



Wildlife Tree Management in British Columbia

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An initiative of the
Wildlife Tree Committee of British Columbia



Workers'
Compensation
Board



Silviculture Branch
Ministry of Forests

Canada

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PREFACE

The Wildlife Tree Committee (WTC) was formed in 1985. The Committee draws most of its membership from the provincial Ministry of Forests (MOF), the Ministry of Environment, Lands and Parks (MOELP), and the Workers' Compensation Board (WCB). Representatives from the Canadian Wildlife Service (CWS), the forest industry, and public conservation organizations also participate.

This document is a result of the Wildlife Tree Committee's concern with the ongoing loss of wildlife tree habitat throughout British Columbia. It is aimed at a wide-ranging technical audience that includes government resource managers, forest industry employees, and other individuals such as woodlot operators, who are involved in forest management activities.

Wildlife Tree Management in British Columbia presents a brief overview of the biology of wildlife trees, looks at the challenge of integrating wildlife tree management into forestry operations, addresses the issue of worker safety (including details about the new *Wildlife/Danger Tree Assessor's Course*), and introduces some of the latest wildlife tree research projects and educational initiatives.

ACKNOWLEDGEMENTS

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INTRODUCTION

A Wildlife Tree Is . . .

. . . a tree that provides present or future critical habitat for the maintenance or enhancement of wildlife.

Assessment of a wildlife tree as critical habitat may be determined by one or more physical attributes such as structure, species, condition, age, abundance, location, and surrounding habitat features.

Wildlife trees occur naturally in all types of forest ecosystems, but current forest management practices in British Columbia are resulting in a significant decline in the number of wildlife trees throughout the province. The next three sections explain some of the reasons why wildlife tree management is a necessary and worthwhile endeavour. The remainder of this report describes how wildlife tree management is being implemented in British Columbia.

Home Sweet Home—and More

Wildlife trees provide many kinds of critical habitat, including nest cavities and platforms, nurseries, dens, roosts, hunting perches, foraging sites, and display stations.



Martens often raise their young in tree cavity dens.

Birds, mammals, and amphibians all make use of wildlife trees. In British Columbia, more than 90 species (about 16% of our native wildlife) can be counted as wildlife tree users. Some are highly dependent on this specialized habitat and cannot exist without it.

A number of wildlife-tree-dependent species appear on the provincial Red list of endangered animals and the Blue list of sensitive or vulnerable species (see p. 23).

*Wildlife tree management is an essential part
of safeguarding British Columbia's
biological diversity.*

Life and Death and Life: the Cycle of Nature



Wildlife trees provide perches and nest sites for Tree Swallows.

Dead and dying trees make an important contribution to the health of forest ecosystems.

Wildlife trees provide important habitat for a variety of insects that thrive on both live and dead trees. These insects are a valuable food source for many species of wildlife. For example, woodpeckers use their powerful bills to probe deep inside tree trunks in search of food. Chickadees, nuthatches, and creepers capture their prey on the surface of bark and leaves. Flycatchers, swallows, bluebirds, and bats feed on winged insects in flight.

Wildlife trees also provide nest cavities and hunting perches for owls, kestrels, and hawks. These birds prey heavily on small mammals that eat tree seeds and damage seedlings.

When wildlife trees are removed from forests, insectivores and birds of prey lose their nesting and feeding sites. We, in turn, lose efficient natural predators that help control forest pests and maintain a balance in the ecosystem.

Wildlife tree management contributes to healthy forest ecosystems.

WARNING! Felling That Tree May Be Illegal

Under Section 35 of the *British Columbia Wildlife Act*

"A person who ... possesses, takes, injures, molests or destroys

- (a) a bird or its egg,*
- (b) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl, or*
- (c) the nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg*

commits an offense."

This means that a wildlife tree containing an active nest of any bird, or a nest of the specific species listed above, even outside the breeding season, may not be felled.

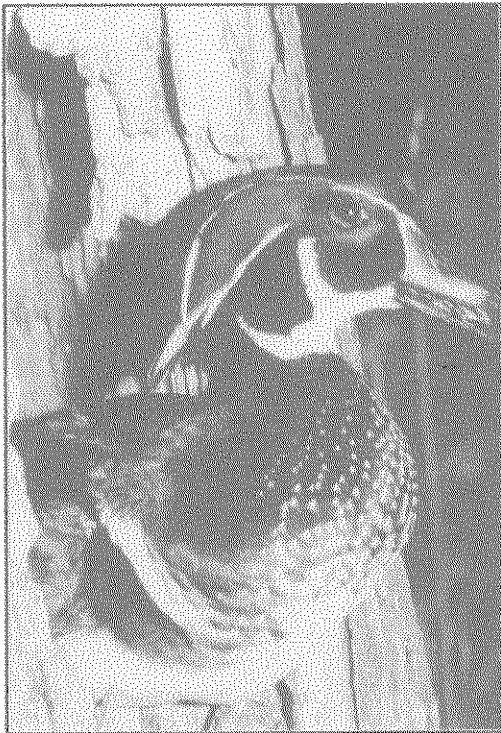
Wildlife tree management includes legal protection of certain critical habitat trees.

CLASSIFYING WILDLIFE TREES

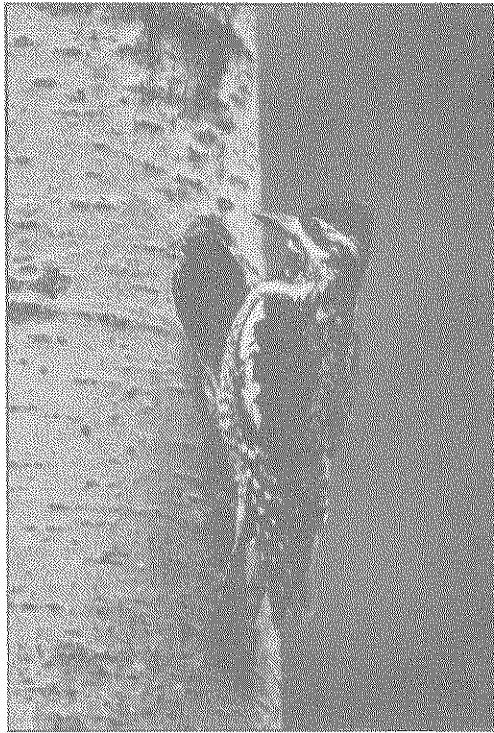
It Takes All Kinds

There are many different kinds of wildlife trees. Each wildlife tree is created by a unique combination of factors including the species of the tree; whether the tree is alive or not (if not, the cause of death and time since death); site factors, such as surrounding vegetation, elevation, and exposure; and local climatic conditions.

Just as different people choose to live in different types of houses, various animal species favour different kinds of wildlife trees.



Wood Ducks nest in abandoned woodpecker holes or natural cavities in older dead trees that have softened with age.



Red-naped Sapsuckers excavate nest holes in the hard wood of live and recently dead wildlife trees.

One factor that greatly influences the use of wildlife trees by cavity dwellers is size. In general, the preferred trees are taller (to offer protection from ground predators), and larger in diameter (to allow room for spacious, thick-walled cavities). Cavity-nesting birds usually choose trees at least 25 cm in diameter, or the largest available trees on the site.

RIPARIAN ZONE

The streambank and floodplain adjacent to streams or waterbodies, with particular reference to the vegetation.

Location also affects the habitat value of wildlife trees. Those in riparian areas, deciduous patches, gullies, and ravines often get the most use, both as homes and as feeding sites.

