



Woodland Fish & Wildlife

Cavity-Nesting Birds and Small Woodlands

Fran Cafferata Coe, Cafferata Consulting, Hillsboro, Oregon

Many birds utilize cavities for roosting, resting, cover, or other purposes during some time of the year to ensure their survival in forested areas in Oregon and Washington. These colorful, active and interesting bird species have important ecological roles that enhance the beauty and ecological health of woodlands. These species:

- Create key habitats for other species.
- Reinforce natural decay patterns in snags and downed wood, which eventually returns nutrients to the soil.
- Consume insects (including forest insect pests).

Cavity-nesting bird species are diverse, ranging from woodpeckers to chickadees, owls and ducks. These species all rely upon standing dead wood, or snags, for habitat. Live trees with significant defects such as heart rot or decayed branch scars also provide habitat. Habitat for cavity-nesting species begins to form when a tree dies, or rot persists in a live tree, and continues to provide habitat for different species as decomposition continues. The following common cavity-nesting bird species may be found within Oregon and Washington.

Common, easily identifiable species of cavity-nesters that may be seen on private woodlots and forests include:

- Northern flicker
- Red-breasted sapsucker
- Hairy and downy woodpecker
- Violet-green and tree swallow

- Black-capped, chestnut-backed, and mountain chickadee
- Red-breasted nuthatch
- House wren

The cavity-nesting species found in Oregon and Washington have diverse habitat requirements and species ranges. For specific habitat requirements and general information on these species, the following resources are recommended:

Cornell lab of Ornithology:

- www.birds.cornell.edu

Oregon Department of Fish and Wildlife:

- <http://www.dfw.state.or.us/species/birds/index.asp>

Washington Department of Fish and Wildlife:

- <http://wdfw.wa.gov/living/birds.html> and <http://wdfw.wa.gov/publications/00026/>
- **Field Guides**, such as the Sibley Field Guide to Birds: Western North America
- *Birds of Oregon: a General Reference*

Primary and Secondary Cavity Nesters

A recently dead tree, with bark intact and with firm heartwood is first used by woodpeckers, which are called primary excavators. These primary excavators chip out a new cavity (or rework an old one) every year as a regular part of courtship



Downy Woodpecker. Photo by Glenn Thompson

A publication by the Woodland Fish and Wildlife Group, 2014. Funded in Part by the Oregon Forest Resources Institute. Publications by the Woodland Fish and Wildlife Group are intended for use by small woodland owners across the Pacific Northwest. Some resources here are state specific, but should be generally useful to landowners throughout the Pacific Northwest.

Cavity-Nesting Bird Species in Oregon and Washington

Common Name	User Type	Common Name	User Type
Chickadees, Titmice, Nuthatches & Creepers			
Black-capped chickadee	Primary	Pygmy nuthatch	Primary
Boreal chickadee	Primary	Red-breasted nuthatch	Primary
Chestnut-backed chickadee	Primary	White-breasted nuthatch	Primary
Mountain chickadee	Primary		
Ducks			
Barrow's goldeneye	Secondary	Common merganser	Secondary
Bufflehead	Secondary	Hooded merganser	Secondary
Common goldeneye	Secondary	Wood duck	Secondary
Falcons			
American kestrel	Secondary	Merlin	Secondary
Flycatchers			
Ash-throated flycatcher	Secondary	Old-world sparrows	—
Pacific-slope flycatcher	Secondary	House sparrow	Secondary
Owls			
Barn owl	Secondary	Northern pygmy owl	Secondary
Barred owl	Secondary	Northern saw-whet owl	Secondary
Boreal owl	Secondary	Spotted owl	Secondary
Flammulated owl	Secondary	Western screech-owl	Secondary
Swallows			
Purple martin	Secondary	Violet-green swallow	Secondary
Tree swallow	Secondary		
Swifts			
Vaux's swift	Secondary		
Thrushes			
Mountain bluebird	Secondary	Western bluebird	Secondary
Vultures			
Turkey Vulture	Secondary		
Woodpeckers			
Acorn woodpecker	Primary	Pileated woodpecker	Primary
Black-backed woodpecker	Primary	Red-breasted sapsucker	Primary
Downy woodpecker	Primary	Red-naped sapsucker	Primary
Hairy woodpecker	Primary	Three-toed woodpecker	Primary
Lewis's Woodpecker	Primary	White-headed woodpecker	Primary
Northern flicker	Primary	Williamson's sapsucker	Primary
Wrens			
Bewick's wren	Secondary	Winter wren	Secondary
House wren	Secondary		

