Background Paper 4

Features Inventory

Kootenay Plains Ecological Reserve

Support Document for Visitor Services Development Plan for the David Thompson Corridor
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Introduction

This background paper reviews current information about the Kootenay Plains Ecological Reserve. Materials include the reserve’s management plan, a number of reports on the flora and fauna of the site, and a wide variety of sources on the natural cultural history of the Kootenay Plains.

The paper is illustrated by photographs taken by Will Husby of EcoLeaders Interpretation on field visits to the ecological reserve in the summer of 2010. This document also includes a number of original maps based on one or more of the maps from original research reports cited in the text.

Although all effort was made to access all reports and documents about the Kootenay Plains, this background paper is not to be though of as a complete summary of all that is known about this important site. Visitor Services Staff should consider this as a starting point to which they can add new information as it becomes available.
The Role of Ecological Reserves

According to the Kootenay Plains Ecological Reserve Management Plan (1996), "Ecological Reserves are areas selected as representative or special natural landscapes and features of the province, which are protected as examples of functioning ecosystems, as gene pools for research, and for education and heritage appreciation purposes."

Ecological Reserves are established to achieve four program objectives of Alberta Parks:

- Protection: to protect the full range of landscapes, environmental diversity and special natural features of Alberta
- Outdoor Recreation: to protect natural landscapes throughout Alberta for a variety of resource-based, dispersed recreation pursuits
- Heritage Appreciation: to protect landscapes that ensure, for Albertans and visitors, the opportunity to explore, understand and appreciate the full range of Alberta’s natural heritage
- Tourism: to protect areas capable of sustaining adventure travel and ecotourism, including extended tours, and enable visitors to experience the unspoiled landscapes and abundant wildlife representative of Alberta’s natural regions.

According to the management plan, the most important objective of ecological reserves is protection. Ecological reserves are legally established areas that protect natural heritage, conserve biological resources and promote on-site conservation of species and ecosystems.

Role of Kootenay Plains Ecological Reserve

The Kootenay Plains has been designated as an Ecological Reserve primarily to protect a portion of land in Alberta that represents the Montane Sub-Region. The Douglas fir forest, limber pine and grassland mosaic typical of Montane are all found at Kootenay Plains. The river valleys, outwash plains, moraine fields and mineralized wetlands are also typical Montane landforms found within the Ecological Reserve. The area is protected as an Ecological Reserve because it includes so many natural features that represent the Montane subregion.

Further, the reserve’s management plan states: “A secondary role of the Kootenay Plains Ecological Reserve is the protection of a number of special features that enhance its importance as a protected area. The Siffleur Falls, Native ceremonial sites, rare plants and wildlife mineral licks are a few examples of special features found in the Reserve. Details on all special features are found later in the management plan. A third role of the Kootenay Plains Ecological Reserve is the importance the area plays in presenting Alberta’s ecological reserves program to a large number of visitors. Kootenay Plains Ecological Reserve is unusual among the ecological reserves in Alberta in having a large number of visitors.”
The Kootenay Plains Ecological Reserve contains 3,438.655 hectares (8,496.80 acres) of the North Saskatchewan River Valley south of the Abraham Lake reservoir (see Figure BP4.1). It includes some unique physical and topographic features, including a spectacular waterfall and canyon along the Siffleur River, a wide section of the North Saskatchewan River Valley dominated by a complex system of terraces deposited by glacial meltwater, alluvial fans and active floodplains.

Its unique location in the rain shadow of the Rocky Mountains and position in the northern edge of the Chinook region of Alberta result in a dry climate that supports a number of regionally unique plant communities including grasslands. These plant communities and low accumulation of snow in winter support an abundance of large mammals especially elk. Throughout human history the abundance of game has attracted people to this area. According to Uwe Wittkugel (Management Concept For A Kootenay Plains Ecological Reserve. Masters Thesis: Faculty of Environmental Design, University of Calgary, 1983), the Kootenay Plains Ecological Reserve, established in 1983, was the first ecological reserve designated in Alberta. It was established in response to concerns about habitat damage from recreational activities, especially off road vehicles.

The Kootenay Plains Ecological Reserve is located within the Montane Subregion of the Rocky Mountain Natural Region. This subregion is characterized by chinooks and is intermittently snow-free in the winter (for more on Chinooks see Background Paper 1).

The montane climate is generally dry and windy. This is enhanced by air moving down the North Saskatchewan River valley corridor. The resulting climate is one that experiences moderate winter temperatures and higher winter precipitation than the surrounding area.

GEOWEST Environmental Consultants (1997) indicate an average annual precipitation for the Kootenay Plains is 280 mm. High average wind speeds and the rain-shadow effect result in high evapotranspiration rates for the area. Prevailing winds are from the west to northwest.

Average mean summer temperatures (May to Sept.) are between 10 to 11°C.

Dry springs are common, sometimes causing drought-like conditions, especially on southern aspects.
Figure BP4.2: The location of Kootenay Plains Ecological Reserve in the North Saskatchewan River Valley.
**Geomorphology**

**Surficial Geology**

According to McPherson (*Landforms and Glacial History of the Upper North Saskatchewan Valley*, Canadian Geographic XIV (1), 1970), the valley system housing the Kootenay Plains was initially cut by stream action during the Tertiary period. This was followed by at least two major glacial advances down the upper portion of the North Saskatchewan Valley. McPherson (1970) proposed that the second and main glacial advance took place during the late Wisconsin period. The age of the first glacial advance is more difficult to determine because much of it was obliterated by the actions of the second advance. Geologist believe that the retreating first advance glaciers deposited at least 107 meters of sands and gravels on in the valley bottom.

The second ice advance is responsible for the landforms presently found in the ecological reserve. The advancing second glaciation reworked the deposits laid down by the first, forming landforms including drumlins and fluted ground moraine found between Thompson Creek (west of the ecological reserve) and the mouth of the Siffleur River.

Because the ecological reserve is located at lower elevations in the North Saskatchewan River valley, morainal deposits have been reworked by glacial meltwaters. Therefore, the dominant surficial deposit found within the Kootenay Plains Ecological Reserve is of glacial melt-water origin. The structure of these materials can be attributed to the slow meltdown of the glaciers that last occupied this valley. According to Bruhjell, D.R., A. Saxena, J.A. Bentz and R. Schultz (1997). *Biophysical And Significant Ecological Features of the Kootenay Plains Ecological Reserve*, this glacier did not retreat, it remained stationary and fell apart.

During the meltdown period, huge amounts of debris-laden glacial meltwater took the leading role in landscape forming processes. A large amount of gravel and sand (meltwater outwash sediments from the glaciers) was deposited and reworked in channels along the edges of the ice sheets. This melting time was a period of alternating erosion and deposition of material. The terraces that result from these processes are found throughout the ecological reserve. They are very stony, consisting of a mixture of sand, silt and clay.

