

Retaining Wildlife Habitat Elements



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Beneficial Management Practices and Operational Considerations

This document is a compendium of guidance for retaining wildlife habitat elements such as snags, stumps, down woody debris, den trees and nest trees during forest harvesting. Criteria, strategies, and practices are described based on current direction, guidelines, and available scientific information. These Beneficial Management Practices (BMPs) are part of a program to meet SFI requirements by incorporating data collected, biodiversity and ecosystem research results and field applications into BC Timber Sales' (BCTS) forest management decisions. These BMPs will be reviewed and updated as needed to reflect changes to guidance based on the best available information and research results.

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1.0 Introduction

Wildlife Tree Retention (WTR) in BC forestry takes as many forms as there are tree species, plant communities and age classes encountered during harvest planning and development. Retaining wildlife habitat elements, such as snags, stumps, down woody debris, den trees and nest trees, at the stand level is usually accomplished through Wildlife Tree Retention Areas (WTRA). For the purpose of these recommended beneficial management practices, a Wildlife Tree Retention Area (WTRA) is as defined in the *Forest Planning and Practices Regulation* (BC FRPA 2023):

wildlife tree retention area means an area occupied by wildlife trees that is located

- (a) in a cutblock,
- (b) in an area that is contiguous to a cutblock, or
- (c) in an area that is sufficiently close to the cutblock that the wildlife trees could directly impact on, or be directly impacted by, a forest practice carried out in the cutblock;

And,

wildlife trees means a tree or group of trees that

- (a) provide wildlife habitat, and
- (b) assist in the conservation of stand level biodiversity;

This document summarizes the main points to review and consider when developing WTRAs in the forest harvest planning cycle. The essential reading that follows are the most current guidance; other important links are found in following sections, and in the sources list at the end.

Essential Reading

[FRPA Forest Planning and Practices Regulation \(s. 12.5, 66, 67, 68, 91\)](#).

[FRPA General Bulletin #8 Wildlife Tree Retention: Guidance for District and Licensee Staff](#) (Dec. 2011).

[FRPA General Bulletin #15 Managing and Tracking Wildlife Tree Retention Areas under the 'Forest and Range Practices Act'](#) (March 15, 2023).

[Wildlife Tree Retention: Management Guidance](#) (May 16, 2006).

2.0 Wildlife Tree Retention Area Requirement

Unless alternate requirements are approved in a Forest Stewardship Plan (FSP), the default WTR requirement under FRPA (i.e., [FPPR s. 66, 67, and 68](#)) are:

- a minimum of 7% of the total area under prescription (TAUP) of all cutblocks harvested within a one-year period.
- the minimum amount of WTRA that relates to each cutblock is 3.5% of the TAUP of the cutblock.
- managed by the agreement holder (TSL licensee).

WTRAs may relate to more than one cutblock, provided all the cutblocks related to the retention area collectively meet the 7% and 3.5% requirements. Further, an FSP result or strategy (R/S) may specify the TSM is responsible for WTRA management, effectively retaining WTRA management considerations with the Crown.

Unless an approved FSP states otherwise, the objective for wildlife and biodiversity at the stand level is to retain wildlife trees (FRPA Bulletin #15). WTR should be established within and/or adjacent to every cutblock. Review the applicable FSP to confirm the approved result/strategy that applies to your block. Flexibility in cutblock retention levels should be based on sound ecological principles. The following are

examples of reasons for varying the percentage of WTR on a cutblock (areas of lower retention need to be balanced by areas of higher retention on cutblocks where biodiversity is a higher priority):

- A lower percentage of retention on cutblocks adjacent to protected areas, or in areas that are highly inoperable or otherwise constrained;
- A lower level of retention on cutblocks with few ecological attributes;
- A higher percentage of retention in cutblocks with unusually diverse or high-value ecological attributes;
- A higher percentage of retention where multiple objectives must be met; and
- A higher percentage of retention for cutblocks >100 ha in size, with a gradual increase beyond that size.

