus argentatus	Herring Gull		31-Mar	1-Apr	2-Apr					vagrant	na	na	na
Podiceps auritus	Horned Grebe		15-Apr	16-Apr	17-Apr		common	uncommon	irregular laggard	common spring			
Passer domesticus	House Sparrow	x											
Troglodytes aedon	House Wren		21-Apr	28-Apr	29-Apr		common			common		mid to late May/June	end of June/late July
Larus glaucoides kumlieni	Iceland Gull		21-Apr	25-Apr	3-May					vagrant	na	na	na
Charadrius vociferus	Killdeer		23-May	26-May	29-May		common			common	early may	Late May/mid June	end of June/through July
Empidonax minimus	Least Flycatcher		6-May	7-May	8-May		common			common		June	September
Tringa flavipe	Lesser Yellowlegs		1-Apr	8-Apr	10-Apr		irregular laggard			common	na	na	na
Melospiza lincolnii	Lincoln's Sparrow		22-Apr	24-Apr	25-Apr					common	na	na	na
Clangula hyemalis	Long-Tailed Duck		na	na	na	irregular		irregular	irregular laggard	abundant			

Knight Piésold CONSULTING

TABLE 6.5

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
BIRD SPECIES OBSERVED AND KNOWN TO OCCUR IN THE WEIR AREA

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Species-scientific	Species-common	2009	ESA1	ESA2	ESA3	Resident				Transient	Evidence of Breeding		
		Obs.				Spring	Summer	Fall	Winter		Mating Display/Singing	Nest/Eggs	Yearling Present
Corus brachyhynchos	American Crow		4-Mar	11-Mar	12-Mar		common		irregular laggard	spring/fall			
Dendroica magnolia	Magnolia Warbler		10-May	14-May	15-May	rare		uncommon		Transient	na	na	na
Anas platyrhynchos	Mallard	x	29-Mar	31-Mar	2-Apr		common		rare	abundant		Late April/early May	end of May
Falco columbarius	Merlin						common		uncommon	common		early May	
Zenaida macroura	Mourning Dove		23-Mar	27-Mar	6-Apr		common		irregular laggard	common		end of April - mid-July	
Oporonis philadelphia	Mourning Warbler		10-May	17-May	23-May					uncommon	na	na	na
Cardinalis cardinalis	Northern Cardinal												
Colaptes auratus	Northern Flicker		21-Apr	22-Apr	23-Apr		common		irregular laggard	common	early May	end of May	June/July
Seiurus noveboracensis	Northern Waterthrush		30-Apr	1-May	3-May	uncommon		common		Transient			
Contopus cooperi	Olive-Sided Flycatcher	x	10-May	12-May	13-May					spring/fall	na	na	na
Pandion haliaetus	Osprey		29-Mar	1-Apr	16-Apr		rare summer resident			uncommon	na	na	na
Dendroica palmarum	Palm Warbler		2-May	5-May	6-May	uncommon		common		Transient			
Falco peregrinus	Peregrine Falcon		29-Mar	Apr-44	6-Apr		rare			uncommon	na	na	na
Podilymbus podiceps	Pied-Billed Grebe		10-Apr	14-Apr	21-Apr		common		irregular laggard	common		early/late June	June-August
Pinicola enucleator	Pine Grosbeak		26-Aug	14-Sep	13-Oct				rare		na	na	na
Carduelis pinus	Pine Siskin		1-May	3-May	6-May					common		mid June	mid July/mid August
Carpodacus purpureus	Purple Finch		5-Apr	6-Apr	8-Apr		irregular resident		irregular visitor	common			
Corvus corax	Raven	x											
Sitta canadensis	Red-Breasted Nuthatch		permanent resident								end of March/April	April/May	end of May
Vireo olivaceus	Red-Eyed Vireo		10-May	13-May	15-May		common			common		June	July
Buteo jamaicensis	Red-tailed Hawk	x											
Agelaius phoeniceus	Red-Winged Blackbird	x	23-Mar	25-Mar	29-Mar		common		irregular laggard	abundant		end of May	mid-June/mid-July
Larus delawarensis	Ring-Billed Gull		19-Mar	22-Mar	23-Mar		common			abundant spring/fall		mid-May	mid-July
Columba livia	Rock Dove	x											
Pheucticus ludovicianus	Rose-Breasted Grosbeak		6-May	8-May	9-May		irregular		irregular laggard	uncommon	end of June		mid August
Chen rossii	Ross's Goose		12-Apr	15-Apr	17-Apr	common	common				na	na	na
Regulus calendula	Ruby-Crowbed Kinglet		14-Apr	15-Apr	18-Apr		rare			common			mid July
Bonasa umbellus	Ruffed Grouse											May	June
Grus canadensis	Sandhill Crane		29-Mar	31-Mar	1-Apr		uncommon			abundant spring/fall		late April/early May	
Chen caerulescens	Snow Goose		23-Mar	1-Apr	7-Apr					abundant	na	na	na
Actitis macularia	Spotted Sandpiper	x	8-Apr	26-Apr	29-Apr		common			common	end of May	mid June/mid July	

Knight Piésold CONSULTING

TABLE 6.5

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
BIRD SPECIES OBSERVED AND KNOWN TO OCCUR IN THE WEIR AREA

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Species-scientific	Species-common	2009	ESA1	ESA2	ESA3	Resident				Transient	Evidence of Breeding		
		Obs.				Spring	Summer	Fall	Winter		Mating Display/Singing	Nest/Eggs	Yearling Present
Corus brachyhynchos	American Crow		4-Mar	11-Mar	12-Mar		common		irregular laggard	spring/fall			
Catharus ustulatus	Swainson's Thrush		21-Apr	22-Apr	24-Apr		irregular resident			common	mid June/mid July		
Verminvora peregrina	Tennessee Warbler		3-May	7-May	9-May		rare summer visitor			common	June/July	na	na
Aechmophorus occidentalis	Western Grebe	x	15-Apr	20-Apr	23-Apr		common			abundant	mid May	early/late July	early August
Sturnella neglecto	Western Meadowlark		10-Mar	15-Mar	17-Mar		common		irregular laggard	common		late May/early July	
Contopus sordidulus	Western Wood-Pewee		16-May	18-May	19-May		irregular resident			uncommon		mid June	
Zonotrichia leucophrys	White-Crowned Sparrow		20-Apr	24-Apr	25-Apr				irregular laggard	common	na	na	na
Zonotrichia albicollis	White-Throated Sparrow	x	6-Apr	9-Apr	10-Apr		irregular		irregular laggard	common	end of June/mid July		
Catoptrophorus semipalmatus	Willet		11-Apr	17-Apr	22-Apr		common			common	mid may	mid May/ mid June	mi/late June early July
Wilsonia pusilla	Wilson's Warbler		2-May	3-May	4-May		irregular laggard			common fall	na	na	na
Dendroica petechia	Yellow Warbler	x	23-Apr	3-May	5-May		common			common		early June/July	end of June
Sphyrapicus varius	Yellow-Billed Sapsucker		6-Apr	12-Apr	13-Apr		uncommon		irregular laggard	common		early June	end of June/early July
Xanthocephalus xannthocephalus	Yellow-Headed Blackbird		6-Apr	9-Apr	17-Apr		common		irregular laggard	common		mid May/end of June	end of June/through July
Dendroica coronata	Yellow-Rumped Warbler		11-Apr	13-Apr	17-Apr		rare summer resident		irregular laggard	abundant		mid June/mid July	mid July
Geothlypis trichas	Yellowthroat	x											

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NOTES:

1. ESA - EARLIEST SPRING ARRIVAL.
2. PEREGRINE FALCON COSEWIC STATUS - THREATENED.
3. REFERENCE - LEIGHTON et al. 2002.
4. 2009 COLUMN INDICATES BIRD OBSERVED DURING THE COURSE OF THESE FIELD STUDIES.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 6.6

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
HABITAT OF BIRD SPECIES KNOWN TO OCCUR IN THE WEIR AREA

Print Feb/15/10 14:33:58

Species	Habitat Type	Nesting Habitat
American Robin		scotch pine, elm, elder, windows, bird boxes
American White Pelican		
Black-Billed Magpie	rural and urban, shelterbelts and trees along the river, in open areas	conifers, deciduous, willows, riverbanks, rural bluffs, parks and shelterbelts
Black-Capped Chickadee	shrubby and treed regions	
Canada Goose		
Chipping Sparrow	south boreal forest, backyards, river valleys, farmlands	juniper bushes, conifers, deciduous trees, dense shrubs, vines, ground
Common Merganser		
Dark-Eyed Junco		
Glaucous Gull		
Greater Scaup		
Mallard		
Olive-Sided Flycatcher	tree canopy	na
Red-Winged Blackbird		
Spotted Sandpiper		
Western Grebe		
White-Throated Sparrow		
Raven		
Rock Dove		
House Sparrow		
Common Grackle		
American Crow		coniferous trees, tall elms, willow, aspens
American Dipper		
American Goldfinch	countryside, pastureland, grain fields	shrubs near fields
American Redstart	thickets, deciduous	damp shrubby area, creeks, lakes, rivers, willow
American Tree Sparrow		
Bald-Eagle	perched along river	na
Baltimore Oriole	popular bluffs, farm groves, city shade trees	
Barn Swallow		
Belted Kingfisher		
Black and White Warbler	deciduous trees or river edges parks	forested and wooded regions across Southern Saskatchewan
Blue Jay		willow, ash
Bohemian Waxing	ornamental trees and shrubs, farmyards, mountain ash	north-central Canada, open coniferous woodland, mixed forest and muskeg
Brown Creeper	parks, riverbanks, lakes, creeks	mature deciduous and coniferous trees in the boreal forest
Brown Thrasher	na	na
Brown-Headed Cowbird	open grassland and forest edge	laying eggs in others nests
California Gull		
Canada Warbler	parks, mature shrubs	
Cedar Waxing	shade trees, shrubbery areas, parks, farmlands	large shrubs close to water
Chestnut-Sided Warbler		na
Clay-Colored Sparrow	bushy openings, edges and burns in boreal forests.	snowberry, wolf willow, rose caragana, choke cherry, alfalfa fields
Common Goldeneye		
Common Loon		
Common Redpoll	weedy fields, ditches, grassy slough edges, shrubs, birch, wood, conifers	na
Common Tern		
Double-Crested Cormorant		
Eared Grebe		
Eastern Kingbird	aspen bluffs, ripariean areas, farmyards, shelterbelts, brushy patches	shrubbery, low, ground, large trees
Fox Sparrow		
Gray Catbird	thickets along the river, in city parks, and rural areas	hedges, honeysuckle bushes, crabapple trees, cherry bushes
Gray-Checked Thrush		subarctic
Great Blue Heron		
Great Horned Owl		nests build in previous years high above ground
Grive Fauve	aspen forest, low leafy undergrowth, along streams	ground or less than 2 m up
Hairy Woodpecker		trees
Harlequin Duck		
Harris' Sparrow		
Hermit Thrush	river banks, parks, residential yards with shrub cover	northern coniferous and mixed forests
Horned Grebe		
House Wren	bushy thickets, residential yards, shelterbelts	cavity nester, bird houses, dead trees, stumps
Iceland Gull		Baffin Island, extreme northwest Quebec
Killdeer		
Least Flycatcher	aspen bluffs, sandy soil, wooded valleys, coulees, lakesides	trees
Lesser Yellowlegs		
Lincoln's Sparrow		
Long-Tailed Duck		
Magnolia Warbler	dense shrubbery, parks, backyards, and farmyards	mixed and boreal forests
Merlin	spruce trees, weeping birch	river valleys, lakes, do not build nests they use old crow or magpie nests preferably in conifers
Mourning Dove		conifers,ground,under rosebush, trunk of log
Mourning Warbler	shrubby and treed regions	southern boreal forest
Northern Flicker	treed areas, shelterbelts, river valleys small bluffs with mature poplar	
Northern Waterthrush	dense shrubbery along rivers and creeks	northern woodlands adjacent to water
Orange-Crowned Warbler	treed areas of the city and surrounding countryside	wooded hillsides, on ground under grass tuft
Osprey	along rivers, lakes and creeks	forested areas, tops of dead trees along shores, isolated rocks in lakes
Palm Warbler	river, parks, lakes, backyards, shrubs	boreal forests north of the treeline
Peregrine Falcon		Arctic cliffs
Pied-Billed Grebe		
Pine Grosbeak	mature conifers	na
Pine Siskin	coniferous and mixed stands of trees	elm
Purple Finch	backyard feeders	southern boreal forest

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TABLE 6.6

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
HABITAT OF BIRD SPECIES KNOWN TO OCCUR IN THE WEIR AREA

Print Feb/15/10 14:33:58

Species	Habitat Type	Nesting Habitat
Red-Breasted Nuthatch		conifers in boreal forests, apple tree
Red-Eyed Vireo	aspen groves, well treed towns, farm sheterbelts	lilac bush
Ring-Billed Gull		
Rose-Breasted Grosbeak	parks, lakes, residential yards	aspen parkland and southern boreal forest, large deciduous trees, tall shrubs stream or marsh edges
Ross's Goose		
Ruby-Crowbed Kinglet		northern coniferous forest
Ruffed Grouse	deciduous mixed woods, woodes riparian areas	
Sandhill Crane		
Snow Goose		
Swainson's Thrush	well treed residential and park areas, riverbanks, marshes and lakes	boreal forests of central and northern Saskatchewan
Tennessee Warbler	shrubby and treed regions	na
Western Meadowlark	countryside, grassy meadows, prairie, parks, open areas along river	ground and concealed in grass
Western Wood-Pewee	well treed areas, lakes, parks bluffs, shhelterbelts	woodlands
White-Crowned Sparrow		
Willet		
Wilson's Warbler		bulky masses of grass and moss on ground near water in northern forest
Yellow Warbler		tree branch one to 10 m above ground
Yellow-Billed Sapsucker	birch, willow, aspen	deciduous trees
Yellow-Headed Blackbird		
Yellow-Rumped Warbler		spruce tree
Northern Cardinal		
Herring Gull		na
Franklin's Gull		marshes

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NOTES:

1. REFERENCE (LEIGHTON et. al., 2002)

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

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TABLE 6.7

SASKATOON LIGHT AND POWER
HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

ENVIRONMENTAL BASELINE STUDIES 2009
MAMMALS OBSERVED IN THE SASKATOON AREA

Print Feb/15/10 14:35:10

Scientific Name	Common Name	Source	Location	Habitat
Canis latrans	Coyote	Jonker and Gollop, MVA	NE Swale	plains; prairies; woodlands; brushy areas (Farrand 1996)
Castor canadensis	Beaver	Jonker and Gollop	NE Swale/ East Bank	ponds; marshes; streams; rivers (Farrand 1996)
Citellus franklini	Franklin's Ground Squirrel	Jonker and Gollop, MVA	NE Swale/ East Bank	
Citellus richardsoni	Richardson's Ground Squirrel	Jonker and Gollop, MVA	NE Swale/ East Bank	
Citellus triodecemlineatus	Thirteen-Lined Ground Squirrel	Jonker and Gollop, MVA	NE Swale/ East Bank	prairies; fields; roadsides; lawns (Farrand 1996)
Clethrionomys gapperi	Gapper's red-backed mouse	East Bank	East Bank	
Erethizon dorsatum	Porcupine	East Bank	East Bank	
Lepus americanus	Snowshoe hare	East Bank	East Bank	
Lepus townsendi	White-Tailed Jack Rabbit	Jonker and Gollop, MVA	NE Swale	prairies; meadows; agricultural areas (Farrand 1996)
Liomys irroratus	Pocket Mouse	MVA	NE Swale	
Marmota monax?	Woodchuck	East Bank	East Bank	
Mephitus mephitus	Striped Skunk	Jonker and Gollop, MVA	NE Swale/ East Bank	woodlands; plains; deserts; residential areas (Farrand 1996)
Microtus pennsylvanicus	Meadow vole	East Bank	East Bank	
Mus musculus	House Mouse	MVA	NE Swale/ East Bank	buildings; cultivated areas (Farrand 1996)
Mustela frenata	Long-Tailed Weasel	Jonker and Gollop	NE Swale/ East Bank	woodlands; fields; brushy areas; farmlands (Farrand 1996)
Mustela frenata	Long-tailed weasel	East Bank	East Bank	
Mustela nivalis	Least weasel	East Bank	East Bank	
Odocoileus cirginianus	White-Tailed Deer	Jonker and Gollop, MVA	NE Swale	woodlands; thickets; suburban areas (Farrand 1996)
Odocoileus hemionus	Mule Deer	Jonker and Gollop, MVA	NE Swale	forests; mountains; grassy areas (Farrand 1996)
Ondatra zibethica	Muskrat	Jonker and Gollop	NE Swale/ East Bank	marshes; rivers; marshy lakes and ponds (Farrand 1996)
Peromyscus maniculatus	Deer mouse	East Bank	East Bank	
Procyon lotor	Raccoon	Knight Piesold 2009	East Bank	
Rattus norvegicus	Norway rat	East Bank	East Bank	
Sorex cinereus	Masked shrew	East Bank	East Bank	
Sylvilagus nuttalli	Mountain Cottontail	Jonker and Gollop	NE Swale	
Tamias minimus	Least chipmunk	East Bank	East Bank	
Tamiasciurus hudsonicus	Red squirrel	East Bank	East Bank	
Taxidia taxus	Badger	Jonker and Gollop, MVA	NE Swale	plains; prairies; farmlands (Farrand 1996)
Thomomys talpoides	Northern Pocket Gopher	Jonker and Gollop	NE Swale	mountain meadows (Grassy and Keene 1998)
Vulpes vulpes	Red fox	East Bank	East Bank	

M:\1\03\00198\02\A\Report\Report 1 - Environmental Baseline\Rev 0\Tables\[6-7 Mammals.xls]6.7

NOTES:

1. JONKER, P. AND B. GOLLOP. 2000. A GUIDE TO NATURE VIEWING SITES IN AND AROUND SASKATOON. SASKATOON NATURAL HISTORY SOCIETY, SASKATOON, SASKATCHEWAN.
2. MVA = DELANOY, L. 2001. VEGETATION AND WILDLIFE SURVEY OF THE NORTHEAST SWALE NEAR SASKATOON. UNPUBLISHED REPORT, MEEWASIN VALLEY AUTHORITY, SASKATOON, SASKATCHEWAN.
3. EAST BANK = HILDERMAN, FEIR, WITTY AND ASSOCIATES, 1981 EAST BANK OPEN SPACE STUDY.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT VA103-198/2-1	MT	CB	CB

384000
385000
386000
387000
388000
5779000
5778000
5777000
5776000
5775000
5774000
5773000
CIRCLE DRIVE
CANADIAN PACIFIC RAILWAY BRIDGE
WEIR
UNIVERSITY BRIDGE
VICTORIA BRIDGE
BROADWAY BRIDGE
IDYLWYLD BRIDGE
GRAND TRUNK RAILWAY BRIDGE
SCALE 1:20,000 ("B" SIZE)
DATUM/PROJECTION: UTM NAD83 / ZONE 13
200 100 0 200 400 600 800 1,000 m

LEGEND:

- ROAD
- 472.5 m ELEVATION
- 473 m ELEVATION
- 473.5 m ELEVATION
- 474 m ELEVATION
- 474.5 m ELEVATION

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.
3. WEIR CREST ELEVATION 472.6 m.
4. FIGURE SHOWS THE CITY OF SASKATOON.
5. LIDAR INFORMATION WAS SUPPLIED BY THE CITY OF SASKATOON AND WAS USED TO GENERATE CONTOUR INTERVALS OF 0.5 m.
6. IDYLWYLD BRIDGE IS FORMALLY NAMED SENATOR SID BUCKWOLD BRIDGE.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