Finally, most of the surface of the Kootenay Plains is covered with a thin wind-blown silty veneer up to 30 cm thick that originated from the floodplain and was deposited by the strong westerly prevailing winds blew over the exposed glacial till picking up, then depositing fine-grained loess.

**Land Systems and Units**

Wittkugel (1983) defined four land systems units within the reserve. The two most prevalent systems are the valley bottom fans and floodplains, and the slightly higher lateral benches. Materials in both consist mainly of wind-blown deposits (loess) over gravel. Wittkugel claimed that the valley’s strong, frequent winds continually deposit new loess material and thereby bury existing soils. The four land systems units are described in more detail below. Also see Figure BP4.2 for the location of these Land System Units.

1. **Fans and Flood Plain Land System**

Fans are formed where swift streams and rivers flowing down steep slopes reach flatter terrain. Where their flow slows, they drop large amounts of gravel silt and sand in fan-shaped deposits. This land system covers the central portion of the ecological reserve and straddles the North Saskatchewan River.

Two types of fans are present:

- fans formed by small permanent streams
  - most common fan formation in the reserve
  - slopes vary from five to nine percent
  - individual fans may be 1½ km wide at the toe
  - several fans coalesce into single large fans several kilometers across
  - consist mainly of moderately well sorted gravel and often contain sand lenses
- fans formed by larger rivers (e.g., Siffleur River and the Whitrabbit Creek)
  - slope is generally gentler than 5%
  - material varies from coarse gravels of recent stream beds to stratified fines 1m or more thick

2. **Lateral Bench Land System**

These are the bench-like features along the valley sides. The steep slopes (50-70%) dropping from the benches to the valley bottom are somewhat faceted so that wind exposed and sheltered slopes can be distinguished.

Other bench areas are undulating to rolling with slopes of five to 30 percent.
Figure BP4.3 The location of the Land System Units described by Wittkugel (1983). Note that Wittkugel's boarders of the ecological reserve no longer correspond to current boundaries.

1. Fans and Floodplains
2. Lateral Benches
3. Mountain Slopes
4. Rocklands
3. **Mountain Slope Land System**
This system encompasses the mountain slopes and fans of recently weathered rock of the valley walls up to the treeline. The slopes are generally steep (30-70%) and surface material is coarse textured colluvium with some talus, scree, and rock outcrops.

This land system appears exclusively within the south west end of the ecological reserve, where slopes are east to south east facing.

4. **Rockland Land System**
These are barren rock areas represented at Whirlpool Point. The bedrock is mainly composed of bedded and fractured limestone and dolomites with some sandstone and shales outcropping at higher elevation.

**Other Important Geomorphological Features**

**Front Range of the Rocky Mountains**
Although the ecological reserve is located entirely within the North Saskatchewan River Valley, it offers many spectacular views of front range mountains. The western boundary of the reserve nearly corresponds with the Bourgeau thrust near Whirlpool Point—the western extent of the Front Ranges. Details on the formation and structure of these mountains can be found in Background Paper 1.

**North Saskatchewan River Valley**
The valley shows the typical U-shaped sides of a glacial valley. The ecological reserve is situated mostly on the valley floor but includes some sections of valley walls (see Figure BP4.2 on the facing page).

**Calcareaous Cliffs**
Bruhjell et al (1997) consider these limestone outcrops to be the most significant geological features of the Kootenay Plains because they provide habitat for regionally uncommon plant species such as prairie selaginella, slender lip fern and smooth cliff brake. These authors indicate that these cliffs can be found in many locations in the ecological reserve and included one in their significant features map (see Figure BP4.12 on page 16).

**Siffleur River Canyon**
This spectacular canyon is one of the key visitor attractions in the ecological reserve. Here the Siffleur River has cut deeply exposing the steeply sloped strata of sedimentary bedrock.

**Whirlpool Point**
Whirlpool Point, an isolated bedrock massif in the southern part of the ecological reserve is considered a significant feature because it is a unique landform, supports a tree of renown (an old Limber Pine over 1,000 years old), and provides outstanding wildlife habitat.
Effects of Grazing

According to Wallis and Wershler (1981), the Kootenay Plains’s fire history combined with the effects of grazing produce conditions that tend to favour grassland communities over deciduous tree communities. They conclude that feral and domestic horse overgrazing on the east side of the North Saskatchewan River occurred up to 1979 and has reduced plant species diversity and increased mineral soil exposure—making the grasslands even drier. That said, it appears that this ecosystem has historically been subject to periodic occurrences of fire and heavy grazing. Historical reports record large populations of elk and bison in Kootenay Plains. Park staff indicate that there still is heavy ungulate use in winter.

Vegetation and Plant Communities

Table BP4.1 Rare Plant Species in Kootenay Plains Ecological Reserve

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<td>Few-leaved Groundsel (Senecio cymbalariaoides)</td>
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Vegetation

The vegetation of the Kootenay Plains is a result of many environmental variables including physiography, climate, fire and effects of current and historic grazing of ungulates and domestic animals. The climate of the area is strongly influenced by the Rocky Mountains. Chinooks combined with a rain-shadow affect, produce high evapotranspiration rates setting up conditions for drought tolerant vegetation such as grassland and savannah grassland communities. As well, the extensive presence of fire-adapted lodgepole pine stands suggest a history of fire along this section of the North Saskatchewan River Valley.

Wallis and Wershler (Kootenay Plains Flora And Grassland Vegetation Assessment, Cottonwood Consultants, 1981) identified the vegetation of the Kootenay Plains as a significant biological resource with disjunct montane woodland and grassland plant communities typical of the Montane subregion (disjunct = occurring in widely separated geographic areas, distinctly separate or discontinuous to the species normal range). Vegetation in the ecological reserve is representative of montane subregion’s characteristic mosaic of forests and grasslands. Upland sites are dominated by lodgepole pine forests while white spruce forests generally occur on terraces and along watercourses. Aspen and balsam poplar stands are generally restricted to river depositional fans and terraces. Many exposed rock outcrops and some well drained slopes are dominated by limber pine and shrub communities.

Well drained southern aspects, floodplains, terraces and fans are dominated by grassland communities.

