

Fisher Habitat Management Decision Table – Dry Forests



Landscape/planning level: A 30 km² area¹ is used as the implementation unit at this level as it represents an area that should meet all the habitat requirements for a female fisher. *Minimum structural attributes* identify the characteristics of important habitat structures and patches used by fishers. *Primary stand attributes* are stand features identifiable in the VRI that describe stands which likely contain the important habitat features required by fishers. *Minimum targets* provide minimum estimates of the area of habitat and number of individual features an average female fisher is thought to require within a 30-km² home range. *Strategies* provide ideas for implementing the targets to address fisher habitat needs. Finally, the table describes *why* these attributes are required for fishers. Note that multiple fisher life history components may be met by the same tree, patch, or stand.

Dry Forests (SBPSxc, SBPSmc, SBPSdc, SBPSmk, IDFdk, IDFdc, IDFmw, IDFdw, IDFww, MSxc, MSxk, MSdv, MSdm, MSdk, MSdc)

Fisher life history component	Structural attributes required	Primary stand attributes	Minimum targets	Strategies	Why?
Rearing or breeding habitat	<p><u>Tree characteristics:</u></p> <ul style="list-style-type: none"> Trembling aspen (At) ≥44 cm dbh, declining² with ≥15% tree and shrub cover immediately surrounding. Lodgepole pine (Pl) ≥35 cm dbh, declining with ≥5% tree and shrub cover immediately surrounding. Douglas-fir (Fd) ≥65 cm dbh, declining with ≥15% tree and shrub cover immediately surrounding. 	<p><u>Aspen (At) den stands:</u></p> <ul style="list-style-type: none"> At or Act leading or secondary species Stand age ≥135 years. <p><u>Douglas-fir (Fd) den stands:</u></p> <ul style="list-style-type: none"> Fd leading, secondary, or tertiary species Crown closure ≥20%. QMD ≥34.3 cm Stand age ≥207 years. 	<p><u>Primary stands:</u></p> <ul style="list-style-type: none"> 232 ha needed per 30 km² (7.7% of home range). <p><u>Other stands:</u></p> <ul style="list-style-type: none"> Potential den trees will also occur in other stand types where trees with the required structural attributes occur. Targets for those stands are addressed at the stand level. 	<ul style="list-style-type: none"> Mapping exercises can identify areas with suitable breeding habitat and ensure that sufficient area in Primary stands are retained in a 30 km² area at all times. In general, harvested areas will not contain viable denning trees unless suitable trees are retained <i>and</i> forest cover is protected or develops sufficiently to provide security cover. 	<ul style="list-style-type: none"> Fishers require den cavities for birthing and raising their young. In the dry forests, den cavities have been found in a range tree species. Den trees must be relatively large diameter, contain heart-rot cavities, and have structurally sound sapwood. Female fishers often use more than one den tree in a single year. Given this, fishers need multiple suitable trees for the present and will also require new den trees to develop in the future when existing trees fall. No Primary stand attributes are provided for lodgepole pine den stands as the impacts of MPB are expected to have removed most old pine stands. Suitable pine is likely to still exist as Individual trees or small patches which are best dealt with at the stand level.
Resting habitat: <i>rust broom sites</i>	<p><u>Tree characteristics:</u></p> <ul style="list-style-type: none"> Sx ≥27 cm dbh with rust brooms. Rust brooms should be >40cm diameter to provide a platform for fisher. 	<p><u>Spruce (Sx) rest stands:</u></p> <ul style="list-style-type: none"> Sx leading, secondary, or tertiary species. Crown closure ≥40%. QMD ≥20.1 cm. Stand age ≥83 years. 	<p><u>Primary stands:</u></p> <ul style="list-style-type: none"> 420 ha needed per 30 km² (14% of home range). <p><u>Other stands:</u></p> <ul style="list-style-type: none"> Potential rest trees will also occur in other stand types with a spruce component. Targets for those stands are addressed at the stand level. 	<ul style="list-style-type: none"> Mapping exercises can identify areas with suitable resting habitat and ensure that sufficient area in Primary stands are retained in a 30 km² area at all times. Resting stands should be provided in a well dispersed arrangement where possible. 	<ul style="list-style-type: none"> Tree-based rest sites provide fishers with places to rest while providing protection from predators, thermal cover, and opportunities for prey detection. Rust brooms are used year round, but are used more often when temperatures are moderate (e.g. >-10° C).