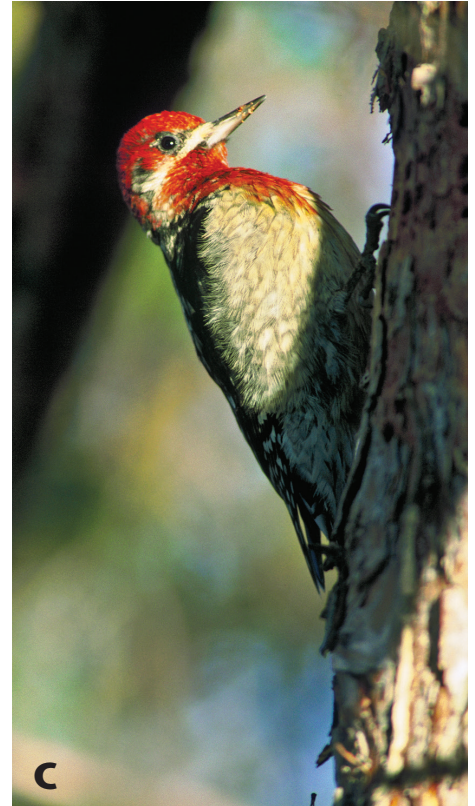
and nesting behavior. They drum and call near their selected cavity locations in impressive displays. Primary cavity excavators that use these hard snags in Oregon and Washington include woodpeckers such as the hairy woodpecker and red-breasted sapsucker. As the hard snags decay and begin to soften, a different group of primary excavators move in and create cavities. Primary excavators that utilize soft snags include nuthatches and some woodpeckers that are considered “weak excavators” (e.g., northern flicker). Primary cavity nesting species are considered ecological keystone species, as their presence allows many other species to use the interiors of tree stems as critical nesting and roosting habitats.

The cavities created by primary excavators are later used by a secondary cavity nesters, birds that cannot make their own cavities, but rely upon cavities for nesting or as part of their reproductive cycle. Some species utilize natural cavities in trees that are formed during the trees decay process. Examples include the cavity-nesting owls and ducks which are completely reliant on available cavities for nesting.

General Habitat Conditions and Associations

Nesting Habitat

In general, cavity nesting bird species require dead wood (usually snags) for nesting habitat. As trees decay, they become softer and can be more easily



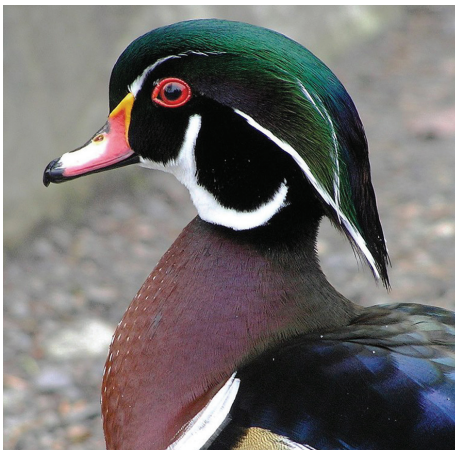
Northern Flicker (A), Red-breasted Nuthatch (B), and Red-Breasted Sapsucker (C).
Photos by Dave Menke, USFWS.

excavated. In addition, natural decay processes, including heart rot create natural cavities in trees that are used by a variety of species, including western screech owls. Cavity-nesting bird species utilizes snags in a variety of forest types – from mature timber to clearcuts, depending on their individual species needs.

Past studies have shown that snag abundance is related to the successional stage of a forest stand (Ohmann et al., 1994). That is, as forest stands age and increase from early to mid- to late-successional forests, snag abundance and size increases as well. Mature stands generally contain more snags than younger forested stands. Closed-canopy stands (which are typical of late-successional forests) recruit more snags due to shady forested conditions and competition for light (Ohmann et al., 1994). Older stands have also had more time to develop snags.