Rare Species

Studies of the flora of the ecological reserve have taken place in 1979, 1981 and 1996. A total of 16 rare species have been identified (see Table BP4.1). Interestingly, this table shows a wide variation in the number of species identified in each study. Geographic Dynamics Corp. (1996) suggested that because each study took place at a different time of year and that there were major variations in annual precipitation in the years that the studies took place some species were probably overlooked by the researchers. This is because many plants are tiny and their key identification features (flowers and/or seeds) may not have been present during the times some studies took place. Therefore, some rare species will have been overlooked or unidentifiable. Geographic Dynamics Corp. (1996) strongly recommend that regular summer-long plant censuses should be undertaken to clarify the presence of rare plant species. As well, they will determine if some of these species have been extirpated.
Wallis and Wershler (1981) identified six major and nine minor grassland communities. All these communities are variations of the Northern Wheatgrass–June Grass–Pasture Sagewort–Pussy toes grassland community. The six major grassland communities include:

- **Northern Wheatgrass–June Grass–Pasture Sagewort**
  - most common grassland community in the Kootenay Plains Ecological Reserve
  - found on well-drained, mesic sites
  - uncommon species: Hooker’s Townsendia

- **Northern Wheatgrass–Dragonwort–Pasture Sagewort**
  - found on well-drained sites
  - less common than the previous community.

- **Northern Wheatgrass–June Grass–Pasture Sagewort–Pussy toes**
  - on moderately well to well-drained sites, with a greater abundance of forbs
  - rare species include one-flowered ironplant

- **Northern Wheatgrass–Pussytoes**
  - along woodland edge,

  - **Pussy toes**
    - in the transition between the grassland and forest, and along drainage channels
    - may include grape fern

  - **Creeping Juniper**
    - is actually a Northern Wheatgrass–June Grass–Pasture Sagewort community, with depressions dominated by creeping juniper
    - may include Hooker’s oatgrass

**A Missing Grassland Species**

Rough fescue (*Festuea scabrella*) is prevalent in most grasslands in Alberta but has not been found in the Kootenay Plains. Wallis and Wershler (1981) speculated that its absence may be the result of the severe grazing pressure by wildlife (bison, elk, sheep) in the 1800’s, as well as horses in the 1900’s.
**Limber Pine**

This is an important tree species that is growing in the Kootenay Plains Ecological Reserve. Here it grows at the furthest northern extent of its range. The reserve includes a tree located near Whirlpool Point that is designated by the Heritage Tree Foundation of Alberta (http://heritagetreefoundation.com/) as a Tree of Renown.

**Habitat**

Limber pine in Alberta is usually found on south- and west-facing slopes. These sites are usually quite dry because they receive more sunlight and are exposed to the drying influence of strong westerly winds.

Limber pine grows on a variety of topographies, from gently rolling terrain to cliffs. It is most often found on rocky ridges and on steep rocky slopes, especially those with southern or western exposures, and can survive in extremely wind-swept and dry areas. Often limber pine is the only tree species capable of growing on many of these sites. Sites with limber pine in the foothills and Porcupine Hills, generally have deeper soil, although many trees still grow on rocky outcrops. All of the growing sites for limber pine are dry to fairly dry because of the rapid run-off on the steep slopes, coarse soils on which they grow, and their exposure to strong winds and direct sunlight (especially on south-facing slopes).

Throughout most of its range, limber pine is a successful colonizer of disturbed sites—usually the first tree to colonize burned sites because of rapid seed dispersal by Clark’s nutcrackers and its high tolerance of harsh, dry conditions.

The most common shrubs associated with limber pine are common juniper, creeping juniper, shrubby cinquefoil and bearberry. Grasses are common on most limber pine sites.

**Biology**

Limber pine is slow-growing and long-lived. The oldest recorded tree in Alberta is 642 years. 200–400 years-old trees have been found in the northern part of its range. In its southern range, large old trees are now quite rare because of high mortality from the mountain pine beetle.

This is a short tree, rarely taller than 15 m. Diameter may be as large as 60 cm in very old trees. On mature trees, the trunk is short and stout, markedly tapered and crooked. In response to harsh growing conditions, older trees often have a bushy growth form. Young branches are very flexible and bend without breaking. On windswept sites, these trees have a krummholz growth form—stems are bent and grow flat along the ground.

Roots of limber pine are known to be associated with a mycorrhizal fungus (*Gomphidius smithii*). Currently no one has investigated the importance of this relationship to the tree’s survival.

**Reproduction**

- reproductive age in Alberta has not been examined
- however, limber pine in the USA does not begin to bear cones until at least 50 years
- pollination by wind occurs in June and July
- fertilization occurs the following spring or early summer, after which cones and seeds mature rapidly
- cones turn colour from green to light brown as they mature
- in Alberta, cones mature in late August to early September
- large cone crops produced every 2–4 years
- seeds are large and wingless
- drop from open cones over a 2–3 week period in late August and early September
- typically fall within the drip line of the tree
- seed dispersal is mainly carried out by rodents and birds
- the red squirrel is not an effective seed dispersor because it harvests green cones when the seed is not yet viable
- mice and voles harvest seed that has fallen to the ground and often cache it
- these caches are usually close to the source tree and are often located in poor germination sites
- Clark’s nutcracker is the most important user and efficient disseminator of limber pine seed
- harvest ripened seed from open cones in August and September
- transport them (in mouth pouches located underneath their tongues) up to 22 km away
- can carry up to 125 seeds per trip
- caches of 1-5 seeds are buried 2-3 cm in the ground
- many of these caches are not later used
- in a US study, nutcrackers cached 30,000 limber pine seeds per hectare per year
- preferred Clark’s nutcracker cache sites are windswept ridges with southerly aspects—ideal germination sites for seeds
- snow does not accumulate
- ground is exposed in early spring
- seeds in caches remain viable for up to two years

The mutualism between limber pine and Clark’s nutcracker is highly evolved and important for the survival and well-being of both species.

In many parts of its range, limber pine seeds are important source of food for bears.

**Mortality Factors**

Limber pine trees are infected and killed by white pine blister rust throughout its range. Any species of currant (*Ribes spp.*) found in Alberta is an obligate alternate hosts of the rust. If currants are not present, limber pines cannot become infected by this fungus.

This pine is susceptible to numerous other fungal diseases and can be heavily infected or killed by limber pine dwarf-mistletoe and is susceptible to infestation by mountain pine beetles, cone beetles, coneworms, and budworms.
Forested Lands

Wittkugel (1983) concentrated on the study of the reserve’s forested areas. He identified six major forest communities:

- **White Spruce–Willow**
  - occurs on fans and floodplains of the North Saskatchewan River
  - tree canopy is open and trees somewhat stunted

- **White Spruce–June Grass**
  - occurs along dry terraces on fans and floodplains of the North Saskatchewan River,
  - dominated by plant species adopted for drier conditions, such as June grass, bearberry, and juniper

- **Limber Pine–June Grass**
  - occurs on windy ridges with southern exposures

- **Douglas Fir–June Grass**
  - Douglas fir stands in the Kootenay Plains Ecological Reserve are quite rare
  - Kootenay Plains and the Athabasca Valley in Jasper National Park are the few places north of the Bow River where Douglas fir occurs
  - interspersed individual fit trees or clustered with limber pine stands
  - only one stand of pure Douglas fir was found by Wittkugel
  - oldest Douglas fir was 374 years

- **Lodgepole Pine–Buffaloberry**
  - fairly extensive, covers a large portion of the reserve
  - originates from fire

- **Trembling Aspen–Strawberry**
  - limited by low water availability
  - found along stream channels and where ground water is available

Invasive Plants

No extensive studies of invasive plants have taken place in the reserve. However, in 1997, Bruhjell et al (1997) indicated that nonnative plant invasion in the ecological reserve was minimal. Significant populations are restricted to areas that are continually disturbed, primarily trails, roadsides, riversides and the shoreline of nearby Abraham Lake.