RIVER BANK CONTOURS

Knight Piésold CONSULTING

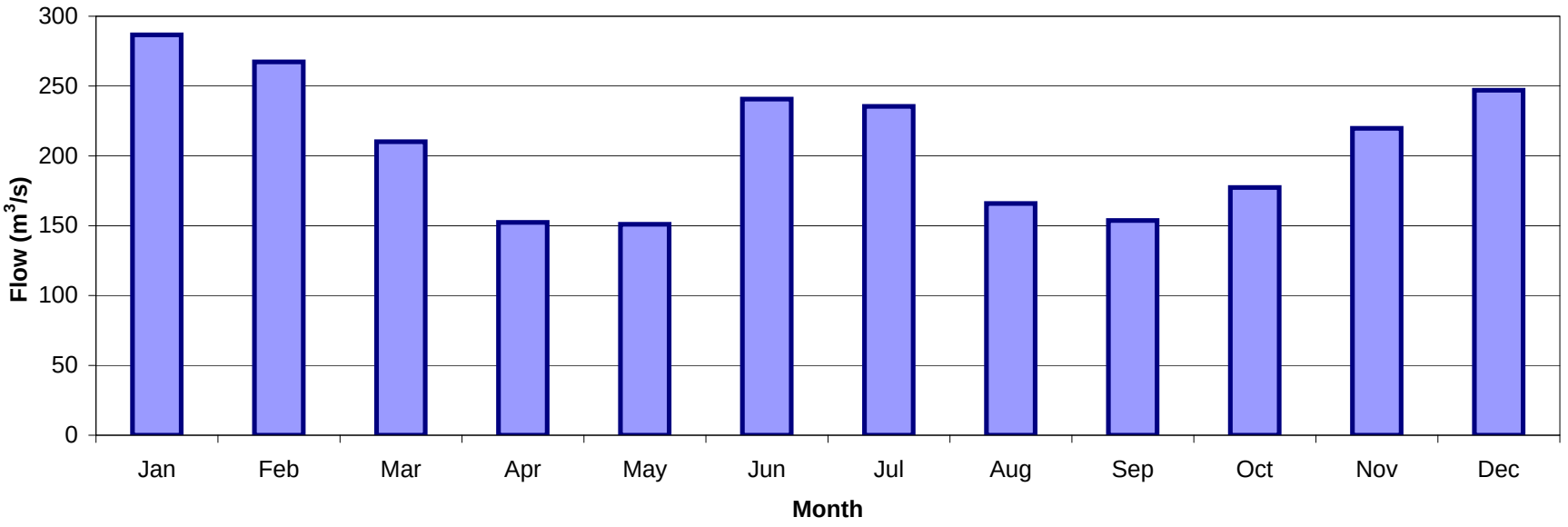
P/A NO. VA103-198/2

REF. NO. 1

FIGURE 1.1

REV 0

SAVED: I:\1\03\00198\02\A\GIS\ArcView\figures\B01.mxd; Dec 15, 2009 3:59:00 PM amoore



NOTES:

1. DATA OBTAINED FROM ENVIRONMENT CANADA (WSC 05HG001).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

AVERAGE MONTHLY FLOWS AT SASKATOON WEIR (1968 - 2008)

Knight Piésold CONSULTING

P/A NO. VA103-198/2

REF. NO. 1

FIGURE 2.1

REV 0

384000
385000
386000
387000
388000
5779000
5778000
5777000
5776000
5775000
5774000
5773000
N
WEIR
SLP-3
SLP-1
SLP-2

SCALE 1:20,000 ("B" SIZE)

DATUM/PROJECTION: UTM NAD83 / ZONE 13

200 100 0 200 400 600 800 1,000 m

LEGEND:

ROAD

WATER AND SEDIMENT SAMPLING SITES

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.
3. FIGURE SHOWS THE CITY OF SASKATOON.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

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SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

WATER AND SEDIMENT SAMPLING SITES

Knight Piésold CONSULTING

P/A NO.	REF. NO.
VA103-198/2	1

FIGURE 3.1 REV 0

384000
385000
386000
387000
388000
5779000
5778000
5777000
5776000
5775000
5774000
5773000
N

SCALE 1:20,000 ("B" SIZE)

DATUM/PROJECTION: UTM NAD83 / ZONE 13

200 100 0 200 400 600 800 1,000 m

LEGEND:

ROAD

STUDY AREA BOUNDARY

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

SAVED: I:\1\03\00198\02\AIG\S\ArcView\figures\B02.mxd; Dec 15, 2009 1:45:56 PM amoore

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITIES STUDY AREA

Knight Piésold CONSULTING

P/A NO.	REF. NO.
VA103-198/2	1

FIGURE 4.1

REV 0

LEGEND:

- ROAD
- VEGETATION COMMUNITY BOUNDARY
- STUDY AREA BOUNDARY
- SAMPLING SITE

CODE	COMMUNITY
AQ	AQUATIC
DF	DRY FOREST
FP	FLOOD PLAIN
FPS	FLOODPLAIN SHRUB SWAMP
HU	HUMAN ENVIRONMENT
MF	MOIST FOREST/STREAM VALLEY
RSS	RIVERSIDE SHRUB SWAMP
GRF	GRASSY RIVERSIDE FLAT
SS	SHRUB SLOPE

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITIES
GRAND TRUNK BRIDGE AND DOWNSTREAM

Knight Piésold CONSULTING

P/A NO. VA103-198/2 | REF. NO. 1

FIGURE 4.2 | REV 0

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LEGEND:

- ROAD
- VEGETATION COMMUNITY BOUNDARY
- STUDY AREA BOUNDARY
- SAMPLING SITE

CODE	COMMUNITY
AQ	AQUATIC
DF	DRY FOREST
FP	FLOOD PLAIN
FPS	FLOODPLAIN SHRUB SWAMP
HU	HUMAN ENVIRONMENT
MF	MOIST FOREST/STREAM VALLEY
RSS	RIVERSIDE SHRUB SWAMP
GRF	GRASSY RIVERSIDE FLAT
SS	SHRUB SLOPE

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

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SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITIES UPSTREAM OF IDYLWYLD BRIDGE

Knight Piésold CONSULTING

P/A NO.	REF. NO.
VA103-198/2	1

FIGURE 4.3 REV 0

LEGEND:

- ROAD
- VEGETATION COMMUNITY BOUNDARY
- STUDY AREA BOUNDARY
- SAMPLING SITE

CODE	COMMUNITY
AQ	AQUATIC
DF	DRY FOREST
FP	FLOOD PLAIN
FPS	FLOODPLAIN SHRUB SWAMP
HU	HUMAN ENVIRONMENT
MF	MOIST FOREST/STREAM VALLEY
RSS	RIVERSIDE SHRUB SWAMP
GRF	GRASSY RIVERSIDE FLAT
SS	SHRUB SLOPE

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

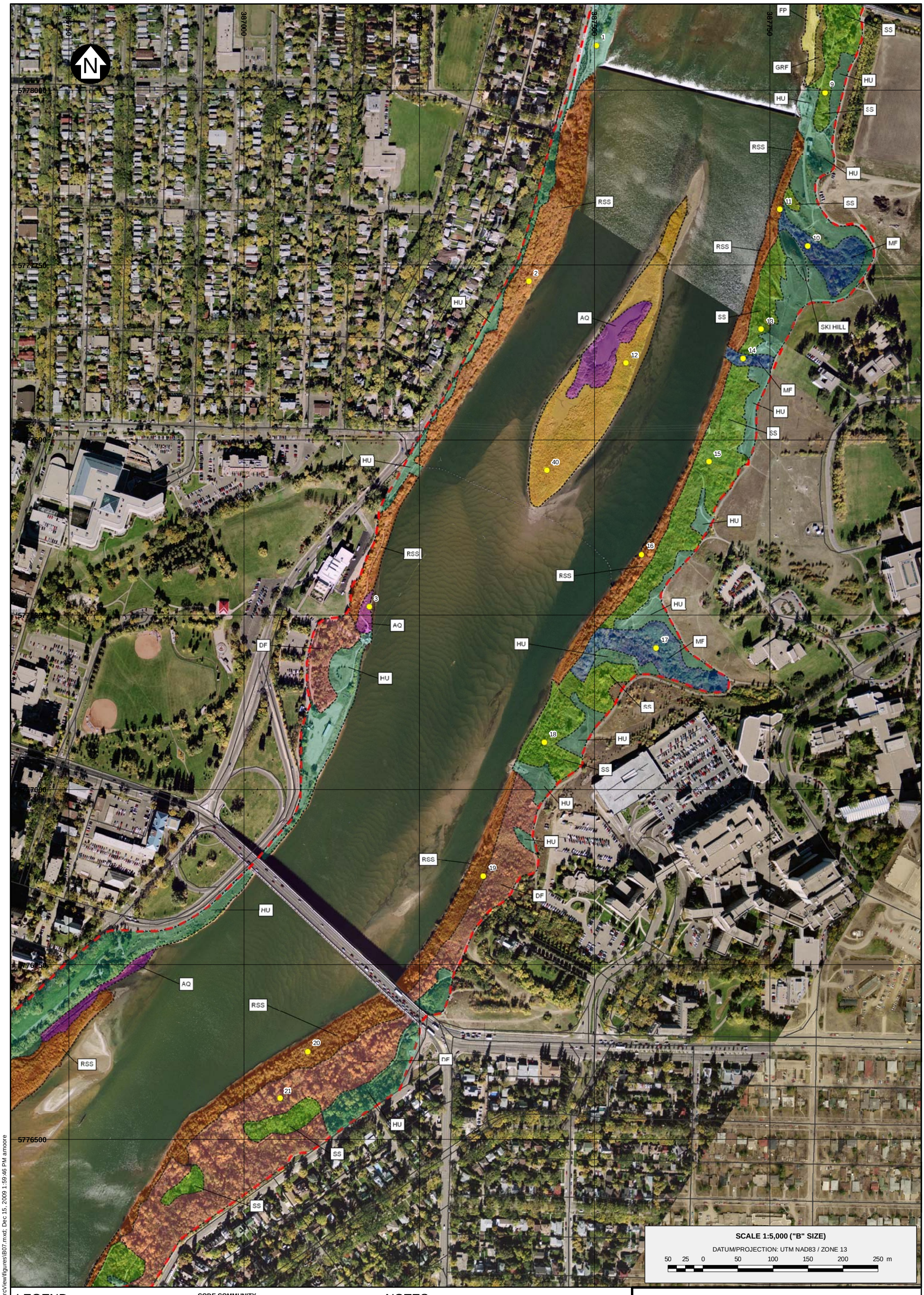
VEGETATION COMMUNITIES DOWNTOWN SASKATOON AREA

Knight Piésold CONSULTING

P/A NO. VA103-198/2 | REF. NO. 1

FIGURE 4.4 | REV 0

SAVED: I:\1\03\00198\02\A\GIS\ArcView\figures\B06.mxd; Dec 15, 2009 1:57:20 PM amoore



LEGEND:

- ROAD
- VEGETATION COMMUNITY BOUNDARY
- STUDY AREA BOUNDARY
- SAMPLING SITE

CODE	COMMUNITY
AQ	AQUATIC
DF	DRY FOREST
FP	FLOOD PLAIN
FPS	FLOODPLAIN SHRUB SWAMP
HU	HUMAN ENVIRONMENT
MF	MOIST FOREST/STREAM VALLEY
RSS	RIVERSIDE SHRUB SWAMP
GRF	GRASSY RIVERSIDE FLAT
SS	SHRUB SLOPE

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITIES
WEIR TO UNIVERSITY BRIDGE

Knight Piésold CONSULTING

P/A NO. VA103-198/2 | REF. NO. 1

FIGURE 4.5 | REV 0

SAVED: i:\1\03\00198\02\AGIS\ArcView\figures\B07.mxd: Dec 15, 2009 1:59:46 PM amoore

LEGEND:

- ROAD
- VEGETATION COMMUNITY BOUNDARY
- STUDY AREA BOUNDARY
- SAMPLING SITE

CODE	COMMUNITY
AQ	AQUATIC
DF	DRY FOREST
FP	FLOOD PLAIN
FPS	FLOODPLAIN SHRUB SWAMP
HU	HUMAN ENVIRONMENT
MF	MOIST FOREST/STREAM VALLEY
RSS	RIVERSIDE SHRUB SWAMP
GRF	GRASSY RIVERSIDE FLAT
SS	SHRUB SLOPE

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

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SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITIES NORTH OF WEIR

Knight Piésold CONSULTING

P/A NO.	REF. NO.
VA103-198/2	1

FIGURE 4.6 REV 0

384000
385000
386000
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5774000
5773000
FH4
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FH5
FH2
FH6
FH16
FH7
FH3
FH15
FH14
FH13
FH10
FH12
FH9
FH17
FH11
FH20
FH19
FH8
uncl
SCALE 1:20,000 ("B" SIZE)
DATUM/PROJECTION: UTM NAD83 / ZONE 13
200 100 0 200 400 600 800 1,000 m

LEGEND:

- CHANNEL LOCATION (JUNE 2009)
- ROAD
- FISH HABITAT SAMPLING SITES

SHORELINE FISH HABITAT

1. SHALLOW RAPIDS WITH BOULDER SUBSTRATE
2. STEEP DROP OFF WITH SILT/SAND SUBSTRATE
3. STEEP DROP OFF WITH BOULDER BANK AND SUBSTRATE
4. SHALLOW SLOPE, SANDBARS WITH SAND SUBSTRATE AND SUBMERGENT VEGETATION
5. SHALLOW WITH EMERGENT AQUATIC VEGETATION

UNCLASSIFIED (PRIVATE PROPERTY)

NOTES:

1. BASE MAP: © THE CITY OF SASKATOON. ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 13 AND IS IN METRES.

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	ASM	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

FISH HABITAT

Knight Piésold CONSULTING

P/A NO. VA103-198/2

REF. NO. 1

FIGURE 5.1

REV 0

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Knight Piésold
CONSULTING

APPENDIX A

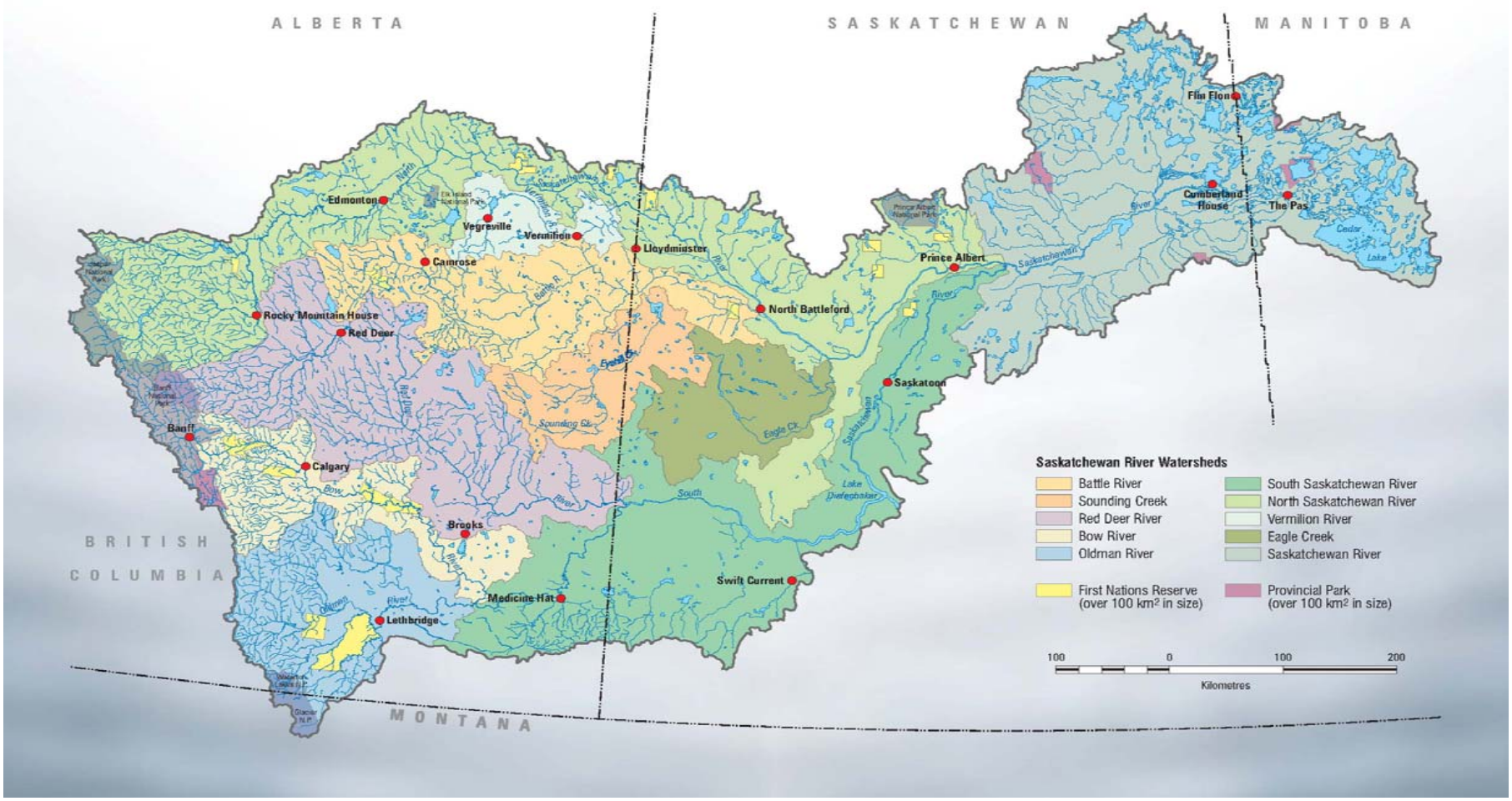
HYDROLOGY DATA

Knight Piésold
CONSULTING

APPENDIX A1

SASKATCHEWAN RIVER CATCHMENT MAP

(Figure A1.1)



REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

SASKATCHEWAN RIVER CATCHMENT MAP

Knight Piésold CONSULTING

P/A NO. VA103-198/2

REF. NO. 1

FIGURE A1.1

REV 0

Knight Piésold
CONSULTING

APPENDIX A2

HYDROMETRIC DATA - 05HG001 - SOUTH SASKATCHEWAN RIVER AT SASKATOON

(Pages A2-1 to A2-13)

2009 Real Time Data
Water Level

Ap-Oc 2009

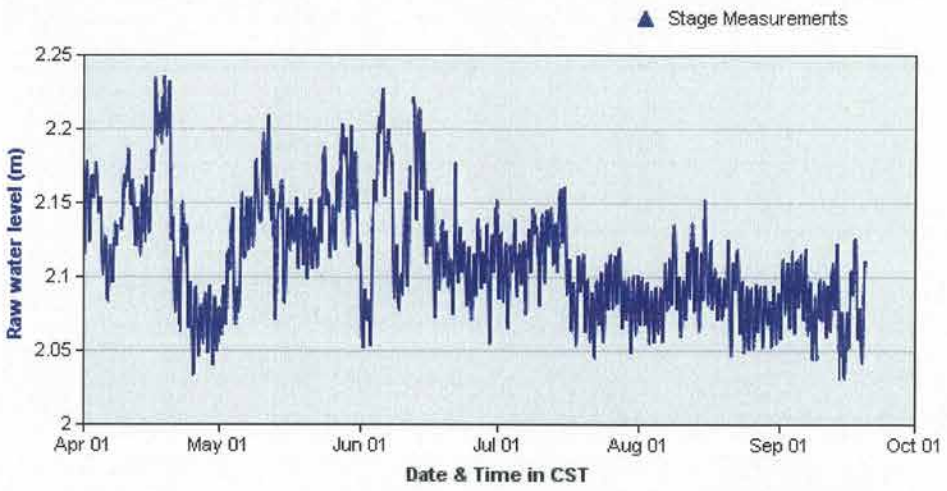
Environment Canada | Environnement Canada

Canada

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level (Second Parameter)



Station Navigation

EC Map

Text Search

Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority

Y-Axis View: Min 2 Max 2.25

Start Date: Apr 1 2009

End Date: Sep 20 2009

Redraw

Statistics for period of record

- [x] Max
- [x] Mean
- [ ] Lower quartile
- [ ] Min
- [ ] Upper quartile
- [ ] Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM		**add** 470.946m

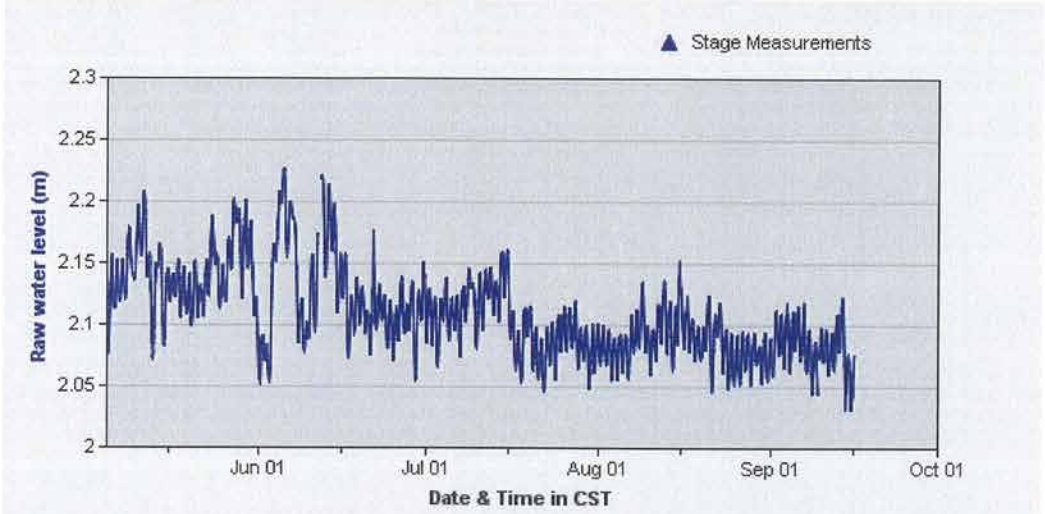
Water Level

May 2009 - Sept 2009

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level (Second Parameter)