Younger forested stands also provide habitat for cavity-nesting birds. In fact, these stands are of particular importance to certain species, such as violet-green swallows, western bluebirds, and red-breasted sapsuckers. Generally, the snags found in younger stands are remnant snags – those snags that have been preserved from past forest conditions. The lack of natural recruitment of snags in younger forest conditions on managed forests underscores the importance for snag preservation and creation for cavity-nesting species on these lands, as will be discussed below. Studies have shown that created snags do provide habitat for cavity nesting birds (A.J. Kroll et. al 2012).

Forested wetlands, waterways, and riparian areas containing abundant snags are critical for some cavity-nesting birds, specifically ducks such as wood ducks, common merganser, and bufflehead. Cavities created by natural conditions



Wood duck. Photo by Kahn Tran.



Tree Swallow. Photo by Ken Bevis.

and by primary excavators are used by these species for nesting.

Larger snags provide the best habitat for cavity nesting species, providing more available surface and internal space for cavities. Large snags are critical for big birds such as pileated woodpeckers and cavity-nesting ducks, as they require larger trees to install their nests. Research has shown that cavity-nesting birds consistently select the larger trees and snags in a stand for nesting over smaller ones. Thus, diameter seems to be an important factor in the quality of potential nesting trees and snags.

However, smaller snags provide habitat for many species, particularly when soft. Chickadees, for example, will make a tiny cavity in snags and other soft, dead wood as small as 4" in diameter. While tall snags and trees provide more potential habitat for nesting (i.e., more cavities can fit in a tall tree) and better protection from predators, some cavity-nesting birds will use short snags. Even tall stumps can provide adequate substrate for some species such as low-nesting flickers.

"A tall stump is a short snag."

— Ken Bevis



Duck box. Photo by Steve Hillebrand, USFWS.

Foraging habitat

While snags are important for cavity-nesting species, as they provide substrates for the natural creation or excavation of cavities, foraging habitat is also critical to the success of these species. The snags themselves often provide dual habitat purposes – both substrates for cavities and foraging opportunities. Snags of differing softness provide habitat for insects and other prey items for cavity-nesting

birds. Dead branches on live trees can also provide similar foraging habitat for cavity-nesting birds.

Live trees also provide opportunities for foraging, and the larger the tree, the more surface area (including crown, trunk and branches) is available for foraging habitat. Therefore, larger trees provide more potential foraging habitat than smaller trees (Weikel and Hayes 1999). Larger diameter conifer trees generally have more deeply

furrowed bark. These furrows have been indicated to influence the presence of insects, which many cavity-nesting species feed upon.

Many cavity-nesting species forage in hardwood, or deciduous trees. Hardwood species have been indicated to have higher concentrations of arthropods, insects that many cavity-nesting species, such as chestnut-backed chickadees, feed upon (Weikel and Hayes 1999). As the abundance of these important prey items may be higher on hardwood tree species, such as red alder, hardwood preservation may be particularly important to many cavity-nesting bird species, especially on landscapes that are dominated by conifers.

Threats to Cavity-Nesting Species

Snags are often removed from forests as they are thought to be dangerous, vectors for disease and insect pests, fire hazards, and firewood. Salvage logging in areas disturbed by fire, drought or insect damage further reduces the presence of standing snags and downed wood. Fire suppression has had a double-edged effect to a reduction in snag habitat: resulting in a lack of low-intensity fires that can create snags, and an increase in high-intensity, stand-replacing fires that destroy habitat altogether. In addition to the loss of nesting habitat, the loss of suitable foraging habitat can also negatively impact cavity-nesting bird species. Forest harvest practices should strive to retain snags, downed wood and hardwood patches in order to maintain habitat for cavity-nesting birds. Snags can stand for many years in most forest settings and should be considered as a part of long term forest management.

What silvicultural methods can I use to promote habitat for cavity-nesting species?

There are many tools that forest landowners can use to promote habitat for cavity-nesting species. The following general forest practices will help main-



Wood duck eating – Juanita Bay. Photo by Glenn Thompson.

tain healthy populations of cavity-dwellers, which in turn can lead to healthier forests:

- Retain existing snags, especially large-diameter snags.
- Retain live trees for future snag recruitment and foraging habitat, especially larger-diameter trees and trees with defects.
- Create snags, using techniques such as girdling or topping.
- Create and maintain foraging habitat, including large live trees, hardwoods, downed wood, and snags.
- Gather firewood as a part of thinning activities by girdling smaller diameter trees one year before cutting for firewood.
- Retain all large (>10") diameter snags unless it is a safety hazard.

