Black Bear

PROJECT NAME: Sooke Hills Wilderness and Mount Wells Regional Parks

Scientific Name: *Ursus americanus*

Species Code: M_URAM

Status: Yellow-listed (any indigenous species or subspecies (taxa) which is not at risk in British Columbia).

I. DISTRIBUTION

Provincial Range

Black bears inhabit all forested regions of British Columbia. They can be found within all biogeoclimatic zones and occupy a wide variety of habitats ranging from coastal estuaries to alpine meadows.

Elevational Range

Sea-Level to Alpine

Provincial Context

Black bears occur commonly throughout their range. Populations in BC are stable, and currently, approximately 140 000 - 160 000 black bears occur in BC (T. Hamilton, pers. comm.). Black bears occur from sea level in coastal estuaries, up to high elevation alpine meadows; and are present in every biogeoclimatic zone in the province. The highest coastal concentrations of black bears occur in the Kitimat Range (KIR) and Nass Ranges (NAR) ecosections, whereas, the Chilcotin and Okanagan areas have low densities. Relative densities of black bear are lower on southern Vancouver Island due to the preponderance of closed canopy second growth forest and human settlements.

Project Area: CRD Parks Sooke Hills Watershed

Ecoprovince:	Georgia Depression
Ecoregions:	Eastern Vancouver Island
Ecosections:	Nanaimo Lowlands (NAL)
Biogeoclimatic Zones:	CDFmm, CWHxm1

Project Map Scale: 1:20,000

II. ECOLOGY AND KEY HABITAT REQUIREMENTS

General

Black bears prefer forested and shrubby areas, but use wet meadows, high tidelands, ridgetops, burned areas, riparian areas and avalanche chutes (Pelton, 1979). They prefer mesic over xeric sites and timbered over open areas (Unsworth *et al*., 1989).

Black bears are very adaptable and inhabit a wide variety of plant communities. In the Northwest black bears are found in spruce-western redcedar-hemlock forests as well as pine and fir forests (Pelton, 1987).

Black bears are omnivorous and opportunistic in their feeding habits. Green leafy material forms the bulk of their diet, especially in late spring and early summer. They also feed on insects, fruits, berries, fish, garbage, carrion, and small mammals. Occasionally, black bears will prey on young/small deer.

During periods of inactivity, black bears periodically utilize bed sites in forest habitat with thick understudy vegetation. These sites are often a simple shallow depression in the forest leaf litter, but may become deeper with use.

Seasonal movement of black bears within a geographic area are influenced by the juxtaposition or availability of seasonally important food resources or habitat components, breeding activity, reproductive status of individuals and availability of denning habitat (Rogers, 1977).

Black bears make extensive seasonal movements to areas of food abundance such as spring green-up sites, spawning areas, berry patches and garbage dumps (Amstrup & Beecham, 1976, Rogers, 1977, Modafferi, 1978). In particular, these extensive movements occur to and from winter den sites and during the late summer and fall when foraging activities increase (Pelton, 1982).

Migrating black bears will use movement corridors such as game trails, human trails, open edges, shorelines, ridges, creek beds, snow filled avalanche chutes, logging roads, sandbars or rivers (Stevens & Lofts, 1988).

Generally, adult males have the largest home ranges, which may be several times as large as those of females and overlap more than those of females (Amstrup & Beecham, 1976, Rogers, 1977, Young & Ruff, 1982). Females have well-defined home ranges of between 12 and 50 km^2. Male black bears, especially subadults, have much larger home ranges, sometimes traveling 50 km or more to a preferred food source or winter denning site (Rogers, 1977).

Breeding occurs in May and June (Stevens & Lofts, 1988). Gestation is 6 to 7 months long with one to three cubs being born from late November through February. Birth and early maternal

care occurs in the winter den. The cubs remain with their mother for 1 to 2 years. Hollow trees or fallen logs are used for hibernating habitat.

