7.2 Species – Habitat Model for Fisher

Common Name: **Fisher**
Scientific Name: *Martes pennanti*
Species Code: M-MAPE
B.C. Status: Blue-listed (B.C. Ministry of Environment, 1996; B.C. CDC, 1997)
Identified Wildlife Status: Yes (B.C. Ministry of Environment, 1997)
COSEWIC Status: Has not been examined

Fishers are managed as Class 2 fur-bearers as they are not present on most registered traplines in manageable numbers, and fishers are vulnerable to over-harvest (B.C. Ministry of Environment, 1991).

7.2.1 Introduction

Fisher is blue-listed because of suspected population declines and have been identified as a species of management concern. It is currently included as an Identified Wildlife Species in *Identified Wildlife Management Strategy* (1997) for the *Forest Practices Code of British Columbia.*

General habitat ratings for the fisher are predicted to have a low reliability as no model verification has been done and there is very little documented of the wildlife and habitat associations for this area of British Columbia. Fisher habitat ecology and diet including fisher-prey relationships are not well researched for northeastern British Columbia; however there is currently an ongoing study in the northern interior (Mackenzie Forest District). Information presented in the species-habitat model has been extrapolated from other regions and relevant literature from B.C. has been included where it is available. Initial discussions with the biologists working on the fisher study in the Mackenzie area have also been incorporated into the species models.

7.2.2 Distribution

7.2.2.1 Provincial Range

Fisher are found at low densities throughout the boreal forests of British Columbia (Banci, 1989). They are considered to be at the northern extent of their range in B.C. (Banci, 1989); although, fisher also occur within the Liard river basin of the southeastern Yukon where they are considered rare (Penner, 1981; Slough, 1985).

Fishers are well distributed across British Columbia, occurring in most of the eco-provinces and biogeoclimatic zones with the exception of the coastal islands and the southern portions of the Southern Interior and Southern Interior Mountains Eco-provinces. The actual distribution is not known and could be patchier than indicated above, but further inventories will be required to confirm suspected ranges (RIC, 1997f).

Within British Columbia, fisher are considered to be common-abundant yearlong in the moist, warm BWBS (Stevens, 1995). In many northern areas including the Williston Watershed, population numbers are thought to traditionally be low (D. Becker, personal communication, 1998). The fisher population within the Liard river drainage is considered to be low (Penner, 1981). Low numbers of fishers are present within the La Biche and Sandy Creek areas (J. Hart, personal communication), and they occur in both the MAU and MUP eco-sections (BWBSmw2 variant) represented within the study areas. Fishers are fairly evenly distributed throughout the Fort Nelson area with trappers reporting fairly consistent numbers of fishers caught (J. Hart, personal communication).

7.2.2.2 Elevational Range

Elevations within the study areas range from 220 to 850 m. Elevation is not considered a limiting factor to habitat use within the study areas. Generally, Fishers occur at the middle range of elevations and changes in elevation between seasons do not often occur (Banci, 1989).

7.2.3. Ecology and Habitat Requirements

Fisher occur primarily in forested landscapes and often prefer late succession forest over younger seral stages (Clem 1997, Jones and Garton, 1994, as per Weir and Harsted, 1997). Although there is relatively little known on fisher ecology and habitat use in North America, it appears that fishers in western coniferous forests may rely on the structures and ecological process associated with late successional stands to fulfill many of their life requirements (Ruggerio *et al.*, 1994, in Weir and Harestad, 1997). Fishers will avoid traveling through areas of deep, soft snow and will use forests with snow interception during periods of deep snow accumulations (Arthur et. al., 1989; Raine, 1983). The types of forests that provide snow interception are generally mature coniferous stands.

Fisher establish home ranges that are used all year. Home range sizes for fisher are 20 to 34 km^2 for adult males and 15 to 19 km^2 for females. Home ranges within the sexes cannot overlap, but male and female ranges can overlap.

