

1.1. Black Bear

Common Name: Black bear

Scientific Name: *Ursus americanus* (Pallas)

Species Code: M-URAM

Status: Yellow listed except *Ursus americanus emmonsii* which is blue listed (Harper 1996).

1.1.1. Provincial Range

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

There are 16 subspecies of black bears found in North America. BC has half of these. The subspecies which can be found on the west coast of BC are:

- *Ursus americanus* ssp. *kermodei* (white colour phase found in the Terrace/Kitimat area).
- *Ursus americanus* ssp. *vancouveri* (Vancouver Island only).
- *Ursus americanus* ssp. *carlottae* (Queen Charlotte Islands, Alaska).
- *Ursus americanus* ssp. *altifrontalis* (Pacific northwest coast).
- *Ursus americanus* ssp. *emmonsii* (“blue” colour phase found in the Tatshenshini-Elsek area of extreme northwestern BC).

Black bears on the coast of BC occur in many habitats, but are primarily associated with a mosaic of forest and non-forested cover types. Coastal bears are often larger than interior species (because of their protein rich fish and carbohydrate rich berry diets).

1.1.1.1. Concentration/Best Region

The black bear is relatively common throughout BC. Populations in BC are considered to be stable at an estimated 120,000 animals (BC Environment 1996b). On the coast of BC, black bears are common throughout all biogeoclimatic zones.

1.1.1.2. Biogeoclimatic Zones (BEC)

Coastal black bears inhabit all biogeoclimatic subzones of:

- Coastal Douglas-Fir (CDF);
- Coastal Western Hemlock (CWH);
- Mountain Hemlock (MH);
- Engelmann Spruce Subalpine Fir (ESSF); and
- Alpine Tundra (AT).

The best habitat for black bears on the coast of BC is found in the floodplain units of the CWH (Stevens and Lofts 1988).

1.1.1.3. Ecosession/ Ecoregion

Coastal black bears are found in the following ecosessions of the Coast and Mountains and Georgia Depression Ecoprovinces within BC:

- SPR, EPR, NPR, OUF ecosessions of the Pacific Ranges Ecoregion
- HEL, KIR ecosessions of the Coastal Gap Ecoregion
- NAB ecosession of the Nass Basin Ecoregion
- NAR ecosession of the Nass Ranges Ecoregion
- BOR, ecosession of the Northern Coastal Mountains Ecoregion
- NWC ecosession of the Northwestern Cascade Ranges Ecoregion
- QCL ecosession of the Queen Charlotte Lowlands Ecoregion
- SKP, WQC ecosessions of the Queen Charlotte Ranges Ecosession
- NWL, NIM, WIM ecosessions of the Western Vancouver Island Ecosession
- NAL ecosessions of the Eastern Vancouver Island Ecoregion
- FRL, GEL ecosessions of the Lower Mainland Ecoregion
- JDF, SGI, SOG ecosessions of the Georgia -Puget Basin Ecoregion

The highest concentrations of black bears on the coast of BC are believed to be in the KIR and NAR ecosessions.

1.1.2. Key Habitat Requirements and Attributes

Black bears prefer forested and shrubby areas, but use wet meadows, high tidelands, ridgetops, burned areas, riparian areas and avalanche chutes (Pelton 1982). They prefer mesic over xeric sites and timbered over open areas (Unsworth et al. 1989).

1.1.2.1. General

Black bears are very adaptable and inhabit a wide variety of plant communities. In the Pacific Northwest black bears are found in spruce-western red cedar-hemlock forests as well as pine and fir forests (Pelton 1982). They also use Engelmann spruce, subalpine fir, and mountain hemlock forests as summer habitat.

Old-growth stands of western red cedar provide hiding and thermal cover as well as dens for black bears (Arno 1977).

1.1.2.2. Reproduction

Breeding occurs in May and June (Stevens and Lofts 1988). Gestation is 6 or 7 months with 1 to 3 cubs being born from late November through February. Birth and early maternal care occurs in the winter den. The cubs will remain with the mother for 1 or 2 years.

Black bears generally mate every 2 years with females becoming sexually mature at age 5 years.