III. HABITAT USE: LIFE REQUISITES

- **Living Habitat (LI)**

The living life requisite for black bears is satisfied by the presence of suitable feeding and security habitat, which are described in detail below.

- **Feeding Habitat (FD)**

➢ **Early Spring**

In early spring, black bears on the coast feed on the early green vegetation found in the estuaries and seepage sites that become snow-free first. Grasses, sedges and horsetails are the most commonly selected spring food items of bears, mainly because these plants develop early (Hatler, 1967, Lloyd & Fleck, 1977, Ruff, 1978). In early spring bears require high-protein, digestible forage and so feed on succulent vegetation in wet meadows, riparian inclusions, skunk cabbage swamps, avalanche chutes and burns (Steven & Lofts, 1988). Beaches, estuaries and open riparian areas are also important feeding habitat. Warm aspect avalanche tracks, slides and clearcuts are important feeding habitat because of early exposed vegetation.

➢ **Late Spring / Summer**

Green leafy material and wild berries in old-growth and mid-seral, deciduous forests provide summer food for black bears. Recent clearcuts (5-15 years old) are important feeding areas. Salmonberry (*Rubus spectabilis*) is important in early summer, and other berries are utilized as they become available (e.g., red huckleberry (*Vaccinium parvifolium*), raspberry (*Rubus leucodermis*), blueberry (*Vaccinium* spp.), currants (*Ribes* spp.), black twinberry (*Lonicera involucrata*), elderberry (*Sambucus racemosa*), devil's club (*Oplopanax horridus*), highbush-cranberry (*Vibernum edule*), red-osier dogwood (*Cornus stolonifera*) and salal (*Gaultheria shallon*)). Habitats with predictably high species-specific berry production (e.g., salal) may be rated more suitable. Insects, especially ants and wasps are also important summer food. Late spring feeding habitat for black bears is difficult to distinguish from summer feeding habitat. Refer to Appendix A for a more detailed list of forage species preferences of black bears.

➢ **Fall**

In the late summer and fall, ecosystem units with spawning rivers and streams represent important feeding habitat. Black bears continue to feed on the late-producing berry species (e.g., salal) and other available vegetation. Although black bear diet is seasonal, black bears are opportunistic omnivores. Black bears will also feed on fish, wildlife, domestic animals, carrion and insects, such as carpenter ants (*Camponotus* spp.), yellow jackets (*Vespula* spp.), bees (*Apidae*), and termites (*Isoptera*) as available. Ecosystem units with high coarse woody debris loadings are also suitable foraging habitat for black bears. Black bears will also climb trees to eat young shoots so ecosystem units at structural stages with trees large enough to support bears will also be rated as moderate feeding habitat (Stevens & Lofts, 1988).

- **Security habitat (SH)**

Security habitat for black bears bears is variable, but is used to avoid interspecific (e.g., adult bear to juvenile bears) and intraspecific (e.g., bear to human and black bear to grizzly bear) contact.

1) Bear/bear avoidance - During the growing season, shrub and tree cover are used as security from other bears. To avoid aggressive males, females with cubs rely on wildlife tree patches (with a structural stage beyond pole-sapling), and will rarely forage greater than 100 m from a stand that provides this type of security habitat (Jonkel, 1978). Black bears also prefer immature forest stands (14-23 yr. preferred over 5-12yr. stands and stands older than 38 years) (Lindzey & Meslow, 1977), likely because of the cover value associated with these stands. In order to forage close enough to security cover, some black bears rarely use habitat beyond 183 m of forest cover (Rogers & Allen, 1987).

2) Bear/human avoidance: Black bears typically will avoid high-traffic roads (e.g., highways or active logging roads) and human settlements, unless attracted by atypical food sources (e.g., garbage dump, fruit trees). Suitable habitat adjacent to such non-habitat features are less suitable.