A tree's physical condition is perhaps the most important factor in determining which wildlife tree an animal chooses. Trees change constantly as they begin to die, and from the time of death until they are reduced to woody debris on the forest floor. A wildlife tree classification system that charts the stages of decay is a useful wildlife tree management tool.

Nine Stages of Decay

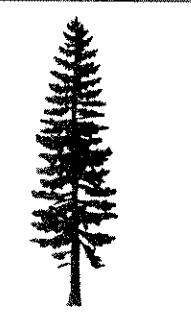
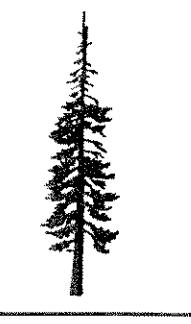
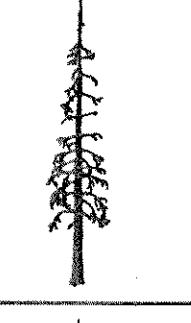
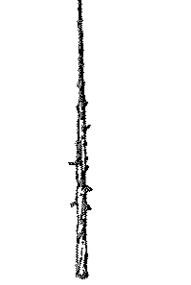
The wildlife tree classification system developed for the *Wildlife/Danger Tree Assessor's Course* describes nine stages of decay for conifers. The system provides a simple identification for each stage (e.g., "dead – spongy") and a description of its physical characteristics. The wildlife uses typically associated with each stage of decay are also listed.

This classification system (shown on the following pages), is used in British Columbia's draft harvesting guidelines for managing and maintaining wildlife trees (see pp. 9–13).



Coarse woody debris provides foraging sites and shelter for many species, including the clouded salamander.

British Columbia's Wildlife Tree Classification System*

Gradual Death: Conifers	General Description of Tree	Wildlife Uses and Users	Stages of Decomposition
1	live/healthy – no decay	nesting; roosting; perching; territory; large-limb eagle and Osprey nests; raptors; scavengers; Great Blue Heron colonies; Marbled Murrelet	
2	live/unhealthy – internal decay or growth deformities (including insect damage, broken tops); dying tree	nests/roosts – PCEs ¹ (strong excavators); SCUs ² ; large-limb nests; insect feeders	
3	dead ³ – hard heartwood; needles and twigs present; roots stable	nests/roosts – PCEs (strong excavators); SCUs; bats; large-limb nests; hunting/hawking perches; branch roosts; insect feeders	
4	dead – hard heartwood; no needles/twigs; 50% of branches lost; loose bark; top usually broken; roots stable	nests/roosts – PCEs (weaker excavators); SCUs; bats; insect feeders	

Gradual Death: Conifers	General Description of Tree	Wildlife Uses and Users	Stages of Decomposition
5	dead – spongy heartwood; most branches/bark absent; internal decay; roots stable for larger trees; roots of smaller trees beginning to soften	nests/roosts – PCEs (weakest excavators); SCUs; bats; insect feeders; salamanders	
6	dead – soft heartwood; no branches or bark; sapwood/heartwood sloughing from upper bole; lateral roots of larger ones softening; smaller ones unstable	SCUs; insect feeders; salamanders; small mammals	
7-8	dead – soft heartwood; stubs; extensive internal decay; outer shell may be hard; lateral roots completely decomposed; hollow or nearly hollow shells	insect feeders; salamanders; small mammals	
9	debris – downed stubs or stumps	insect feeders; salamanders; small mammals; amphibians; drumming logs for grouse; flicker foraging; nutrient source	

* This classification system does not apply to downed logs and/or coarse woody debris.

¹ PCE = primary cavity excavator

² SCU = secondary cavity user

³ The stability of dead trees is influenced by the cause of death. Dead trees can be unstable if killed by butt rot or root rot, depending on the species of the fungus. In general, *Phellinus* attack leads to instability; *Armillaria* attack must be assessed carefully on a site-specific basis.

INTEGRATING WILDLIFE TREE MANAGEMENT INTO FORESTRY OPERATIONS

Planning for Success

Because a large proportion of British Columbia's forested lands are managed for commercial timber production, wildlife tree management strategies need to be fully incorporated into forestry operations to be effective. Wildlife trees and the animals that use them should be considered at every step. Successful wildlife tree management begins with long-term planning and cooperation between stakeholders, and continues through harvesting and post-harvest activities. Planning and consultation are the keys to success.

Defining Roles and Responsibilities

In June 1992, the Ministry of Forests, the Ministry of Environment, Lands and Parks, and the Workers' Compensation Board signed a Memorandum of Understanding (MOU) concerning wildlife trees and wildlife tree habitat. The MOU is a working agreement that defines each agency's roles and responsibilities in wildlife tree habitat management.

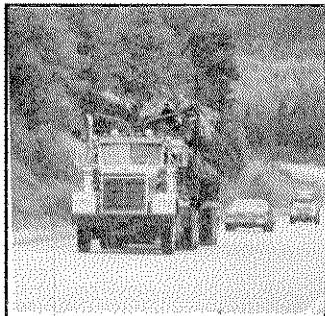
The intent of this formal agreement is twofold: to recognize the Wildlife Tree Committee as the advisory body acting on behalf of the signatory agencies and representing all wildlife tree matters in British Columbia; and to ensure that the three parties work together in developing, maintaining, and managing the wildlife habitat values of standing green, dying, or dead trees.



Commitment to Cooperation

The Ministry of Forests recently issued a new policy outlining its commitment to wildlife tree management. The policy states that "*The Ministry of Forests will cooperate with the Ministry of Environment, Lands and Parks in protecting wildlife trees which provide critical habitats for rare and endangered species and other species of management concern.*"

British Columbia's Draft Harvesting Guidelines for the Management and Maintenance of Wildlife Trees



Draft provincial harvesting guidelines for managing and maintaining wildlife trees were developed in October 1992, by the Wildlife Tree Committee. These guidelines are based on the premise that managed forests, worker safety, and the maintenance of forest biodiversity — including valuable habitat for wildlife-tree-dependent species — are mutually compatible if cooperative action is taken to integrate these goals. The harvesting guidelines, once approved, will be used in conjunction with existing coastal and interior fish/forestry/wildlife and biodiversity guidelines.

Present forest management activities produce conifer stands that remain at a mid-successional stage for many years. This limits the extent and distribution of other habitats critical for wildlife species, including riparian areas, upland deciduous habitats, pioneer stages, and old-growth stages. For forest management to maintain biodiversity, we must consider both the extent and arrangement of these critical habitats within the landscape.

Forest management must also account for specific forest attributes on which wildlife species depend. Significant structural attributes of forest stands include:

- a diversity of tree species (coniferous and deciduous) in various successional stages;
- multiple canopy layers;
- standing dead trees of varying sizes and in various stages of decay;
- large, live trees (defective trees may recruit more quickly to become useful wildlife trees); and
- coarse woody debris for foraging substrate and shelter.

Wildlife trees occur in all the critical habitat types listed above, and provide the stand attributes and structural complexity described. Therefore, managing for wildlife trees is an effective means of maintaining biological diversity within the framework of forestry operations.