Both Oregon and Washington state forest practices rules require that snags and green trees be left during forest

harvests to support wildlife species, including cavity-nesting species. On average, two snags and/or green trees are required to be left, per acre. However, these state requirements should be seen as minimum requirements rather than targets to help maintain habitat for cavity-nesting birds; the more snags and live trees that can be maintained within a forest harvest, the better. These trees should be the largest diameter and tallest available. To reduce the cost of leaving snags, landowners can select trees that are rotting or that have deformities.

If non-federal lands are to continue contributing to cavity-nester habitat in the region, the most critical needs are to ensure that large snags are retained following harvest, that sufficient live trees are retained for future snags, and that snag and stand dynamics are considered over longer time frames (at least 1 entire stand rotation).



Hairy Woodpecker. Photo by Donna Dewhurst, USFWS.



Pileated Woodpecker. Photo by Glenn Thompson.

Live and dead snags that should be retained for cavity-nesting bird species include those with:

- Broken or dead tops
- Dead branches in the crown (especially main limbs)
- Wounds or scars on the tree, particularly at the base
- Indicators of internal rot (fungi, conks, or existing woodpecker use)

Larger diameter and taller snags can stand longer and provide for more (and larger) cavities. These trees should be retained. Where snags are lacking, they can be created by a variety of methods:

- Girdling - removing a strip of bark around the entire diameter of the trunk of a tree, or around the main branches. This can be an effective technique high on the stem.
- Topping - removing the top portion of the tree and leaving only the bole or the bole plus a few live branches. Removing approximately $\frac{3}{4}$ of the side-branches of the tree.

Where should I leave my snags?

Not all species of cavity-nesting birds use snags in the same way. Therefore, a variety of snag retention or creation

strategies should be used. Snags and live trees may be scattered throughout harvest areas, or can be clumped together in “islands.” Snags and live trees may be especially beneficial to cavity-nesting birds if left near forested wetlands, riparian areas, or adjacent to patches of hardwoods, shrubs or forest openings. It is important to consider how your forest fits within the surrounding landscape. For example if your land is adjacent to a large industrial forest, that might influence how and where snags are needed on your property.

Creating artificial nest sites

Where snags are lacking, but habitat conditions are otherwise optimal, landowners can help to provide habitat for cavity-nesting birds by creating and installing nest boxes. Species that readily accept boxes include:

- Wood duck
- Common merganser
- Hooded merganser
- Western and Mountain bluebird
- American kestrel
- Purple martin
- Violet-green and Tree swallow
- House wren

Nest boxes may be purchased or can be handmade, but each should be tailored to individual species needs. Key features are: Depth from entrance hole to floor, diameter of entrance hole, roughness of interior surface, especially on the inside of the door to allow young birds to climb out. For example, western bluebirds require entrance holes between 1.25 and 1.5 inches in diameter, to help resist predators and deter competition from European starlings. Nest boxes should be placed in areas ideal for the target species, such as within or adjacent to forested wetlands for wood ducks, on the edges of openings for swallows and bluebirds, and must be maintained on a regular basis. For more information regarding artificial nest sites, refer to the following resources:



American Three-toed Woodpecker - Highland Snow Park. Photo by Glenn Thompson.

Cornell Lab of Ornithology:

Attracting Birds with Nest Boxes:

- <http://www.allaboutbirds.org/page.aspx?pid=1139>

NestWatch:

Nest Box Resource Center:

- <http://nestwatch.org/learn/nest-box-resource-center/nest-box-construction-plans/>

Washington Department of Fish and Wildlife:

- <http://wdfw.wa.gov/living/projects/nestboxes/>

Oregon State University:

- <http://extension.oregonstate.edu/4hwildlifestewards/pdfs/birds.pdf>

Nest boxes should feature:

- Untreated wood
- Drain and ventilation holes
- Access panels for maintenance
- Rough interior walls
- No exterior perches
- Weather resistant roofs

Sources and More Information:

Andrew J. Kroll, S. Duke, M. Hane, J. Johnson, M. Rochelle, M. Betts & E. Arnett. 2012. Landscape composition influences avian colonization of experimentally created snags. *Biological Conservation* 152 (2012) 145 – 151.

