Woodland
Fish and Wildlife

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Managing Small Woodlands for Cavity Nesting Birds

Dead trees or snags provide a valuable forest component for wildlife which use these standing habitats as a place to feed, nest, perch and roost. Some birds which inhabit tree cavities feed on insects, which left uncontrolled, can cause damage to commercial crop trees. As cavity trees decay, they eventually fall and become large woody material on the forest floor, providing additional benefits for wildlife as well as improving soil productivity.

Some small mammals, birds and amphibians use large, down woody material as a place to live and feed on insects, seeds and fungi found on the forest floor. Forest managers know that if soil fungi is eliminated from the forest system, tree seedlings have difficulty becoming established because they cannot successfully extract nutrients and minerals from the soil. Small mammals feed on fungi and pass fungal spores in their droppings. As the animals move about the forest they dispense spores and insure that the invaluable fungi will remain

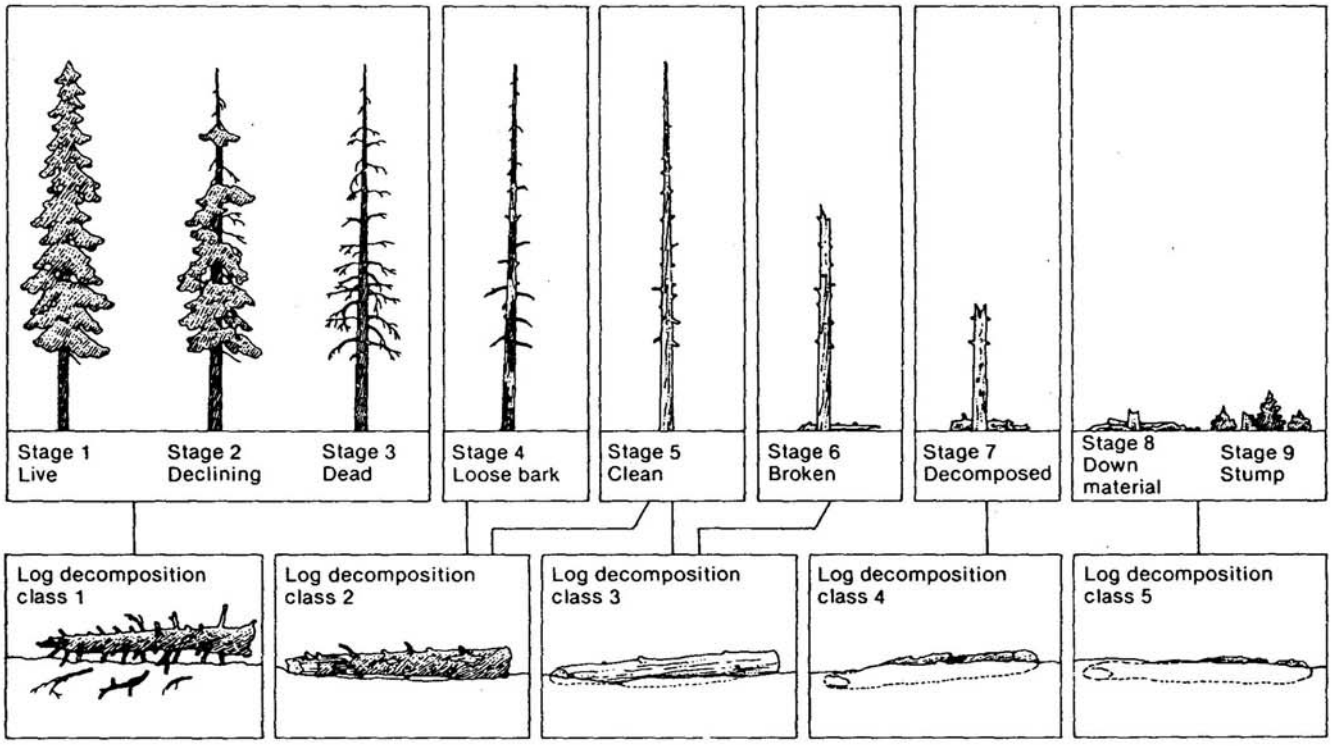
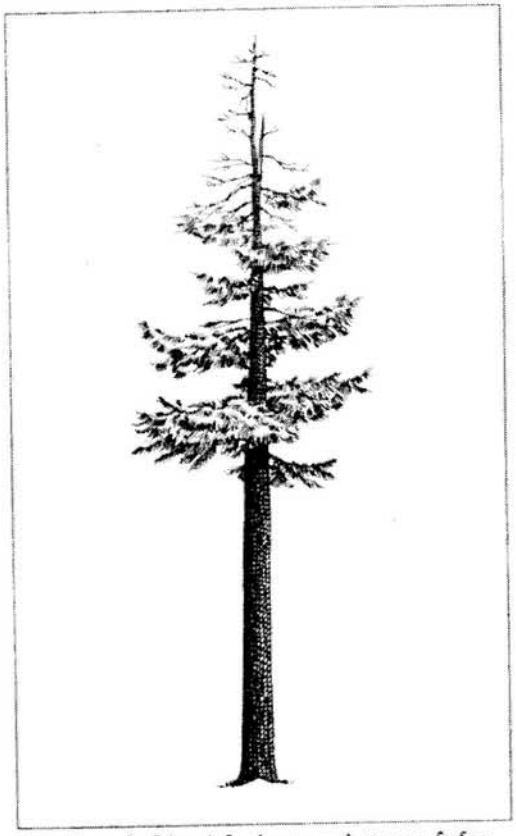


