

Brackendale Eagles Provincial Park

BACKGROUND DOCUMENT

Prepared for:

Ministry of Environment, Lands and Parks
BC Parks
Garibaldi/Sunshine Coast District

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Introduction

This report has been prepared to provide natural, cultural, and recreational information to assist the management planning process for Brackendale Eagle Provincial Park.

Brackendale Eagles Provincial Park is located on the west side of the Squamish River, near the community of Brackendale, B.C., approximately 70 km. north of Vancouver (Figure 1). It is 755 hectares in size.

The Squamish River Valley has long been recognized as one of the most significant areas of wintering bald eagles (*Haliaeetus leucocephalus*) in North America. On January 9th, 1994, Squamish had a world record count of 3,769 eagles. The river's riparian area is heavily used for roosting, perching and feeding. Prolific runs of chum salmon (*Oncorhynchus keta*) in the Squamish, Cheakamus, and Mamquam rivers draw eagles in from all over the Pacific Northwest from November to February each year.

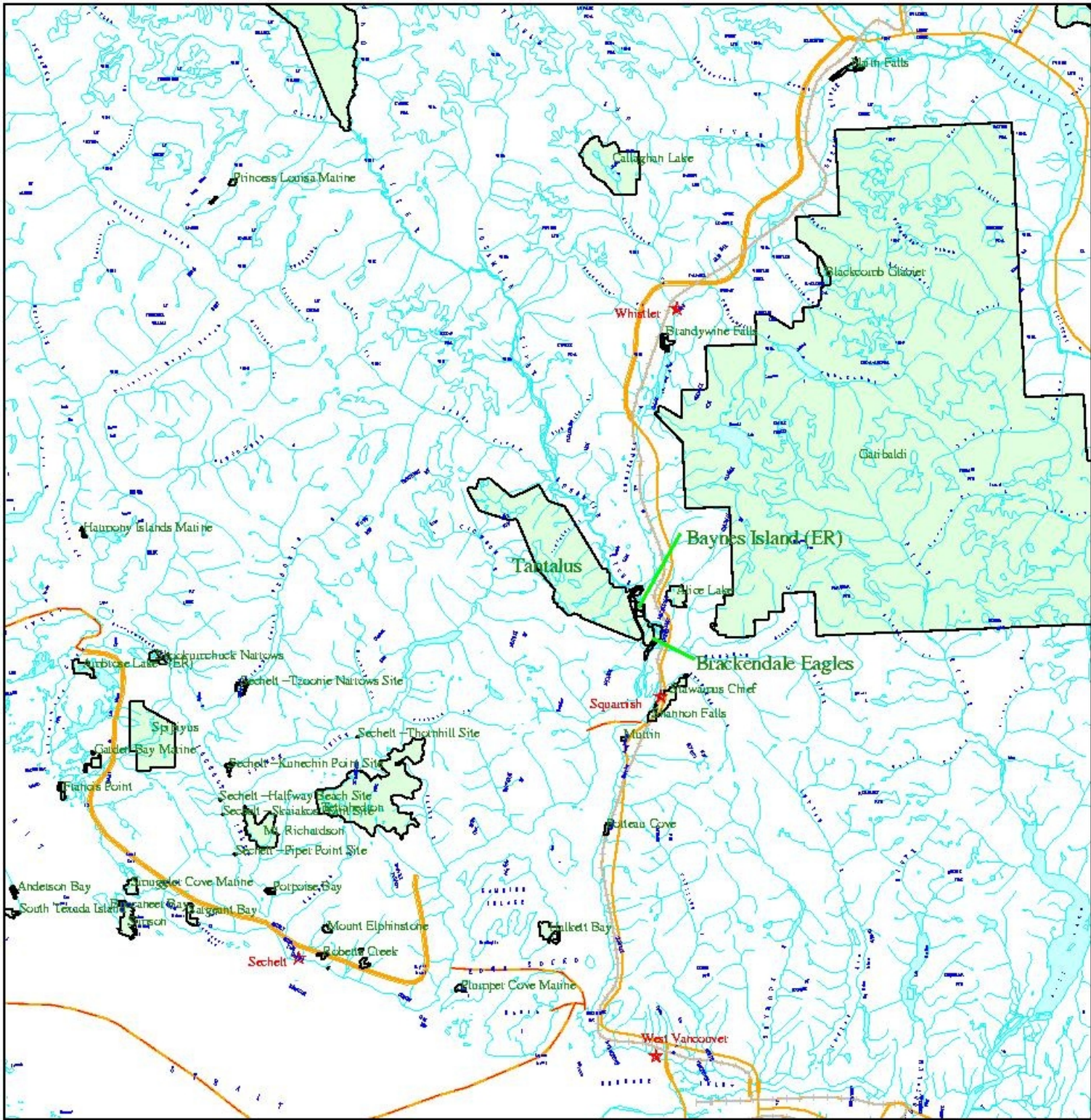
Park Establishment and Legislation

In 1992, British Columbia announced the Protected Areas Strategy, a plan to protect 12 percent of the province by the year 2000. The selection and establishment of protected areas for most of the province was, and continues to be, attained through regional and sub-regional land use planning tables. However, to address the issue of protected areas in the Lower Mainland region, the government established a Regional Public Advisory Committee (RPAC) in June, 1995. The committee included representatives from conservation groups, the forest industry, outdoor recreation groups, mining, tourism, fish and wildlife, and a number of government agencies. In 1996 the Province accepted the committee's recommendations for 23 new protected areas thus bringing the total amount of protected area to approximately 14 percent in this region.