- **Thermal habitat (TH)**

Black bears will temporarily seek shelter from precipitation under forests/patches with low canopy or rock overhangs. Bears will also seek relief from heat by using open water (e.g., ponds, lakes, rivers, streams, springs), and using beds in cool, sandy areas. Generally, these habitat features are too small to map as TEM polygons, and are difficult to rate. If located, these features will be identified in the 'Evidence of Use' section in the Wildlife Habitat Assessment form.

- **Hibernating Habitat (HI)**

Suitable dens for black bears are warm, dry and secure. Black bears hibernate between October and May. However, black bears in coastal habitats may not enter their dens until late November or early December, emerging in April. Some coastal black bears, given suitable climate regimes, do not enter dens. Typically dens are underground and in locations that catch early snow and maximize the snow's insulative qualities. Cavities in old-growth structures, including large old trees, stumps, root bolls and logs having a diameter greater than 85 cm are suitable dens. Yellow cedar and western redcedar are important hibernating sites, although sites are likely based on den structure, rather than tree species. Hibernating in second growth forest stands is limited by suitable hibernating locations.

IV. SEASONS OF USE

Black bears require different feeding, security and thermal habitat throughout the year. Table A8 summarizes the life requisites of black bear for each month of the year for the Coast and Mountains ecoprovince.

Table A8. Monthly Life Requisites for Black Bear.

Month	Season*	Life requisites
January	Winter	Hibernating
February	Winter	Hibernating
March	Winter	Hibernating

April	Early Spring	Feeding/Security&Thermal
May	Late Spring	Feeding/Security&Thermal
June	Summer	Feeding/Security&Thermal
July	Summer	Feeding/Security&Thermal
August	Summer	Feeding/Security&Thermal
September	Fall	Feeding/Security&Thermal
October	Fall	Feeding/Security&Thermal
November	Winter	Hibernating
December	Winter	Hibernating

*Seasons defined for Coast and Mountains Ecoprovinces per the Chart of Seasons by Ecoprovince (RIC, 1999, Appendix B).

Based on the habitat requirements identified in this species account and the location of the project (i.e., Coast and Mountains Ecoprovince), Early Spring (PE), Summer (S), Fall (F) and Winter (W) seasons will be rated for black bear.

V. HABITAT USE AND ECOSYSTEM ATTRIBUTES

Table A9. Relationship between Terrestrial Ecosystem Mapping (TEM) attributes and each life requisite for black bear.

Life Requisite	TEM attribute
Feeding (FD)	• site -site series, site disturbance, elevation, slope, aspect, structural stage, site modifier • vegetation - % cover by layer, species list by layer, structural stage modifier, stand composition modifier, available forage • soil - flooding regime
Security & Thermal (ST)	• site - site series, slope, structural stage, structural stage, modifier • vegetation - total % cover, % cover by layer, stand composition modifier
Hibernating (HI)	• site - site series, site disturbance, elevation, slope, aspect • soil - terrain classification, rooting depth, rooting zone particle size, root restricting layer, seepage water depth, flooding regime, soil depth, soil texture, percent coarse fragments

VI. RATINGS

There is a detailed enough level of knowledge of the habitat requirements of black bears in British Columbia to use a 6-class rating scheme (RIC, 1999).

Provincial Benchmark

Ecosection: Kitimat Ranges (KAR)

Biogeoclimatice Zone: CWHvm1 (Coastal Western Hemlock - very wet maritime)

Broad Ecosystem Unit:

Habitats: skunk cabbage, floodplains, wetlands, estuaries/beaches; the highest densities of black bears are associated with extensive areas of early seral stages complexed with salmon bearing streams, marine beach habitats, and forested ecosystem units for security/thermal cover.

Ratings Assumptions

1. Black bears make discrete choices of the plant food items consumed, and therefore, availability and abundance of food items are key factors in habitat selection by the bear. Recorded habitat use is assumed to reflect habitat preferences, and habitat preferences are assumed to reflect habitat requirements.

