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## 7.0 PROJECT SETTING AND CHARACTERISTICS

This section describes the existing environmental conditions of the project area. Information on the existing environment was compiled based on available data, scientific publications, aerial photograph interpretation and field investigations.

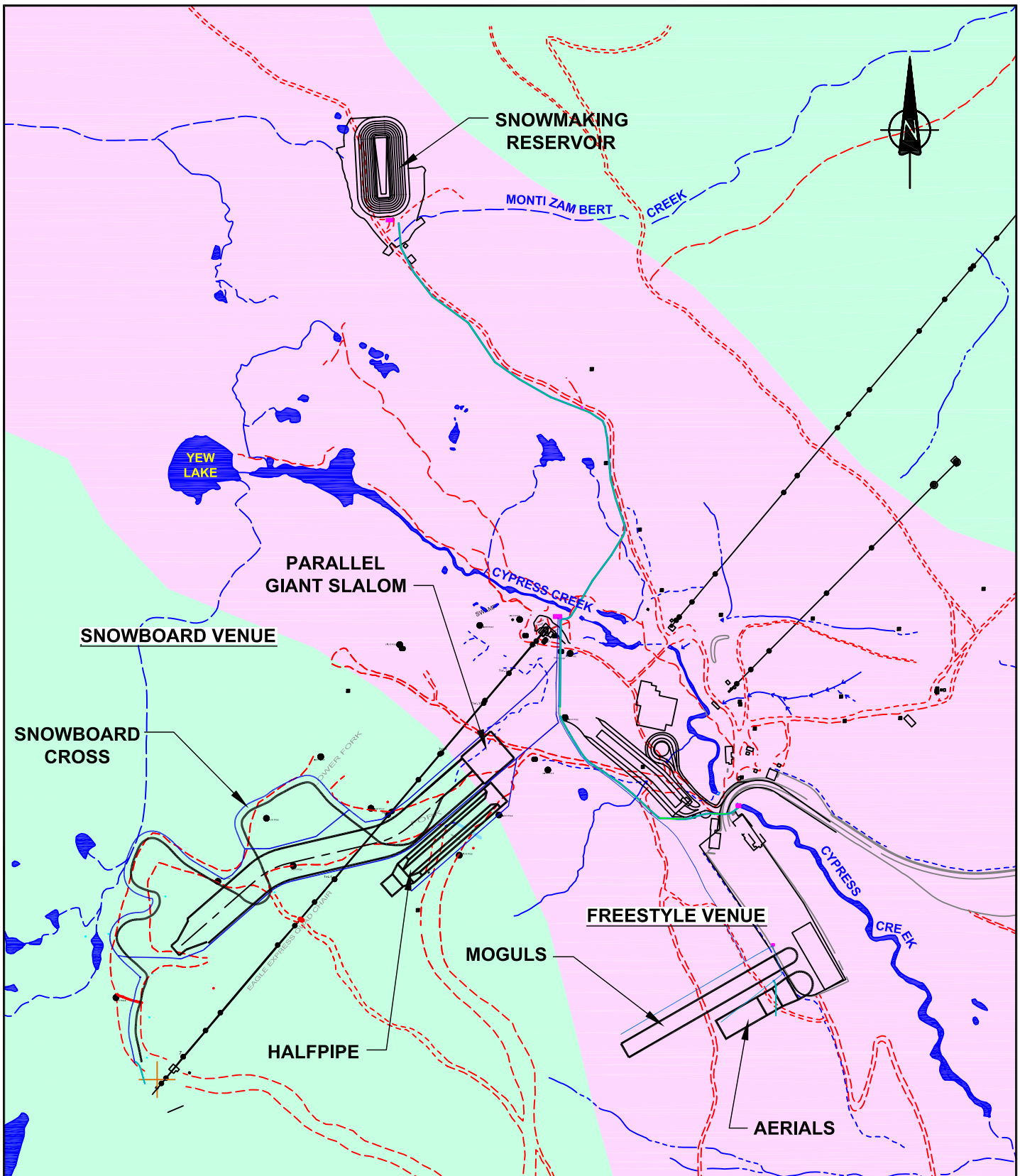
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### 7.1 Regional Setting

Cypress Provincial Park is one of a number of protected areas in the Howe Sound and Lower Mainland area that provides recreation opportunities, while protecting the natural environment. It is bounded on the west by Howe Sound, on the north and east by the ridge tops of Mount Hanover, Mount Strachan and Hollyburn Mountain and to the south by the Municipal District West Vancouver.

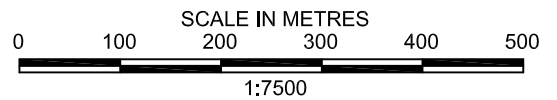
The project area occurs within two biogeoclimatic zones (Figure 7-1). The lower elevations (i.e., within the Cypress Bowl) are within the Coastal Western Hemlock zone and the upper elevations are within the Mountain Hemlock (MH) zone. The CWH zones typically have mild winters; however it also has the highest average rainfall of any zone in the province. Summers are usually cool. The Mountain Hemlock biogeoclimatic zone is a subalpine zone that occurs between the Coastal Western Hemlock and the Alpine Tundra zone. This zone is characterized by short, cool summers and long, wet winters with deep, persistent snow (MFRP 1995).






**BEC LABEL**

-  CWH vm2
-  MH mm1



	CLIENT: <b>VANOC</b>		<b>BIOGEOCLIMATIC ZONES OF THE PROJECT AREA</b> CYPRESS VENUE - ENVIRONMENTAL ASSESSMENT CYPRESS PROVINCIAL PARK, BRITISH COLUMBIA	Fig No. <b>7-1</b>
	PROJECT No: BCV50473	DATE: 09-Mar-06		
	DRAWN BY: NP	CHECKED BY: MD		

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## 7.2 Freshwater Environment

There are several important creeks within Cypress Provincial Park. The two main creeks that may potentially be affected by the project are Cypress Creek and Montizambert Creek.

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### 7.2.1 Water Quality

Water quality in Cypress Creek was completed in 1992 as part of the environmental assessment for the Control Recreation Area Master Plan. Further testing was completed in 1995, 1997 and again in 2004. Results of these surveys are discussed below.

Water quality tested in three locations in the upper Cypress Creek watershed and one location above Highway 1 in the District of West Vancouver indicate that surface water in the upper Cypress Creek watershed contains elevated iron concentrations and pH levels below the range recommended for aquatic life (Ministry of Land and Parks 1995). Cadmium and copper concentrations were elevated slightly in the lower creek (ENKON 2002b). Cadmium and copper levels were 0.0047 mg/L and 0.004 mg/L, respectively, exceeding the guidelines for protection of freshwater life (0.0002 mg/L and 0.002 mg/L, respectively). Analysis from water quality sampling in nine locations in upper Cypress Creek indicated that total suspended solids (TSS) and turbidity levels are low. Total suspended solids ranged from <1 mg/L to 19 mg/L, and turbidity ranged from 0.3 NTU to 13 NTU (ENKON 2002b).

Water quality analysis of Marr, Montizambert and Rodgers Creeks indicate that several water quality parameters are naturally outside recommended ranges for drinking water (McElhanney 2002) and aquatic life based on the BC Approved and Working Guidelines for Protection of Freshwater and Aquatic Life Specifications. These included low pH, elevated total chromium and elevated levels of dissolved aluminum.

