

**SUMMER 2007 VEGETATION AND RARE PLANT SURVEYS OF
PROPOSED MAINTENANCE / CONSTRUCTION PROJECTS -
W.A. SWITZER PROVINCIAL PARK**

Prepared for Alberta Tourism, Parks, Recreation and Culture

by
Joan A. Williams, MSc., PBIOL.

J. Williams Consulting
9624 Oakcliffe Drive S.W.
Calgary, Alberta T2V 0J7
(403) 242-3079
jawill@telusplanet.net

August 31, 2007

This publication may be cited as:

Williams, J.A. 2007. Summer 2007 vegetation and rare plant surveys of proposed maintenance / construction projects - W.A. Switzer Provincial Park. Prep. for Parks, Conservation, Recreation and Sport Division, Alberta Tourism, Parks, Recreation and Culture. Edmonton, Alta.

1.0 INTRODUCTION

This report contains the results of rare plant, and vegetation surveys conducted within project areas slated for future development or maintenance within William A. Switzer Provincial Park, approximately 19 km NW of Hinton, Alberta. Only a mid-summer rare plant survey was conducted.

Project areas were identified as per descriptions and mapping obtained from Alberta Tourism, Parks, Recreation and Culture (TPRC) (K. Vujnovic pers. comm.) and Duffin Consulting (B. Duffin pers. comm.). Proposed projects in the Gregg Lake campground include a new group campground and emergency exit road, a new parking lot at Lakeside campground, brushing of hiking trails, amphitheatre expansion, expansion to Loop A campsites, new parking stalls near the campground entry building/convenience store, and new sanitary treatment buildings. A new trail will also be developed west of, and between Cache Lake and Graveyard Lakes.

In addition to new survey sites, a relocation survey was conducted for two potentially rare plants observed in the Jarvis Lake trails area in spring of 2007, but not identifiable to species level at that time.

2.0 METHODS

Methods consisted of:

- . a literature review of ecological studies for the local and regional area,
- . a provincial Element Occurrence (EO) record database search,
- . a review of special plant communities and rare vascular plants that could potentially occur in the project area, and
- . a field survey.

The Park occurs within the Upper Foothills Natural Subregion (Natural Areas Committee 2006). A list of rare vascular floral taxa known or expected to occur in the Foothills natural region was compiled based on Wallis *et al.* (1987) and Fairbarns *et al.* (1987), as well as the most currently available ANHIC tracking and watch lists (Gould 2006), and known rare plant occurrences for the Upper Foothills natural subregion. Distribution maps of numbers of populations/locations for rare Alberta plant species in Moss (1983), and Kershaw *et al.* (2001) were also reviewed. A list of special plant communities that are known or expected for the project area was also reviewed, based on Allen (2006).

The Alberta Natural Heritage Information Centre (ANHIC) was contacted May 17th, 2007 for EO records of rare plants within the township(s) and range(s) within which the Park is located. Their database listed one tracked plant record for the S1S2-ranked *Cardamine pratensis*, and no special plant community EO records (J. Rintoul pers. comm.). A plant checklist of the park obtained from the ANHIC May 23rd, 2007 additionally contained rare plant species for which there are apparently no equivalent EO records, including the S1-ranked *Woodsia glabella*, *Carex hystericina*, *Erigeron hyssopifolius*, S2-ranked *Pellaea glabella*, *Potamogeton foliosus*, *Carex lacustris*, *Camassia quamash*, *Ranunculus glaberimmus*, S2W-ranked *Carex capitata*, *Ranunculus occidentalis*, S2S3-ranked *Veronica catenata*, S4W-ranked *Carex lasiocarpa*, and SU-ranked *Poa stenantha* (see also Appendix 1). Status rankings are based on Gould (2006).

3.0 RESULTS

Rare plant surveys were conducted on August 1st to 4th, 2007, using accepted standard techniques as per Alberta Native Plant Council guidelines (ANPC 2000). Additional guidance provided by Ksenija Vujnovic included surveying the width of existing trails and up to 1 m on each side of the existing trails, and surveying about 2.5 m wide bend on each side of the flagged central line for a newly proposed trail. A plotless sampling survey technique was used to give the greatest range of variability to community types observed in the field. UTM coordinates (via GPS unit *Garmin GPSMap 60Cx*), photographs and/or voucher specimens of unknown or problematic plant species were taken, along with notes on plant communities or associations encountered. Vouchers were later identified and/or verified against type specimens and taxonomy texts. Appendix 1 presents a checklist of plant species observed during the 2007 summer survey.

Project areas are divided into three sections: Gregg Lake campground and vicinity, Graveyard Lake - Cache Lake connector trail, and rare plant relocation survey. Projects within the Gregg Lake Campground include the following sites:

- new parking stall expansion around entry building/convenience store by Loop A (Antler Grove);
- new sanitary treatment buildings, Loop F (Fox Den);
- new expansion to Loop A (Antler Grove) campground;
- amphitheatre expansion;
- new parking lot, Loop L (Lakeside);
- new group camp and emergency exit road (Hay River Road); and
- hiking trails within Gregg Lake Campground.

3.1 Gregg Lake Campground and vicinity

3.1.1 New parking stall expansion around entry building/convenience store by Loop A (Antler Grove)

The road and parking area surrounding the entry building/convenience store area by Loop A, Gregg Lake Campground will be expanded to accommodate increased traffic flow, and congestion around the store. Survey of the south side expansion area, and north side expansion area are discussed separately; areas are approximately 10 X 20 m in size.

South of access road and entry building

The area south of the access road leading into campground Loops A to F (southeast of the entry building) was surveyed first, and is mostly forested by a moderately closed, variably-aged lodgepole pine / Labrador tea - common bearberry / bunchberry / feathermoss community. Pine trees have an average dbh of 23-25 cm; there is a secondary successional canopy of white spruce. Clumps of dwarf mistletoe were noted in trees.

