

## MOOSE

**Scientific Name:** *Alces alces*

**Species Code:** M-ALAL

**Status:** Yellow-listed

### **Distribution**

#### • **Provincial Range**

Moose are mainly distributed throughout the mainland of the province. They are found on the coast of British Columbia in low densities but not in the drier parts of the southern Okanagan Valley.

• **Elevational Range:** Sea level to the alpine. Areas higher than 1300 m seldom used in the winter.

#### • **Provincial Context**

Moose are widespread throughout a variety of habitats from sea-level to alpine. Moose populations are most abundant in the central and northern areas of the province. The provincial population is estimated to be 240 000 individuals.

#### • **Project Area:**

**Ecoprovince:** Central Interior

**Ecoregions:** Chilcotin Ranges and Fraser Plateau

**Ecosections:** *Central Chilcotin Ranges (CCR), Chilcotin Plateau (CHP) and Fraser River Basin (FRB)*

**Biogeoclimatic Zones:** *BGxh3; BGxw2; IDfxm; IDfdk3; IDfdk4; MSxk; MSxv; ESSFxy2, ESSFxy2; SBPSxc*

The ecosections and biogeoclimatic zones that have been italicized indicate areas within the project area, that have suitable habitat for the species under consideration, and have therefore been rated.

### **Ecology and Key Habitat Requirements**

#### • **General**

Moose utilize a variety of different habitats depending on the season. Winter is the critical season for Moose and the presence of forest cover adjacent to foraging areas is essential. Their winter distribution is often limited by the availability of woody food plants and by snow conditions, especially when the snow depth exceeds 1m. During the winter they often inhabit valley bottoms, riparian habitats, floodplains and other shrub dominated habitats such as shrub lands, wetlands and their edges, burns, cutovers and other open areas (Demarchi 1986) (Sopuck *et al.* 1997). Coniferous and mixed-wood stands are used for security and thermal cover, bedding and as travel corridors (Sopuck *et al.* 1997).

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During the summer, Moose may move to higher elevations, and utilize forest stands for cover from heat and predation (Sopuck *et al.* 1997). Summer ranges consist of the same type of habitat as the winter range: floodplains, riparian habitats and adjacent forest provide most of the habitat. Wetland habitats are used extensively for spring, summer and fall foraging. Riparian areas along rivers and lakes are also favored habitats but are not used as heavily as the spruce/shrub wetlands.

Moose are generalist herbivores and common browse species throughout their range includes willow, cottonwood, red-osier dogwood, Douglas maple, birch, aspen, and balsam fir (Ehlers *et al.* 1998) (U.S. Forest Service 1998).

Moose migrate seasonally from high elevations in the summer, to elevations below 1300 m in the winter (Sopuck *et al.* 1997). The extent of seasonal migrations may vary depending on topography, snow fall patterns and forage availability in certain areas.

Seasonal home ranges average 5-10 km<sup>2</sup> in size and vary depending on the season. Typically home ranges are larger in the summer as they are not limited by mobility as they are by the winter snow (Sopuck et al. 1997).

The rutting period begins in mid to late September and usually lasts for approximately three weeks, but may last longer. Habitat requirements for rutting appear to be varied with respect to vegetation, topography, and proximity to human disturbance (Stevens and Lofts 1988) (Sopuck *et al.* 1997). Calves are born during May through June. The most important habitat requirement in the summer is security cover for cows with young calves. This is required in order to minimize predation (Sopuck *et al.* 1997). Calving sites require suitable security cover to decrease calf predation. Such sites are often found in relatively large forest stands with dense cover of shrubs and forest canopy.

### Habitat Use and Life Requisites

The life requisites that will be rated for Moose are: feeding and security/thermal cover which are described in detail below.

#### • Feeding Habitat

Moose are generalist herbivores and their diet consists of a variety of different species. During the winter, Moose feed on the twigs of shrubs and trees such as willows, red-osier dogwood, trembling aspen, cottonwood, poplar, yew and subalpine fir (Stevens and Lofts 1988). The bark of trembling aspen may also be eaten especially in late winter. Access to foraging areas during the winter is a critical aspect of winter habitat selection. In unlogged areas preferred foraging habitat includes wetlands and riparian areas where willow and bog birch is abundant. Natural disturbances such as wildfires and insect infestation can also create seral stages that provide suitable foraging habitat by increasing edge effect which increases the diversity of plant species and staggers the maturation rate of various seral stages (Stevens and Lofts 1988) (Sopuck 1998). They also forage in spruce/sedge meadows and willow patches. Forage production in cutovers changes over time and can peak at anywhere between 10-35 years after disturbance. Cutovers can provide winter foraging habitats but often deep snow accumulations can restrict their use in the winter months (Sopuck 1998).

During the summer the movements of Moose are less restricted due to their broader diets and easy access to foraging areas. In the summer they feed on the foliage of deciduous trees and shrubs as well as grasses, sedges and horsetails (Stevens and Lofts 1988). They frequently forage in wetland meadows, spruce/shrub wetlands, lakes for aquatic vegetation and high elevation forest. The use of clearcuts and burns was found to decrease during the summer and fall (Sopuck 1997).

Table 1. Important forage plants for Moose.