3.0 Basic Retention Strategies

Different retention strategies will be required for different sites. Landscape management objectives, FSPs and Forest Landscape Plans (FLPs), wildlife needs, stand type and condition, tree species, and windthrow hazard, create unique situations. When planning for WTR, consider the following:

- Use a diversity of retention strategies across sites and landscapes;
- More and larger patches are usually preferable to single tree retention;
- Overlap harvest constraints as much as possible when objectives allow (e.g., OGMA, WHA, UWR, riparian zones, wet areas, cultural features, sensitive terrain or soils, recreation features, visuals);
- Consult and use monitoring and evaluation standards to design prescriptions (e.g., FREP);
- Connectivity and landscape position;
- Complexity in the spatial distribution of structures as well as the variety of individual structures (more is usually better);
- Forest health objectives and recommendations; and,
- Ensure WTR is representative of the harvested forest (i.e., same species composition, age, and volume).

Where possible WTRAs should be anchored around important wildlife habitat elements and biological legacies that have relatively high ecological value. By retaining such structural elements at the time of harvest, some habitat values can be maintained, and connectivity can be conserved across the landscape. For these areas, consider leaving higher percent retention. Some examples of ecological anchors include:

- At Risk Ecological Communities ([BCTS At Risk Ecological Communities](#));
- Old growth (particularly when spatially defined);
- Trees that may be at the edge of their typical range;
- Large witches broom;
- Wildlife trees, larger or with evidence of use is usually better;
- Animal dens, nests, and nesting areas;
- Bat hibernacula;
- Wildlife mineral licks, wallows, trails, and resting sites;
- Species at risk occurrences; and,
- Critical habitat for Species at Risk, Identified Wildlife, or Species of Management Concern (SOMC).

If there are no such attributes either the largest trees or trees that are representative of the pre-harvest stand should be kept. In general, trees that show signs of developing wildlife tree attributes or trees with large branches are good candidates as the anchor for a WTRA.

4.0 Retention Scale and Distribution

Planning at multiple spatial scales can conserve and manage habitat for a range of species. Be aware of the landscape level targets and minimum legal requirements that apply to the subject stand (refer to the FSP or FLP in effect). The focus of this BMP is on stand level considerations but a short section on landscape level considerations is included.

Landscape Level Considerations

At the landscape level, consider overall connectivity, distribution of retention strategies, patch sizes, co-location of values, and the inclusion of regionally important ecological anchors.

In some cases, retention can be prioritized for wide ranging species which are more likely to benefit from landscape level WTR objectives. At the landscape level, lower long term retention levels present a higher risk to meeting ecological objectives. There will be retention targets designated by landscape unit, and landscape level objectives can be provided to operations and lay out crews by planning teams. These can include strategies designed for:

- Caribou (Matrix, Core habitats);
- UWR (Elk, Moose, Deer, Goats);
- OGMAs (e.g., size and distribution, connectivity, minimum age characteristics) (some are both landscape level and block level required values); and,
- Furbearing animals (e.g., Wolverine, Fisher, Marten, Badger).

Stand Level Considerations

At the stand (or site) level, consider different retention opportunities possible with the proposed cutblocks. When assessing the biodiversity attributes before harvest to identify the best retention options it is important to consider existing areas with high-value wildlife trees or biodiversity and areas that show operational constraints as well as high-value wildlife trees. Considering these two factors will decrease the impact on the timber supply.

Identify and retain site-specific habitat elements that are encountered and fit with planning objectives. Prioritize retention of uncommon tree species and stand structures as they are important to biodiversity. In some cases, retention can be prioritized for species that require site specific or point habitat elements and are more likely to benefit from cutblock level WTR objectives. At the stand level, well distributed retention of basal area may be sufficient to retain features for biological legacies. These can include strategies designed for:

- OGMAs (e.g., minimum age, species, presence of old growth attributes) (some are both landscape level and block level required values);
- WHAs;
- Nesting birds (Goshawks, Woodpeckers, Herons, etc.); and,
- Denning animals (e.g., bears, furbearers, bats, rodents).

Patch Retention

Patch or group retention are situations where an area of intact forest is left untouched; patches can be fully within a block, adjacent to it, or fully outside. Patch retention:

- Is measured by area;
- Is described and defined (preferably as representative of what was cut);
- Is situated around ecological anchors;
- Considers overlapping constraints; and,
- Larger patches (>2 ha) are better than smaller.