The tall shrub layer is sparse, and consists of a few Scouler's willow, balsam poplar and aspen saplings. Labrador tea decreases farther downslope in openings, where common fireweed becomes more prominent. Other species in the low shrub layer include prickly rose, occasional Canada buffaloberry, beaked willow, and regenerating sapling white spruce, and aspen. In addition to bunchberry, other major herbs include common fireweed, heart-leaved arnica, and bog cranberry. Lesser amounts of wild strawberry, northern bedstraw, pine reed grass, oat grass, greenish-flowered wintergreen, twinflower, hairy wild rye, harebell, and white camas were also noted, along with trace amounts of one-sided wintergreen, common yarrow, red paintbrush, arctic aster, and horsetails. Deadfall accounts for about 5% of the total ground cover. A few introduced species (*i.e.*, white and red clovers, annual bluegrass) occur along the road edge. No rare plants were observed.

North of entry building

A small parking lot expansion is also proposed immediately north of the entry building/convenience store by Loop A. The area, which was flagged prior to survey, includes an existing graveled tent site and garbage container. This is north of the access road leading into campground Loops A to F, and east of the access road leading northward to the Lakeside Campground. The site is dominated by a lodgepole pine - white spruce / Labrador tea / bunchberry / feathermoss community, with secondary successional canopy of white spruce. A few standing trees are dead; dbh for pine is on average 20-23 cm, with one spruce tree about 30 cm dbh. Common understory species in addition to Labrador tea and bunchberry include common fireweed, heart-leaved arnica, and bog cranberry. Minor amounts of pine reed grass, low bilberry, bishop's-cap, Venus'-slipper orchid, wild vetch, bracted honeysuckle, bastard toadflax, spike trisetum, and oat grass are also present. Introduced species found along the road edge include Kentucky blue grass, and annual bluegrass. There are a few patches of common bearberry on the east-facing slope. No rare plants were observed.

MITIGATION: Limit removal of mature trees, where possible.

3.1.2 New sanitary treatment buildings, Loop F (Fox Den)

A small forested area approximately 50 X 50 m will be cleared to create a new water treatment facility in Loop F of the Gregg Lake campground, between approximate campstalls #86, and #89. Outer portions of the site are relatively dry, on slightly hummocky terrain, however the central portion is somewhat depressional and thus contains a moister soil regime, and vegetation type.

The site is dominated by a mature open-canopied lodgepole pine / Labrador tea / feathermoss community, with secondary successional white spruce canopy, and regenerating spruce in the low and tall shrub layers. Pine trees are variably aged with an average dbh of 20-23 cm. The area exhibits previous disturbance in the form of fire scarring, and there are several burned tree stumps present throughout. A few scattered subalpine fir were noted in the 6-7 m height range.

The sparse tall shrub layer consists of a few Scouler's willow, and trace aspen saplings. The low shrub layer consists of dense Labrador tea, with occasional prickly rose, beaked willow, bog cranberry, common bearberry, and Canada buffaloberry. Major herbs include bunchberry and hairy wild rye; other common species include wild strawberry, asters, common fireweed, northern bedstraw, twinflower, heart-leaved arnica, alpine hedysarum, and white camas. Trace amounts of wild peavine, common yarrow, yellow false dandelion, stiff club-moss, ground-cedar, ground juniper and harebell were also noted. Photo 1 (APPENDIX 2) shows the understory vegetation looking west along the southern boundary of the proposed water treatment building.

The central portion of the proposed water treatment facility contains a similar plant community type, with up to 10-15% cover by 1 to 1.3 m height willows and very occasional bog birch in the shrub layer, above patches of leaf litter and feathermosses. Species growing under the moderately dense shrub layer include northern valerian, felwort, common yarrow, wild red paintbrush, white camas, low bilberry, star-flowered Solomon's-seal, and bluejoint. A few hairgrass, bluegrass, pine reed grass, spike trisetum, common dandelion, white clover and annual bluegrass were noted within 2 m of the upper trail edge. No rare plants were observed.

MITIGATION: Limit removal of mature trees, and any standing dead tree snags of value to wildlife, where possible. Note this site is in very close proximity to existing campstalls, and informal hiking paths.

3.1.3 Campground expansion, Loop A (Lakeside)

An area approximately 30 m wide by 600 m in length along the western side of the existing Loop A campground was surveyed, including three new pull-in campstalls at the north end. The centre of each of the three rhomboid-shaped pull-in sites was flagged at the road edge, with campstalls angling at about 33 degrees (B. Duffin pers. comm.). The entire Loop A area surveyed shows evidence of fire on the dominant tree species, lodgepole pine.

Three pull-in campstalls

Forest cover in the most northerly of the three proposed campstalls is a moderately open lodgepole pine / Canada buffaloberry - Labrador tea / feathermoss vegetation community type. Pine trees are mature, with an average dbh of 20 cm, above a secondary successional canopy of white spruce. Most spruce are about two-thirds the height of pine.

Dominant shrubs include Canada buffaloberry, or patches of Labrador tea, with occasional Scouler's willow, beaked willow, and other willows, green alder, and prickly rose. Major herbs are common fireweed, bunchberry, and hairy wild rye; associated species include heart-leaved arnica, common bearberry, bog cranberry, dwarf bilberry, northern bedstraw, wild peavine, grass-of-parnassus, common yarrow, alpine hedsarum, arctic aster, star-flowered Solomon's-seal, wild lily-of-the-valley, northern reed grass, and wild strawberry. Along the road edge, in openings, additional species such as rough hair grass, oat grass, white clover, red clover, alfalfa, and trace amounts of common dandelion were noted. Photo 2 (APPENDIX 2) shows typical vegetation at the first proposed pull-in campsite, across from existing campstall #11.