¹ A 30-km² area is the size of an average home range for female fishers in the dry forests of British Columbia. Male home ranges typically overlap 1 or more female home range so their needs (all habitat components except rearing/breeding habitat) would be met by the requirements identified for female fishers.

² Declining: appearance code 2; tree live, but unhealthy; internal decay or growth deformities present; often dead leader (DTEIF 1990).

Fisher Habitat Management Decision Table – Dry Forests

Dry Forests – Landscape Level Management Continued

Fisher life history component	Structural attributes required	Primary stand attributes	Minimum targets	Strategies	Why?
Resting habitat: <i>branch-limb sites</i>	<u>Tree characteristics:</u> <ul style="list-style-type: none"> • Branches >12 cm diameter. • Will be captured by rearing habitat structural attributes (above). 	<ul style="list-style-type: none"> • Will be captured by rearing habitat stand attributes (above). 	<ul style="list-style-type: none"> • Will be achieved through rearing habitat targets (above). 	<ul style="list-style-type: none"> • Branch-limb rest sites have similar attributes as breeding structures and stands, so it is likely that overlap with breeding habitat allows these components to be met with the strategies used for rearing habitat. 	<ul style="list-style-type: none"> • Rest sites provide fishers with places to rest while providing protection from predators, thermal cover, and opportunities for prey detection. • Large branches provide fishers with relatively flat areas to rest.
Resting habitat: <i>cavity sites</i>	<u>Tree characteristics:</u> <ul style="list-style-type: none"> • Will be captured by rearing habitat structural attributes (above). 	<ul style="list-style-type: none"> • Will be captured by rearing habitat stand attributes (above). 	<ul style="list-style-type: none"> • Will be achieved through rearing habitat targets (above). 	<ul style="list-style-type: none"> • The tree characteristics, stand attributes, and targets for cavity rest sites are very similar to rearing habitat. This overlap allows these components to be met with strategies used for rearing habitat. 	<ul style="list-style-type: none"> • Rest sites in tree cavities provide fishers with safer and thermally superior rest sites than branches. • Cavity rest sites may also act as reproductive dens. However, females appear to require smaller entrance holes to denning cavities than to resting cavities, likely to provide greater protection for their kits.
Resting habitat: <i>coarse woody debris sites</i>	<u>CWD characteristics:</u> <ul style="list-style-type: none"> • ≥20 cm diameter. • ≥10 m in length. • Decay class 2-3³. • Can be hollow. • Any species acceptable. 	<ul style="list-style-type: none"> • Sx or At >25% of stand. • Stand age ≥100 years. 	<u>Primary stands:</u> <ul style="list-style-type: none"> • 450 ha in 30 km² (15% of home range). <u>Other stands:</u> <ul style="list-style-type: none"> • Potential CWD sites will also occur in other stand types. Targets for those stands are addressed at the stand level. 	<ul style="list-style-type: none"> • Mapping exercises can identify areas with suitable CWD resting habitat and ensure that sufficient area in Primary stands are retained in a 30 km² area at all times. • Future high quality rest sites can also be created in harvested areas by reserving suitable logs and by creating piles of woody debris. 	<ul style="list-style-type: none"> • The long, thin body of a fisher is thermally inefficient due to their high surface area to body weight ratio. Together, CWD and snow provide fishers with thermally efficient rest sites during winter. • Micro habitats that minimize heat loss are important for fishers, especially for areas with cold winter climates such as BC.
Foraging habitat: <i>snowshoe hare</i>	Not applicable	<u>Optimal snowshoe hare stands:</u> <ul style="list-style-type: none"> • Average tree heights ≥3 m. • Tree density: ≥8000 stems/ha optimal. • Cover (trees and shrubs <3 m) 80-100% optimal, 30-80% increasing suitability, and <30% unsuitable for hare. 	<u>Primary stands:</u> <ul style="list-style-type: none"> • 7 ha in 30 km² (0.2% of home range). 	<ul style="list-style-type: none"> • Avoid spacing stands where conifer growth is not stagnating. Where spacing is necessary, retain 25% of the stand in dense patches and strips that provide habitat and facilitate snowshoe hare dispersal. 	<ul style="list-style-type: none"> • Snowshoe hare habitat did not make up a large proportion of fisher home ranges in the Chilcotin. Despite this, hares are important prey for fishers throughout BC that provide a relatively large source of calories per kill.