There is very little information on the reproductive habits of fishers in western North America. Generally, fishers may give birth as early as January but more commonly in March to April having 1 to 4 (average of 2 to 3) kits (Banci, 1989; Powell, 1982). Breeding takes place soon after parturition with the breeding season from late February to mid April (Banci, 1989). Female fishers become sexually mature and begin breeding at the age of one and have their first litter when they are two (Powell and Zielinski, 1994).

7.2.4 Habitat Use (Life Requisites and Seasons)

7.2.4.1 Living

In general, fishers prefer a diversity of forest types with a high degree of interspersion (Arthur *et al.*, 1989; Banci, 1989). Fishers use multi-aged stands interspersed with openings, wetlands, edges, or eco-tones (Banci, 1989; Powell and Zielinski, 1994), and riparian forests are important for fishers (Buck *et al.*, 1994; Powell and Zeilinski, 1994) as they select for old-growth habitat elements in riparian stands (Weir, 1995). High fisher use has also been found in areas with cottonwoods and kettle lake systems (D. Becker, personal communication).

A high degree of diversity in tree heights, shapes, light gaps, and associated understory vegetation, coarse woody debris, snags, and many layers of cover are preferred in forest habitat types (Buskirk and Powell, 1994 in Powell and Zielinski, 1994; Weir, 1995). This complexity in forest structure and associated prey may be the critical features explaining habitat preferences of fishers (Buskirk and Powell, 1994 in Powell and Zielinski, 1994).

7.2.4.2 Feeding

Fishers are generalist feeders and have diverse diets including mainly small-medium size mammals, birds, and carrion. The staple food groups of the fisher are snowshoe hare, porcupine, deer and moose (obtained primarily as carrion), squirrels, small mammals, and birds (Banci, 1989; Weir, 1995). The primary prey identified by Weir (1995) in Central British Columbia included snowshoe hares, red squirrels, and small mammals including southern red-backed voles. Fishers in B.C. tend to use porcupine less than was determined in other study areas, and they tend to use moose carrion more frequently than deer (Weir, 1995).

Throughout most of the fisher's range, snowshoe hares are probably the primary food source (Kuehn, 1989). Studies in Manitoba found snowshoe hares to constitute 70% (Raine, 1987) and 84.3% (Raine, 1986) of fisher diets. Snowshoe hares composed 31.4% of fisher diets in South-Central B.C. and were recorded as the most frequently used species of prey (Weir, 1995). Although literature indicates that fisher numbers may be largely reflective of hare abundance in many areas (RIC, 1997f), Weir (1995) suggests that fisher diets in B.C. may not be as dependent on hare as those of studies done in more eastern regions. This is supported by findings of Kuehn (1989). Fishers will switch prey in response to availability (Banci, 1989), and they can thus compensate for decreases in populations of their primary prey by switching to more available prey items (Kuehn, 1989; Weir, 1995).

Fishers do not exhibit seasonal diet differences, but there is an increased use of plant material especially fruits and nuts during summer (Powell and Zielinski, 1994).

7.2.4.3 Reproduction

Most information on natal dens (where parturition occurs) and maternal dens (different dens where young are raised) comes from eastern North America. Natal den requirements include thermal protection for kits and security from predators (Banci, 1989). In general, tree cavities are used almost exclusively for natal dens and large, dead or living trees are needed to provide suitable den sites (Powell and Zielinski, 1994). Dens are usually located 7 to 12 m above the ground (Powell and Zielinski, 1994). Most natal dens found have been in hardwoods, most commonly in aspens (Powell and Zielinkski, 1994). In the Williams Lake area, Weir (1995) found fishers whelped exclusively in large cottonwood trees (mean diameter 103 cm) with heart rot and branch hole. Weir (personal communication, 1998) suggested that large diameter cottonwoods could be significant, even possibly limiting, for natal denning and whelping in the north-central interior (Weir, 1995).