The second (middle) pull-in campsite is situated on higher ground that slopes downward towards the first and third proposed campstall. It has an open lodgepole pine / bog cranberry - bunchberry - (Labrador tea) / feathermoss vegetation type. Mosses, willows, and Labrador tea are less prominent, in part due to better drainage, while herbs increase. There are a few scattered aspen saplings, above patches of common bearberry. Associated herbs noted include wild strawberry, common yarrow, hairy wild rye, heart-leaved arnica, arctic aster, and pine reed grass.

The third, most southerly of the three campstalls contains similar vegetation composition to the first campstall. Species noted in the understory include low bilberry, wild strawberry, wild red paintbrush, common fireweed, common bearberry, wild peavine, northern reed grass, pine reed grass, twinflower, heart-leaved arnica, hairy wild rye, common yarrow, star-flowered Solomon's-seal, and trace amounts of ground-cedar, white camas, wild red raspberry, and shrubby cinquefoil. Along the road edge, harebell, felwort, and hairgrass were also noted.

No rare plants were observed.

MITIGATION: Limit removal of mature trees, and any standing dead tree snags of value to wildlife, where possible. Note that the middle campstall is on much higher ground, with drainage sloping towards lower proposed campstalls; may require considerable topographic contouring.

Additional campground expansion, west side of Loop A

Immediately south of the three aforementioned pull-in campstalls, an area along the western edge of the existing access road through the Loop A campground, was surveyed. Proposed campstalls will occupy an area approximately 30 m X 600 m in length, on somewhat hummocky terrain. One large red squirrel midden was noted in this area.

The dominant vegetation type is an open- to moderately open canopied lodgepole pine / (white spruce subdominant) / Labrador tea / bunchberry / feathermoss community at the north end, shifting toward a lodgepole pine / Labrador tea / common fireweed - bunchberry / feathermoss vegetation type in the southern half. There is little conifer regeneration throughout. Subalpine fir was noted to be uncommon to occasional in the 5 m height range. Other shrubs include Canada buffaloberry, dwarf bilberry, prickly rose, bracted honeysuckle, willows, and trace amounts of mountain ash.

In addition to fireweed and bunchberry, herbs include twinflower, dwarf bilberry, bog cranberry, northern reed grass, heart-leaved arnica, wild strawberry, hairy wild rye, white spruce, dwarf horsetail, hooded ladies'-tresses, bishop's-cap, Labrador tea, grasses, and willow shrubs. No rare plants were observed.

MITIGATION: Limit removal of mature trees, any standing dead tree snags of value to wildlife, and large old squirrel middens, where possible.

3.1.4 Amphitheatre expansion

An expansion to the Gregg Lake campground amphitheatre seating area has been proposed; the site is approximately 50 m X 20 m, of which about 30 m X 15 m are occupied by the existing facility. B. Duffin (pers. comm.) outlined the survey area as being from ridgeline (crest of hill) to bottom of slope (amphitheatre bowl), extending outward 1-2 m beyond the outermost row of wooden benches (refer to Photo 3, APPENDIX 2). The survey was divided into east and west sections, as vegetation type varies depending on the differing aspect.

East half (looking upslope through seating area)

Drier vegetation occupies slopes in the eastern half of the amphitheatre seating area, with driest habitat near the ridgeline, increasing in moisture regime toward the base of the amphitheatre bowl. The dominant vegetation type is a mature white spruce - (aspen) / hairy wild rye - bunchberry - twinflower / feathermoss community. Trees are fire-scarred, and burned stumps are present. There is very little tree regeneration; one or two aspen saplings under 2 m in height were noted.

The tall shrub layer includes very sparse willow, above scattered Canada buffaloberry, patches of Labrador tea, and a few prickly rose. Trace amounts of ground juniper, shrubby cinquefoil, twining honeysuckle, bog cranberry, and bog birch were also noted.

Common herbs include wild strawberry, alpine hedsarum, harebell, heart-leaved arnica, wild peavine, northern bedstraw, wild vetch, dwarf bilberry, and common fireweed. Associated species include Labrador lousewort, wild red paintbrush, one-sided wintergreen, greenish-flowered wintergreen, white camas, bishop's-cap, running raspberry, low northern sedge, leatherleaf lichens, and tall lungwort, among others. Along trail edges, and around amphitheatre benches, there are small amounts of white and red clovers, and common dandelion.

West half (looking upslope through seating area)

The dominant forest type in the western half of the amphitheatre area, is a mature moderately closed canopied white spruce - lodgepole pine - aspen / hairy wild rye - bunchberry / feathermoss mixedwood. Labrador tea occurs in patches, and is more common than in the east half of the survey site. Other species noted include harebell, common fireweed, heart-leaved arnica, northern bedstraw,

wild peavine, dwarf bilberry, twinflower, common pink wintergreen, and trace amounts of lesser rattlesnake plantain, pine reed grass, asters, common yarrow, and cut-leaved anemone. Arboreal lichens are prominent on spruce.

No rare plants were observed.

MITIGATION: Limit removal of mature trees, and any standing dead tree snags of value to wildlife, where possible. Note that increasing the density of seating in the existing disturbed amphitheatre bowl area might provide a suitable alternative to clearing new vegetation upslope, which will move the audience farther from the stage, and potentially decrease the 'participatory' experience.

3.1.5 New parking lot, Loop L (Lakeside)

An area approximately 20 X 60 ft (6.1 m X 18.3 m) (B. Duffin pers. comm.) was flagged prior to survey for a proposed new vehicle/trailer parking lot in Loop L of the Lakeside campground. The dominant plant community is a variably aged mature open canopied white spruce - lodgepole pine - aspen / Labrador tea / bog cranberry / feathermoss, with sparse tall shrub layer, and relatively dense low shrub layer. Mature aspen have an average dbh of 25-30 cm; white spruce 30 (38) cm; and pine smaller, at about 15-18 cm dbh. Arboreal lichens are evident on coniferous trees. There is some pine and white spruce regeneration (1-2% of the total cover), with occasional balsam poplar and aspen saplings and beaked willow, particularly in openings near the road edge. Photo 4 (APPENDIX 2) shows typical vegetation associated with this site.

