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**WILDLIFE MODELS FOR SLOCAN FOREST PRODUCTS SMITH/VENTS RIVERS
TERRESTRIAL ECOSYSTEM MAPPING PROJECT
WOODLAND CARIBOU SPECIES PROFILE DATA SHEET**

1.0 INTRODUCTION

1.1 BACKGROUND

This species account provides background information used in preparing a model for rating habitat capability/suitability for woodland caribou in the Smith/Vents rivers TEM mapping project area within the Fort Nelson Forest District. The purpose of wildlife habitat capability/suitability modelling is to identify the relative importance of various habitats, or ecological units (site series) to wildlife populations (RIC, 1997) relative to a provincial standard.

Woodland caribou are a regionally important species in the Fort Nelson Forest District. Caribou provide an important component of the large mammal fauna within parts of the district and are a species of management concern. With limited distribution in BC, caribou have a high public profile and are an important resource for wildlife viewing and recreational hunting in the Peace Region. Late seral stages of forest cover and alpine zones are important for caribou, therefore, caribou habitat management is of importance in the planning of managed forest habitats.

This species account summarizes known information on the status, ecology, habitat requirements, life requisites and seasonal use patterns of woodland caribou as applicable in the Fort Nelson Forest District.

1.2 NOMENCLATURE

Species common name	Woodland Caribou
Latin name	<i>Rangifer tarandus caribou</i>
Species code	M-RATA

1.3 STATUS

BC Status	Provincial Management List:	Yellow listed
	Conservation Data Centre Rank:	-
	Identified Wildlife (Yes/No):	No

COSEWIC Status	Vulnerable
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2.0 DISTRIBUTION

2.1 PROVINCIAL DISTRIBUTION

Two ecotypes of woodland caribou are recognised; mountain caribou that use areas of deeper snow during winter, feeding primarily on arboreal lichens, and northern caribou that utilise areas of shallow snow and dig through the snow to access terrestrial lichens (McLellan, et al, 1995). Woodland caribou are widely distributed in Northern British Columbia. Caribou in Northeastern BC and the study area belong to the northern ecotype. Caribou have spotty distribution in southern part of province. Absent from most of southern interior; absent from Vancouver Island, Queen Charlotte Islands, coastal islands, southern coast, and Lower Mainland. Present in Selkirk and Monashee Ranges, Nelson Mountains, Wells Grey park/Quesnel Highlands, eastern slopes of Coast Mountains, northcentral BC, northwestern BC, and much of northeastern BC.

In contrast to southern populations of woodland caribou, which are Blue-listed in British Columbia, northern populations of caribou are not.

2.2 STUDY AREA DISTRIBUTION

Caribou occur in the southern portion of the study area (Fishing Creek, Fishing Lake, Vents River drainage) but appear to be scarce or absent over much of the northern portion of the study area (Smith River drainage within BC). The study area has been classified in the low density zone for all of the Smith river drainage most of the Fishing River drainage with only the southern most portion of the study area classified in the moderate density zone (Ministry of Environment 1979). Winter aerial survey results from Resource Analysis Branch (1978) recorded caribou only in the upper Fishing Creek and upper Grant Creek drainages, south of the Liard River. However, BC Environment has not conducted an inventory of caribou covering the entire study area.

Information from BC Hydro's investigations of the Liard River valley suggest a population in the Niloil Lake-Grant Lake-Fishing Lake area (Goulet and Haddow, 1985). They report 24 caribou on Grant Lake and adjacent burns in February 1978 and numerous tracks on Fishing Lake and a chain of small lakes to the northwest. They also report 18 caribou in the Fishing Creek area and 7 near Niloil Lake, with numerous tracks on frozen lakes and creeks.

2.3 DISTRIBUTION IN BIOGEOCLIMATIC ZONES OF STUDY AREA

Ecoprovinces:	Northern Boreal Mountains
Ecoregions:	Liard Basin, Northern Mountains and Plateaus, Northern Canadian Rocky Mountains
Ecosections:	Liard Plain, Hyland Highland, Eastern Muskwa Ranges, Muskwa Foothills
Biogeoclimatic Zones:	

Expected to occur in all biogeoclimatic zones of study area, including Boreal White and Black Spruce (BWBS) dk2, Spruce-Willow-Birch (SWB) mk, Spruce-Willow-Birch (SWB) mks (parkland), and Alpine Tundra (AT)

2.4 ELEVATION RANGE

Within Study Area throughout study area from main Liard River valley (425 m) to highest alpine regions.