Y-Axis View
Min Max

Start Date: May 5 2009

End Date: Sep 16 2009

Redraw

Statistics for period of record

- [x] Max
- [x] Mean
- [ ] Lower quartile
- [ ] Min
- [ ] Upper quartile
- [ ] Median

Station Navigation

EC Map

Text Search

Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM	**add** 470.946m	

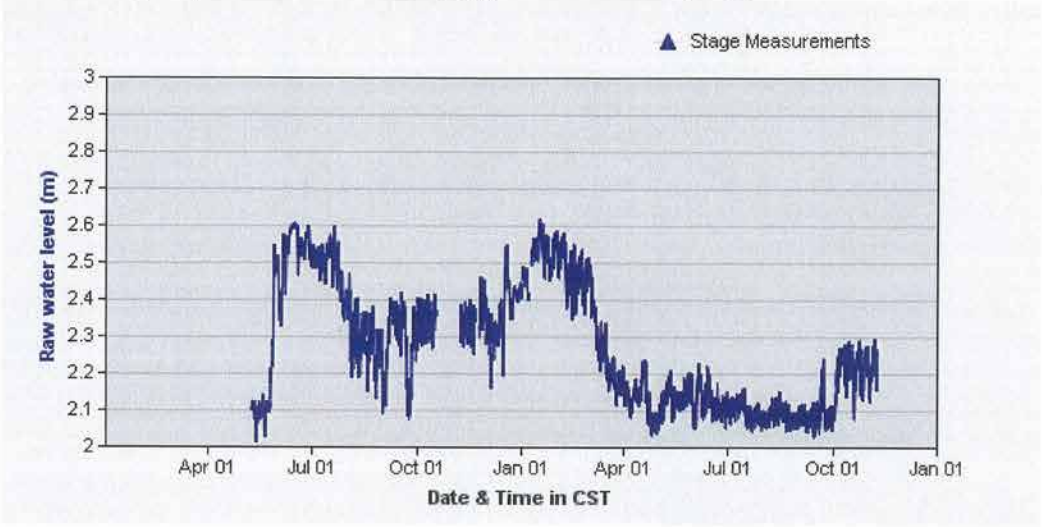
Water Level

Jan - Nov 2009

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level (Second Parameter)



Station Navigation

EC Map

Text Search

Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority

Y-Axis View
Min 2 Max 3

Start Date: Jan 2 2008

End Date: Nov 10 2009

Redraw

Statistics for period of record

☐ Max ☐ Mean ☐ Lower quartile
☐ Min ☐ Upper quartile ☐ Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM	**add** 470.946m	

May 2009

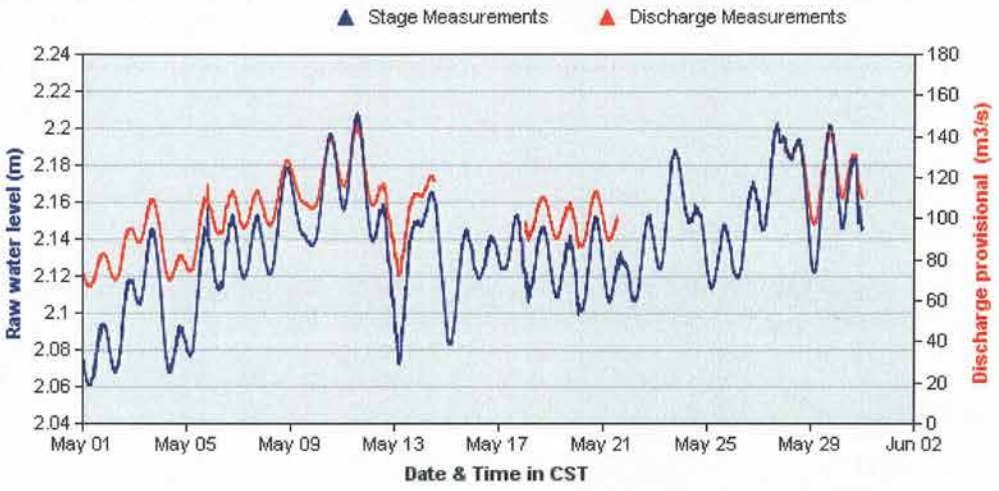
Environment Canada | Environnement Canada

Canada

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level | Discharge provisional



Station Navigation

EC Map

Text Search

Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority

Y-Axis View
Min Max

Start Date: May 1 2009

End Date: May 31 2009

Redraw

Statistics for period of record

☐ Max ☐ Mean ☐ Lower quartile
☐ Min ☐ Upper quartile ☐ Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM		**add** 470.946m

June 2009

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level | Discharge provisional

Station Navigation

EC Map

Text Search

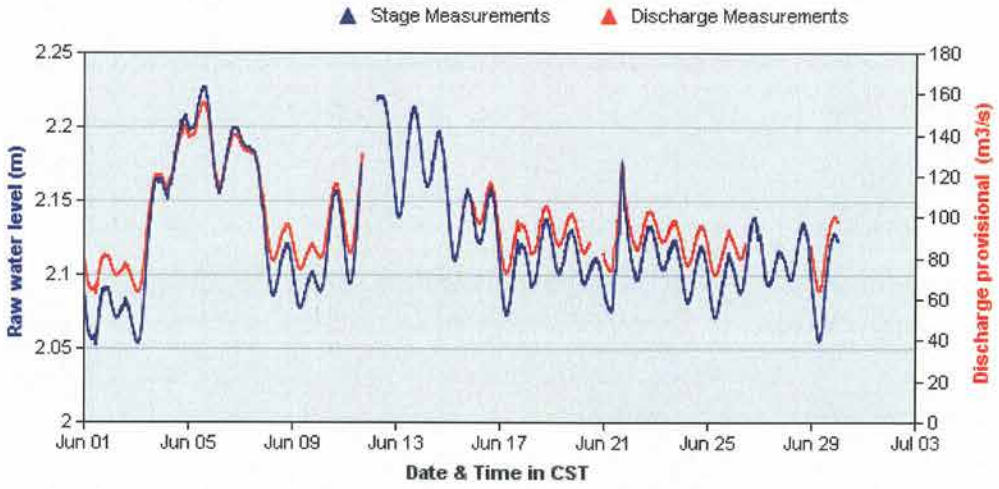
Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority



Y-Axis View Min Max

Start Date: Jun 1 2009

End Date: Jun 30 2009

Redraw

Statistics for period of record

☐ Max ☐ Mean ☐ Lower quartile
☐ Min ☐ Upper quartile ☐ Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM	**add**	470.946m

July 2009

Environment Canada | Environnement Canada

Canada

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level | Discharge provisional

Station Navigation

EC Map

Text Search

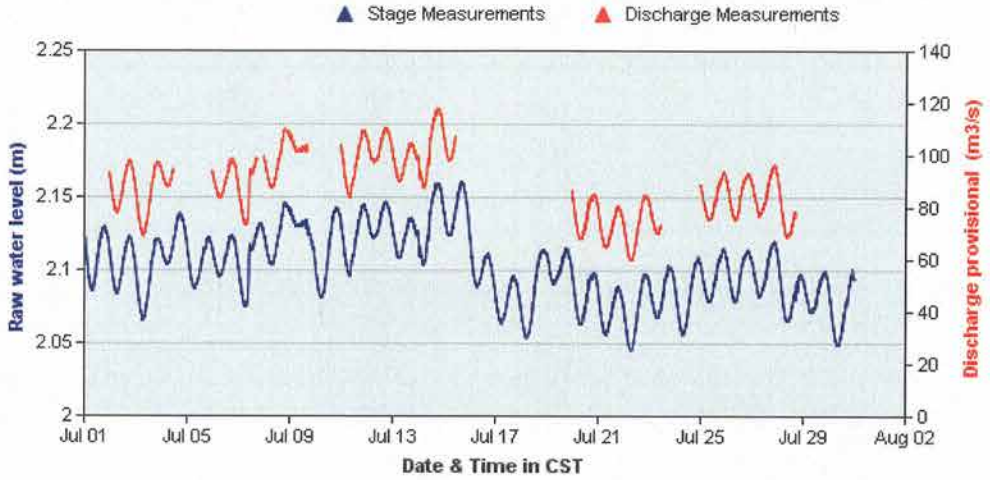
Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority



Y-Axis View Min 2 Max 2.25

Start Date Jul 1 2009

End Date Jul 31 2009

Redraw

Statistics for period of record

☐ Max ☐ Mean ☐ Lower quartile
☐ Min ☐ Upper quartile ☐ Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM	**add** 470.946m	

2008, 2009 Real time data
Discharge

Ap-Oct

2009

Environment Canada | Environnement Canada

Canada

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level | Discharge provisional

Station Navigation

EC Map

Text Search

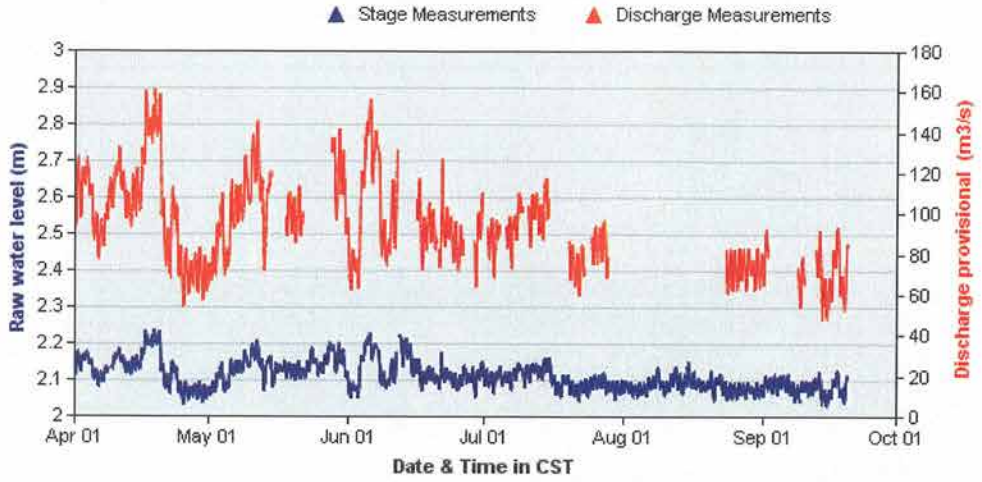
Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority



Y-Axis View Min 2 Max 3

Start Date Apr 1 2009

End Date Sep 20 2009

Redraw

Statistics for period of record

☐ Max ☑ Mean ☐ Lower quartile
☐ Min ☐ Upper quartile ☐ Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM	**add**	470.946m

2009

Environment Canada | Environnement Canada

Canada

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level | Discharge provisional

Station Navigation

EC Map

Text Search

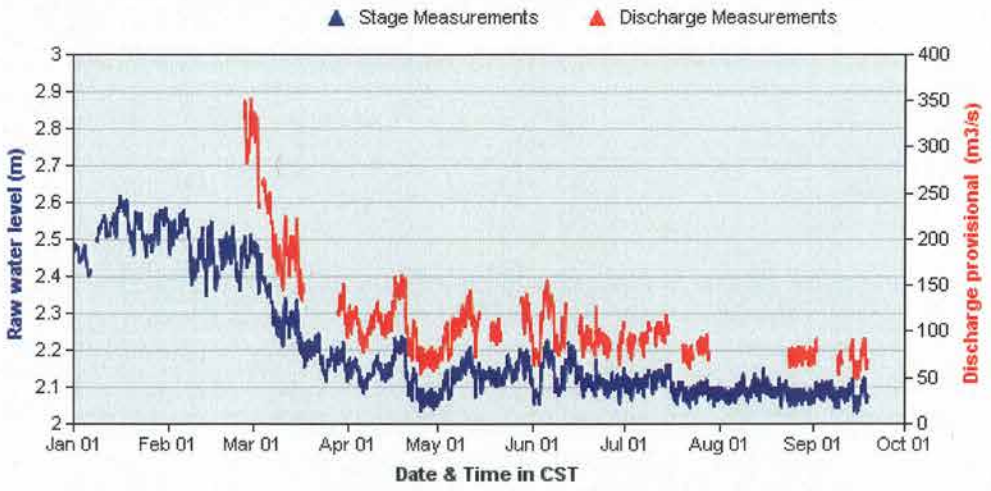
Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority



Y-Axis View Min 2 Max 3

Start Date: Jan 1 2009

End Date: Sep 19 2009

Redraw

Statistics for period of record

☐ Max ☐ Mean ☐ Lower quartile
☐ Min ☐ Upper quartile ☐ Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
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Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

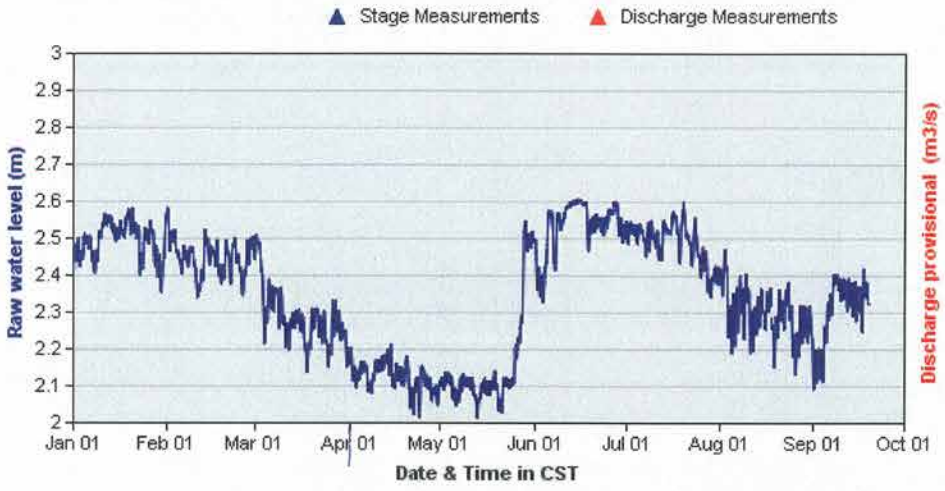
Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM	**add** 470.946m	

2008

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Data Category: Real Time Go

Parameter Type: Raw water level | Discharge provisional



Station Navigation

EC Map
Text Search
Google Map

Customization

Hydrometric Portfolio

In partnership with

Saskatchewan Watershed Authority

Y-Axis View Min 2 Max 3

Start Date: Jan 1 2008

End Date: Sep 19 2008

Redraw

Statistics for period of record

☐ Max ☐ Mean ☐ Lower quartile
☐ Min ☐ Upper quartile ☐ Median

Click the following links for information on ice conditions at stations, and data spikes and dips.

Station Information:

Active or discontinued	Active	**Province/Territory**	SK
Latitude	52° 08' 25" N	**Longitude**	106° 38' 36" W
Gross drainage area	141000 km^2		
Record length	96 Years	**Period of record**	1911 - 2006
Regulation type	Regulated		

Hydrometric measurement

Period of record	Type	Operation schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA	**Data Contributed By**	
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM		**add** 470.946m

Historic Data 1998 - 2008

Water Level and Streamflow Statistics

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

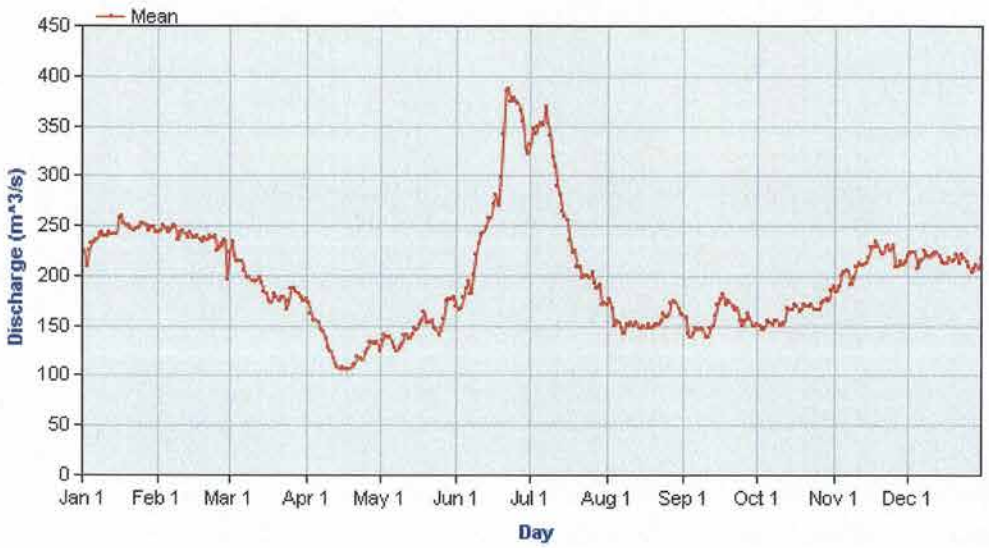
Navigation
New query

Other Links
Real-Time Data
Archived Hydrometric Data
Archived Sediment Data

In partnership with
Saskatchewan

Graph: 05HG001 Daily Refresh

Daily Discharge for SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)



Statistics corresponding to 11 years of data recorded from January 1998 to December 2008.*

Statistics				Scale		
Max	☐	Upper quartile	☐	Log	○	Redraw
Min	☐	Lower quartile	☐	Normal	◉	
Mean	☑	Median	☐			

Water Level and Streamflow Statistics Report:

Report Type: DAILY Obtain Report

Report Output Type: IN CURRENT BROWSER (NUMERICAL)

Station Information: SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Active or discontinued	Active	**Province/Territory**	Saskatchewan
Latitude	52°8'25" N	**Longitude**	106°38'36" W
Gross drainage area	141000 km^2	**Effective drainage area**	88100 km^2
Record length	98 years	**Period of record**	1911 - 2008
Regulation type	Regulated	**Period of record**	1930 - 2008

Period of record	Hydrometric measurement type	Operational schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2006	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA		
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM		**add** 470.946 m

***Note:** **If n<10, percentiles are not calculated. Click here for further information.**

Created: 2003-12-22
Modified: 2007-03-26
Reviewed: 2007-03-26

Important Notices

URL of this page:
http://www.wsc.ec.gc.ca/staflo/index_e.cfm?cname=flow_daily.cfm

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The Green Lane™,
Environment Canada's World Wide Web Site

Archived Data 1911 – 2008

Archived Hydrometric Data

SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

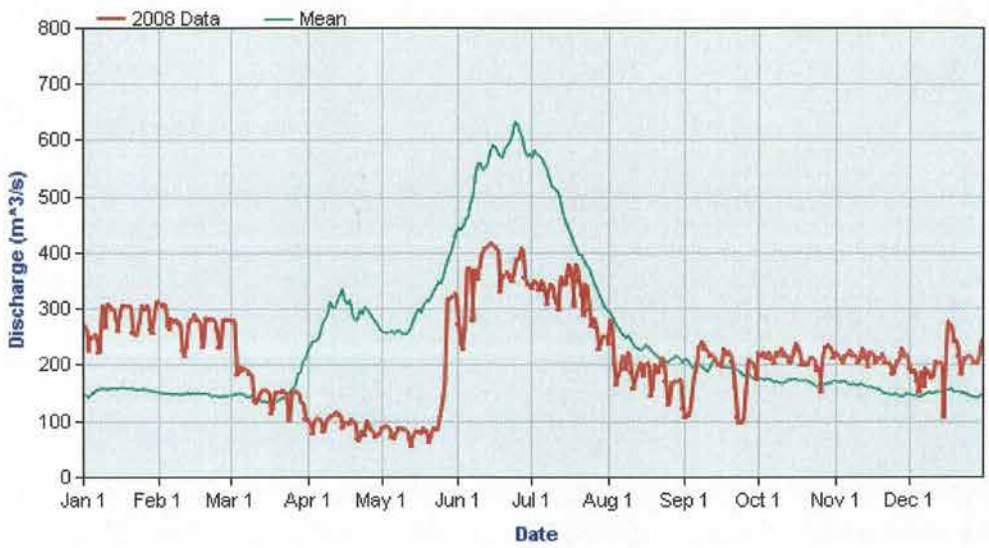
Graph: 05HG001 | Daily | Refresh

Navigation
New query

Other Links
Real-Time Data
Water Level and Flow
Statistics
Sediment Data

In partnership with
Saskatchewan

Daily Discharge for SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)



Statistics corresponding to 98 years of data recorded from 1911 to 2008.*

Statistics for period of record

Max	☐	Upper quartile	☐
Min	☐	Lower quartile	☐
Mean	☑	Median	☐

Scale
Log ○
Normal ◉
Year 2008

Redraw

Archived Hydrometric Data Report:

Report Type: DAILY | Obtain Report
Report Output Type: IN CURRENT BROWSER (NUMERICAL)

Station Information: SOUTH SASKATCHEWAN RIVER AT SASKATOON (05HG001)

Active or discontinued	Active	Province/Territory	Saskatchewan
Latitude	52°8'25" N	Longitude	106°38'36" W
Gross drainage area	141000 km^2	Effective drainage area	88100 km^2
Record length	98 years	Period of record	1911 - 2008
Regulation type	Regulated	Period of record	1930 - 2008

Period of record	Hydrometric measurement type	Operational schedule	Gauge type
1911 - 1961	Flow	Continuous	Manual
1962 - 2009	Flow	Continuous	Recorder

Real-time data available	Yes	**Sediment data available**	Yes
Type of water body	River	**RHBN**	No
EC regional office	REGINA		
Datum of published data	ASSUMED DATUM		
To convert to	GEODETIC SURVEY OF CANADA DATUM	**add** 470.946 m	

** MAX. INST. DISCHARGE, AS ALL DISCHARGES, ARE CONTROLLED. ** 2008 WINTER FLOW DATA COMPUTED USING DIEFENBAKER LAKE OUTFLOWS AS A REFERENCE.