Within the Cypress Creek watershed, natural settling of suspended solids occurs in the Yew Lake wetland complex. The vegetation and organic soils of the wetland provide natural filtration and absorption capability for solid and dissolved compounds (ENKON 2002a). Low levels of suspended solids however, have been observed in overland runoff flows within Cypress Bowl. Reddish staining (i.e., iron oxide) occurs on substrate of at least one minor drainage flowing into Cypress Creek, upstream of the main road culvert in the Cypress base vicinity (ENKON 2002a and b), however iron concentrations further downstream are under the guideline limit (Kerr Wood Leidal 2004). Water quality within the Assessment Area



appears to be influenced by the natural environment of the park and from the existing modifications due to the ski area.

### 7.2.2 Water Quantity

For the purpose of this report, water quantity is characterized by climate, precipitation, mean annual run-off, low flow assessment and historical flooding. The water quantity (i.e., hydrological regime) of the Assessment Area is dominated by snowpack accumulation between November and April. Between May and October, and occasionally in winter months, there is potential for high runoff rates largely due to the high rainfall intensities on steep slopes, shallow soil cover and snow cover.

#### Climate and Precipitation

Because snowmelt rates are much less than potential rainfall rates, snowmelt floods without rainfall are less critical than floods with rainfall, especially floods caused by rainfall on snow in the small catchment areas of Cypress Creek and Montizambert Creek watersheds.

Climate and precipitation has been recorded at the Hollyburn Ridge Climatological Station (No. 1103510, Elevation 930 m, 49 degrees 23' N 123 degrees 11'W). Based on the information recorded, the total average yearly rainfall from 1954 to 1990 for Hollyburn Ridge is 2115.4 mm (Table 7-1). Historically, the highest rainfall events occur in October, November and December and the lowest rainfall event are in April, July, and August (McElhanney 2002).

**Table 7-1 Average rainfall (mm) at Hollyburn Ridge from 1954 to 1990**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
169.2	166.2	128	108.2	150	128.8	114	109.3	174.5	342.6	296.5	228.1

The historical trend for the amount of rainfall is similar for the amounts of total precipitation. Historically the greatest amount of precipitation falls during October, November and December (Table 7-2). August produces the least amount of precipitation per year (McElhanney 2002).

**Table 7-2 Average precipitation (mm) at Hollyburn Ridge from 1954 to 1990**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
331.4	305.3	255	180.9	161.6	128.9	114	109.3	174.6	359.3	392.8	402.9

Table 7-3 summarizes climate within the Assessment Area based on data from the Hollyburn Ridge Climatological Station. Climate and temperature are important



factors to consider as they influence the rate of snow melt and the mean annual run-off. The highest daily maximum temperature occurs in July and August. The coldest of the daily minimum temperatures occurs in December and January. Extreme maximum temperature occurs in July and the extreme minimum temperature occurs in December (McElhanney 2002).

**Table 7-3 Daily maximum, daily minimum, daily mean, extreme maximum, and extreme minimum at Hollyburn Ridge. Information based on data collected from 1954 to 1990 (Degrees Celsius)**

Temp. (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily Max.	1	2.6	3.6	6.3	10.3	14	17.9	17.9	15.2	9.3	3.3	0.7
Daily Min.	-4.5	-3.2	-2.7	-8	-1.7	4.9	7.8	8.1	5.7	2.1	-1.7	-4.1
Daily Mean	-1.7	-0.2	0.5	2.7	6.1	9.5	12.8	13	10.5	5.7	0.8	-1.6
Extreme Max.	17.8	16.7	15.6	22.5	30.5	31.7	33.3	32	30.5	26.7	22.2	12.8
Extreme Min.	-22	-20	-15	-8.3	-4.4	-2.2	0	0.6	-3.9	-14	-20	-27

### Mean Annual Run-Off

Streamflow data was collected in Cypress Creek from March 31, 2004 to April 13, 2005 from a hydrometric station located immediately upstream of the 3.5 m culvert that runs beneath Cypress Bowl Road adjacent to the current Day Lodge (BGC Engineering Inc. 2005). Estimated monthly mean runoffs are presented in Table 7-4.

**Table 7-4 Monthly Mean Runoff from Cypress Creek.**

Station Name	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05
Cypress Creek (L/s/km <sup>2</sup> )	130.0	120.9	42.7	2.9	26.4	72.6	128.6	-	(67.3)	334.8	29.1	127.1	(153.1)

( ) = incomplete data available for monthly averages.

The data logger on the hydrometric station was not functioning between October and December therefore a regional analysis of streamflow data was used to compare and estimate the mean annual discharge of the creeks within Cypress Bowl. Based on the comparison of monthly seasonal flows MacKay Creek and Cypress Creek have similar unit flows (BGC Engineering Inc. 2005). Runoff patterns for Cypress Creek were based on patterns developed on MacKay Creek (Station 08GA061), due availability of hydrologic data and the proximity of MacKay



Creek to the Assessment Area and the long period of record (McElhanney 2002). Estimated monthly mean runoffs are presented in Table 7-5. High runoff is associated with the months of November through May when the ground tends to be saturated and/or frozen and/or covered in snow (McElhanney 2002). The snow cover melts during a rainfall event and increases total runoff. The data is presented as liters per second per kilometer (L/s/km) and average amounts in millimeter (mm).

**Table 7-5 Monthly Mean Runoff Pro-rated from MacKay Creek values**

Station Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Mean
Cypress Bowl (L/s/km <sup>2</sup> )	119.7	128.1	90.4	80.0	61.2	37.0	22.2	17.1	22.9	65.2	161.0	144.2	79.3
Cypress Bowl mm)	320.5	312.6	242.2	207.3	163.8	95.8	59.4	46.0	59.2	174.6	417.3	386.2	207.1

### Low Flow Assessment

There is insufficient streamflow data available within Cypress Bowl to complete statistical analysis of runoff conditions. The closest Water Survey of Canada streamflow station with a catchment area comparable to the Assessment Area is MacKay Creek (Station 08GA061) located east of Cypress Creek in North Vancouver. Seasonal variation in low flow has not been analyzed, however based on historical data low flows are most likely to occur in the summer months including July, August and September (McElhanney 2002).

### Historical Flooding

Floods and debris torrents have been historically recorded in the watercourses of West Vancouver and along Howe Sound (McElhanney 2002), likely due to both seasonal and unseasonable climatic conditions discussed above (e.g., precipitation events, run-off).

#### 7.2.3 Fish and Fish Habitat

Above Highway 99, Cypress Creek has a watershed area of 12.4 km<sup>2</sup>. The presence of fish species has been previously recorded within the mainstem of Cypress Creek (Table 7-6).

