Black Bear (*Ursus americanus*)

SPECIES NAME: Black bear
SCIENTIFIC NAME: *Ursus americanus*
SPECIES CODE: M-URAM
STATUS: Not at risk (MELP, 1997; COSEWIC, 1998)

DISTRIBUTION

Ursus americanus is found throughout most of the North American continent.

Provincial Range

U. americanus inhabits the entire mainland, Vancouver Island, the Queen Charlotte Islands and the larger coastal islands. Hall (1981) reports five sub-species of black bear in BC. *U. a. cinnamomum* ranges across most of mainland British Columbia east of the coastal mountain ranges and is the sub-species present in the Besa/Prophet study Area (Nagorsen, 1990).

Provincial Benchmark

Ecoprovince: Not established.
Ecoregion:
Ecosection:
Biogeoclimatic zone:
Broad Ecosystem Units:

Project Study Area

Ecoprovince: Northern Boreal Mountains
Ecoregion: Northern Canadian Rocky Mountains
Ecosection: Muskwa Foothills (MUF), Eastern Muskwa Ranges (EMR)
Biogeoclimatic zone: BWBSmw2, SWBmk, SWBmks, and AT.
Elevational range: Valley bottom to alpine tundra (~ 900m to 2000m a.s.l.).

ECOLOGY AND HABITAT REQUIREMENTS

Black bears utilise a wide range of habitat types although they are generally associated with forested communities. Their ranges must include seasonal food sources, spring/summer/fall ranges or territories, bedding sites, travel routes and winter denning sites (Fish and Wildlife Branch, 1980). A mixed forest with a variety of tree and shrub species of varying ages provides the best habitat for black bear.

Black bears tend to concentrate on food resources within the forest, using these communities more than grizzlies, but also forage in lowland and alpine/subalpine wet meadows, avalanche shrubland, riparian and aquatic habitats such as rivers and streams (Aune, 1994; Jonkel and Cowan, 1971). Like grizzlies, they are omnivorous and utilise seasonally and locally abundant food. The bulk of their diet is vegetation and includes leaves, flowering parts, roots, bulbs, berries, nuts and fruits of grasses, forbs, shrubs and trees. Locally important plants for black bears include horsetails, bearberry (*Arctostaphylos urva-ursi*), blueberries and huckleberries (*Vacinium caespitosum, V. membranaceum and V. uligonosum*), and various graminoids *(Poa sp., Carex sp., Festuca, sp.*). They will also kill small mammals, fish and young ungulates in addition to eating carrion (Fish and Wildlife Branch, 1980; Banfield, 1974).

In spring, they forage for succulent vegetation in wet meadows, riparian inclusions, skunk cabbage swamps, avalanche chutes, and burns (Stevens and Lofts, 1988). During this period, they feed mainly on

poplar catkins, spruce needles, newly emerging grasses and sedges, insects, ants, tree buds and carrion resulting from winter losses (Banfield, 1974; Kolenosky and Strathearn, 1987).

During the summer and fall months, black bears feed mainly on ripening fruit, cowparsnip and other forbs. In mountainous terrain, they will move to higher elevations, following green-up from spring to summer. Raine and Kansas (1990), studying in Banff, found ants to be a favoured summer food. In autumn, black bears forage in wild berry patches and aquatic habitats with spawning fish.
In many areas, black bears exist close to human settlements because of the extra food sources (refuse) which occur seasonally or throughout the year (Fish and Wildlife Branch, 1980). They may also feed in campgrounds, garbage dumps and orchards.

Albert *et al.*(1990) state that uneven-aged forests appear far superior to even-aged in meeting favourable bear habitat needs. In forests with mixed conifer or spruce-fir areas, small (<0.1ha) grouped selection tree plots are better than even aged stand composition because they tend to reduce horizontal and vertical cover throughout larger blocks of forest. An uneven-aged forest with small grassy openings is more suitable. Large trees (>25dbh) in these areas provide good cover and protection however, and stands with canopy cover less than 60% but with understorey vegetation up to six feet in height is sufficient to prevent bears from being seen by rivals for over 30m away (Albert *et. al.*, 1990). Black bears will generally not move more than 100 m from adequate cover (Stevens and Lofts, 1988).