The Planning Process

The following steps must be taken when planning for wildlife tree management:

- Develop both landscape- and stand-level management objectives and options. Landscape-level planning considers the broad distribution of forest stands through time and space. It must maintain habitats for individual species and species guilds, and should minimize potential fragmentation effects. Stand-level management seeks to maintain specific structural attributes in the forest.
- Identify which species or species guilds of particular management concern are present in the ecoregion, biogeoclimatic zone, or, if necessary, the subzone or subzone variant where operations will be carried out. These include any species on the provincial Red or Blue lists (see p. 23).
- Determine minimum and/or critical habitat requirements for selected species or guilds in order to reach or maintain the desired population level. Based on their habitat requirements (e.g., nesting, feeding, denning/roosting, thermal cover, seasonal use), certain species or guilds may require specific management plans.
- Choose the harvesting and silvicultural systems appropriate to meeting and maintaining the structural goals of the stand, including the number, character, and distribution of wildlife trees. Silvicultural strategies must be applied throughout the life of the stand in order to maintain future structural objectives.
- Incorporate harvest and silviculture options into Pre-Harvest Silviculture Prescriptions (PHSPs), other silviculture prescriptions, and the higher level plans upon which these prescriptions are based. In harvest planning, leave-management strategies (landscape level) include patches, strips, corridors, and forest ecosystem networks. Recruitment and retention strategies (stand level) during harvesting and silviculture operations include green tree retention and artificial habitat creation/enhancement, including stubs and topped or girdled trees.
- Monitor the short- and long-term effects of forest practices on species and species guilds of management concern, and on operational efficiency and planning needs.

SPECIES GUILD

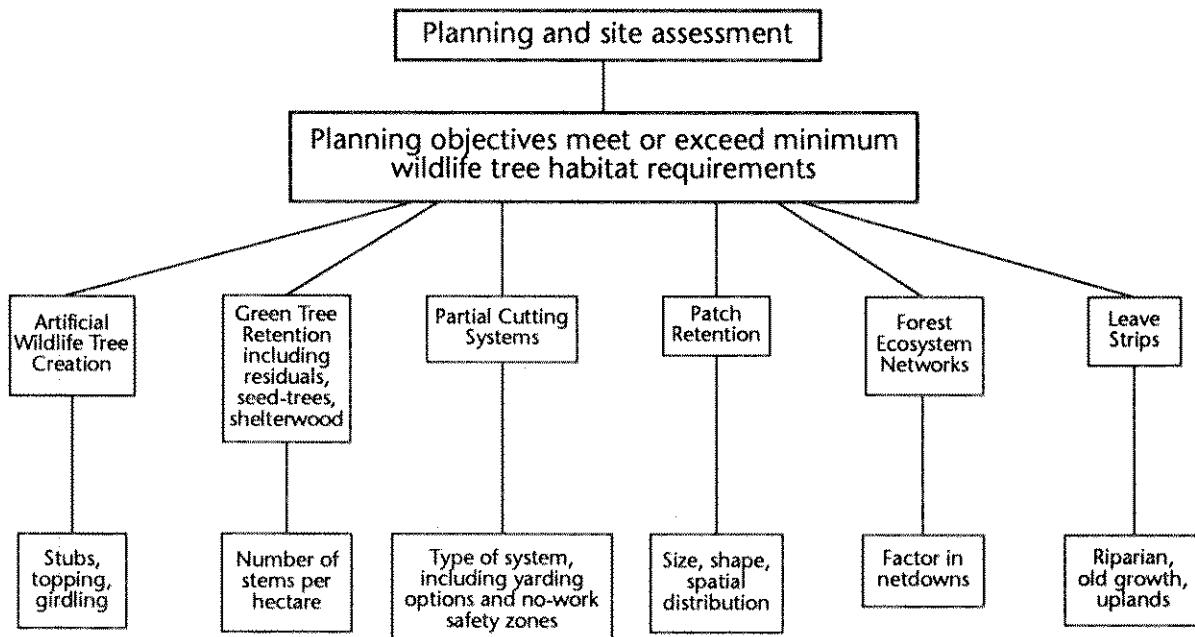
A group of species with similar behaviours and similar ecological requirements (e.g., cavity-nesting ducks).

FOREST ECOSYSTEM NETWORKS

A landscape-level strategy in which forested corridors, exhibiting specific functional attributes, connect special reserve areas, such as old growth, riparian zones, or other important habitats. The reserve areas are permanent, while the connecting or linkage corridors may change over time.

Operational Options

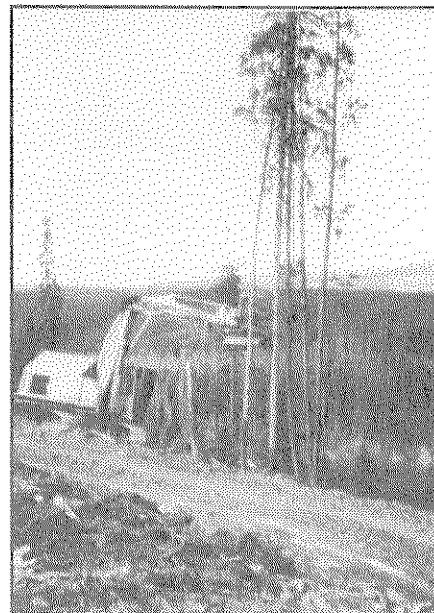
Managing for wildlife trees will require the implementation of a range of alternative harvesting options. The approach chosen will depend on site-specific factors. The various options are shown in the flowchart below and described in detail in the draft harvesting guidelines document, available from the Wildlife Tree Coordinator (address on p. 31).



Summary of Recommendations

- As a general rule, the most desirable wildlife trees should meet the following criteria and be incorporated into one or more of the operational options described earlier (forest ecosystem networks, patch retention, leave strips, partial cutting systems, green tree retention, artificial wildlife tree creation):
 - ~ **wildlife use** – Evidence of existing/active use by wildlife (see criteria below for eagle nests).

- **size** – Selected wildlife trees should be as large as possible for the site, given the nature of the trees occurring in the area. A recommended range is > 30 cm dbh and > 15–20 m height. However, where trees of this size are not available, at least 3 stems/ha should be within the upper 10% of the diameter range distribution for the biogeoclimatic zone or subzone, including veteran trees.
 - **type** – Selected wildlife trees should consist of a mixture of hard and soft stems (Classes 2–5). Class 2 trees can serve as recruitment snags. Depending on species and location, Class 2 trees should be well branched. Live recruitment trees can include veterans, seed-trees, shelterwood trees, and residual stems left on site. Selected trees should consist of a mix of species, including a hardwood component.
 - **number*** – A minimum of 5–10 wildlife trees/ha average distribution should be retained (as per above description for mixture of live and dead stems, including 3 stems in upper 10% of diameter range). This total should augment those wildlife trees found in adjacent areas that would not normally be harvested, such as rocky bluffs, gullies, unstable slopes, environmentally sensitive areas, lakeshore zones, etc.
- *(Range of 5–10 wildlife trees/ha is a minimum average for ecosystems provincially. However, recommended wildlife tree densities are currently being evaluated and will be ecosystem specific.)
- **distribution** – Not all hectares will contain suitable wildlife trees, therefore stems should be clumped where possible. Depending on site-specific factors such as topography, wind exposure, and stand age and structure, some locations may be suited to retention of dispersed, single, live recruitment wildlife trees such as seed-trees or residuals. Selected wildlife trees should be distributed across the planning unit, ranging from valley bottom riparian zones to upslope areas.
 - **persistence** – Selected wildlife trees should be windfirm.