**Table 7-6 Fish species present in the Cypress Creek (900-073500) Watershed.**

Species	Scientific Name	Provincial Status	COSEWIC / SARA Status	Report Date
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Yellow	Endangered (2005) Okanogan population	Fish Wizard, 2005



Species	Scientific Name	Provincial Status	COSEWIC / SARA Status	Report Date
Coho Salmon	<i>Oncorhynchus kisutch</i>	Yellow		Fish Wizard, 2005
Cutthroat Trout	<i>Oncorhynchus clarki</i>	No Status		Fish Wizard, 2005
Rainbow Trout	<i>Oncorhynchus mykiss</i>	Yellow		Fish Wizard, 2005
Sculpin	<i>Cottidae</i> spp.			Fish Wizard, 2005
Steelhead	<i>Oncorhynchus mykiss</i>	Yellow		Fish Wizard, 2005

The British Columbia Conservation Data Centre (BCCDC) records for the Squamish Forest District indicate that the coastal cutthroat trout, *clarki* subspecies, (*Oncorhynchus clarki clarki*) is the only blue-listed species expected to occur in the Cypress Creek watershed. No red listed species have been recorded or expected to be in Cypress Park. The Okanogan population of the Chinook salmon (*Oncorhynchus tshawytscha*) was designated as Endangered by the Committee on the Status of Wildlife Species in Canada (COSEWIC) in May of 2005. This population is the only remaining Columbia Basin population of Chinook salmon in Canada, and is distinct from all other Canadian Chinook salmon populations. This population has not been listed under the *Species at Risk Act*.

Approximately 360 meters upstream of the upper levels highway (Highway 1) crossing there is a barrier to fish migration at Cypress Falls (10 m in height) that prevents the upstream movement of fish species (ENKON 2002). Species listed in Table 7-5 have been observed below the falls (Talisman, 1992). There are two more sets of falls, one at 10 m and the other at 40 m in height. These falls are located just north of Highway 1. In addition there is a series of chutes, cascades and falls located just downstream from the current day lodge that are also barriers to upstream fish passage. Sampling was conducted at six locations between Yew Lake and Cypress Bowl in 1997. During this sampling, no fish were captured (Coast River 1997). Additional sampling was conducted in 2002 in seven reaches between Cypress Falls and Yew Lake. No fish were captured during this sampling as well (ENKON 2002).

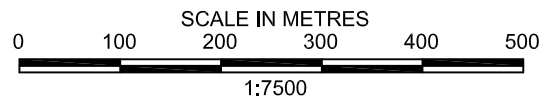
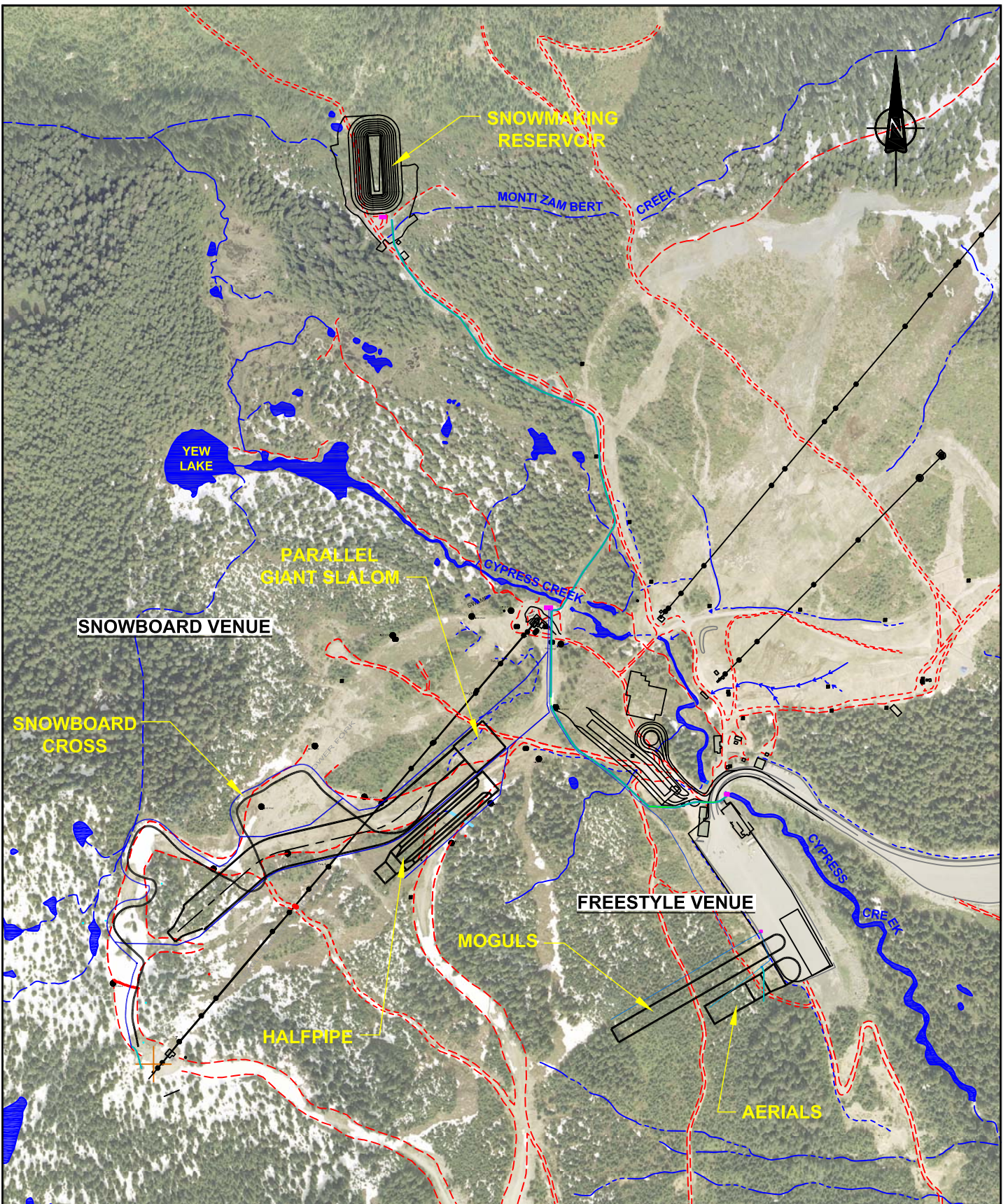
General site characteristics of Cypress Creek include an average channel width of 7.0 meters and an average gradient of 9.4 percent. The headwaters of the creek are at Yew Lake and the total length of the creek is approximately 9 km. The gradient does exceed 20 percent in several locations along the length of the creek. Suitable habitat for rearing and overwintering has been observed in reaches within the Assessment Area (ENKON 2002).




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During the fish surveys in 2002, several amphibians were observed or captured. A blue-listed Coastal-tailed frog (*Ascaphus truei*) was observed downstream of the large culvert located behind the current day lodge. The Coastal-tailed frog is also listed on Schedule 1 of *SARA* as a species of Special Concern. Northwestern salamanders (*Ambystoma gracile*) were captured around Yew Lake (ENKON 2002).





	CLIENT:	<b>VANOC</b>		<b>WATERBODIES AND STREAMS</b> CYPRESS VENUE - ENVIRONMENTAL ASSESSMENT CYPRESS PROVINCIAL PARK, BRITISH COLUMBIA	Fig No. <b>7-2</b>	
	PROJECT No:	BCV50473	DATE:			09-Mar-06
	DRAWN BY:	NP	CHECKED BY:			MD

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## 7.3 Terrestrial Environment

Terrestrial habitat in the Assessment Area is somewhat fragmented by the existing ski runs, hiking trails, service roads, forest harvesting and historic gravel extraction. The vegetation communities in the Assessment Area show the environmental effects of recent forestry activities. Many of the tree and shrub species observed are typical of early seral and mid-seral stage successional forest assemblages.

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### 7.3.1 Vegetation Resources

Information on the Vegetation Resources of the Assessment Area, including the potential distribution of rare plants and plant communities, was compiled based on available data, scientific publications, aerial photograph interpretation and field investigations.