In fall, black bears select dens usually in a cave, rock crevice, hollow log, windthrown stump, or merely a mossy hollow under the low, sweeping branches of a spruce or fir (Banfield, 1974). In a study by Hayes and Pelton (1994), 66.6% of the bears studied used rock cavities for winter denning, and the remainder denned in excavations (12.5%), clearcuts (12.5%, open nests (4.2%) and tree cavities (4.2%).

Black and grizzly bear habitats overlap in many areas but differences in use are present. For example, grizzly bears will utilise a broader range of food resources available throughout a given environment while black bears concentrate on food resources within the forest (Herrero, 1978). Aune (1994) found that the mean elevation for black and grizzly bears increased from spring to fall but black bears were located at sites within the mid range of elevations more frequently than grizzly bears. Furthermore, Aune (1994) reports that grizzly bears use flat terrain with little discernible aspect more frequently than do black bears where as, black bears use the northeast, east, and southeast slopes more than did grizzly bears.

LIFE REQUISITES/SEASONAL USE PATTERNS

In this model, black bear life requisites are divided into food, security and denning (Table 5.3.1).

Table 5.3.1 Black bear seasonal life requisites.

Rank	Life Requisite	Season	Months
1.	Food	Spring	June
2.	Food	Summer/Fall	July to September
3.	Security	Spring and Summer/Fall	June to September
4.	Denning	Winter	October to May
5.	Living	Spring and Summer/Fall	June to September

Food

Areas with an abundance of food is considered the single most important factor determining habitat selection for black bear. Food habitats in spring are at low elevations with early green up. Food habitats in summer/fall are at mid to high elevations with high plant productivity and high berry production.

Security

Security is provided by a closed canopy forest and cover that can hide 90% of a black bear from 120 m away and late successional stage areas that have a canopy closure > than 50%. Security habitat provides two functions: (1) concealment and escape while feeding and, (2) concealment during movement or migration.

Denning

Dens are generally located in areas of high snowfall and low snowmelt with high vertical and horizontal cover on steep slopes, especially in the middle third of such slopes. Dens may be located in hollow trees, caves, rock crevices, fallen logs, or underground excavations (Stevens and Loft, 1988).

Living

Optimal black bear habitat contains a mosaic of suitable food and security areas, preferably within 100m of each other.

HABITAT USE AND ECOSYSTEM ATTRIBUTES

Ecosection

Black bears are widely distributed throughout the interior of British Columbia and occur in the MUF and EMR Ecosections. Distribution in these two areas is largely a function of the biogeoclimatic zones contained within. The presence of the BWBSmw2 sub-zone in the MUF Ecosection results is a greater availability of good forest cover and early spring feeding areas. The EMR contains only the SWBmk, SWBmks and the AT and the SWB is characterised by a short growing season and relatively sparse forest cover with open canopies.

Based on overview capability mapping for the NE region (Habitat Inventory Section, 1994a), the Study Area provides up to moderate black bear habitat (corresponding to a rating of 3). Individual ratings for food and security may be higher.

Biogeoclimatic Zone

Black bears may be found in all of the sub-zones within the Study Area. After den emergence, black bears descend to lower elevations (BWBSmw2) to access early green vegetation. With increasing late-spring and

summer temperatures, black bears are able to access green vegetation at higher elevations (SWBmk, and SWBmks).

Site Series

Moister site series (sub-mesic to sub-hygric) are rated higher than drier sites (very xeric to sub-xeric) for feeding as they have higher plant productivity and more robust vegetation. These sites also provide better security.

Structural Stage

Optimal security is provided in young to old forest (structural stages 5, 6 and 7). Optimal food habitat is provided in mature and old forests and in herbaceous and shrub (structural stages 02 and 3a). Structural stages 4 and 5 generally provide poor feeding and security.

Aspect

Warm southerly and westerly aspects (135-285º) provide higher quality spring and summer feeding.