***Note:** **If n<10, percentiles are not calculated. Click here for further information.**

Created: 2003-12-22
Modified: 2006-05-16
Reviewed: 2006-05-16

Important Notices

URL of this page:
http://www.wsc.ec.gc.ca/hydat/H2O/index_e.cfm?cname=graph.cfm&RequestTimeout=300

Canada

The Green Lane™,
Environment Canada's World Wide Web Site

Knight Piésold
CONSULTING

APPENDIX B

DATA

Knight Piésold
CONSULTING

APPENDIX B1

WATER AND SEDIMENT CERTIFICATES OF ANALYSIS

(Pages B1-1 to B1-9)

SGS Lakefield Research Limited
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Knight Piesold Limited
Attn : Maret Tae saiken@knightpiesold.com; cduval@knightpiesold.com

1650 Main Street West
North Bay, ON
P1B 8G5,

Phone: 705-476-2165 ext. 241
Fax:pdf, excel

Monday, October 05, 2009

Date Rec. : 17 September 2009
LR Report: **CA10361-SEP09**
Reference: 103-198/2

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: SLP-1-5	6: SLP-3-5	7: SLP-2-5
Sample Date & Time			15-Sep-09 09:00	15-Sep-09 11:22	15-Sep-09 15:20
Membrane filtration: Total coliform [cfu/100mL]	18-Sep-09	13:21	16000 UAL	100000 UAL	4000
Membrane filtration: E. coli [cfu/100mL]	18-Sep-09	13:21	8000 UAL	6000 UAL	1000
Alkalinity [mg/L as CaCO3]	21-Sep-09	12:48	42	36	100
Total Sulphur [%]	30-Sep-09	15:17	0.046	0.013	0.013
Total Organic Carbon [%]	29-Sep-09	10:47	0.649	0.297	0.351
T. kjeldahl Nitrogen [as N %]	25-Sep-09	09:07	0.02	< 0.01	< 0.01
Ammonia+Ammonium [%]	21-Sep-09	14:30	< 0.01	< 0.01	< 0.01
Mercury [µg/g]	22-Sep-09	11:00	< 0.1	< 0.1	< 0.1
Aluminum [µg/g]	24-Sep-09	08:53	2500	1500	1900
Silver [µg/g]	24-Sep-09	08:53	0.81	0.06	0.07
Arsenic [µg/g]	24-Sep-09	08:53	25	4.8	4.9
Barium [µg/g]	24-Sep-09	08:53	88	49	61
Beryllium [µg/g]	24-Sep-09	08:53	0.23	0.12	0.16
Boron [µg/g]	24-Sep-09	08:53	3	2	2
Bismuth [µg/g]	24-Sep-09	08:53	0.31	< 0.09	< 0.09
Calcium [µg/g]	24-Sep-09	08:53	30000	18000	19000
Cadmium [µg/g]	24-Sep-09	08:53	0.15	0.06	0.09
Cobalt [µg/g]	24-Sep-09	08:53	17	4.4	4.9
Chromium [µg/g]	24-Sep-09	08:53	5.2	5.4	3.9
Copper [µg/g]	24-Sep-09	08:53	7.9	2.0	2.9
Iron [µg/g]	24-Sep-09	08:53	8300	8600	7400
Potassium [µg/g]	24-Sep-09	08:53	600	200	400
Lithium [µg/g]	24-Sep-09	08:53	6	4	5
Magnesium [µg/g]	24-Sep-09	08:53	5100	3800	4500
Manganese [µg/g]	24-Sep-09	08:53	220	160	190
Molybdenum [µg/g]	24-Sep-09	08:53	0.2	0.2	0.2
Sodium [µg/g]	24-Sep-09	08:53	90	43	67
Nickel [µg/g]	24-Sep-09	08:53	29	9.0	10
Lead [µg/g]	24-Sep-09	08:53	10	4.6	4.4
Phosphorus [µg/g]	24-Sep-09	08:53	320	390	350
Selenium [µg/g]	24-Sep-09	08:53	< 0.7	< 0.7	< 0.7
Antimony [µg/g]	24-Sep-09	08:53	0.1	< 0.1	< 0.1

OnLine LIMS

SGS Lakefield Research Limited
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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA10361-SEP09**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: SLP-1-5	6: SLP-3-5	7: SLP-2-5
Tin [µg/g]	24-Sep-09	08:53	< 0.5	< 0.5	< 0.5
Strontium [µg/g]	24-Sep-09	08:53	50	20	25
Thallium [µg/g]	24-Sep-09	08:53	0.07	0.02	0.05
Titantium [µg/g]	24-Sep-09	08:53	51	61	51
Uranium [µg/g]	24-Sep-09	08:53	0.49	0.60	0.41
Tungsten [µg/g]	24-Sep-09	08:53	0.11	< 0.04	< 0.04
Vanadium [µg/g]	24-Sep-09	08:53	11	12	8
Zinc [µg/g]	24-Sep-09	08:53	27	15	21
PCB pulp [ug/g]	25-Sep-09	09:05	< 1	< 1	< 1
Naphthalene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Acenaphthylene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Acenaphthene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Fluorene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Phenanthrene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Anthracene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Fluoranthene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Pyrene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Chrysene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene [µg/g]	25-Sep-09	09:05	< 0.05	< 0.05	< 0.05
Dibenzo(a,h)anthracene [µg/g]	25-Sep-09	09:05	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene [µg/g]	25-Sep-09	09:05	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene [µg/g]	25-Sep-09	09:05	< 0.1	< 0.1	< 0.1
1,1,1,2-Tetrachloroethane [µg/g]	23-Sep-09	12:08	< 0.005	< 0.005	< 0.005
1,1,2,2-Tetrachloroethane [µg/g]	23-Sep-09	12:08	< 0.005	< 0.005	< 0.005
1,1,1-Trichloroethane [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,1,2-Trichloroethane [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,1-Dichloroethane [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,1-Dichloroethylene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,2-Dichlorobenzene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,2-Dichloroethane [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,2-Dichloropropane [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
cis-1,3-dichloropropene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
trans-1,3-dichloropropene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,3-Dichlorobenzene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
1,4-Dichlorobenzene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Bromoform [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Bromomethane [µg/g]	23-Sep-09	12:08	< 0.05	< 0.05	< 0.05
Carbon tetrachloride [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Chlorobenzene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Chloroform [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Chloroethane [µg/g]	23-Sep-09	12:08	< 0.05	< 0.05	< 0.05
Chloromethane [µg/g]	23-Sep-09	12:08	< 0.05	< 0.05	< 0.05
Dibromochloromethane [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Ethylenedibromide [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Dichloromethane [µg/g]	23-Sep-09	12:08	< 0.005	< 0.005	< 0.005
Tetrachloroethylene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002

SGS Lakefield Research Limited
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Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA10361-SEP09**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: SLP-1-5	6: SLP-3-5	7: SLP-2-5
cis-1,2-Dichloroethylene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
trans-1,2-Dichloroethylene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Trichloroethylene [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Vinyl Chloride [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Bromodichloromethane [µg/g]	23-Sep-09	12:08	< 0.002	< 0.002	< 0.002
Styrene [µg/g]	23-Sep-09	12:08	< 0.005	< 0.005	< 0.005
Trichlorofluoromethane [µg/g]	23-Sep-09	12:08	< 0.05	< 0.05	< 0.05
Moisture Content [%]	22-Sep-09	11:49	30.6	24.9	25.9
CCME F1 (C6-C10) [µg/g]	22-Sep-09	11:49	< 10	< 10	< 10
CCME F2 (C10-C16) [µg/g]	24-Sep-09	13:11	< 10	< 10	< 10
CCME F3 (C16-C34) [µg/g]	24-Sep-09	13:11	< 50	< 50	< 50
CCME F4 (C34-C50) [µg/g]	24-Sep-09	13:11	< 50	< 50	< 50
Chromatogram returned to baseline at nC50 [Yes / No]	24-Sep-09	13:11	NO	YES	YES
Benzene [µg/g]	23-Sep-09	12:09	< 0.002	< 0.002	< 0.002
Toluene [µg/g]	23-Sep-09	12:09	< 0.002	< 0.002	< 0.002
Ethylbenzene [µg/g]	23-Sep-09	12:09	< 0.002	< 0.002	< 0.002
Xylene total [µg/g]	23-Sep-09	12:09	< 0.005	< 0.005	< 0.005
o-xylene [µg/g]	23-Sep-09	12:09	< 0.005	< 0.005	< 0.005
m/p-xylene [µg/g]	23-Sep-09	12:09	< 0.005	< 0.005	< 0.005
pp-DDD [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05
pp-DDE [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05
pp-DDT [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05
op-DDT [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05
alpha-Chlordane [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05
Dieldrin [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05
Endosulfan I [µg/g]	28-Sep-09	15:46	< 0.04	< 0.04	< 0.04
Endosulfan II [µg/g]	28-Sep-09	15:46	< 0.04	< 0.04	< 0.04
Endrin [µg/g]	28-Sep-09	15:46	< 0.04	< 0.04	< 0.04
gamma-BHC [µg/g]	28-Sep-09	15:46	< 0.01	< 0.01	< 0.01
gamma-Chlordane [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05
Heptachlor [µg/g]	28-Sep-09	15:46	< 0.01	< 0.01	< 0.01
Heptachlor epoxide [µg/g]	28-Sep-09	15:46	< 0.01	< 0.01	< 0.01
Hexachlorobenzene [µg/g]	28-Sep-09	15:46	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene [µg/g]	28-Sep-09	15:46	< 0.01	< 0.01	< 0.01
Hexachloroethane [µg/g]	28-Sep-09	15:46	< 0.01	< 0.01	< 0.01
Methoxychlor [µg/g]	28-Sep-09	15:46	< 0.05	< 0.05	< 0.05

UAL - Unreliable: Sample Age Exceeds 48hr hold time
Alkalinity performed from saturated paste.

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

SGS Lakefield Research Limited
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Knight Piesold Limited
Attn : Maret Tae saiken@knightpiesold.com; cduval@knightpiesold.com

1650 Main Street West
North Bay, ON
P1B 8G5,

Phone: 705-476-2165 ext. 241
Fax:pdf, excel

Monday, October 05, 2009

Date Rec. : 17 September 2009
LR Report: **CA10362-SEP09**
Reference: 103-198/2

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: SLP-1-W	6: SLP-2-W	7: SLP-1-W Diss	8: SLP-2-W Diss
Sample Date & Time			15-Sep-09 09:00	15-Sep-09 11:22	15-Sep-09 09:00	15-Sep-09 11:22
Membrane filtration: Total coliform [cfu/100mL]	18-Sep-09	13:21	96 UAL	70 UAL	---	---
Membrane filtration: E. coli [cfu/100mL]	18-Sep-09	13:21	44 UAL	30 UAL	---	---
BOD [mg/L]	23-Sep-09	14:51	< 2	< 2	---	---
pH [no unit]	22-Sep-09	14:34	7.86	8.36	---	---
Conductivity [uS/cm]	22-Sep-09	14:35	542	470	---	---
Alkalinity [mg/L as CaCO3]	22-Sep-09	14:35	253	158	---	---
Colour [TCU]	21-Sep-09	09:52	7	6	---	---
Solids (Total Dissolved) [mg/L]	22-Sep-09	08:16	260	277	---	---
Tot. Suspended Solids [mg/L]	21-Sep-09	08:22	4	3	---	---
COD [mg/L]	21-Sep-09	08:38	12	9	---	---
Tot.Reactive Phos. [mg/L]	18-Sep-09	13:27	< 0.03	< 0.03	---	---
Dissolved Organic Carbon [mg/L]	22-Sep-09	11:05	2.2	2.7	---	---
Total Organic Carbon [mg/L]	22-Sep-09	11:05	2.8	2.6	---	---
4AAP-Phenolics [mg/L]	18-Sep-09	10:26	< 0.002	< 0.002	---	---
Ammonia+Ammonium (N) [mg/L]	21-Sep-09	14:01	< 0.1	< 0.1	---	---
Nitrogen-Kjeldahl (N) [mg/L]	18-Sep-09	13:57	< 0.5	< 0.5	---	---
Sulphate [mg/L]	22-Sep-09	14:31	67	69	---	---
Chloride [mg/L]	22-Sep-09	14:31	8.2	9.6	---	---
Bromide [mg/L]	22-Sep-09	14:31	< 0.3	< 0.3	---	---

OnLine LIMS

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Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: SLP-1-W	6: SLP-2-W	7: SLP-1-W Diss	8: SLP-2-W Diss
Nitrite (as nitrogen) [mg/L]	22-Sep-09	14:31	< 0.06	< 0.06	---	---
Nitrate (as nitrogen) [mg/L]	22-Sep-09	14:31	0.18	0.17	---	---
Mercury [mg/L]	25-Sep-09	08:39	< 0.0001	< 0.0001	---	---
Hardness [mg/L as CaCO3]	23-Sep-09	09:32	184	190	172	170
Silver [mg/L]	22-Sep-09	10:44	< 0.00001	0.00001	< 0.00001	< 0.00001
Aluminum [mg/L]	23-Sep-09	09:32	0.04	0.03	0.02	0.01
Arsenic [mg/L]	22-Sep-09	10:44	0.0008	0.0008	0.0007	0.0008
Barium [mg/L]	22-Sep-09	10:44	0.0858	0.0883	0.0805	0.0818
Beryllium [mg/L]	22-Sep-09	10:44	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Boron [mg/L]	22-Sep-09	10:44	0.0244	0.0265	0.0229	0.0240
Bismuth [mg/L]	22-Sep-09	10:44	< 0.00001	0.00001	< 0.00001	0.00002
Calcium [mg/L]	23-Sep-09	09:32	45.5	46.9	41.6	41.1
Cadmium [mg/L]	22-Sep-09	10:44	0.000011	0.000017	0.000011	< 0.000003
Cobalt [mg/L]	22-Sep-09	10:44	0.000162	0.000156	0.000100	0.000195
Chromium [mg/L]	22-Sep-09	10:44	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Copper [mg/L]	22-Sep-09	10:44	0.0016	0.0018	0.0011	0.0019
Iron [mg/L]	23-Sep-09	09:32	0.08	0.05	0.01	< 0.01
Potassium [mg/L]	23-Sep-09	09:32	2.92	3.05	2.46	2.39
Lithium [mg/L]	23-Sep-09	09:32	< 0.002	< 0.002	< 0.002	< 0.002
Magnesium [mg/L]	23-Sep-09	09:32	17.1	17.6	16.6	16.4
Manganese [mg/L]	22-Sep-09	10:44	0.0113	0.0104	0.00073	0.00174
Molybdenum [mg/L]	22-Sep-09	10:44	0.00151	0.00160	0.00141	0.00144
Sodium [mg/L]	23-Sep-09	09:32	26.4	28.3	22.2	22.4
Nickel [mg/L]	22-Sep-09	10:44	0.0016	0.0016	0.0021	0.0019
Phosphorus [mg/L]	23-Sep-09	09:33	< 0.01	< 0.01	< 0.01	< 0.01
Lead [mg/L]	22-Sep-09	10:44	0.00030	0.00026	0.00014	0.00017
Antimony [mg/L]	22-Sep-09	10:44	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Selenium [mg/L]	22-Sep-09	10:44	< 0.001	< 0.001	< 0.001	< 0.001
Silica [mg/L]	23-Sep-09	09:33	0.75	0.81	0.59	0.64
Tin [mg/L]	22-Sep-09	10:44	0.00007	0.00012	0.00008	0.00001
Strontium [mg/L]	23-Sep-09	09:33	0.277	0.287	0.258	0.255
Titanium [mg/L]	22-Sep-09	10:44	0.0012	0.0009	0.0001	0.0002
Thallium [mg/L]	22-Sep-09	10:44	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Uranium [mg/L]	22-Sep-09	10:44	0.00121	0.00120	0.00118	0.00118

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Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: SLP-1-W	6: SLP-2-W	7: SLP-1-W Diss	8: SLP-2-W Diss
Vanadium [mg/L]	22-Sep-09	10:44	0.00055	0.00049	0.00066	0.00082
Tungsten [mg/L]	22-Sep-09	10:44	< 0.00003	< 0.00003	< 0.00003	< 0.00003
Zinc [mg/L]	22-Sep-09	10:44	0.003	0.003	0.002	0.002
Chlorophyl A [mg/L]	05-Oct-09	12:35	---	<0.001	---	---
Diquat [ug/L]	18-Sep-09	16:30	<1	<1	---	---
Paraquat [ug/L]	18-Sep-09	16:30	<1	<1	---	---
Glyphosate [ug/L]	22-Sep-09	10:53	<6	<6	---	---
Polychlorinated Biphenyls (PCBs) [ug/L]	22-Sep-09	15:48	< 0.1	< 0.1	---	---
Benzo(a)pyrene [ug/L]	21-Sep-09	14:30	<0.01	<0.01	---	---
2,4-dichlorophenol [ug/L]	21-Sep-09	14:30	<1	<1	---	---
2,4,6-trichlorophenol [ug/L]	21-Sep-09	14:30	<0.25	<0.25	---	---
2,3,4,6-tetrachlorophenol [ug/L]	21-Sep-09	14:30	<1	<1	---	---
Pentachlorophenol [ug/L]	21-Sep-09	14:30	<0.5	<0.5	---	---
Alachlor [ug/L]	22-Sep-09	13:03	< 0.11	< 0.11	---	---
Aldicarb [ug/L]	22-Sep-09	13:03	< 0.30	< 0.30	---	---
Aldrin + Dieldrin [ug/L]	22-Sep-09	13:03	< 0.067	< 0.067	---	---
Aldrin [ug/L]	22-Sep-09	13:03	< 0.060	< 0.060	---	---
Dieldrin [ug/L]	22-Sep-09	13:03	< 0.067	< 0.067	---	---
Atrazine + N-dealkylated metabolites [ug/L]	22-Sep-09	13:03	< 0.12	< 0.12	---	---
Atrazine [ug/L]	22-Sep-09	13:03	< 0.11	< 0.11	---	---
Desethyl atrazine [ug/L]	22-Sep-09	13:03	< 0.12	< 0.12	---	---
Azinphos-methyl [ug/L]	22-Sep-09	13:03	< 0.21	< 0.21	---	---
Bendiocarb [ug/L]	22-Sep-09	13:03	< 0.13	< 0.13	---	---
Carbaryl [ug/L]	22-Sep-09	13:03	< 0.16	< 0.16	---	---
Carbofuran [ug/L]	22-Sep-09	13:03	< 0.37	< 0.37	---	---
Chlordane (Total) [ug/L]	22-Sep-09	13:03	< 0.11	< 0.11	---	---
a-chlordane [ug/L]	22-Sep-09	13:03	< 0.069	< 0.069	---	---
g-chlordane [ug/L]	22-Sep-09	13:03	< 0.063	< 0.063	---	---
Oxychlordane [ug/L]	22-Sep-09	13:03	< 0.11	< 0.11	---	---
Chlorpyrifos [ug/L]	22-Sep-09	13:03	< 0.18	< 0.18	---	---
Cyanazine [ug/L]	22-Sep-09	13:03	< 0.18	< 0.18	---	---
Diazinon [ug/L]	22-Sep-09	13:03	< 0.081	< 0.081	---	---
(DDT) + Metabolites [ug/L]	22-Sep-09	13:03	< 0.14	< 0.14	---	---
op-DDT [ug/L]	22-Sep-09	13:03	< 0.095	< 0.095	---	---