As previously mentioned, two biogeoclimatic zones/subzones are found in the assessment area, including Coastal Western Hemlock very wet maritime-montane (CWHvm2) and Mountain Hemlock moist maritime windward variant (MHmm1). The Mountain Hemlock Zone occupies mountain slopes and valleys above approximately 900 meters, while the CWH zone is found in transition with MH at or below 900 meters. The Mountain Hemlock-Twistedstalk site association, common to the slopes of Hollyburn Mountain, provides the environment in which old growth stands over 1,000 years old are found (MELP 1997).

Typical natural vegetation in the Assessment Area includes mountain hemlock, amabilis fir and yellow cedar with an understory of *Vaccinium* species and other ericaceous shrubs. The most common forest ecosystems belong to the Mountain Hemlock-Amabilis Fir-*Vaccinium* and Mountain Hemlock-Copperbush associations, which is transitional to the Mountain Hemlock parkland subzone. The old-growth forest ecosystem within the Assessment Area is estimated to be average 315 years of age (BC Ministry of Forests 1985). The maximum ages for old growth trees include ~600 year old mountain hemlock (*Tsuga mertensiana*) and ~1000 year old yellow cedar (*Chamaecyparis nootkatensis*) (Stoltmann, 1990). Appendix B provides a list of the vegetation species that occur within the Assessment Area.

The area to be affected by construction of the Freestyle facilities consists of trees less than 40 years old with a dense understory of huckleberries and blueberries (*Vaccinium* spp.) which dominate the lower elevations of the Assessment Area near the existing ski venues. A patch of old-growth forest (>250 years) is located immediately southeast of the existing parking lot. This patch is dominated by mountain hemlock and amabilis fir (*Abies amabilis*). The understory in the center of



the patch is dominated by many ferns, blueberry and huckleberry and with coarse woody debris on slopes exceeding 30% in many places.

The upper elevation surrounding the ski lift and upper ski runs, where the Snowboarding facilities will be developed, contains the oldest trees within the Assessment Area. Amabilis fir and mountain hemlock are the dominant tree species. There is a limited understory, primarily composed of blueberry species. The forest contains large amounts of coarse woody debris. Vegetation along the existing ski runs is limited to shrubs and grasses that have become established in the cleared areas. The forest structure along the edges of the existing ski runs exhibit signs typical of being impacted by clearing (i.e., edge effect). This edge-effect includes the presence of shrubs, large woody debris from blow downs and multi-aged trees resulting from regeneration resulting in an area that is very dense with vegetation.

The diversity of vegetation species in the area around the old gravel borrow pit, where the snow making reservoir is proposed, is relatively high. Certain species are found here that are not found in similar habitat and at similar elevation. The influence of water seepage from Montizambert Creek allows for the presence of wetland and terrestrial species of flora in the area. However, this area is within a successional stage and is presently being invaded by alders.

### 7.3.1.1 Rare Plants

According to the BCCDC database there are 15 rare plants that could potentially occur within the Assessment Area (Table 7-7). Of the 15 plants, two are Red-listed in the province. This includes the cliff paintbrush (*Castilleja rupicola*) and the snow bramble (*Rubus nivalis*). The remaining 13 plants are Blue-listed in British Columbia. The cliff paintbrush is also listed as Threatened under Schedule 1 of the federal Species at Risk Act.

A search of the BCCDC database (2005) for the Assessment Area identified one record of a vascular plant – Nuttall's quillwort (*Isoetes nuttalli*). This record is from the Yew Lake trail. Table 7-7 provides a list of potential rare plants and their likelihood of occurrence within the Assessment Area.

Overall, the disturbed nature of the areas examined (gravel pit, existing ski runs, second growth forest) precluded the critical habitat required for most of the rare plants on the list. Growth on the ski runs was very stunted compared to other sections. The understory of the second growth forest is dominated by blueberry; consequently optimum conditions for rare plants that prefer a forested habitat do not exist. The old growth forest was very open, and forms a very small portion of the overall footprint. Most of the old growth forest's understory was either very dense or



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had been cleared away for mountain bike paths that have been built through the forest.



**Table 7-7 Rare plants that may occur in the assessment area.**

Scientific Name Common Name	Provincial Status	Federal <i>Species at Risk Act</i> Status Schedule	Habitat Requirements	Likelihood of Occurrence <sup>1</sup>	Species Recorded within Assessment Area
<i>Anemone drummondii</i> var. <i>drummondii</i> alpine anemone	Blue	Not Listed	Mesic to dry meadows, rock outcrops and scree slopes in the montane and alpine zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No
<i>Asplenium adulterinum</i> corrupt spleenwort	Blue	Not Listed	Dry to mesic talus slopes and walls of limestone fissures in the montane and subalpine zones.	<b>Low</b> Suitable habitat is not present	No
<i>Castilleja rupicola</i> cliff paintbrush	Red	Threatened (2005) Schedule 1	Dry to mesic cliffs and rocky slopes from the upper montane to alpine zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No
<i>Cheilanthes gracillima</i> lace fern	Blue	Not Listed	Dry rocks and rock crevices in the lowland and montane zones.	<b>Low</b> Suitable habitat is not present	No
<i>Douglasia laevigata</i> var. <i>ciliolata</i> smooth douglasia	Blue	Not Listed	Moist talus slopes to rocky ridges and ledges in the subalpine and alpine zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No
<i>Epilobium leptocarpum</i> small-fruited willowherb	Blue	Not Listed	Moist meadows and streambanks in the montane and alpine zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No
<i>Isoetes nuttalli</i> Nuttall's Quillwort	Blue	Not Listed	Vernal pools and ephemeral winter seepages in the lowland zone.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	Yes
<i>Mitella caulescens</i> leafy mitrewort	Blue	Not Listed	Wet to moist meadows and woodlands in the lowland and montane zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No

<sup>1</sup> Based on BC Parks Impact Assessment Process criteria – Full assessment and Criteria contained in Appendix A.





Scientific Name Common Name	Provincial Status	Federal <i>Species at Risk Act</i> Status Schedule	Habitat Requirements	Likelihood of Occurrence <sup>1</sup>	Species Recorded within Assessment Area
<i>Pleuropogon refractus</i> nodding semaphoregrass	Blue	Not Listed	Bogs, streambanks, lakeshores, wet meadows and forests in the lowland and montane zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No
<i>Pyrola elliptica</i> white wintergreen	Blue	Not Listed	Dry to moist forests in the montane zone.	<b>Low</b> Suitable habitat not present	No
<i>Rubus lasiococcus</i> dwarf bramble	Blue	Not Listed	Mesic to moist thickets and open forest in the montane and lower subalpine zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No
<i>Rubus nivalis</i> snow bramble	Red	Not Listed	Moist forests and glades in the montane zone.	<b>Low</b> Suitable habitat not present	No
<i>Rupertia physodes</i> California-tea	Blue	Not Listed	Mesic open forests in the lowland zone.	<b>Low</b> Suitable habitat not present	No
<i>Sagina decumbens</i> <i>ssp. occidentalis</i> western pearlwort	Blue	Not Listed	Margins of vernal pools, mesic forest openings and dry hillsides in the lowland zone.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No
<i>Sanguisorba menziesii</i> Menzies' burnet	Blue	Not Listed	Fens, bogs, marshes and wet meadows in the lowland and montane zones.	<b>Low to moderate</b> Suitable habitat present – previously disturbed area	No



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### 7.3.2 Sensitive Sites

Certain habitats exist within the Assessment Area that can be considered as sensitive sites based on the rarity of occurrence within the park. For the purposes of this assessment these sensitive sites refer to the habitats within the Yew Lake ecosystem, old growth forest, subalpine wetlands and habitat for rare species.