7.2.4.4 Security Habitat

Fishers avoid non-forested areas (Jones and Garton, 1994; Powell and Zielinski, 1994; Thomasma *et al.*, 1994; Weir, 1995) and mixed-selectively logged stands (Weir, 1995). Kelsall *et al.* (1977) found fishers to be virtually absent from recently burned or logged stands but to utilize second-growth stands more than marten will. Fisher are generally believed to require closed canopy habitats, although, apparently at least some of that canopy may be deciduous (RIC, 1997f). They selected sites with >20% canopy closure in Central B.C. (Weir, 1995) and >50% in a habitat study in Michigan (Thomasma *et al.*, 1994), although 21% to 41% of canopy may be deciduous (Weir, 1995; RIC, 1997f). Fishers select for trees >27cm dbh in Michigan (Thomasma *et al.*, 1994).

7.2.4.5 Thermal Cover (Resting Sites)

Resting sites can be quite diverse including snow dens, hollow logs, holes in the ground, tree cavities, snags, and downed logs (Banci, 1989). Tree species used for resting in the Williams Lake area included aspen, cottonwoods, Douglas-fir, and spruce (Weir, 1995). Keisker (1996) suggests that CWD in decay classes 1, 2, and 3 are the most important for resting and denning sites. In the winter, fishers select for spruce stands with aspen components and use CWD and slash piles for thermal protection when temperatures are low (Weir, 1995).

7.2.4.6 Life Requisites and Ecosystem Attributes

Life Requisite	Ecosystem Attribute
Security Habitat	% cover of shrubs and trees (>20% canopy closure); coarse woody debris; other structural elements
Thermal Habitat/Resting Sites	Large diameter (>20 cm) coarse woody debris, rust broom, cavities in large trees
Feeding	Volume of coarse woody debris (>50 m^3/ha), mixed wood, coniferous, and deciduous forests (structural stages 5, 6, 7) with abundant shrub/ground cover
Reproduction	Large diameter cottonwood trees

7.2.4.7 Seasons of Use

Table 13. Seasons of Use With Rated Life Requisites for Fisher in the La Biche and Sandy Creek Study Areas.

Month	Season*	Rated Life Requisites
January	W	LI-ST, FD
February	W	LI-ST, FD
March	W	LI-ST, FD; RP-SH
April	W	LI-ST, FD; RP-SH
May	G	LI-ST, FD
June	G	LI-ST, FD
July	G	LI-ST, FD
August	G	LI-ST, FD

September	G	LI-ST, FD
October	W	LI-ST, FD
November	W	LI-ST, FD
December	W	LI-ST, FD

- as defined in RIC (1997a).

Table 14: Seasons of Use Summary for Fisher Within the La Biche and Sandy Creek Study Areas

Habitat Use	Code	Months of Use*
Living during the growing season	LI_G	May-September
Living during the winter season	LI_W	October-April

* as defined by RIC (1997a)

7.2.5 Hierarchy of Life Requisites

- Reproduction - Fisher populations appear to be limited primarily by the availability of suitable maternal denning sites (Weir, personal communication, 1998). Maternal den sites are most often found in large diameter deciduous (most commonly cottonwood) trees in riparian habitats.
- Winter Feeding and Security/Thermal Cover - During the winter when food sources are most limited, habitats are required that provide opportunities for winter foraging and provide security/thermal cover.
- Living during the Growing Season (foraging and security habitat)

7.2.6 Ratings

7.2.6.1 Rating Scheme –6 Class, 4 Season

A 6-Class, fisher, rating scheme of high (1), moderately high (2), moderate (3), low (4), very low (5), and nil (6) is employed (as suggested by Resources Inventory Committee, 1997a) and requires a substantial knowledge of habitat use (Table 15).

Table 15: Relative Quality Classes (from RIC, 1997a and RIC, 1997g).

Code	Quality relative to the best in B.C.	Suitability/Capability
1	Equivalent (75%-100% of best)	High
2	Slightly less (50%-75% of best)	Moderately high
3	Moderately less (25%-50% of best)	Moderate
4	Substantially less (5%-25% of best)	Low
5	Much less (0%-5% of best)	Very low
6	The habitat or attribute is absent	Nil

Two seasons (Winter and Growing) will be rated for fisher.