The tall shrub layer also includes occasional Scouler's willow. The low shrub layer consists of Labrador tea, with scattered bog birch, Canada buffaloberry, prickly rose, honeysuckles, and ground juniper. Major herbs are bog cranberry, bunchberry, twinflower, dwarf bilberry, and grasses. Associated species include wild lily-of-the valley, wild strawberry, dwarf raspberry, dwarf horsetail, common fireweed, harebell, pine reed grass, heart-leaved arnica, wild red paintbrush, northern bedstraw, wild peavine, white camas, and alpine hedsysarum. There are trace amounts of yellow false dandelion, hooded ladies'-tresses, cut-leaved anemone, arctic aster, common pink wintergreen, and one-sided wintergreen. Leatherleaf lichens are common.

Along road edges and in the road ditch, species such as northern reed grass, introduced bluegrasses, common yarrow, veiny meadowrue, common blue-eyed grass, hairgrass, red clover, plus reindeer lichens and dry mosses were noted. No rare plants were observed.

MITIGATION: Limit removal of largest trees, and retain snags (standing dead) along eastern edge, where possible.

3.1.6 New group camp and associated emergency exit road (Hay River Road)

North of the Gregg Lake Campground entry building, and near a sharp east-angled bend along the road leading to the Day Use Area and Loop L (Lakeside), there is a proposed new group campground and access road. The group camp is within an approximately circular area 150 m X 100 m in diameter, and was flagged prior to survey. Associated with it, is an existing cleared emergency exit road about 400 m long X 5 m wide known as the Hay River Road, which will provide access to the campground.

Emergency exit road

The first half of the emergency exit road will be cleared and upgraded to gravel, with a 1 m buffer along either edge of the current zone of disturbance to be brushed. The exit road consists of exposed gravels and soils near the entry gate, with partial cover by herbaceous vegetation elsewhere. A few seedling and sapling balsam poplar, and seedling lodgepole pine and white spruce are invading the site from road edges. Introduced wheat grasses, reed grasses, red clover, and common bearberry are primary species, with lesser amounts of wild strawberry, everlasting, groundsels, fleabanes, common yarrow, wild red paintbrush, Rocky Mountain fescue, yellow false dandelion, low goldenrod, prickly rose, small-leaved everlasting, and harebell noted. There are trace amounts of blue-eyed grass and Labrador lousewort.

In the buffer zone along either edge of the existing roadbed, species such as common dandelion, yellow rattle, low willows, hairy wild rye, cinquefoils, woodland horsetail, tall lungwort, palmate-leaved coltsfoot, Arctic aster, wild peavine, alpine hedsarum, and wild vetch were observed. There are trace amounts of common fireweed, northern green bog orchid, grass-of-parnassus, shrubby cinquefoil, Labrador lousewort, star-flowered Solomon's-seal, broad-leaved everlasting, and awnless brome (refer to Photo 5).

New group camp

The proposed group camp is on relatively flat, level terrain at the crest of a small rise above east and south-facing slopes. The forest type throughout is relatively homogeneous, and comprised of a mature to overmature moderately closed canopied lodgepole pine - white spruce - aspen / common bearberry - bog cranberry - twinflower / feathermoss community. On slightly hummocky ground, the mixedwood tends to shift toward understories of Labrador tea / bog cranberry - hairy wild rye / feathermoss - (leatherleaf lichen). No wet sites or depressions were observed.

A few large aspen with dbh to 40 cm, and white spruce to 43 cm or more were noted in the north-eastern portion of the site. Dwarf mistletoe occurs on some conifers. A sparse successional secondary canopy of white spruce forms the tall shrub layer; trees are about half the height of the main canopy.

Subalpine fir seedlings and saplings to about 2 m in height are occasional, with regeneration by tree species accounting for less than 2% of the total cover. Canada buffaloberry makes up about 5% cover in the low shrub layer, while shrubby cinquefoil and willows are trace to occasional. In addition to bearberry and twinflower, other major herbs include hairy wild rye, northern bedstraw, and wild strawberry. Lesser amounts of species such as wild lily-of-the-valley, wild red paintbrush, bastard toadflax, one-sided wintergreen, harebell, dwarf horsetail, yellow false dandelion, Labrador lousewort, awnless brome and cut-leaved anemone were also noted, among others. Photos 6, and 7 (APPENDIX 2) show typical vegetation on this site. No rare plants were observed.

Three old national acid rain biomonitoring research plots were observed along the southeast side of the proposed group camp (Photo 8, APPENDIX 2). UTM coordinates were taken of sites and forwarded to Alberta Parks, Tourism, Recreation and Culture (K. Vujnovic pers. comm.).

MITIGATION: Determine status of old research plots, and if still being monitored, relocate the proposed group camp to exclude them from development. Fence off prior to construction, if required. Limit removal of largest trees and of any snags, where possible.

3.1.7 Gregg Lake Hiking trails

Two hiking trails to be brushed later in the season for maintenance purposes, were surveyed in the Gregg Lake campground and vicinity. This included a 1 m wide buffer along either edge of an approximately 2.5 km long north-south running trail between Loop L (Lakeside) and Loop F (Fox Den), plus a smaller approximately 1 km trail long trail east of the first trail, between Gregg Lake and the northeast section of Loop F (Fox Den). A time allowance was also made to survey a shorter east-west aligned trail segment connecting Loop E (Elk Ridge) to Loop G (Grizzly), and a north-south segment from about halfway along this trail running to Loop F (Fox Den), as requested by B. Duffin (pers. comm.).