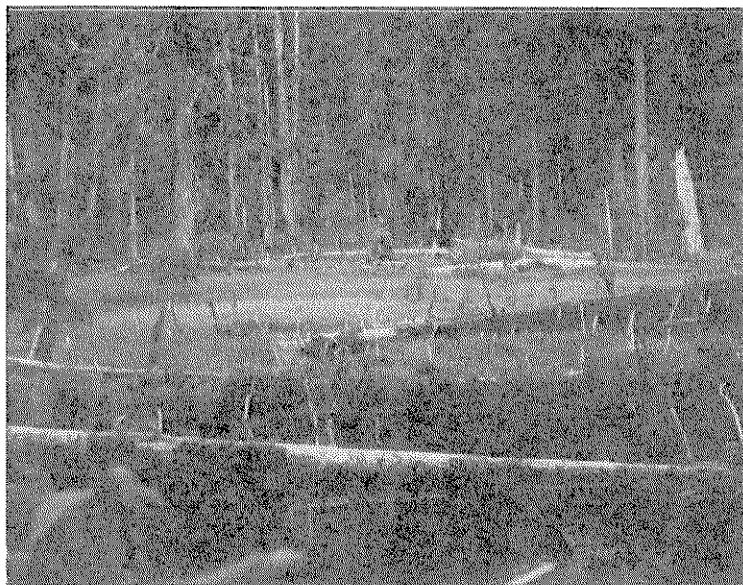


Mechanical feller bunchers can be used to create artificial wildlife tree habitat.



Pileated Woodpecker.

- Maintain buffers around special wildlife habitat features such as eagle, Osprey, or heron nests. Nest trees, and nearby large trees that may be used as alternative nest, perching, or feeding sites are usually located near water. Buffer strips of 100–150 metres may be required to avoid disturbing the birds during nesting, and to provide future nest and perch trees.
- Wherever possible (within the limits of utilization standards and fire protection restrictions), retain some coarse woody and large organic debris on site for feeding and shelter.
- Maintain wildlife trees in silviculture operations, and along cut block boundaries and roads where they do not endanger the work area (refer to procedures and criteria outlined in the *Wildlife/Danger Tree Assessor's Course*).
- Options for wildlife tree management in silviculture operations include:
 - ~ retaining coarse woody debris in various stages of decomposition when preparing a site, and keeping broadcast slashburning to a minimum;
 - ~ planting a diverse mix of tree species;
 - ~ retaining patches of brush, especially along streams and on green tree retention areas;
 - ~ managing brush only around crop trees, where feasible;
 - ~ retaining some regenerating hardwoods wherever possible;
 - ~ using variable spacing to create a mosaic of stand densities; and
 - ~ retaining safe wildlife trees during spacing and thinning.
- Management recommendations for wildlife-tree-dependent species and guilds should be developed. Special emphasis will be placed on Red-, Blue-, and Yellow-listed species.



Favourable wildlife tree habitat.

Wildlife Tree Management After Harvesting

Various activities are carried out in managed forests following harvesting. Post-harvesting activities include site preparation, planting, and stand tending treatments such as juvenile spacing, brushing, thinning, pruning, and fertilization. These silviculture activities may affect the availability of wildlife trees in a number of ways.

Workers' Compensation Board regulations and conventional methods of site preparation and stand tending often result in the loss of both remnant and potential wildlife trees in managed forests. However, new approaches are allowing some wildlife trees to remain standing while second growth matures, and for replacement wildlife trees to be recruited through the natural processes of death and decay.

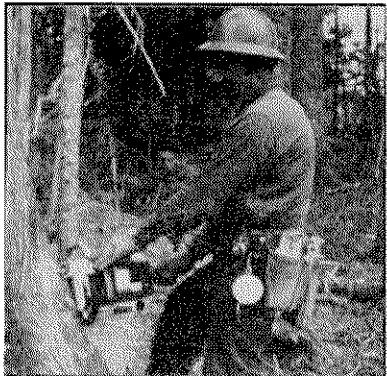
The *Wildlife/Danger Tree Assessor's Course* (see p. 16) provides a mechanism for assessing the soundness, safety, and habitat value of wildlife trees. Where trees are assessed as sound and safe, and/or of significant value to wildlife, it may be possible to either work around them (depending on the type of silviculture activity and the presence of ground vibrations), or establish a no-work safety zone.



Tree planters at work.

ADDRESSING THE NEED FOR FOREST WORKER SAFETY

Workers' Compensation Board Regulations



Worker safety and wildlife tree management are closely tied.

The Workers' Compensation Board of B.C. deals with snags and danger trees in Section 60 of the *Industrial Health and Safety Regulations*. The regulations that concern the removal of potential hazards and snag falling, and that influence the development of a wildlife tree management strategy are:

60.14.

"(1) Trees, snags and saplings, within reach of landings, spars, logging machines and guy-lines, shall be felled before yarding operations commence.

(2) All trees, snags and saplings, which are hazardous to workmen and within reach of camp, shop, or other work areas, shall be felled."

60.38.

"Where practicable, snags shall be felled:

- (a) progressively with the falling of other timber, and*
- (b) before falling adjacent live trees"*

60.54.

"Trees, snags and other objects that might endanger workers shall be felled or removed during pioneering and [road] construction before travel and hauling commences."

60.82.

"[In cable tree thinning operations] . . . dangerous trees and snags shall be felled during the first thinning."

60.232

"All snags, danger trees, loose rocks, stumps or other unstable material shall be removed or cleared for a safe distance back from roadsides or roadside banks when they present a hazard to users of roadways."

"The Wildlife Tree Committee believes that its proposals will ensure both increased safety for workers and reduced costs to forestry, while maintaining a healthy environment complete with trees for wildlife."

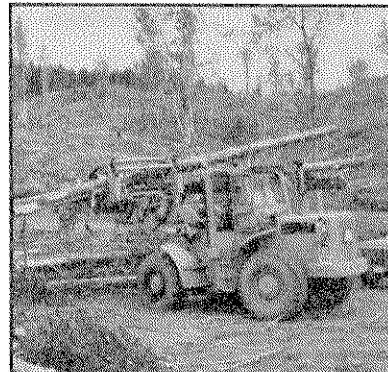
(WTC submission to the WCB 1990)

WTC Submission to the Workers' Compensation Board

The Workers' Compensation Board (WCB) is currently conducting a comprehensive review of *British Columbia's Industrial Health and Safety Regulations*. The Wildlife Tree Committee has made a formal submission to the WCB, suggesting specific changes be incorporated into the revised regulations. The WTC believes that these changes would result in a more pro-active approach to wildlife/danger tree safety issues, with greater emphasis on pre-planning than on regulatory enforcement.

The Wildlife Tree Committee's submission contains four major recommendations:

- 1) Danger trees should be identified by government agencies, which would take responsibility for hazard removal through an action plan that addresses safety.
- 2) In areas where there are no significant ground vibrations during forestry operations, a distinction should be made between sound and unsound dead trees. (Ground vibrations are produced by heavy machinery and/or felling of large trees. These conditions do not exist when activities such as planting, spacing, and brushing are being carried out.)
- 3) No-work zones should be identified and marked around designated wildlife trees if they present a hazard because of their condition or the type of work being carried out in the area.
- 4) A program to train wildlife/danger tree assessors should be established.



Ground vibrations occur during operation of heavy machinery and felling of large trees.

Training Wildlife/Danger Tree Assessors

The *Wildlife/Danger Tree Assessor's Course*, developed by the WTC, is the first of its kind in North America. The goal of this course is to present information, practical field experience, and methods for:

- maintaining a safe work environment;
- identifying wildlife trees and future wildlife trees; and
- retaining selected wildlife tree habitat.

Who Will Participate in the Training Course?