3.0 POPULATION CHARACTERISTICS

Woodland caribou generally occur in much of northern British Columbia, with seventy eight percent of caribou habitat and seventy seven percent of the province's 13,500 caribou (Ritcey 1991). The majority of caribou range (56%) is identified as supporting caribou at low densities, with moderate densities in 39% of the range and high densities supported in only 5% of the range. Low density is defined as one caribou per 25-250 km², moderate density as one caribou per 3.4- 25 km² and high density is one caribou for every 3.4 km² or less (Ritcey 1991). The study area has been classified in the low density zone for all of the Smith river drainage, and most of the Fishing River drainage with only the southern most portion of the study area classified in the moderate density zone (Ministry of Environment 1979). Specific information on population status and characteristics are lacking for the study area. In terms of numbers, the February 1978 aerial survey by the Resource Analysis Branch recorded a total of 25 (10 at the upper end of Grant Creek and 15 to the northwest of Fishing Lake). Home ranges also vary widely and in the Spatsizi Wilderness Park area ranged from 500 to 4,000 km² (Hatler, 1986). In the Quintette Coal area, home range varied from 38 to 653 km², being smallest in summer and largest in spring, and averaging 357 km² (Sopuck, 1985).

4.0 ECOLOGY AND LIFE REQUISITES

4.1 GENERAL

While woodland caribou in BC have received considerable study during the past 30 years caribou on the dryer, east slopes of the Rocky Mountains are not nearly as well understood. However some patterns of habitat utilisation in NE BC can be interpreted from a diversity of studies from NEBC and NW Alberta (Murray 1992, Sopuck 1985, Backmeyer 1994, Hornbeck and Moyles 1995, Edwards 1988). Each of the populations studied has its own characteristics, so application of specific findings from other areas to the study area is difficult. However general pattern of habitat use and critical factors can be interpreted.

While, caribou have been studied intensively in the north Columbia Mountains (McLellan et al,

1995), the Quesnel Highlands (Seip, 1992) and the southeastern mountain ranges (e.g., Simpson and Woods, 1987; Stevenson and Hatler, 1985); this information is of limited value in application to northern caribou due to substantively different environmental conditions, especially snow depth and temperature extremes. Caribou studies in the Spatsizi Park area (Hatler, 1986; Bergerud and Butler, 1978) are more relevant but may have substantially different factors from the NE BC populations where it is substantially dryer.

Ground investigations during BC Hydro's 1978-1981 studies found high densities of caribou pellets in the Fishing Creek area, with most sign in mature upland coniferous forest and a preference for pine-white spruce forests (Goulet and Haddow, 1985). Most observations of caribou and sign during BC Hydro studies were removed from the main Liard River valley, although scattered sign was found near the river itself; this suggests that a few caribou may move through (or across) the valley during feeding, most likely in winter. Patterns of use in NEBC indicate utilisation of terrestrial lichens, grasses and forbs, shrubs and some aboreal lichens with substantive movements in response to snow conditions to capitalise on variable forage availability. Extensive use of forested habitats is characteristic for midwinter and may indicate response to cold temperatures.

Two general patterns of caribou habitat utilisation appear to exist in NEBC. Some populations utilise both mountain habitats and forested lowlands east of the Rocky Mountains, while other populations appear to exist solely in the forested lowlands.

Populations that utilise both mountain and eastern lowland habitats appear to select alpine and subalpine habitats for much of the late winter, spring summer and fall and move to the forested lowlands during the winter. Their ability to move to the mountains in late winter/early spring appears to be affected by snow depth and composition.

Populations that utilise forested lowlands only appear to exist at low densities throughout most of NE BC and much of Northern Alberta. These animals appear to be relatively non-migratory but have large home range sizes. Their key habitats appear to be wetland and open conifer forests types (treed muskeg, scrub conifer) with more utilisation of closed canopy forests in winter (Hornbeck and Moyles 1995). These animals are often observed in disturbed sites in oil and gas areas (Churchill pers. comm.), however, no information is available to assess whether this is a selection response or a visibility bias.

It is not known which type of caribou occur in the study area as very little is known of their populations or movements.

4.2 SEASONAL HABITAT REQUIREMENTS

Generalised seasonal habitat requirements are outlined below.