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pp-DDD [ug/L]	22-Sep-09	13:03	< 0.098	< 0.098	---	---
pp-DDE [ug/L]	22-Sep-09	13:03	< 0.075	< 0.075	---	---
pp-DDT [ug/L]	22-Sep-09	13:03	< 0.14	< 0.14	---	---
Dimethoate [ug/L]	22-Sep-09	13:03	< 0.12	< 0.12	---	---
Diuron [ug/L]	22-Sep-09	13:03	< 0.087	< 0.087	---	---
Heptachlor + Heptachlor Epoxide [ug/L]	22-Sep-09	13:03	< 0.11	< 0.11	---	---
Heptachlor [ug/L]	22-Sep-09	13:03	< 0.061	< 0.061	---	---
Heptachlor epoxide [ug/L]	22-Sep-09	13:03	< 0.11	< 0.11	---	---
Lindane [ug/L]	22-Sep-09	13:03	< 0.056	< 0.056	---	---
Malathion [ug/L]	22-Sep-09	13:03	< 0.091	< 0.091	---	---
Methoxychlor [ug/L]	22-Sep-09	13:03	< 0.14	< 0.14	---	---
Metolachlor [ug/L]	22-Sep-09	13:03	< 0.092	< 0.092	---	---
Metribuzin [ug/L]	22-Sep-09	13:03	< 0.12	< 0.12	---	---
Parathion [ug/L]	22-Sep-09	13:03	< 0.18	< 0.18	---	---
Phorate [ug/L]	22-Sep-09	13:03	< 0.11	< 0.11	---	---
Prometryne [ug/L]	22-Sep-09	13:03	< 0.23	< 0.23	---	---
Simazine [ug/L]	22-Sep-09	13:03	< 0.15	< 0.15	---	---
Temephos [ug/L]	22-Sep-09	13:03	< 0.31	< 0.31	---	---
Terbufos [ug/L]	22-Sep-09	13:03	< 0.12	< 0.12	---	---
Triallate [ug/L]	22-Sep-09	13:03	< 0.10	< 0.10	---	---
Trifluralin [ug/L]	22-Sep-09	13:03	< 0.12	< 0.12	---	---
2,4-dichlorophenoxyacetic acid (2,4-D) [ug/L]	23-Sep-09	11:16	< 0.19	< 0.19	---	---
2,4,5-trichlorophenoxyacetic acid (2,4,5-T) [ug/L]	23-Sep-09	11:16	< 0.22	< 0.22	---	---
Bromoxynil [ug/L]	23-Sep-09	11:16	< 0.33	< 0.33	---	---
Dicamba [ug/L]	23-Sep-09	11:16	< 0.20	< 0.20	---	---
Diclofop-methyl [ug/L]	23-Sep-09	11:16	< 0.40	< 0.40	---	---
Dinoseb [ug/L]	23-Sep-09	11:16	< 0.36	< 0.36	---	---
Picloram [ug/L]	23-Sep-09	11:16	< 0.25	< 0.25	---	---
Benzene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Bromodichloromethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Bromoform [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Bromomethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Carbon tetrachloride [ug/L]	22-Sep-09	10:52	< 0.2	< 0.2	---	---
Chlorobenzene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---

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Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: SLP-1-W	6: SLP-2-W	7: SLP-1-W Diss	8: SLP-2-W Diss
Chloroethane [ug/L]	22-Sep-09	10:52	< 5	< 5	---	---
Chloroform [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Chloromethane [ug/L]	22-Sep-09	10:52	< 5	< 5	---	---
Dibromochloromethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,2-Dichlorobenzene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,3-Dichlorobenzene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,4-Dichlorobenzene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,1-Dichloroethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,2-Dichloroethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,1-Dichloroethylene (vinylidene chloride) [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,2-Dichloropropane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
cis-1,2-Dichloroethene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
trans-1,2-Dichloroethene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
cis-1,3-Dichloropropene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
trans-1,3-Dichloropropene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Ethylbenzene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Ethylenedibromide [ug/L]	22-Sep-09	10:52	< 0.2	< 0.2	---	---
Dichloromethane [ug/L]	22-Sep-09	10:52	< 2	< 2	---	---
Styrene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,1,2,2-Tetrachloroethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Tetrachloroethene [µg/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Toluene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Trichloroethylene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Vinyl Chloride [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Trichlorofluoromethane [ug/L]	22-Sep-09	10:52	< 5	< 5	---	---
1,1,1-Trichloroethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,1,2-Trichloroethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
Xylene (Total) [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
o-xylene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
m/p-xylene [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
1,1,1,2-Tetrachloroethane [ug/L]	22-Sep-09	10:52	< 0.5	< 0.5	---	---
F1 (C6-C10)-water [ug/L]	18-Sep-09	09:43	< 25	< 25	---	---
F2 (C10-C16)-water [µg/L]	23-Sep-09	11:10	< 100	< 100	---	---
F3 (C16-C34)-water [µg/L]	23-Sep-09	11:10	< 500	< 500	---	---

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F4 (C34-C50)-water [µg/L]	23-Sep-09	11:10	< 500	< 500	---	---
Chromatogram returned to baseline at nC50 [Yes / No]	23-Sep-09	11:10	YES	YES	---	---

UAL - Unreliable: Sample Age Exceeds 48hr hold time
Chlorophyll A bottle broken for sample SLP-1-W. Analysis not performed.

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

Knight Piésold
CONSULTING

APPENDIX B2

VEGETATION DATA SUMMARY AND PHOTOS

(Pages B2-1 to B2-19)

Saskatoon Light and Power
Environmental Baseline Studies, 2009
Vegetation Field Sampling Summary

Date	Jun-15	Jun-15	Jun-15	Jun-15	Jun-16	Jun-16	Jun-16	Jun-16
Plot #	1	2	3	4	5	6	7	8
Community Code	HU	RSS	AQ	RSS	SS	GRF	DF	FPS
East	387502	387406	387178	386646	388125	388067	387924	387854
North	5778065	5777728	5777262	5776538	5778680	5778623	5778281	5778202
Slope (degrees)	30	5	5	0	45	0	45	0
Aspect	e	e	e		w		w	
Soil								
texture	cement/boardwalk	sand	sand	sand/clay	sand	sand	sand	sand
drainage		good	poor	poor	good	poor	well	poor
stoniness		none	none	none	low	none	none	none
moisture (w/m/d)	d	w	w	w	d	m	d	w
Vegetation community								
field community comments	Human influenced	swamp forest	shrub swamp w aquatics	shrub swamp	shrub slope	grass dom riverside flat	tree dom shrub slope	riverside shrub
Community Code	HU	RSS	AQ	RSS	SS	GRF	DF	FPS
Dominant physiognomic form								
tree		d	x		x		d	
shrub		sd	sd	d	d	x	sd	d
herb/forb		sparse	x		x	d	x	x
aquatic			d	x				
Wildlife		Magpie	CAGO	RWBB	r-tail hawk			
		CAGO		MALL				
		AMWP		Magpie				
				W-th-sp				
				House sparrow				
Comments	shrub planting							
Photos	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2

Saskatoon Light and Power
Environmental Baseline Studies, 2009
Vegetation Field Sampling Summary

Date	Jun-16	Jun-16	Jun-16	Jun-16	Jun-16	Jun-16	Jun-16	Jun-16
Plot #	9	10	11	12	13	14	15	16
Community Code	SS	MF	RSS	FPS	SS	MF	SS	RSS
East	387828	387804	387764	387544	387737	387712	387663	387567
North	5777998	5777778	5777830	5777610	5777659	5777617	5777469	5777337
Slope (degrees)	45	30	0	0	45	45	45	0
Aspect	w	n/s			w	w	w	
Soil								
texture	sand	rich sandy	sand/silt	sand	sandy loam	clay	sandy loam	sandy
drainage	well	moderate	poor		well	poor	well	poor
stoniness	none							
moisture (w/m/d)	d	m	w	w	d	m	d	w
Vegetation community								
field community comments	shrub slope	ts valley community	riverside shrub	shrub swamp sb willow	shrub slope	moist ts seep	shrub slope	ts riverside
Community Code	SS	MF	RSS	FPS	SS	MF	SS	RSS
Dominant physiognomic form								
tree		sd	x				x	x
shrub		d	d	d	d	d	d	d
herb/forb	d	fc	fc	n	x	x	x	x
aquatic								
Wildlife		13 lined prairie dog	goose grazed	CAGO	RWBB	mallard, f &young		
			beaver	AMWP	kingbird			
					cedar waxwing			
Comments								
Photos	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2

Saskatoon Light and Power
Environmental Baseline Studies, 2009
Vegetation Field Sampling Summary

Date	Jun-16	Jun-16	Jun-16	Jun-16	Jun-16	Jun-17	Jun-17	Jun-17
Plot #	17	18	19	20	21	22	23	24
Community Code	MF	SS	RSS	RSS	DF	SS	FP	DF
East	387587	387428	387342	387091	387051	384108	384224	384248
North	5777203	5777069	5776877	5776627	5776560	5773199	5773325	5773287
Slope (degrees)	60	60	30	0	45	45	5	45
Aspect	n/s	w	w		w	w	w	w
Soil								
texture	sandy loam	sandy loam	sandy loam	loam	loam	sandy	sand/silt	sandy loam
drainage	mod	well	mod	mod	well	well	poor	mod
stoniness			none					
moisture (w/m/d)	m	d	w	w	d	d	w	d
Vegetation community								
field community comments	stream valley	shrub slope	ts dom moist	shrub dom riverside flat	tree dom upland slope	shrub slope	UV floodplain	tree dom slope
Community Code	MF	SS	RSS	RSS	DF	SS	FP	DF
Dominant physiognomic form								
tree	d		x	sd	d			d
shrub	sd	d	d	d	sd	d		sd
herb/forb	x	x	none	sparse	x	x		x
aquatic								
Wildlife							deer tracks	
							magpie	
							gulls	
Comments								
Photos	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2

Saskatoon Light and Power
Environmental Baseline Studies, 2009
Vegetation Field Sampling Summary

Date	Jun-17	Jun-17	Jun-17	Jun-17	Jun-17	Jun-18	Jun-18	Sep-15
Plot #	25	26	27	28	29	30	31	40
Community Code	FPS	HU	FPS	HU	RSS	SS	FP	FPS
East	384559	384904	385106	385202	385843	384716	384589	387439
North	5773628	5774514	5774960	5775131	5775769	5774706	5774390	5777437
Slope (degrees)	0	30	10		30	30	0	0
Aspect		w	w		w	e		
Soil								
texture	sand/silt		sand			sand	sand	sand - river deposits
drainage	poor		mod			mod	mod	
stoniness			gravel 10				none	not
moisture (w/m/d)	w	d	w	d	w	d	w	w
Vegetation community								
field community comments	shrub swamp sb willow	grassland/prairie	sb will	human influenced	shrub riverside	shrub slope	UV floodplain	
Community Code	FPS	HU	FPS	HU	RSS	SS	FP	FPS
Dominant physiognomic form								
tree						x		
shrub	d		d		d	d		
herb/forb	sparse	d	x			x		
aquatic							some	
Wildlife	MALL					deer		CAGO - many dead eggs
	RWBB					garter snake		no songbird nest evidence
	COYE							beaver
	YEWA							
Comments				garden with park - private shoreline to the south	park adj			not seasonally flooded
Photos	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2	see Appendix B2

Saskatoon Light and Power
Environmental Baseline Studies, 2009
Vegetation Field Sampling Summary

Date	Sep-15
Plot #	41
Community Code	FPS
East	386449
North	5776418
Slope (degrees)	
Aspect	
Soil	
texture	sand - river deposits
drainage	
stoniness	
moisture (w/m/d)	w
Vegetation community	
field community comments	
Community Code	FPS
Dominant physiognomic form	
tree	
shrub	
herb/forb	
aquatic	
Wildlife	
Comments	
Photos	see Appendix B2

key	
d	dominant
sd	subdominant
x	present >25% cover
fc	full cover

Photo 1: Sampling Site 1 - Overview.

Photo 2: Sampling Site 1 - Pelicans.

Photo 3: Sampling Site 1 - Weir.

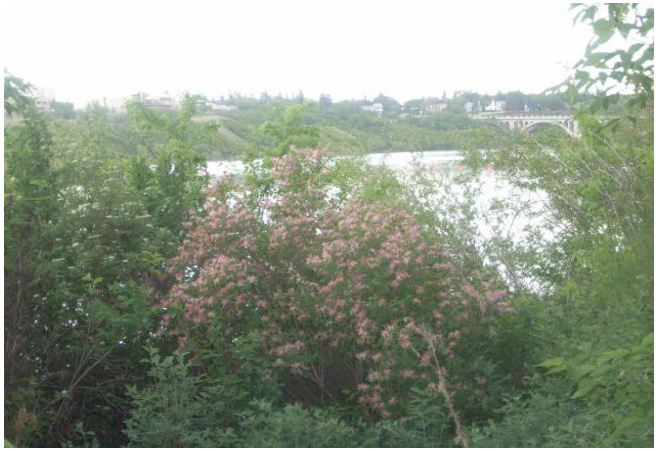

Photo 4: Sampling Site 2 - Honeysuckle.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 1 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.1

REV 0

Photo 1: Sampling Site 2 - Overview.

Photo 2: Sampling Site 3 - Close.

Photo 3: Sampling Site 3 - Overview.

Photo 4: Sampling Site 4 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 2 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.2

REV 0

Photo 1: Sampling Site 4 - Overview.

Photo 2: Sampling Site 5 - Close.

Photo 3: Sampling Site 5 - Overview.

Photo 4: Sampling Site 6 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 3 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.3

REV 0

Photo 1: Sampling Site 6 - Overview.

Photo 2: Sampling Site 7 - Close.

Photo 3: Sampling Site 7 - Overview.

Photo 4: Sampling Site 8 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 4 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.4

REV 0

Photo 1: Sampling Site 8 - Overview.

Photo 2: Sampling Site 9 - Close.

Photo 3: Sampling Site 9 - Overview.

Photo 4: Sampling Site10 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 5 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.5

REV 0

Photo 1: Sampling Site 10 - Overview.

Photo 2: Sampling Site 13 - Close.

Photo 3: Sampling Site 13 - Overview.

Photo 4: Sampling Site 14 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 6 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.6

REV 0

Photo 1: Sampling Site 14 - Overview.

Photo 2: Sampling Site 15 - Close.

Photo 3: Sampling Site 15 - Overview.

Photo 4: Sampling Site 16 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 7 OF 14)

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REF. NO. 1

FIGURE B2.7

REV 0

Photo 1: Sampling Site 16 - Overview.

Photo 2: Sampling Site 17.

Photo 3: Sampling Site 18 - Close.

Photo 4: Sampling Site 18 - Overview.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 8 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.8

REV 0

Photo 1: Sampling Site 19 - Close.

Photo 2: Sampling Site 19 - Overview.

Photo 3: Sampling Site 20 - 1.

Photo 4: Sampling Site 20 - 2.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 9 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.9

REV 0

Photo 1: Sampling Site 22.

Photo 2: Sampling Site 23 - Overview.

Photo 3: Sampling Site 23 - View north.

Photo 4: Sampling Site 24.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 10 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.10

REV 0

Photo 1: Sampling Site 25 - Close.

Photo 2: Sampling Site 25 - Closer.

Photo 3: Sampling Site 25 - Overview.

Photo 4: Sampling Site 26 - Overview.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 11 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.11

REV 0

Photo 1: Sampling Site 26 - Alfalfa.

Photo 2: Sampling Site 27.

Photo 3: Sampling Site 28.

Photo 4: Sampling Site 29.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 12 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.12

REV 0

Photo 1: Sampling Site 30.

Photo 2: Sampling Site 31 - Close.

Photo 3: Sampling Site 31 - Overview.

Photo 4: Sampling Site 40 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 13 OF 14)

Knight Piésold CONSULTING

P/A NO. NB103-198/2

REF. NO. 1

FIGURE B2.13

REV 0

Photo 1: Sampling Site 40 - Far.

Photo 2: Sampling Site 40 - Geese.

Photo 3: Sampling Site 41 - Far.

Photo 4: Sampling Site 41 - Close.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MLT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

VEGETATION COMMUNITY SAMPLING SITE PHOTOS (SHEET 14 OF 14)

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REF. NO. 1

FIGURE B2.14

REV 0

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APPENDIX B3

FISH HABITAT DATA SUMMARY AND PHOTOS

(Pages B3-1 to B3-9)

Date

Surveyor

Location UTM

Sampling Point Code **Description:**

Photos

Riparian Zone

Bank Slope

Bank stability

	highly unstable		moderate unstable		stable					
%										

Riparian vegetation

	tree			shrub			wetland			aquatic
%										

Bank cover/canopy overhang

Shoreline Habitat Features

Substrate

	bedrock / rock	boulder	rubble/cobble	gravel/pebble	sand	silt	Cley	Muck	Marl	Detritus
%										

Instream cover

Undercut banks	Boulder	Log & tree	Organic Debris	Macrophytes	No cover

Stream cover/canopy

Bottom slope (to 5 m)

Aquatic vegetation

submergent	floating	emergent	algae

Spawning Habitat Suitability

Northern Pike	Yellow Perch	Walleye and Sauger	Lake Whitefish	Goldeye	Lake Sturgeon	Suckers

Field Trip		May	May	May	June	June	June	June
Date		05-May	05-May	07-May	16-Jun	16-Jun	16-Jun	16-Jun
Site #		1	2	3	4	5	6	7
		rail bridge to weir				mid river from rail bridge		
		FH1	FH2	FH3	FH4	FH5	FH6	FH7
East		5778190	5777946	5776682	5778393	5778164	5777688	5777154
North		387563	387487	386771	387973	387697	387712	387443
Riparian Zone								
Bank Slope		45	30	30	5		0	5
Bank stability		stable	moderately unstable		moderate		mod	mod
Riparian vegetation	tree	10			0			none
	shrub	10	70		0		70	
	herb	80	30		0		30	
	aquatic				0			
Shoreline Habitat Features								
Substrate	boulder	70	5		5	25		
	rubble/cobble	20			80	30		
	gravel/pebble				20			
	sand	10	90		100		100	100
	silt							
	clay	tr						
Instream cover	boulder	50	2					
	sticks						5	
	none	50	98					100
Stream cover/canopy		n	0		0		none	none
Bottom slope (to 5 m)		5	30		5		10	5
Aquatic vegetation							none	none
	submergent		x		0			
	floating							
	emergent							
	algae	90						
Photo		Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3
Spawning Habitat Suitability					fast current			
Northern Pike		0	0	2	0	0	0	0
Yellow Perch		1	0	2	0	0	0	0
Walleye and Sauger		3	0	0	2	3	1	1
Lake Whitefish		1	0	0	0	2	1	0
Goldeye		0	0	1	0	0	0	0
Lake Sturgeon		3	0	0	2	3	1	1
Suckers		2	0	0	2	2	1	1

Field Trip	June	June	June	June	September	September	September	September	September
Date	17-Jun	17-Jun	18-Jun	18-Jun	14-Sep	14-Sep	14-Sep	14-Sep	15-Sep
Site #	8	9	10	11	12	13	14	15	16
	FH8	FH9	FH10	FH11	FH12	FH13	FH14	FH15	FH16
East	5773362	5774946	5775974	5774390	5775876	5776101	5776337	5776573	5777358
North	384286	385097	386204	384595	386462	386695	386804	386978	387378
Riparian Zone									mid-stream
Bank Slope	5	10	10	5	45	30	30	30	
Bank stability	mod	mod	stable	unstable	stable	mod unstable	unstable	unstable	
Riparian vegetation	none	none			20	20		20	
			75	60	50	10	90	80	
				40		70			
Shoreline Habitat Features									na
Substrate		25	80	10		40	10		
			20	50			10	10	
							50		
	100			60	100	80	20	90	30
									30
						50			30
Instream cover		25	90	20			10		
	100				100			100	100
Stream cover/canopy	none	none	none	none	shrub	shrub	shrub	none	
Bottom slope (to 5 m)	5	45	30	5	5	5	5	5	
Aquatic vegetation		none	none				none		none
	50			40	50			20	
Photo	Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3	Appendix B3
Spawning Habitat Suitability									
Northern Pike	1	0	0	1	1	0	0	0	0
Yellow Perch	1	0	0	0	0	1	1	0	0
Walleye and Sauger	0	1	2	1	0	0	1	0	0
Lake Whitefish	0	0	2	1	0	0	1	0	0
Goldeye	1	0	0	0	1	0	0	0	0
Lake Sturgeon	0	1	1	1	0	0	0	0	0
Suckers	0	1	2	1	0	0	1	0	0

Field Trip	September	September		
Date	15-Sep	15-Sep	16-Sep	16-Sep
Site #	17	18	19	20
	FH17	FH18	FH19	FH20
East	5774546	5778241	384716	384809
North	384711	387745	5774020	5774285
Riparian Zone	mid-stream	mid-stream		
Bank Slope			5	30
Bank stability			stable	stable
Riparian vegetation				
			30	50
			70	50
Shoreline Habitat Features	na	na		
Substrate		30		80
		40		20
		20		
	30	10	100	
	30			
	30			
Instream cover		30		80
	100		100	
Stream cover/canopy			none	
Bottom slope (to 5 m)			5	30
Aquatic vegetation			none	none
	50			
Photo	Appendix B3	Appendix B3	Appendix B3	Appendix B3
Spawning Habitat Suitability				
Northern Pike	0	0	0	0
Yellow Perch	1	0	0	0
Walleye and Sauger	0	3	0	0
Lake Whitefish	0	0	0	0
Goldeye	0	0	0	0
Lake Sturgeon	0	3	0	0
Suckers	0	3	0	0

0	not suitable
1	marginal
2	moderate
3	most suitable

Photo 1: Fish Habitat 1.