The *Wildlife/Danger Tree Assessor's Course* is offered in half-day information seminars and intensive three-day qualifying courses:

- 1) Half-day seminars: These are general information sessions to inform forest resource management staff, logging supervisors, and other interested people about the habitat value of wildlife trees and the dangers these trees can pose to forest workers. Wildlife/danger tree assessment procedures and alternative wildlife tree management practices are reviewed and discussed. The seminars are designed for people who are interested in becoming familiar with the wildlife/danger tree assessment process, but who do not require qualification.
- 2) Three-day course: This course is designed for people whose work demands that they be qualified in wildlife/danger tree assessment. Participants may include WCB field inspectors, forest technicians, habitat specialists, forestry contractors, tree fallers, logging supervisors, or personnel involved in tree removal or arboriculture. Course training includes:
 - recognizing existing and potential wildlife trees, identifying wildlife tree use, and understanding the importance of wildlife trees and how to integrate the protection of these trees into operational resource management;
 - distinguishing between sound and unsound dead trees, and safe and unsafe green trees; and
 - determining safety hazards and appropriate procedures for dealing with wildlife and danger trees during silviculture operations and along roadsides and treatment unit boundaries.

Individuals who successfully complete the three-day course will be qualified to undertake wildlife/danger tree assessments.

Wildlife/Danger Tree Assessment Methodology

The *Wildlife/Danger Tree Assessor's Course* (three-day course) will qualify workers to assess wildlife/danger trees. This training will involve instruction in both office and field assessment.

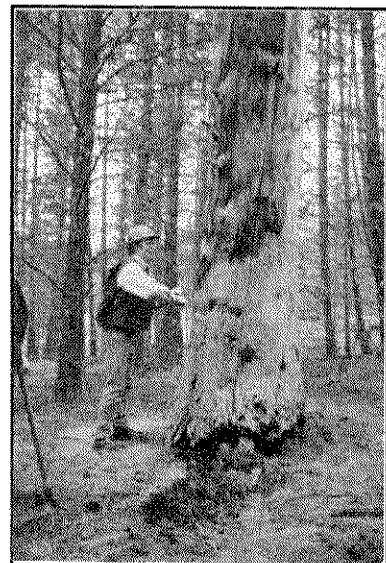
The office or pre-field assessment will:

- compile relevant stand and site information from opening files;
- stratify blocks into areas of similar terrain and habitat, based on existing information such as field surveys, prescriptions, maps, and air photos; and
- attempt to identify potential habitat values and safety concerns.

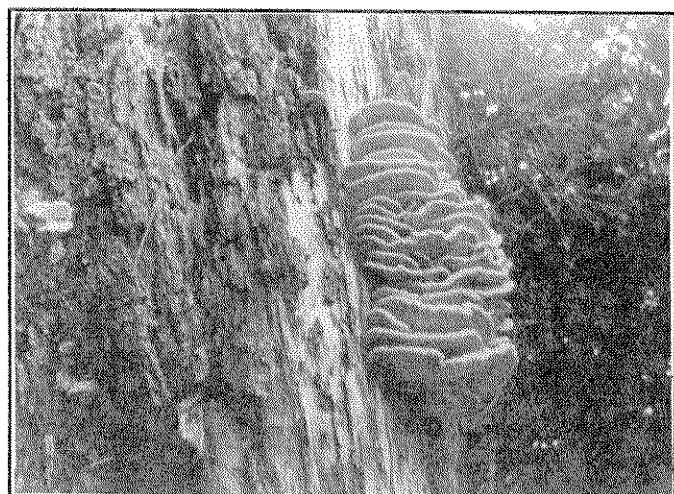
The field assessment will:

- be done in the field season in which the planned silviculture activity will take place;
- confirm strata and other information collected during the office assessment;
- involve either a walk-through assessment or systematic grid pattern survey within selected strata;
- determine individual wildlife tree safety ratings based on factors such as tree species, defects, damage, slope, condition, lean, and location;
- determine individual wildlife tree habitat value based on factors such as tree species, cause of death, decay stage, condition, location, and use by wildlife;
- determine required safety procedures (safe to work up to, establishment of a no-work zone, or removal of the tree) and recommended management options; and
- mark wildlife trees and no-work zones as appropriate in the field, and record all information on survey cards and maps for opening files.

The flowcharts on the following pages summarize this process. In addition to assessing currently valuable wildlife trees, wildlife tree assessors may, based on specified management objectives, also identify and designate areas for wildlife tree creation and recruitment.

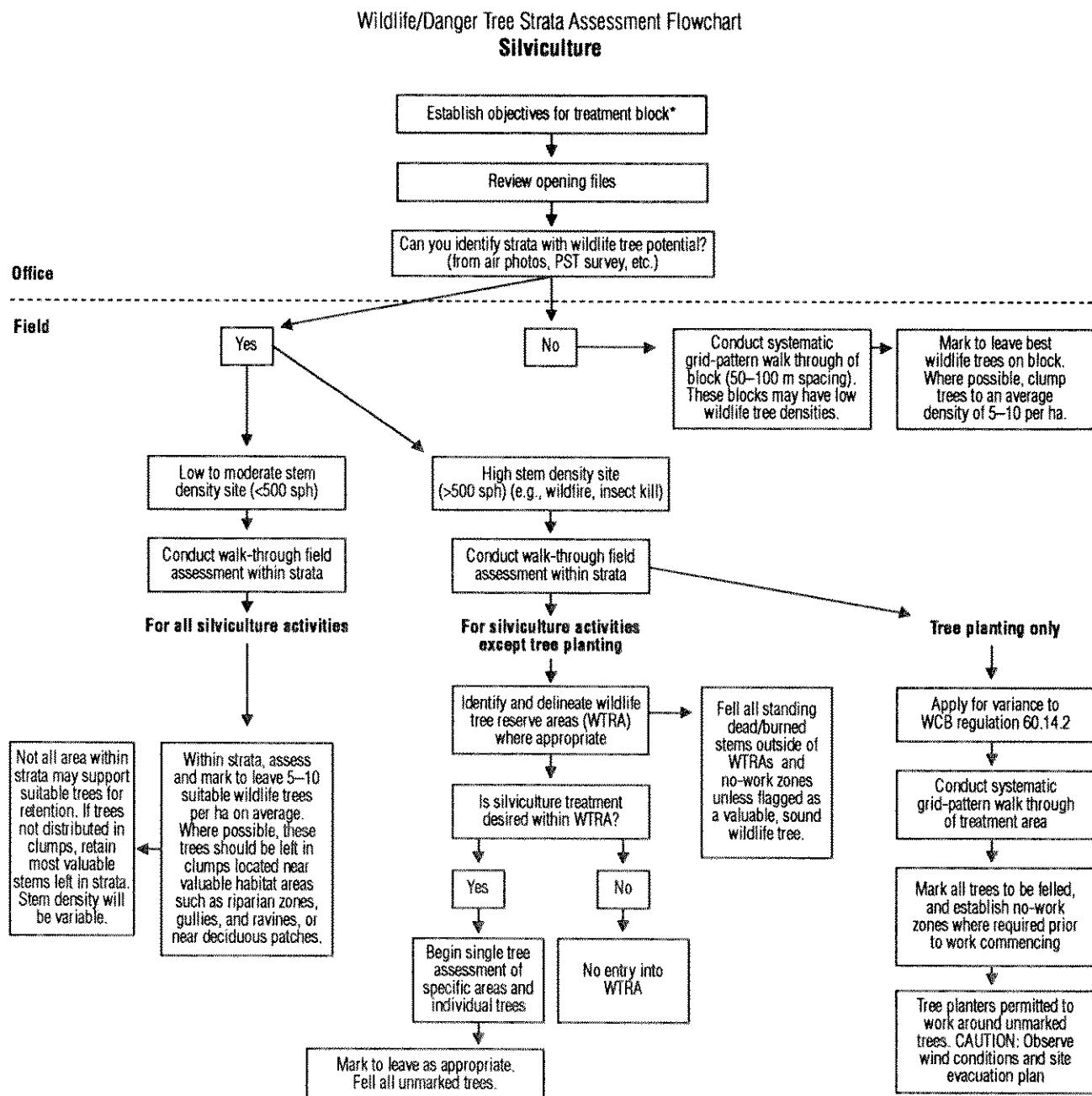


A Wildlife/Danger Tree Assessor's Course participant evaluating stem hardness.