Spring	Movements to alpine	Disperse from winter ranges in BWBSdk2 and SWBmk to calve (possibly in the AT but may also remain in lower forests)
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Summer/Fall	Feeding	Move throughout AT, SWBmk, SWBmks to feed; rut mostly in AT.
Early Winter	Move down-slope	Feeding in SWBmk and into BWBSdk2
Late Winter	Move in context with snow density and depth	Remain in SWBmk and BWBSdk2 to feed moving to AT and SWBmks in late
February		March if snow conditions permit.

4.3 MIGRATIONS AND DISTRIBUTION

Most caribou that utilise mountain areas are migratory, exhibiting spatial movements between summer/fall range and a separate winter range. The northern ecotype has less pronounced movements between seasonal ranges, due to the relatively low snowfall in the Liard River area. Caribou migrate in response to snow cover and food availability. As snow starts to accumulate at higher elevations, caribou move lower into older spruce and pine forest stands which have low snow packs from the interception of snow by the forest canopy. These stands offer terrestrial and arboreal lichens as a winter food supply. For caribou which inhabit the upper elevations into the AT at the south end of the study area during summer, movements to winter ranges in the Fishing Creek-Fishing Lake-Grant Lake-Niloil Lake area are expected to occur. Some caribou may remain in lower forests for the summer and fall and would have less pronounced movements.

Winter ranges in the Fishing Creek-Fishing Lake-Grant Lake-Niloil Lake area are not particularly low in elevation (as compared to the Liard River valley and Smith River area) and may represent year-round habitat for some caribou. It is possible that some caribou in the Fishing/Vents drainage move into forest stands that afford better opportunities to feed on terrestrial lichens; this may only involve small altitudinal or linear movements.

4.4 REPRODUCTION

Two major functions play a key role in the annual life cycle of caribou: calving and rutting.

4.4.1 Calving

Caribou calve in late May-early June, either in the AT zone on ridges and rocky areas or in upper elevation forests where security cover or isolation from predators is available. Caribou that only use forested lowlands select sites within these forest types for calving. Cow caribou disperse throughout these habitats prior to calving as an anti predator strategy (Hornbeck and Moyles 1991). Those caribou that calve in the AT (such as in the Horseranch Range and Caribou Range), are known to stay in larger groups and temporarily leave to calve, then return to the larger group.

4.4.2 Rutting

In mountain areas rutting occurs on AT ridges and on plateaux in SWBmk/SWBmks in late September to mid- October (Edwards 1988). Caribou that only use forested lowlands are found within these forest types during rutting (Hornbeck and Moyles 1991). Rutting locations in the study area have not been identified. Typical caribou mountain rutting habitats occur only in locations in the southern portion of the study area near Upper Prochniak Creek and south of Skeezer Lake.

4.5 FEEDING

Utilisation of food resources varies considerably during the annual cycle.

A list of key plants in the study area is provided below:

- Arboreal lichens (*Alectoria* spp., *Bryoria* spp.)
- Terrestrial lichens (*Cladina* spp., *Cladonia* spp., and *Peltigera* spp.)
- Sedges (*Carex* spp.)
- Horsetail (*Equisetum* spp.)
- Blueberries, huckleberries (*Vaccinium* spp.)
- Willows (*Salix* spp.)
- Glandular birch (*Betula glandulosa*)
- Avens (*dryas* spp.)
- Labrador tea (*Ledum groenlandicum*)

4.5.1 Spring

Caribou move upslope from their winter range, often prior to new growth being available. Once openings appear, caribou feed in openings on early new growth, shrubs and lichens. They gradually may move up into the AT in the southern portion of the study area, with pregnant cows seeking out calving sites in the SWBmks and SWBmk. Food sources in spring include arboreal lichens, terrestrial lichens, sedges, grasses and new shrub growth (willows, glandular birch). Sedge, grasses and forbs become increasingly important as spring progresses and new growth is available.

4.5.2 Summer/Fall

Caribou inhabit the AT, SWBmk, and SWBmks throughout the summer and fall and also likely occur in the BWBSdk2. Sedges, grasses, forbs, mushrooms and terrestrial lichens are important food sources; leaves and tips of shrubs may also continue to be used.

4.5.3 Early Winter

After the rut, caribou remain in the AT and SWBmks to feed. Only with the onset of deepening snow cover in the AT and SWBmks do caribou move down slope into the SWBmk and

BWBSdk2. Mature stands of lodgepole pine or mixed pine-black spruce/white spruce that intercept snowfall are used where terrestrial lichens are available; caribou are able to dig through the light snow to access terrestrial lichens, sedges and horsetail on the edge of wetlands.

