Mountain Goat

Scientific Name: *Oreamnos americanus*
Species Code: M-ORAM

Status: Yellow listed

Distribution

- **Provincial Range**

The present distribution of mountain goats in the province has changed little from that of historical times. However, some populations have been exterminated and in many parts of its range numbers have decreased due to habitat loss, disease or starvation and over-hunting. Mountain goats are found throughout suitable habitats in a variety of biogeoclimatic zones on the mainland of British Columbia. In British Columbia mountain goats are most abundant in the Rocky Mountains, scattered populations exist in the coastal mountain and in northern mountains and plateaus (Stevens and Lofts 1988).

- **Elevational Range:** Usually >1500 m

- **Provincial Context**

Mountain goats are restricted to the northwest portion of North America, including British Columbia. British Columbia has more native goat range than any other province. The 1997 provincial population estimate for mountain goats was 50,000 (Hatter 1997).

- **Range in Project Area:**

Ecoprovince: Southern Interior Mountains
Ecoregions: Columbia Mountains and Highlands, Southern Rocky Mountain Trench, Western Continental Ranges
Ecosections: Eastern Purcell Mountains, East Kootenay Trench, Southern Park Ranges
Biogeoclimatic Zones: IDFdm2, MSdk, ESSFdk; ESSFdku; ESSFdkp; ESSFwm; ESSFwmu; ESSFwmp; AT

Ecology and Key Habitat Requirements

The mountain goat is a generalist herbivore. Habitat selection is determined more by topographical features rather than by the presence of specific forage species. Mountain goats inhabit rugged terrain comprised of cliffs, ledges, projecting pinnacles and talus slopes in subalpine and alpine habitats. Forage sites for mountain goats must be adjacent to suitable landforms to which they can retreat in times of danger. One study showed that the distance to cliffs was the most important factor determining goat distribution and that summering goats made little use of foraging areas over 400m from cliffs (USDA Forest service 1997).

The diet of mountain goats in the interior of British Columbia is primarily graminoids. The winter diet includes mainly shrubs, trees, litterfall and both arboreal and terrestrial lichens. Summer diets are more varied with a higher proportion of forbs, grasses and sedges and less browse (Fox and Smith 1988). Grasses and forbs are highly palatable and nutritious in spring and early summer, and they become less nutritious in fall and winter. During the fall and winter seasons, the higher protein content of woody forage encourages greater browsing.

Winters are spent on well ledged or fractured cliffs, and very steep terrain with interspersed vegetation with low snow accumulation. These habitats are usually, on steep south to southwest aspects with access to forage. Mountain goats use those portions of winter ranges on slopes exceeding 40 degrees. Suitable winter ranges may also be at lower elevations where snow is less abundant and persistent.

In spring, mountain goats feed in snow-free habitats on warm aspects. As the summer progresses, they will follow the melting snow line up slope and feed on emerging young, succulent vegetation on other aspects. During the summer months, goats often use areas of lush herbaceous forage in alpine grasslands, meadows, and grassy slide-rock slopes of the AT and ESSF parklands. Timbered areas and

avalanche tracks in the ESSF subzones may also be used during migration or movement between cliff bands and feeding areas. When crossing areas that are without escape terrain goats repeatedly use the same trails (USDA Forest service 1997).

In general mountain goats will make use of higher elevation habitats in the summer and lower ones during the winter (USDA Forest service 1997).

Kids are born between May-June on the steepest most rugged areas of the goat's range.

Habitat Use and Life Requisites

The life requisites that will be rated for Mountain Goat are: food and security habitat which are described in detail below.

- **Food**

Mountain goats select habitat more for its topographical features than for the availability of specific forage species. Mountain goats will feed in a variety of habitats adjacent to escape terrain such as alpine tundra, alpine/subalpine wet meadow, subalpine parkland, talus shrublands and subalpine forest burns. Goats may feed in lower coniferous forests during winter in wet snow areas, or may use windswept ridges in dry interior locations (Stevens and Lofts 1988).

Mountain goats feed on a variety of plant foods. Grasses, sedges, rushes, ferns, forbs, lichens, shrubs and conifers are important in different seasons. During the winter they will feed upon whatever plants are available or emerging from the snow, from dried grasses to conifer needles and even mosses and lichens. Plants in their winter diet include shrubs, coniferous trees, litterfall and both arboreal and terrestrial lichens. Their summer diet is more varied with a higher proportion of forbs, grasses and sedges. Grasses have been found to make up the bulk of their summer diet.

Table 22. Important forage species for mountain goats (Himmer and Powers 1999).

