
Appendix 5.4.13A

Marten Species Account

BLACKWATER GOLD PROJECT

APPLICATION FOR AN
ENVIRONMENTAL ASSESSMENT CERTIFICATE /
ENVIRONMENTAL IMPACT STATEMENT
APPENDIX 5.4.13A



Project Name: Blackwater
Scientific Name: *Martes americana*
Species Code: M-MAAM
Status: Yellow-listed species by the British Columbia Conservation Data Centre (2014)

1.0 DISTRIBUTION

Provincial Range

Marten is a native year-round resident of British Columbia (BC). It is distributed throughout the province, including Vancouver Island and Haida Gwaii, and is generally separated into interior and coastal ecotypes (Lofroth and Steventon, 1990). Four subspecies are recognized in the province (Cowan and Guiguet, 1975). Marten is not in jeopardy and is protected as a furbearer under the *Wildlife Act* (Government of BC, 1996).

Elevational Range

Sea level to treeline.

Provincial Context

Marten is found in many biogeoclimatic zones and subzones, including the Engelmann Spruce — Subalpine Fir (ESSF) and Sub-Boreal Spruce (SBS) zones. Marten is reported to be very abundant in the SBS zone (Meidinger and Pojar, 1991).

Project Area:

Ecoprovince: Central Interior
Ecoregions: Fraser Plateau
Ecosections: Nazko Upland
Biogeoclimatic Zones: Sub-Boreal Spruce Dry Cool (SBSdk)
Sub-Boreal Spruce Stuart Dry Warm (SBSdw3)
Sub-Boreal Spruce Babine Moist Cold (SBSmc2)
Sub-Boreal Spruce Kluskus Moist Cool (SBSmc3)
Engelmann Spruce — Subalpine Fir Nechako Moist Very Cold (ESSFmv1)
Engelmann Spruce — Subalpine Fir Moist Very Cold Parkland (ESSFmvp)
Boreal Altai Fescue Alpine Undifferentiated (BAFAun)

Elevational Range in Study Area: 671 metres above sea level (masl) to 1,930 masl

2.0 ECOLOGY AND KEY HABITAT REQUIREMENTS

Marten is primarily associated with late-successional coniferous forest habitats. The species is most plentiful in mature/old-growth forests dominated by spruce and fir with a minor

deciduous component (less than 20%). They generally avoid areas with more than 40% deciduous canopy closure. Conifer cover is important because it persists all winter. Marten will mainly use habitats with 20% to 60% coniferous canopy closure and tend to avoid stands with greater or lesser canopy closure (Lofroth, 1993).

Marten favour moist areas with shrubby undergrowth and an abundance of large coarse woody debris, low to medium high shrub/low shrub closure, and high basal areas of trees and snags. These areas provide habitat for many prey species and, in winter, subnivean access for hunting and shelter and offer the best marten den sites (Steventon and Major, 1982; Sherburne and Bissonette, 1994).

Shrubs provide food and cover for prey species and in winter, when bent over by snow-pressure, allow marten access to subnivean habitats. Hard snags and other coarse woody debris are believed to be important for providing subnivean access to resting sites and prey opportunities (Steventon and Major, 1982; Corn and Raphael, 1992).

While marten are usually reluctant to venture far from overhead cover (Simon, 1980; Spencer et al., 1983), in the montane part of their distribution they will make summer use of subalpine meadows and talus slopes for foraging (Grinnell et al., 1937; Streeter and Braun, 1968; Maser, 1998). Streeter and Braun (1968) documented marten summer use of talus slopes three kilometres (3 km) from the nearest forest cover in Colorado. Marten will also forage in some herbaceous and low-shrub meadow openings if suitable prey are available (Buskirk and Powell, 1994).