Included in the recommendations was an important wintering site for bald eagles – the Brackendale Eagle Reserve. Over 700 hectares along the west side of the Squamish River was set aside to protect feeding, perching, and roosting sites that contribute to the extensive population of over-wintering eagles.

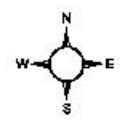
In 1999, Brackendale Eagles Provincial Park was established as a Class A Provincial Park ensuring that critical bald eagle habitat for feeding, perching, and roosting along the Squamish River was protected (Figure 2).

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 Figure 1: Regional Context Map

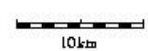


- ★ Major Cities
- Transportation Network
- Water Features
- ▭ Parks and Protected Areas

Garibaldi/Sunshine Coast District



Scale 1:600000



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Figure 2. Park Map

Planning and Management History

Various government agencies have been responsible for the planning and management of the area in the past. Fish and wildlife resources were managed by the BC Environment within the Lower Mainland Region Management Unit 2-6 for hunting, fishing, trapping, and guide-outfitting. The Department of Fisheries and Oceans has a mandate to manage sea-run salmonids in the Squamish River system.

Some logging activity has taken place on privately held land adjacent to the Brackendale Eagles Provincial Park boundaries. Scott Paper currently holds logging rights along the riverbank from Brackendale to the estuary. As well, forest companies such as Interfor and Weldwood have cutting rights to various areas in the region.

Natural Values

Physiography

Brackendale Eagles Provincial Park lies in the Squamish River watershed within the rugged mountain terrain of the Coast Mountain Range. The Squamish River watershed is one of several river systems draining through the Pacific Ranges to the coast. In the process, these river systems have cut large low-level valleys through the mountains dividing the Pacific ranges into separate blocks.

Some of the valley bottom deposits were formed by repeated rock avalanches, debris flows and volcanic deposits originating from Mount Garibaldi and other nearby mountains. At the end of the last ice age (approximately 10,200 years ago) much of the present lower Squamish River Valley was rapidly filled in with large amounts of sediment brought down by rivers of glacial meltwater and by the significant presence of glacial material.

All this sediment deposition has resulted in the deep deposits of surficial material in the lower Squamish River Valley causing the river to slow down, spread out, and form meandering braided channels as it flows into Howe Sound.

Geology

The park lies within the South Coast Mountains underlain by granitic rock of the Coast Plutonic Complex. In general, the Squamish area is underlain by Cretaceous granite and granodiorite bedrock (between 90 to 100 million years old) of the Jurassic to Tertiary Coast Plutonic Complex. Resting on this granitic bedrock are depositions of surficial material deposited by glacial, landslide, and river activities. The most prominent geological feature in the Squamish area is the Stawamus Chief, a 670m tall granodiorite monolith.

Following the late Pleistocene epoch approximately 10,000 years ago, several rockfall avalanches have occurred along the western flank of Mt. Garibaldi creating such features as the Cheekeye Fan at the northeast corner of the park. The volcanic rocks of the Garibaldi Volcanic Belt such as the dacitic lavas and tuff-breccias that comprise the western flank of Mt. Garibaldi are prone to extensive rapid landslides. More recently, in the Holocene epoch a series of massive rockfalls (approximately 4800, 1100, and 500 years ago) originating from Mt. Cayley resulted in the repeated blockage of the Squamish River forming temporary lakes. The layers of fine sediment that accumulated on the bottom of the temporary lakes resulted in varved lacustrine sediment formations found in the surficial material of the Squamish Valley north of Brackendale Eagles Provincial Park.

Another geological feature in the area is a fault line that underlies the park, running from its southeast corner to its northwest boundary. Tectonic activities in the region have created a series

of faults which, combined with erosion, have exposed bodies of ore that were once buried under layers of sedimentary and volcanic rocks. These ore bodies include minerals such as sericitized schist, malachite, and azurite.

The park lies within the Garibaldi Volcanic Belt which is the northern extension of the Cascade Volcanic Belt. The Garibaldi Belt includes nearby Mt. Garibaldi along with Mt. Cayley and Mt. Meagher to the north. Since the last ice age the Squamish region has experienced a significant amount of volcanic activity resulting in such geological features as Mt. Garibaldi and the Ring Creek Lava flow. One of the primary outcomes of volcanic activity is the region's granitic igneous intrusive bedrock. Just west of the park at the base of the Tantalus Range is a small fissure eruption that lies along a fault line. The fissure eruption has produced a considerable amount of lava and pyroclastic deposits that have eroded away resulting in protruding pinnacles of lava and partially collapsed caves.