Figure 1. When they fall, trees and snags immediately enter one of the first four log decomposition classes (reproduced from Maser et al. 1979, p. 80)



Snag Type 3 - Live defective trees that are safe for topping to reduce susceptibility to blowdown after harvest.

available throughout forest succession.

As large woody material decays over time it continues to provide benefits for a woodlot and the ecosystem. Decaying wood acts as a reservoir for water storage by slowly releasing moisture throughout the summer. This helps maintain a moist, cool forest floor where seedlings can survive. Phosphorus, potassium and other nutrients are released providing essential elements for the growth of trees. Nitrogen fixing bacteria live in decaying wood and produce nitrogen, an essential nutrient for forest tree growth. Eventually, over a period of years, the decaying woody material becomes part of the soil, contributing to the cycle of forest health.

DEAD TREE HABITATS

West of the Cascades in Oregon and Washington, 39 species of birds and 14 species of mammals depend on cavity trees for their survival. East of the Cascades 39 bird species and 23 mammal species depend on these trees. Additionally, many species of fungi, moss, lichens, ferns, invertebrates, reptiles and amphibians that form an integral part of a healthy forest also depend on dead trees and down woody material for all or a part of their life cycle.

Habitat for cavity dwelling birds begins to form when a large tree dies and forms a "HARD SNAG" with the bark still intact and with firm heart and sapwoods. Later, this hard snag decays to become a "SOFT SNAG" which may have some bark remaining but with the wood beginning to soften. As decomposition continues, a soft snag may become a "BUCKSKIN SNAG" where the bark is missing and the wood continues to soften. Decomposition causes snags to become shorter and shorter as parts of the top decay and successively fall, adding woody material to the forest floor. Each of these progressive changes in a cavity tree represents a structural habitat change that benefits a different group of birds. Snags may provide habitat over a period of 30 to 70 years depending on the size and species of tree and the type of forest in which it occurs.

A recently dead tree or hard snag is first used by woodpeckers, called primary excavators, which are capable of making a cavity in wood. Woodpeckers that may use hard snags include:

- yellow-bellied sapsucker
- black-backed three toed pileated
- Williamson's sapsucker
- northern three toed downy acorn

After the hard snag decays and softens, a different group of primary excavators move in and create cavities. Three species of chickadees, the Lewis' woodpecker and three species of nuthatches are examples. These cavities are later used by about 27 bird and 18 mammal species that can't make their own cavities, but rely on cavities made and abandoned by woodpeckers. This group is called the "secondary cavity user" group. Some examples are:

- mountain bluebird
- western bluebird
- house wren
- tree swallow
- wood duck
- goldeneye duck
- barn owl
- pygmy owl
- saw-whet owl
- American kestrel
- Vaux's swift
- bats
- squirrels
- marten
- raccoon
- porcupine

An additional 25 bird and 23 mammal species depend on tree cavities during some time of the year if they are to survive in timbered areas.

In addition to the benefits that cavity dependent birds provide in consuming insects, some species such as owls, kestrels, weasels and marten prey on gophers, voles, hares and mountain beaver which may cause significant losses in young forest stands.

CAVITY TREE MANAGEMENT

Trees managed for cavity nesters should meet minimum height and diameter criteria and occur in the woodlot in specific places in relation to riparian zones, slope position and aspect. The number of existing cavity trees and the number of "replacement" cavity trees is important in maintaining long-term populations of cavity dependent birds. A minimum number of cavity trees would be two "hard', one "soft" and three "replacement" green (live) trees per acre with a minimum diameter of 15 to 17 inches and a height of 15 to 30 feet. In a clear cut larger than 10 acres, a minimum number of cavity trees would be two snags or two green trees at least 30 feet in height and 11 inches DBH at least 50 percent of which are conifers. Additionally, two downed logs or trees, 50 percent of which are conifers, that are at least 12 inches in diameter and 16 feet long, should be left for wildlife. If trees of this size are not available, equivalent volume of downed material will suffice. A snag tree that is 20-24 inches in diameter and at least 30' high will provide habitat for large species like the pileated woodpecker and wood duck as well as the smaller species. These cavity trees should be distributed over 50 to 75 percent of the woodlot. Green replacement trees are as important as existing snags in a healthy forest because they replace snags that fall over, ensuring a constant supply of snags through time.