Food

Although they are very adept at climbing, marten hunt mainly on the ground (Grinnell et al., 1937; Francis and Stephenson, 1972). Their diet varies by season and geographic area. Throughout much of BC, the marten's staple foods are red-backed voles and meadow mice (Weckworth and Hawley, 1962; Koehler et al., 1975; Kelly, 1982). Marten will also eat deer mice, tree squirrels, ground squirrels, shrews, hares, and birds and their eggs. Birds can make up as much as 10% of marten's diet (Blood, 1987). Carrion is readily eaten (Lofroth and Steventon, 1990). Mesic habitats support the greatest number of small rodent prey and the greatest variety of understory plant species (Koehler and Hornocker, 1977). In late summer and fall, the berries of *Vaccinium* and *Rubus* can be an important addition to their diet, especially where prey species are scarce (Buskirk and Ruggiero, 1994).

Reproduction

The summer breeding season is from late June to early August with most matings in July (Markley and Bassett, 1942). Natal dens are usually in large diameter (more than 35 centimetres (cm)) hollow trees and snags, among rocks, under logs, or in squirrel middens (Lofroth, 1993). Resting sites are in cavities in the boles of trees (more than 25 cm

diameter), brush piles, rust brooms, squirrel middens, and high tree basal area habitats (Wilbert, 1992; Lofroth, 1993).

Special Habitat Needs

Marten are believed to be highly selective of micro-environments for thermal cover, for protection from predators, and for access to subnivean foraging sites (Buskirk and Ruggiero, 1994).

Territory/Home Range

Marten are solitary and territorial animals. In most populations studied, marten appear to exhibit intrasexual territoriality with home ranges overlapping little between members of the same sex but having extensive overlap between members of the opposite sex (Buskirk and Powell, 1994). The home range of a male may overlap the ranges of several females. In a given area, male home ranges are typically twice the size of female ranges (Lofroth and Steventon, 1990).

Male home range sizes have been reported from 0.9 km² to 17.9 km² and female ranges from 0.5 km² to 8.5 km² (Stordeur, 1985). Home range size is believed to be dependent on the availability of suitable cover types and the abundance of prey. Marten using younger seral stage habitats have larger home ranges and lower population densities (Soutiere, 1979). Lofroth (1993) found the home ranges for male martens in the SBSmc3 variant and SBSdk subzone to average 5.25 km², while the female ranges averaged 3.16 km². The average daily movements of marten varies from 0.97 km to 5.9 km for males and from 0.2 km to 4.7 km for females (Stordeur, 1985).

3.0 HABITAT USE: LIFE REQUISITES

Marten habitat use has been rated for two seasons—growing and winter—each with food and security life requisites (**Table 1**). It is assumed that suitable denning habitat is provided in habitat with good security and is not limiting so therefore is not rated separately.

Feeding Habitat (FD)

Most studies of habitat use by marten have found them to prefer late-successional coniferous forests, especially those with complex physical structure near the ground (Buskirk and Powell, 1994). The most important habitat element is an abundance of coarse woody debris (more than 35 cm diameter) together with a moderate to dense shrub understory. Mesic to hygric forests of this type provide ideal habitat for the marten's primary prey species, the red-backed vole (*Clethrionomys gapperi*), and a variety of other small mammals such as *Microtine* rodents, hares, squirrels, and birds including *Galliformes* (Koehler and Hornocker, 1977). Xeric forests provide generally poorer habitats for many of the marten's prey species.

Marten will sometimes venture from forests into clearcuts to forage, depending on the age of the area and the amount of coarse woody debris and overhead shrub cover available. These areas are more likely to be used in late summer and fall when *Vaccinium* species and other berry-producing shrubs can provide valuable nutrition (Buskirk and Powell, 1994).

Marten hunt mostly on the ground but may also pursue prey such as squirrels or birds in the trees. In winter, most hunting is done beneath the surface of the snow. Red squirrel middens, tree trunks, snags, stumps, and large woody debris provide important access points to subnivean spaces. Marten will also hunt for prey in young successional stages with brushy undergrowth and thickets from 10 years to 20 years after logging or burning (Baker, 1992; Buskirk and Powell, 1994; Hatler et al., 2008).

Table 1: Monthly Life Requisites for Marten

Life Requisites	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	Growing (Early Spring)
Feeding, Security, Thermal, Natal Dens	June	Growing (Spring)
Feeding, Security/ Thermal, Natal Dens	July	Growing (Summer)
Feeding, Security, Thermal, Natal Dens	August	Growing (Summer)
Feeding, Security/ Thermal	September	Growing (Fall)
Feeding, Security/ Thermal	October	Growing (Fall)
Feeding, Security/ Thermal	November	Winter
Feeding, Security/ Thermal	December	Winter

Note: Seasons defined for Central Interior Ecoprovince per the Chart of Seasons by Ecoprovince (RISC, 1999; Appendix B).