7.2.6.2 Provincial Benchmark

A provincial benchmark has not yet been established for fisher.

7.2.6.3 Assumptions

Habitat ratings for the fisher are presented in sections 7.2.6.4 and 7.2.6.5. Further study is needed to validate and refine these ratings. The following assumptions have been made:

- Units with abundant CWD and snags will have more value year round as these structures will provide resting sites and thermal and security habitat. Stands with no coarse woody debris are avoided, and, in winter, stands with >50 m3/ha of CWD >20 cm in diameter, which is not resting on the ground, are preferred (Weir, 1995).

- Excessive snow depth may restrict fisher movements (Raine, 1983). During times of little snow or when heavy crust is present, fishers are able to travel extensively and may utilize most site series for hunting. However, during severe winters, mature closed canopy, coniferous-dominated stands are likely important habitat for fishers, providing thermal cover and relatively shallow snow depths which will not hinder fisher movement. Structural stages 1 to 4 are rated as having minimal security habitat value in a winter of average snowfall. In an average winter, prey is assumed to be present yet not accessible to fishers in younger structural stages (1 to 4) due to restrictive snow depths, and they are therefore given low food values.
- Fishers avoid non-forested areas (Jones and Garton, 1994; Powell and Zielinski, 1994; Thomasma *et al.*, 1994; Weir, 1995); therefore, non-forested and non-and-sparsely vegetated units will receive very low security habitat in both the growing and winter seasons. Stands with <20% canopy closure will receive low security ratings as fishers selected for sites with >20% canopy closure in Central B.C. (Weir, 1995). Structurally complex habitats with abundant shrub layers and CWD will enhance security and thermal values for fishers.
- Fishers will forage in habitat that provides food and cover for their prey, primarily, snowshoe hares, squirrels, and small mammals (Weir, 1995). Low conifer branches, coarse woody debris, low and high shrub cover, rocks, and small trees, which offer the dense physical structure required by snowshoe hare (Livaitis *et al.*, 1985), will be selected for by fishers (Buskirk and Powell, 1994; Powell, 1982; Weir, 1995). Small mammal populations will be greater in areas with good security and thermal cover. These are generally productive sites with dense low and high shrub layers and large volumes of coarse woody debris.
- Forests stands with greater structural diversity will have higher feeding values due to presence of more prey and more opportunities for hunting. Since fisher are generalist hunters and use prey in relation to availability, often taking advantage of cyclic prey populations, it is difficult to assess habitat in terms of prey availability.
- Structural stages 6 and 7 have only been distinguished by age class; structurally they are the same.
- Structural stages 6 and 7 are likely the only stages that will consistently provide suitable trees for natal dens within the study area and must have a mature deciduous component. If fisher are using large balsam poplars for birthing as they are in south-central B.C. (Weir, 1995), then the SH unit should have the highest value for birthing as this ecosystem supplies the largest balsam poplars. The AM ecosystem may also have high value for natal dens as some sites provide large aspen trees.
- During the growing season, stage 3 clearcuts and Willow-Alder units may receive some use for hunting in summer when some overhead cover from brush and saplings is provided and mature stands are adjacent. Most forested units within the study area probably have some foraging values as fisher prey can be found in a variety of seral stages and forest types. However, resting and denning is limited to structures such as large trees, CWD, and snags found in late-successional forests (Powell and Zielinski, 1994). The AM/01 and 01$ and SH/05 and 05$ forests likely have moderate-high value during spring through fall as they are generally quite diverse and have many-layered canopies. The BL/04 site series has limited structural diversity and probably has low foraging value due to subsequent low prey diversity. Wetter ecosystem units (e.g., BS/08 and BW/09) may have low prey abundance due to the wetness of sites and may have low foraging values. Edges and eco-tones between units will have high value as they are usually very diverse and should have good abundance of several different prey items.

7.2.7 References

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