2. The importance value of food items determined from scat analysis accurately reflects the importance of that food item to the bear in that time period, and that forage plant availability is correctly predicted by the site unit.

3. Feeding and security habitats in close proximity are assumed to be the limiting factors for black bears.

4. Although it is recognized that other factors such as predation, disease, intra/inter specific competition and hunting influence black bear population growth and distribution, this model does not include these factors.

5. Black bear habitat use is strongly influenced by intraspecific social interactions and the presence and activities of people.

6. Ecosystem units with high forage plant diversity and abundance in a lush herb layer with an abundance of grasses, Sedges (*Carex spp*.), horsetails (*Equisetum spp*.), skunk cabbage, cow parsnip, stinging nettle, hellebore, and dandelion represents class 1 black bear spring, feeding habitat. Habitat with lower plant diversity and abundance will be rated poorer than class 1.

7. Ecosystem units with total shrub cover of 15-30%, shrub height < 2.5 m, shrub species dominated (i.e., >15%) by *Vaccinium* or other berry producers (e.g. soopolallie, thimbleberry, twinberry, devil's club, elderberry, high bush cranberry), and high coarse woody debris will be rated class 1 black bear summer, feeding habitat.

8. Ecosystem units consistently occurring near salmon spawning streams, berry producing areas (see assumption 6), and high coarse woody debris (e.g., moist forests with abundant forage plants) will be rated class 1 black bear fall, feeding habitat.

9. Ecosystem units with tree species composition of mixed conifer/deciduous species, and/or mature shrub cover (e.g., >35%), and/or high canopy closure (e.g., >50%) or any equivalent combination will be rated class 1 security/thermal habitat for black bears across all seasons.

10. High elevation ecosystem units on steep slopes, with dry stable, fine-textured soil conditions will be rated class 1 for hibernating habitat.

11. In coastal ecosystems, black bear hibernating habitat can occur in the old-growth forests with, for example, large diameter trees which offer hollow boles, and/or large diameter downed hollow, coarse woody debris.

Table A10. Summary of general habitat attributes for black bears.

Habitat Use	Specific Attributes for Suitable Black Bear Habitat	Structural Stage
Spring Feeding	• high forage plant diversity in lush herb layer with an abundance of grasses, sedges (Carex spp.) horsetails (Equisetum spp.); cow parsnip, stinging nettle, hellebore, dandelion, skunk cabbage, etc. • (See Appendix A for detailed preferred forage species).	2-3, 6-7
Summer Feeding	• 15-30% total shrub cover • shrub species composition dominated (>15%) by Vaccinium or other berry producers (e.g. soopolallie, thimbleberry, twinberry, devil's club, elderberry, high bush cranberry) • shrub Height < 2.5 m • high coarse woody debris	3, 6-7
Fall Feeding	• salmon spawning areas • berry-producing areas close to salmon streams • high coarse woody debris • moist forests with abundant forage plants	-
Security/ Thermal Cover	• tree species composition mixed conifer/deciduous • mature conifer • shrub cover >50% • canopy closure >66%	3, 5-7
Hibernating Habitat	• deep, fine-textured soils • dry, moisture-shedding site • higher elevation, steep slope site • old-growth coastal forests, with large diameter tress and coarse woody debris.	6,7

VII. RATINGS ADJUSTMENTS

Table A11outlines some general ratings assumptions that can be applied to black bear habitat suitability.

Table A11. Some suggested adjustments to initial field habitat ratings for black bears.

Attribute	Adjustment
Proximity of mature forest cover to suitable open feeding areas	(e.g., > 100m -200m downgrade FD by 1 >200m-400m downgrade FD by 2 >400m downgrade FD to nil)
Road density (km/km^2)	*project specific*
Distance to road (m)	*project specific*
Presence of salmon stream within unit	(e.g., increase to class 1 FD for fall)

VIII. LITERATURE CITED

Armstrup, SC. & J. Beecham. 1976. Activity patterns of radio collared black bears in Idaho. J.Wildl.Manage.,40:340-348.