Mineral Resources

There are no documented mineral deposits in the areas encompassing the park. However, some areas near the park possess mineral potential. Underlying the park is a fault line that runs through the Squamish River Valley in a northwest direction. This fault line may potentially contain copper and gold deposits. Due to heavy sedimentation, access to probable instream mineral deposits would be difficult, thus making mineral assessment impossible and exploitation unfeasible. Immediately west of the park are potentially limited gold, copper, lead, and zinc deposits in the Tantalus Range. There also exists a potentially significant deposit of gold just southwest of the park near the Squamish River Estuary.

Soils

Soils in the Squamish area are generally Ferro-Humic Podzols and Folisols overlying igneous intrusive rock. Intrusive rocks are quite weather resistant and soil development has been relatively slow. Over time, however, physical and chemical weathering has produced a coarse-textured acidic soil.

Due to high precipitation in the area, soils are generally moist to wet. The soil temperature regime is mild (the mean annual soil temperature fluctuates from 8 to 15 Celsius). A high level of moisture has resulted in generally poorly drained soils. The processes of soil development in the Podzol order include an accumulation of organic material (mainly coniferous litter) with iron and aluminum dominating in the B horizon. They are characterized by Mor humus forms. Fluvial gravels and sands occur on terraces and floodplains of the Squamish River. These areas are prone to flooding and displacement. Vegetation establishment is often temporary.

Hydrology

The Squamish River drains a watershed of approximately 2330 sq. km. It has four major tributaries; the Mamquam River, the Cheakamus River, Ashlu Creek and Elaho Creek. Runoff is generally highest in the summer (April to November), resulting from snowmelt in the Coast Mountains (average 500 cubic meters /sec.in July). However, maximum peak discharges are usually in the fall (2610 cu.m/s was recorded on October 8, 1984), and result from a combination of snowmelt and heavy rainfall.

Extensive dyking has occurred in the Squamish River Valley to protect homes from flooding and to provide more land for development. This has changed many of the natural flow patterns. In 1993, the Water Management Branch established flood elevation maps for the area that can be used to predict the maximum height of water at a given location. A 200-year flood event is of highest concern.

The Cheakamus River Hydroelectric Facility (approximately 25 kilometers north of Brackendale) diverts water from the Cheakamus River and stores it in a reservoir behind the Daisy Lake Dam. This has a significant impact on water flows, especially during times of low discharge (December to March), and has recently been the subject of great concern with regard to fish sustainability. Both the Cheakamus and the Squamish Rivers run through Brackendale Eagles Provincial Park and are affected by these changes in flow regimes.

Climate

The climate of the Squamish area is typical of southern coastal British Columbia. A strong maritime influence results in relatively cool, dry summers and moist, mild winters with very little snowfall at low elevations. The growing season is long with an average of 222 frost-free days.

The area falls within the Coastal Western Hemlock biogeoclimatic zone and has a south-east aspect. Annual precipitation is high and temperatures are generally mild. The mean annual precipitation from 1982 to 1996 was 2488mm, with 354mm falling between May and September and 2134mm falling between October and April. The mean annual temperature from 1982 to 1996 was 9.5 degrees C, with the warmest month being July and the coldest December.

Strong outflow winds often affect the area. Extensive snow and ice in mountainous areas above Squamish can quickly cool passing air masses, which then move downhill under the influence of gravity.

Vegetation

The Brackendale Eagle Reserve lies within the Coastal Western Hemlock dry maritime subzone (CWHdm). Forests are dominated by Douglas-fir (*Pseudotsuga menziesii*), western red-cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*). Major species in the moderately

developed shrub layer include salal (*Gaultheria shallon*), red huckleberry (*Vaccinium parvifolium*), dull Oregon-grape (*Mahonia nervosa*), and trailing blackberry (*Rubus ursinus*). The herb layer is dominated by sword fern (*Polystichum munitum*) and bracken fern (*Pteridium aquilinum*). Mosses include step moss (*Hylocomium splendens*), flat moss (*Plagiothecium undulatum*), and Oregon-beaked moss (*Kindbergia oregana*).

Floodplain areas adjacent to the Squamish River have a large deciduous component of red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera ssp. trichocarpa*), and bigleaf maple (*Acer macrophyllum*). Sitka spruce (*Picea sitchensis*) is also found here. Dominant shrubs in riparian areas include salmonberry (*Rubus spectabilis*) and Devil's club (*Oplopanax horridus*). Herb layer vegetation such as false lily-of-the-valley (*Maianthemum dilatatum*) and three-leaved foamflower (*Tiarella trifoliata*) are common. Most of the park is comprised of mature conifer stands with a large deciduous component along the Squamish River.

Wildlife

Brackendale Eagles Provincial Park preserves critical habitat for wintering bald eagles. During this period, large numbers of eagles congregate along the Squamish and Cheakamus rivers to feed on salmon carcasses.

Other wildlife species in the park include 55 probable or possible mammals, 11 probable or possible amphibian species, and 5 probable or possible species of reptiles. Species are listed in Appendix 1.

