Birchcliff Biophysical Impact Assessment

Prepared for

Longview Planning & Design

June 2010

Prepared by

207 Edgebrook Close NW
Calgary, Alberta
T3A 4W5 Canada

Phone 403-241-8668
Fax 403-241-8679
Email: troy.whidden@mses.ca

List of Contributors

Project Management	Dr. Troy Whidden, P.Biol.
	Ms. Shannon Gavin, M.Sc., P.Biol.
Wildlife	Dr. Troy Whidden, P.Biol.
	Ms. Shannon Gavin, M.Sc., P.Biol.
	Ms. Abbie Stewart, M.Sc., P.Biol.
	Ms. Sarah Hechtenthal, M.Sc., P.Biol.
Vegetation	Dr. Elizabeth E. Dickson, P.Biol.

Executive Summary

Management and Solutions in Environmental Science Inc (MSES) was requested to conduct a Biophysical Impact Assessment (BIA) in support of the preparation of a proposed residential development at the Birchcliff Project site (SE 17-39-1 W5M). A reconnaissance survey (April), pellet group and browse survey (May), vegetation survey (June) and bird point count survey (June) were completed. In addition, government databases were searched to determine if any species of special management concern could potentially occur in the Project Area (PA). The objectives of the biophysical surveys were to evaluate the current environmental conditions by capturing information on wildlife presence/absence and delineating vegetation communities.

The PA is located near the southeast edge of Sylvan Lake and east of Birchcliff village. The PA is approximately 50 acres in size (SE 17-39-1 W5M) with the southeast corner located at the junction of Range Rd 14 and Range Rd 14A (immediately north of Township Rd 392. Based on historical analysis of aerial photographs, most of the area appears to have undergone prolonged mechanical or physical alteration of the soil surface. The southeast corner of the area was cleared for housing between 1950 and 1970.

Three broad vegetation communities or cover types were identified in the PA during the field site reconnaissance: deciduous forest, non-native grasslands and areas of anthropogenic disturbance (e.g. residence). Luvisol soils are common throughout the upland areas of the project area. The dominant soil type in the project area is Dark Gray Luvisol on medium textured (loam to clay loam) till.

No permanent or ephemeral wetlands, watercourse, or drainages were identified during the site reconnaissance. Some low lying areas throughout the PA may collect snowmelt for short periods of time. However, based on vegetation community characteristics, precipitation likely infiltrates the ground in these areas.

Wildlife sign noted in the area during the reconnaissance survey and pellet and browse survey included moose (*Alces alces*), deer (*Odocoileus* sp.), coyote (*Canis latrans*), red squirrels (*Sciurus vulgaris*), wood frog (*Rana sylvatica*) and small rodents. One species observed during the bird survey, the least flycatcher (*Empidonax minimus)* is listed provincially as 'Sensitive'. Least flycatchers nest in Alberta in deciduous forests and the reason for their recent population decline is currently unknown, although loss of habitat and pesticide use on their wintering grounds is the likely cause. Great horned owls (*Bubo virginianus*) and a red tailed hawk (*Buteo jamaicensis*) were observed in the area and it is

likely that both species nest within, or in close proximity to, the PA. If construction activities and vegetation clearing are anticipated during the raptor breeding season (late February to July), a nest search for these species by a Professional Biologist is recommended.

A Grassland Ecologically Significant Area (ESA) (Category 3 and 6) is located approximately 6 km southeast of the PA and represents an ESA of national significance (ACIMS 2009). The Sylvan Lake Management Plan (2000) has identified an area of Key Ungulate Habitat immediately north of the PA.

No significant or sensitive environmental features were identified within the PA. A search of the provincial Fish and Wildlife Management Information System (FWMIS) indicated that no records of any species of special management concern have been recorded within the PA. A single species of management concern was identified during the field program; the Least flycatcher is provincially listed as 'Sensitive'. To reduce potential impacts to this species, areas to be cleared should be searched for active nests prior to vegetation clearing or clearing should be scheduled to avoid bird nesting season (mid February through August 31). A search of the Alberta Conservation Information Management System (ACIMS) indicated that three rare plants were previously reported within Lacombe County and Red Deer County, but none were recorded directly within the PA. No rare plants were observed during the spring vegetation surveys (June 5 and 6, 2010). However, this does not preclude the potential for such species to occur in this area as some rare plants may appear later during the season (late summer).

TABLE OF CONTENTS

TABLE OF CONTENTS (cont)

PAGE

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 Introduction

Longview Planning + Design requested Management and Environmental Solutions in Environmental Science Inc (MSES) conduct a Biophysical Impact Assessment (BIA) in support of the preparation of a proposed residential development at the Birchcliff Project site (part of SE 17-39-1 W5M). The objectives of this BIA are to characterize current environmental conditions of the subject lands and evaluate environmentally significant or sensitive features.

2.0 Study Area Overview

2.1 Location

The Project Area (PA) is located near the southeast edge of Sylvan Lake and east of Birchcliff village (SE 17-39-1 W5M). The PA is an approximately 50 acre parcel of land with the southeast corner located at the junction of Range Rd 14 and Range Rd 14A (immediately north of Township Rd 392).

2.2 Climate

The PA is located within the Central Parkland Subregion of the Parkland Natural Region of Alberta (Natural Regions Committee 2006), and borders the Boreal Forest Natural Region. This Subregion has temperatures, precipitation, and growing conditions intermediate between the dry, warmer Northern Fescue Natural Subregion to the south and the cooler, moister Dry Mixedwood Natural Subregion to the north and west. The mean monthly maximum daily temperature for the months of June, July, and August in nearby Red Deer is 21.5 C, while the mean monthly minimum daily temperature for the months of December, January, and February is -17.4 C. The greatest amount of precipitation occurs between May and September and the mean annual precipitation for Sylvan Lake is 398.3 mm (Environment Canada Weather Office 1971-2000).

2.3 Physiographic Description

Sylvan Lake is part of the Western Alberta Plains Physiographic Region of Alberta (Natural Regions Committee 2006). The PA is located within the Central Parkland Natural Subregion of the Parkland Natural Region of Alberta (Natural Regions Committee 2006). This Subregion, which includes the PA, is characterized by hummocky uplands with undulating plains. Uncultivated areas typically contain aspen forest with a mixed understory dominated by snowberry (*Symphoricarpos sp.*), bunchberry (*Cornus canadensis*), beaked hazelnut (*Corylus cornuta*), choke cherry (*Prunus virginiana*), wild lily-of-the-

valley (*Maianthemum canadense*), and purple oat grass (*Schizachne purpurascens*); poplar forests (*Populus sp.*) with red-osier dogwood (*Cornus stolonifera*), pussy willow (*Salix discolour*), northern gooseberry (*Ribes oxyacanthoides*), green alder (*Alnus crispa*), bracted honeysuckle (*Lonicera involucrata*), tall lungwort (*mertensia paniculata*), palmate-leaved coltsfoot (*Petasites palmatus*), bishop's cap (*Mitella nuda*) and red baneberry (*Actaea rubra*); interspersed with grasslands dominated by plains rough fescue (*Festuca halli*). The Subregion is also characterized by a heavily cultivated landscape.

2.4 Methods

2.4.1 Spatial Boundaries

The PA western and northern boundaries were delineated by quarter section (SE17) boundaries (Figure 1). The PA was bounded on the eastern edge by Range Road 14 and on the southern edge by Range Road14A.

2.4.2 Information Review

Provincial and federal government databases, such as the *Species at Risk Act* (SARA) Registry and Alberta Sustainable Resource Development (ASRD) general status of wild species, were searched to identify wildlife species that are potentially at risk in Alberta that may occur near the study site. MSES also obtained a listing of species of special concern from ASRD's Fisheries and Wildlife Management Information System (FWMIS) database within and around the study site.

The Alberta Conservation Information Management System (ACIMS – formerly ANHIC) was contacted to search for records of any occurrences of rare plants within the area. ACIMS ranks species based on the number of occurrences globally and provincially and when available, other life history information.

2.4.3 Aerial Photo Interpretation

Vegetation and anthropogenic features were delineated using aerial photograph interpretation to provide an initial PA map for surveying vegetation communities and wildlife habitat. Aerial photo interpretation was performed using a high resolution (0.4 cm/pixel) digital colour image of the study area. The 2007 digital aerial photograph was obtained from Tarin Resource Services Ltd (2010). A historical analysis of the study area was also performed through aerial photograph interpretation. The aerial photographs used for the historical analysis were from 1950, 1970, 1984, 1998, and 2007 (Appendix A, Figures A-1 through A-5).


Legend
Project area boundaries
Air photo date: 05/07/2007
PROJECT
Birchcliff Residential Project
TITLE
Proposed Project Area for the Birchcliff Residential Project
N
BY
DATE
DRAWN
ZS
09/06/21
MSES PROJECT NO.
9055
SCALE
1 : 5,000
Kilometers
0 25 50 100 150
UTM Zone 11 NAD 83
MSES
FIGURE
Figure 1

2.4.4 Field Site Reconnaissance

A site reconnaissance was conducted on April 1, 2010. The purpose of the site reconnaissance was to identify wildlife habitat within the PA, to determine potential habitat linkages to adjacent lands, and to determine the more detailed field surveys necessary to adequately assess the potential environmental effects associated with the proposed development. The PA was visually inspected and dominant vegetation types and wildlife presence (birds and mammals) was noted (see section 3.2). Site pictures were taken to record dominant vegetation types and potential wildlife habitat. The presence/absence of wetland or wet areas that could represent potential amphibian breeding habitat was also noted.

2.4.5 Vegetation Survey

Rare plant and vegetation surveys within the PA were conducted on June 5 and 6, 2010, in order to classify vegetation communities and wetlands and determine the presence of rare plants. Following the guidelines of the Alberta Native Plant Council for assessing presence or absence (L. Kershaw et. al 2001), a Professional Biologist systematically searched each mapped polygon for rare plants. In addition, observations and photographs of species composition and vegetation community type were noted within each mapped polygon.