In addition to the influence of regional precipitation and temperature regimes, vegetation community development is influenced by microsite variability in terms of aspect, slope steepness, moisture and nutrient regimes and disturbance factors such as fire, flooding and grazing.
Microbiotic Crusts

If you walk across what appears to be bare or sparsely vegetated grassland and hear a little crunch under your feet, you are most likely walking on a microbiotic soil crust. This crust is a complex mosaic of living organisms—algae, cyanobacteria (blue-green algae), bacteria, lichens, mosses, liverworts, and fungi—that grow on or just below the soil surface. Microbiotic crusts are often thought of as desert phenomena. However, they are common in dry grasslands such as those in Kootenay Plains Ecological Reserve. Microbiotic crusts are common worldwide in arid and semi-arid grasslands, shrublands and woodlands.

These living crusts, though very thin and very fragile, are vital to some prairie plants and soil biota. They are a spongy layer that helps protect soil from erosion, absorbs moisture, and provides nitrogen and other nutrients for plant growth.

During drought and frost, the microbiotic crust uplifts and cracks. These cracks provide germination sites for seeds from grasses and forbs.

Grasses and forbs typically cover most prairie soils, but microbiotic crusts can be found on exposed hill tops and outcrops in dry microclimates.

There is a lot of variation in what microbiotic crusts look like. Colour and texture is determined by the organisms present and this in turn dependant on soil chemistry and physical characteristics, and weather patterns. Microbiotic crusts are distinguishable from bare soil by a bumpy appearance, forming sort of a mini-landscape on the soil surface of hills and valleys. They tend to be dark colors, especially when dry. However if a little moisture is added they may transform to vivid greens, yellows, and oranges as the mosses and lichens come out of dormancy and spring to life.

What They Are Not
Microbiotic crusts are not physical or chemical crusts. These are formed by different processes and tend to form a hard, impermeable layer on the soil surface. They also lack the biological characteristics that make biological soil crusts unique.

Why They Are Important
Microbiotic crusts are a carpet of photosynthetic life that can strongly influence local ecology.

Soil Stabilization
Microbiotic crusts contribute to soil stability and reduce wind and water erosion. Surface soil particles are bound together by algal filaments and fungal mycelium. Studies using scanning electron microscopes also show that some blue-green algae change soil structure by surrounding themselves with sticky polysaccharide sheaths that wind through soil. Soil particles become glued to the sheaths. These soil-binding structures may extend as deep as 10 cm.

Increased Soil Fertility
Nitrogen is an essential plant nutrient but although it is present in high abundance in the atmosphere, most higher plants (e.g., grasses, forbs, shrubs and trees) can not use it in its gaseous form. They must rely on animals and bacteria to convert gaseous nitrogen into usable nutrients. Blue-green algae in the crusts, both free-living and associated with lichens, convert atmospheric nitrogen into usable natural nitrogen fertilizer in the soil.

Microbiotic crusts also fix carbon through photosynthesis and contribute to the primary production of arid and semi-arid ecosystems.

Why They Are Important
Microbiotic crusts may help the soil to retain more moisture. The extent to which this occurs depends on both the composition of the crust and soil characteristics. Crusts that contain significant amounts of moss and blue-green algae have been shown to hold more water in the first centimetres than bare soil.

Assisting Germination of Native Seeds
The spongy texture of the microbiological crust holds moisture, including dew, at the soil surface, providing some moisture to germinating native grass, forb and shrub seeds.

Weed Exclusion
The nature of this crust works to keep exotic weeds out. Native plants, that evolved with biological soil crusts have developed mechanisms to allow seeds to penetrate the crust (e.g. small size, or structures that “drill” them into the crust). Seeds of some exotic species are quite large and may not have a way of getting through the crust.

Trampling of Microbiotic Crusts
Once fragmented by footsteps, mountain bikes, or vehicles, microbiotic crusts may take years to recover. Damage may reduce total microbiotic crust cover or reduce the number of species that make up the crust.
Wildlife

Mammals and Birds
Although no thorough on-site inventory of wildlife has taken place, it is clear that the Kootenay Plains support a broad diversity of wildlife. In 1981, Wallis and Wershler in a study of plants in the Kootenay Plains identified 65 species of birds, 14 mammals and 2 amphibians that they claim have been recorded in the area. Bruhjell et al (1997), looking at species distribution literature in Alberta, speculated that these numbers may be as high as 76 species of birds and 49 species of mammals. Bruhjell et al (1997) include (COSEWIC) listed species such as grizzly bear, wolverine, and great gray owl in their speculative list. Their list also includes provincially listed mammals such as Columbian ground squirrel, long-tailed vole, timber wolf, cougar, lynx, long-tailed weasel, fisher, elk and bighorn sheep as well as birds including osprey, bald eagle, three-toed woodpecker, piliated woodpecker, mountain chickadee, winter wren, varied thrush and a few waterfowl. Bruhjell et al’s species list is included at the end of this chapter.

Birds of Special Interest
The management plan (1996) indicates that mountain bluebirds are common in the reserve. However, it is noted that bluebirds have suffered a widespread decline over their entire range including the Kootenay Plains.

Barn, tree and rough-winged swallows have been reported in this Reserve. Bank swallows may also be present. The tree swallows occur next to the grasslands but the others are prevalent along the river.

Large Mammals of Special Interest
The grasslands in the Kootenay Plains Ecological Reserve support a large number of ungulates. Bruhjell et al (1997) list elk, moose, white-tailed deer, mule deer, bighorn sheep, and woodland caribou (a species living in or traveling through the Kootenay Plains and surrounding area). Mountain goats are also present at higher elevations surrounding the ecological reserve. According to park staff, elk are by-far the most numerous. In winter they feed on the reserve’s high-nutrition grasses and make use of the region’s lack of snow cover (in most winters).