Graminoids	bluegrasses *Poa* spp. fescues *Festuca* spp. wheatgrasses *Elymus* spp. *Calamagrostis* spp. *Trisetum* spp.	*Bromus* spp. sedges *carex* spp. rushes *juncus* spp. woodrush *Luzula* spp. *Agrostis* spp.
Forbs	moss campion *Silene acaulis* *Penstemon* spp. *Aster* spp. cinquefoil *Potentilla* spp. yarrow *Achillea millefolium* stonecrop *Sedum* spp. *Arnica* spp.	pussytoes *Antennaria* spp. mountain sagewort *Artemisia norvegica* field chickweed *Cerastium arvense* edible thistle *Cirsium edule* Jacob's ladder *Polimonium* spp. smooth alumroot *Heuchera glabra*
Shrubs	yellow mountain-heather *Phyllodoce glanduliflora* white moss heather *Cassiope mertensiana* trailing bramble *Rubus pedatus* willow *Salix* spp. *Vaccinium* spp. black twinberry *Lonicera involucrata* kinnikinick *Arctostaphylos uva-ursi* saskatoon *Amelanchier alnifolia* crowberry *Empetrum nigrum*	
Trees	subalpine fir *Abies lasiocarpa* Douglas-fir *Pseudotsuga menziesii* common juniper *Juniperus communis*	
Ferns	lady fern *Athyrium filix-femina* deer fern *Blechnum spicant* spiny wood fern *Dryopteris* spp. bracken *Pteridium aquilinum*	

Mosses	*Hylocomium splendens* *Rhytidiadelphus spp.* *Sphagnum cuspidatum*
Lichens	*Bryoria* spp. *Alectoria* spp. *Usnea* spp. *Lobaria* spp.

- **Security Habitat**

Security habitat is used by mountain goats to escape predators. For class 1 security habitat mountain goats need steep, preferably greater than 80% slope, rugged terrain with cliffs, rock ledges and talus slopes. Escape terrain (i.e. class 1 and 2 security habitat) should optimally be within 400m of forage sites. Visibility is another important factor in security habitat selection. Lack of visibility may limit their use of dense stands of conifers far from escape terrain.

Seasons of Use

Table 23 summarizes the life requisites required for each month of the year.

Table 23. Monthly life requisites required for mountain goat.

Life Requisite	Month	Season
Food, Security habitat	January	Winter
Food, Security habitat	February	Winter
Food, Security habitat	March	Winter
Food, Security habitat	April	Growing (Spring)
Food, Security habitat	May	Growing (Spring)
Food, Security habitat	June	Growing (Summer)
Food, Security habitat	July	Growing (Summer)
Food, Security habitat	August	Growing (Summer)
Food, Security habitat	September	Growing (Fall)
Food, Security habitat	October	Growing (Fall)
Food, Security habitat	November	Winter
Food, Security habitat	December	Winter

Habitat Use and Ecosystem Attributes
Table 24 outlines the specific ecosystem attributes (e.g., site series/ecosystem unit, plant species, canopy closure, age structure, slope, aspect, terrain characteristics) that are considered when rating each life requisite

Table 24. Terrestrial ecosystem mapping (TEM) attributes considered for each life requisite for mountain goat.

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

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

- **Provincial Benchmark**

	Winter		**Growing**
Ecoprovince:	Southern Interior Mountains		Southern Interior Mountains
Ecosection:	Southern Park Ranges (SPK)		Southern Park Ranges (SPK)
Biogeoclimatic Zone:	ESSFdk	AT	
Broad Ecosystem Unit:	White Spruce-subalpine fir/RO –Rock		Alpine meadow

Habitats: Mature – oldgrowth forests, subalpine parkland and seepage areas complexed with cliffs, rock bluffs, talus slopes, and avalanche tracks, on steep (greater than 80% slope), south to southwest aspects. Mountain goats may at times use habitats on gentle to moderate slopes but usually within close proximity to steep escape terrain. Northerly aspects may be used in winter if windswept of snow accumulations.

- **Ratings Assumptions**

Assumptions for Security Habitat in Winter	
TEM attribute	**Assumptions**
Aspect	-Cool aspects may be rated lower than warm aspects due to deeper snow
Slope	-Forested and non-forested slopes > 130% rated up to class 1 -Slopes 100 – 130% rated up to class 2 -Level and gently sloping EU's rated up to class 4
Structural Stage	-Stages greater than 3 on steep slopes will decrease ratings slightly because of reduced sightability -Stages greater than 3 on level or gentle slopes will increase ratings slightly because of reduced sightability permitting mountain goats to be less visible
Site Series	-Talus slopes rated up to class 2 -Cliffs rated up to class 1 -Rock outcrops on slopes > 100% rated up to class 1
Assumptions for Security Habitat in Spring, Summer and Fall	
Aspect	-Cool aspects may be rated lower than warm aspects due to deeper snow
Slope	-Forested and non-forested slopes > 130% rated up to class 1 -Slopes 100 – 130% rated up to class 2 -Level and gently sloping EU's rated up to class 4

Structural Stage	-Stages greater than 3 on steep slopes will decrease ratings slightly because of reduced sightability -Stages greater than 3 on level or gentle slopes will increase ratings slightly because of reduced sightability permitting mountain goats to be less visible
Site Series	-Talus slopes rated up to class 2 -Cliffs rated up to class 1 -Rock outcrops on slopes > 100% rated up to class 1
Assumptions for Food in Winter	
Plants	-EUs that contain the plants listed in Table 1 rated up to class 1 depending on density of forage species
Assumptions for Food in Spring, Summer and Fall	
Plants	-EUs that contain the plants listed in Table 1 rated up to class 1 depending on density of forage species

- **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. settlements); 3) adjacency to escape terrain.

One study showed that the distance to class 1 habitat was the most important factor determining goat distribution. Summering goats were found to make little use of class 1 and 2 food habitat areas that were over 400m from class 2 or better security habitat (USDA Forest service 1997).

Literature Cited

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