2.4.6 Mammal Pellet Group & Browse Survey

On 20 May 2010 MSES Professional Biologists conducted pellet group and browse surveys throughout the property. Pellet group surveys are effective indicators of relative animal distribution and thus habitat use within a specific area. The pellet group survey consisted of randomly placing 10 circular plots with a 5.65 m radius (100 m^2; Neff 1968) within various habitats (Figure 2). GPS coordinates were recorded at the centre of each plot. Tree, shrub and herbaceous vegetation found within plots were identified to help categorize the habitat to a broad habitat type. Several pictures were taken to record dominant vegetation types. Pellet group survey plots were distributed a minimum of 150 m from each other, preferably within a distinct habitat type and separated by natural features, such as a water body or ravine. Each plot was assumed to be an independent unit of replication to measure habitat use by wildlife. The number of pellet groups by species or species group was recorded within the circular plots. Individual deer species were identified to group level because pellet groups did not permit identification to species level. In addition, due to the difficulty in distinguishing between fisher (*Martes pennanti*) and marten (*Martes americana*) scat, the fisher/marten complex was used to identify mustelid scat observed in the PA. The number of pellet groups provided


Legend
Pellet group and browse survey plots
Project area boundaries
Air photo date: 05/07/2007
PROJECT
Birchcliff Residential Project
TITLE
Locations of Pellet Group and Browse Survey Plots
N
BY
DATE
DRAWN
ZS
09/06/22
MSES PROJECT NO.
9055
SCALE
1 : 2,500
Kilometers
0 0.01 0.02 0.04 0.06
UTM Zone 11 NAD 83
MSES
FIGURE
Figure 2

information on the relative use of each broad habitat type by each species recorded. Pellet group surveys provided information on wildlife habitat use over the winter and into the spring season.

Browse surveys measure ungulate habitat use by comparing the number of vegetation branches that are eaten to those that are untouched. Within each sample plot (100 m^2), browsed vegetation species were identified and a browse score assigned. Browse scoring was qualitative and ranged from 0 to 4 based on the following scheme:

- 0 (no browse);
- 1 (up to 10% browse);
- 2 (11 to 25% browse);
- 3 (26 to 50% browse); and
- 4 (more than 50% browse).

2.4.7 Bird Survey

Point-count surveys provide information on species abundance and bird-habitat relationships (Ralph et al. 1995). A spring songbird survey was conducted on June 19, 2010 using fixed radius point-count survey methods. A total of five point-count sites were surveyed (Figure 3). An observer stood at a randomly selected point within the PA and recorded all the birds seen or heard in all directions within 100 m of that point over a 10 minute period. Although points were often in an area of nearly homogeneous habitat, occasionally the large diameter of the survey area combined with the heterogeneous nature of the habitat meant that surveys were conducted from areas containing more than one broad habitat type. Individuals identified outside the 100 m radius were recorded as incidental observations. Surveys were conducted between approximately one half-hour to 2 hours after sunrise. Periods of high wind (above Beaufort ratings of 3) or heavy rain were avoided.


Legend
Bird survey plots
Project area boundaries
Air photo date: 05/07/2007
PROJECT
Birchcliff Residential Project
TITLE
Locations of Bird Survey Plots
N
BY
DATE
DRAWN
ZS
09/06/22
MSES PROJECT NO.
9055
SCALE
1 : 2,500
Kilometers
0 0.01 0.02 0.04 0.06
UTM Zone 11 NAD 83
MSES
FIGURE
Figure 3

3.0 Results

3.1 Background Information Review

The aerial photographs used for historical analysis of the study area were taken in 1950, 1970, 1984, 1998, and 2007 (Appendix A, Figures A-1 through A-5). The review of these photographs indicated that the clearing of the land in the study area happened sometime between 1950 and 1970. Most of the area appeared to be divided into two agricultural fields meaning that the area has undergone prolonged mechanical or physical alteration of the soil surface. The southeast corner of the area was cleared for housing between 1950 and 1970.

3.1.1 Land Use

As depicted in the aerial photographs that were accessible (Appendix A, Figures A-1 through A-5), clearing for agricultural purposes took place in the surrounding land mainly between 1950 and 1970. Shoreline development (housing) mainly occurred between 1984 and 2010.

3.2 Field Site Reconnaissance

Vegetation

Three broad vegetation communities or cover types were identified in the PA during the field site reconnaissance.

Deciduous Forest

For this assessment, deciduous forest in the PA was divided into three types: balsam poplar (*Populus balsamifera*) dominant, trembling aspen (*Populus tremuloides*) dominant and balsam poplar/trembling aspen mixed forests. In addition to these mature forests, areas of extensive aspen/poplar re-growth were noted extending into areas previously mowed or cultivated.

Non-native Grassland

Flat or gently rolling, non-forested, open areas occupy the majority of the PA. Previously cleared, cultivated and/or grazed as pasture, these areas are characterized by dense non-native grasses such as brome, bluegrass and fescue, forbs and disturbance-tolerant species such as Canada thistle (*Cirsium arvense*) and dandelion (*Taraxacum officinale*). Several isolated mature poplars and one box elder (*Acer negundo*) are found within the non-native grassland fields.

Anthropogenic Disturbance

One residence with associated buildings (e.g., garage, general farm storage building, cattle corral, small shacks) and roads occurs on the property. The residence yard has been landscaped with flowering trees and shrubs. In addition, white spruce (*Picea glauca*) and blue spruce (*Picea pungens*) have been planted adjacent to the house, along the driveway and near the boundaries of nearby forest. Weed species grow along the driveway and adjacent to buildings. Cement pipe debris is located in a field near the center of the property and loose barbed wire at its northern boundary.

Wildlife

Deer (*Odocoileus* sp.) sign (pellet groups, tracks, and browsed tree saplings) was common throughout the PA. Moose (*Alces alces)* pellet groups and an antler rub were also noted. Other mammal sign observed within the PA included coyote scat (*Canis latrans*), red squirrels (*Sciurus vulgaris*), and other unidentified small rodents (i.e. voles or field mice). A more detailed description of mammal species presence in the PA can be found in Section 3.4.1.

Several bird species were recorded during the site reconnaissance and as incidentals during the pellet group surveys including resident species such Black-capped chickadees (*Poecile atricapillus*), Blue jays (*Cyanocitta cristata*), American robins (*Turdus migratorius)*, American crows (*Corvus brachyrhynchos*), common ravens (*Corvus corax*), woodpeckers (*Picoides* sp.), grouse species and black-billed magpies (*Pica hudsonia*). Observed migratory species included white-throated sparrow (*Zonotrichia albicollis)*, clay-coloured sparrow (*Spizella pallid)*, swallows, brown-headed cowbird (*Molothrus ater*), yellow warbler (*Dendroica petechia)*, savannah sparrow (*Passerculus sandwichensis)*, least flycatcher (*Empidonax minimus)*, and red-tailed hawk (*Buteo jamaicensis)*. Field personnel did note a potential raptor nest approximately 20 m beyond the west boundary of the property and a magpie nest in the deciduous forest adjacent to the farm building and residential garage at the southern end of the PA. A more detailed evaluation of bird species presence can be found in Section 3.4.2.

Wetlands, Watercourses, and Drainages

No wetlands, watercourse, or drainages were identified during the site reconnaissance. An area that has the potential to accumulate water was noted near the center of the property; however, there was no evidence of wetland vegetation species being present.

3.3 Vegetation

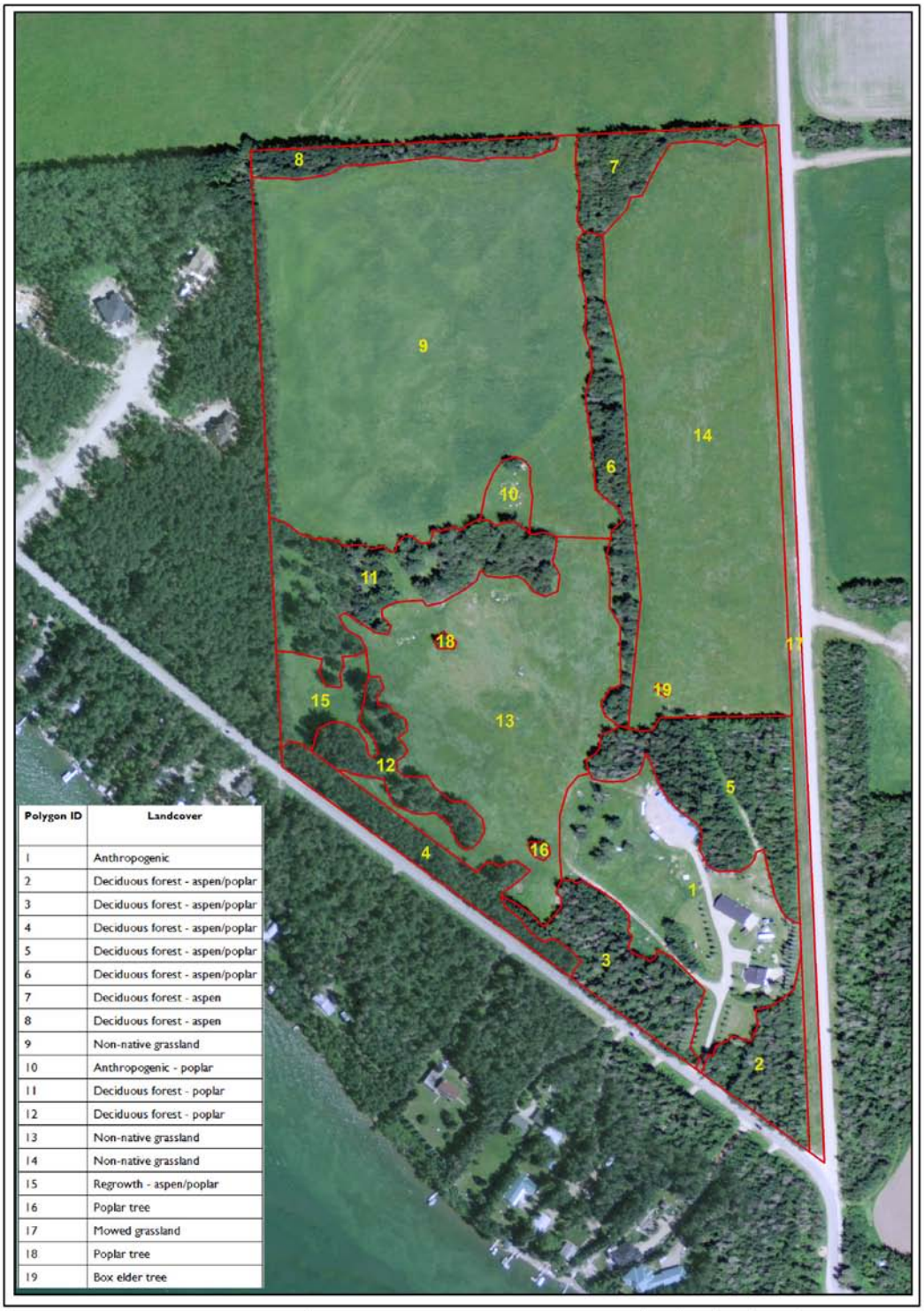
There are at least 92 rare vascular plant species that potentially could be found in the Central Parkland Subregion (Appendix B). A list of 83 plant species observed in the PA is provided in

Appendix C for each vegetation polygon mapped. Scientific names for plants follow Moss (1983). Polygon identifiers and vegetation community type are shown in Figures 4 and 5.