Goulet and Haddow (1985) report that in the Fishing Creek area (which is in the implied winter range), arboreal lichens were scattered in mature forest sampled (100-140 years old) but were not abundant. However, terrestrial lichens (*Cladonia* spp., *Peltigera* spp.) covered up to 75% of ground cover, with a mean of 40% in areas where caribou pellets were recorded (Goulet and Haddow, 1985). They further suggest that the heavier browsing on lodgepole pine, white spruce, black spruce, Labrador tea, and green alder recorded in areas of caribou sign was attributed to caribou use, rather than moose.

4.5.4 Late-Winter

Caribou in the study area are expected to rely heavily on terrestrial lichens for feeding throughout the remainder of winter, but are likely opportunistic and would feed on arboreal lichens. Habitats in the BWBSdk2 and SWBmk where snow cover and density (i.e., compaction) are adequate to support caribou and where arboreal lichens are abundant, may be suitable winter habitat as this food source is more readily available than terrestrial lichens as late winter snow depths increase. Arboreal lichens are most common in mature stands of white spruce, black spruce and mixed spruce-lodgepole pine especially open stands at higher elevations.

Information in Goulet and Haddow (1985) indicates a February 1981 snow depth of 50 cm on several lakes and an April snow depth of 41-55 cm along the Alaska Highway. They suggest that during most winters, the Fishing Creek area has snow depths not exceeding 55-60 cm, which should allow caribou to forage on ground vegetation (including terrestrial lichens).

Sedges and horsetail at edges of bogs and fens may also be used, if snow cover is amenable to cratering. Shrubs may also still be important at this time of year. Murray (1992) found that radio-collared caribou in low elevation boreal forest utilized pine flats (i.e., submesic or mesic lodgepole pine) and black spruce “swamp” habitat (black spruce bog).

In very late winter, when snow morphology (compaction/crusting) permits travel in open areas caribou often move to windswept alpine areas where ground vegetation is accessible (Sopuck 1985, Backmeyer 1994, Churchill pers. communication).

4.6 SECURITY COVER

In mountain caribou populations, cows utilise ridges in the AT or parkland to calve in late May-early June. Cows select secluded locations for calving; dispersion at low densities during the calving season is an anti-predator strategy.

During the summer and fall when caribou inhabit a wide range of habitat types, mature coniferous stands in the SWBmks and SWBmk are used as cover. During winter, mature stands

of lodgepole pine, white spruce and black spruce provide important security cover at all elevations.

4.7 THERMAL COVER

Thermal protection is an important life requisite in summer when caribou seek out late snowfields as refuge from insects and for thermal regulation. Late snowfields occur in the AT, in higher elevation basins with north or east aspects. Thermal protection is also found in mature coniferous stands in the SWBmk and SWBmks especially moister sites. With winter inversions, caribou may move up in forested habitats to find more stable temperatures.

5.0 LIFE REQUISITES AND HABITAT ATTRIBUTES

5.1 SEASONS OF USE

Seasons of use for primary life requisites are outlined in the table below.

Life Requisites of Caribou for Each Month of the Year:				
Life Requisite	Specific Period	Time	Month	Season
Feeding, Security Habitat			January	Winter
Feeding, Security Habitat			February	Winter
Feeding, Security Habitat			March	Winter
Feeding, Security Habitat			April	Winter
Feeding, Security Habitat			May	Spring
Feeding, Security Habitat			June	Spring
Feeding, Security Habitat			July	Summer
Feeding, Security Habitat			August	Summer
Feeding, Security Habitat			September	Fall
Feeding, Security Habitat			October	Fall
Feeding, Security Habitat			November	Winter
Feeding, Security Habitat			December	Winter

Data were collected for two seasons; growing (G) and winter (W). The primary life requisites that were rated are security habitat (SH) and feeding (FD), in conjunction with the secondary life requisite living (LI).

The two seasons for which ratings were applied to are:

Growing season	calving in spring, spring feeding in openings in BWBSdk2, SWBmk and SWBmks, summer/fall feeding in AT, SWBmk, SWBmks and BWBSdk2; to early-November;
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Winter feeding on terrestrial and arboreal lichens and possibly some shrubs and herbs in BWBSdk2 and SWBmk; November to late March.