Large mammals include black bear (*Ursus americanus*), cougar (*Felis concolor*), gray wolf (*Canis lupus*), and Columbian black-tailed deer (*Odocoileus hemionus columbianus*). Fur-bearing species include coyote (*Canis latrans*), bobcat (*Lynx rufus*), mink (*Mustela vison*), and weasel (*Mustela frenata*). Many small mammals inhabit the area including the Northern flying-squirrel (*Glaucomys sabrinus*), the Snowshoe hare (*Lepus americanus*), and the Yellow-pine chipmunk (*Tamias amoenus*).

Reptiles found in the area include 3 species of garter snake. Eleven amphibians are likely present; these include the Tailed frog (*Ascaphus truei*) and the Northwestern salamander (*Ambystoma gracile*).

There are approximately 148 bird species that use the park area at various times throughout the year.

Fish

During the fall, an abundance of salmon return to spawn in the rivers and creeks of the Squamish region. The deposition of salmon carcasses onto riverbanks provides a valuable food source for wintering bald eagles. Chinook (*Oncorhynchus tshawytscha*), chum (*O. keta*), coho (*O. kisutch*),

pink (*O. gorbusha*), and sockeye salmon (*O. nerka*) spawn within the Squamish, Cheakamus, Mamquam, and Ashlu Rivers (Tables I, II and III).

Table I. Average Annual Salmon Returns on the Squamish, Cheakamus, Mamquam, and Ashlu Rivers, for the period 1984-1993.

River	Chum	Chinook	Coho	Pink (Even Yr.)	Pink (Odd Yr.)	Sockeye
Squamish	48,409	612	4,757	100	1,667	100
Cheakamus	61,250	368	2,700	3,367	13	0
Mamquam	12,665	202	758	0	1,014	45
Ashlu	750	278	223	0	100	0

Table II. Peak Annual Salmon Returns on the Squamish, Cheakamus, Mamquam, and Ashlu Rivers, for the period 1984-1993.

River	Chum	Chinook	Coho	Pink (Even Yr.)	Pink (Odd Yr.)	Sockeye
Squamish	160,000	2,000	10,000	100	2,000	300
Cheakamus	130,000	1,000	6,000	5,000	25	0
Mamquam	45,000	750	3,000	0	3,500	80
Ashlu	4,000	600	500	0	200	0

Table III. Timing of Annual Salmon Returns on the Squamish, Cheakamus, and Mamquam Rivers.

River	Chum	Chinook	Coho	Pink	Sockeye
Squamish	Oct to Jan	Jun to Oct	Sep to Jan	Aug to Oct	Jul to Sep
Cheakamus	Sep to Jan	Jun to Oct	Aug to Feb	Sep to Jan	Jul to Sep
Mamquam	Sep to Jan	Jul to Nov	Sep to Feb	Aug to Oct	Jun to Oct

In addition to salmon, many other fish species are found in the Squamish, Cheakamus, Mamquam, and Ashlu Rivers (Table IV).

Table IV. Fish Species Present in the Squamish, Cheakamus, Mamquam, and Ashlu Rivers.

Species	Squamish	Cheakamus	Mamquam	Ashlu
Dolly Varden char (<i>Salvelinus malma</i>)	P	P	P	P
Cutthroat trout (<i>O. clarki</i>)	P	P	P	P
Rainbow/steelhead trout (<i>O. mykiss</i>)	P	P	P	P
Green sturgeon (<i>Acipenser medirostris</i>)	P	N/P	N/P	N/P
Lamprey eels (Family Petromyzontidae)	P	P	N/P	N/P
Whitefish (Family Salmonidae)	N/P	P	N/P	N/P
Sculpins (Family Cottidae)	N/P	P	N/P	N/P

P – Fish species present

N/P – Fish species not present

Several runs of wild salmon (particularly chum and coho) on the Squamish, Mamquam, and Cheakamus Rivers and their tributaries are being reinforced by enhancement and restoration efforts. Through the Watershed Restoration Program of Forest Renewal BC, several salmon bearing streams in this watershed are being extensively rehabilitated. Some of these streams include Mashiter Creek on the Mamquam River, Shovelnose Creek on the Squamish River, and the BC Rail spawning channels on the Cheakamus River, all situated outside the park boundaries. In addition, the North Vancouver Outdoor School (NVOS) north of the park has created several kilometres of spawning channels throughout their property. As well, the Tenderfoot Hatchery operated by the DFO and a hatchery operated by the NVOS produces Chum and Coho salmon to supplement wild stocks on the Cheakamus River.

Sport fishing for salmon, trout, and char is allowed on the Squamish, Mamquam, and Cheakamus Rivers, as well as tributaries like the Ashlu River. The Squamish, Mamquam, Cheakamus and Ashlu Rivers have an allowable daily catch of two salmon total of either coho, chinook, chum, and/or pink salmon. These waters also have an allowable daily catch of four fish total of either trout and/or char. Anglers are allowed a daily limit of two hatchery steelhead trout but must release all wild fish. Angling pressure is moderate on the Squamish and Cheakamus, whereas, the Mamquam and Ashlu receive light fishing pressure.