3.3.1 Community Descriptions

Deciduous forests

Aspen (Populus tremuloides). Mature aspen dominant groves are located at the northern end of the PA (Figure 5), polygons 7 and 8 (Figures 4 and 6). The aspen forests cover 0.7 hectares (3.5%) of the PA (Table 1). Although aspen predominates in cover, poplar (*Populus balsamifera*) is also patchily present. The moist understory of these aspen forests include an occasional choke cherry or balsam poplar tree. Shrubs include common snowberry (*Symphoricarpos albus*), northern gooseberry, swamp red current (*Ribes triste*), and saskatoon (*Amelanchier ulnifolia*). In addition to grasses (awnless brome - *Bromus inerme*; Kentucky bluegrass - *Poa pratensis*), a forb component consists of cow's parsnip (*Heracleum lanatum*), wild sarsaparilla (*Aralia nudicaulis*), Siberian yarrow (*Achillea siberica*), coltsfoot (*Petasites vitifolius*), tall blue bell (*Mertensia paniculata*), blunt-leaved sandwort (*Arenaria laterfolia*), veined peavine (*Lathyrus venosus*), alsike clover (*Trifolium hybridum*), American vetch (*Vicia americana*), marsh hedge-nettle (*Stachys palustris*), fairybells (*Diasporum trachycarpum*), wild lily-of-the-valley, star-flowered Solomon's seal (*Smilacina stellata*), common pink wintergreen (*Pyrola asarifolia*), baneberry, western meadowrue (*Thalictrum occidentalis*), veiny meadowrue (*Thalictrum venulosum*), smooth wild strawberry (*Fragaria virginiana*), silverweed (*Potentilla anserine*), prickly rose (*Rosa acicularis*), northern bedstraw (*Galium boreale*), and Canada violet (*Viola canadensis*) (Appendix C). Weeds found within the aspen forests were dandelion, shepard's purse (*Capsella bursa-pastoris*), stick weed (*Thlapsi arvense*), and common plantain (*Plantago major*). A wildlife trail transverses through these two groves.



Polygon ID	Landcover
1	Anthropogenic
2	Deciduous forest - aspen/poplar
3	Deciduous forest - aspen/poplar
4	Deciduous forest - aspen/poplar
5	Deciduous forest - aspen/poplar
6	Deciduous forest - aspen/poplar
7	Deciduous forest - aspen
8	Deciduous forest - aspen
9	Non-native grassland
10	Anthropogenic - poplar
11	Deciduous forest - poplar
12	Deciduous forest - poplar
13	Non-native grassland
14	Non-native grassland
15	Regrowth - aspen/poplar
16	Poplar tree
17	Mowed grassland
18	Poplar tree
19	Box elder tree

Legend

Vegetation polygon

Air photo date: 05/07/2007

PROJECT: Birchcliff Residential Project

TITLE: Vegetation Polygon Identifiers for the Birchcliff Project Area

N

	BY	DATE	MSES PROJECT NO.
DRAWN	ZS	09/06/21	9055

SCALE 1:2,500
Kilometers
0 0.01 0.02 0.04 0.06
UTM Zone 11 NAD 83

FIGURE: Figure 4


8
7
9
14
6
10
11
18
17
19
15
13
12
5
4
16
1
3
2
Legend
Anthropogenic
Anthropogenic - poplar
Box elder tree
Deciduous forest - aspen
Deciduous forest - aspen/poplar
Deciduous forest - poplar
Mowed grassland
Non-native grassland
Poplar tree
Regrowth - aspen/poplar
Project area boundaries
Air photo date: 05/07/2007
PROJECT
Birchcliff Residential Project
TITLE
Vegetation Community Classification for the Birchcliff Project Area
N
BY
DATE
DRAWN
ZS
09/06/21
SCALE
1 : 2,500
Kilometers
0 0.01 0.02 0.04 0.06
UTM Zone 11 NAD 83
MSES PROJECT NO.
9055
MSES
FIGURE
Figure 5

Figure 6: Aspen Forest within the Birchcliff Project Area (Polygon 8)

Poplar (Populus balsamifera). Two mature poplar dominant forests and a disturbed poplar regrowth comprise 1.6 hectares (8.1% of PA; Table 1) in the mid-western section of the PA (Figure 5), polygons 10, 11 and 12 (Figure 4) (Figure 7). The mature poplar forest understorey is similar but less diverse than the aspen forest, missing coltsfoot, blunt-leaved sandwort, marsh hedgewort, awnless brome, Canada bluegrass (*Poa compressa*), Kentucky bluegrass, common pink wintergreen, silverweed, chokecherry, and prickly rose. Three species in the poplar forest that were not present in the aspen forest were Canada thistle, three-flowered avens (*Geum triflorum*) and ground ivy (*Glecoma hederaceae*). An area, disturbed with concrete pipe sections, is found in a low drainage area in the centre of the property (polygon 10), with young poplar regrowth and snowberry predominating (Appendix C) (Figure 8).

Figure 7: Mature Poplar within the Birchcliff Project Area (Polygon 12)

Figure 8: Poplar Regrowth Disturbance within the Birchcliff Project Area (Polygon 10)

Mixed Aspen/Poplar. Mature mixed deciduous forest is found near the southern boundary of the property (polygons 2, 3, and 4), to the northern end of the built area (polygon 5), and extending nearly directly north in the centre of the PA (polygon 6) (Figures 4 and 5) (Figure 9). The total area of mixed aspen/poplar forest is 3.6 hectares or 17.8% of the PA (Table 1). The southern end of polygon 6 consists of two rows of poplar that become increasingly mixed with aspens towards the north. Its understorey is similar to the poplar and aspen forests, except for the presence of twining honeysuckle (*Lonicera dioica*), purple clematis (*Clematis occidentalis*) and being generally less species rich overall (Appendix C).

Figure 9: Poplar-Aspen Forest with Hazelnut Understorey within the Birchcliff Project Area (Polygon 3)

The mixed deciduous forest understoreys of polygons 2, 3, 4 and 5 differ significantly from the understoreys of the more open poplar and aspen forests. These four polygons' dense shrubby understorey contains beaked hazelnut, common snowberry, black gooseberry (*Ribes lacustre*), northern gooseberry, pin cherry (*Prunus pensylvanica*), choke cherry, saskatoon, prickly rose, raspberry *(Rubus ideaus*), red-osier dogwood, low bush cranberry (*Viburnum edule*) and willow. There is thick leaf litter with cow's parsnip, wild sarsaparilla, tall bluebell, bunchberry, American vetch, fairybells (, wild lily-of-the-valley, star-flowered false Solomon's seal, fireweed (*Epilobium angustifolium*),

common pink wintergreen, purple clematis, smooth wild strawberry, silverweed, dewberry (*Rubus pubescens*), sweet-scented bedstraw (*Galium triflorum*), western meadowrue, and Canada violet. Caragena, blue spruce and white spruce are found at the edges of this forest type. Young aspen/poplar regrowth dominates a southwest area (polygon 15) between two mature balsam poplar groves (Figures 4 and 5).

Non-native grasslands.

Three large fields of non-native grassland comprise 12.7 hectares (62.5%) of the PA (polygons 9, 13, and 14) (Figures 4 and 5; Table 1) (Figure 10). Although some plant species were not identified because of their stage of development in early June, the species compositions of these three fields appear generally similar to each other. At borders with deciduous forest, shoots of aspen and poplar were becoming established.

Figure 10: Non-native Grassland within the Birchcliff Project Area (Polygon 14)

Awnless brome, plains rough fescue, and Kentucky bluegrass were common to all three fields. In the two northern fields (polygon 9 and polygon 14), red fescue (*Festuca rubra*) and Canada bluegrass were seen. While, meadow brome (*Bromus biebersteinii*) and orchard grass (*Dactylis glomerata*) were noted only in polygon 9.

Various forbs, such as common yarrow (*Achillea millefolium*), veined peavine, sweet clover (*Melilotus officinalis*), alsike clover, American vetch and weeds, such as Canada thistle and dandelion were observed in all three grass fields. Dandelion flowers were prominent throughout. In polygons 9 and 13, common snowberry was noted. Observed in only one of the three grass fields were: Shepard's purse star-flowered false solomon's seal, common plantain in (polygon 9); plains wormwood (*Artemesia campestris*) in (polygon 13); long-leaved chickweed (*Stellaria longifolia*), saskatoon, woodland strawberry (*Fragaria vesca*) and smooth wild strawberry in (polygon 14) (Appendix C).

Isolated mature poplar trees exist within the non-native grasslands (polygons 10, 16, and 18) (Figures 4 and 5), surrounded by young poplar clones. A single mature box elder (polygon 19) can be found at the southern end of the eastern field (polygon 14) (Figures 4 and 5).

Anthropogenic Areas.

Buildings and roads are found on 1.6 hectares in the southeastern portion of the PA (polygon 1) (Figures 4 and 5; Table 1). Non-native and native plants have been planted near the dwelling and weedy species have established along the driveway and utility buildings (Figure 11). A mowed non-native grass lawn is established near the driveway, dwelling and associated buildings.

Figure 11: Garage and Dwelling within the Birchcliff Project Area (Polygon 1)

Table 1: Landcover Area in the Birchcliff PA

Polygon ID	Landcover	Hectares Polygon	Hectares Vegetation Community	% PA
1	Anthropogenic	1.651	1.7	8.2%
7	Deciduous forest - aspen	0.387	0.7	3.5%
8	Deciduous forest - aspen	0.316		
11	Deciduous forest - poplar	1.112	1.6	8.1%
12	Deciduous forest - poplar	0.389		
10	Anthropogenic - poplar	0.132		
2	Deciduous forest - aspen/poplar	0.451	3.6	17.8
3	Deciduous forest - aspen/poplar	0.647		
4	Deciduous forest - aspen/poplar	0.505		
5	Deciduous forest - aspen/poplar	1.062		
6	Deciduous forest - aspen/poplar	0.623		
15	Regrowth - aspen/poplar	0.309		
9	Non-native grassland	5.728	12.7	62.5%
13	Non-native grassland	2.740		
14	Non-native grassland	4.166		
16	Poplar tree	0.013		
18	Poplar tree	0.011		
19	Box elder tree	0.005		
	TOTAL PA	20.250		
17	Mowed grassland	0.667		
	TOTAL	20.917		

Cultivated plants. Mostly white and some blue spruce line the driveway, and are within the yard and at the margins of the remnant forests. The top of a large blue spruce behind the house has broken off and is lying on the ground. A lodgepole pine (*Pinus contorta*) has been planted among a row of white spruce between the dwelling and road. In the open understorey of this treed row is a single Canada buffaloberry (*Shepherdia canadensis*). Near the dwelling and garage, several flowering species have been planted including apple (*Malus* sp.), western mountain ash (*Sorbus scopulina*), choke cherry,

flowering plum (*Prunus* sp.), Nanking cherry (*Prunus tomentosa*), rose cultivar (*Rosa* sp.), lilac (*Syringia* sp.), caragena (*Caragena arborescens*), and Johnny Jump Up (*Viola tricolour*) (Appendix C),

Weeds. Several weeds were found in the highly disturbed areas of the roads and buildings, including Flodman's thistle (*Circium flodmanii*), pineapple weed (*Matricaria matricarioides*), dandelion, shepard's purse, lens-podded hoary cress (*Cardaria chalapensis*), lamb's quarters (*Chenopodium album*), oak-leaved goosefoot (*Chenopodium salinum*), and common plantain (Appendix C). Other weed species are likely to appear later in the season.