Bruhjell et al (1997) cite observations from the journals of Alexander Henry, who noted in 1811 that “Buffalo are very numerous on this plain ... moose and red deer (elk) are also plenty; jumping deer, grizzly bears, and other animals peculiar to this country are also found here”. Henry and later John Palliser (1863) both made reference to several large herds of bighorn sheep feeding on the grasslands. Bruhjell et al (1997) state that overhunting in the early 1800s resulted in a steady decline of ungulate numbers. Bison likely were extirpated from the Kootenay Plains by 1859.

European settlers took advantage of the livestock grazing potential of the Kootenay Plains around the turn of the century. They brought horses through the Clearwater and Siffleur river valleys and established ranches. The abandonment of these ranches left a population of feral horse herd inhabiting the valley. By the mid-1900s, feral horses were depleting the grasslands. Horse culling was implemented in the 1930s.

Grizzly Bear
Grizzlies have historically used the Kootenay Plains habitats to hunt elk and moose. Bruhjell et al (1997) conclude that in recent times, it is likely that grizzly bears have reverted to higher elevation sub-alpine habitats above the reserve.

Small Mammals
The small mammal populations in the reserve have not been studied. However they are likely representative of the Montane ecosystem. Bruhjell et al (1997) include a speculative list of mammals that may be present in the ecological reserve.

Abundance
Compared to historic reports of ungulate abundance, present day populations appear to be relatively small. Past surveys conducted by Alberta Fish and Wildlife Services in the Kootenay Plains Ecological Reserve revealed fluctuating use of the area over the past few years, with 30 elk observed in the area in 1990, none in 1993 (tracks only), and 94 in 1994.

Historical and recent observations confirm the significance of the Kootenay Plains as winter range for ungulates, particularly elk.

Migration Routes
Elk and mule deer are two species known to migrate considerable distances between their winter and summer ranges. Wittkugel (1983) indicates that there is no information about the exact location of summer ranges of the ungulates that overwinter in the Kootenay Plains. He does say that the main migration routes for these animals are the valleys of the North Saskatchewan, the Siffleur and Cline River, and Whiterabbit Creek.
Easily Viewed Wildlife Signs
Multiple wildlife trails on steep terrace slopes can be seen year-round from the trails in the ecological reserve (see Figure BP4.8). These trails are made by browsing elk, deer and bighorn sheep. They are also used as escape terrain by bighorns when they are grazing in nearby meadows.

Winter Distribution of Large Mammals
Mussel (1982) found that the highest ungulate use of the Kootenay Plains occurs during winter:

Elk
- likely the most important present-day user of the Kootenay Plains, primarily during winter
- pellet densities highest in open pine/spruce forests and grasslands
- roadsides, upland forests, open slopes, medium dense pine forests, and vegetated alluvial flats also frequently used
- distributed throughout the ecological reserve
  - highest use density on a grassland located on the west side of the Hwy. 11

Deer
- use all habitat types used by elk except roadsides and disturbed grassland

Moose
- prefer deciduous shrubs and trees in riparian habitat on alluvial flats
  - e.g., white spruce/willow-birch communities around the Siffleur River and Whiterabbit Creek.

Bighorn sheep
- confined to the open windswept slopes and ridges (e.g., limber pine communities)
  - less seasonality in the occurrence compared with all other ungulate species
  - often frequent at the Whirl Pool Point (lick salt on Hwy. 11)

Mineral Licks Are Important
Mineral licks are documented within the reserve. Of these, a mineral lick near Whirlpool Point provides salt for the areas ungulates. Mineral licks are places where below-ground mineral springs upwell to deposit materials collected by waters percolating through surrounding soils. These mineral-laden seeps can range in size from a few metres.

In the Kootenay Plains Ecological Reserve, mineral licks are unique habitat features important in the ecology of elk, deer, bighorn sheep and moose.

Mineral licks used by elk, deer and moose are generally characterized by well worn trails leading to wet muddy springs or seepage areas. The springs and soils in these seepage areas have high concentrations of minerals. Although various elements such as calcium and magnesium, trace elements, and sulfur have been suggested as major lick attractants, most studies have concluded that sodium is the main attractant for ungulates.

In “Sodium Dynamics and Adaptations of a Moose Population,” published in 1981 in the *Journal of Mammalogy*, G.E. Belovsky and P.A. Jordan reported that plants provide many mineral nutrients for herbivores, but they appear to be an insufficient source during certain seasons.

Mineral lick use by ungulates is seasonal, occurring mostly in spring and early summer. This seasonal use may be due to sodium loss in urine and feces from ingesting large quantities of potassium and water in new-growth forage, from winter depletion of mineral reserves, and from increased mineral demand due to pregnancy and lactation, molting and antler growth.
Amphibians
Only two species have been identified in the Kootenay Plains Ecological Reserve; the spotted frog and the western toad.

Additional Species
Wood frogs have been collected outside the reserve from an area immediately adjacent to Abraham Lake.
The reserve’s management plan speculates that long-toed salamanders may occur in the some of the small ponds in the reserve.

Fish

Tebby (Fishes of Abraham Lake (reservoir) and the Upper North Saskatchewan River, Alberta Lands and Forests, 1974) described this basin as the most naturally depauperate of Alberta’s major watersheds.

However, Brubjell et al (1997) indicate that the variation in hydrological regimes in and around the Kootenay Plains Ecological Reserve provides the region’s watercourses with a diverse complement of fish habitat. As a result locally, the North Saskatchewan River and Abraham Lake is populated by 13 fish species:

Six Salmonids:
- mountain whitefish
- bull trout
- cutthroat trout
- rainbow trout
- lake trout
- brook trout

Three species of sucker:
- longnose sucker
- mountain sucker
- white sucker

Two species of Minnow (Cyprinidae)
- longnose dace
- lake chub

One species of Sculpin (Cottidae)
- the spoonhead sculpin

Not all of these species are indigenous to the North Saskatchewan drainage:
- cutthroat trout were introduced in 1929
- rainbow trout were introduced in 1934
- brook trout were introduced in 1941
- brown were introduced trout in 1948

See Background Paper 1 for a detailed review of the natural history of native bull trout.

Insects

The Kootenay Plain’s long ice-free conditions and unique mix of habitats and flora could result in a unique and interesting insect fauna. However, the area does not seem to have been studied extensively. The only insect group that appears to have received some study is the lepidoptera (butterflies and moths). In 1986, N.G. Kondla published Skippers and butterflies of the Kootenay Plains, Alberta (Alberta Naturalist 16:11-14, and the University of Alberta cites the presence of two species of noctuid moth in A few tips regarding butterfly collecting in Alberta (http://iccb2010.biology.ualberta.ca/Collecting%20spots%20in%20Alberta.pdf). In 2007, the Alberta Lepidopterists’ Guild published 2006 Survey of Montane Macro-Moths (www.biology.ualberta.ca/uasm/alg/downloads/Schmidt_2006_Montane_Survey_BCS_23Nov07.pdf) which identified a number of rare and common moth species captured using light traps near Whirlpool Point on the night of July 7, 2006.
Figure BP4.12. Location of key Environmentally Significant Features identified by Bruhjell et al (1997).
Environmentally Significant Features

The ecological reserve is a mosaic of open forests and grassland communities typical of the Montane Sub-Region (see Figure BP4.12). Bruhjell et al (1997) defined environmentally significant features within these communities as areas which are deemed to be important to society in terms of ensuring the maintenance of ecological processes or by the provision of useful products.