Rare and Endangered Species

Although bald eagles are not considered to be a red or blue-listed species, their habitat has been constantly shrinking. For this reason they are still considered to be of management concern. This is especially the case where significant congregations of bald eagles occur, such as the Squamish River Valley.

Rare and endangered species in the Squamish Forest District include the Bull Trout (*Salvelinus confluentus*), the Tailed Frog (*Ascaphus truei*), and the Spotted Owl (*Stix occidentalis*) (Appendix 1).

Cultural Values

There are no documented archeological sites within the park boundaries that are listed with the British Columbia Provincial Heritage Register. However, there are numerous prehistoric, historic, and culturally significant sites in the Squamish region.

The park lies within the traditional territory of the Squamish Nation and numerous Indian Reserve lands exist adjacent to park boundaries. Natural values, particularly related to salmon, are likely of significant value to the Squamish First Nation people. As well, spiritual and cultural values also likely exist within the park boundaries.

At the moment there exists outstanding First Nation claims on lands within and adjacent to the park. Land claim treaty negotiations between the Squamish Nation and the Federal and Provincial governments are ongoing.

Recreation and Tourism Values

The park lies within a region known for its outstanding recreational and aesthetic values. The Squamish area possesses a combination of ocean, river, and mountain scenery, which forms a varied setting for a range of outdoor activities.

Nearby sub-alpine mountains offer opportunities for wilderness hiking, camping, glacier skiing, and fishing. Four existing backcountry trails on the west-side of the lower Squamish River provide access to Lake Lovely Water, Mt. Sedgewick, Echo Lake, and areas beyond. Further north, snowshoeing, nordic and downhill skiing, and other alpine activities can be found at Garibaldi Lake Provincial Park, Brohm Ridge, and at Whistler and Blackcomb Mountains.

The region is becoming an increasingly popular year round rock-climbing destination. Immediately south of Squamish is the Stawamus Chief, a large granodiorite monolith where local and visiting climbers can choose from over 200 climbing routes to its summit. Other rock faces nearby are also suitable for climbing.

The Sea-to-Sky Highway bisects the region east of the park. Aesthetic views along the route include the ocean and mountain scenery of Howe Sound, Shannon Falls, the Stawamus Chief, and the Tantalus Range. Near the park, frontcountry camping is available close to the highway at Alice Lake and Porteau Cove Provincial Parks.

The many rivers in the Squamish area offer excellent sport fishing opportunities for species such as trout and char, in addition to coho, chinook, chum, and pink salmon. Anglers can use the

numerous gravel bars in the Squamish River system, including those opposite the park, to access prime fishing locations, particularly during fall, when the salmon return to spawn. These gravel bars are also used for picnicking, walking, informal hiking, and some off-road vehicle use. During summer, local residents swim in the side channels and pools off the main stem of the Squamish River near the park.

The lower reaches of the Squamish and Cheakamus Rivers are navigable by raft and kayak and contain challenging white-water stretches. Several rafting companies use the western shore of the Squamish River within the park boundaries as stopping points for lunch and eagle viewing. Further downstream, the Squamish River Estuary is home to over 170 species of birds and is an excellent area for bird watching.

Eagles congregate in large numbers along the Squamish River system in winter to feed on the carcasses of salmon that have washed onto the gravel bars including those within the park. Paved and gravel roads along with an extensive dyke system and trails provide easy access to the river for eagle viewing at the eastern edge of the park.

Existing Facilities

At present, there are no recreational facilities in the park. An undeveloped hiking trail passes through the north end of the park leading up to Lake Lovely Water in the Tantalus Range.

Tenures, Occupancy Rights and Jurisdictions

A wide variety of land holdings exist in the area surrounding Brackendale Eagles Park, including private land, crown land, and Indian Reserves. The western edge of the park is bordered by Tantalus Provincial Park, a Class A Park recently protected under the Protected Areas Strategy. A private holding, district lot 2656 lies within the borders of Brackendale Provincial Park and has been partially logged. Consideration for inclusion into the protected area should be addressed in the future. To the north and south of the park the majority of landholdings are held by the Crown and are leased out as forest tenures. A large amount of these tenures are leased to the Small Business Enterprise Program. Twelve other forest companies have cutting rights in the area, including International Forest Products Ltd., Terminal Forest Products Ltd., and Scott Paper (Figure 3). Scott Paper has some riparian cutting rights from south of the park to the estuary. The impact of such logging activities will be reviewed within the Special Resource Management Zone (SRMZ-21) by the Forest Service.

The community of Brackendale lies on the east side of the Squamish River, across from the park. Landholdings here are a mixture of privately and commercially held land under the District Municipality of Squamish. There are also eight Indian Reserves adjacent to the new park (Table V).