Photo 2: Fish Habitat 2.

Photo 3: Fish Habitat 3.

Photo 4: Fish Habitat 4.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 1 OF 5)

Knight Piésold CONSULTING

P/A NO. VA103-198/2

REF. NO. 1

FIGURE B3.1

REV 0

Photo 1: Fish Habitat 5.

Photo 2: Fish Habitat 6.

Photo 3: Fish Habitat 7.

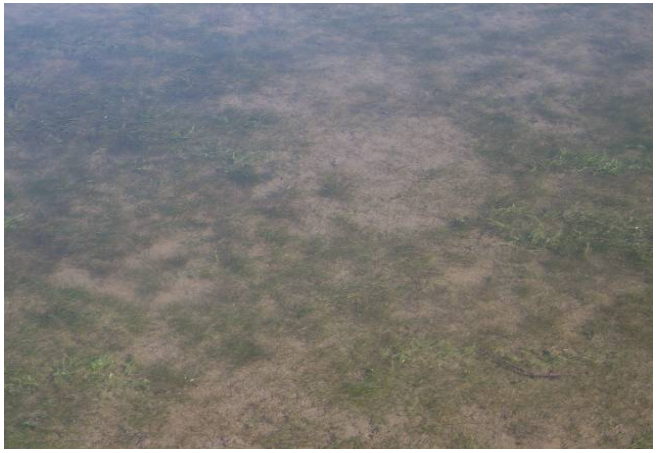

Photo 4: Fish Habitat 8.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 2 OF 5)

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P/A NO. VA103-198/2

REF. NO. 1

FIGURE B3.2

REV 0

Photo 1: Fish Habitat 9.

Photo 2: Fish Habitat 10.

Photo 3: Fish Habitat 11.

Photo 4: Fish Habitat 12.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 3 OF 5)

Knight Piésold CONSULTING

P/A NO. VA103-198/2

REF. NO. 1

FIGURE B3.3

REV 0

Photo 1: Fish Habitat 13.

Photo 2: Fish Habitat 14.

Photo 3: Fish Habitat 15.

Photo 4: Fish Habitat 16.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 4 OF 5)

Knight Piésold CONSULTING

P/A NO. VA103-198/2

REF. NO. 1

FIGURE B3.4

REV 0

Photo 1: Fish Habitat 17.

Photo 2: Fish Habitat 18.

Photo 3: Fish Habitat 19.

Photo 4: Fish Habitat 20.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 5 OF 5)

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REF. NO. 1

FIGURE B3.5

REV 0

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APPENDIX B4

WILDLIFE PHOTOS

(Pages B4-1 to B4-3)

Photo 1: American White Pelicans.

Photo 2: Beaver Lodge on Goose Island.

Photo 3: Canada Geese.

Photo 4: Canada Goose family.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 1 OF 3)

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P/A NO. VA103-198/2

REF. NO. 1

FIGURE B4.1

REV 0

Photo 1: Pelicans fishing.

Photo 2: Pelicans.

Photo 3: Female mallard and young.

Photo 4: Northern Leopard Frog.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 2 OF 3)

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P/A NO. VA103-198/2

REF. NO. 1

FIGURE B4.2

REV 0

Photo 1: Pelicans.

Photo 2: Thirteen lined ground squirrel.

Photo 3: Richardson's ground squirrel.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	15DEC'09	ISSUED WITH REPORT	MT	CB	CB

SASKATOON LIGHT AND POWER

HYDROPOWER AND WHITEWATER PARK DEVELOPMENT STUDIES

PHOTOS
(SHEET 3 OF 3)

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REF. NO. 1

FIGURE B4.3

REV 0

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APPENDIX C

SPECIES LISTS

Appendix C1 Herpetiles
Appendix C2 Avian Checklists
Appendix C3 Species at Risk in Saskatchewan

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APPENDIX C1

HERPETILES

(Pages C1-1 to C1-2)

Table AMP-1. Saskatchewan Amphibians

Common Name	Scientific Name	Family	Distribution
Tiger salamander	Ambystoma tigrinum	Ambystomatidae	prairie, aspen parklands
Plains spadefoot	Spea bombifrons	Pelobatidae	dry prairies of the southwest
Canadian toad	Bufo hemiophrys	Bufonidae	all, except northeastern subarctic woodland
Great Plains toad	Bufo cognatus	Bufonidae	dry prairies of the southwest
Western chorus frog	Pseudacris triseriata	Hylidae	all, except northeastern subarctic woodland
Wood frog	Rana sylvatica	Ranidae	all, except northeastern subarctic woodland
Northern leopard frog	Rana pipiens	Ranidae	all, except northeastern subarctic woodland

Table REP-1. Reptiles of Saskatchewan

Common Name	Species	Family	Distribution
Snapping turtle	Chelydra serpetina	Chelydridae	southeast corner
Painted turtle	Chrsemys picta	Emydidae	southeast; north to Duck Mountain
Greater short-horned lizard	Phrynosoma hernandesi	Iguanidae	Frenchman River valley
Western hog-nosed snake	Heterodon nasicus	Colubridae	southern prairies
Yellow-bellied racer	Coluber constrictor	Colubridae	extreme southern prairies
Bullsnake	Pituophis catenifer	Colubridae	prairies
Red-bellied snake	Storeria occipitomaculata	Colubridae	lower Qu'Appelle Valley
Smooth green snake	Opheodrys vernalis	Colubridae	southeast corner
Red-sided garter snake	Thamnophis sirtalis	Colubridae	whole province, except south-west and northeast
Wandering garter snake	Thamnophis elegans	Colubridae	southwestern dry prairies
Plains garter snake	Thamnophis radix	Colubridae	prairies and aspen parklands
Western/prairie rattlesnake	Crotalus viridis	Viperidae	Frenchman and South Saskatchewan valleys of the southwestern corner

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APPENDIX C2

AVIAN CHECKLISTS

(Pages C2-1 to C2-4)

SPECIES	CODE	Status	#	BC
Brown Thrasher	BRTH	B		
Curve-billed Thrasher	CBTH	S		
European Starling	EUST	Bi		
American Pipit	AMPI	R		
Sprague's Pipit	SPPI	B		
Bohemian Waxwing	BOWA	B		
Cedar Waxwing	CEDW	B		
Blue-winged Warbler	BWWA	S		
Golden-winged Warbler	GWWA	Sp		
Tennessee Warbler	TEWA	B		
Orange-crowned Warbler	OCWA	B		
Nashville Warbler	NAWA	B		
Northern Parula	NOPA	S		
Yellow Warbler	YWAR	B		
Chestnut-sided Warbler	CSWA	B		
Magnolia Warbler	MAWA	B		
Cape May Warbler	CMWA	B		
Black-throated Blue Warbler	BTBW	Ro		
Yellow-rumped Warbler	YRWA	B		
Black-throated Gray Warbler	BTYW	S		
Black-throated Green Warbler	BTNW	B		
Townsend's Warbler	TOWA	So		
Blackburnian Warbler	BLBW	B		
Pine Warbler	PIWA	Sp		
Prairie Warbler	PRAW	S		
Palm Warbler	PAWA	B		
Bay-breasted Warbler	BBWA	B		
Blackpoll Warbler	BLPW	B		
Black-and-white Warbler	BAWW	B		
American Redstart	AMRE	B		
Prothonotary Warbler	PROW	S		
Worm-eating Warbler	WEWA	S		
Ovenbird	OVEN	B		
Northern Waterthrush	NOWA	B		
Connecticut Warbler	CONW	B		
Mourning Warbler	MOWA	B		
MacGillivray's Warbler	MGWA	B		
Common Yellowthroat	COYE	B		
Hooded Warbler	HOWA	S		
Wilson's Warbler	WIWA	B		
Canada Warbler	CAWA	B		
Yellow-breasted Chat	YBCH	B		
Summer Tanager	SUTA	S		
Scarlet Tanager	SCTA	Ro		
Western Tanager	WETA	B		
Green-tailed Towhee	GTTO	S		
Spotted Towhee	SPTO	B		
Eastern Towhee	EATO	Rp		
American Tree Sparrow	ATSP	B		
Chipping Sparrow	CHSP	B		
Clay-coloured Sparrow	CCSP	B		
Brewer's Sparrow	BRSP	B		
Field Sparrow	FISP	Rp		
Vesper Sparrow	VESP	B		
Lark Sparrow	LASP	B		
Black-throated Sparrow	BTSP	S		
Lark Bunting	LARB	B		
Savannah Sparrow	SAVS	B		
Grasshopper Sparrow	GRSP	B		
Baird's Sparrow	BAIS	B		
Le Conte's Sparrow	LCSP	B		
Nelson's Sharp-tailed Sparrow	NSTS	B		
Fox Sparrow	FOSP	B		
Song Sparrow	SOSP	B		
Lincoln's Sparrow	LISP	B		
Swamp Sparrow	SWSP	B		
White-throated Sparrow	WTSP	B		
Harris's Sparrow	HASP	B		

SPECIES	CODE	Status	#	BC
White-crowned Sparrow	WCSP	B		
Golden-crowned Sparrow	GCSP	S		
Dark-eyed Junco	DEJU	B		
McCown's Longspur	MCLO	B		
Lapland Longspur	LALO	R		
Smith's Longspur	SMLO	R		
Chestnut-collared Longspur	CCLO	B		
Snow Bunting	SNBU	R		
Northern Cardinal	NOCA	Sp		
Rose-breasted Grosbeak	RBGR	B		
Black-headed Grosbeak	BHGR	B		
Lazuli Bunting	LAZB	B		
Indigo Bunting	INBU	B		
Painted Bunting	PABU	S		
Dickcissel	DICK	So		
Bobolink	BOBO	B		
Red-winged Blackbird	RWBL	B		
Eastern Meadowlark	EAME	S		
Western Meadowlark	WEME	B		
Yellow-headed Blackbird	YHBL	B		
Rusty Blackbird	RUBL	B		
Brewer's Blackbird	BRBL	B		
Common Grackle	COGR	B		
Brown-headed Cowbird	BHCO	B		
Orchard Oriole	OROR	B		
Bullock's Oriole	BUOR	B		
Baltimore Oriole	BAOR	B		
Brambling	BRAM	S		
Gray-crowned Rosy-Finch	GCRF	R		
Pine Grosbeak	PIGR	B		
Purple Finch	PUFI	B		
House Finch	HOFI	Bi		
Red Crossbill	RECR	B		
White-winged Crossbill	WWCR	B		
Common Redpoll	CORE	B		
Hoary Redpoll	HORE	R		
Pine Siskin	PISI	B		
American Goldfinch	AMGO	B		
Evening Grosbeak	EVGR	B		
House Sparrow	HOSP	Bi		

HYPOTHETICAL SPECIES

Emperor Goose	White-winged Dove
Barnacle Goose	Yellow-billed Cuckoo
Mute Swan	Flammulated Owl
Common Pochard	Western Screech-Owl
Tufted Duck	Black Swift
Smew	Black-chinned Hummingbird
Chukar	Acadian Flycatcher
Brown Pelican	Gray Flycatcher
Neotropic Cormorant	Great Kiskadee
Tricoloured Heron	Fork-tailed Flycatcher
Glossy Ibis	Plumbeous Vireo
Black Vulture	Pinyon Jay
California Condor	Bridled Titmouse
Swallow-tailed Kite	Tufted Titmouse
Red-shouldered Hawk	Pygmy Nuthatch
Pacific Golden-Plover	Cactus Wren
Mountain Plover	Canyon Wren
Eskimo Curlew	Carolina Wren
Black-tailed Godwit	Blue-gray Gnatcatcher
Bar-tailed Godwit	Northern Wheatear
Surfbird	Western Bluebird
Red-necked Stint	Bendire's Thrasher
Sharp-tailed Sandpiper	White Wagtail
Rock Sandpiper	Yellow-throated Warbler
Curlew Sandpiper	Kentucky Warbler
Laughing Gull	McKay's Bunting
Iceland Gull	Blue Grosbeak
Glaucous-winged Gull	Great-tailed Grackle
Ross's Gull	Black Rosy-Finch
Ivory Gull	Cassin's Finch
Pigeon Guillemot	Lesser Goldfinch
Long-billed Murrelet	Oriental Greenfinch

Weather

Start Temp: _____ End Temp:_____

Wind (Beaufort Scale), check start (s) and end (e):

Code	Speed	Conditions	s	e
0	<2 kph	smoke rises vertically		
1	2-5 kph	some smoke drift		
2	6-11	leaves rustle		
3	12-19	leaves & twigs in motion		
4	20-29	small branches move		
5	30-39	small trees sway		
6	> 40	large branches in motion		

Sky condition codes, check start (s) and end (e):

	Conditions	s	e		Conditions	s	e
0	clear, few clouds			4	drizzle		
1	partly cloudy			5	snow		
2	cloudy, overcast			6	showers		
3	fog or smoke						

Breeding Codes (BC)

Observed
- O - OBSERVED, but no indication of breeding

Possible breeding
- H – observed , breeding calls heard in suitable nesting HABITAT

Probable breeding
- P - PAIR observed in suitable nesting habitat
- T - TERRITORY presumed through nesting behaviour
- C - COURTSHIP behaviour between male and female
- V - VISITING probable nest site
- N - NEST-BUILDING (or excavation of nest hole by woodpeckers or wrens)

Confirmed breeding
- NB - NEST BUILDING or carrying nest material (for all species except woodpeckers and wrens)
- DD - DISTRACTION DISPLAY
- UN - USED NEST or eggshells found
- FL - recently FLEDGED young or downy young
- ON - OCCUPIED NEST indicated by adult entering or leaving nest site or seen incubating or brooding
- CF - CARRYING FOOD or faecal sac
- NE - NEST with EGGS
- NY - NEST with YOUNG

Any records of stragglers, hypothetical species or species new to the list should be supported by detailed notes and a sketch taken in the field, or preferably by a photograph or sound recording. Reports should be submitted to the Royal Saskatchewan Museum, Regina, SK S4P 3VT.

Compiled and published by Nature Saskatchewan.
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ARS 2008

Field Checklist of Saskatchewan Birds

This checklist includes 440 species of birds recorded in Saskatchewan. The 376 species in the main body have been confirmed by a specimen, photograph or sound recording. Another 64 hypothetical species, lacking similar evidence, are listed separately.

PRIMARY STATUS (upper case)

B: Regular breeding	248
R: Regular non-breeding	54
Total regularly-occurring	**302**
E: Extinct or extirpated	2
S: Stragglers (30 or fewer records)	72
Total confirmed	**376**
H: Hypothetical	64
Total	**440**

SECONDARY STATUS (lower case)

o: Occasional or former breeding	18
p: Probable breeding	12
i: Introduced	8

Although this checklist may be used for yearly or life lists, it is ideally suited for one day's birding at one site. Record the location, and if possible legal land description, latitude-longitude or Universal Transverse Mercator Grid (UTM).

column - number of birds seen or heard
BC (Breeding Code) column: *See* back panel)

Name: _____
Address: _____
_____
Phone:_____
Observers:_____
_____

Date: _____._____._____ (dd.mm.yr)
Start time: _____ End time:_____

Location: _____
1:50,000 NTS Mapsheet: _____
Latitude: _____ º _____ ' _____ "
Longitude _____ º _____ ' _____ "
Legal: q _____sec _____ tp _____ ra_____mer_____
UTM_____E_____N (in metres)

Habitat (to the nearest 10%)

Habitat	%	Habitat	%
Grassland		Deciduous Forest	
Slough/marsh		Mixedwood Forest	
Bog/fen		Coniferous Forest	
Creek/river		Badlands	
Riparian Woodland		Cultivated	
Aspen Grove		Urban	

SPECIES	CODE	Status	#	BC
Greater White-fronted Goose	GWFG	R		
Snow Goose	SNGO	R		
Ross's Goose	ROGO	R		
Brant	BRAN	S		
Cackling Goose	CACG	R		
Canada Goose	CANG	B		
Trumpeter Swan	TRUS	B		
Tundra Swan	TUSW	Ro		
Wood Duck	WODU	B		
Gadwall	GADW	B		
Eurasian Wigeon	EUWI	S		
American Wigeon	AMWI	B		
American Black Duck	ABDU	B		
Mallard	MALL	B		
Blue-winged Teal	BWTE	B		
Cinnamon Teal	CITE	B		
Northern Shoveler	NSHO	B		
Northern Pintail	NOPI	B		
Garganey	GARG	S		
Green-winged Teal	GWTE	B		
Canvasback	CANV	B		
Redhead	REDH	B		
Ring-necked Duck	RNDU	B		
Greater Scaup	GRSC	Rp		
Lesser Scaup	LESC	B		
King Eider	KIEI	S		
Common Eider	COEI	S		
Harlequin Duck	HARD	S		
Surf Scoter	SUSC	B		
White-winged Scoter	WWSC	B		
Black Scoter	BLSC	R		
Long-tailed Duck	LTDU	R		
Bufflehead	BUFF	B		
Common Goldeneye	COGO	B		
Barrow's Goldeneye	BAGO	R		
Hooded Merganser	HOME	B		
Common Merganser	COME	B		
Red-breasted Merganser	RBME	B		
Ruddy Duck	RUDU	B		
Gray Partridge	GRPA	Bi		
Ring-necked Pheasant	RGNP	Bi		
Ruffed Grouse	RUGR	B		
Greater Sage-Grouse	GRSG	B		
Spruce Grouse	SPGR	B		
Willow Ptarmigan	WIPT	R		
Rock Ptarmigan	ROPT	S		
Sharp-tailed Grouse	STGR	B		
Greater Prairie-Chicken	GRPC	Eo		
Wild Turkey	WITU	Bi		
Red-throated Loon	RTLO	B		
Pacific Loon	PALO	R		
Common Loon	COLO	B		
Yellow-billed Loon	YBLO	S		
Pied-billed Grebe	PBGR	B		
Horned Grebe	HOGR	B		
Red-necked Grebe	RNGR	B		
Eared Grebe	EAGR	B		
Western Grebe	WEGR	B		
Clark's Grebe	CLGR	B		
American White Pelican	AWPE	B		
Double-crested Cormorant	DCCO	B		
American Bittern	AMBI	B		
Least Bittern	LEBI	S		
Great Blue Heron	GBHE	B		
Great Egret	GREG	Ro		
Snowy Egret	SNEG	S		
Little Blue Heron	LBHE	S		