The two larger trails between Lakeside campground and Loop F are dominated by fairly open canopied mixedwood forests of lodgepole pine - white spruce - aspen, with variable understories. Near Gregg Lake and at lower elevations, paper birch and black spruce are present in the tree canopy in addition to pine, white spruce and aspen; bog birch and tall willows are occasional (refer to Photo 9, APPENDIX 2). The most common shrub species appears to be Canada buffaloberry, above common fireweed, common bearberry, and hairy wild rye. Other species noted in the understory include prickly rose, bunchberry, twinflower, wild strawberry, ground juniper, wild red paintbrush, harebell, bishop's-cap, alpine hedsarum, asters, common yarrow, heart-leaved arnica, pine reed grass, white camas, cut-leaved anemone, showy locoweed, purple oat grass, Rocky mountain fescue, awnless brome, yellow rattle, goldenrods, and one-sided wintergreen, among others. Feathermosses carpet the forest floor throughout. No rare plants were observed.

The two smaller trail segments surveyed in the Gregg Lake Campground were dominated by a similar lodgepole pine - white spruce - aspen community, with understories of Labrador tea / feathermoss, alternating with Canada buffaloberry / bunchberry - twinflower / feathermoss. The north-south running segment passes along the edge of a disturbed grassy meadow with playground facility. No rare plants were observed.

MITIGATION: Limit removal of mature trees, and any standing dead tree snags of value to wildlife, where possible.

3.2 Graveyard - Cache Lakes connector backcountry trail

A survey was conducted of a proposed backcountry connector trail west of the Graveyard Lake - Cache Lake area. This backcountry trail, which was originally estimated to be approximately 3 km in length, will be 1.8 m wide (B. Duffin pers. comm.). An area approximately 5 m wide was surveyed, *i.e.*, 2.5 m each side of centre line.

The central line was flagged prior to field survey, however flagging did not always reflect line of sight, nor was it frequent enough to provide a clear indication of where the trail was to be constructed. Ungulate trails were to be used as centre line for much of the distance (B. Duffin pers. comm.), however there were at times, significant deviations from the generally north-south route alignment, and from ungulate trails.

Travelling north to south from the road edge just east of the Kettle Lake trailhead, the proposed new trail bisects Winter Creek (dry at the time of survey), then passes along the west side of Graveyard Lake and Cache Lake where there are great vistas of the wetlands. It terminates south of Powder Creek at a junction with the Blue Lake Lodge access road. The northern portion of the trail appears to follow esker ridges and/or other rolling morainal features. As Powder Creek is approached the terrain levels off, and is much lower in elevation. After traversing the trail, both the non-vascular specialist and myself reassessed the distance as being 5-6 km in length, rather than 3 km. This distance will be determined after construction is complete.

Much of the proposed trail transects mixedwood forests of lodgepole pine - aspen - white spruce, with understories dominated by Labrador tea and bog cranberry, above a carpet of feathermosses. These are generally mature open to moderately open stands; openings tend to contain younger trees. Evidence of fire was noted throughout, with fire-scarred trees, and burned stumps.

Shrub layers are sparse to moderate in cover, depending on aspect and moisture regime. Common species include varying amounts of Canada buffaloberry, prickly rose, willows, and occasional beaked hazelnut, saskatoonberry, regenerating fir or ground juniper. Common herbs include wild strawberry, twinflower, dwarf bilberry, alpine hedsarum, wild peavine, and hairy wild rye. Lesser amounts of northern green bog orchid, showy aster, harebell, hooded ladies'-tresses orchid, common pink wintergreen, and Labrador lousewort, among others were also noted.

Common bearberry and Canada buffaloberry are dominant in openings in lodgepole pine - (white spruce) on south- to SE-facing slopes, along with various grass species. Associated species include prickly rose and saskatoonberry shrubs, plus felwort, low goldenrod, white camas, northern bedstraw, wild red paintbrush, cut-leaved anemone, Rocky Mountain fescue, bastard toadflax, fleabanes, groundsels, heart-leaved arnica, awnless brome, among others.

West-facing slopes and hilltops tend to contain stands of submature to mature aspen, with open herbaceous understories and leaf litter being predominant, rather than mosses. These are aesthetically pleasing forest stands, due to height of trees, and ability to see landform features through the open understories. Species associated with these sites are generally similar to mixedwood stands, but with more occurrence of asters, fleabanes, dwarf bilberry, golden alexanders, toadflax, and wild red paintbrush, for example.

At the intersect with dry creek beds, a narrow riparian fringe of balsam poplar or aspen occurs above open alder clumps and herbaceous vegetation. Species associated with these sites include running raspberry, bishop's-cap, tall lungwort, dwarf horsetail, stiff club-moss, buckbrush, star-flowered Solomon's-seal, large-leaved yellow avens, buttercups, baneberry, swamp horsetail, bistort, hair grass, groundsels, tall larkspur, greenish-flowered wintergreen, and red clover, among others. Three clumps of an odd form of elephants-head (*Pedicularis groenlandica*) were observed along a 7-8 metre stretch of small north-facing creek bank at UTM 446281 5928497 (1168 m asl). Specimens all had smaller than normal, yet fully developed greenish-white flowers on otherwise robust stems and normal leaves; comparison with vouchers at the University of Calgary indicate that this form has not been collected previously (B. Smith pers. comm.).

Immediately beyond the aforementioned creek bed, the terrain flattens out into a fairly wide floodplain terrace. The vegetation community on the terrace is different from most of the remainder of the trail, and is dominated by mature to overmature open-canopied aspen and balsam poplar, above a lush herb layer. Common species in the understory include currants, meadowrue, asters, common fireweed, purple oat grass, and tall larkspur. Nearing the Blue Lake access road, the forest type is again lodgepole pine - white spruce - aspen, above relatively sparse shrub and herb layers, and feathermoss ground layers.

No rare plants were observed.

MITIGATION: Limit removal of mature trees, and any standing dead tree snags of value to wildlife, where possible. Three clumps of an odd form of elephants-head (UTM 446281 5928497) should be avoided during trail construction.