**Table V. Squamish Nation Indian Reserves
in the Squamish Area**

I.R.# 11	Cheakamus
I.R.# 12	Yookwit
I.R # 13	Skaman
I.R.# 14	Waiwakum
I.R.# 15	Alkwuck
I.R.# 16	Seaichem
I.R.# 17	Kawtain
I.R # 18	Yekwaupsum

Although many mining claims exist in the general area, all mineral claims within the park area have expired. B.C. Regulation 302/96 established a no-staking mineral and placer reserve over 22 proposed protected areas in the Lower Mainland Region on November 6, 1996. This includes the area now lying within Brackendale Eagles Provincial Park. Two mines east of the park are currently active, one on the south side of the Mamquam River (Tenure # 356249), which is primarily used for storage and another granite quarry further east on the Mamquam.

The District of Squamish has a number of reserves set aside for sand, gravel and rock extraction. However, no current plans for extraction exist at this time. Because gravel extraction could have such significant effects on spawning salmon and foraging eagles, any future activity must receive

approval from the Department of Fisheries & Oceans and the Ministry of Environment, Lands, and Parks.

The District of Squamish recently commissioned a feasibility study for a pedestrian crossing on the lower Squamish River. Should the crossing be developed, it would provide access to a largely undeveloped area including the park. The obvious environmental impacts of such a crossing must be seriously assessed when considering wildlife values. It should also be noted that the recommended crossing structure western abutment location is identified within the park boundaries.

Marketing Analysis

Existing Use Analysis

Due to its recent establishment, current existing use figures are not available for the park. However, volunteers of the Eagle Watch Program of Squamish estimated approximately 4,000 bird watchers visited the Squamish/Brackendale area to view eagles during a ten weekend period from December 11, 1998 to February 14, 1999.

The Nature Conservancy of Canada has established an eagle viewing site outside the park on the eastern shore of the Squamish River opposite the park. The viewing site contains an interpretive display that provides information on eagle biology. Also, volunteers from the Eagle Watch Program are at the viewing site during the winter eagle season to provide interpretive presentations for visitors. In addition to the viewing site, several rafting companies provide eagle watchers a chance to view the birds closely from the river.

In addition to eagle watching, the Squamish region offers other recreational uses such as sightseeing, mountain biking, walking, hiking, fishing, rafting, and other outdoor activities during the winter season. Nearby, Garibaldi Provincial Park's Diamond Head area offers backcountry skiing, hiking, mountain biking, snowshoeing, wilderness camping, and other backcountry activities. Closer to Squamish, Brohm Ridge provides groomed trails for snowmobiling. Further north Whistler and Blackcomb Mountains provide world class downhill skiing facilities. During the summer, visitors can mountain bike, hike, windsurf, rock climb, glacier ski, camp, fish, and pursue other summer outdoor activities.

Trends and Demands

Tourism in the Squamish region continues to grow due in part to the popularity and appeal of Whistler Village's ski resorts and the variety of outdoor activities offered in the area. Visitor counts by the Squamish Visitor Information Centre show a steady growth from 23,029 in 1996, to 24,644 in 1997, and 21,285 by the end of August, 1998 with the strongest increases occurring during the autumn, winter, and spring seasons. The visitor counts obtained from the Squamish

Visitor Information Centre do not include those individuals staying with friends or relatives in the area, who are less likely to visit information centres. Thus, the actual numbers of visitors are likely to be higher.

Visitor growth during the autumn, winter, and spring seasons can be attributed to the variety of regional products and services that appeal to off-season tourists, such as eagle watching. However, summer remains the most popular tourist season in the Squamish area due to the region's appeal as a summer outdoor destination. The majority of visitors to the Squamish area sightsee (51%), or pursue outdoor activities (22%).

Day-use attendance figures for nearby Brandywine Falls, Murrin Lake, and Shannon Falls Provincial Parks have also been increasing (Table VI).

Table VI. BC Parks Day-Use Attendance Figures for Three Day-Use Areas Near the Squamish/Brackendale Area, 1992-1997.

Park	1992	1993	1994	1995	1996	1997
Brandywine Falls	43,361	45,635	63,850	52,584	46,924	44,775
Murrin	38,451	46,284	43,635	45,350	47,494	47,842
Shannon Falls	102,101	114,201	123,673	131,662	136,375	151,995

The growth in visitation to the Squamish/Brackendale area is expected to continue, given the increasing appeal of the region for outdoor recreation and the international popularity of Whistler Village as a ski destination.

The growth in tourists in the region has resulted in a significant increase in annual hotel room revenues that can be attributed to the influence of Whistler's ski resorts; a substantial percentage of visitors staying in Squamish are travelling to and from Whistler. The tourist room revenue for the Squamish/Lillooet Regional Districts have grown significantly over the years (Table VII).

Table VII. Annual Tourist Room Revenue, Squamish/Lillooet Regional District, 1992 to 1997.

Revenue	1992	1993	1994	1995	1996	1997
(\$ Thousands)	\$51,764	\$52,037	\$65,783	\$82,035	\$92,672	\$101,871

Promotion and Information

Due to the park's recent establishment, visitor information is not currently available for the Brackendale Eagles Park.

At the moment, there is little marketing effort focused on promoting eagle watching in the Squamish area. No funds are being expended by government agencies or private groups to

promote this resource. However, cultural events such as the annual Brackendale Winter Eagle Festival help raise awareness of the area's eagle resource. The festival activities include an eagle count by volunteers and bird watchers during the Christmas holidays. Promotion occurs primarily through the media and by word-of-mouth.