Dispersed Retention

Dispersed retention can be individual trees or unmapped groups of trees and can be achieved through a silvicultural system that retains target trees while harvesting. Dispersed retention:

- Can provide structural diversity, wildlife needs and coarse woody debris within the cutblock;
- Can be measured in stem characteristics (e.g., stems/ha, preferred species, age class, diameter);
- Can be measured by area (calculations are applied to determine % retention values);
- Is described and defined (preferably as representative of what was cut); and,
- Is a wildlife tree or is close to an ecological anchor.

Coarse Woody Debris

WTRAs provide a long-term supply of Coarse Woody Debris (CWD) to maintain ecological functions driven by the input of dead wood. In addition, retaining the amount and type of dead wood on the ground to mimic levels post-disturbance, prior to harvest, or in similar mature ecosystems is recommended. Strategies for the retention of CWD include the following:

- Licensees are required to leave some CWD ([BC FRPA 2023. Sec. 68](#));
- Larger pieces (e.g. >20 cm in diameter and >10 m in length) last longer and provide different ecosystem functions than smaller pieces;
- Leave a full range of CWD decay and diameter classes;
- Overlapping logs raised off the ground can be left without dispersing them;
- Plan for CWD recruitment using stand retention;
- Vary CWD retention among sites and across landscapes;
- Disperse slash rather than piling where possible considering fire hazard, and plantability and localized wildlife management objectives (e.g. fisher); and,
- If fire hazard rating is high, lower CWD retention.

In general logs left on site for CWD will come from the unmerchantable component. The waste benchmarks as described in the [Provincial Logging Residue and Waste Measurement Procedures Manual](#) allow for a set volume of merchantable sawlogs to be left on a harvested cutblock without payment of a waste assessment.

Additional background: ([Chief Forester's Guidance on Coarse Woody Debris May 2010](#)).

5.0 Salvage Retention

In guidance from the Chief Forester's Office (FLNRORD, 2018), when planning retention during salvage logging, there are six points of overarching guidance, in order of priority:

1. Ensure human safety and minimize damage to existing infrastructure;

2. Sustain, restore, or enhance the capacity of ecosystems to provide ecosystem values, such as those related to water quality and wildlife habitat;
3. Consider the collective disturbances on the landscape to mitigate cumulative impacts on environmental and societal values;
4. Facilitate the adaptation of forests to improve resilience to climate change;
5. Minimize impacts to timber supply by shifting logging from un-damaged stands to damaged stands wherever possible; and,
6. Recover value from the burnt timber before the wood quality deteriorates.

Wherever possible and safe, forest structure retained in salvage harvested areas should focus on (Klenner, 2023):

- Large veteran trees (live or dead);
- Green trees or live regeneration conifer and broadleaf green trees such as Aspen, Cottonwood, or birch, from regeneration to mature or declining stems;
- Patches of burned mature stems;
- Large, downed wood, especially material unsuitable for commodity products scattered across the block or in small “cull” piles within the block, etc.; and,
- Unburned understory shrub vegetation may represent key areas of winter browse for ungulates for several years after a high-severity fire. Keep mechanical disturbance to a minimum on any sites with understory vegetation.

Additional background: [Post-Natural Disturbance Forest Retention Guidance 2017 Wildfires](#) (FLNRORD, 2018).

6.0 Windthrow

How blocks are laid out affects windthrow. Narrower (<20m) internal retention strips experience more damage, as do small retention patches and dispersed trees. The potential for retained trees to be downed by windthrow should be assessed before designing the retention. Some key considerations include:

- Southern-exposed boundary orientations experience much more damage;
- Windward facing edges have increased damage;
- Openings with larger fetch (open horizontal distance) have increased damage;
- Openings on ridge crests or upper slopes have increased damage;
- The more open, the greater the treatment hazard;
- Boundary projections that are exposed to several wind directions have greater damage; and,
- Strips or patches that are one tree-length or less in width can be susceptible to windthrow.

A good practice is to include an FSP R/S to allow for conducting windfirming treatments on trees within a WTRA.

Additional background: BCTS Windthrow Manual (2010).