5.2 HIERARCHY OF LIFE REQUISITES

The following relates to a hierarchy of the most important life requisites, on a seasonal basis:

- spring calving areas in the AT, SWBmk and SWBmks;
- winter feeding on terrestrial lichens in the BWBSdk2 and SWBmk;
- fall rutting grounds in the AT and SWBmks; and
- summer and fall feeding in the BWBSdk2, SWBmk, SWBmks and AT (with security cover nearby).

5.3 LIFE ATTRIBUTES AND RATINGS

At a minimum, ratings were assigned for thermal cover (TH); security cover (SH); and feeding (FD). When the thermal and security values could not be separated, the habitat was rated for both (i.e., code ST). Additional codes could be rated when warranted by special conditions (e.g., reproduction (RP); potential or confirmed birthing sites or rutting areas).

Structural stages that have the most value for woodland caribou in this region are ranked as follows:

Structural stage 6	mature forest (FD, foraging; SH and TH, year-round security habitat, thermal cover)
Structural stage 7	old forest (FD, foraging; SH and TH; year-round security habitat, thermal cover)
Structural stage 2	herb (FD, spring and summer foraging)
Structural stage 3	shrubs (FD, summer foraging)

6.0 SUITABILITY/CAPABILITY RATING SYSTEM

6.1 RATING SCHEME

A six class/two season rating scheme (1=high; 2=moderately high; 3=moderate; 4=low; 5=very low; 6=nil) was used to rate habitat use by caribou within the study area, this is explained in the table below. These ratings are based on the habitat's potential under optimal conditions (i.e., optimal structural stage) to support caribou and reflects use relative to the best habitat in the province. Habitat use is evaluated as expected use and is based on a subjective estimate of number of animals that may use the habitat during a specified time period for a specified area of habitat.

Carrying Capacity (% of maximum capability)	Detailed Knowledge Level of Habitat Use (6-class)	
	Rating	Code
100 – 75%	High	1
75 – 50%	Moderately High	2
50 – 25%	Moderate	3
25 – 5%	Low	4
5 – 0%	Very Low	5
0%	Nil	6

6.2 BENCHMARK FOR CAPABILITY RATING

The study area has not previously been mapped and rated for caribou capability under recent (i.e., Resource Analysis Branch/Wildlife Branch) procedures. More recent mapping at the 1:2,000,000 scale rates the study area from class 2 to class 5 on a six level scale (MOELP 1994). The provincial benchmark has been established as the Stikine Plateau and Cariboo Mountains eco-sections. None of the study area is expected to qualify as better than Class 2 for caribou.

6.3 RATINGS ASSUMPTIONS

6.3.1 Model Assumptions

- Secure calving areas in the spring (mid-May to early June) are considered important for caribou population maintenance; these occur in the SWBmk, SWBmks, Parkland, AT and possibly in the BWBSdk2; secluded locations with escape terrain and adjacent security cover are necessary.
- Mature black spruce, white spruce, pine and mixed spruce/pine forests (structural stages 6 and 7) in the BWBSdk2 and SWBmk are considered essential for winter habitat; large expanses of such habitat with minimal fragmentation are considered important to long term survival of the population.
- Mature stands in the BWBSdk2, SWBmk and SWBmks (structural stages 6 and 7) are essential to caribou at various times of the year.
- The AT and SWBmks are expected to be used as summer and fall range in this area with the possibility of some low density year round use of the BWBSdk2.
- Habitat alteration from forest harvesting and linear access (roads, power lines) have direct impacts on caribou habitat. Fragmentation of habitats, particularly between summer/fall ranges in mountainous terrain and adjacent boreal forest results in a deterioration of habitat suitability, increases mobility of predators, and results in unnatural movements of caribou than would occur under undisturbed conditions.

6.3.2 Ecosystem Unit Values and Assumptions

Ratings are assigned to ecosystem units within the study area based on habitat attributes and structural stages considered to be important. Habitat requirements for caribou in the study area and related data requirements are summarized in Tables 1, 2 and 3.

6.4 SUITABILITY/CAPABILITY RATINGS TABLE

A suitability/capability ratings table is appended (capability=highest value of suitability). This is based on a listing of site series within BEC units of the study area, provided by the project ecologist (based on Banner et al, 1993 and newly developed site series information). New site series were developed through fieldwork and approved by the Ministry of Forests project ecologist.