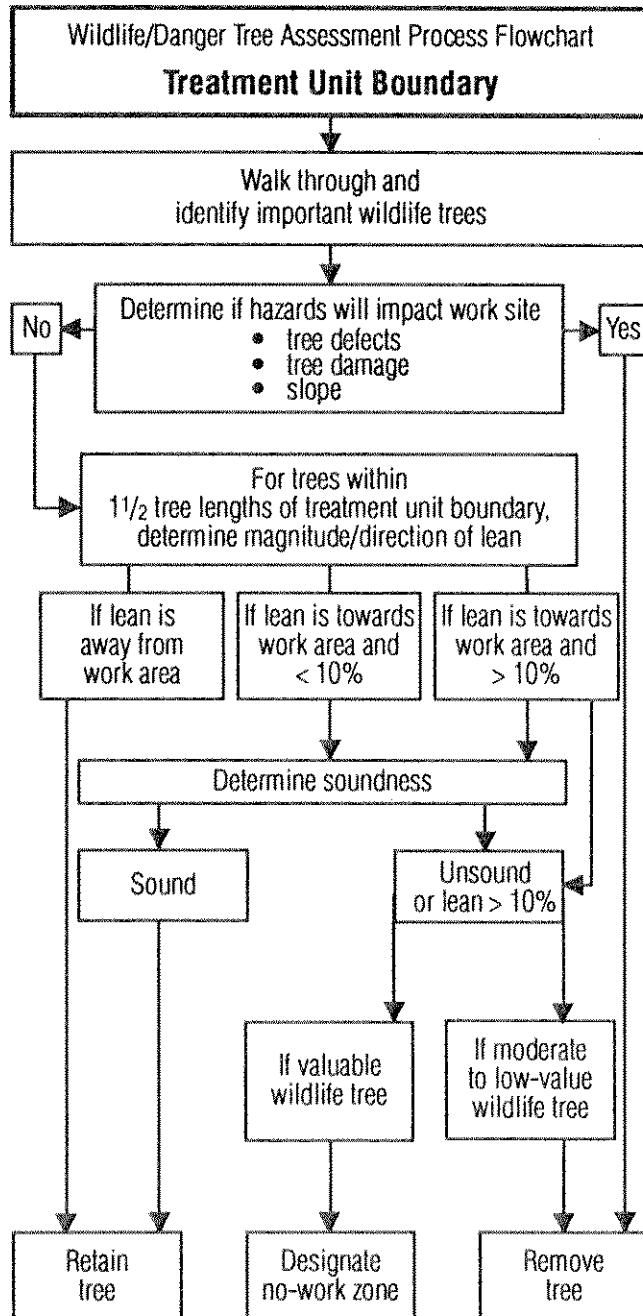


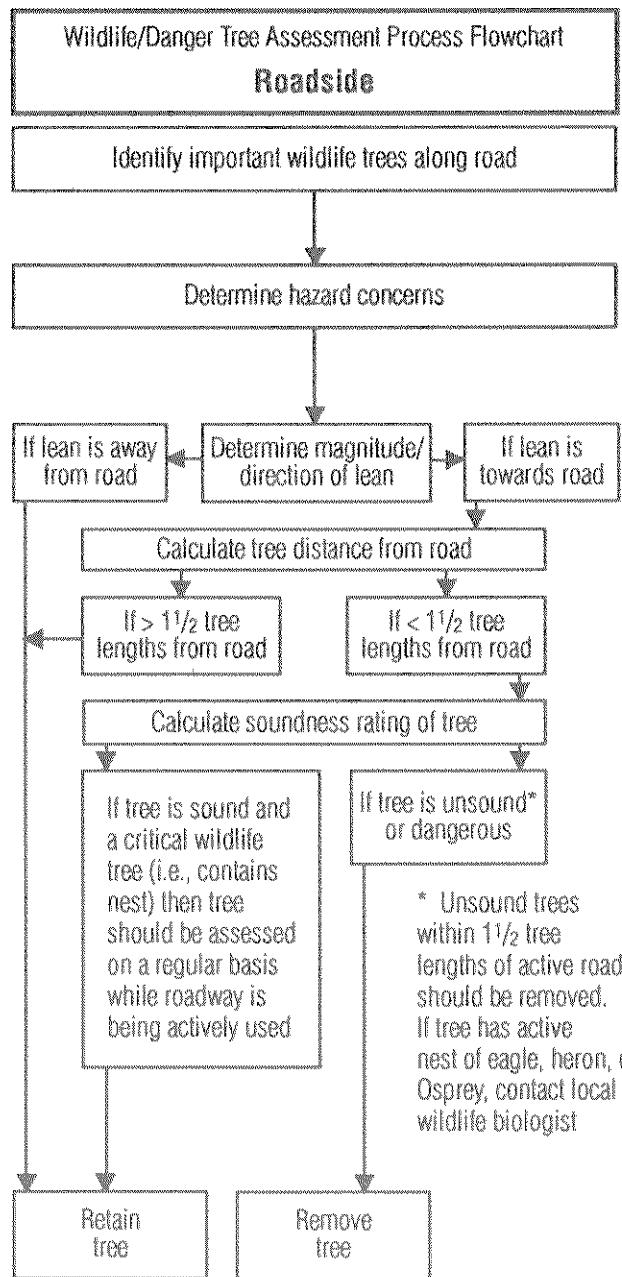
Fungal fruiting bodies (conks) indicate decay within the trunk of this wildlife tree.

Wildlife/Danger Tree Strata Assessment Flowcharts



* No Wildlife/Danger Tree Assessment needed for surveys unless estimated density of dangerous stems > 100 trees/ha





Note: If slope is > 30%, assess wildlife tree carefully.

FILLING THE KNOWLEDGE GAPS

Research Needs

Although wildlife tree management efforts are already under way, there is still much to be learned about wildlife trees and the species that use them. The Wildlife Tree Committee has established the following research priorities to direct investigations over the next few years:

- Habitat requirements of primary cavity excavators
 - ~ Breeding requirements
 - ~ Wintering requirements
- Inventory of wildlife trees
 - ~ Method
 - ~ Modelling recruitment and mortality (population dynamics of wildlife trees)
- Response of primary cavity excavators to forest management and silviculture options
 - ~ Experimental design
 - ~ Monitoring
- Habitat requirements of secondary cavity users
- Artificial structures and habitats (e.g., nest boxes, bat roosts, Osprey nesting platforms, and stub creation)

Wildlife Tree Users at Risk

The ongoing loss of wildlife trees throughout the province is detrimental to every species that uses them. However, the effect is not equal for all wildlife tree users. Species that have highly specialized niches cannot simply switch to another nesting or roosting site, or an alternative food source, if wildlife trees are not available. When wildlife trees are eliminated from an ecosystem, the species that are most dependent on them also disappear. The more adaptable species may remain, but their breeding success or foraging efficiency may be affected.