Marshall, D.B., M.G. Hunter, and A.L. Contreras, Eds. 2006. *Birds of Oregon: A General Reference*. Oregon State University Press, Corvallis, Oregon. 768 pp.

Ohmann, Janet L., William C. McComb, and Abdel Azim Zumrawi. 1994. Snag Abundance for Primary Cavity-Nesting Birds on Nonfederal Forest Lands in Oregon and Washington. *Wildlife Society Bulletin* 22:607-620, 1994. Available online at: <http://www.treesearch.fs.fed.us/pubs/5510>.

Parks, Catherine. G. and Torolf R. Torgersen. 1997. Identification of Snags and Logs in the Interior Columbia River Basin. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station General Technical Report. PNW-GTR-390. http://www.fs.fed.us/pnw/pubs/pnw_gtr390.pdf

Scott, Virgil E., Keith E. Evans, David R. Patton and Charles P. Stone. 1977. Cavity-Nesting Birds of North American Forests. U.S. Department of Agriculture, Washington D.C. Available online at: <http://t.nyfoa.org/swg/docs/CavityNestingBirdsofNorthAmericanForests.pdf>.

Weikel, Jennifer M. and John P. Hayes. 1999. The Foraging Ecology of Cavity-Nesting Birds in Young Forests of the Northern Coast Range of Oregon. *The Cooper Ornithological Society: The Condor* 101:58-66. Available online at: <https://sora.unm.edu/sites/default/files/journals/condor/v101n01/p0058-p0066.pdf>

Summary

Cavity-nesting bird species are ecologically important, as they provide habitat for a variety of other species, help to control populations of insects and small mammals (including damaging pest species), and reinforce and accelerate natural decay processes. These species are not only compatible with small woodland management, but are beneficial as well. There are over 50 cavity-nesting bird species found in Oregon and Washington, each with unique habitat and foraging requirements. They are, however, all dependent upon standing dead trees (snags), and/or defective live trees for nesting habitat. Existing snags should be protected and preserved, and live trees should be left for later recruitment of snags, especially large diameter, tall trees with existing rot or deformities. When natural habitat is lacking, forest and woodland owners can create habitat for cavity-nesting birds by creating snags and installing nest boxes in appropriate locations.

The Woodland Fish and Wildlife Group gratefully acknowledge funding support provided by USDA Forest Service, Pacific Northwest Region, State and Private Forestry.

The species associated with cavity habitats make up between 25 and 40% of the vertebrate biota in forest ecosystems in Oregon and Washington. Providing dead wood habitats for these species is one of the best strategies available to small woodland owners for maintaining and enhancing wildlife populations on their lands.

About The Woodland Fish and Wildlife Group

The Woodland Fish and Wildlife Group is a consortium of public agencies, universities, and private organizations which collaborates to produce educational publications about fish and wildlife species, and habitat management, for use by small woodland owners in the Pacific Northwest.

Currently available publications can be viewed and downloaded, free of charge, at the organization's website:

www.woodlandfishandwildlife.com

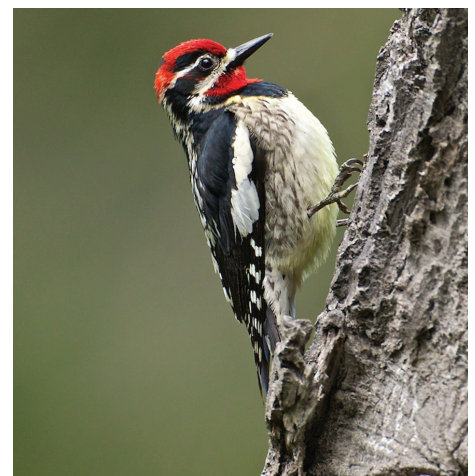
Woodland Fish and Wildlife publications are not copyrighted and may be reproduced with appropriate credit to the organization and the author(s).

Comments or other communications may be directed to:

Woodland Fish and Wildlife Group
c/o Executive Director
Western Forestry and Conservation Association

4033 SW Canyon Road
Portland, OR 97221
(503) 226- 4562

richard@westernforestry.org



Red-naped Sapsucker. Photo by Glenn Thompson.