MULE DEER

Scientific Name: *Odocoileus hemionus hemionus*
Species Code: M-ODHH

Status: Yellow-listed

Distribution

- **Provincial Range**

Mule Deer occur throughout much of the province east of the Coast Range to the Alberta border. They are absent or rare in coastal forests and the northwestern portion of the province.

- **Elevational Range:** Sea-Level to Alpine

- **Provincial Context**

They are most common in the southern interior and Peace River areas of the province.

- **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; ESSFxv2, ESSFxvp2; 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

Food and habitat requirements vary across its range but typically Mule Deer are found in open coniferous forests and early structural stages where it feeds on a variety of grasses, forbs and shrubs in varying proportions depending upon season (Ehlers *et al.* 1998).

During the spring areas of early green-up are important for feeding. This occurs on moderate to steep, south and west facing slopes at medium elevations. During the summer season Mule Deer are usually found at higher elevation habitats such as subalpine parkland, alpine tundra and shrubby alpine and subalpine wet meadows. The fall finds Mule Deer in the same habitat areas as in the spring season. The winter season forces them from high elevation habitats to low elevation areas with specific habitat characteristics to ensure their survival. Winter survival for Mule Deer is dependent on old growth or mature Douglas-fir stands with well developed canopies that intercept snow, provide security and thermal cover and provide food. If snow accumulations exceed 50 cm then an area is generally avoided (Ehlers *et al*. 1998).

Mule Deer are capable of digesting a wide variety of plants. They are mainly browsers, but they will also eat forbs and grasses, especially during the spring season. Forage preferences are determined by both the seasonal variations in forage digestibility and protein content, and by the nutritional requirement of the animals.

Mule Deer breed during mid-October and early December (Stevens and Lofts 1988). Fawns are born in June after a gestation of approximately 210 days (Banfield 1981). Optimum fawning habitat has a dense understory of low shrubs or small trees from 0.6 - 1.8 m tall and a tree overstory of approximately 50% crown closure. Good fawning habitat is in close proximity to suitable foraging areas (Stevens and Lofts 1988).

Average home range for Mule Deer varies widely between individuals, sexes, and habitat occupied. Bucks generally use larger areas than the does. Deep snow can impede movements, especially young animals and therefore winter ranges are smaller than summer ranges.

Important habitat features for Mule Deer are summarized in Table 1.

Table 1. Important habitat features for different seasons and snowpack conditions for Mule Deer.

Season/ Snowpack	Habitat Feature
Winter/moderate to deep snowpack	• topographic features that reduce snowpack (i.e. slopes, southerly aspects) • tall, large-crowned conifers with 65-70% average canopy closure • arboreal lichens • tall shrub understory • small forest openings
Winter/shallow snowpack	• topographic features that reduce snowpack (e.g. slopes, southerly aspects) • patches of cover with shrub understory
spring	• topographic features that encourage early growth • openings that encourage early growth of herbaceous forage • security/thermal cover near forage habitat (i.e. within 200 m) • closed canopy forest with shrubby understory for fawning
summer/fall	• abundant forage, especially herbs and shrubs • patches of cover interspersed with food.

Habitat Use and Life Requisites

The life requisites that will be rated for Mule Deer are: feeding (FD) and security/thermal cover (ST) which are described in detail below.

• **Feeding Habitat**

Feeding requirements for Mule Deer are related to the availability of forage species and season. During the spring areas of early green-up are important for feeding. This occurs at low elevations on moderate to steep, south facing slopes. Important spring forage species include *Poa* spp., junegrass, bluebunch wheatgrass and big sagebrush. Summer habitat consists of areas with a suitable mix of young to old forest areas, with an adequate supply of forage and cover elements. Key summer forage species include saskatoon, Oregon grape, red-osier dogwood and arboreal lichens.

Winter forces Mule Deer from high elevation areas to low elevation mature - old growth, multi-aged moderately closed canopy Douglas-fir forests with south-facing, warm aspect slopes where the snowpack is lower. Forage quality and quantity are at their lowest value during the winter (Strategy Committee 1996). As the snowpack increases the accessibility to forage species declines. Good nutrition during the winter season is especially important. In the Cariboo, Douglas-fir foliage from large, old trees is the most common forage species in the winter season. At Knife Creek, near Williams Lake, Douglas-fir constituted approximately 62 - 89 % of their winter diet (Waterhouse *et al*. 1994). More specifically Douglas-fir becomes most valuable after trees reach age class 6 or greater (100+ years or structural stage 5 and above). Sage is another important forage species that was found in abundance in the diets of Mule Deer at Churn Creek (Waterhouse *et al*. 1994). Litterfall from Douglas-fir trees combined with arboreal lichens, saskatoon and red-osier dogwood are also eaten during the winter. Table 2 illustrates important forage plants for Mule Deer.

Table 2. Important forage plants for Mule Deer in the Churn Creek study area.

	Winter forage	Spring forage	Summer forage
Trees and Shrubs	Douglas-fir needles saskatoon Oregon grape big sagebrush Douglas maple red-osier dogwood *Rosa* spp. willow spp.	big sagebrush Douglas-fir common rabbit-brush saskatoon willow spp.	saskatoon Oregon grape red-osier dogwood willow spp.