The most productive cavity habitat will be present when a variety of trees species, diameters and heights are available throughout the woodlot. Conifers usually last longer than other species. In general, cavity trees less than 12 inches in diameter and less than 15 feet high provide the least amount of benefits. Also your woodlot should have a minimum of two pieces of large, downed woody material per acre in various stages of decay. These pieces should be 10 feet long to be

Wildlife trees may be left where they will cause little problem if they fall, such as along roads so they do not threaten to roll, fall or slide into the right-of-way.

most effective in maintaining wildlife habitat and forest health.

Tree species which provide good quality cavity habitats vary depending on the type of vegetative community they are in. Grand fir, Douglas fir, ponderosa pine, spruce, larch, western red cedar, cottonwood and willow are used because they tend to stand for long periods of time. The best hardwoods to grow on a woodlot to provide cavities are big leaf maple, oak and alder. The type of habitat in which a snag is located will also determine which wildlife use it. A snag in a young forest will provide habitat for a different set of species than a snag in an old stand.

Large cavity trees will usually stand longer than small diameter trees and could be present through many stages of forest development. Small diameter cavity trees provide minimum opportuntiy for cavity dependent birds and deteriorate within a few years. Where conditions permit, cavity trees should be located within riparian zones or wet areas, along the upper one-third of slopes, and on the south and east slopes. Cavity trees in riparian zones eventually fall and may add large woody debris to stream channels. This is a valuable component for maintaining pools and riffles which provide fish habitat, aquatic insect habitat and protection for fish from predators.

If the woodlot has no cavity trees present, potential future cavity trees can be selected from diseased live trees, possibly with heart rot or a dead top. Live trees without such problems, but not suitable for market, can be purposely injured to create snags. Tops can be removed from live trees or they can be partially barked. These practices imitate nature by providing a place for organisms and fungi to enter the tree and begin the decay process. Burning will also kill trees, but often "case hardens" the snag rendering it less valuable to wildlife. Trees killed by fire should be left, however, because they provide structure and perch sites in the forest. Live trees may be left during harvest to grow to the diameter and height needed for good cavity trees. Scheduling future cavity trees in "time and space" assures the manager of a constant supply of birds, mammals and large woody debris.

SAFETY

Cavity trees can be a hazard to vehicles, buildings, powerlines, fences and workers if not

Wildlife trees can be left along lakes, ponds or streams, especially where the lean is over water or along the edge away from work area.

CHECKLIST FOR CAVITY TREE MANAGEMENT

Use this checklist to evaluate the health of your woodlot. Cavity trees and replacement trees should be a minimum of 15 to 17 inches DBH and 15-30 feet tall.

	GOOD	NEEDS HELP
Hard Cavity Trees:		
Less than 1/acre		yes
Soft Cavity Trees:		
Less than 1/acre		yes
1 or more /acre	yes	
Future Cavity Trees:		
Less than 1/acre		yes
1 or more / acre	yes	
Distribution over woodlot:		
less than 25%		yes
25% to 49%		yes
50% to 74%	yes	
more than 75%	(very good)	

Down Woody Debris (two pieces per acre in each decay class 16 feet long by 20 inches in diameter.)

	2 OR MORE	LESS THAN 2
Class 1 sound	yes	no
Class 2 soft (contact w/ground)	yes	no
Class 3 soft (partially buried)	yes	no
Class 4 skeleton remains	yes	no

managed properly. Cavity trees should be located where they will not damage property or cause injury if they fall. Plan and organize work to prevent workers and equipment being in the "fall zone" of cavity trees. Guidelines for safe cavity tree nesting management are available from various state and federal agencies.

REFERENCES

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_____.1986. Guideline for Selecting Live or Dead Standing Tree Wildlife Habitat. Pub. No. R6-F&WL-219-1986. USDA Forest Service, Pacific NW Region, Portland, OR. 9 pp.

Available from Fish and Wildlife Division, US Forest Service, P.O. Box 3623, Portland, OR. 97208

Our Purpose...

This leaflet was written by Richard J. Pederson, wildlife/silviculturist program manager, U.S.D.A. Forest Service Pacific NW Region.

The Woodland Fish and Wildlife Project is a cooperative effort among the World Forestry Center, Oregon State Department of Forestry, Washington State Department of Natural Resources, Oregon State University Extension Service, Washington State University Cooperative Extension, University of Washington Center of Streamside Studies, Oregon Association of Conservation Districts, Oregon Small Woodlands Association, Washington Farm Forestry Association, Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Wildlife, Oregon Soil Conservation Service, Washington Soil Conservation Service and the USDA Forest Service. The World Forestry Center serves as the coordinating organization for the project.

The Woodland Fish and Wildlife Project was initiated to provide information on fish and wildlife management to private woodland owners and managers. It is the intent of the organizations involved in this project to produce publications that will serve as practical guides to woodland owners.

Each publication is intended to be complete in itself. Users may find it convenient to collect all publications in this series in a three ring binder to form a permanent reference file. Woodland Fish and Wildlife Project publications range from an overview of fish and wildlife opportunities on woodland properties to specific publications concerning techniques for managing individual species.

These publications can be obtained from any of the cooperating organizations or by contacting the World Forestry Center, 4033 SW Canyon Road, Portland, OR 97221, (503) 228-1367.

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