3.3.2 Rare Plants

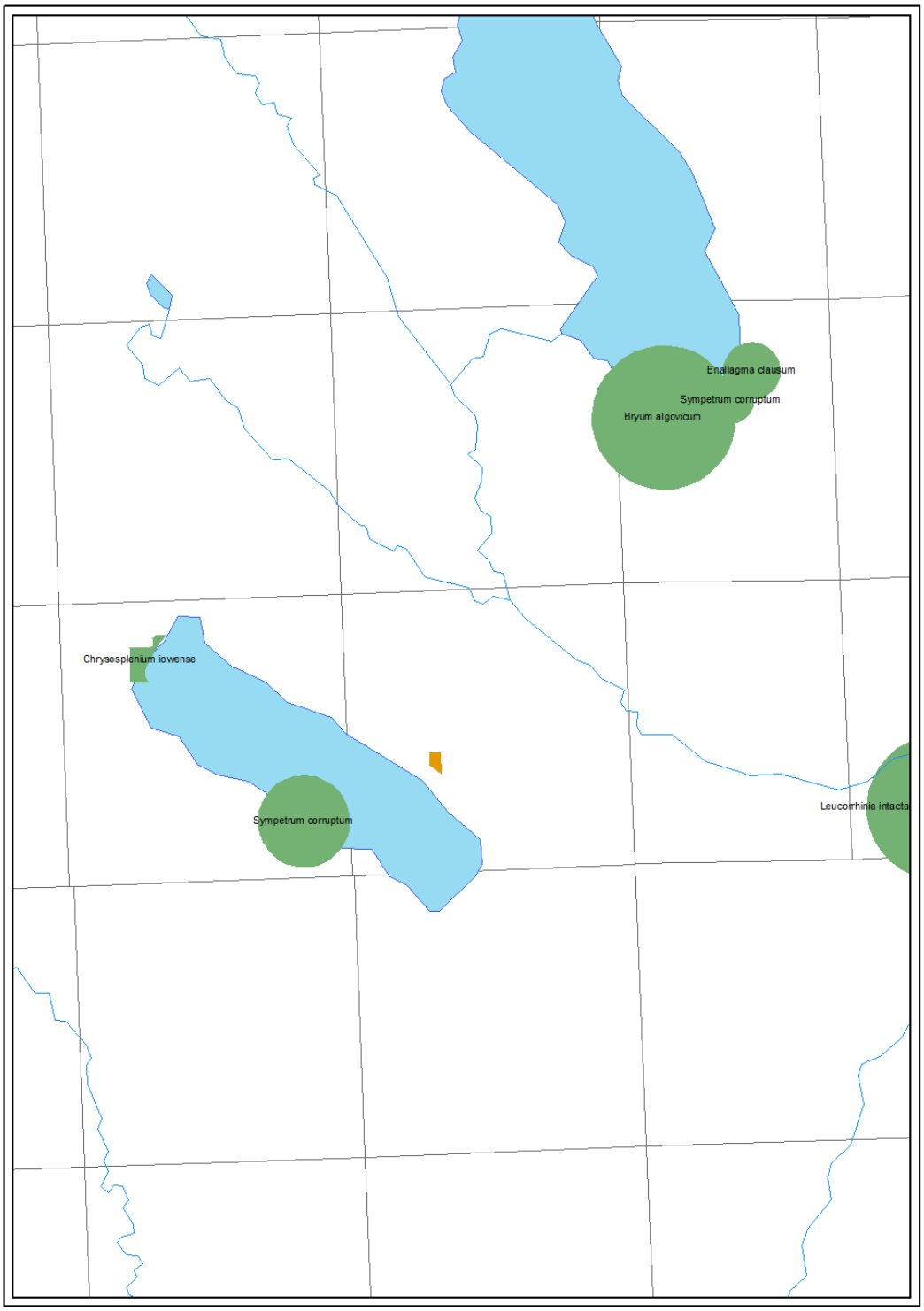
No rare plants were observed during the spring vegetation surveys (June 5 and 6, 2010). However, this does not preclude the potential for such species to occur in this area as rare plants may appear later during the season. To increase the likeliness of locating existing rare plants on the PA, additional surveys are recommended for late summer (August).

3.3.3 Rare, Threatened, and Endangered Species

Three rare plant species have previously been reported in the general area: *Chrysosplenium iowense* (Golden saxifrage, Saxifragaceae), *Bryum algovicum* (Bryum Moss), and *Muhlenbergia racemosa* (Marsh Muhly, Poaceae) (ACIMS 2010) (Figure 12).

3.4 Wildlife

There are at least 60 federally and/or provincially listed wildlife species that potentially could be found in the Central Parkland Subregion (Appendix D).



Legend
- Lakes and Rivers
- Non-Sensitive EOS
- Project area boundaries
- Townships

PROJECT: Birchcliff Residential Project

TITLE: Locations of Rare Plant Species Observations Provided By ACIMS

N

	BY	DATE	MSES PROJECT NO.
DRAWN	ZS	09/06/21	9055

SCALE 1: 125,000
Kilometers 0 0.5 1 2 3
UTM Zone 11 NAD83

FIGURE: Figure 12

3.4.1 Mammals

Deer (*Odocoileus virginianus* or *Odocoileus hemionus*), white-tailed jackrabbits (*Lepus townsednii*), foxes and coyotes are likely to be common in the PA as these species tend to use both wooded and open habitats. Other mammal species that could occur in the general area of the Project include the Canada lynx (*Lynx canadensis*) provincially listed as Sensitive (ASRD 2005), several small mammals (e.g. voles, shrews), weasels, porcupine (*Erthizon dorsatum*), American badger (*Taxidea taxis*) provincially listed as Sensitive (ASRD 2005), striped skunk (*Mephitis mephitis*), northern pocket gopher (*Thomomys talpoides*) and bats. The long-tailed weasel (*Mustela frenata*) is often found in open country throughout the parkland natural region (Government of Alberta 2009a); it is provincially listed as May Be At Risk due to habitat loss and fragmentation (ASRD 2005).

The pellet group survey found moose (10 pellet groups/ha) and deer (500 pellet groups/ha) presence within the PA. Moose pellet groups were found within deciduous habitat while deer pellet groups were found within all habitat types. A moose and white-tailed deer were observed on the property during the bird survey. Other incidental wildlife observations included ungulate antler rubs and canid scat. Ungulate browse on shrubs in the understory of the forest stands showed the highest browse score for beaked hazelnut, rose, ribes, and tree saplings; followed by pin cherry, dogwood, raspberry, and snowberry. Deer are often generalist foragers while moose usually prefer to forage on willow species, red-osier dogwood and Saskatoon (Poole and Stuart-Smith 2005).

3.4.2 Birds

The PA could support a number of bird species that are common to this Natural Region, including species that use aspen/shrub dominated habitats as well as open fields. Several species of woodpecker may use the wooded habitats in the PA year-round. Northern flickers (*Colaptes auratus*) and yellow-bellied sapsuckers (*Sphyrapicus varius*) may also be common in these habitats in the spring and summer months. Resident passerine species include Black-billed magpies, Black-capped chickadees, and Blue jays. Migratory species include Least flycatcher and Baltimore oriole (*Icterus galbula*) – both listed as Sensitive in Alberta (ASRD 2005), Red-eyed vireo (*Vireo olivaceus*), Tree swallows (*Tachycineta bicolor*), House wrens (*Troglodytes aedon*), and several warbler and sparrow species. In terms of raptors, both *Buteo* and *Accipter* hawk species may use the PA. Swainson's hawks (*Buteo swainsoni*) are listed as Sensitive in Alberta (ASRD 2005). Several owl species may also be present in the PA such as the Great horned owl (*Bubo virginianus*) and Long eared owl (*Asio otus*); neither of these species is listed in Alberta.

Seventeen bird species were recorded during the point-count survey (Table 2). Of the species recorded during the surveys, all are passerines with the exception of two woodpecker species (Downy woodpecker and Northern flicker) and one raptor species (Red-tailed hawk). One of the passerine species observed is listed provincially as Sensitive (least flycatcher), but none are listed federally. Least flycatchers nest in Alberta in deciduous forests and the reason for their recent population decline is currently unknown, although loss of habitat and pesticide use on their wintering grounds is likely.

Table 2: Spring Point Count Survey Results

Species	Scientific Name
American crow	*Corvus brachyrhynchos*
American robin	*Turdus migratorius*
Black-capped chickadee	*Poecile atricapillus*
Cedar waxwing	*Bombycilla cedrorum*
Clay-coloured sparrow	*Spizella pallid*
Downy woodpecker	*Picoides pubescens*
House wren	*Troglodytes aedon*
Least flycatcher*	*Empidonax minimus*
Northern flicker	*Colaptes auratus*
Orange-crowned warbler	*Vermivora celata*
Red-tailed hawk	*Buteo jamaicensis*
Savannah sparrow	*Passerculus sandwichensis*
Song sparrow	*Melospiza melodia*
Vireo species	*Vireo spp.*
White-crowned sparrow	*Zonotrichia leucophrys*
White-throated sparrow	*Zonotrichia albicollis*
Yellow warbler	*Dendroica petechia*
Incidental Species Recorded during Point Counts	
Great horned owl	*Bubo virginianus*
Townsend's solitaire	*Myadestes townsendi*
Tree swallow	*Tachycineta bicolor*

*Indicates provincially listed species (ASRD 2005)

Three additional species were noted as incidental observations during the surveys (Table 2), including one raptor species (great horned owl). None of these species are listed federally or provincially. One adult and three juvenile (2-3 month old young-of-year) owls were observed in the stand of deciduous

trees behind the farm buildings. The observed presence of both adult and juvenile great horned owls indicates the likely presence of a nest in, or in close proximity to, the PA. Great horned owls are commonly found year round throughout Alberta in mixedwood forests, agricultural areas, shrublands and riparian woodlands. Great horned owls often use abandoned nests in wooded areas or they may also nest along ledges of cliffs. Eggs are laid in late February and early March which is earlier than most other owls. The presence of stick nests (observed during reconnaissance surveys) on the property also indicates possible use of the Project area for nesting.