	Winter forage	Spring forage	Summer forage
Trees and Shrubs	Twigs and branches of: paper birch red-osier dogwood saskatoon Douglas maple willow spp. trembling aspen	Foliage of: paper birch red-osier dogwood saskatoon Douglas maple willow spp. trembling aspen	Foliage of: paper birch red-osier dogwood saskatoon willow spp. trembling aspen aquatics
Herbs		grass spp. sedge spp. horsetails	grass spp. sedge spp. horsetails

• **Security/Thermal Habitat**

Security habitat for Moose is essential for hiding from hunters and predators. The most important habitat requirement for summer is security cover for cows with young calves. Forest stands provide shelter from heat and predation. During the winter forest stands also provide cover for snow interception, security/hiding cover and thermal cover. Moose seek dense coniferous forests during mid to late winter as the snow depth increases. Ideal winter range consists of conifers taller than 6m, with a canopy closure of 75 % or greater for cover (U.S. Forest Service 1998). Often dense coniferous forests and aspen stands of mixed-wood forests are used for security habitat during travel and bedding. Immature and mature spruce forests are used more frequently than mature pine forests for cover (Sopuck 1997).

**Seasons of Use**

Moose require feeding and security/thermal habitats throughout the year. Table 1 summarizes the life requisites required for each month of the year.

Table 2. Monthly Life Requisites for Moose.

Life Requisite	Month	Season
Feeding, Security/Thermal	January	Winter
Feeding, Security/Thermal	February	Winter
Feeding, Security/Thermal	March	Winter
Feeding, Security/Thermal	April	Winter
Feeding, Security/Thermal	May	Spring
Feeding, Security/Thermal	June	Spring
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
Feeding, Security/Thermal	December	Winter

**Habitat Use and Ecosystem Attributes**

Table 2 outlines how each life requisite relates to specific ecosystem attributes (e.g., site series/ecosystem unit, plant species, canopy closure, age structure, slope, aspect, terrain characteristics)

Table 3. Terrestrial Ecosystem Mapping (TEM) Relationships for each Life Requisite for Moose.

Life Requisite	TEM Attribute
Feeding Habitat	- site: site disturbance, elevation, slope, aspect, structural stage - soil/terrain: flooding regime - vegetation: % cover by layer, species list by layer, cover for each species for each layer
Security/Thermal Habitat	- site: elevation, slope, aspect, structural stage - soil/terrain: - vegetation: % cover by layer - mensuration: tree species, dbh, height

**Ratings**

There is a detailed level of knowledge of the habitat requirements of Moose in British Columbia to warrant a 6-class rating scheme.

• **Provincial Benchmark**

Ecosection: Peace Lowland (PEL)

	<u>Winter</u>	<u>Growing</u>
Biogeoclimatic Zone:	BWBSmw	BWBSmw
Broad Ecosystem Unit:	Boreal White Spruce- Trembling Aspen (structural stage 2-3)	White Spruce-Balsam Poplar Riparian (structural stage 2-3)

• **Ratings Assumptions**

**BGxh3 and BGxw2**

1. Dry, open grassland habitats rate 6.
2. Shrubby riparian habitat with willow or red osier dogwood as a dominant species rate up to 3 for winter feeding.
3. Mature to old growth deciduous forests can rate up to 3 for security/thermal cover.
4. Very open Douglas-fir forests provide little cover and very limited forage and are therefore only rated as high as 5 for feeding and 4 for cover.

**IDFdk3, IDFdk4 and IDFXm**

5. Dry, open grassland habitats rate 6.
6. Riparian wetlands and deciduous and mixed wood forests provide forage and cover and rate up to 3 in winter
7. Mature to old growth deciduous forests can rate up to 3 for security/thermal cover.
8. Very open Douglas-fir forests provide little cover and very limited forage and are therefore only rated as high as 5 for feeding and 4 for cover.
9. Natural and man made shrubby openings or clearings in the forest rate 2-4 for winter and spring feeding.
10. Moderate slopes, south facing slopes with uneven-aged stands within 100m are rated up to 2 for security and feeding.

**MSxv, MSxk and SBPSxc**

11. Understory of upland forests provide little forage and rate up to 4 for feeding and up to 2 for cover if closed canopy.
12. Riparian forests rate 2 for cover if closed canopy and up to 2 for feeding if abundance of preferred forage species is present (*Cornus stolonifera*, *salix*).

**ESSFxv2**

13. Winter snow loading seriously impedes movement and therefore these units are selected against and rated 6 for the winter season.
14. Forests are rated up to 3 for security/thermal during the spring, summer and fall.

• **Ratings Adjustment Considerations**

Final capability and suitability map products may incorporate 1) landscape heterogeneity and connectivity; 2) habitats adjacent to significant anthropogenic disturbance regimes (e.g. roads, settlements); 3) interspersions of different structural stages within the landscape.

Please note that even though structural stage substage or modifiers and stand composition modifiers were employed in the original mapping, these units (other than structural stage modifier 3a and 3b) have not been included in the final ratings tables. This is because the ratings for the modified and unmodified ecosystem units are the same and including these units in the final ratings table would in turn make the ratings table too cumbersome. In instances where the modified ecosystem unit (either structural stage substage or modifiers and stand composition modifiers) is mapped, please use the wildlife habitat rating for the same unmodified ecosystem unit.

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