Further, Bruhjell et al (1997) indicate that these areas are often sensitive to disturbance.

The presence of montane woodland and grassland, important ungulate wintering habitat, make the entire Kootenay Plains Ecological Reserve significant. Many rare wetland and calcareous cliff habitats, not represented elsewhere in Alberta, are also present within the reserve.

Significant features of the Kootenay Plains Ecological Reserve identified by Bruhjell et al (1997) are summarized below.

Provincially Significant Sites

Montane Grasslands

Location: throughout the ecological reserve

Description:

- occupies large portions of the North Saskatchewan River valley floor and adjacent fans and terraces
- consist of montane grassland communities that are separated from the main, continuous portion of Alberta grassland habitat

Key Features

- one of only two extensive northern cordilleran montane woodlands in Alberta
- the largest, most diverse area of disjunct Montane vegetation in Alberta
- supports extensive and diverse grassland communities
- habitat for rare Albertan species including one-flowered ironplant and mountain mare’s-tail
- many disjunct grassland or montane plant species
- spring grizzly bear habitat on south facing slopes
- important elk winter range
- key mule deer and bighorn sheep habitat
- spotted frog habitat (rare species in this region)
- grizzly bear have been documented in and around the ecological reserve
- Bruhjell et al (1997) recommends detailed investigations to determine whether these populations exist within the ecological reserve

Sensitivity: High

Nationally Significant Sites

North Saskatchewan River

Location: dissect the reserve

Description:

- part of upper portion of the North Saskatchewan River
- supports an important sport fishery
- part of an important wildlife corridor
- high landform diversity (meanders, braided channels, islands, point bars)

Key Features

- a nationally important, interprovincial watercourse
- provides critical hydrological function, including groundwater discharge
- provides habitat for a number of rare and uncommon plant species
- sustains a portion of the ecological reserve’s 11 fish species including mountain whitefish, bull trout, brook trout, cutthroat trout, rainbow trout, longnose dace, lake chub, longnose sucker, white sucker, mountain sucker and spoonhead sculpin
- includes numerous regionally scarce calcareous wetlands

Sensitivity: Moderate
Montane Woodlands

Location: throughout the ecological reserve

Key Features
- occupies large portions of the North Saskatchewan River Valley floor and adjacent fans and terraces
- one of only two northern cordilleran representatives of extensive montane woodland in Alberta
- the largest, most diverse area of disjunct Montane vegetation in Alberta
- numerous disjunct montane plant species
- includes isolated Douglas fir communities
- habitat for rare Albertan species including glandular Labrador tea, one-flowered ironplant and mountain mare’s-tail
- important elk winter range
- key mule deer bighorn sheep and moose habitat
- potential spring grizzly bear habitat on south facing slopes
- potential habitat for caribou
- spotted frog habitat

Sensitivity: High

Limber Pine Community

Location: throughout ecological reserve
- on rocky outcrops and primarily on glacial meltwater deposits and isolated rocky debris slopes

Key Features
- limber pine is restricted to montane environments
- the largest limber pine communities found in this region
- open, windswept slopes occupied by limber pine area
- a significant part of local bighorn sheep habitat

Sensitivity: High
**Unique Wetland**

**Location:**
- located in NW 13 - Twp.36 –Rge.18 - W5M
- a small wetland occurring between Highway No. 11 and the North Saskatchewan River, in the southern half of the reserve

**Key Features**
- located in a poorly drained depressional area
- consists of materials deposited by glacial meltwater
- provides habitat for a provincially significant vegetative community
- plant species include mountain mare’s-tail, Franklin’s sedge, rocky-ground sedge and sedge (*Carex simulata*)
- potential habitat for spotted frog and western toad
- likely temporary use by waterfowl

**Sensitivity:** High

**Unique Meadow**

**Location:**
- located in SW 24 - Twp.36 –Rge.18 - W5M
- west of Highway No. 11 on glaciofluvial materials with an discontinuous veneer of fine wind-deposited silt and dust

**Key Features**
- a vegetative community not described elsewhere in Alberta
- plant species include one-flowered ironplant, western wheatgrass and Nuttall’s salt-meadow grass

**Sensitivity:** High

**Small Rivers**

**Siffleur River**

**Location:** central portion of the reserve

**Key Features**
- the lower portion and mouth of the Siffleur River
- a key wildlife corridor
- high landform diversity (includes meanders and point bars)
- provides critical hydrological function, including groundwater discharge
- provides habitat for a number of rare and uncommon plant species
- sustains a portion of the area’s population of 11 fish species
- upper reaches are potentially very good harlequin duck habitat
- includes fossil exposures around a plunge pool below Siffleur falls

**Sensitivity:** Moderate

**Whiterabbit Creek**

**Location:** central portion of the reserve

**Key Features**
- the lower portion and mouth of Whiterabbit Creek
- an important wildlife corridor for ungulates and large mammals
- high landform diversity (includes meanders, islands, point bars)
- provides critical hydrological function, including groundwater discharge
- provides habitat for a number of rare and uncommon plant species

**Sensitivity:** Moderate

**Two O’Clock Creek**

**Location:** central portion of the reserve

**Key Features**
- the lower portion and mouth of Two O’Clock Creek
- important wildlife corridor
- high landform diversity
- provides critical hydrological function, including groundwater discharge
- provides habitat for a number of rare and uncommon plant species
- sustains a portion of the Ecological Reserve’s population of 11 fish species
- a recreational area

**Sensitivity:** Moderate
Human History

Significant Archaeological Features

The Kootenay Plains Ecological Reserve Management Plan (1995) has identified twenty-three prehistoric sites known to exist within the Kootenay Plains Ecological Reserve. These sites are extremely sensitive and are purposely excluded from the Significant Areas map. Archaeological studies within the reserve have been sporadic and project specific. The only extensive survey was conducted prior to the construction of the Big Horn Dam in 1972. Another study conducted in 1987 focused on the potential of selected landforms to have ancient sites greater than 8000 years of age. This study showed that the existing inventory represents only a percentage of the number believed to exist within the reserve.

Historically, the North Saskatchewan River was used as an important trade and travel corridor linking the Alberta Plains to the interior of British Columbia. Transitory groups, such as the Kutenai Indians who resided in the Rocky Mountain Trench, made numerous journeys into the Kootenay Plains each year to hunt bison and trade. Use by other indigenous groups have also been recorded in the area. Most of the known archaeological sites are small hunting and fishing camps and stone tool workshops.