3.3 Potential rare plant relocation survey

Two sections of the Meadow Run trail, part of the Jarvis Lake Trails complex, were resurveyed on August 4, 2007 to determine if two potential rare plants encountered during the spring 2007 rare plant survey were mature enough to identify to species level. The potentially rare buttercup at 11U (UTM 0444960 5925685 +/- 7 m) was not relocated, and thus remains *Ranunculus sp.* A second potentially rare species was relocated in a seasonally wet channel (near dry) near the edge of a low birch fen community. It was in flower at this time and was identified as *Cardamine pensylvanica*, which is not a rare species.

MITIGATION: No mitigation is required for these species.

4.0 SUMMARY

The species checklists for both the spring, and summer 2007 surveys contain several new occurrences for the park, based on a previously known checklist compiled for William A. Switzer Provincial Park provided by the ANHIC (J. Rintoul pers. comm.).

No rare plant species or special plant communities were observed during the summer rare vascular plant survey. Two potentially rare species observed along the Jarvis Lake Trails in the spring of 2007 were checked during the summer survey; one was not relocated, and the other was determined to be a common species.

The level of confidence in locating rare plants is a function of the time spent searching, plus appropriate season. The August 2007 rare plant survey was appropriate for the detection of most rare plant species; the majority of flowering plants were in bloom, or had identifying characteristics of the species. Willows were not always identifiable to species, as catkins were absent at this time of year. None of the habitats encountered were considered unique or unusual, based on the literature review, expected and known element occurrences in the project area or region, plus professional judgement by the botanist conducting the rare plant survey.

Recommended mitigation measures are indicated by site, in the aforementioned sections.

5.0 LITERATURE CITED

Alberta Native Plant Council. 2000. ANPC Guidelines for Rare Plant Surveys in Alberta. Information Bulletin: March 2000.

Allen, L. 2007. Alberta Natural Heritage Information Centre Preliminary Ecological Community Tracking List. Alberta Community Development, Edmonton, Alberta. Publ. No. T/527 116 pp.

Duffin, Bruce (pers. comm.) Duffin Consulting Ltd., Spruce Grove, Alta.

Fairbarns, M., V. Loewen and C. Bradley. 1987. The rare vascular flora of Alberta. Vol. 1: a summary of the taxa occurring in the Rocky Mountains. Natural Areas Publ. No. T/155. Alberta Forestry, Lands and Wildlife, Public Lands. Edmonton, Alta.

Gould, J. 2006. Alberta Natural Heritage Information Centre tracking and watch lists - vascular plants, mosses, liverworts and hornworts (compiled July 2006). Alberta Community Development, Parks and Protected Areas Division. Edmonton, Alta.

Kershaw, L., Gould, J., Johnson, D. and J. Lancaster (eds.). 2001. Rare vascular plants of Alberta. Prepared by the Alberta Native Plant Council. Published by The University of Alberta Press, Edmonton, and The Canadian Forest Service, Northern Forestry Centre. Edmonton, Alta.

Moss, E.H. 1983. Flora of Alberta (Second edition revised by J.G. Packer). University of Toronto Press. Toronto, Ont.

Natural Regions Committee. 2006. Natural regions and subregions of Alberta. Compiled by Downing, D.J. and W.W. Pettapiece. Government of Alberta. Publ. No. T/852.

Rintoul, John (pers. comm.) Heritage Information Systems Coordinator, Alberta Natural Heritage Information Centre (ANHIC); Parks, Conservation, Recreation and Sport Division; Alberta Tourism, Parks, Recreation and Culture. Edmonton, Alta.

Smith, Bonnie (pers. comm.). Curatorial assistant, Herbarium, University of Calgary. Calgary, Alta.

Vujnovic, Ksenija (pers. comm.). Heritage Protection Specialist, West Central/East Central Areas; Parks, Conservation, Recreation and Sport Division; Alberta Tourism, Parks, Recreation and Culture. Spruce Grove, Alta.

Wallis, C., Bradley, C., Fairbarns, M. and V. Loewen. 1987. The rare flora of Alberta. Volume 3: species summary sheets. Alberta Forestry, Lands and Wildlife, Public Lands. Edmonton, Alta.

APPENDIX 1.

CHECKLIST OF PLANT SPECIES OBSERVED IN THE PROJECT AREA

(observed on August 1st to August 4th, 2007 surveys)

LYCOPODIACEAE

Diphasiastrum complanatum
Lycopodium annotinum

ground-cedar
stiff club-moss

EQUISETACEAE

Equisetum arvense
Equisetum fluviatile
Equisetum pratense
Equisetum scirpoides
Equisetum sylvaticum

common horsetail
swamp horsetail
meadow horsetail
dwarf horsetail
woodland horsetail

CUPRESSACEAE

Juniperus communis

ground juniper

PINACEAE

Abies bifolia
Picea glauca
Picea mariana
Pinus contorta

subalpine fir
white spruce
black spruce
lodgepole pine

POACEAE

Agropyron dasystachyum
Agropyron smithii
Agropyron trachycaulum
Agrostis scabra
Bromus ciliatus
Bromus inermis
Calamagrostis canadensis
Calamagrostis inexpansa
Calamagrostis rubescens
Danthonia californica
Festuca saximontana
Hierochloe odorata
Leymus innovatus (= *Elymus innovatus*)
Muhlenbergia richardsonis
Phleum pratense
Poa spp.
Poa annua
?Poa interior or nemoralis

Poa pratensis
Schizachne purpurascens
Trisetum spicatum

northern wheat grass
western wheat grass
slender wheat grass
rough hair grass
fringed brome
awnless brome
bluejoint
northern reed grass
pine reed grass
California oat grass
Rocky Mountain fescue
sweet grass
hairy wild rye
mat muhly
timothy
bluegrasses
annual bluegrass
?inland or wood bluegrass (may be introduced;
road edge campground)
Kentucky bluegrass
purple oat grass
spike trisetum