Denning Habitat (DE)

The summer breeding season for marten is from late June to early August with most matings in July (Markley and Bassett, 1942). Marten use two types of dens: natal dens where parturition takes place and maternal dens that are occupied by the mother and young but are not used for parturition (Buskirk and Ruggiero, 1994). Natal dens are usually in large diameter (more than 35 cm) hollow trees and snags, among rocks, under logs, or in squirrel middens (Lofroth, 1993).

During the season of parturition, females may require aboveground dens to avoid wet ground conditions (Wynne and Sherburne, 1984). Winter dens are almost always subnivean and typically associated with coarse woody debris such as squirrel middens, snags, stumps, and the root masses of large trees (Lofroth and Steventon, 1990).

Security/Thermal Habitat (ST)

Security/thermal habitat conceals marten from larger predators and modifies extremes in climate, thus assisting them in maintaining a constant body temperature. Thermal habitat is more critical for marten in winter when they may be nutritionally stressed and need to minimize energy expenditures. Security/thermal habitat for marten is provided by the same types of late-successional coniferous forests that are used for foraging, namely those characterized by having a well-developed shrub understory and complex physical structure near the ground. Resting sites are in cavities in the boles of trees (more than 25 cm diameter), brush piles, rust brooms, squirrel middens, and high tree basal area habitats (Wilbert, 1992; Lofroth, 1993).

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 2 *Terrestrial Ecosystem Mapping (TEM) Relationships for Each Life Requisite for Marten*

Life Requisite	TEM Attribute
Feeding Habitat	<ul style="list-style-type: none"> • 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, coarse woody debris
Security/Thermal Habitat	<ul style="list-style-type: none"> • site: elevation, slope, aspect, structural stage • soil/terrain: terrain texture • vegetation: % cover by layer • mensuration: tree species, dbh, height
Denning Habitat	<ul style="list-style-type: none"> • site: site disturbance, elevation, slope, aspect, structural stage • soil/terrain: bedrock, terrain texture, flooding regime • mensuration: tree species, dbh, height

Note: dbh = diameter at breast height, % = percentage

4.0 RATINGS

Habitats were rated for all seasons for all life requisites of the marten.

There is a moderate level of knowledge of the habitat requirements of marten in BC and thus a four-class rating scheme was used (**Table 3**).

Table 2: Habitat Suitability Rating Scheme for Marten

% of Provincial Best	Rating	Code
100% – 76%	High	H
75% – 26%	Moderate	M
25% – 1%	Low	L
0%	Nil	N

Provincial Benchmark

There is no officially recognized provincial benchmark for marten. However, the study area is expected to provide up to High rated habitat for marten, especially in the SBS zone and subzones (Meidinger and Pojar, 1991).

Ratings Assumptions

- Xeric forest types generally have low value as forage habitat for marten.
- Most preferred marten prey species (e.g., red-backed voles) favour mesic to hygric forest types.
- Units with berry-producing shrubs are rated Moderate to High for summer forage.
- Mature and old-growth forests provide an optimal mix of denning, foraging, and security/thermal habitats for marten and are rated High for Living (Li).
- Deciduous stands are rated low to moderate for security/thermal (ST) summer habitat and Nil for winter ST.
- Stands with large diameter (>35 cm) cottonwoods or trembling aspens are rated High as denning habitat.
- Large spruce with well-developed rust brooms are rated High as rest sites.
- Mid-successional stages (4–5) with residual old growth features, such as large diameter snags and stumps, may be rated High for denning or resting habitat.
- Successional stages 1 and 2 are rated Nil for marten use.
- Water and minerals are not limiting for marten.
- All roads have the same effect on marten behaviour or survival regardless of use.
- All human activities have the same effect on marten behaviour and survival.

5.0 REFERENCES AND BIBLIOGRAPHY

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