³ Decay class 2: intact log, hard to partly decaying, elevated but slightly sagging, bark intact or partly missing; Decay class 3: hard large pieces, partly decaying, sagging near ground or broken, traces of bark (DTEIF 1990).

Fisher Habitat Management Decision Table – Dry Forests

Dry Forests – Landscape Level Management Continued

Fisher life history component	Structural attributes required	Primary stand attributes	Minimum targets	Strategies	Why?
Foraging habitat: <i>squirrels</i>	Not applicable	<p><u>Optimal red squirrel stands:</u></p> <ul style="list-style-type: none"> • Tree Canopy Closure >50%. • Coniferous canopy height ≥ 15 m. • Conifer (pine, spruce and Douglas-fir) tree canopy ≥ 50%. • Spruce in Tree Canopy ≥60%. <p><u>Optimal flying squirrel stands:</u></p> <ul style="list-style-type: none"> • Tree Canopy Closure 50-85%. • Coniferous canopy height ≥21 m. • Conifer (pine, spruce and Douglas-fir) tree canopy 30-80%. • Large Deciduous tree density (>35 cm dbh): ≥2 stems/ha. 	<p><u>Primary stands:</u></p> <ul style="list-style-type: none"> • 17.8 km² in 30 km² (59.3% of home range). 	<ul style="list-style-type: none"> • Mapping exercises can identify areas with suitable squirrel habitat and ensure that sufficient area in Primary stands are retained in a 30 km² area at all times. • Harvested areas will not provide suitable squirrel habitat for a considerable time; however, suitable sized WTPs and riparian reserves can provide some habitat after harvesting. 	<ul style="list-style-type: none"> • Squirrel habitat makes up a relatively large component of fisher home ranges in the Dry Forest Region. Their importance in fisher diets is supported by a study in BC that found red squirrels comprising the second highest frequency of occurrence in the stomachs of fisher (after snowshoe hare).
Foraging habitat: <i>ruffed grouse</i>	Not applicable	<p><u>Optimal ruffed grouse stands:</u></p> <ul style="list-style-type: none"> • <i>Looking for new/better model.</i> 	<p><u>Primary stands:</u></p> <ul style="list-style-type: none"> • <i>New targets required.</i> 	<ul style="list-style-type: none"> • Mapping exercises can identify areas with suitable grouse habitat and ensure that sufficient area in Primary stands are retained in a 30 km² area at all times. 	<ul style="list-style-type: none"> • Ruffed grouse is an important prey species for fishers throughout BC.
Movement habitat	<p><u>Tree/CWD characteristics:</u></p> <ul style="list-style-type: none"> • Structural attributes that provide cover or facilitate escape from predators, such as trees, security cover, and complex piles of CWD. 	<p><u>Movement stands</u></p> <ul style="list-style-type: none"> • No empirical data currently available, but movement habitat is likely suitable if total cover (combination of tree and shrub cover) is >20% based on observations of fisher habitat-use patterns. • "High-quality" movement stands are believed to be stands with total cover ≥50% (30% shrub and 20% tree cover). 	<p><u>Primary stands:</u></p> <ul style="list-style-type: none"> • 16.3 km² in 30 km² (54.5% of home range with total cover >20%). <p><u>Other stands:</u></p> <ul style="list-style-type: none"> • Movement habitat should also be supplied in harvested areas using reserves, non-merchantable patches, and coarse woody debris. 	<ul style="list-style-type: none"> • Movement habitat can be overlapped effectively with riparian reserves to form linear arrangements of habitat that facilitate dispersal. • Linear arrays of non-merchantable timber within cut blocks can be used by fisher to cross openings. • Piles of CWD spaced appropriately can provide escape habitat in harvested areas and can be used with other retention to help fishers cross openings. • Design blocks to limit the "dash distance" fishers have to travel without forested cover or other escape habitat. 	<ul style="list-style-type: none"> • Movement habitat is needed so fishers can safely travel between important habitats within their home range, and to access new areas when dispersing.