CYPERACEAE

Carex spp.
Carex aquatilis
Carex brunnescens
Carex capillaris

sedges
water sedge
brownish sedge
hair-like sedge

Carex concinnoides
Carex gynocrates
Carex cf. norvegica

low northern sedge
northern bog sedge
Norway sedge

LILIACEAE

Maianthemum canadense var. *interius*
Smilacina stellata
Zigadenus elegans

wild lily-of-the-valley
star-flowered Solomon's-seal
white camas

IRIDACEAE

Sisyrinchium montanum

common blue-eyed grass

ORCHIDACEAE

Calypso bulbosa
Goodyera repens
Platanthera hyperborea (= *Habenaria hyperborea*)
Platanthera obtusata (= *Habenaria obtusata*)
Spiranthes romanzoffiana

Venus'-slipper
 lesser rattlesnake plantain
northern green bog orchid
blunt-leaved bog orchid
hooded ladies'-tresses

SALICACEAE

Populus balsamifera
Populus tremuloides
Salix spp.
Salix bebbiana
Salix myrtilifolia
Salix scouleriana
Salix discolor

balsam poplar
aspen
willows
beaked willow
myrtle-leaved willow
Scouler's willow
pussy willow

BETULACEAE

Alnus viridis ssp. *crispa* (= *A. crispa*)
Alnus tenuifolia
Betula glandulosa
Betula papyrifera
Betula pumila

green alder
river alder
bog birch
white or paper birch
dwarf birch

SANTALACEAE

Geocaulon lividum

bastard toadflax

LORANTHACEAE

Arceuthobium americanum

dwarf mistletoe

POLYGONACEAE

Polygonum viviparum
Rumex cf. *occidentalis*

alpine bistort
western dock (leaves only)

CARYOPHYLLACEAE

Cerastium arvense
Stellaria longipes

field mouse-ear chickweed
long-stalked chickweed

RANUNCULACEAE

Actaea rubra
Anemone multifida
Aquilegia sp.
Delphinium glaucum
Ranunculus sp.
Ranunculus cf. *abortivus*
Ranunculus acris

red or white baneberry
cut-leaved anemone
columbine (in seed; probably *brevistyla*)
tall larkspur
buttercup
small-flowered buttercup
tall buttercup

Ranunculus cf. cardiophyllus
Thalictrum venulosum

heart-leaved buttercup
veiny meadow rue

BRASSICACEAE

Cardamine pensylvanica

bitter cress

SAXIFRAGACEAE

Mitella nuda

bishop's-cap; mitrewort

PARNASSIACEAE

Parnassia palustris

northern grass-of-parnassus

GROSSULARIACEAE

Ribes sp.

Ribes lacustre

Ribes oxycanthoides

Ribes triste

currant or gooseberry
bristly black currant
northern gooseberry
wild red currant

ROSACEAE

Fragaria virginiana

Geum macrophyllum

Potentilla bipinnatifida

Potentilla fruticosa

Potentilla gracilis

Potentilla norvegica

Rosa acicularis

Rubus arcticus ssp. acaulis

Sorbus sp.

wild strawberry
large-leaved yellow avens
plains cinquefoil
shrubby cinquefoil
graceful cinquefoil
rough cinquefoil
prickly rose
dwarf raspberry
mountain ash (not keyed; seedlings)

FABACEAE

Astragalus cf. alpinus

Hedysarum alpinum

Lathyrus ochroleucus

Medicago sativa

Oxytropis cf. monticola

Oxytropis splendens

Trifolium pratense

Trifolium repens

Vicia americana

alpine milk vetch
northern hedysarum
cream-coloured vetchling
alfalfa
late yellow locoweed (leaves only)
showy locoweed
red clover
white clover
wild vetch

VIOLACEAE

Viola sp.

Viola renifolia

violet (leaves only)
kidney-leaved violet

ELAEAGNACEAE

Shepherdia canadensis

Canada buffaloberry

ONAGRACEAE

Epilobium angustifolium

Epilobium ciliatum

common fireweed
northern willowherb

APIACEAE

Zizia aptera

heart-leaved Alexanders

CORNACEAE

Cornus canadensis

bunchberry

PYROLACEAE

Orthilia secunda
Pyrola asarifolia
Pyrola chlorantha

one-sided wintergreen
 common pink wintergreen
 greenish-flowered wintergreen

ERICACEAE

Arctostaphylos uva-ursi
Ledum groenlandicum
Vaccinium caespitosum
Vaccinium myrtillus
Vaccinium vitis-idaea

common bearberry
 common Labrador tea
 dwarf bilberry
 low bilberry
 bog cranberry

GENTIANACEAE

Gentianella amarella
Gentiana cf. affinis
 U of C
Halenia deflexa

felwort
 prairie gentian (leaves and bud only; checked at
 spurred gentian

POLEMONIACEAE

Polemonium acutiflorum

tall Jacob's-ladder

BORAGINACEAE

Mertensia paniculata

tall lungwort

SCROPHULARIACEAE

Castilleja miniata
Euphrasia subarctica or nemorosa

common red paintbrush
 eyebright (not keyed; on disturbed Jarvis Lake
 trail)

Pedicularis groenlandica
Pedicularis labradorica
Penstemon procerus
Rhinanthus minor
Veronica americana

elephant's-head
 Labrador lousewort
 blue beardtongue
 yellow rattle
 American brooklime

RUBIACEAE

Galium boreale
Galium trifidum

northern bedstraw
 small bedstraw

CAPRIFOLIACEAE

Linnaea borealis
Lonicera dioica
Lonicera involucrata
Viburnum edule

twinflower
 twining honeysuckle
 bracted honeysuckle
 low-bush cranberry

VALERIANACEAE

Valeriana dioica

northern valerian

CAMPANULACEAE

Campanula rotundifolia

harebell

ASTERACEAE

Achillea millefolium
Agoseris glauca
Antennaria neglecta
Antennaria parvifolia
Antennaria racemosa
Arnica cordifolia

common yarrow
 yellow false dandelion
 broad-leaved everlasting
 small-leaved everlasting
 racemose everlasting
 heart-leaved arnica