Eagle Watch and other Squamish-based organizations have also contributed to public awareness of the area's eagles through such events as Eagles Watch's Annual Eagle Count each winter. The Annual Eagle Count has received considerable media attention through local and Vancouver newspaper coverage, CBC radio interviews, and international media, and by visitor word-of-mouth; the event has assisted in promoting the eagles and increasing the profile of organizations such as Eagle Watch. In the past, the Nature Conservancy of Canada has promoted the eagles through "The Eagles of Brackendale Project" at the Squamish Airport and in the "Book of Eagles".

Considerable work has been done by the Squamish community toward educating eagle watchers. An example is the construction of an eagle interpretive centre, which contains displays describing eagle biology, traditional aboriginal relationships with the eagle, and eagle viewing ethics.

Park Products

The primary product of the park is its eagle watching opportunities. The park is located across the Squamish River from a popular eagle viewing site established by the Nature Conservancy of Canada. The public can see hundreds of bald eagles feeding on salmon carcasses deposited onto the gravel bars on the eastern edge of the park during the winter months. Tall black cottonwood trees further inland provide perching and roosting areas.

Other products during the eagle watching season include accessible sightseeing, mountain biking, walking, hiking, and day-use recreation in nearby provincial and municipal parks. Visitors can raft down the Cheakamus and Squamish Rivers to get a closer view of the eagles, as well as fish the Squamish River and its tributaries for salmon, trout, and char. Backcountry and downhill skiing, snowshoeing, and other alpine activities can be found in Garibaldi Provincial Park, Brohm Ridge, and at Whistler and Blackcomb Mountains. Major nearby attractions include Murrin Lake, Shannon Falls, Stawamus Chief, Alice Lake, Garibaldi and Brandywine Falls Provincial Parks.

Key Management Issues

Commercial Activities

Four rafting companies currently operate on the Cheakamus and Squamish rivers. Their activities are concentrated around eagle viewing and have a significant impact on eagle feeding behaviour. Biologists who have studied the eagles in this area have recommended a code of ethics for rafting companies to follow. Restrictions such as the time of trips, the number of boats, the distance from

eagles, and stopping-off locations have been suggested. The report *Human Disturbance to Wintering Bald Eagles on the Squamish River* (Armstrong, Keong and Vockeroth, 1999) also recommends restricting rafting on the Cheakamus and Squamish Rivers in early morning hours (prime eagle foraging time).

Logging activity in the area is strictly monitored under Special Resource Management Zone 21. However, pressure to harvest trees in areas that provide critical bald eagle habitat will continue in the future. The impact of forest practices near Brackendale Eagle Provincial Park must be looked at carefully.

Conservation

A high value should be placed on preserving the ecological integrity of the Squamish River and its main tributaries. Recent salmon enhancement efforts such as the spawning channels at the North Vancouver Outdoor School and on the Mamquam River, as well as the Tenderfoot Hatchery on the Cheakamus River have helped to ensure that strong salmon runs continue into the future. As well, plentiful runs of salmon will ensure an adequate supply of food for wintering bald eagles.

Riparian habitat used by bald eagles, such as roosting and perching trees should be maintained. Further studies on bald eagle behaviour are required to determine their use of these riverine habitats. As well, more extensive study on the impact of recreational activities on bald eagles is recommended.

A high value must be placed on maintaining water quality within the Squamish River watershed. Future expansion of waste treatment facilities in upstream areas such as Whistler must be developed with an eye to conservation values.

Recreational Activities

The impacts on bald eagles must be considered before recreational facilities, such as trails and interpretive centers, are constructed near the park. Before creating new trails or other recreational structures an impact assessment should be carried out to determine their effects on eagles. Approved projects should be implemented during the spring to fall period while the eagles are absent in order to minimize interference with the eagles. While the eagles are present in the park recreational opportunities that do not interfere with the daily activities of the eagles should be encouraged and promoted such as eagle viewing and hiking. Conversely, activities that have an adverse effect on the eagles must be discouraged or prohibited.

Municipal bylaws should be implemented to prevent recreational opportunities that may intrude on the feeding activities of wintering eagles such as the use of off-road vehicles on gravel bars and powered watercraft, as well as, the use of gravel bars by rafting companies for lunch and sightseeing. Such bylaws should be applicable to the areas within/adjacent to the park and along the sections of the Squamish River system where eagles are known to roost and feed.

Integrated Resource Management

In order to maintain and protect the ecological integrity of Brackendale Eagles Provincial Park, BC Parks must establish close relations with adjacent landowners and managers. This is particularly important in undeveloped areas such as those that exist on the west side of the Squamish River.

In addition, intergovernmental cooperation is crucial to the long-term protection of the park's integrity. Management decisions by the Ministry of Forests and the Ministry of Energy, Mines and Petroleum with regards to resource extraction in the Squamish Valley should be made with the input of BC Parks where activities are likely to impact park values.