Fisher Habitat Management Decision Table – Dry Forests

Stand Level Management: practices that should be conducted at the cutblock level to retain fisher habitat. *Primary stand attributes* are identifiable stand features that describe stands which likely contain the important habitat features required by fishers. *Minimum targets* provide minimum estimates of the area of habitat and number of individual features an average female fisher is thought to require. Primary stands will contain most of the structures used by fisher in its home range, but a lower density of structures is also required in other stands. *Strategies* provide ideas for implementing the targets to address fisher habitat needs. Note that the most effective strategy for retaining life history components will be to avoid logging high quality structures, patches, and stands. Finally, the table describes *why* these attributes are required for fisher. It is also important to note that multiple fisher life history components may be met by the same tree, patch, or stand.

Dry Forests (*SBPSxc, SBPSmc, SBPSdc, SBPSmk, IDFdk, IDFmw, IDFDw, IDFww, MSxc, MSxk, MSdv, MSdm, MSdk, MSdc*)

Fisher life history component	Structural attributes required	Primary stand attributes	Minimum targets	Strategies	Why?
Rearing or breeding habitat	<p><u>Tree characteristics:</u></p> <ul style="list-style-type: none"> Trembling aspen (At) ≥44 cm dbh, declining⁴ with ≥15% tree and shrub cover immediately surrounding. Lodgepole pine (Pl) ≥35 cm dbh, declining with ≥5% tree and shrub cover immediately surrounding. Douglas-fir (Fd) ≥65 cm dbh, declining with ≥15% tree and shrub cover immediately surrounding The most valuable trees for present use by fisher have cavities with entrance holes (>1.5m from ground) that have typical dimensions of 5–10 cm wide by 7–15 cm tall. Larger trees (>30 cm dbh) of the above species with multiple infection points for the recruitment of future den trees. 	<p><u>Aspen (At) den stands:</u></p> <ul style="list-style-type: none"> At or Act leading or secondary species Stand age ≥135 years. <p><u>Douglas-fir (Fd) den stands:</u></p> <ul style="list-style-type: none"> Fd leading, secondary, or tertiary species Crown closure ≥20%. QMD ≥34.3 cm Stand age ≥207 years. 	<p><u>Number of suitable trees:</u></p> <ul style="list-style-type: none"> Total of 500 trees per 30 km²: <ul style="list-style-type: none"> 200 (0.5 trees/ha) in Primary stands. 300 (0.03 trees/ha) in other stands. 	<ul style="list-style-type: none"> Retain trees with required structural attributes in or adjacent to harvested areas. Where possible, protect suitable trees in wind-firm retention areas, or maintain advanced regen/brush around the trees to provide concealment cover (≥45% total cover [tree and shrub combined]). Stands not defined as high quality will also have scattered trees or small patches of trees with the required structural attributes. Isolated large live pine that meet the structural attributes required should be retained where found. Trained field crews can identify these trees for retention. 	<ul style="list-style-type: none"> Fishers require den cavities for birthing and raising their young. In the dry forests, den cavities have been found in a range tree species. Den trees must be relatively large diameter, contain heart-rot cavities, and have structurally sound sapwood. Female fishers often use more than one den tree in a single year. Given this, fishers need multiple suitable trees for the present and will also require new den trees to develop for the future when existing trees fall. No Primary stand attributes are provided for lodgepole pine den stands as the impacts of MPB are expected to have removed most old pine stands. However, suitable live pine is likely to exist as Individual trees or in small patches.
Resting habitat: <i>rust brooms</i>	<p><u>Tree characteristics:</u></p> <ul style="list-style-type: none"> Sx ≥27 cm dbh with rust brooms. Rust brooms should be >40cm diameter to provide a platform for fisher. 	<p><u>Spruce (Sx) rest stands:</u></p> <ul style="list-style-type: none"> Sx leading, secondary, or tertiary species. Crown closure ≥40%. QMD ≥20.1 cm. Stand age ≥83 years. 	<p><u>Number of suitable trees:</u></p> <ul style="list-style-type: none"> 3130 trees per 30 km²: <ul style="list-style-type: none"> 2350 (5.6 trees/ha) in Primary stands. 780 (0.08 trees/ha) in other stands. 	<ul style="list-style-type: none"> Where possible, protect the trees in windfirm wildlife tree patches with crown closure ≥40 % for Sw and ≥35% for Sb. 	<ul style="list-style-type: none"> Rest sites provide fishers with protection from predators, thermal cover, and opportunities for prey detection. Tree-based sites are used year round, but are used more often when temperatures are moderate (e.g. >-10° C).