<i>Aster conspicuus</i>	showy aster
<i>Aster laevis</i>	smooth aster
<i>Aster sibiricus</i>	Arctic aster
<i>Crepis tectorum</i>	annual hawk's-beard
<i>Erigeron acris</i>	northern daisy fleabane
<i>Erigeron glabellus</i>	smooth fleabane
<i>Hieracium umbellatum</i>	narrow-leaved hawkweed
<i>Petasites frigidus</i> var. <i>palmatus</i>	palmate-leaved coltsfoot
<i>Senecio</i> sp.	groundsel
<i>Senecio pauperculus</i>	balsam groundsel
<i>Senecio streptanthifolius</i>	northern ragwort
<i>Solidago gigantea</i>	giant goldenrod
<i>Solidago spathulata</i>	low goldenrod
<i>Taraxacum officinale</i>	common dandelion

NON-VASCULARS (incidental obs.)

<i>Ptilium crista-castrensis</i>	feathermoss
<i>Pleurozium schreberi</i>	feathermoss
<i>Hylocomium splendens</i>	feathermoss
<i>Polytrichum</i> sp.	Christmas tree moss
<i>Cladonia</i> sp.	lichen
<i>Cladina</i> sp.	reindeer lichen
<i>Peltigera</i> spp.	leatherleaf lichen
<i>Stereocaulon</i> sp.	reindeer lichen
puffballs	

APPENDIX 2.
SELECTED PHOTOGRAPHS OF SURVEYED AREAS



Photo 1. Understory vegetation looking west along southern boundary of the proposed sanitary treatment building. Loop F (Fox Den), Gregg Lake Campground. August 2, 2007.



Photo 2. Typical vegetation within proposed pull-in campstalls, Loop A (Antler Grove), Gregg Lake Campground. Common fireweed, Canada buffaloberry, Labrador tea, grasses and willow shrubs are visible. August 2, 2007.

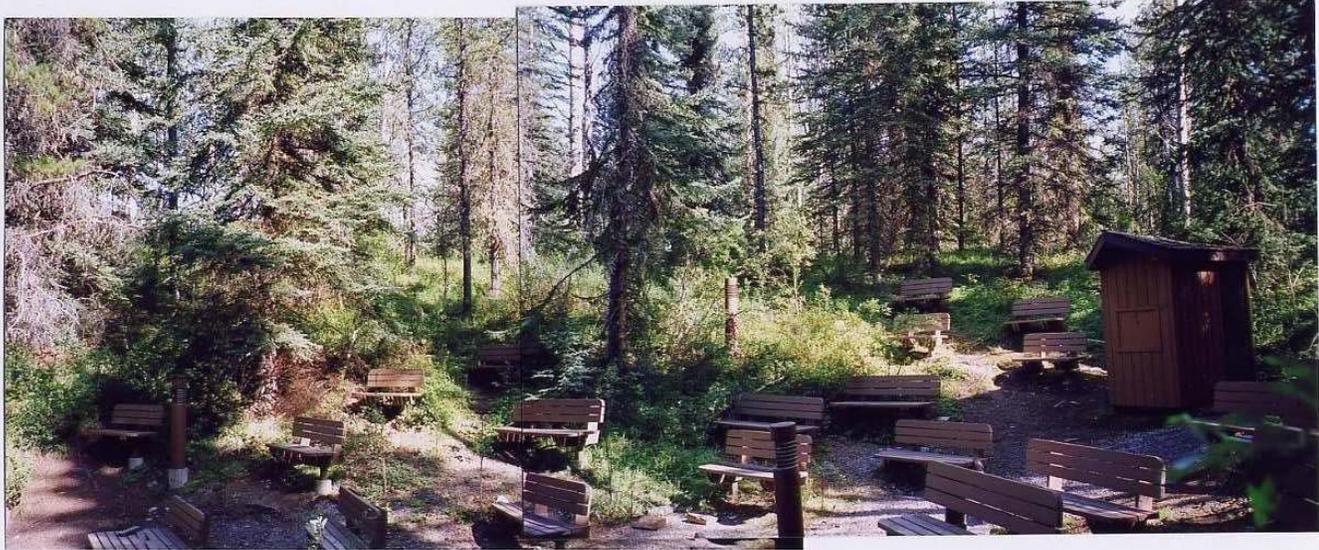


Photo 3. Amphitheatre, Gregg Lake Campground. View upslope through seating area. August 2, 2007.



Photo 4. New parking lot, Loop L, Lakeside Campground. White spruce - lodgepole pine - aspen / Labrador tea / bog cranberry / feathermoss mixedwood. August 3, 2007.



Photo 5. Previously disturbed revegetating emergency exit road (Hay River Road) proposed as new access road for new group camp. North of Gregg Lake Campground entry building; west of Lakeside (Loop L). August 3, 2007.



Photo 6. Proposed new group camp west of Lakeside, north of the entrance to Loops A-G, Gregg Lake Campground. Variably-aged lodgepole pine - white spruce - aspen mixedwood. August 3, 2007.



Photo 7. Bog cranberry, common bearberry, Labrador tea, and feathermosses under pine-spruce-aspen mixedwood in proposed new group camp, Gregg Lake Campground. August 3, 2007.



Photo 8. Old acid rain biomonitoring research plots found within proposed new group camp. August 2, 2007.



Photo 9. Pine-spruce-aspen-(paper birch) mixedwood forest along hiking trail between Gregg Lake (south parking lot), and Loop F (Fox Den). Looking northeast toward Gregg Lake. August 4, 2007.