Herbs		bluebunch wheatgrass needle grasses blue grasses	bluebunch wheatgrass needle grasses blue grasses
Arboreal Lichens	*Alectoria* *Bryoria*	*Alectoria* *Bryoria*	*Alectoria* *Bryoria*

• **Security/Thermal Habitat**

Thermal habitat allows deer to expend less energy to maintaining body temperature, allowing allocation of conserved energy to growth and reproduction. Thermal habitat can vary daily, seasonally, with prevailing weather conditions, and age, size and nutritional condition of the animal. In general night time thermal cover should trap long-wave radiation and maintain warmer air temperatures (occurring under a closed canopy above a deer's head or above 3 m), reduce wind at deer height (occurring in a forest stand or dense underbrush) and intercept precipitation (occurring under a closed canopy and large crown volume). In general, daytime thermal requirements are met by areas that gather heat (on or near rock bluffs) or intercept excessive solar radiation (canopy closure) (Bunnell *et al.* 1985).

Winter represents a critical season for deer species due to the associated energetic costs of maintaining body temperature and moving through snow. Forest cover influences snow depth, density and surface hardness, and deer typically expend most energy walking through crustless, dense, deep snow (i.e. sinking depths greater than 25 cm) (Nyberg & Janz 1990). Conditions that produce favourable snow conditions for deer include dense young-growth (>10 m tall) and old-growth forests (Nyberg & Janz 1990). Canopy closure (i.e., stands taller than 10 m with greater than 60% crown completeness) exerts the most influence on snow interception, and creates areas with snow conditions that don't limit deer movement (Bunnell *et al*. 1985). Multi-layered Douglas-fir forests with deep, wide crowns and high crown closures are the preferred winter habitats for Mule Deer. Additionally north aspects also provide good snow interception in the winter, as they can support denser stands of higher crown closures and therefore, may be used during severe weather conditions (Strategy Committee 1996).

Security habitat for Mule Deer is essential for hiding from hunters and predators. For Mule Deer the most effective security cover hides 90% of the animal at a distance of 60 m or less, and security patches need to be 180 m or more in diameter. Generally mature - old growth forests with a dense shrub or patchy conifer understory will satisfy security cover requirements. In the growing season uneven aged stands of Douglas-fir forests provide good protection from wind and heat loss. Areas of steep broken terrain can also be used as security habitat. (Nyberg & Janz 1990).

Winter range is defined as those areas with 10 to 45 % slope, having a south and/or west aspect, and below 1500 m in shallow to moderate snowpack zones or below 1000 m in deep snowpack zones (U.S. Forest Service 1998).

Seasons of Use

Table 3. Monthly Life Requisites for Mule Deer.

Life Requisite	Month	Season
Feeding, Security/Thermal	January	Winter
Feeding, Security/Thermal	February	Winter
Feeding, Security/Thermal	March	Winter
Feeding, Security/Thermal	April	Spring
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 4 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 4. Terrestrial Ecosystem Mapping (TEM) Relationships for each Life Requisite for Mule Deer.

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

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

- **Provincial Benchmark**

	Winter	Growing
Ecosection:	Fraser River Basin	Eastern Purcell Mountains
Biogeoclimatic Zone:	IDFxm	ESSFdk
Broad Ecosystem Unit:	Interior Douglas-fir Forest (structural stage 6)	Subalpine Meadow (structural stage 2)

- **Ratings Assumptions**

1. Low elevation (BGxw2, BGxh3 and IDFxm) mature to old growth (structural stage 6-7) Douglas-fir dominated forests with a closed canopy (>35% crown closure) on moderate to gentle slopes (<45% slope) with available understory forage rate 1 for winter feeding and cover.
2. Open Douglas-fir forests (less than 25% crown closure) rate 2-3 for winter feeding and cover.
3. Open grasslands are used during spring green up and those ecosystems with abundant fescues, Poa's, junegrass and bluebunch wheatgrass are preferred and rate up to 2 for winter and spring feeding.
4. Low elevation riparian habitat with closed canopy (>35% crown closure) rates 3 in winter and up to 2 in growing seasons for feeding and cover.
5. Although south aspects have more direct sunlight and are therefore warmer and have lower snow depths; north aspects support denser stands of higher crown closures with good snow interception and therefore closed canopy Douglas-fir forests with moderate cool aspects rate 1-2 for security/thermal habitat.
6. Grasslands rate up to 2 for feeding depending on the abundance of preferred forage species. The more junegrass and fescues the higher the rating. Rate highest in spring in areas of quick green up such as warm aspects.
7. Moderate to gentle aspect closed canopy forests can rate up to 1 for winter cover.
8. Higher elevation mesic - subhygric closed canopy forests rate up to 3 for feeding in spring and fall if abundant understory shrubby vegetation is present.
9. Higher elevation wetlands and wet marshes rate 5 in winter and up to 3 for feeding in spring and summer.

- **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) interspersion of different structural stages within the landscape.

Please note that eventhough 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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