⁴ Declining: appearance code 2; tree live, but unhealthy; internal decay or growth deformities present; often dead leader (DTEIF 1990).

Fisher Habitat Management Decision Table – Dry Forests

Dry Forests – Stand Level Management Continued

Fisher life history component	Structural attributes required	Primary stand attributes	Minimum targets	Strategies	Why?
Resting habitat: <i>cavity sites and branch-limb sites</i>	<u>Tree characteristics:</u> <ul style="list-style-type: none"> • Branches >12 cm diameter. • Will be captured by rearing habitat structural attributes (above). 	<ul style="list-style-type: none"> • Will be captured by rearing habitat stand attributes (above). 	<ul style="list-style-type: none"> • Will be achieved through rearing habitat targets (above). 	<ul style="list-style-type: none"> • The tree characteristics, stand attributes, and targets for cavity and branch-limb rest sites are very similar to rearing habitat. This overlap allows these components to be met with strategies used for rearing habitat. 	<ul style="list-style-type: none"> • Rest sites in tree cavities provide fishers with safer and thermally superior rest sites than branches. • Cavity rest sites may also act as reproductive dens. However, females appear to require smaller entrance holes to denning cavities than to resting cavities, likely to provide greater protection for their kits. • Fishers have been observed resting on branches in large Douglas-fir and mistletoe brooms in pine.
Resting habitat: <i>coarse woody debris sites</i>	<u>CWD characteristics:</u> <ul style="list-style-type: none"> • ≥20 cm diameter. • ≥10 m in length. • Decay class 2-3⁵. • Can be hollow. • Any species acceptable. 	<ul style="list-style-type: none"> • Sx or At >25% of stand. • Stand age ≥100 years. 	<u>Number of suitable logs:</u> <ul style="list-style-type: none"> • 7580 per 30 km²: <ul style="list-style-type: none"> - 4550 (10 logs/ha) in Primary stands. - 3030 (0.5 logs/ha) in other stands. 	<ul style="list-style-type: none"> • Protect stands and patches where Sx or At form >25% of stand and are >100 years old. • Protect natural accumulations of CWD using machine free zones, or create piles of CWD using machinery. • Man-made piles should be generally > 20 m³. 	<ul style="list-style-type: none"> • Together, CWD and snow provide fishers with thermally efficient rest sites during winter. The long, thin body of a fisher is thermally inefficient due to their high surface area to body weight ratio. • Micro habitats that minimize heat loss are important for fishers, especially for areas with cold winter climates such as BC.
Foraging habitat: Ruffed grouse and small rodents	Not applicable	<u>Optimal ruffed grouse stands:</u> <ul style="list-style-type: none"> • Looking for new/better model. <u>Optimal small rodent stands:</u> <ul style="list-style-type: none"> • Contains abundant patches with increased cover in CWD, shrubs, and regen. 	<u>Ruffed grouse Primary stands:</u> <ul style="list-style-type: none"> • Looking for new/better model. <u>Small rodents Primary stands:</u> <ul style="list-style-type: none"> • Targets will depend on structural/floristic attributes of the proposed cut block and harvesting constraints. 	<ul style="list-style-type: none"> • Grouse: concentrate WTPs on habitats that meet optimal structural attributes. Promote the development of deciduous overstory. • Small rodents: protect areas of advanced regeneration and natural CWD characteristics using machine free zones; retain individual pieces of CWD in various sizes (length and diameter) on block; and create complex piles of CWD. 	<ul style="list-style-type: none"> • Fisher require catchable prey to survive and will target different prey species in different habitats, although, the habitats of some prey will overlap.