1.1.2.3. Feeding

Black bears are opportunistic omnivores and alter their food habits according to the availability of food items throughout the various seasons. They depend heavily on plant foods but will feed on fish, wildlife and domestic animals when available. Their diet changes seasonally with the relative abundance of various food items. They will also climb trees to feed on young shoots (Stevens and Lofts 1988). Some of the preferred forage species of black bears include:

cow parsnip (<i>Heracleum lanatum</i>)	mountain ash (<i>Sorbus</i> spp.)
dogwood (<i>Cornus</i> spp.)	kinnikinnick (<i>Arctostaphylos uva-ursi</i>)
cranberry (<i>Viburnum</i> spp.)	<i>Vaccinium</i> spp.
<i>Ribes</i> spp.	<i>Rhus</i> spp.
<i>Rosa</i> spp.	<i>Lupinus</i> spp.
sarsaparilla (<i>Aralia nudicaulis</i>)	thistle (<i>Cirsium</i> spp.)
soopallalie (<i>Shepherdia canadensis</i>)	<i>Lomatium</i> spp.
Labrador tea (<i>Ledum groenlandicus</i>)	clover (<i>Trifolium</i> spp.)
tree cambium	skunk cabbage (<i>Lysichiton americanum</i>)

Spring

After emerging from their winter dens in the spring, black bears seek southerly slopes at lower elevations for forage and move to northerly and easterly slopes at higher elevations as summer progresses (Hatler 1972; Jonkel 1987).

In the early spring, black bears on the coast feed on the early green vegetation found in wet meadows, riparian inclusions, skunk cabbage swamps, avalanche chutes and burns that become snow-free first (Stevens and Lofts 1988). Grasses, sedges and horsetails are the most commonly selected spring food items of bears, mainly due to

these plants early phenological development. (Hatler 1967; Lloyd and Fleck 1977; Ruff 1982). South-facing green-up areas are critical in the spring (BC Environment 1995).

Summer

In the summer black bears diet preferences shift to ripe berries, and a variety of green leafy forbs (Stevens and Lofts 1988). They will also feed on carrion, and insects such as carpenter ants (*Camponotus* spp.), yellow jackets (*Vespula* spp.), bees (*Apidae*), and termites (*Isoptera*) and sometimes kill and eat small rodents and young ungulates (USDA Forest Service 1991).

Late Summer and Fall

In the late summer and fall they concentrate on feeding on salmon as they become readily available in the spawning channels. During this period of gorging on salmon black bears will eat large quantities of live and eventually dead salmon to attain the fat reserves they require to over winter. When the salmon supplies have been depleted, they return to feeding on skunk cabbage and other vegetation until they enter their dens to overwinter.

1.1.2.4. Bedding

During periods of inactivity, black bears will utilize bed sites in forested habitats with dense understory vegetation. These sites are often a simple shallow depression in the forest leaf litter but may also be a deep excavation (Pelton 1982).

1.1.2.5. Denning

Black bears hibernate between October and May. Black bears in coastal habitats may not enter their dens until late November or early December and emerge in April dependent on weather conditions.

Bears choose den sites that are usually underground and in locations that are exposed to early snow and maximize snow's insulative qualities. The dens are lined and closed with leaves, grass and detritus from the forest floor (Pelton 1982). They will use tree cavities, caves, culverts, excavations under logs or rocks or into banks, or shallow depressions (USFWS 1996).

1.1.2.6. Migration

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; IGBC 1987).

Black bears make extensive seasonal movements to localities of food abundance such as spring green-up sites, spawning areas, berry patches and garbage dumps (Amstrup and 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).

Black bears will utilize movement corridors such as dry creek beds, snow filled avalanche chutes, logging roads, sandbars or rivers (Stevens 1995).

1.1.2.7. Home Range

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 and Beecham 1976; Rogers 1977; Young and Ruff 1982). Home ranges of females are well defined and maintained throughout their adult life and may be used by a female offspring after death of the mother (Kolenosky and Strathearn 1987).

In western Canada, male home ranges have been reported to be from 55 to 500 km² and female home ranges have been reported to be from 10 to 125 km² (MacHutchon and Smith 1990).

Black bears usually avoid each other except during mating season and when high concentrations of food are available (e.g. salmon spawning areas or productive berry patches).

1.1.2.8. Cover/Escape

Black bears use dense cover for hiding and thermal protection, as well as for bedding. Large trees are important escape cover for cubs. Black bears will use dense cover and/or trees to escape from predators. They commonly bed in dense shrub communities and use forested areas as travel corridors (Jonkel 1978). Generally they do not move more than 100 meters from cover (Stevens and Lofts 1988).

1.1.3. Rating Guide

1.1.3.1. Hierarchy of Critical Factors

- 1) Late summer and fall forage
- 2) Spring forage
- 3) Cover/Escape/Bedding
- 4) Summer forage
- 5) Overwinter denning

1.1.3.2. Rating System

A 6-class/2 season rating scheme (1=high; 2=moderately high; 3=moderate; 4=low; 5=very low; 6=nil) was used to rate habitat use by season for black bears within the study area. Ratings were assigned for security/thermal cover (ST), and feeding (FD) during early spring (PE) and growing (G) seasons and hibernating (HI) during the winter season.

The provincial benchmark for black bear is in the NAR and KIR ecosections of the Coast and Mountains ecoprovince. Best habitats for black bears are those that produce abundant seasonally important foods in proximity to security and thermal cover, which generally corresponds to a mosaic of structural stages 2-3 and 6-7. Floodplains, wetlands, and forests with large diameter snags or rock outcrops and caves are considered the best habitat for black bears.