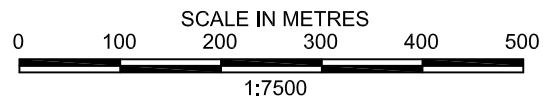
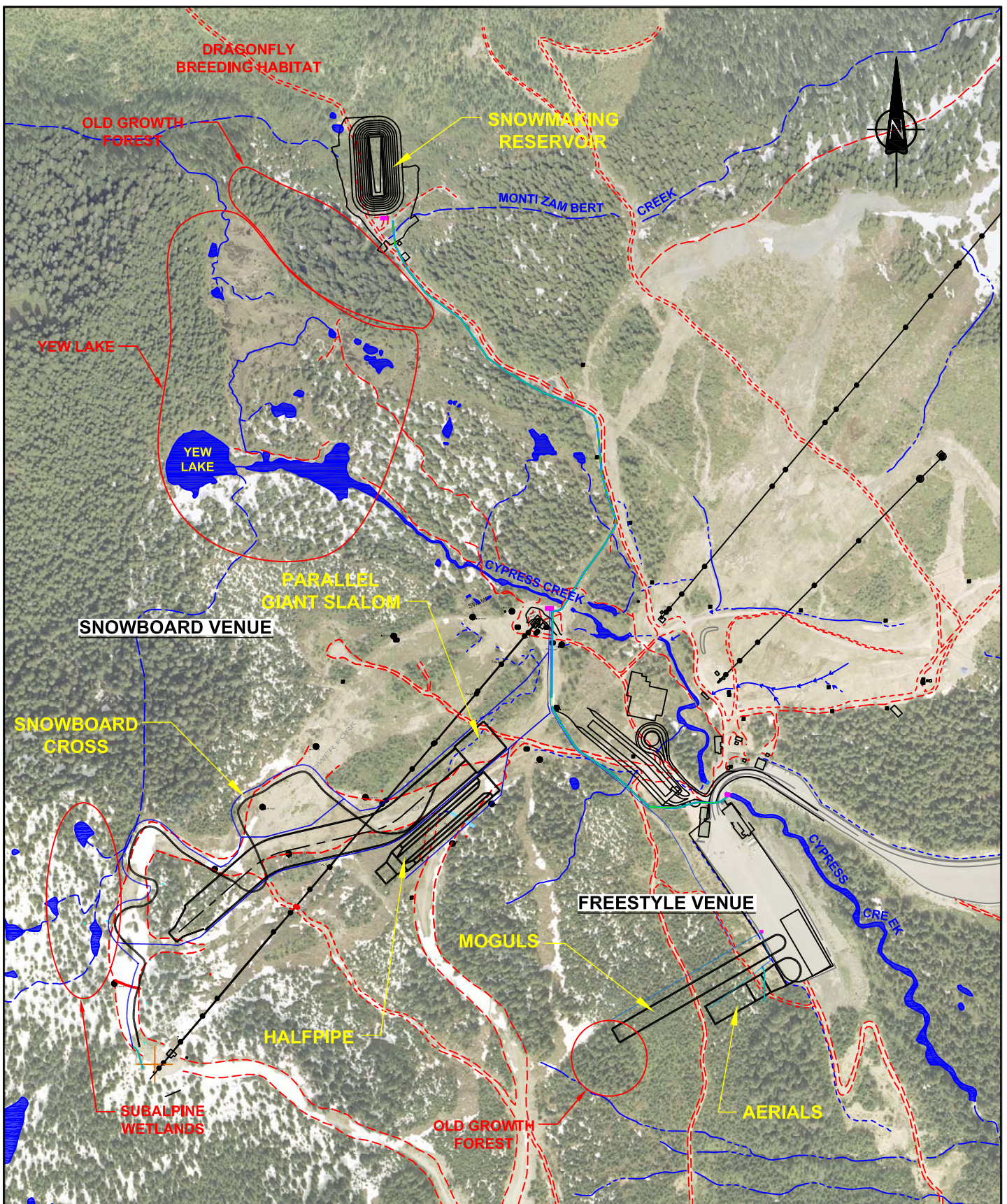
The Yew Lake ecosystem occurs in a transition zone between the lower elevation CWH zone and the higher elevation MH zone. The area contains subalpine meadows, wetland and old growth forest. The area contains a range of flora that is associated with subalpine meadows in one of the few publicly accessible locations on the North Shore Mountains. Other subalpine wetlands are present within the Assessment Area. Small ponds, bogs and drainages occurring near the summit of Black Mountain support a variety of flora similar to that found around Yew Lake.


Subalpine old growth ecosystems are considered to have very high ecological values due to their complex structural diversity, and old growth dependant wildlife that they support. Trees of significant size and age have been recorded within the old growth forests of Cypress Provincial Park. Species of yellow cedar, amabilis fir and mountain hemlock have identified as being among the largest recorded examples of their species (Stoltman 1990). Much of the unique old-growth forest in the Assessment Area has been thinned or completely removed for the development of the ski area (BC Parks 2003).

Suitable breeding habitat for the blue-listed Black Petaltail dragonfly (*Tanypteryx hageni*) has been identified within the Assessment Area (Figure 7-3). This is the only known breeding site for this species in Canada. The range of this particular species includes the mountains of western North America from the Sierra Nevada of California, north through the Cascades and Olympics to the coast range of southern British Columbia. (Vancouver Natural History Society 2005).

A distinguishing feature of this dragonfly is that the larvae do not spend their life below water in marshy ponds or slow moving streams as other dragonflies do, but live in small tunnels dug into moss and decaying plant matter. Preferred locations are sub-alpine seepage areas that are constantly moist. The burrows or tunnels they excavate are 6 mm to 8 mm in diameter, only slightly wider than the larva itself. Preferred habitat for this species is sub-alpine seepage areas that are constantly moist (Vancouver Natural History Society, 2005). The Black Petaltail can be found in flats or hillsides, often associated with streams and not under forest canopies in wet mountain ranges (Natureserve 2005). Populations of this species are scattered and are sensitive to disturbance.





	CLIENT:	<b>VANOC</b>		<b>SENSITIVE HABITAT LOCATIONS</b> CYPRESS VENUE - ENVIRONMENTAL ASSESSMENT CYPRESS PROVINCIAL PARK, BRITISH COLUMBIA	Fig No.  <b>7-3</b>	
	PROJECT No:	BCV50473	DATE:			09-Mar-06
	DRAWN BY:	NP	CHECKED BY:			MD

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### 7.3.3 Terrestrial Wildlife

Information on the distribution of wildlife, including rare, endangered, threatened and species of special concern, and its habitat in the Cypress Provincial Park and potential distribution within the Assessment Area was compiled based on available data, scientific publications, aerial photograph interpretation, and field investigations. Field investigations involved visual surveys to identify wildlife habitat values within the proposed development area, particularly in areas proposed for clearing.