Hatler, DF. 1967. Some aspects of the ecology of black bears (Ursus americanus) in Interior Alaska. M.S. Thesis., University of Alaska College., 111pp.

Lindzey, FG. and EC. Meslow. 1977. Home range and habitat use by black bears in southwestern Washington. J. Wildl.Manag., 41:413-325.

Lloyd, K. and S. Fleck. 1977. Some aspects of the ecology of black and grizzly bears in southeast British Columbia. Unpublished report, BC Fish and Wildlife Branch, Cranbrook, BC 55pp.

Modafferi, RD. 1978. Black bear movements and home range study. Alaska Department of Fish and Game Report 23pp.

Pelton, MR. 1982. Black bear. Pages 504-514 in JA Chapman and GA Feldhamer (eds.) Wild Mammals of North America. John Hopkins University Press, Baltimore 1147 pp.

RIC (Resources Inventory Committee) 1999. BC Wildlife Habitat Ratings Standards. Ministry of Environment, Lands and Parks. Version 2.0.

Rogers, LL. 1977. Social relationship, movements, and population dynamics of black bears in northeastern Minnesota. Ph.D. thesis, Univ.Minn., Minneapolis. 194pp.

Rogers, LL. and AW. Allen. 1987. Habitat suitability index model: black bear. 54 p. Upper Great Lakes Reg. USFW Serv.Biol.Rep. 82.

Ruff, RL. 1982. Dynamics of black bear populations: (low to no human exploitation). Pages 87-103 in FG Lindzey, ed. Procedures of the Second West Black Bear Workshop, Logan, Utah 136pp.

Stevens, V. and S. Lofts. 1988. Wildlife Habitat Handbooks for the Southern Interior Ecoprovince Vol 1:Species Notes for Mammals. BC Envir., BC Min. For., Victoria, BC.

Unsworth, JW., JJ. Beecham and LR. Irby. 1989. Female black bear habitat use in west-central Idaho. J. Wild. Manage. 53:668-673.

Young, BF. and RL Ruff. 1982. Population dynamics and movements of black bears in east central Alberta. J.Wildl.Manage., 46:845-860.

Personal Communications:

McLellan, Ministry of Forests, Revelstoke, B.C.

Tony Hamilton, Ministry of Environment, Lands and Parks, Victoria, B.C.

Grant Machuthon, Biologist, Comox, B.C.

Stephan Himmer, Biologist, Hagenborg, B.C.

XI. APPENDIX A. BEAR FOOD ITEMS AND PREFERENCE RANKS

Species	**Black Bear**	**Grizzly Bear**
Graminoids		
Bromus spp.	Lvs (1)	Lvs (1)
Carex spp. / *Juncus* spp.	Lvs (3)	Lvs (3)
Leymus spp.	Lvs (1)	Lvs (1)
Luzula spp.	Lvs (1)	Lvs (1)
Phleum spp.	Lvs (1)	Lvs (1)
Poa spp.	Lvs (2)	Lvs (2)
Trisetum spp.	Lvs (1)	Lvs (1)
Forbs		
Achillea millefolium	Lvs (1)	Lvs (1)
Allium cernuum	St (1)	St (1)
Angelica arguta	Lvs (2)	Lvs (3)
Aster conspicuus	Lvs (1)	Lvs (1)
Aster foliaceus	Lvs (1)	Lvs (1)
Astragalus spp.		St (2)
Claytonia lanceolata		St (3)
Circium spp.	Lvs, St (1)	Lvs, St (1)
Equisetum arvense	Lvs, St (3)	St (3), Lvs (3)
Epilobium spp	Lvs, St (1)	Lvs, St