PRIMARY CAVITY EXCAVATORS

Birds such as woodpeckers, nuthatches, and chickadees that are able to excavate their own nest holes. Woodpeckers make new holes each year as part of their courtship ritual, and will not accept nest boxes.

SECONDARY CAVITY USERS

Animals that utilize tree holes that they have not excavated themselves — either abandoned woodpecker cavities or holes formed naturally through decay.

Provincial biologists have drawn up lists of wildlife species that require special management attention because of their rareness or vulnerability.

1991 Red List

Species on this list are wildlife tree users and are candidates for designation as endangered or threatened.

Marbled Murrelet
Spotted Owl
Keen's long-eared myotis

1991 Blue List

Species on this list are wildlife tree users and are considered to be vulnerable to population declines.

Vaux's Swift
Purple Martin
Western Bluebird
Barn Owl
Flammulated Owl
Gray Flycatcher
Lewis' Woodpecker
White-headed Woodpecker
Williamson's Sapsucker
Great Blue Heron
Bald Eagle
Northern long-eared myotis
Sitka mouse
Red-tailed chipmunk
Townsend's chipmunk
Fisher
Caribou



Western Bluebird.

1991 Yellow List

Species on this list are wildlife tree users and are of management concern.

Pileated Woodpecker
Bufflehead
Wood Duck
Barrow's Goldeneye
Common Goldeneye
Common Merganser
Hooded Merganser
Boreal Owl
Northern Pygmy Owl
Northern Saw-whet Owl
Western Screech Owl
Turkey Vulture
Osprey
Weasel species
Pine marten
Spotted skunk
Raccoon
Black bear

The Wildlife Branch is in the process of revising the Red and Blue lists. Among the proposed changes is the inclusion of taxa at the subspecies level. Subspecies that are wildlife tree users and can be "considered at risk" include:

"Rocky Mountain" Williamson's Sapsucker
"Queen Charlotte Islands" ermine
"Tillamook" long-tailed weasel
"Rocky Mountain" red-tailed chipmunk
"Queen Charlotte Islands" Hairy Woodpecker
"Queen Charlotte Islands" Northern Saw-whet Owl
"Vancouver Island" Northern Pygmy Owl
"Western" Williamson's Sapsucker
"Vancouver Island" ermine

Research Projects—What's Happening Now

Government, universities, and forest companies are starting to work towards increasing our understanding of wildlife trees and the creatures that use them. Current wildlife tree research projects in B.C. are looking at a number of different questions in a wide range of geographic locations. A number of these projects are described on the following pages.

► *Assessment of the potential of stubs as habitat for wildlife tree users*

The creation of stubs (high-cut stumps, 3–5 m in height) by mechanical feller bunchers has been proposed as a means of providing wildlife tree habitat in harvested areas. This technique is compatible with current WCB safety requirements. The utility of these stubs as artificial habitat for wildlife-tree-dependent species is presently being evaluated.

This study is being conducted at a site near Okanagan Falls, within the Montane Spruce biogeoclimatic zone. There are three objectives:

- 1) to determine which wildlife species use the stubs and how they are used;
- 2) to determine how location affects wildlife use (i.e., proximity to adjacent forest cover, uniform versus clumped distribution); and
- 3) to determine the seasonal use of stubs by wildlife.

The parties involved in the stub research project are Simon Fraser University's Department of Natural Resource Management, the Ministry of Environment, Lands and Parks, and Weyerhaeuser Canada Ltd.

SEASONAL USE OF WILDLIFE TREES

Several current research projects include a consideration of seasonal use of wildlife trees. In winter, holes in trees are used by non-migratory cavity nesters as roosts, and by some mammals as dens.



➤ *Examination of alternatives to conventional clear-cutting for maintaining forest biodiversity*

This project seeks to provide options for retaining critical habitat elements, particularly wildlife trees, that are important for the maintenance of biological diversity. The study site is within the Engelmann Spruce-Subalpine Fir biogeoclimatic zone, about 85 km northwest of Mackenzie.

Cut blocks have been harvested using three different enhancement techniques that involve the retention of specified numbers of stubs and/or 0.25 ha "islands" of mixed-age timber. These treatments and a conventionally logged control area will be evaluated over a six-year period for use by breeding birds, especially cavity nesters, and by martens. During the six years, field work will alternate between spring and summer assessments one year and winter assessments the following year.

This is a joint project between the Ministry of Environment, Lands and Parks, the Habitat Conservation Fund, the Williston Wildlife Compensation Program, and Fletcher Challenge Canada.

➤ *Black bear denning study*

Black bears living in B.C.'s rainforests are known to hibernate in the hollow trunks of large standing trees, especially western redcedars. A number of tree dens have been discovered by loggers in the course of their work. In some cases the bears have been accidentally killed, while in others, the dens have been destroyed. Wildlife managers want to find out the significance of wildlife trees as black bear denning sites.

This three-year research project is being carried out in the Nimpkish River Valley, south of Port McNeill. One of the primary objectives is to determine coastal black bear denning habitat requirements and the impacts of clear-cutting on den site availability.

Funding for this study is provided by the Habitat Conservation Fund and Canadian Forest Products Ltd. The work is being directed by the Ministry of Environment, Lands and Parks.



Black bear.

➤ *Evaluation of wildlife trees in harvested and unharvested areas*

This five-year investigation will be carried out in the Nelson Forest Region. One objective is to compare unharvested stands within the West Arm Demonstration Forest (WADF), with sites outside the WADF where green trees have been left standing during past silviculture operations. Researchers will evaluate the density, distribution, and characteristics of wildlife trees in both areas.

The second objective is to study wildlife use of the trees to determine characteristics of wildlife tree users, such as species diversity and density, and the seasonality of use.

This project is being coordinated by the Ministry of Forests, the Ministry of Environment, Lands and Parks, and the Wildlife Tree Committee.

➤ *Assessment of wildlife trees in the Sub-Boreal Spruce biogeoclimatic zone*

This research project will apply the techniques of the *Wildlife/Danger Tree Assessor's Course* to Sub-Boreal Spruce forests in the Skeena region. Work will include measuring the abundance, recruitment, and use by vertebrates of various wildlife tree classes, and examining differences between successional stages that have been established by fire.

The Ministry of Forests and the Ministry of Environment, Lands and Parks are jointly coordinating this study.

➤ *Evaluation of the habitat requirements and breeding ecology of woodpeckers in relation to forest practices in the Kamloops Forest Region*

The overall objective of this study is to evaluate the response of woodpecker nesting and foraging behaviour to the habitat changes created by harvesting and silviculture operations.

The study will focus on high elevation and valley bottom forests, contrasting species richness at the two elevations during summer and winter, and comparing foraging behaviour in areas with different levels of winter snow accumulation. In addition, the relationship between the density of dead trees, dying trees, and woody debris, and woodpecker density will be examined. The abundance and distribution of other wildlife species dependent on dead trees, dying trees, coarse woody debris, or tree cavities will also be observed and recorded.

This project is being conducted by the Ministry of Forests.



Lewis' Woodpecker.

➤ *Examination of the breeding and habitat ecology of woodpeckers in the Hat Creek Valley*

This project is evaluating the breeding, nesting, and foraging habitat, and the population ecology of woodpeckers in the Hat Creek Valley near Cache Creek.

The Royal British Columbia Museum is conducting the study.

➤ *Investigation of bird communities in Interior Douglas-fir forests*

Originally part of B.C.'s Old-Growth Strategy Project, a researcher from the Department of Forest Sciences at the University of British Columbia is documenting differences in relative abundance of birds in thinned and unthinned stands of Interior Douglas-fir. In the first field season, foraging substrates (downed woody debris and standing dead trees) were sampled and nest sites of cavity-nesting birds were mapped.