A total of 65 species of small mammals, 21 species of carnivores, and six species of ungulates are expected to occur in the CWHvm2 and MHmm1 biogeoclimatic subzones (Stevens 1995). The subalpine habitat of the Mountain Hemlock zone supports fewer species and individuals compared to the habitats that fall within the CWH zones. This is attributed to the harsh climate and slow growth rates among vegetation that grows at the higher elevations. Approximately 20 species of terrestrial wildlife (Appendix C) have been recorded in Cypress Provincial Park. Habitats present in the study area include:

- several types of old-growth forest;
- mixed second-growth forest;
- sub-alpine wetlands;
- rocky bluffs;
- mountain-top plateaus and
- fire-scarred areas.

To obtain an understanding of the wildlife habitat and use in the vicinity of the proposed project, field surveys were conducted in 2002, 2004 and 2005. This compilation of information provided a good indication of the presence of wildlife species and habitat usage in the study area for conducting the effects assessment. Key habitat features in the study area include areas of mature forest stands with multiple canopy layers, coarse woody debris and fragmented old growth stands. The large area of older stands within the park provide good nesting habitat for forest nesting birds, such as warblers, woodpeckers, hawks, owls, and Rufus Hummingbirds.

In British Columbia, the assessment and protection of species at risk are considered important for recovery planning. These species are often considered indicator species and measures taken to reduce impacts on species at risk result in the protection of other wildlife resources as well. The British Columbia Conservation Data Centre (BCCDC 2003) identifies ten red-listed and eight blue-listed wildlife



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species which occur in the Cypress Provincial Park and may be found within the Assessment Area (Table 7-8).

Although the affected lands are not property of the Government of Canada, consideration of requirements of the Species at Risk Act was included in the assessment. This was achieved through a review of information provided by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Of those species identified as Red- or Blue-listed in the province, COSEWIC identifies the Pacific water shrew as Threatened and Keen's long-eared myotis and the grizzly bear, as a species of Special Concern.

Only one of the species listed above, the grizzly bear is considered a species of Special Concern both federally and provincially. The grizzly bear is on the provincial blue-list and is considered vulnerable, meaning they are particularly sensitive to human activities or natural events (BCCDC 2003). Grizzly bears are also classified as a species of special concern by COSEWIC (2003). The only recovery plan for grizzly bear in BC is for the northern Cascades, which covers the southwestern portion of the province (North Cascades Grizzly Bear Recovery Team 2001). Within the Cypress study area, the Grizzly bear can be expected to inhabit the CWH biogeoclimatic zones.

The proximity of Cypress Provincial Park to a large urban population makes survival a greater challenge for the resident wildlife population. Some of the animal species that historically have inhabited this location (e.g., wolves) have moved to a different location (ENKON 2002).





**Table 7-8 Mammals of conservation concern that may occur in the Assessment Area**

Scientific Name Common Name	Provincial Status	Federal Species at Risk Status Schedule *	Habitat Requirements	Likelihood of Occurrence <sup>2</sup>	Species Recorded within Assessment Area
<i>Sorex bendirii</i> Pacific water shrew	Red	Threatened (2000) Schedule 1	Inhabits moist riparian areas that are by streams and marshes. Usually found in forests with thick canopy cover, thick shrubs, and good ground cover of woody debris and litter. Generally found at lower elevations (below 600 meters).	<b>Moderate</b> Suitable habitat, however elevations at study site too high.	No
<i>Sorex trowbridgii</i> Trowbridge's shrew	Blue		Open areas, woodlands, forests	<b>Low</b> Suitable undisturbed forest areas not present in the study area	No
<i>Lasiurus blossevillii</i> Western red bat	Red		Prefer riparian areas where they roost in tree foliage. Prefer low elevation.	<b>Low to Moderate</b> Low elevation habitat not present within the study area	No
<i>Myotis keenii</i> Keen's long-eared myotis	Red	Special Concern (2003) Schedule 3	Limestone caves and old growth forests.	<b>Low to Moderate</b> Small pockets of mature forests present, caves are absent from study area.	No
<i>Lepus washingtonii</i> Snowshoe hare subsp. washingtonii	Red		Found in open fields, fence rows, swamps, riverside thickets, cedar bogs and coniferous lowlands	<b>Low</b> Small pockets of suitable habitats exist within the study area. Extirpated from study area	No

<sup>2</sup> Based on probability of occurrence.





Scientific Name Common Name	Provincial Status	Federal Species at Risk Status Schedule *	Habitat Requirements	Likelihood of Occurrence <sup>2</sup>	Species Recorded within Assessment Area
<i>Ursus arctos</i> Grizzly bear	Blue	Special concern (2002) No SARA rating	Prefer open areas such as tundra, alpine meadows, and coastlines	<b>Low to Moderate</b> Pockets of suitable habitat present in the study area	No



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#### 7.3.4 Avifauna

Information on the occurrence and abundance of birds, including rare, endangered, threatened and species of special concern, within the Assessment Area was compiled based on available data, scientific publications, and field investigations. Field investigations for birds were based on Resource Inventory Committee standards involved breeding bird surveys, a raptor/heron nest survey and a Northern Spotted Owl survey. Information regarding potential for the occurrence of rare birds within the Assessment Area was obtained from the British Columbia Conservation Data Centre using their Internet Mapping Service, which lists all individual verified records of at-risk birds mapped by the BCCDC within the Assessment Area and existing habitat up to September 2005. The list of potentially occurring at-risk bird species is based on an assessment of the listings provided by the BCCDC, the *SARA* web site (Table 7-9).

Over 100 species of birds (Appendix D) have been recorded in Cypress Provincial Park. Most species are considered uncommon or casual visitors to the park. Approximately half of the species that occur in the park are known to breed there. Five bird species have been assessed, according to their distribution and existing habitat in the vicinity of the Assessment Area. These species, described in detail below, have moderate potential for occurring and nesting within or adjacent to the Assessment Area boundaries.

##### **Western Screech-owl**

The most significant value of the Assessment Area is its potential to provide roosting habitat as well as nesting habitat for the blue-listed Western Screech-owl (*Megascops kennicottii kennicottii*) (BCCDC 2005). This species has the potential to nest in the interior forest in the vicinity of the Assessment Area. Many of the trees within the venue area and surrounding areas are mature second-growth, with patches of old-growth, and thus provide good cavity roost sites for small raptors like the Western Screech-owl, Northern Saw-whet Owl and Northern Pygmy-owl.

##### **Northern Spotted Owl**

Due to the high level of human disturbance and the lack of contiguous old-growth forest the potential to support the Northern Spotted Owl is severely limited. There have been no confirmed reports of the Northern Spotted Owl within Cypress Provincial Park (Hilton et al. 2001) However, due to Cypress Provincial Park's potential or capability to support this endangered raptor it is designated as a Spotted Owl Special Resource Management Zone (Blackburn and Godwin 2004).



## Northern Goshawk

The Northern Goshawk (*Accipiter gentiles*) is considered, by the B.C. Wildlife Watch, an accidental observation in autumn and a rare winter observation at Cypress Provincial Park (B.B.W.W. 2005). Two Northern Goshawk subspecies occur in British Columbia, *A.g. atricapillus* is Yellow-listed (not at risk), while *A.g. laingi* is Red-listed provincially, and listed as Threatened by COSEWIC, and included in Species at Risk Act Schedule 1. The ranges of the two subspecies have not been defined completely, and it is not clear which subspecies could occur in the Assessment Area (Cooper and Stevens 2000, MELP 1998). There is potential for the British Columbia mainland coast to be within the range of the Threatened *laingi* subspecies (E. McLaren pers. comm.). Genetic testing is underway to define the subspecies' ranges more accurately, but no genetic data is available for the Assessment Area. Due to the conservation status of the *laingi* subspecies and the uncertainty as to which subspecies occurs in the Assessment Area, this assessment has considered this species.