		(1)
Erythronium grandiflorum		R (3)
Fragaria virginiana	Lvs, Fr (2)	Lvs, Fr (2)
Gymnocarpium dryopteris	Lvs (1)	Lvs (1)
Hedysarum boreale		R (2)
Hedysarum sulphurescens		R (2)
Heracleum lanatum	Lvs, St (2)	Lvs (3)
Lathyrus spp.	Lvs (3)	Lvs (3)
Ligusticum canbyi		Lvs (2)
Lomatium dissectum, Lomatium triternatum	St (3)	St, R (3)
Lysichiton americanum	Lvs, St (3)	Lvs, St (2)
Osmorhiza chilensis	Lvs, St (2)	Lvs (2)
Osmorhiza spp.	Lvs, St (2)	Lvs (2)
Oxytropis campestris		St (2)
Polygonum bistortoides		St (1)
Rhamnus alnifolia	Fr (2)	Fr (2)
Senecio triangularis		Lvs (1)
Streptopus amplexifolius	Lvs, Fr (1)	Lvs, Fr (1)
Taraxacum officinale	Lvs (3)	Lvs (3)
Tiarella trifoliata	St (1)	St (1)
Trifolium hybridum	Lvs (3)	Lvs (3)
Trifolium repens	Lvs (3)	Lvs (3)
Valeriana sitchensis		Lvs (2)
Veratrum viride		Lvs (1)
Viola glabella		Lvs (1)
Shrubs		
Amelanchier alnifolia	Fr (3)	Fr (3)
Arctostaphylos uva ursi	Fr (2)	Fr (2)
Cornus stolonifera	Fr (2)	Fr (2)
Empetrum nigrum		Fr (2)
Lonicera involucrata	Fr (1)	Fr (1)

Oplopanax horridum	Fr, Lvs (1)	Fr, Lvs (1)
Rhamnus alnifolia	Fr (2)	Fr (2)
Ribes hudsonianum	Fr (1)	Fr (1)
Ribes lacustre	Fr (1)	Fr (1)
Rosa acicularis	Fr (2)	Fr (1)
Rosa woodsii	Fr (2)	Fr (1)
Rubus idaeus	Fr (2)	Fr (1)
Rubus parviflorus	Fr (2)	Fr (1)
Salix spp (catkins)	Fr (2)	Fr (1)
Sambucus racemosa	Fr (2)	Fr (2)
Shepherdia canadensis	Fr (3)	Fr (3)
Sorbus scopulina	Fr (2)	Fr (2)
Vaccinium membranaceum	Fr (3)	Fr (3)
Vaccinium scoparium	Fr (2)	Fr (2)
Vaccinium spp.	Fr (3)	Fr (3)
ANIMALS		
Coccinellidae (lady bugs)	E	E
Noctuidae (army cutworms)		E
Camponotus spp. (carpenter ants)	E	E
Formica spp. (ants)	E	E
Vespula spp. (wasps)	E	E
Bombus spp. (bumblebees)	E	
Marmota caligata (hoary marmots)		E
Alces alces (moose calves)	E	E
Odocoileus hemionus (mule deer fawns)	E	E
Odocoileus virginiana (white-tailed deer fawns)	E	E
Spermophilus columbianus (golden mantled ground squirrel)		E
Carrion	E	E
Legend: E - entire organism, Fl - flower, Fr - fruit, Lvs - leaves, R - root, St - stem		

Preference Ranking: (1) - low use, (2) - moderate use, (3) - high use
Reference Sources: Chapman et al. (1953), Tisch (1961), Taylor (1964), Burt and Grossenheider (1976), Herrero (1978), Servheen (1983), Holcroft and Herrero (1984), Irwin and Hammond (1985), Eggers (1986), Almack (1986), Mace (1986), Mace and Bissell (1986), McLellan (1986), Kansas et al. (1989), MacHutchon (1989), Holcroft and Herrero (1991), McLellan and Hovey (1995), MacHutchson (1996), McCann (1997), pers. comm. B.McLellan (1999), pers. comm. F. Hovey (1999).