SPECIES	CODE	Status	#	BC
Cattle Egret	CAEG	Ro		
Green Heron	GRHE	S		
Black-crowned Night-Heron	BCNH	B		
Yellow-crowned Night-Heron	YCNH	S		
White-faced Ibis	WFIB	So		
Turkey Vulture	TUVU	B		
Osprey	OSPR	B		
White-tailed Kite	WTKI	S		
Mississippi Kite	MIKI	S		
Bald Eagle	BAEA	B		
Northern Harrier	NOHA	B		
Sharp-shinned Hawk	SSHA	B		
Cooper's Hawk	COHA	B		
Northern Goshawk	NOGO	B		
Broad-winged Hawk	BWHA	B		
Swainson's Hawk	SWHA	B		
Red-tailed Hawk	RTHA	B		
Ferruginous Hawk	FEHA	B		
Rough-legged Hawk	RLHA	Rp		
Golden Eagle	GOEA	B		
American Kestrel	MAKE	B		
Merlin	MERL	B		
Gyrfalcon	GYRF	R		
Peregrine Falcon	PEFA	Ro		
Prairie Falcon	PRFA	B		
Yellow Rail	YEAR	B		
Virginia Rail	VIRA	B		
Sora	SORA	B		
American Coot	AMCO	B		
Sandhill Crane	SACR	B		
Common Crane	COCR	S		
Whooping Crane	WHCR	Ro		
Black-bellied Plover	BBPL	R		
American Golden-Plover	AMGP	R		
Snowy Plover	SNPL	So		
Semipalmated Plover	SEPL	B		
Piping Plover	PIPL	B		
Killdeer	KILL	B		
Black-necked Stilt	BNST	So		
American Avocet	AMAV	B		
Spotted Sandpiper	SPSA	B		
Solitary Sandpiper	SOSA	B		
Spotted Redshank	SPRE	S		
Greater Yellowlegs	GRYE	B		
Willet	WILL	B		
Lesser Yellowlegs	LEYE	B		
Upland Sandpiper	UPSA	B		
Whimbrel	WHIM	R		
Long-billed Curlew	LBCU	B		
Hudsonian Godwit	HUGO	R		
Marbled Godwit	MAGO	B		
Ruddy Turnstone	RUTU	R		
Red Knot	REKN	R		
Sanderling	SAND	R		
Semipalmated Sandpiper	SESA	R		
Western Sandpiper	WESA	S		
Least Sandpiper	LESA	B		
White-rumped Sandpiper	WRSA	R		
Baird's Sandpiper	BASA	R		
Pectoral Sandpiper	PESA	R		
Dunlin	DUNL	R		
Stilt Sandpiper	STSA	R		
Buff-breasted Sandpiper	BBSA	R		
Ruff	RUFF	S		
Short-billed Dowitcher	SBDO	B		
Long-billed Dowitcher	LBDO	R		
Wilson's Snipe	WISN	B		

SPECIES	CODE	Status	#	BC
American Woodcock	AMWO	S		
Wilson's Phalarope	WIPH	B		
Red-necked Phalarope	RNPH	B		
Red Phalarope	REPH	S		
Franklin's Gull	FRGU	B		
Little Gull	LIGU	S		
Bonaparte's Gull	BOGU	B		
Mew Gull	MEGU	B		
Ring-billed Gull	RBGU	B		
California Gull	CAGU	B		
Herring Gull	HERG	B		
Thayer's Gull	THGU	R		
Lesser Black-backed Gull	LBBG	S		
Slaty-backed Gull	SBGU	S		
Western Gull	WEGU	S		
Glaucous Gull	GLGU	R		
Great black-backed Gull	GBBG	S		
Sabine's Gull	SAGU	S		
Black-legged Kittiwake	BLKI	S		
Least Tern	LETE	S		
Caspian Tern	CATE	B		
Black Tern	BLTE	B		
Common Tern	COTE	B		
Arctic Tern	ARTE	B		
Forster's Tern	FOTE	B		
Pomarine Jaeger	POJA	S		
Parasitic Jaeger	PAJA	R		
Long-tailed Jaeger	LTJA	S		
Black Guillemot	BLGU	S		
Ancient Murrelet	ANMU	S		
Rock Pigeon	ROPI	Bi		
Band-tailed Pigeon	BTPI	S		
Eurasian Collared-Dove	ECDO	Bi		
Mourning Dove	MODO	B		
Passenger Pigeon	PAPI	Eo		
Black-billed Cuckoo	BBCU	B		
Barn Owl	BNOW	S		
Eastern Screech-Owl	EASO	B		
Great Horned Owl	GHOW	B		
Snowy Owl	SNOW	R		
Northern Hawk Owl	NHOW	B		
Burrowing Owl	BUOW	B		
Barred Owl	BDOW	B		
Great Gray Owl	GGOW	B		
Long-eared Owl	LEOW	B		
Short-eared Owl	SEOW	B		
Boreal Owl	BOOW	B		
Northern Saw-whet Owl	NSWO	B		
Common Nighthawk	CONI	B		
Common Poorwill	COPW	B		
Whip-poor-will	WPWI	B		
Chimney Swift	CHSW	B		
Ruby-throated Hummingbird	RTHU	B		
Anna's Hummingbird	ANHU	S		
Calliope Hummingbird	CAHU	S		
Rufous Hummingbird	RUHU	S		
Belted Kingfisher	BEKI	B		
Lewis's Woodpecker	LEWO	S		
Red-headed Woodpecker	RHWO	Ro		
Red-bellied Woodpecker	RBWO	S		
Williamson's Sapsucker	WISA	S		
Yellow-bellied Sapsucker	YBSA	B		
Red-naped Sapsucker	RNSA	B		
Downy Woodpecker	DOWO	B		
Hairy Woodpecker	HAWO	B		
Am 3-toed Woodpecker	ATTW	B		
Black-backed Woodpecker	BBWO	B		

SPECIES	CODE	Status	#	BC
Northern Flicker	NOFL	B		
Pileated Woodpecker	PIWO	B		
Olive-sided Flycatcher	OSFL	B		
Western Wood-Pewee	WEWP	B		
Eastern Wood-Pewee	EAWP	Rp		
Yellow-bellied Flycatcher	YBFL	B		
Alder Flycatcher	ALFL	B		
Willow Flycatcher	WIFL	B		
Least Flycatcher	LEFL	B		
Dusky Flycatcher	DUFL	Rp		
Eastern Phoebe	EAPH	B		
Say's Phoebe	SAPH	B		
Great Crested Flycatcher	GCFL	B		
Western Kingbird	WEKI	B		
Eastern Kingbird	EAKI	B		
Scissor-tailed Flycatcher	STFL	S		
Loggerhead Shrike	LOSH	B		
Northern Shrike	NSHR	Ro		
White-eyed Vireo	WEVI	S		
Yellow-throated Vireo	YTVI	B		
Cassin's Vireo	CAVI	S		
Blue-headed Vireo	BHVI	B		
Warbling Vireo	WAVI	B		
Philadelphia Vireo	PHVI	B		
Red-eyed Vireo	REVI	B		
Gray Jay	GRAJ	B		
Steller's Jay	STJA	S		
Blue Jay	BLJA	B		
Clark's Nutcracker	CLNU	S		
Black-billed Magpie	BBMA	B		
American Crow	AMCR	B		
Common Raven	CORA	B		
Horned Lark	HOLA	B		
Purple Martin	PUMA	B		
Tree Swallow	TRES	B		
Violet-green Swallow	VGSW	B		
Northern Rough-winged Swallow	NRWS	B		
Bank Swallow	BANS	B		
Cliff Swallow	CLSW	B		
Barn Swallow	BARS	B		
Black-capped Chickadee	BCCH	B		
Mountain Chickadee	MOCH	S		
Boreal Chickadee	BOCH	B		
Red-breasted Nuthatch	RBNU	B		
White-breasted Nuthatch	WBNU	B		
Brown Creeper	BRCR	B		
Rock Wren	ROWR	B		
House Wren	HOWR	B		
Winter Wren	WIWR	B		
Sedge Wren	SEWR	B		
Marsh Wren	MAWR	B		
American Dipper	AMDI	S		
Golden-crowned Kinglet	GCKI	B		
Ruby-crowned Kinglet	RCKI	B		
Eastern Bluebird	EABL	B		
Mountain Bluebird	MOBL	B		
Townsend's Solitaire	TOSO	Ro		
Veery	VEER	B		
Gray-cheeked Thrush	GCTH	B		
Swainson's Thrush	SWTH	B		
Hermit Thrush	HETH	B		
Wood Thrush	WOTH	S		
American Robin	AMRO	B		
Varied Thrush	VATH	R		
Gray Catbird	GRCA	B		
Northern Mockingbird	NOMO	Ro		
Sage Thrasher	SATH	Ro		

Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 2001 codes follow species names.

E Endangered SC Special Concern
T Threatened

Species known or believed to have nested, usually with the abundance shown in the Summer column, are underlined.

Checklists are available from the Saskatoon Nature Society (203-115-2nd Ave. N., Saskatoon, SK, S7K 2B1; tel: 306-665-1915) at the Society's monthly meetings, from the Meewasin Valley Gift Shop, or on the Society's website www.saskatoonnaturesociety.sk.ca.

Details for the numbered columns can be entered below.

1_____

2_____

3_____

4_____

Species names and order follow the AOU checklist, 47th suppl.

1	2	3	4		S	S	F	W
				Geese & Swans				
___	___	___	___	Greater White-fronted Goose	A	i	A	i
___	___	___	___	Snow Goose	A	i	A	i
___	___	___	___	Ross's Goose	C	-	C	-
___	___	___	___	Brant	i	-	i	-
___	___	___	___	Cackling Goose	F	-	F	-
___	___	___	___	Canada Goose	A	C	A	C
___	___	___	___	Tundra Swan	A	i	A	i
				Dabbling Ducks				
___	___	___	___	Wood Duck	R	i	R	-
___	___	___	___	Gadwall	C	C	C	i
___	___	___	___	Eurasian Wigeon	i	-	-	-
___	___	___	___	American Wigeon	C	C	C	i
___	___	___	___	American Black Duck	i	i	i	-
___	___	___	___	Mallard	A	C	A	R
___	___	___	___	Blue-winged Teal	C	C	C	-
___	___	___	___	Cinnamon Teal	R	i	i	-
___	___	___	___	Northern Shoveler	C	C	C	i
___	___	___	___	Northern Pintail	C	F	C	i
___	___	___	___	Green-winged Teal	F	U	F	i
				Diving Ducks				
___	___	___	___	Canvasback	C	F	C	i
___	___	___	___	Redhead	C	F	C	i
___	___	___	___	Ring-necked Duck	U	R	U	i
___	___	___	___	Greater Scaup	U	-	U	i
___	___	___	___	Lesser Scaup	C	F	C	i
___	___	___	___	King Eider	-	-	i	-
___	___	___	___	Common Eider	-	-	i	i
___	___	___	___	Harlequin Duck	i	i	i	-
___	___	___	___	Surf Scoter	i	-	U	-
___	___	___	___	White-winged Scoter	U	R	R	i
___	___	___	___	Black Scoter	i	-	i	-
___	___	___	___	Long-tailed Duck	i	-	R	i
___	___	___	___	Bufflehead	C	U	C	i
___	___	___	___	Common Goldeneye	F	R	C	F
___	___	___	___	Barrow's Goldeneye	-	-	i	-
___	___	___	___	Hooded Merganser	R	i	R	i
___	___	___	___	Common Merganser	F	R	U	i
___	___	___	___	Red-breasted Merganser	R	i	R	i
___	___	___	___	Ruddy Duck	C	C	C	i
				Upland Game Birds				
___	___	___	___	Chukar	x	x	x	x
___	___	___	___	Gray Partridge	F	F	F	F
___	___	___	___	Ring-necked Pheasant	x	x	x	x
___	___	___	___	Ruffed Grouse	U	U	U	U
___	___	___	___	Sharp-tailed Grouse	F	F	F	F
___	___	___	___	Greater Prairie-Chicken (1946)	x	x	x	x
				Loons & Grebes				
___	___	___	___	Red-throated Loon	-	-	i	-
___	___	___	___	Pacific Loon	-	-	R	-
___	___	___	___	Common Loon	U	R	U	-
___	___	___	___	Yellow-billed Loon	i	-	i	-
___	___	___	___	Pied-billed Grebe	F	F	F	i
___	___	___	___	Horned Grebe	F	F	U	i
___	___	___	___	Red-necked Grebe	F	F	F	-
___	___	___	___	Eared Grebe	C	C	C	i
___	___	___	___	Western Grebe	A	F	A	i
___	___	___	___	Clark's Grebe	i	-	i	-
				Pelican & Cormorant				
___	___	___	___	American White Pelican	F	F	F	-
___	___	___	___	Double-crested Cormorant	F	U	C	-
				Bitterns, Herons & Ibis				
___	___	___	___	American Bittern	U	U	U	-
___	___	___	___	Least Bittern (~1920) T	-	i	-	-
___	___	___	___	Great Blue Heron	U	U	U	-
___	___	___	___	Great Egret	i	i	i	-
___	___	___	___	Snowy Egret	i	i	-	-
___	___	___	___	Cattle Egret	i	-	i	-
___	___	___	___	Black-crowned Night-Heron	U	U	U	-
___	___	___	___	White-faced Ibis	i	i	-	-
				Vulture, Eagles, Harrier & Hawks				
___	___	___	___	Turkey Vulture	R	R	R	-
___	___	___	___	Osprey	U	R	U	-
___	___	___	___	Bald Eagle	F	-	F	i
___	___	___	___	Northern Harrier	F	F	F	i
___	___	___	___	Sharp-shinned Hawk	U	R	F	i
___	___	___	___	Cooper's Hawk	U	U	U	i
___	___	___	___	Northern Goshawk	R	i	U	R
___	___	___	___	Broad-winged Hawk	R	i	i	-
___	___	___	___	Swainson's Hawk	F	F	F	-
___	___	___	___	Red-tailed Hawk	C	C	C	i
___	___	___	___	Ferruginous Hawk SC	i	i	i	-
___	___	___	___	Rough-legged Hawk	U	-	U	i
___	___	___	___	Golden Eagle	U	-	U	i
				Falcons				
___	___	___	___	American Kestrel	F	U	F	i
___	___	___	___	Merlin	F	F	F	U
___	___	___	___	Gyrfalcon	i	i	i	i
___	___	___	___	Peregrine Falcon T	U	R	U	-
___	___	___	___	Prairie Falcon	i	i	R	i
				Rails, Coot & Cranes				
___	___	___	___	Yellow Rail SC	R	R	R	-
___	___	___	___	Virginia Rail	R	R	R	-
___	___	___	___	Sora	C	C	C	-
___	___	___	___	American Coot	C	C	A	-
___	___	___	___	Sandhill Crane	C	U	A	-
___	___	___	___	Whooping Crane E (nest 1912)	R	i	R	-
				Shorebirds				
___	___	___	___	Black-bellied Plover	F	F	F	-
___	___	___	___	American Golden-Plover	F	R	R	-
___	___	___	___	Semipalmated Plover	F	F	F	-
___	___	___	___	Piping Plover E	R	R	R	-
___	___	___	___	Killdeer	F	F	F	-
___	___	___	___	Black-necked Stilt	i	i	-	-
___	___	___	___	American Avocet	C	C	F	-
___	___	___	___	Spotted Sandpiper	F	F	F	-
___	___	___	___	Solitary Sandpiper	U	U	U	-
___	___	___	___	Greater Yellowlegs	U	i	F	-
___	___	___	___	Willet	F	F	F	-
___	___	___	___	Lesser Yellowlegs	C	i	C	-
___	___	___	___	Upland Sandpiper	U	U	U	-
___	___	___	___	Whimbrel	i	i	-	-
___	___	___	___	Long-billed Curlew SC	U	U	U	-
___	___	___	___	Hudsonian Godwit	U	F	F	-
___	___	___	___	Marbled Godwit	F	F	F	-
___	___	___	___	Ruddy Turnstone	U	R	R	-
___	___	___	___	Red Knot	R	i	i	-
___	___	___	___	Sanderling	F	F	F	-
___	___	___	___	Semipalmated Sandpiper	A	A	A	-
___	___	___	___	Western Sandpiper	i	-	i	-
___	___	___	___	Least Sandpiper	F	F	F	-
___	___	___	___	White-rumped Sandpiper	F	i	i	-
___	___	___	___	Baird's Sandpiper	C	C	C	-
___	___	___	___	Pectoral Sandpiper	C	C	C	-
___	___	___	___	Dunlin	R	i	i	-
___	___	___	___	Stilt Sandpiper	A	A	A	-
___	___	___	___	Buff-breasted Sandpiper	R	i	i	-
___	___	___	___	Ruff	i	-	-	-
___	___	___	___	Short-billed Dowitcher	F	R	F	-
___	___	___	___	Long-billed Dowitcher	C	R	C	-
___	___	___	___	Wilson's Snipe	F	F	F	i
___	___	___	___	Wilson's Phalarope	C	C	C	-
___	___	___	___	Red-necked Phalarope	A	i	A	-
				Jaeger & Gulls				
___	___	___	___	Parasitic Jaeger	i	-	i	-
___	___	___	___	Franklin's Gull	C	C	C	-
___	___	___	___	Little Gull	-	-	i	-
___	___	___	___	Bonaparte's Gull	U	R	F	-
___	___	___	___	Mew Gull	-	-	i	-
___	___	___	___	Ring-billed Gull	A	C	A	i
___	___	___	___	California Gull	C	C	C	-
___	___	___	___	Herring Gull	F	R	F	-
___	___	___	___	Thayer's Gull	i	-	i	-
___	___	___	___	Iceland Gull	i	-	i	-
___	___	___	___	Lesser Black-backed Gull	i	-	-	-
___	___	___	___	Glaucous Gull	i	-	i	i
___	___	___	___	Sabine's Gull	-	-	i	-
				Terns				
___	___	___	___	Least Tern	-	i	-	-
___	___	___	___	Caspian Tern	i	i	i	-
___	___	___	___	Black Tern	C	C	U	-
___	___	___	___	Common Tern	F	F	F	-
___	___	___	___	Arctic Tern	i	-	-	-
___	___	___	___	Forster's Tern	F	F	F	-
				Pigeons, Doves & Cuckoo				
___	___	___	___	Rock Pigeon	C	C	C	C
___	___	___	___	Band-tailed Pigeon	-	i	i	-
___	___	___	___	Eurasian Collared-Dove	i	i	i	-
___	___	___	___	Mourning Dove	F	F	F	i
___	___	___	___	Black-billed Cuckoo	R	R	R	-
				Owls				
___	___	___	___	Great Horned Owl	F	F	F	F
___	___	___	___	Snowy Owl	F	i	F	F
___	___	___	___	Northern Hawk Owl	i	i	i	i
___	___	___	___	Burrowing Owl E	i	i	i	-
___	___	___	___	Barred Owl	-	-	i	-
___	___	___	___	Great Gray Owl	-	-	i	i
___	___	___	___	Long-eared Owl	i	i	i	-
___	___	___	___	Short-eared Owl SC	i	i	i	R
___	___	___	___	Boreal Owl	i	-	i	i
___	___	___	___	Northern Saw-whet Owl	U	U	U	i
				Nighthawk, Hummingbirds & Kingfisher				
___	___	___	___	Common Nighthawk	U	U	U	-
___	___	___	___	Ruby-throated Hummingbird	U	R	F	-
___	___	___	___	Rufous Hummingbird	-	i	i	-
___	___	___	___	Belted Kingfisher	U	U	F	i
				Woodpeckers				
___	___	___	___	Lewis's Woodpecker SC	i	-	-	-
___	___	___	___	Red-headed Woodpecker SC	i	i	-	-
___	___	___	___	Yellow-bellied Sapsucker	F	U	F	i
___	___	___	___	Downy Woodpecker	F	F	F	F
___	___	___	___	Hairy Woodpecker	F	F	F	F
___	___	___	___	American Three-toed Woodpecker	-	-	i	i
___	___	___	___	Black-backed Woodpecker	i	-	R	R
___	___	___	___	Northern Flicker	C	F	C	R
___	___	___	___	Pileated Woodpecker	R	R	R	R
				Flycatchers				
___	___	___	___	Olive-sided Flycatcher	R	R	R	-
___	___	___	___	Western Wood-Pewee	U	i	U	-
___	___	___	___	Eastern Wood-Pewee	-	i	-	-
___	___	___	___	Yellow-bellied Flycatcher	i	-	i	-
___	___	___	___	Alder Flycatcher	F	U	F	-
___	___	___	___	Willow Flycatcher	-	i	-	-
___	___	___	___	Least Flycatcher	C	C	C	-
___	___	___	___	Eastern Phoebe	U	U	U	-
___	___	___	___	Say's Phoebe	U	i	U	-
___	___	___	___	Great Crested Flycatcher	R	i	R	-
___	___	___	___	Western Kingbird	C	C	C	-
___	___	___	___	Eastern Kingbird	C	C	C	-
___	___	___	___	Scissor-tailed Flycatcher	-	-	i	-
				Shrikes				
___	___	___	___	Loggerhead Shrike T	U	U	U	-
___	___	___	___	Northern Shrike	U	-	U	R