First Nations interests must be taken into consideration regarding any future park development. Significant archeological sites adjacent to the park must be integrated with park planning. Cooperation between the Squamish Nation and government agencies must be encouraged to ensure comprehensive land use planning in the future.

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BRACKENDALE EAGLE PROVINCIAL PARK

BACKGROUND REPORT

Appendix 1

Wildlife Species Within Brackendale Eagle Provincial Park

Mammals in Brackendale Eagle Provincial Park:

P Probable Occurrence

? Possible Occurrence

bold Red/Blue Listed

Common Name	Scientific Name	Status
Common Shrew	<i>Sorex cinereus</i>	P
Dusky Shrew	<i>Sorex monticolus</i>	P
Water Shrew	<i>Sorex palustris</i>	P
Trowbridge's Shrew	<i>Sorex trowbridgii</i>	?
Vagrant Shrew	<i>Sorex vagrans</i>	P
Shrew-mole	<i>Neurotrichus gibbsii</i>	P
Coast Mole	<i>Scapanus orarius</i>	P
Big Brown Bat	<i>Eptesicus fuscus</i>	P
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	P
Hoary Bat	<i>Lasiurus cinerius</i>	P
California Myotis	<i>Myotis californicus</i>	P
Keen's Long-eared Myotis	<i>Myotis keenii</i>	?
Little Brown Myotis	<i>Myotis lucifugus</i>	P
Yuma Myotis	<i>Myotis yumanensis</i>	P
Townsend's Big-eared Bat	<i>Plecotus townsendii</i>	?
Snowshoe Hare	<i>Lepus americanus</i>	P
Common Pika	<i>Ochotona princeps</i>	?
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	P
Long-tailed Vole	<i>Microtis longicaudus</i>	P
Townsend's Vole	<i>Microtus townsendii</i>	?
Muskrat	<i>Ondatra zibethicus</i>	P
Heather Vole	<i>Phenacomys intermedius</i>	P
Northern Bog Lemming	<i>Synaptomys borealis</i>	?
Beaver	<i>Castor canadensis</i>	P
Bushy-tailed Woodrat	<i>Neotoma cinerea</i>	?
Deer Mouse	<i>Peromyscus maniculatus</i>	P
Columbian Mouse	<i>Peromyscus oreas</i>	P
Porcupine	<i>Erethizon dorsatum</i>	P
House Mouse	<i>Mus musculus</i>	P
Norway Rat	<i>Rattus norvegicus</i>	P
Black Rat	<i>Rattus rattus</i>	P
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	P
Yellow-pine Chipmunk	<i>Tamias amoenus</i>	P
Townsend's Chipmunk	<i>Tamias townsendii</i>	?
Douglas' Squirrel	<i>Tamiasciurus douglasii</i>	P

Common Name	Scientific Name	Status
Pacific Jumping Mouse	<i>Zapus trinotatus</i>	P
Coyote	<i>Canis latrans</i>	P
Gray Wolf	<i>Canis lupus</i>	P
Red Fox	<i>Vulpes vulpes</i>	?
Cougar	<i>Felis concolor</i>	P
Bobcat	<i>Lynx rufus</i>	P
Wolverine	<i>Gulo gulo</i>	?
River Otter	<i>Lontra canadensis</i>	P
Marten	<i>Martes americana</i>	P
Fisher	<i>Martes pennanti</i>	?
Striped Skunk	<i>Mephitis mephitis</i>	P
Ermine	<i>Mustela erminea</i>	P
Long-tailed Weasel	<i>Mustela frenata</i>	P
Mink	<i>Mustela vison</i>	P
Spotted Skunk	<i>Spilogale putoris</i>	P
Harbor Seal	<i>Phoca vitulina</i>	P
Raccoon	<i>Procyon lotor</i>	P
Black Bear	<i>Ursus americanus</i>	P
Moose	<i>Alces alces</i>	P
Mule Deer	<i>Odocoileus hemionus</i>	P

Source: Thomas Plath, BC Environment, Lower Mainland Region, Surrey, BC.

Reptiles and Amphibians in Brackendale Eagle Provincial Park:

P = Probable Occurrence
 ? = Possible Occurrence
bold = Red/Blue Listed

Reptiles:

Common Name	Scientific Name	Status
Northern Alligator Lizard	Gerrhonotus coerulean	P
Rubber Boa	Charina bottae	?
Western Garter Snake	Thamnophis elegans	P
Northwestern Garter Snake	Thamnophis ordinoides	P
Common Garter Snake	Thamnophis sirtalis	P

Amphibians:

Common Name	Scientific Name	Status
Rough-skinned Newt	Taricha granulosa	P
Northwestern Salamander	Ambystoma gracile	P
Long-toed Salamander	Ambystoma macrodactyla	P
Ensatina	Ensatina escholtzii	P
Western Red-backed Salamander	Plethodon vehiculum	P
Tailed Frog	Ascaphus truei	P
Western Toad	Bufo boreas	P
Pacific Treefrog	Hyla regilla	P
Red-legged Frog	Rana aurora	P
Spotted Frog	Rana pretosia	P
Green Frog	Rana clamitans	P