Alberta Environmental Protection (1995) believed that the grasslands were likely larger in prehistoric times. These expanded grasslands would have been suitable for human occupation. Therefore the reserve may contain numerous undiscovered archaeological sites.

Overall, the archaeological sites in the area are the remains of prehistoric hunting and gathering cultures that have used the area for the past 12,000 years or more. Portions of the reserve is thought to have been ice-free near the end stages of the last ice age. The Kootenay Plains may have been part of the passageway that the ancestors of North America’s First Nations people emigrated from the Bering States/Yukon area to the southern plains. Consequently, it may contain some of the earliest evidence of human activity on the continent.
Recent History

The Fur Trade

The lands that make up the Kootenay Plains Ecological Reserve have been a fur trade transportation route since the eighteenth century. The first Euro-Canadian outpost in the region was Rocky Mountain House, established in 1799. The Kootenay Plains became an important hunting and trapping hinterland for the fur traders.

By 1810, the hostile Peigan Nation forced the Euro-Canadian fur traders to abandoned the Howse Pass. Afterwards, non-native occupation on the Kootenay Plains ceased for nearly one hundred years.

The 1900s to Present Day

Tom Wilson, guide and outfitter working out of Banff, established his Powderhorn Ranch during in the winter of 1902-03, near the confluence of Whiterabbit Creek and the North Saskatchewan River. He bought or rented his first cabin from Silas Abraham of the Stoney Nation. In 1903 Wilson built his own cabins closer to the North Saskatchewan and wintered his horse herd and that of other outfitters on adjacent land. Wilson remained for eight years. The site is now flooded by the Abraham Lake reservoir, but his cabin and outbuildings were moved by the Province to Two O’Clock Creek around 1970. The cabin was burned by vandals in the spring of 1994.

In 1905 Elliot Barnes established the Kadoona Tinda Ranch beside Two O’Clock Creek where he raised Clydesdale horses. Three years later, Barnes abandoned the operation.

The construction of the David Thompson Highway in the 1950’s provided access to Banff and Jasper National Parks through the Kootenay Plains. In 1974 Bighorn Dam was built, creating Lake Abraham.

Current First Nations Use

There is significant historical and continuing use of the reserve and surrounding area by local Aboriginal groups for religious and ceremonial activities. As well nearby lands are used for traditional activities such as hunting and trapping. According to the reserve’s management plan, sun dance lodges are set up in locations within the reserve and adjacent lands.

According to Wittkugel (1983), the Kootenay Plains is traditional camping and hunting grounds of the Stoney First Nation. The area has religious and cultural values the plains and surrounding mountains have always represented for the Stoney First Nations. Further, he quotes J. Snow (1977, These Mountains are Our Sacred Places. The Story of the Stoney Indians. Samuel Stevens. Toronto). Note this book includes a history of the local Big Horn community history it should be read by all ecological reserve staff.

“These mountains are our temples, our sanctuaries, and our resting places. They are places of hope, a place of vision, a place of refuge, a very special and holy place where the Great Spirit speaks with us. Therefore, these mountains are our sacred places.”

Traditionally, members of the Stoney Nation have used the Kootenay Plains area for their ceremonial activities.

The majority of their use has been on land that is leased to the band adjacent to the ecological reserve (see Figure BP4.13). Stoney people of the nearby Bighorn Reserve, have since July 1982, been authorized by Order in Council to administer and control two parcels of lands immediately adjacent to the ecological reserve. Provisions of the Order in Council restrict the use of these lands:

“the land shall be used by the Stoney Band uniquely for burial and cultural, religious and historical purposes and the Minister of Canada shall not permit or countenance upon the substituted land any activity which is not uniquely for the said purposes”.

Other Indian bands also use the area.

The band holds annual (August) meetings with special pow-wows, dances, and religious ceremonies, which last usually only a few days and include the building of a sun dance lodge as well as sweat houses. These structures are used only once. Their remains can be observed in many locations on these ceremonial lands.

The eastern area also contains relocated First Nations grave sites.
Recreation

Activities
Hiking and sightseeing appear to be the most popular recreation activities in the reserve.

Sight Seeing
Key attractive features include:
- many viewscapes of front range mountains
- the Siffleur River Canyon and Siffleur Falls
- the natural dry landscape
- wildlife watching
- the suspension bridge over the North Saskatchewan River

Hiking
The reserve has a suite of five linear trails:
- Glacier Trail
- Kinglet Lake Trail
- Siffleur Boundary Access Trail
- Siffleur Falls Trail
- a short un-named access trail from the Siffleur Falls Staging Area to Glacier Trail

For locations of these trails see Figure BP4.18 on the facing page. Hiking is encouraged on all trails in the reserve.

Through personal communications with park staff and through limited first-hand observation by EcoLeaders staff in the summer of 2010, it appears that the Siffleur Falls Trail is the most heavily used hiking trail in the reserve. This trail provides relatively easy access to view the Siffleur Canyon and Siffleur Falls. The trip to the first viewpoint overlooking the canyon takes about an hour’s walk (one-way from the Siffleur Falls Staging Area parking lot).
Kootenay Plains Ecological Reserve Trails

- Hiking
- Mountain Biking
- Equestrian
- Wildlife Viewing Site

Figure BP4.18. Trails in the Kootenay Plains Ecological Reserve.
Mountain Biking
Mountain biking is allowed on Glacier Trail. The reserve’s management plan (1996) indicates that monitoring of the trails will determine if habitat damage is occurring as a result of cycling and if so, regulations will be changed to protect the reserve’s delicate landscapes.

Horse Riding
The reserve’s management plan (1996) indicates that part of the northern section of Glacier Trail will be open so that equestrian riders can cross the reserve to access trails outside the reserve in the Whiterabbit Creek and North Saskatchewan River valleys.

Camping
Camping is not permitted in the reserve. However, it is available nearby at Two O’clock Creek Campground and Cavalcade Group Campground in the Kootenay Plains Provincial Recreation Area adjacent to the ecological reserve.