It is likely that both the great horned owls and red tailed hawks observed during the surveys nest within, or in close proximity to, the PA. If construction activities and vegetation clearing are anticipated during the raptor breeding season (late February to July), a pre-construction nest search for these species by a Professional Biologist is recommended. If a raptor nest is located during construction, the appropriate Alberta Fish and Wildlife should be notified and a 1000 m disturbance buffer should be respected until young have fledged from the nest, or until otherwise instructed by authorities.

3.4.3 Amphibians

Potential amphibian species that could occur in the PA include boreal chorus frogs (*Pseudacris maculate*), wood frogs (*Rana sylvatica*), western toads (*Bufo boreas*), Canadian toads (*Bufo* hemiophrys), northern leopard frogs (*Rana pipiens)*, and tiger salamanders (*Ambystoma tigrinum*). All are listed provincially as secure except for the western toad listed as Sensitive, the northern leopard frog listed as At Risk, and the Canadian toad listed as May be at Risk (ASRD 2005). Both the western toad and northern leopard frog are Special Concern and listed as Schedule 1 under SARA (Government of Canada 2007). Two reptiles, the red-sided garter snake (*Thamnophis sirtalis*) and wandering garter snake (*Thamnophis elegans*) could potentially occur within the PA and may be found in habitat near ponds, lakes, marshes and streams (Russell and Bauer 2000). Both of these snake species are listed as Sensitive by ASRD.

An incidental observation of a single wood frog was noted in the PA. No permanent wetlands were apparent in the PA.

3.4.4 Rare, Threatened, and Endangered Species

FWMIS (FWMIS 2010) was queried for the PA however no records of any species of special management concern have been recorded for the area (Pers. Comm. Russell 2010). One bird species listed as Sensitive (ASRD 2005) was observed during the field program: least flycatcher.

3.4.5 Habitat Connectivity

The PA falls within a heavily cultivated landscape with residual patches of vegetation serving as habitat refuges and linkages for wildlife species in the area. The fragmented forest patches evident throughout the region from airphoto interpretation are often connected via shelter belts, forested road allowances, riparian buffers and other remaining or planted patches of forest.

The clearing of habitat for the Project could lead to increased fragmentation of habitat in the landscape. Wildlife require habitat patches large enough to maintain their life history requirements but increasing development can isolate or reduce the size of these patches, fragmenting the landscape. Habitat corridors connecting more continuous habitat patches are important in maintaining wildlife movement through the landscape. The PA falls immediately south of an environmentally significant area (Key Ungulate Habitat), as identified in the Sylvan Lake Management Plan (Lacombe County & Red Deer County 2000) (see Section 3.8). The forested patches on the property may function as habitat linkages to this Key Ungulate Habitat.

3.5 Wetlands, Watercourses, and Drainages

No wetlands or watercourses were observed in the PA. Drainage from the northeast corner of the PA is associated with aspen forest (Polygon 7) and aspen/poplar forest (Polygon 6). Drainage from the middle of the property to the west is associated with a disturbed site (Polygon 10) and poplar forest (Polygon 11).

3.6 Hydrology

3.6.1 Permanent Watercourse or Waterbodies

No permanent wetlands, watercourses, or drainages were identified within the PA.

3.6.2 Ephemeral Watercourse

No ephemeral watercourses were identified in the PA. Some low lying areas throughout the PA may collect snowmelt for short periods of time. However, based on vegetation characteristics (non-wetland species), precipitation likely infiltrates the ground in these areas.

3.6.3 Groundwater

According to Regional Groundwater Assessments for Lacombe County (Hydrogeological Consultants Ltd 2001) and Red Deer County (Hydrogeological Consultants Ltd 2005), apparent yields for water wells completed in sand and gravel aquifers on the eastern edge of Sylvan Lake range from 0 – 100 m^3/day. Along the northern edge of Sylvan Lake, apparent yields range from 100 - 500 m^3/day and along the western edge, apparent yields are generally greater than 100 m^3/day.

3.7 Soil

Based on the Agricultural Region of Alberta Soil Inventory Database (AGRASID), Luvisol soils are common throughout the upland areas of the project area. Soils of the Luvisolic order generally have light-colored, eluvial horizons and have illuvial B horizons in which silicate clay has accumulated. These soils develop characteristically in well- to imperfectly-drained sites, in sandy loam to clay, base-saturated parent materials under forest vegetation in subhumid to humid, mild to very cold climates (Soil Classification Working Group, 1998).

The dominant soil type in the project area is Dark Gray Luvisol on medium textured (loam to clay loam) till (AAF 2005). The soils may include soils that are not strongly contrasting from the dominant or co-dominant soils. Dark Gray Luvisol soils have Ah or Ahe horizon with ≥5 cm in thickness (Soil Classification Working Group. 1998). These horizons generally have eluvial features, such as gray streaks or splotches when dry, or platy structure (Soil Classification Working Group. 1998). Dark Gray Luvisols have a mean annual soil temperature less than 8°C (Soil Classification Working Group. 1998).

3.8 Environmentally Significant/Sensitive Areas

Environmental Significant/Sensitive Areas (ESA) were searched using ACIMS's update of the 1997/1998 ESA of Alberta data and maps (ACIMS 2009). ESAs represent areas that are important in maintaining biological diversity and natural environmental processes. They often contain rare or unique elements/species or those that require special conservation management. ESAs may or may

not fall within government policy for legal protection but they can certainly be useful as an important tool in designing land use planning.

A Grassland ESA (Category 3 and 6) is located approximately 6 km SE of the PA and represents an ESA of national significance. The criteria for ESA designation includes this area containing habitat for focal species (Category 3) and containing large natural areas (Category 6). Potential elements of conservation concern falling within this area include the ferruginous hawk and western burrowing owl (Government of Alberta 2009).

The Sylvan Lake Management Plan (Lacombe County & Red Deer Country 2000) has identified an environmentally significant area immediately north of the PA. Specifically, this area has been identified as Key Ungulate Habitat. Policy directions outlined within the Sylvan Lake Management Plan state that "*development on or adjacent to lands that are identified as being environmentally sensitive shall be restricted to uses which are compatible with the environmental conditions….*".

4.0 Reserve Designation

The role of the municipal government and guidelines for proposed developments are outlined in the Municipal Government Act 1998 (Government of Alberta 1998) and the Lacombe County Municipal Development Plan 2010 (Armin A. Preiksaitis & Associated Ltd. 2010), including criteria for the conservation of sensitive environmental features.

No environmentally sensitive or significant areas were identified within the PA. Therefore, based on the biophysical features found within the PA, no lands are recommended to be designated as Environmental Reserves or Easements, Municipal Reserves, or Conservation Easements.

5.0 Conclusions

This BIA was conducted to provide a general description of the environmental setting in the PA. The subject lands consist primarily of non-native grassland with some patches of deciduous forest throughout the PA. No significant or sensitive environmental features were identified within the PA. A single species of management concern was identified during the field program; the least flycatcher is provincially listed as Sensitive (ASRD 2005). To reduce potential impacts to this species, areas to be cleared should be searched for active nests prior to vegetation clearing or clearing should be scheduled to avoid bird nesting season (mid February through August 31). Overall, based on the biophysical features found within the PA, no lands are recommended to be designated as Environmental Reserves or Easements, Municipal Reserves, or Conservation Easements.

6.0 Closure

We trust that the preliminary information contained within this report satisfies your requirements. Should you have any questions, please do not hesitate to contact me at 403-998-2013.

Respectfully,

Troy Whidden, Ph.D., P.Biol.

7.0 Literature Cited

Alberta Agriculture and Food (AAF). 2005. Agricultural Region of Alberta Soil Inventory Database. Accessed: June 16, 2010. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/sag10372.

ACIMS (Alberta Conservation Information Management System). 2009. Environmental Significant Areas. http://tpr.alberta.ca/parks/heritageinfocentre/environsigareas/default.aspx. Updated Sept. 1, 2009. Accessed on June 2010.

ACIMS (Alberta Conservation Information Management System). 2010. Element Occurrence Data. 2010. Alberta Community Development, Edmonton, AB.

Armin A. Preiksaitis & Associated Ltd. 2010. Update: Lacombe County Municipal Development Plan: Setting Directions and Making Choices Together. Prepared for Lacombe County August 28, 2007; Updated January 14, 2010.

ASRD (Alberta Sustainable Resource Development). 2005. The 2005 General Status of Alberta Wild Species. http://www.srd.gov.ab.ca/fishwildlife/wildspecies/search.htm. Last updated: 07-01-26. Accessed 2010-06-15.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2008. COSEWIC Species Database. http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Last updated: 2008-03-03. Accessed 2008-08-06.

Environment Canada Weather Office, Canadian Climate Normals 1971-2000. http://www.climate.weatheroffice.gc.ca

Fish and Wildlife Management Information System (FWMIS). 2010. Alberta Sustainable Resource Development. Edmonton, AB. May 2010.

Government of Alberta. 1998. Municipal Government Act. Accessed online June 22, 2010: http://www.gov.ns.ca/legislature/legc/bills/57th_1st/3rd_read/b047(1).htm.

Government of Alberta. 2009. Tourism, Parks and Recreation: Environmentally Significant Areas. http://www.tpr.alberta.ca/parks/heritageinfocentre/environsigareas/default.aspx. Last updated: 2009-09-01. Accessed 2009-06-22.

Hydrogeological Consultants Ltd. 2001. Lacombe County Regional Groundwater Assessment. Part of the Red Deer River Basin Tp 038 to 041, R21 to 28, W4M & Tp 0.368 to 041, R 01 to 04, W5M. Prepared for Lacombe County. In conjunction with: Agriculture and Agri-Food Canada and Prairie Farm Rehabilitation Administration. January 2001. File No. 00-174.

Hydrogeological Consultants Ltd. 2005. Red Deer County Regional Groundwater Assessment. Part of the Red Deer River Basin Tp 034 to 039, R 21 to 28, W4M and Tp 034 to 039, R 01 to 04, W5M. Prepared for Red Deer County. In conjunction with: Agriculture and Agri-Food Canada and Prairie Farm Rehabilitation Administration. May 2005. File No. 03-186.

Kershaw, L., J. Gould, D. Johnson, and J. Lancaster. 2001. Rare Vascular Plants of Alberta. The University of Alberta Press and The Canadian Forest Service, Edmonton, Alberta.

Lacombe County, Red Deer County. 2000. Sylvan Lake Management Plan. Updated 2000. Accessed June 15, 2010: http://www.lacombecounty.com/index.php?option=com_content&view=article&id=125:sylvan-lake-management-plan-2000-update&catid=171&Itemid=254

Moss, E. H. 1983. The Flora of Alberta, 2nd Edition revised by J. G. Packer. University of Toronto Press, Toronto, Ontario.