6.5 ADJUSTMENTS

It is anticipated that only a limited number of factors will contribute to an increase or decrease in ranking of suitability for caribou (an increase being for example, from Class 3 to Class 2). The following adjustments have been utilized for a decrease of one class, as based on site modifiers (singly or in combination) for ecosystem units:

- ◆ For all biogeoclimatic zones:
 - ◆ cool aspect with very shallow soil (kv) for all SS; to a minimum of Class 5.
- ◆ In the SWBmks:
 - ◆ very steep slope with very shallow soil (vz) for all SS; to a minimum of Class 5.
 - ◆ very steep slope with shallow soil (sz) for all SS; to a minimum of Class 5.
 - ◆ very steep slope with coarse-textured soil (cz) for all SS; to a minimum of Class 5.

The rationale for these decreased adjustments is generally related to the physical characteristics of ecosystems, primarily very steep slopes with shallow and/or coarse-textured soils which support limited forage for caribou and very limited shelter.

TABLE 1
SUMMARY OF HABITAT REQUIREMENTS
FOR CARIBOU IN THE SMITH/VENTS RIVERS STUDY AREA

LIFE REQUISITE	SEASON	STRUCTURAL STAGE	REQUIREMENTS
Feeding	Spring/ Summer/Fall	2, 6,7	Spring feeding on early green-up vegetation in openings when a variety of herbs (forbs, sedges, grasses) are important. SWBmk and SWBmks with exposed ridges and rock bluffs and adjacent AT are important calving areas. AT and SWBmks (and likely into SWBmk and BWBSdk2) used extensively in summer and fall; forbs, terrestrial lichens, and some shrubs used through summer and fall. Caribou move throughout various zones to AT and SWBmks (parkland) in search of food and cover.
	Winter	2, 6,7	Winter in SWBmk and into BWBSdk2 to feed on terrestrial lichens (and likely also arboreal lichens) in mature coniferous forests. Cratering is used to access terrestrial lichens, sedges and forbs especially on edges of wetlands.
Security/ Thermal Cover	Spring/ Summer/Fall	2,6,7	SWBmks and SWBmk near ridges and rock outcrops is essential security habitat for caribou calving. Ridges and mountaintops in AT are utilized throughout summer and fall and provide escape terrain; also important for insect avoidance and thermal regulation, particularly on late snowfields. Mature coniferous forests at high elevation in SWBmks and SWBmk in structural stages 6 and 7 provide security cover and thermal cover.
	Winter	2,6,7	Lowland mature forests in SWBmk and BWBSdk2 zone provide security cover for much of the winter.

**TABLE 2
SUMMARY OF CRITICAL HABITAT REQUIREMENTS MEASURED**

SEASON/ACTIVITY	MEASURABLE ATTRIBUTE	HABITAT FEATURES
Spring/Summer/Fall Feeding (FD/G)	Herb cover Shrub cover Terrestrial lichen cover	Percent cover of herbs and shrubs Species and percent cover of terrestrial lichens
Winter Feeding (FD/W)	Terrestrial lichen cover Arboreal lichen cover	Species and percent cover of terrestrial lichens Abundance class of arboreal lichens
	Aspect	Windswept ridges in AT
Spring/Summer/Fall Thermal Cover (TH/G)	Elevation	Highest elevations will retain snowfields longer and afford protection from insects and provide thermal regulation.
	Aspect	North and east aspects are last to clear of snow.
Winter Thermal Cover (TH/W)	Crown cover	Canopy closure >40% in spruce, spruce/fir, and spruce/pine forest.
Spring/Summer/Fall Security Cover (SH/G)	Elevation, landform	SWBmks (parkland) and SWBmk with exposed ridges and rock outcrops required for calving.
Winter Security Cover (SH/W)	Tree species, crown cover	Mature stands of white spruce, black spruce, and mixed spruce/pine afford protection from predators

TABLE 3
SUMMARY OF DATA COLLECTION METHODOLOGY

HABITAT FEATURES	FORM USED	METHOD
Tree Cover	V	Field Manual for Describing Terrestrial Ecosystems (FMDTE)
Tree Species	V	FMDTE
Tree Height	V	FMDTE
Shrub layer	V	FMDTE
Herb Layer	V	FMDTE
Leading Species	V	FMDTE
Crown Closure	V	FMDTE
Arboreal lichens	CWD	Lichen loading guide
Aspect	S	FMDTE
Slope	S	FMDTE
Elevation	S	FMDTE

S – Site Description Form

V – Vegetation Form

CWD – Coarse Woody Debris Form

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