7.0 Tracking

One important intent of WTRAs is that they will remain unharvested until other trees in the associated cutblock have developed mature seral attributes. If the WTRA is shown as within the Timber Sale License (TSL) it could be moved at the licensee’s discretion. If the WTRA location is critical to ensure protection

of an ecological anchor or other feature, then the WTRA should be removed from the mapped exhibit A area on the TSL.

Forest Stewardship Plans

BCTS Business Areas determine the percentages of WTRAs left on each cutblock, the sum of all retention areas or the harvested area and the ecological attributes, and report into RESULTS. Once a WTRA is reported it is no longer BCTS' responsibility, it becomes the responsibility of the local District Manager. The reported WTRA is tied to the original opening for an entire rotation unless it is harvested, and suitable replacement is found. Tracking the life cycle is important to determine the time at which the reported WTRA and its associated amendments (which occurred during the life cycle of the WTRA) are available for harvest without obligation to replace or maintain the original WTRA. The FSP should state the intention and requirements for establishing and amending reported WTRA. Once an area is reported it must be maintained even if it is greater than what is required; any area removed from a reported WTRA must be replaced.

A TSL holder may move a WTRA if they choose to change the plan provided with their licence and if there is not an applicable FSP R/S that prohibits that move. If a WTRA is being utilized to manage habitat for SOMC/AREC or to protect an area of cultural significance (including an archaeological feature) then steps must be taken to ensure the location cannot be changed by the TSL holder. The FSP may have R/S designed to address this need, however if the FSP does not include extra protections to ensure the WTRA cannot be relocated then the WTRA should be excluded from the Exhibit A area and some form of reserve established within the TSL. R/S from an approved FSP, professional recommendations or other mitigating practices from a BMP may be appropriate to describe in the TSL Highlights and/or Site Plan.

Moving WTRA locations may have implications on the appraisal of the harvest authority. WTRAs are excluded from timber cruising. If a WTRA is moved to facilitate harvesting the original WTRA footprint, a reappraisal may be triggered.

Additional background: FRPA Bulletin #15 [Managing and Tracking Wildlife Tree Retention Areas under the 'Forest and Range Practices Act'](#).

RESULTS

As per FPPR ([s 86](#)), BCTS submits an annual report through RESULTS. This system recognizes two types of tree retention. Short-term retention trees are referred to as "residuals" or "retention" or other terminology that conveys standing trees to be retained for only a portion of a current rotational planning cycle; long-term retention trees are referred to as "reserves" and are retained for at least a full harvest cycle. The RESULTS submission generally occurs after logging has been completed; any notations may not be seen until after the WTRA has been harvested. For this reason, it is recommended that WTRAs be excluded from the Exhibit A area to ensure licensees cannot relocate the reserve.

Wildlife Tree Retention Areas can be tracked in RESULTS, choosing one of these reserve types per polygon:

- D - Dispersed
- G - Grouped
- C - Carbon offset
- N - No reserve

There are more choices for reserve objectives:

- BIO – Biodiversity
- BOT – Botanical Forest Products
- CAR – Carbon Offset
- CHR – Cultural Heritage Resource
- CWD – Coarse Woody Debris
- FH – Forest Health
- FUE – Fuel Management
- MSM – MSMA Treated Area
- OTH – Other
- REC – Recreation
- RMA – Riparian Management Area
- SEN – Sensitive Site
- TER – Terrain Stability
- TIM – Timber Management
- VIS – Visual
- WTR – Wildlife Tree Retention Goals

Additional background: [Submitting Forest Cover to Results For Openings With Treed Retention](#) (BC FLNRO, 2016).

Forest and Range Evaluation Program

The Forest and Range Evaluation Program (FREP) has been monitoring stand level retention (SLR) for over 20 years, comparing random samples of retention to objectives and strategies in FSPs and default FRPA requirements. Planners and operations staff should be familiar with the SLR Protocol, which has useful information for all phases of retention planning and implementation. [Forest and Range Evaluation Program biodiversity monitoring - Province of British Columbia \(gov.bc.ca\)](#)

FREP assessments consider the landscape context (in terms of retention amount, patch sizes, connectivity, and micro-environments), retention practices (retention tree size and condition, habitat value, and wind firmness), and CWD (amount, dispersion, size, and condition). Field sampling is for cutblocks > 2ha and 1-3 years post-harvest. The program is a warehouse of data on WTR and numerous related metrics.