Poole, K. and K. Stuart-Smith. 2005. Fine-scale winter habitat selection by moose in interior montane forests. Alces 41:1-8.

Ralph, C. J., J.R. Sauer and S. Droege. 1995. Monitoring Bird Populations by Point Counts. United States Department of Agriculture, Forest Service, Pacific Southwest Research Station.

SARA (Species at Risk Act). 2007. Species at Risk Public Registry. http://www.sararegistry.gc.ca/default_e.cfm. Last updated: 2007-11-14. Accessed: 2010-06-15.

Soil Classification Working Group. 1998. The Canadian System of Soil Classification, 3rd ed. Agriculture and Agri-Food Canada Publication 1646, 187 pp. http://sis2.agr.gc.ca/cansis/publications/manuals/1998-1646-ed3/intro.html. Accessed on June 16, 2010.

Tarin Resource Services Ltd. 2010. Aerial Surveys. http://www.tarin.ca/. Accessed May 2010.

Appendix A

Figure A-1: Historical Air Photograph: 1950

Figure A-2: Historical Air Photograph: 1970

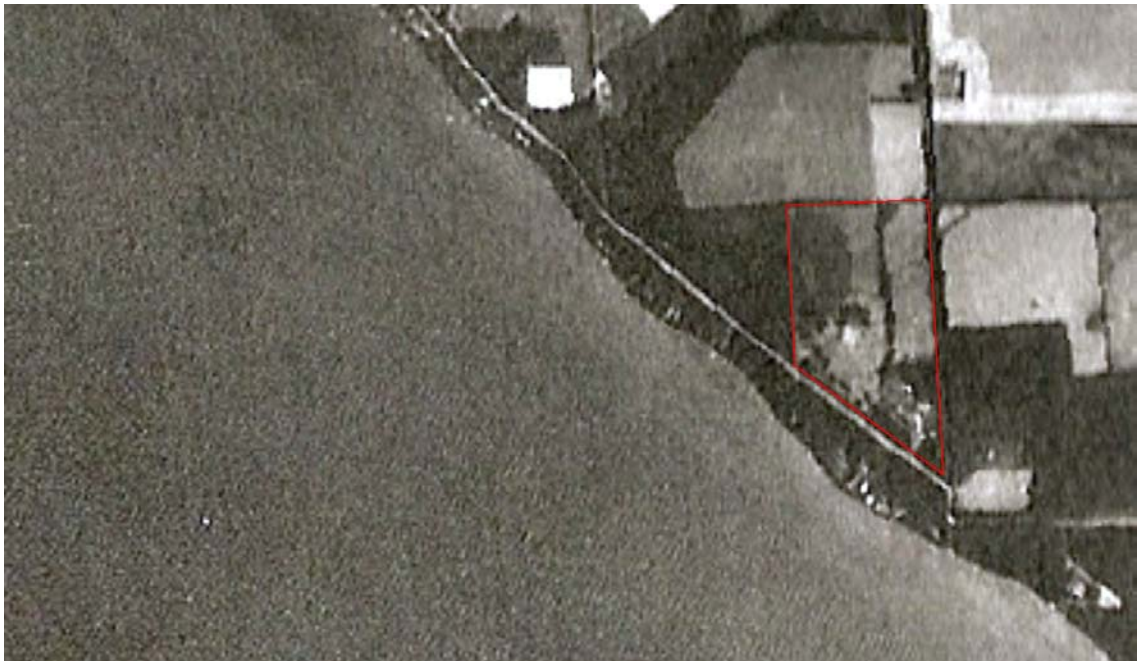


Figure A-3: Historical Air Photograph: 1984

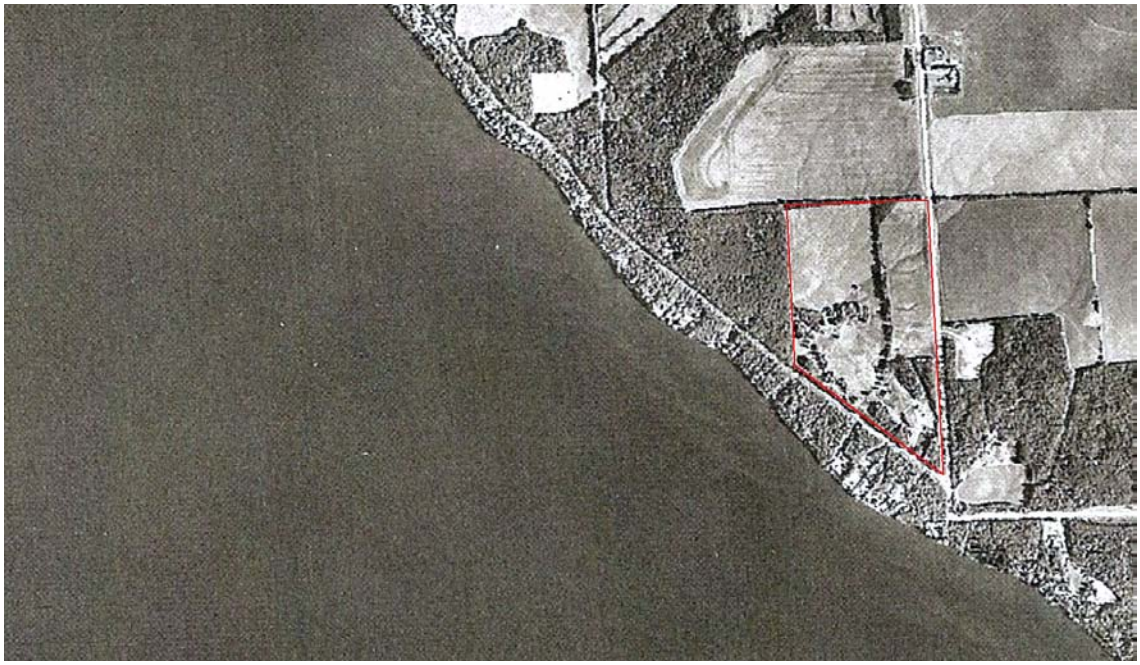


Figure A-4: Historical Air Photograph: 1988

Figure A-5: Historical Air Photograph: 2007

Appendix B

Table B-1: Rare Vascular Plant Species Reported in the Parkland Natural Region (Kershaw et. al 2001)

Plant Type	Family	Species Name	Common Name
Forb	Apiaceae	*Osmorhiza longistylis*	smooth sweet cicely
Forb	Asclepiadaceae	*Asclepias ovalifolia*	low milkweed
Forb	Asteraceae	*Artemisia tilesii*	Herriot's sagewort
Forb	Asteraceae	*Aster eatonii*	Eaton's aster
Forb	Asteraceae	*Aster pauciflorus*	few-flowered aster
Forb	Asteraceae	*Aster umbellatus*	flat-topped white aster
Forb	Asteraceae	*Crepis atribarba*	hawk's-beard
Forb	Asteraceae	*Erigeron flagellaris*	creeping fleabane
Forb	Asteraceae	*Gnaphalium microcephalum*	common cudweed
Forb	Asteraceae	*Hieracium cynoglossoides*	woolly hawkweed
Forb	Asteraceae	*Nothocalais cuspidata*	prairie false dandelion
Forb	Asteraceae	*Prenanthes sagittata*	purple rattlesnakeroot
Forb	Asteraceae	*Shinneroseris rostrata*	annual skeletonweed
Forb	Boraginaceae	*Cynoglossum virginianum var boreale*	wild comfrey
Forb	Boraginaceae	*Mertensia lanceolata*	lance-leaved lungwort
Forb	Boraginaceae	*Onosmodium molle*	western false gromwell
Forb	Brassicaceae	*Barbarea orthoceras*	American winter cress
Forb	Caryophyllaceae	*Spergularia salina*	salt-marsh sand spurry
Forb	Chenopodiaceae	*Chenopodium atrovirens*	goosefoot
Forb	Chenopodiaceae	*Chenopodium leptophyllum*	narrow-leaved goosefoot
Graminoid	Cyperaceae	*Bolboschoenus fluviatilis*	river bulrush
Graminoid	Cyperaceae	*Carex adusta*	browned sedge
Graminoid	Cyperaceae	*Carex aperta*	open sedge
Graminoid	Cyperaceae	*Carex crawei*	Crawe's sedge
Graminoid	Cyperaceae	*Carex nebrascensis*	Nebraska sedge
Graminoid	Cyperaceae	*Carex parryana*	Parry's sedge
Graminoid	Cyperaceae	*Carex retrorsa*	turned sedge
Graminoid	Cyperaceae	*Carex tonsa*	bald sedge
Graminoid	Cyperaceae	*Carex vesicaria*	blister sedge
Graminoid	Cyperaceae	*Cyperus schweinitzii*	sand nut-grass

Graminoid	Cyperaceae	*Eleocharis elliptica*	slender spike rush
Graminoid	Cyperaceae	*Rhynchospora capillacea*	slender beak-rush
Forb	Droseraceae	*Drosera anglica*	oblong-leaved sundew
Forb	Droseraceae	*Drosera linearis*	slender-leaved sundew
Forb	Fabaceae	*Psoralea argophylla*	silverleaf psoralea
Forb	Gentianaceae	*Gentiana fremontii*	marsh gentian
Forb	Gentianaceae	*Lomatogonium rotatum*	marsh felwort
Forb	Geraniaceae	*Geranium carolinianum*	Carolina wild geranium
Forb	Hydrophyllaceae	*Ellisia nyctelea*	waterpod
Forb	Hydrophyllaceae	*Nemophila breviflora*	small baby-blue-eyes
Forb	Hydrophyllaceae	*Phacelia linearis*	linear-leaved scorpionweed
Forb	Iridaceae	*Iris missouriensis*	western blue flag
Forb	Iridaceae	*Sisyrinchium septentrionale*	pale blue-eyed grass
Graminoid	Juncaceae	*Juncus confusus*	few-flowered rush
Forb	Lamiaceae	*Lycopus americanus*	American water-horehound
Forb	Lamiaceae	*Physostegia ledinghamii*	false dragonhead
Forb	Liliaceae	*Camassia quamash*	blue camas
Forb	Malvaceae	*Iliamna rivularis*	mountain hollyhock
Forb	Monotrooaceae	*Pterospora andromedea*	pine-drops
Shrub	Onagraceae	*Calylophus serrulatus*	shrubby evening-primrose
Forb	Onagraceae	*Oenothera flava*	low yellow evening-primrose
Fern/Allies	Ophioglossaceae	*Botrychium campestre*	field grape fern
Fern/Allies	Ophioglossaceae	*Botrychium multifidum*	many-leaved grape fern
Fern/Allies	Ophioglossaceae	*Botrychium spathulatum*	spatula-leaved grape fern
Forb	Orchidaceae	*Cypripedium montanum*	mountain lady's-slipper
Forb	Orchidaceae	*Malaxis monophylla*	white adder's-mouth
Forb	Orchidaceae	*Malaxis paludosa*	bog adder's-mouth
Forb	Orobanchaceae	*Orobanche ludoviciana*	Louisiana broom-rape
Graminoid	Poaceae	*Agrostis exarata*	spike redtop
Graminoid	Poaceae	*Alopecurus alpinus*	alpine foxtail
Graminoid	Poaceae	*Danthonia californica*	California oat grass
Graminoid	Poaceae	*Danthonia spicata*	poverty oat grass
Forb	Poaceae	*Melica smithii*	melic grass
Forb	Poaceae	*Melica spectabilis*	onion grass