GETTING THE WORD OUT

Stop Signs in the Forest

Public education has always been an important part of the Wildlife Tree Committee's mandate. Putting up signs on designated wildlife trees is one way to inform members of the public, especially firewood cutters, about the need to protect this habitat.

At the provincial level, the wildlife tree sign program is still in the initial stages; however, in the Cranbrook Region it is well underway. Ministry of Environment, Lands and Parks staff have posted and inventoried over 500 wildlife trees in this area. Naturalist groups and Environmental Youth Corps workers have participated enthusiastically in this local campaign. The Ministry of Forests and the forest industry have posted an additional 400-500 signs throughout the province.

New wildlife tree signs with identification numbers have been designed and a new posting program will begin in the spring of 1993. A pamphlet describing where and how they should be placed has been produced by the Wildlife Tree Committee.

Responsible Firewood Cutting

Public demand for firewood continues to increase. As many people know, dead trees are an excellent source of dry, seasoned fuel wood. Unfortunately, few wood cutters realize that when they fell these trees they are removing critical wildlife habitat.

Free firewood cutting permits are issued by the Ministry of Forests, allowing permit holders to take logging residue, windthrow, and dead, damaged, or diseased timber from designated Crown lands. Some Forest Districts are now adding other conditions to the permits they give out, in an effort to protect wildlife trees.

In areas where there are few wildlife trees or there is heavy pressure from firewood cutters, it may be necessary to limit public access by closing Forest Service roads.

A recent pamphlet, *"Firewood—or Wildlife Tree?"*, is being distributed to everyone receiving a free-use wood cutting permit. The pamphlet advises firewood cutters to refrain from felling larger trees (i.e., greater than 40 cm diameter at breast height), as well as those with numerous limbs and bark.



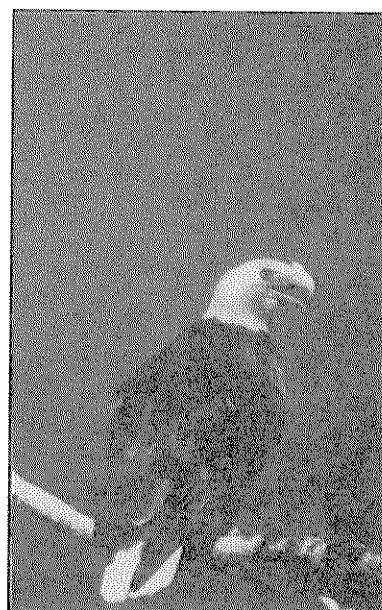
remaining. It also suggests avoiding important habitat areas along marshes, streams, and lakes. Wood cutters are encouraged to look for evidence of animal use, such as nests, nest cavities, and fresh wood chips at the base of trees, and for the bright yellow wildlife tree signs.

Bald Eagles and Forestry

Approximately 4500 pairs of Bald Eagles nest in British Columbia. This represents one-quarter of the world's breeding population. During the winter, our province is home to about 40% of the world's Bald Eagle population, including immatures. Eagles use wildlife trees as nest sites, stations from which to defend the nest, resting and hunting perches, and winter roosts.

A pamphlet explaining how forestry activities can affect Bald Eagles through habitat loss and disturbance, and how forest management practices can be modified to avoid negative impacts, is now available from the Wildlife Tree Coordinator. Recommendations from *Bald Eagles and Forestry* include the following:

- Harvesting activity in the vicinity of nest sites should focus on maintaining the current nest tree and any alternative nest trees, providing perch trees and potential nest trees, and maintaining a visual screen around the nest. Activity should take place outside the critical times of the nesting season.
- Construction of roads or landings should be avoided within 150 m of nest sites, especially when eagles are nest building or incubating. Road access should be restricted during sensitive periods.
- Clear-cutting to the water's edge should be avoided in areas where eagles are known to congregate, such as major feeding areas.
- Harvesting and other activities near roost sites should be avoided from November through March, since Bald Eagles are especially sensitive to human disturbance during winter.
- Roost sites should be identified and deferred from future harvest, because of their specific vegetative characteristics and their rare and localized status.
- Buffer strips (75–100 m wide) should be left to serve as vegetative screens in areas of heavy winter use by eagles or where the potential for disturbance to eagles is high.



Bald Eagle.

Wild About Wildlife Trees

The Wildlife Tree Committee has recently begun working with Project WILD to develop wildlife tree teaching activities for young people. Project WILD is an environmental education program sponsored by the Ministry of Environment, Lands and Parks, and the Canadian Wildlife Federation. It emphasizes awareness, appreciation, and understanding of wildlife and natural resources. Project WILD activities are particularly suitable for grades 4 to 10, and are used by nature centres and youth groups, as well as classroom teachers.

Although there are no existing WILD activities that teach about wildlife trees, several focus on closely related concepts. A writing workshop involving biologists, teachers, and other educators is being planned. The participants will take modules from the current activity guide and modify them to include information about wildlife trees and the wildlife species that use them.

Details about WILD's wildlife tree activities can be obtained by writing to:

The Project WILD Coordinator
c/o The Ministry of Environment, Lands and Parks
Wildlife Branch
780 Blanshard Street
Victoria, B.C.
V8V 1X5



Learning about wildlife trees through hands-on experience.

IF YOU WANT TO KNOW MORE

➤READ . . .

Reports available through the Wildlife Tree Committee:

Silvicultural Systems Research: Wildlife Tree Problem Analysis. (Backhouse and Lousier 1991).

Annotated Bibliography of Wildlife Trees for B.C. 1991.

Wildlife Trees: Their Role in B.C.'s Forests (Submission to the B.C. Forest Resources Commission by the WTC). 1990.

Brochures and pamphlets:

Hanging Wildlife Tree Signs

Firewood—or Wildlife Tree?

Bald Eagles and Forestry

Technical publications:

Davis, J.W. et al. 1983. Snag Habitat Management: Proceedings of the Symposium. USDA For. Serv., Gen. Tech. Rep. RM-99. 226 pp.

Neitro, W.A. et al. 1985. Snags. pp. 129–169 In: Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. Part 1. Browne, E.R. (tech. ed.). USDA For. Serv., R6-F&WL-192-185, PNW Region. 332 pp.

Thomas, J.W. et al. 1979. Snags. pp. 60–77 In: Wildlife Habitats in Managed Forests: The Blue Mountains of Oregon and Washington. USDA For. Serv., Handbook 553. 512 pp.

➤VIEW . . .

Videos available through the Wildlife Tree Committee:

Wildlife Trees: More Than Dead Wood

• produced by the Wildlife Tree Committee (15¹/₂ minutes)

Wildlife Trees: A Threatened Habitat

• produced by Bioquest International (14 minutes)

➤CONTACT . . .

The Wildlife Tree Coordinator
B.C. Environment
Integrated Management Branch
780 Blanshard Street
Victoria, B.C.
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Please turn the page ➤

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- For additional information on specific issues related to wildlife trees, contact:
Forestry Policy and Practices: Peter Bradford
Ministry of Forests
Silviculture Branch
31 Bastion Square
Victoria, B.C. V8W 3E7
 - Wildlife Habitat Management: Mike Fenger
BC Environment
Integrated Management Branch
780 Blanshard Street
Victoria, B.C. V8V 1X5
 - Occupational Safety & Health: Jim Allman
Workers' Compensation Board
320 Cook Street
Victoria, B.C. V8V 4W1