Wildlife Viewing
The reserve provides many wildlife viewing opportunities. The management plan identifies the following key locations:
- Whirlpool Point
  - one of the best wildlife viewing site in the reserve
  - features bighorn sheep, waterfowl, amphibians and swallows
  - also a mineral lick on the east side of the North Saskatchewan River
  - used by elk, deer, bighorn sheep etc.
- Grasslands along Hwy. #11 west of Two O’Clock Creek
  - good viewing of flickers, kestrels, swallows, bluebirds and meadowlarks
  - elk are common during the winter
- Trail to Siffleur Falls
  - good opportunity to view birds in open woodlands and mature conifer forest
- Trail to the north, up onto the ridge toward the mouth of Whiterabbit Creek
  - in the early spring and summer there is a good chance of seeing ungulates at a mineral lick
  - open meadows to the north-east of the ridge are used by deer and elk
Management Objectives
The reserve’s management plan (1996) states that Kootenay Plains Ecological Reserve was established to protect ecosystems and landscapes representative of the Montane. The plan lists the following objectives:

- maintain ecological and biological diversity within the reserve
- ensure the integrity and viability of grasslands, forests and wetlands and other ecosystems
- permit unimpeded functioning of natural ecological processes except for human safety and maintenance of endangered features
- manage natural features within the reserve from an ecosystem management perspective
- protect habitats of rare or sensitive species and monitor to ensure species are not being lost
- integrate Native ceremonial and religious activities within the management of the Reserve while protecting the ecological values
- protect significant ecological and cultural resources from impacts that could result in their loss while permitting for the responsible use of such sites for scientific, educational and interpretive purposes
- monitor human impacts and take remedial action if natural processes or cultural resources are threatened or impaired
- monitor the integrity and vigor of ecosystems and special features

Visitor Services
The reserve’s management plan (1996) states:

*With its rich heritage and diversity, Kootenay Plains can provide a unique experience for many different user groups. The following are the heritage appreciation objectives of the Reserve:*

- Provide information on the role of ecological reserves as part of Alberta’s protected area system.
- Provide visitors with information on the natural and cultural resources of the Reserve.
- Provide information to visitors on how to minimize their impact on the Reserve’s resources.
- Provide opportunities for environmental education to organized groups and schools.
- Work cooperatively with Aboriginal people on the presentation of native history and activities in the Kootenay Plains area.
Infrastructure

Kootenay Plains Ecological Reserve has limited infrastructure and because it is an ecological reserve with a mandate to protect the site’s significant wildlife and plant populations, this is likely to remain so. That said, the reserve has important infrastructure that can be used to support information, orientation, interpretation and education services.

Access Points

The Ecological reserve has one, the Siffleur Falls Staging Area. This is located in the west central region of the reserve, adjacent to Highway 11. The amenities of the staging area are described below.

Parking Lot

The gravel parking lot can accommodate approximately thirty vehicles. It is the main gathering point for visitors who stop for a day trip (day-long hike to a short walk to the suspension bridge and back) or leave their vehicle for multi-day expeditions into the Siffleur Wilderness Area (this staging area is a major access point to this wilderness area). Traffic counters at the entrance to the parking lot indicate that most use occurs in summer but some use occurs year round (see Chapter 3: Visitor Analysis).

Pit Toilets

This amenity is used by ecological reserve visitors and by highway travelers.
Trailhead

The trailhead for all ecological reserve trails except the Kinglet Lake Trail is located adjacent to the parking lot. Nearly all the reserve’s trail users enter and leave the forecountry and backcountry through this trailhead. The trailhead is marked by an information sign (right) and an information kiosk which will be discussed further later in this chapter.

Suspension Bridge

This bridge is part of the access trail that connects to all main trails in the park except for Kinglet Lake trail. The bridge is located within a kilometre of the trailhead and spans the North Saskatchewan River. It is a much photographed visitor attraction and affords excellent views of the North Saskatchewan River Valley and many Front Range Mountains.

Lookouts

The Siffleur Falls Trail has viewing platforms that enable visitors to safely view the Siffleur River Canyon.

The Kootenay Plains Ecological Reserve Management Plan (1996) also calls for a wildlife viewing site located near Whirlpool Point. As of 2011, this has not yet been developed.
Trails
As stated earlier, the ecological reserve has five linear trails (see Figure BP4.15).

Access Trail
This unnamed trail begins at the Siffleur Falls Staging Area parking lot trailhead, leads over the North Saskatchewan River via the suspension bridge to its junction with Glacier Trail.

This trail crosses the flat flood plain of the North Saskatchewan River. Here the soil is very dry, often sandy with sparse vegetation, making it vulnerable to damage by hikers. The condition of the trail speaks of delicate habitat and heavy use (see Figure BP4.20). Key indicators are wide trail bed with uneven edges and exposed tree roots.

After crossing the North Saskatchewan River, the sections of low boardwalk have been put in place to protect sandy soil exposed by previous trail use and to prevent trail users from straying onto sensitive habitat (see Figure BP4.21).

Siffleur Falls Trail
This is the reserve’s most popular trail. Visitors start at the Siffleur Falls staging area walk up the access trail and along a short section of Glacier trail where they cross the Siffleur River before turning onto the Siffleur River Trail that climbs up beside the Siffleur River and above its gorge. Viewpoints and protective railings and warning signs are present where the trail is located close to the edge of the gorge. This 4 km hike (one way) is of moderate difficulty. According to Alberta Park staff, it is possible to continue along this trail to the 2nd and 3rd falls. Trail condition ranges from good to highly eroded and braided in some parts nearer to Siffleur Falls (see figures BP4.22 and BP4.23).
Background Paper 4: Kootenay Plains Ecological Reserve Features Inventory

Regulations Signs
In 2011, Alberta Parks installed two regulations signs. One is located on the existing trailhead kiosk at Siffleur Falls Staging Area. The second is located along the boardwalk section of the Access Trail. The identical signs list prohibited activities in Kootenay Plains Ecological Reserve and Siffleur Wilderness Area and a telephone contact number for Alberta Parks and Protected Areas.

Interpretive Programming
The Kootenay Plains Ecological Reserve Management Plan (1996) indicates that most effort in interpretation will be toward non-personal offerings. This is not because the site does not have significant visitation but a result of low staffing levels in the district. In 2001, there was only one permanent Visitor Services staff for the entire David Thompson Corridor. This position is based at Rocky Mountain House.

Personal Interpretation
After an absence of over ten years, district Visitor Services staff began to deliver a limited number of point duty programs to visitors at the Siffleur Falls Staging Area.
Non-Personal Interpretation
As of 2011, offerings consist of:

- roadside (Highway 11) information/orientation panels
  - 2 on the north edge of the reserve
  - 1 near Whirlpool Point
- 2 trailhead information/orientation panels at the Siffleur Falls Staging Area
- an information/orientation brochure: Kootenay Plains Ecological Reserve Guide
- interpretive signs along the trail to Siffleur Falls
- limited information on the Alberta Parks website

Interpretive Panels
The trails in the ecological reserve have a series of interpretive panels developed in 2009. They feature information about the natural and cultural history of the ecological reserve and its importance for wildlife (see figure BP4.33 on the following page for samples of these signs).
Figure BP4.33 Sample trailside interpretive signs from Kootenay Plains Ecological Reserve.