1	2	3	4		S	S	F	W
				Vireos				
___	___	___	___	Blue-headed Vireo	U	i	U	-
___	___	___	___	Warbling Vireo	C	C	C	-
___	___	___	___	Philadelphia Vireo	U	i	U	-
___	___	___	___	Red-eyed Vireo	C	C	C	-
				Jays & Crows				
___	___	___	___	Gray Jay	i	-	i	i
___	___	___	___	Blue Jay	F	F	F	F
___	___	___	___	Clark's Nutcracker	-	-	i	-
___	___	___	___	Black-billed Magpie	C	C	C	C
___	___	___	___	American Crow	C	C	A	i
___	___	___	___	Common Raven	F	U	F	F
				Lark & Swallows				
___	___	___	___	Horned Lark	C	F	F	i
___	___	___	___	Purple Martin	C	C	C	-
___	___	___	___	Tree Swallow	C	C	C	-
___	___	___	___	Northern Rough-winged Swallow	R	R	R	-
___	___	___	___	Bank Swallow	C	C	C	-
___	___	___	___	Cliff Swallow	C	C	C	-
___	___	___	___	Barn Swallow	C	C	C	-
				Chickadees, Nuthatches & Creeper				
___	___	___	___	Black-capped Chickadee	C	C	C	C
___	___	___	___	Boreal Chickadee	i	-	i	i
___	___	___	___	Red-breasted Nuthatch	F	F	F	F
___	___	___	___	White-breasted Nuthatch	U	U	U	U
___	___	___	___	Brown Creeper	U	-	U	i
				Wrens, Dipper & Kinglets				
___	___	___	___	Rock Wren	i	i	i	-
___	___	___	___	House Wren	C	C	C	-
___	___	___	___	Winter Wren	i	-	i	-
___	___	___	___	Sedge Wren	U	U	U	-
___	___	___	___	Marsh Wren	F	F	F	-
___	___	___	___	American Dipper	-	-	i	-
___	___	___	___	Golden-crowned Kinglet	R	-	F	U
___	___	___	___	Ruby-crowned Kinglet	F	R	F	-
				Thrushes				
___	___	___	___	Eastern Bluebird	i	i	i	-
___	___	___	___	Mountain Bluebird	F	F	F	i
___	___	___	___	Townsend's Solitaire	R	i	R	R
___	___	___	___	Veery	F	F	F	-
___	___	___	___	Gray-cheeked Thrush	U	i	U	-
___	___	___	___	Swainson's Thrush	F	i	F	-
___	___	___	___	Hermit Thrush	U	R	U	-
___	___	___	___	Wood Thrush	i	i	i	-
___	___	___	___	American Robin	C	C	C	R
___	___	___	___	Varied Thrush	i	i	R	i
				Catbird & Allies				
___	___	___	___	Gray Catbird	F	F	F	-
___	___	___	___	Northern Mockingbird	i	i	i	i
___	___	___	___	Brown Thrasher	F	F	F	i
___	___	___	___	Curve-billed Thrasher	-	-	i	i
				Starling, Pipits & Waxwings				
___	___	___	___	European Starling	F	U	F	R
___	___	___	___	American Pipit	F	i	F	-
___	___	___	___	Sprague's Pipit T	U	U	U	-
___	___	___	___	Bohemian Waxwing	A	i	C	C
___	___	___	___	Cedar Waxwing	C	C	C	U

1	2	3	4		S	S	F	W
				Wood Warblers				
___	___	___	___	Tennessee Warbler	C	R	C	-
___	___	___	___	Orange-crowned Warbler	F	F	F	i
___	___	___	___	Nashville Warbler	i	-	R	-
___	___	___	___	Northern Parula	i	-	i	-
___	___	___	___	Yellow Warbler	C	C	C	-
___	___	___	___	Chestnut-sided Warbler	i	-	i	-
___	___	___	___	Magnolia Warbler	R	i	U	-
___	___	___	___	Cape May Warbler	R	i	R	-
___	___	___	___	Black-throated Blue Warbler	-	i	i	-
___	___	___	___	Yellow-rumped Warbler	A	R	A	i
___	___	___	___	Black-throated Green Warbler	i	i	i	-
___	___	___	___	Blackburnian Warbler	i	-	i	-
___	___	___	___	Yellow-throated Warbler	-	-	i	-
___	___	___	___	Prairie Warbler	-	-	i	-
___	___	___	___	Palm Warbler	U	i	F	-
___	___	___	___	Bay-breasted Warbler	i	i	i	-
___	___	___	___	Blackpoll Warbler	C	i	C	-
___	___	___	___	Black-and-white Warbler	F	i	F	-
___	___	___	___	American Redstart	F	U	F	-
___	___	___	___	Prothonotary Warbler E	i	-	-	-
___	___	___	___	Ovenbird	F	U	F	-
___	___	___	___	Northern Waterthrush	U	i	F	-
___	___	___	___	Connecticut Warbler	i	i	i	-
___	___	___	___	Mourning Warbler	U	i	U	-
___	___	___	___	Common Yellowthroat	F	F	F	-
___	___	___	___	Hooded Warbler T	-	-	i	-
___	___	___	___	Wilson's Warbler	U	i	F	-
___	___	___	___	Canada Warbler	R	i	R	-
___	___	___	___	Yellow-breasted Chat	i	i	i	-
				Tanagers				
___	___	___	___	Summer Tanager	i	-	-	-
___	___	___	___	Scarlet Tanager	i	-	i	-
___	___	___	___	Western Tanager	i	i	i	-
				Towhee, Sparrows & Junco				
___	___	___	___	Spotted Towhee	C	C	C	i
___	___	___	___	American Tree Sparrow	F	-	F	i
___	___	___	___	Chipping Sparrow	C	C	C	-
___	___	___	___	Clay-colored Sparrow	C	C	C	-
___	___	___	___	Field Sparrow	i	i	-	i
___	___	___	___	Vesper Sparrow	C	C	C	-
___	___	___	___	Lark Sparrow	R	R	R	-
___	___	___	___	Lark Bunting	R	R	R	-
___	___	___	___	Savannah Sparrow	C	C	C	i
___	___	___	___	Grasshopper Sparrow	i	i	-	-
___	___	___	___	Baird's Sparrow	U	U	U	-
___	___	___	___	Le Conte's Sparrow	F	F	F	-
___	___	___	___	Nelson's Sharp-tailed Sparrow	U	U	U	-
___	___	___	___	Fox Sparrow	U	-	U	i
___	___	___	___	Song Sparrow	F	F	F	i
___	___	___	___	Lincoln's Sparrow	F	-	F	-
___	___	___	___	Swamp Sparrow	U	i	F	-
___	___	___	___	White-throated Sparrow	C	i	C	i
___	___	___	___	Harris's Sparrow	U	i	U	i
___	___	___	___	White-crowned Sparrow	F	i	F	i
___	___	___	___	Golden-crowned Sparrow	i	-	i	i
___	___	___	___	Dark-eyed Junco	C	i	C	R

1	2	3	4		S	S	F	W
				Longspurs & Snow Bunting				
___	___	___	___	McCown's Longspur	i	-	-	-
___	___	___	___	Lapland Longspur	A	i	A	i
___	___	___	___	Smith's Longspur	i	-	i	-
___	___	___	___	Chestnut-collared Longspur	i	i	i	-
___	___	___	___	Snow Bunting	A	i	A	A
				Summer Grosbeaks				
___	___	___	___	Northern Cardinal	i	i	i	i
___	___	___	___	Rose-breasted Grosbeak	U	i	U	i
___	___	___	___	Black-headed Grosbeak	i	i	i	-
				Buntings & Allies				
___	___	___	___	Lazuli Bunting	i	i	-	-
___	___	___	___	Indigo Bunting	-	i	i	-
___	___	___	___	Dickcissel	-	i	-	-
___	___	___	___	Bobolink	F	F	F	-
				Blackbirds & Meadowlark				
___	___	___	___	Red-winged Blackbird	A	A	A	i
___	___	___	___	Western Meadowlark	C	C	C	i
___	___	___	___	Yellow-headed Blackbird	C	C	C	i
___	___	___	___	Rusty Blackbird	R	-	U	i
___	___	___	___	Brewer's Blackbird	C	C	C	i
___	___	___	___	Common Grackle	F	F	F	i
___	___	___	___	Brown-headed Cowbird	C	C	R	i
				Orioles				
___	___	___	___	Orchard Oriole	-	i	-	-
___	___	___	___	Baltimore Oriole	F	F	F	-
				Finches & House Sparrow				
___	___	___	___	Brambling	-	-	i	i
___	___	___	___	Gray-crowned Rosy-Finch	i	-	i	i
___	___	___	___	Pine Grosbeak	U	-	R	U
___	___	___	___	Purple Finch	F	i	F	i
___	___	___	___	House Finch	C	C	C	C
___	___	___	___	Red Crossbill	i	i	i	R
___	___	___	___	White-winged Crossbill	i	i	F	F
___	___	___	___	Common Redpoll	C	i	F	C
___	___	___	___	Hoary Redpoll	i	-	i	i
___	___	___	___	Pine Siskin	C	F	C	F
___	___	___	___	American Goldfinch	F	C	C	i
___	___	___	___	Evening Grosbeak	R	i	R	R
___	___	___	___	House Sparrow	C	C	C	C

Hypotheticals

Trumpeter Swan
Spruce Grouse
Green Heron
Mountain Plover E
Red Phalarope (1946)
Great Black-backed Gull
Ross's Gull T
Western Screech-Owl
Eastern Screech-Owl
Whip-poor-will (1893)
Chimney Swift
Red-bellied Woodpecker
Williamson's Sapsucker
Gray Flycatcher
Steller's Jay
Violet-green Swallow
Western Bluebird
Sage Thrasher
Bendire's Thrasher
Golden-winged Warbler
Townsend's Warbler
Worm-eating Warbler
Brewer's Sparrow
Blue Grosbeak
Bullock's Oriole
Cassin's Finch

Saskatoon Area Birds
A Seasonal Checklist

This checklist contains 321 avian species reported in the Saskatoon, Saskatchewan district to June 2007 (3 species are extirpated) and an additional 26 hypothetical species. The area covered extends from 51° 30' to 52° 30' in latitude and 106° 00' to 107° 30' in longitude. The checklist was primarily compiled from records published in *Birds of the Saskatoon Area* (2002) and is maintained by the records committee of the Saskatoon Nature Society.

Among the best birding areas in the city are Cosmopolitan Park, Meewasin Valley Trail, Forestry Farm Park, and the old Sanatorium grounds. Beyond the city are Beaver Creek Conservation Area, Blackstrap Reservoir, Pike Lake, Radisson Lake and Brightwater Marsh. *A Guide to Nature Viewing Sites in and around Saskatoon* (Jonker & Gollop) describes the natural history of these and other nature areas in the district.

Seasons

S	Spring	March–May
S	Summer	June–July
F	Fall	August–November
W	Winter	December–February

Peak abundance for each season is given by a letter code. Detailed information and definitions can be found in *Birds of the Saskatoon Area* (2002).

A	Abundant	R	Rare
C	Common	i	irregular
F	Fairly Common	x	Extirpated
U	Uncommon		

Knight Piésold
CONSULTING

APPENDIX C3

SPECIES AT RISK IN SASKATCHEWAN

(Pages C3-1 to C3-2)

Species at Risk in Saskatchewan

This list is updated twice per year following COSEWIC Species Assessment Meetings, generally in the spring and the fall.

The *Species at Risk Act* establishes Schedule 1 as the official federal list of wildlife species at risk.
The provincial *Wildlife Act, 1998* also lists at-risk species in Saskatchewan. These are identified below with an asterix (*).

For more information on the *Committee on the Status of Endangered Wildlife in Canada* (COSEWIC) and its recommendations for listing, go to: http://www.cosewic.gc.ca
For more information on the *Species at Risk Act* (SARA) and its registry of protected species go to: http://www.sararegistry.gc.ca
For more information on Saskatchewan species ranked by the Conservation Data Centre (SK CDC) go to: http://www.biodiversity.sk.ca

Taxanomic Group	Common Name	Scientific name	SARA status	COSEWIC Status	SK CDC Rank	Last COSEWIC Assessment	Schedule
Mammal	Black-footed Ferret*	*Mustela nigripes*	Extirpated†	Extirpated	SNA	May 2000	Schedule 1
Mammal	Plains Grizzly Bear*	*Ursos arctos*	Extirpated	Extirpated	SX	May 2002	Schedule 1
Mammal	Ord's Kangaroo Rat	*Dipidomys ordii*	Endangered	Endangered	S2	April 2006	Schedule 1
Mammal	Swift Fox*	*Vulpes velox*	Endangered	Endangered	S1	May 2000	Schedule 1
Mammal	Woodland Caribou	*Rangifer tarandus caribou* (Boreal pop'n)	Threatened	Threatened	S3	May 2002	Schedule 1
Mammal	Plains Bison	*Bison bison bison*	No Status	Threatened	S3	May 2004	No Schedule[1]
Mammal	Wolverine	*Gulo gulo*	No Status	Special Concern	S3S4	May 2003	No Schedule[1]
Mammal	Black-tailed Prairie Dog	*Cynomys ludovicianus*	Special Concern	Special Concern	S2	November 2000	Schedule 1
Bird	Greater Prairie-chicken*	*Tympanuchus cupido pinnatus*	Extirpated	Extirpated	SX	May 2000	Schedule 1
Bird	Burrowing Owl*	*Athene cunicularia*	Endangered	Endangered	S2B	April 2006	Schedule 1
Bird	Greater Sage-grouse*	*Centrocercus urophasianus urophasianus*	Endangered	Endangered	S1B, S1N	April 2008	Schedule 1
Bird	Piping Plover*	*Charadrius melodus circumcinctus*	Endangered	Endangered	S3B	May 2001	Schedule 1
Bird	Mountain Plover	*Charadrius montanus*	Endangered	Endangered	S1B	November 2000	Schedule 1
Bird	Red Knot	*Calidris canutus rufa*	No Status	Endangered	S2M	April 2007	No Schedule[1]
Bird	Whooping Crane*	*Grus americana*	Endangered	Endangered	SXB, S1M	November 2000	Schedule 1
Bird	Eskimo Curlew*	*Numenius borealis*	Endangered	Endangered	SHM	May 2000	Schedule 1
Bird	Sage Thrasher	*Oreoscoptes montanus*	Endangered	Endangered	S1B	November 2000	Schedule 1
Bird	Sprague's Pipit	*Anthus spragueii*	Threatened	Threatened	S4B	May 2000	Schedule 1
Bird	Chimney Swift	*Chaetura pelagica*	No Status	Threatened	S3B	April 2007	No Schedule[1]
Bird	Common Nighthawk	*Chordeiles minor*	No Status	Threatened	S4S5B, S4S5M	April 2007	No Schedule[1]
Bird	Olive-sided Flycatcher	*Contopus cooperi*	No Status	Threatened	S4	November 2007	No Schedule[1]
Bird	Red-headed Woodpecker	*Melanerpes erythrocephalus*	Special Concern	Threatened	S1B, S1M	April 2007	Schedule 3
Bird	Loggerhead Shrike	*Lanius ludovicianus excubitorides*	Threatened	Threatened	S4B	May 2004	Schedule 1
Bird	Peregrine Falcon	*Falco peregrinus anatum*	Threatened	Non-active	S1B, S4M, S2N	April 2007	Schedule 1
Bird	Short-eared Owl	*Asio flammeus*	Special Concern	Special Concern	S3B, S2N	April 2008	Schedule 3
Bird	Ferruginous Hawk	*Buteo regalis*	Special Concern	Threatened	S4B, S4M	April 2008	Schedule 3
Bird	Canada Warbler	*Wilsonia canadensis*	No Status	Threatened	S5B	April 2008	No Schedule[1]

Bird	McCowan's Longspur	*Calcarius mccownii*	Special Concern	Special Concern	S3S4B	April 2006	Schedule 1
Bird	Rusty Blackbird	*Euphagus carolinus*	No Status	Special Concern	S4B	April 2006	No Schedule[1]
Bird	Yellow Rail	*Coturnicops noveboracensis*	Special Concern	Special Concern	S3B, S2M	November 2001	Schedule 1
Bird	Long-billed Curlew	*Numenius americanus*	Special Concern	Special Concern	S4B, S4M	November 2002	Schedule 1
Reptile	Eastern Yellow-bellied Racer	*Coluber constrictor flaviventris*	Threatened	Threatened	S3	November 2004	Schedule 1
Reptile	Greater Short-horned Lizard	*Phrynosoma hernandesi*	Special Concern	Endangered	S2S3	April 2007	Schedule 3
Amphibian	Great Plains Toad	*Bufo cognatus*	Special Concern	Special Concern	S3	May 2002	Schedule 1
Amphibian	Northern Leopard Frog	*Rana pipiens*	Special Concern	Special Concern	S3	November 2002	Schedule 1
Fish	Lake Sturgeon	*Acipenser fulvescens*	No Status	Endangered	S2B	November 2006	No Schedule[1]
Fish	Shortjaw Cisco	*Coregonus zenithicus*	Threatened	Threatened	S1	May 2003	Schedule 2
Fish	Bigmouth Buffalo	*Ictiobus cyprinellus*	Special Concern	Special Concern	S3	April 1989	Schedule 3
Fish	Chesnut Lamprey	*Ichthyomyzon castaneus*	Special Concern	Special Concern	S3S4	April 1991	Schedule 3
Arthropod	Gold-edged Gem	*Schinia avemensis*	Endangered	Endangered	SNR	April 2006	Schedule 1
Arthropod	Monarch Butterfly	*Danaus plexippus*	Special Concern	Special Concern	S3B	April 2006	Schedule 1
Arthropod	Dusky Dune Moth	*Copablepharon longipenne*	No Status	Endangered	SNR	November 2007	No Schedule[1]
Arthropod	Mormon Metalmark	*Apodemia mormo*	Threatened	Threatened	S1	May 2003	Schedule 1
Arthropod	Dakota Skipper	*Hesperia dacotae*	Threatened	Threatened	S1	November 2003	Schedule 1
Arthropod	Monarch Butterfly	*Danaus plexippus*	Special Concern	Special Concern	S3B	November 2001	Schedule 1
Arthropod	Pale Yellow Dune Moth	*Copablepharon grande*	No Status	Special Concern	SNR	November 2007	No Schedule[1]
Arthropod	Verna's Flower Moth	*Schinia verna*	No Status	Threatened	SH	May 2005	No Schedule[1]
Vascular Plant	Tiny Cryptanthe*	*Cryptantha minima*	Endangered	Endangered	S1	May 2000	Schedule 1
Vascular Plant	Small White Lady's-slipper*	*Cypripedium candidum*	Endangered	Endangered	S1	May 2000	Schedule 1
Vascular Plant	Small-flowered Sand Verbena*	*Tripterocalyx micranthus*	Endangered	Endangered	S1	November 2002	Schedule 1
Vascular Plant	Buffalograss	*Buchloe dactyloides*	Threatened	Threatened	S1	November 2001	Schedule 1
Vascular Plant	Hairy Prairie-clover*	*Dalea villosa var. villosa*	Threatened	Threatened	S1	May 2000	Schedule 1
Vascular Plant	Slender Mouse-ear-cress*	*Halimolobos virgata*	Threatened	Threatened	S1	May 2000	Schedule 1
Vascular Plant	Western Spiderwort*	*Tradescantia occidentalis*	Threatened	Threatened	S1	November 2002	Schedule 1
Vascular Plant	Large-headed Wooly Yarrow	*Achillea millefolium var. megacephalum*	Special Concern	Special Concern	S1	May 2000	Schedule 1
Vascular Plant	Athabasca Thrift	*Armeria maritima interior*	Special Concern	Special Concern	SNR	May 2002	Schedule 1
Vascular Plant	MacKenzie Hairgrass	*Deschampsia mackenzieana*	Special Concern	Special Concern	S2	November 2001	Schedule 1
Vascular Plant	Tall Woolly-heads	*Psilocarphus elatior*	Special Concern	Non-active	S1S2	April 2006	Schedule 1
Vascular Plant	Sand-dune Short-capsuled Willow	*Salix brachycarpa var. psammophila*	Special Concern	Special Concern	S2S3	May 2000	Schedule 1
Vascular Plant	Felt-leaf Willow	*Salix silicicola*	Special Concern	Special Concern	S2S3	May 2000	Schedule 1
Vascular Plant	Turnor's Willow	*Salix turnorii*	Special Concern	Special Concern	S2	May 2000	Schedule 1
Vascular Plant	Floccose Tansy	*Tanacetum huronense var. floccosum*	Special Concern	Special Concern	SNR	May 2000	Schedule 1
Vascular Plant	Smooth Goosefoot	*Chenopodium subglabrum*	Threatened	Threatened	S2	April 2006	Schedule 1
Moss	Alkaline Wing-nerved Moss	*Pterygoneurum kozlovii*	Threatened	Threatened	S1	November 2004	Schedule 1

[1] under consideration for addition to Schedule 1

[†] reintroductions planned

* identified as a provincial wild species at risk under *The Wildlife Act, 1998*