Proximity Effects

Habitats that provide primarily food, must have security within 100m.

HABITAT RATINGS

Rating Scheme/Modelling Theme

A six-class rating scheme is used to rate grizzly bear habitat for food (FD), security (SH) and living (LI) in the spring (P) and summer/fall (S). The LI rating is an integration of black bear food and security requirements and more directly reflects where bear are likely to be found, assuming they are present in the area. A GIS algorithm uses the ratings for FD and SH and incorporates the spatial arrangement of ratings in adjacent polygons.

Food (FD) and Security (SH) Habitat Assumptions

The ratings table assigns a suitability rating for FD and SH to each ecosystem unit. An ecosystem unit is a combination of site series and structural stage. The relationship between black bear life requisites and the ecosystem attributes are defined by a degrading score relative to the optimal value for the attribute (Table 5.3.2). For example, the optimal structural stage for security (old forest) has a degrading score of "0"– no degrading effect. However, a sub-optimal structural stage (such as pole-sapling) has a degrading score of 2, which would result in a maximum rating of 3 on a scale of 1 to 6. By summing the degrading scores over all of the ecosystem attributes, a final rating is calculated. See Section 3.5 and Appendix F for a full description of the methodology used to generate the ratings table.

Table 5.3.2 Black bear food and security habitat use assumptions. Each number represents a degradation score. A rating for an ecosystem unit is generated by summing the degradation scores over all attributes. See Section 3.5 and Appendix F for a full description of the ratings approach.

Attribute		Value	Degrading Score		
			P_FD	S_FD	G_SH
1. BEC Unit	**EMR**	SWBmk	-3	-2	-2
		SWBmks	-4	-3	-3

MUF	AT	-5	-3	-5
	BWBSmw2	-2	-2	0
	SWBmk	-3	-2	-2
	SWBmks	-4	-3	-3
	AT	-5	-3	-5
2a. Site Series (SMR)	Xeric	-2	-2	-1
	Subxeric	-1	-1	-1
	Submesic	0	0	0
	Mesic	0	0	0
	Subhygric	0	0	0
	Hygric	0	0	-1
	Subhydric	0	0	-2
	Hydric	0	0	-3
2b. Site Series (SNR)	Very poor	-1	-1	0
	Poor – very rich	0	0	0
3. Structural Stage	Sparse/Bryoid (1)	-3	-3	-5
	Sparse (1a)	-3	-3	-5
	Bryoid (1b)	-3	-3	-5
	Forb-dominated (2a)	0	0	-5
	Graminoid dom. (2b)	0	0	-5
	Dwarf shrub (2d)	0	0	-5
	Low shrub (3a)	0	0	-4
	Tall shrub (3b)	-1	-1	-3
	Pole/sapling (4)	-2	-2	-2
	Young forest (5)	0	0	0
	Mature forest (6)	0	0	0
	Old forest (7)	0	0	0
4. Stand Composition	Coniferous (C)	0	0	0
	Mixed (M)	0	0	0
	Broadleaf (B)	0	0	0

Polygon Food (FD) and Security (SH) Adjustments

Adjustments are used to modify the ratings in order to account for habitat attributes that are not inherent features of the ecosystem unit.

Table 5.3.3 Polygon-specific food and security ratings adjustments for black bear.

Topic	Description
A. Aspect	Rate cool northerly and easterly aspects (285-135°) down 1 FD.
B. Terrain surface expression	Polygons lacking forest cover (structural stages 1a, 1b, 2, 3a and 3b) are rated up 2 SH for growing and winter if the surface expression is ridged (r), undulating (u) or hummocky (h).

Living (LI) Habitat Assumptions

The seasonal living ratings (spring and summer) are each equal to the limiting rating (lower rating) between the polygon FD rating and the best SH rating in all adjacent polygons, including the target polygon.

For complex polygons, the best ratings are selected from the first two deciles.

An overall rating for the growing season is also calculated. This is equal to the best seasonal living rating. This rating is shown on the printed maps.

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