Graminoid	Poaceae	Muhlenbergia asperifolia	scratch grass
Graminoid	Poaceae	Munroa squarrosa	false buffalo grass
Graminoid	Poaceae	Oryzopsis micrantha	little-seed rice grass
Graminoid	Poaceae	Panicum leibergii	Leiberg's millet
Graminoid	Poaceae	Panicum wilcoxianum	sand millet
Graminoid	Poaceae	Poa nervosa	Wheeler's bluegrass
Graminoid	Poaceae	Sphenopholis obtusata	prairie wedge grass
Graminoid	Poaceae	Torreyochloa pallida	false mannagrass
Graminoid	Poaceae	Trisetum cernuum	nodding trisetum
Graminoid	Poaceae	Trisetum wolfii	awnless trisetum
Forb	Polygonaceae	Polygonum minimum	least knotweed
Forb	Portulacaceae	Montia linearis	linear-leaved montia
Forb	Potamogetonaceae	Potamogeton natans	floating-leaf pondweed
Forb	Potamogetonaceae	Potamogeton praelongus	white-stem pondweed
Forb	Primulaceae	Lysimachia hybrida	lance-leaved loosestrife
Fern/Allies	Pteridiaceae	Pellaea glabella	smooth cliff brake
Forb	Ranunculaceae	Ranunculus uncinatus	hairy buttercup
Forb	Rosaceae	Potentilla finitima	sandhills cinquefoil
Forb	Rosaceae	Potentilla plattensis	low cinquefoil
Forb	Rubiaceae	Hedyotis longifolia	long-leaved bluets
Forb	Ruppiaceae	Ruppia cirrhosa	widgeon-grass
Forb	Saxifragaceae	Conimitella williamsii	conimitella
Forb	Saxifragaceae	Lithophragma parviflorum	small-flowered rockstar
Forb	Scrophulariaceae	Castilleja lutescens	stiff yellow paintbrush
Forb	Scrophulariaceae	Gratiola neglecta	clammy hedge-hyssop
Forb	Scrophulariaceae	Nuttallanthus canadensis	field toad-flax
Forb	Scrophulariaceae	Veronica serpyllifolia	thyme-leaved speedwell
Forb	Violaceae	Viola pedatifida	crowfoot violet

Appendix C

Table C-1: Plant Species Observed on the Birchcliff Project Area

Plant Family	Scientific Name	Common Name	Polygon Type1														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
			AN	AP	AP	AP	AP	AP	A	A	G	P	P	P	G	G	YAP
Aceraceae	*Acer negundo*	box elder		1												1	
Apiaceae	*Heracleum lanatum*	cow's parsnip		1	1	1	1	1		1			1				
Araliaceae	*Aralia nudicaulis*	wild sarsapirilla		1	1	1	1			1				1			
Asteraceae	*Achillea millefolium*	common yarrow	1						1	1	1	1	1	1	1	1	1
Asteraceae	*Achillea siberica*	Siberian yarrow											1	1			
Asteraceae	*Artemesia campestris*	plains wormwood													1		
Asteraceae	*Circium arvense*	Canada thistle									1		1	1	1	1	
Asteraceae	*Circium flodmanii*	Flodman's thistle	1														
Asteraceae	*Matricaria matricarioides*	pineapple weed	1														
Asteraceae	*Petasites vitifolius*	coltsfoot								1							
Asteraceae	*Taraxacum officinale*	dandelion	1		1		1	1	1	1	1	1	1	1	1	1	
Betulaceae	*Corylus cornuta*	beaked hazelnut	1	1	1	1	1										
Boraginaceae	*Mertensia*	tall bluebell		1	1	1	1	1		1			1	1			

	paniculata																
Brassicaceae	*Capsella bursa-pastoris*	shepard's purse	I								I						
Brassicaceae	*Cardaria chalapensis*	lens-podded hoary cress	I														
Brassicaceae	*Lepidium densiflorum*	common peppergrass	I														
Brassicaceae	*Thlapsi arvense*	stink weed							I								
Caprifoliaceae	*Lonicera dioica*	twining honeysuckle					I	I									
Caprifoliaceae	*Symphoricarpos albus*	common snowberry	I	I	I	I	I	I	I	I	I	I	I	I	I		I
Caprifoliaceae	*Viburnum edule*	low bush cranberry		I	I	I	I										
Caryophyllaceae	*Arenaria laterfolia*	blunt-leaved sandwort								I							
Caryophyllaceae	*Stellaria longifolia*	long-leaved chickweed														I	
Chenopodiaceae	*Chenopodium album*	lamb's quarters	I														
Chenopodiaceae	*Chenopodium salinum*	oak-leaved goosefoot	I														
Cornaceae	*Cornus canadensis*	bunchberry		I			I										
Cornaceae	*Cornus stolonifera*	red-osier dogwood		I	I	I	I										
Elaeagnaceae	*Shepherdia canadensis*	Canada buffaloberry	I														

Equisetaceae	*Equisetum arvense*	common horsetail	I														
Fabaceae	*Caragena arborescens*	caragena	I		I												
Fabaceae	*Lathyrus venosus*	veined peavine								I	I		I	I	I	I	
Fabaceae	*Melilotus officinalis*	sweet clover									I				I	I	
Fabaceae	*Trifolium hybridum*	alsike clover	I							I	I		I		I	I	
Fabaceae	*Vicia americana*	american vetch	I			I	I	I		I	I		I	I	I	I	
Fumariaceae	*Corydalis aurea*	golden corydalis											I				
Grossulariaceae	*Ribes lacustre*	black gooseberry		I	I	I											
Grossulariaceae	*Ribes oxycanthoides*	northern gooseberry	I				I	I		I			I	I			
Grossulariaceae	*Ribes triste*	swamp red current								I							
Lamiaceae	*Glecoma hederacea*	ground ivy												I			
Lamiaceae	*Stachys palustris*	marsh hedge-nettle							I								
Liliaceae	*Diasporum trachycarpum*	fairybells		I						I							
Liliaceae	*Maianthemum canadense*	wild lily-of-the-valley		I	I	I	I		I	I			I				

Liliaceae	*Smilacina stellata*	star-flowered false solomon's seal	I	I	I		I	I	I	I	I		I	I			
Oleaceae	*Syringa sp.*	lilac	I														
Onagraceae	*Epilobium angustifolium*	fireweed	I	I	I		I										
Pinaceae	*Picea glauca*	white spruce	I		I		I										
Pinaceae	*Picea pungens*	blue spruce	I		I		I										
Pinaceae	*Pinus contorta*	lodgepole pine	I														
Plantaginaceae	*Plantago major*	common plantain	I							I	I		I	I			
Poaceae	*Bromus biebersteinii*	meadow brome									I						
Poaceae	*Bromus inermis*	awnless brome								I	I				I	I	
Poaceae	*Dactylis glomerata*	orchard grass									I						
Poaceae	*Festuca hallii*	plains rough fescue									I				I	I	
Poaceae	*Festuca rubra*	red fescue									I					I	
Poaceae	*Poa compressa*	Canada bluegrass									I					I	
Poaceae	*Poa pratensis*	Kentucky bluegrass								I	I				I	I	

Pyrolaceae	*Pyrola asarifolia*	common pink wintergreen		I			I			I							
Ranunculaceae	*Actaea rubra*	baneberry								I							
Ranunculaceae	*Clematis occidentalis*	purple clematis		I	I	I	I	I									
Ranunculaceae	*Thalictrum occidentalis*	western meadowrue		I	I	I	I			I			I				
Ranunculaceae	*Thalictrum venulosum*	veiny meadowrue						I		I				I			
Rosaceae	*Amelanchier alnifolia*	saskatoon	I	I	I	I	I	I		I				I		I	
Rosaceae	*Fragaria vesca*	woodland strawberry														I	
Rosaceae	*Fragaria virginiana*	smooth wild strawberry	I		I	I	I	I	I	I			I	I		I	
Rosaceae	*Geum triflorum*	three-flowered avens											I				
Rosaceae	*Malus sp.*	crabapple	I														
Rosaceae	*Potentilla anserina*	silverweed			I	I				I							
Rosaceae	*Prunus pensylvanica*	pin cherry		I			I										
Rosaceae	*Prunus sp.*	flowering cherry	I														
Rosaceae	*Prunus tomentosa*	Nanking cherry	I														

Rosaceae	*Prunus virginiana*	choke cherry	I	I	I	I	I	I	I	I							
Rosaceae	*Rosa acicularis*	prickly rose	I	I	I	I	I		I	I	I						
Rosaceae	*Rosa sp.*	rose	I														
Rosaceae	*Rubus ideaus*	raspberry		I	I		I										
Rosaceae	*Rubus pubescens*	dewberry		I		I											
Rosaceae	*Sorbus scopulina*	western mountain ash	I														
Rubiaceae	*Galium boreale*	northern bedstraw	I	I	I		I	I	I	I			I	I	I		
Rubiaceae	*Galium triflorum*	sweet-scented bedstraw					I										
Salicaceae	*Populus balsamifera*	balsam poplar		I	I	I	I	I		I	I	I	I	I	I		I
Salicaceae	*Populus tremuloides*	quaking aspen	I	I	I		I	I	I	I	I		I	I	I	I	I
Salicaceae	*Salix sp.*	willow		I	I	I											
Urticaceae	*Urtica dioca*	stinging nettle						I	I				I				
Violaceae	*Viola canadensis*	Canada violet		I	I	I	I	I	I	I			I	I			
Violaceae	*Viola tricolor*	Johnny Jump Up	I														
1: AN = Anthropogenic; A = Aspen forest; P = Poplar forest; AP = Aspen/Poplar forest; YAP = Young Aspen/Poplar growth; G = Non-native grassland																	


MSES
Management and Solutions in Environmental Science

Appendix D

Table D-1: Listed Wildlife Species Potentially Occurring in the vicinity of the Project Area