Table 7-9 Birds of conservation concern that may occur in the project area

Scientific Name Common Name	Provincial Status	Federal <i>Species at Risk Act</i> Status Schedule	Breeding Habitat Requirements	Likelihood of Occurrence in the Assessment Area <sup>3</sup>	Species Recorded within Assessment Area
<i>Ardea herodias fannini</i> Great Blue Heron	Blue	Special Concern (1997) Schedule 3	Nests colonially in tall, generally isolated Sitka spruce, western red cedar, western hemlock, pine, red alder and black cottonwood. Foraging habitat includes aquatic areas generally less than 0.5 m deep, within 5 km of the nest site.	<b>Low</b> Suitable habitat not present	Yes
<i>Butorides virescens</i> Green Heron	Blue	Not Listed	Use a variety of aquatic habitats in B. C. Slow-moving or shallow water for foraging and nearby dense trees or tall shrubs for nesting is important. The birds seem to be able to tolerate suburban, or even urban conditions.	<b>Low</b> Suitable habitat present	No
<i>Brachyramphus marmoratus</i> Marbled Murrelet	Red	Threatened (2000) Schedule 1	Marbled Murrelets are believed to nest along the entire B.C. coast in intact veteran forests, usually within 20 km of saltwater, but possibly much further inland.	<b>Low to Moderate</b> Suitable habitat is not present	No
<i>Patagioenas fasciata</i> Band-tailed Pigeon	Blue	Not Listed	Generally found in temperate and mountain coniferous and mixed forests and woodlands, also forage in cultivated areas, suburban gardens and parks.	<b>Moderate to high</b> Suitable habitat present in portions of assessment area	No
<i>Melanerpes lewis</i> Lewis's Woodpecker	Blue	Special Concern (2001) Schedule 1	Breeding habitat includes three primary habitat types: open ponderosa pine forest, open riparian woodland, and logged or burned forest.	<b>Low</b> Suitable habitat is not present	No
<i>Accipiter gentilis laingi</i> Northern Goshawk	Red	Threatened (2000) Schedule 1	Extensive forests with large stands of mature trees and dense canopies, but with an open understory. Large trees are important in providing nesting and perching platforms. Closely associated with mature and old-growth forests.	<b>Low to Moderate</b> Suitable undisturbed forest not present	No
<i>Falco peregrinus anatum</i> Peregrine Falcon	Red	Threatened (2000) Schedule 1	Typically nests on inaccessible cliff ledges, often overlooking areas that contain abundant prey.	<b>Low</b> Suitable rock cliff habitat not present.	No

<sup>3</sup> Based on breeding habitat requirements





Scientific Name Common Name	Provincial Status	Federal <i>Species at Risk Act</i> Status Schedule	Breeding Habitat Requirements	Likelihood of Occurrence in the Assessment Area <sup>3</sup>	Species Recorded within Assessment Area
<i>Tyto alba</i> Barn Owl	Blue	Special Concern (2001) Schedule 1	Barn Owls nest solitarily, usually in agricultural areas, sometimes along the edges of open woodlands. Most nests occur in man-made structures such as wooden barns and nest boxes.	<b>Low</b> Suitable habitat not present	No
<i>Strix occidentalis</i> Northern Spotted Owl	Red	Endangered (2000) Schedule 1	Requires large contiguous tracts of old growth forest, with sufficient prey available.	<b>Low</b> Large tracts of old-growth forest are not present	No
<i>Asio flammeus</i> Short-eared Owl	Blue	Special Concern (2001) Schedule 3	Found in open spaces of many kinds, such as estuaries, grasslands, marshes, fields, tundra, alpine meadows and forest clearings. Nests are built on the ground.	<b>Low</b> Suitable habitat not present	No
<i>Megascops kennicottii kennicottii</i> Western Screech-Owl	Blue	Special Concern (2002) Schedule 1	Along the coast it seems to be mostly found in either coniferous or mixed (deciduous or coniferous) forests.	<b>Moderate</b> If patches of suitable habitat are sufficiently large.	No



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## Band-tailed Pigeon

The other bird species listed by the BCCDC that potentially nests within the Assessment Area is the blue-listed Band-tailed Pigeon (*Patagioenas fasciata*). The BCCDC does not have any historical recordings of this species in the area; however it is thought to breed in the park (Appendix D). The Band-tailed Pigeon is found in the forests or coastal woodlands of Western British Columbia and North America. In British Columbia it has been found to breed in areas from sea level to 760 m elevation (Campbell et al. 1990). These pigeons perch, nest and feed in coniferous trees, such as pines, as well as in maples and alders.

## Marbled Murrelet

The nearest Marbled Murrelet records are from Furry Creek (MSRM 2003). Research indicates that most nests are within 30 km of the ocean shore, very few beyond 50 km inland and none beyond 80 km inland (Hamer and Nelson 1995). Available mapping from the Draft Sea-to-Sky Land and Resource Management Plan does not designate Cypress Provincial Park as having potential Marbled Murrelet habitat (MSRM 2002). While the study site is likely to have many migrants during the spring and fall migration seasons, it is expected that relatively few birds breed in the area.

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## 7.4 Atmospheric Environment

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### 7.4.1 Air Quality

Air quality in the assessment area is influenced by smog levels in the Greater Vancouver Regional District (GVRD) and the Fraser Valley. The key smog pollutants are ground-level ozone and fine airborne particulate matter. Particulate matter is considered the most serious kind of air pollution problem in British Columbia, particularly because of its effect on human health (BC Environmental Protection Division 2005). Particulate matter can be divided into two categories: particulates with a diameter of  $\leq 10 \mu\text{m}$  (PM10) and particulates with a diameter of  $\leq 2.5 \mu\text{m}$  (PM2.5). The other common air contaminants within smog include nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>), volatile organic compounds (VOC) and carbon monoxide (CO).

Particulate matter results from combustion of fossil fuels, industrial processes, prescribed burning and forest fires, and fugitive dust from roads. Fine particulates such as PM2.5 stay in the atmosphere for days or weeks. Coarse particulates (i.e., PM10) are removed by gravitational settling and are therefore short-lived in the



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atmosphere (Ministry of Water, Land and Air Pollution and Environment Canada 2003).

The geographical features of the Fraser Valley and the GVRD, including the Coastal Mountains to the north and the Cascade Mountains to the southeast, along with the southwest winds off the Strait of Georgia restrict air-flow patterns and contribute to the area's smog. Most of the smog is generated locally from motor vehicle and industrial emissions (Environment Canada 2006).

Mobile sources, the majority of which are light-duty vehicles, account for approximately 75% of the total air contamination in the Fraser Valley. In 2002, there were approximately 1.2 million light-duty vehicles registered in the Lower Mainland and Fraser Valley. Information collected for the preliminary environmental assessment showed that approximately 300,000 vehicle travel to Cypress Provincial Park along the Cypress Bowl Road on an annual basis. The local air quality of Cypress Provincial Park is likely influenced by emissions from these vehicles. Other factors influencing air quality within the park would be emissions and fugitive dust from construction equipment that is used for maintaining the ski area during the summer.