⁵ Decay class 2: intact log, hard to partly decaying, elevated but slightly sagging, bark intact or partly missing; Decay class 3: hard large pieces, partly decaying, sagging near ground or broken, traces of bark (DTEIF 1990).

Fisher Habitat Management Decision Table – Dry Forests

Dry Forests – Stand Level Management Continued

Area	Minimum structural attributes	Primary stand attributes	Targets	Strategies	Why?
<p>Foraging habitat:</p> <p><i>snowshoe hare and squirrels</i></p>	<p>Not applicable</p>	<p><u>Optimal snowshoe hare stands:</u></p> <ul style="list-style-type: none"> • Average tree heights ≥3 m. • Tree density: ≥8000 stems/ha. • Cover (trees and shrubs <3 m) 80-100% optimal, 30-80% increasing suitability, and <30% unsuitable for hare. <p><u>Optimal red squirrel stands:</u></p> <ul style="list-style-type: none"> • Tree Canopy Closure >50%. • Coniferous canopy height ≥ 15m. • Conifer (pine, spruce and Subalpine-fir) tree canopy ≥ 50%. • Spruce in Tree Canopy ≥60%. <p><u>Optimal flying squirrel stands:</u></p> <ul style="list-style-type: none"> • Tree Canopy Closure 50-85%. • Coniferous canopy height ≥21 m. • Conifer (pine, spruce and Douglas-fir) tree canopy 30-80%. • Large Deciduous tree density (>35 cm dbh): ≥2stems/ha. 	<ul style="list-style-type: none"> • Targets for the different habitats will depend on structural/floristic attributes of the proposed cut block and harvesting constraints. Greater amounts of prey habitat are more likely to support viable prey populations. • During spacing, reserve 25% of the area in non-spaced patches or linear arrays. 	<ul style="list-style-type: none"> • Assess the attributes of each block and target the optimal habitats for each prey species, where present, for management. • <u>Snowshoe hare:</u> Protect natural patches of high density regen, plant patches at higher densities, reserve areas from spacing activities. • <u>Squirrels:</u> concentrate WTPs on patches of forest meeting the optimal structural attributes. Home range size varies with habitat quality, but larger WTPs (>1.5 ha) are more likely to be suitable. Connecting WTPs with adjacent mature timber will also increase habitat quality for squirrels. Squirrel middens are usually located on mesic or wetter sites that can be targeted for WTPs. 	<ul style="list-style-type: none"> • Fisher require catchable prey to survive and will target different prey species in different habitats, although, the habitats of some prey will overlap.
<p>Movement habitat</p>	<p><u>Tree/CWD characteristics:</u></p> <ul style="list-style-type: none"> • Structural attributes that facilitate escape from predators, such as trees/shrubs (>20% cover) and complex piles of CWD. 	<p><u>Movement stands</u></p> <ul style="list-style-type: none"> • No empirical data currently available but, based on fisher habitat-use patterns, movement habitat is likely suitable if total cover (combination of tree and shrub cover) is >20%. • "High-quality" movement stands are believed to be stands with total cover ≥50% (30% shrub and 20% tree cover). 	<ul style="list-style-type: none"> • Assess the block and make the best use of retention areas, regen patches, single tree retention, and CWD piles to provide movement habitat across large open areas. Continuous cover is best, but if it is not possible, try to keep "dash distances <100m. • Travel corridors will benefit both prey and fishers and will generally overlap with riparian management areas and wildlife tree patches. Avoid leaving large areas without some kind of connective cover. 	<ul style="list-style-type: none"> • Use riparian reserve zones to provide movement habitat. • Protect non-merchantable trees and shrubs in gullies crossing cut blocks. • Combine non-merchantable protection, WTPs, single trees and CWD piles to provide linear travel habitats with "dash distances of <100m. 	<ul style="list-style-type: none"> • Movement habitat is needed so fishers can safely travel between important habitats within their home range, and to access new areas when dispersing.