Species	Scientific Name	COSEWIC Updated 2008[1]	SARA Schedule[2]	ASRD 2005[3]	Habitat Description[4]
Birds					
Pied-billed grebe	*Podilymbus podiceps*	-	-	Sensitive	Ponds, marshes, backwaters with thick emergent vegetation
Horned grebe	*Podiceps auritus*	-	-	Sensitive	Breeding: shallow weedy wetlands Migration: wetlands, larger lakes
Western grebe	*Aechmophorus occidentalis*	-	-	Sensitive	Breeding: large lakes with thick emergent vegetation Migration: large deep lakes
American Green-winged teal	*Anas crecca*	-	-	Sensitive	Shallow lake edges and wetlands, prefers short but dense emergent vegetation. Nest in grassy and low shrub habitat within 100 m open water.
Lesser Scaup	*Aythya affinis*	-	-	Sensitive	Woodland ponds and lake edges with grassy margins
White-winged scoter	*Melanitta fusca*	-	-	Sensitive	Large deep lakes and slow moving streams
Northern pintail	*Anas acuta*	-	-	Sensitive	Shallow wetlands, fields, lake edges
American bittern	*Botaurus lentiginosus*	-	-	Sensitive	Among tall dense grasses, bulrush and cattails in emergent wetlands, lake edges
Great Blue heron	*Ardea herodias*	-	-	Sensitive	Forages along the edges of rivers, lakes, marshes, also seen in fields and wet meadows; nest in trees
Trumpeter swan	*Cygnus buccinator*	Not at Risk	-	At Risk	Lakes and large wetlands; often builds nest in vegetation on top of muskrat or beaver lodge, occasionally nests on shore
Osprey	*Pandion haliaetus*	-	-	Sensitive	Lakes, slow moving rivers and streams; nest in trees near water
Swainson's hawk	*Buteo swainsoni*	-	-	Sensitive	Open fields, grasslands and agricultural areas
Bald eagle	*Haliaeetus leucocephalus*	Not at Risk	-	Sensitive	Large lakes, rivers, cooling ponds, open areas
Northern goshawk	*Accipiter gentilis*	Not at Risk	-	Sensitive	Breeding: mature coniferous, deciduous, mixed woodlands Non-breeding: forest edges, parks, farmlands

Species	Scientific Name	COSEWIC Updated 2008[1]	SARA Schedule[2]	ASRD 2005[3]	Habitat Description[4]
Northern harrier	*Circus caneus*	Not at Risk	-	Sensitive	Open country-fields, wet meadows, cattail marshes, croplands, alpine meadows; nest on the ground
Broad-winged hawk	*Buteo platypterus*	-	-	Sensitive	Breeding: boreal forests Migration: ridges, riparian and deciduous forests
Golden eagle	*Aquila chrysaetos*	Not at Risk	-	Sensitive	Open and semi-open mountainous areas in subalpine and alpine; steep canyons and badlands along prairie rivers, occasionally seen at landfills and reservoirs in winter
Peregrine falcon	*Falco peregrinus*	Special Concern	1	At Risk	Lakeshores, river valleys, urban areas, alpine meadows, river mouths, open fields, cliffs for nesting
Sharp-tailed grouse	*Tympanuchus phasianellus*	-	-	Sensitive	Open habitats, mostly grassland, grassy meadows, sagebrush flats and agricultural areas
Sora	*Porzana carolina*	-	-	Sensitive	Wetlands with lots of emergent cattails, bulrushes, sedges, grasses
Yellow rail	*Coturnicops noveboracensis*	Special Concern	1	Undetermined	Sedge marshes
Sandhill crane	*Grus canadensis*	-	-	Sensitive	Migration: agricultural fields, mudflats, shorelines Breeding: isolated open marshes, fens, bogs surrounded by forests or shrubs
Upland sandpiper	*Bartramia longicauda*	-	-	Sensitive	Hayfields, ungrazed pastures, natural grasslands
Red knot	*Calidris canutus*	Endangered	No Schedule	May Be at Risk	Lakeshores, marshes, cultivated fields; does not nest in AB
Short-billed dowitcher	*Limnodromus griseus*	-	-	Undetermined	Shores of lakes, reservoirs, marshes
Black tern	*Childonias niger*	Not at Risk	-	Sensitive	Shallow, freshwater cattail marshes, sloughs, lake edges with emergent vegetation
Short-eared owl	*Asio flammeus*	Special Concern	3	May Be at Risk	Open country, including grasslands, meadows and cleared forests
Northern Hawk owl	*Surnia ulula*	Not at Risk	-	Sensitive	Black-spruce bogs and muskegs, old burns and tree-bordered clearings

Species	Scientific Name	COSEWIC Updated 2008[1]	SARA Schedule[2]	ASRD 2005[3]	Habitat Description[4]
Northern Pygmy owl	*Glaucidium gnoma*	-	-	Sensitive	Coniferous, deciduous or mixed forests, often in riparian areas, occasionally near townsites in winter
Barred owl	*Strix varia*	-	-	Sensitive	Mature coniferous, mixedwood forests, often riparian areas
Great Gray owl	*Strix nebulosa*	Not at Risk	-	Sensitive	Forests, clearings, roadsides, open meadows
Common nighthawk	*Chordeiles minor*	Threatened	No Schedule	Sensitive	Dry coniferous forests, open cottonwood forests, meadows, badlands, larger lakes and grasslands
Black-backed woodpecker	*Picoides arcticus*	-	-	Sensitive	Coniferous forests, disturbed areas
Pileated woodpecker	*Dryocopus pileatus*	-	-	Sensitive	Mature coniferous or mixed wood forests, prefers areas with dead/dying trees
Cape May warbler	*Dendroica tigrina*	-	-	Sensitive	Mature white spruce-fir forests
Black-throated green warbler	*Dendroica virens*	-	-	Sensitive	Mixed woods and mature coniferous forests
Canada warbler	*Wilsonia canadensis*	Threatened	No Schedule	Sensitive	Willow and alder thickets, shrublands and dense understoreys
Common yellowthroat	*Geothylpis trichas*	-	-	Sensitive	Cattail marshes, riparian willow and alder clumps, sedge wetlands and beaver ponds
Olive-sided flycatcher	*Contopus cooperi*	Threatened	No Schedule	-	Mature spruce-fir and riparian forests, burned woodlands
Yellow-bellied Flycatcher	*Empidonax flaveventris*	-	-	Undetermined	Shady coniferous and mixedwood forests, bogs and fens
Least flycatcher	*Empidonax minimus*	-	-	Sensitive	Aspen forests and alder and willow thickets
Eastern phoebe	*Sayornis phoebe*	-	-	Sensitive	Forest edges, clearings, near rivers and lakes
Barn swallow	*Hirundo rustica*	-	-	Sensitive	Near rivers, lakes, marshes, bridges, culverts and other structures in open country and cities
Purple martin	*Progne subis*	-	-	Sensitive	Communal bird houses, tree cavities
Brown creeper	*Certhia americana*	-	-	Sensitive	Mainly coniferous forests (spruce, fir, pine)

Species	Scientific Name	COSEWIC Updated 2008[1]	SARA Schedule[2]	ASRD 2005[3]	Habitat Description[4]
Western tanager	*Prianga ludoviciana*	-	-	Sensitive	Mature coniferous or mixedwood forests and aspen woodlands
Rusty blackbird	*Euphagus carolinus*	Special Concern	No Schedule	Sensitive	Beaver ponds, roadsides, landfills, wet meadows, shoreline shrubs
Baltimore oriole	*Icterus galbula*	-	-	Sensitive	Deciduous, riparian and mixed woods
Mammals					
Northern Long-eared bat	*Myotis septentionalis*	-	-	May Be at Risk	Dry forests, coniferous boreal forests (Caceres and Pybus 1997).
Hoary bat	*Lasiurus cinereus*	-	-	Sensitive	Wooded areas, especially coniferous regions. Also deciduous (Yaki 2008); Seen hunting over lakes or in forest openings
Silver-haired bat	*Lasionycteris noctivagans*	-	-	Sensitive	Flies along streams, lakes, rivers in forested areas
American badger	*Taxidea taxus*	-	-	Sensitive	Open grasslands of the parkland and prairies.
Long-tailed weasel	*Mustela frenata*	-	-	May be at Risk	Open brushy or grassy areas near water, croplands, fallow fields, fencerows, small woodlots, sometimes residential areas
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	-	-	Undetermined	Tall grass with adjacent herbaceous vegetation.
Canada lynx	*Lynx canadensis*	Not at Risk	-	Sensitive	Dense forests with heavy undergrowth, may range into mountains, rocky areas, tundra and edge of Arctic prairie

Species	Scientific Name	COSEWIC Updated 2008[1]	SARA Schedule[2]	ASRD 2005[3]	Habitat Description[4]
Herptiles					
Northern Leopard Frog	*Rana pipiens*	Special Concern	1	At Risk	Inhabits permanent water bodies including springs, streams, and marshes.
Western toad	*Bufo boreas*	Special Concern	1	Sensitive	Aquatic (breeding) habitat: Ponds, shallow stream, lake edges, or ditches Upland habitat: forests, wet shrublands, dense shrub, may use clearcuts (Wind and Dupuis 2002)
Canadian toad	*Bufo hemiophyrs*			May be at Risk	Inhabits open water. Requires sandy soil for burrowing.
Red-sided garter snake	*Thamnophis sirtalis*	-	-	Sensitive	Found near water in meadows, farmlands and valleys; woodlands
Wandering garter	*Thamnophis elegans*	-	-	Sensitive	Found near water in meadows, farmlands and valleys; woodlands

(-) No listing provided.

[1] Endangered: wildlife species facing imminent extirpation or extinction. Threatened: wildlife species likely to become endangered if limiting factors are not reversed. Special Concern: wildlife species that may become a threatened or endangered species because of a combination of biological characteristics and identified threats. Not at Risk: wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances. Data Deficient: wildlife species for which there is inadequate information to make a direct, or indirect, assessment of its risk of extinction (COSEWIC 2008).

[2] Schedule 1 is the official list of wildlife species at risk in Canada. Once listed on Schedule 1, protection and recovery measures are developed and implemented. Schedule 2 includes species designated as Threatened or Endangered by COSEWIC before the creation of the SARA. These species must be reassessed and are not officially protected under SARA. Schedule 3 includes species designated as Special Concern by COSEWIC before the creation of the SARA. These species must also be reassessed and are not officially protected under SARA (SARA 2007).

[3] At Risk: A species known to be at risk after formal detailed status assessment and designation as endangered or threatened in Alberta. May Be at Risk: A species that may be at risk of extinction or extirpation, and is therefore a candidate for detailed risk assessment. Sensitive: A species that is not at risk of extinction or extirpation but may require attention or protection to prevent it from becoming at risk. Undetermined: A species for which insufficient information, knowledge or data is available to reliably evaluate its general status (ASRD 2005)

[4] Reference for habitat information, unless otherwise noted: birds (Fisher and Acorn 1998), mammals (Forsyth 1985), and herptiles (Kavanagh 1991).