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#### 7.4.2 Noise

The current ski area has been in operation since 1974. Noise was not a concern during the Level I environmental assessment, therefore ambient noise levels have not been recorded. Major activities that influence the level of noise in the assessment area include snow grooming, operation of the chairlifts and general maintenance activities. Most noise would be generated during the winter season when activity in the ski area peaks. Ambient noise levels are likely within ranges that are tolerable to humans and wildlife.

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#### 7.4.3 Viewshed

Cypress Provincial Park has been utilized for alpine skiing dating back to the 1920s. The current alpine ski area is located on Black Mountain and Mount Strachan where there are 38 alpine skiing runs that are accessed by six chair lifts. Based on the topography of the area, only the upper portions of the ski runs on Black Mountain and Mount Strachan are visible from the Vancouver area, compared to other ski areas on the North Shore Mountains (i.e., Grouse and Seymour).

The existing ski facility offers night skiing on all main runs during the winter season. Night skiing is available on both the Fork and Panorama runs on Black Mountain



where approximately 20 to 30 lights are used. Night skiing is also available on Mount Strachan and on a portion of the Nordic ski trails. Additional lighting is provided around the day lodge and guest services areas. During the winter season lights are visible on Black Mountain and Mount Strachan.

The park also offers access to several hiking trails plus there is a new mountain bike park that was constructed in 2005.

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## 7.5 Socio-Economic Environment

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### 7.5.1 Recreational Access

Cypress Provincial Park contributes significantly to the recreation goal of BC Parks by providing residents and visitors with readily-accessible day use outdoor recreation activities. According to BC Parks (MELP 1997), approximately 1,000,000 visitors use this park on an annual basis making it one of the most intensively visited alpine areas in the province. Additionally, Cypress Provincial Park contributes to recreational goals by protecting a natural environment which lends itself to a wide variety of recreational opportunities for both winter and summer activities.

Cypress Provincial Park has two BC Parks' identified zones that are relevant to recreational use: the Wilderness Recreation Zone and the Intensive Recreation Zone.

The objective of the Wilderness Recreation Zone is to protect a remote, relatively undisturbed natural landscape and to provide opportunities for backcountry recreation activities that are dependent on a more pristine environment. Compatible activities in this zone include hiking, backpacking, ski touring, fishing, nature appreciation and photography.

The objective of the Intensive Recreation Zone is to provide for a variety of high-use, readily-accessible, facility oriented outdoor recreation opportunities. Both alpine and Nordic skiing, within the Controlled Recreation Area, are recognized uses within the Intensive Recreation Zone. This zone is comprised of the Cypress Parkway city viewpoints, the Parkway itself and the Cypress Mountain and Hollyburn ski areas. The alpine and Nordic ski areas, trails and viewpoints provide recreation experiences for the average park visitor.

Vehicular access to Cypress Provincial Park is along the Cypress Parkway which leads off Highway 1 in West Vancouver and terminates in the Cypress Mountain alpine ski area. This three lane highway has two viewing areas and is maintained by the Ministry of Transportation and Highways. In addition to private vehicle access, Cypress Bowl Recreation Ltd. (CBRL) has, in previous years, operated a



winter season bus system from Park Royal Shopping Centre and Horseshoe Bay in West Vancouver.

Hiking routes into Cypress Provincial Park are from access points along a number of trails. From the north, on Highway 99, a trailhead is established 2 km south of Porteau Cove Provincial Park. This section of the Howe Sound Crest trail is outside the park, yet it gives hikers access to the park via an old logging road. Deeks Lake is also connected to the Cypress Mountain and Hollyburn ski areas along the Howe Sound Crest trail. The Baden-Powell trail which transects the North Shore mountains from Horseshoe Bay to Deep Cove currently crosses the lower portion of Cypress Provincial Park and provides east-west hiker access. Other hiking routes lead from West Vancouver and connect with the Baden-Powell, Skyline and Brothers Creek trails.

Air access into the park is only permitted under park use permit or when an emergency rescue is required. Motorized access is not allowed in the backcountry but snowmobiles are permitted on designated trails in the southern portion of the park.

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#### 7.5.2 Park Use by the Public

Park use by the public generally involves the following activities:

##### **Hiking and Mountaineering**

Hiking and walking are popular activities within the BC Park network, including Cypress Provincial Park. Prior to the establishment of Cypress Provincial Park, the Baden-Powell trail was constructed linking Horseshoe Bay with Deep Cove. This east-west hiking trail bisects Cypress Provincial Park and provides the public access through old growth forests.

Cypress Provincial Park offers over 75 km of hiking trails ranging from relatively easy to difficult (MELP 1997). Major hiking destination areas include the Howe Sound Crest trail, the Lions, Deeks Lake, Black Mountain, Brunswick Mountain, Hollyburn Mountain, Yew Lake, Cabin Lake, Blue Gentian Lake, Brothers Canyon and the Baden-Powell trail.

##### **Winter Recreation**

Cypress Provincial Park is a popular destination for winter recreationists. Due to the park's proximity to the Lower Mainland and paved road access it has the highest visitor attendance of all provincial parks. Along with alpine and Nordic skiing facilities, winter visitors can participate in snowshoeing, backcountry skiing, tobogganing, snowmobiling and nature appreciation. Within the Controlled



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Recreation Area, CBRL provides alpine and Nordic skiing facilities to service one of the most intensively visited alpine ski areas in the province.

### **Nature Appreciation and Outdoor Education**

Cypress Provincial Park provides opportunities for nature appreciation, outdoor education and wildlife viewing. Yew Lake has a popular self-guiding, wheel-chair accessible summer interpretive trail. In addition a loop trail off the main trail has been developed which allows visitors to stroll through an old growth forest.

### **Wilderness Camping**

Wilderness camping opportunities, including shelters located along the Howe Sound Crest trail, Magnesia Meadows and Brunswick Lake.

### **Day Use and Viewpoints**

Cypress Provincial Park provides a number of picnic sites that are located beside scenic lakes or viewing areas. The park also offers views from a number of viewpoints throughout the park.

### **Mountain Biking**

Mountain biking has become a very popular recreational activity on the North Shore mountains. Currently, old logging roads and connecting trails through municipal lands are being used for mountain biking. Beginning in the summer of 2005, Cypress Mountain began offering a lift-aided, maintained mountain bike park.

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## **7.6 Cultural Environment**

The Assessment Area is within the asserted traditional territories of the Musqueam Indian Band, the Squamish Nation, the Stó:lō Nation, and the Tsleil-Waututh First Nation (Burrard Indian Band). An archaeological overview assessment (AOA) was completed in 2005 which included a review of environmental, ethnographic, historic and prehistoric data. A field reconnaissance was also completed as part of the AOA to examine the Assessment Area for archaeological artifacts or features.

The literature search and field inspection revealed that CMTs are located in, and near, the project area. Although the historic literature suggests a low potential for early non- Native sites, archaeological and ethnographic evidence suggests a moderate potential for prehistoric sites on the more open, level ground primarily found at the base area adjacent to the creeks and wetlands.

No archaeological artifacts, features, rock art, rock shelters, or caves were found during the field reconnaissance. Evidence of early historic activities was limited to



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logged trees. One Culturally Modified Tree was identified in the project area near Cypress Creek. Many of the lands to be impacted by the proposed development have been previously disturbed by one or more of the following: logging; road and trail construction; clearing and grading of ski slopes and construction of ski facilities.