Ratings were assigned to the ecosystem units within the study area based on habitat attributes and structural stages considered to be important. Habitat requirements for black bears in the Upper Kitimat River/Davies Creek/Dala River study area are summarized in Tables 4 and 5.

Table 1: Summary of habitat requirements for black bears in the study area.

Season	Life Requisite	Structural Stage	Requirements
Spring (LIPE)	Feeding (FD)	2-3, 6-7	Abundance of early green up vegetation. Skunk cabbage, sedges, horsetails, devil's club, hellebore and grasses are particularly important. Flood plains, valley bottoms and lower snow free side slopes with moist to wet soil moisture regimes and a rich soil nutrient regime support the best spring habitat.
	Thermal & security (ST)	6-7 3b,5-7	Mature and old-growth coniferous forests. Mixed coniferous/deciduous mature forest. Shrub cover >50% and canopy closure >66%. Larger trees (>40cm DBH) within 100 m of foraging areas) are required for security cover, particularly for sows with cubs.
Growing (LIG)	Feeding (FD)	2-3, 6-7	Bears will congregate at salmon spawning areas during this period. Moist forests with skunk cabbage and berry producing shrubs close to salmon streams are also important feeding areas during this period.
	Thermal & security (ST)	6-7 3b, 5-7	Mature and old-growth coniferous forests. Canopy closure >50% and tree compositions dominated by spruce and hemlock/spruce. Larger trees (>40cm DBH) within 100 m of foraging areas) are required for security cover, particularly for sows with cubs.

Table 2: Summary of critical black bear habitat attributes measured.

Season/Activity	Measurable Attribute	Habitat Features
Spring feeding (LIPE_FD)	Herb layer	Percent cover of herbs (see preferred species list)
Growing feeding (LIG_FD)	Salmon spawning stream	Presence of salmon stream in or adjacent to polygon.
	Berry abundance	Preferred berry producing shrubs measured as no. of stems and no. of fruit/stem.
	Berry producing quality	Berry producing shrubs below 2.5 m in height
Spring thermal cover (LIPE_ST)	Aspect	South and southwest aspects have lower snow depths and increased outflow wind protection.
	Crown closure	Canopy closure >66% in spruce and spruce/hemlock forest.
	Elevation	Lower elevations will have lower snow levels and higher average temperatures.
Growing thermal	Crown closure	Mature or old-growth coniferous forest.

cover (LIG_TH)		
Spring and growing security cover (LIPE_ST) LIG_ST	Distance from (mature forest)	Black bears require trees (dbh >40cm) within 100 m of foraging areas for security cover from grizzlies.
	Shrub cover	Shrubs over 2 meter in height (>50% cover).
	Crown closure	Canopy closure >50% in spruce and spruce/hemlock forest.

1.1.3.3. Modeling Theme

The area mapped delineates early spring and summer/fall feeding areas and proximity to mature forest cover (thermal and security cover, denning and bedding areas).

1.1.3.4. Model Assumptions

In the preparation of this model, the following assumptions were made:

- Availability of abundant food items in the late summer and fall is critical to black bear recruitment and survival. On the coast of BC, berry crops and salmon spawning are the major food sources during this season.
- Black bears require mature forest for escape and thermal cover as well as travel corridors. They require cover within 100 m of feeding areas.
- Water and minerals are not limiting.
- All roads have the same effect on bear behaviour or survival regardless of use.
- All human activities are the same in affecting bear behaviour and survival.
- The regional field guide (Banner et al. 1993) accurately predicts ecosystem unit characteristics in the study area.

1.1.4. Field Sampling Scheme

The methods used to sample the habitat attributes important to black bears are outlined below.

Table 3: Sampling scheme for black bears.

Habitat Attribute	Sample Method
Abundance of black bear food plants	Recorded on ecosystem field form (vegetation data sheet).
Presence of security cover (>40cm DBH trees) within 100 m of foraging areas.	Recorded in comments on wildlife data form.
Presence of shrub canopy closure of >50% (security cover)	Recorded on ecosystem field form (vegetation data sheet).
canopy closure >30% (thermal cover)	Recorded on ecosystem field form (vegetation data sheet).
Abundance and quality of berries	Recorded in comments on wildlife data form Methodology developed by T. Hamilton (no. of stems and no. of fruit/stem) was employed.
Evidence of habitat use (scat, diggings, marking)	Recorded on wildlife data sheet.
Presence of dens	Recorded in comments on wildlife data form.
Presence of salmon stream within polygon	Sightings were recorded in comments on wildlife data form FISS and SISS mapping and DFO/BCE escapement records and reports were researched.

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