8.0 Danger Trees

An overarching concern is to ensure human safety and minimize damage to existing infrastructure. When trees are left consider the site characteristics and condition of the trees, and proximity to human use and activities. Prescriptions or layout must not compromise worker safety. An assessment may be required, and work exclusion zones may be needed to address safety hazards that may be present.

Danger trees are more likely to occur in the following situations:

- Timber type changes, especially along new block edges;
- Low lying wet areas versus steep dry sites;
- Clear cut areas versus tree retention areas;
- Deciduous versus coniferous forest types;
- Fire damage to tree roots and stability; and,
- Pockets of root disease, especially in retention harvesting.

If one or more of these indicators occur, an assessment by a certified professional may be required, and work exclusion zones may be needed to address safety hazards that may be present. Note that Occupational Health and Safety Regulation section 26.11 does not provide legal harvest authority to fall danger trees. If a tree is identified as dangerous and it has been assessed that it must be felled (a no-work zone cannot address), then a separate authority under the *Forest Act* must be granted by the District Manager.

List of Acronyms

BMP	Best Management Practices
FA	Forest Act
FREP	Forest and Range Evaluation Program
FRPA	Forest and Range Practices Act
FPPR	Forest Planning and Practices Regulation
FLP	Forest Landscape Plan
FOR	B.C. Ministry of Forests
FSP	Forest Stewardship Plan
OGMA	Old Growth Management Areas
RESULTS	Reporting Silviculture Updates and Land Status Tracking System
SDM	Statutory Decision Maker
SOMC	Species of Management Concern
TAUP	Total Area Under Prescription
TSL	Timber Sale License
UWR	Ungulate Winter Range
WHA	Wildlife Habitat Areas
WTP	Wildlife Tree Patch
WTR	Wildlife Tree Retention
WTRA	Wildlife Tree Retention Area

Definitions

The following definitions were taken from the various reference materials, and the [Forest Practices Board Glossary](#) (October 11, 2023).

Coarse Woody Debris: dead woody material, in various stages of decomposition, located above the soil, larger than 7.5 cm in diameter (or equivalent cross-section) which is not self-supporting. Trees and stumps are not CWD.

Cutblock: a specific area of land with defined boundaries, authorized for harvest.

Danger Tree: a dangerous tree is defined by the Occupational Health and Safety Regulations (section 26.1) to mean a tree that is a hazard to a worker due to:

- (a) its location or lean,
- (b) its physical damage,
- (c) overhead conditions,
- (d) deterioration of its limbs, stem or root system, or
- (e) any combination of the conditions in (a) to (d) above.

Exhibit A Area: the Exhibit A map of a TSL must clearly describe the cutting authority area and must facilitate the boundary to be readily established on the ground.

Reserves: long term residuals retained for an entire rotational planning cycle; reserves are understood to be not available for harvesting until the next rotational cycle for the stand.

Retention: standing trees to be retained (whether they are eventually harvested in another harvest entry or not) for a portion of a current rotational planning cycle; also referred to as "**residuals**" or other terminology that conveys standing trees.

Contiguous Patch Retention: a patch that shares a boundary with a cutblock.

Dispersed Retention: individual trees or small groups of trees that are not spatially located on maps.

External Patch Retention: a patch that is retained entirely outside a cutblock.

Internal Patch Retention: a patch that is retained entirely within a cutblock.

Patch (or Group) Retention: a group of spatially located untouched trees retained for the rotation, until the associated cutblock has matured.

Single Tree Retention: dispersed retention in single trees, usually designated by species.

Wildlife Habitat Feature: a wildlife habitat feature identified under the Government Actions Regulation;

Wildlife Trees: a tree or group of trees that

- a) provide wildlife habitat, and
- b) assist in the conservation of stand level biodiversity;

Wildlife Tree Retention Area: an area occupied by wildlife trees that is located

- c) in a cutblock,
- d) in an area that is contiguous to a cutblock, or
- e) in an area that is sufficiently close to the cutblock that the wildlife trees could directly impact on, or be directly impacted by, a forest practice carried out in the cutblock;

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