

# TECHNICAL NOTES

---

U.S. DEPARTMENT OF AGRICULTURE  
PORTLAND, OREGON

NATURAL RESOURCES CONSERVATION SERVICE  
MAY 2006

---

## **BIOLOGY TECHNICAL NOTE NO. 49**

### **WOODLAND FISH AND WILDLIFE: WILDLIFE IN BROADLEAF WOODLANDS OF OREGON AND WASHINGTON**

The enclosed Technical Note was published by the Woodland Fish and Wildlife group. It provides some broad management ideas, some tables identifying wildlife species primary habitats, and deciduous trees and shrubs native to Oregon and Washington.

Other wildlife publications are available online at <http://www.WoodlandfishandWildlife.org>.



## Woodland Fish and Wildlife

### *Wildlife in Broadleaf Woodlands of Oregon and Washington*

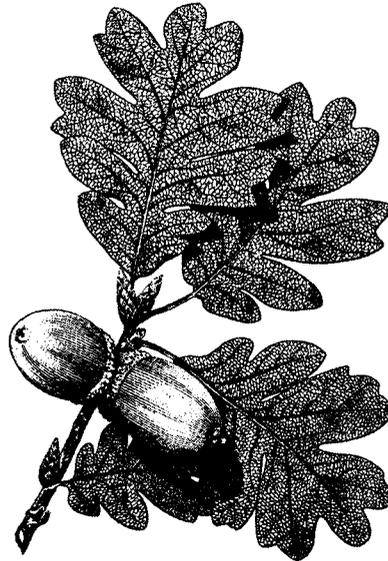
**W**ildlife species need a number of different habitat components in order to thrive. Food, water, shelter and space are all essential pieces of the habitat pie. Wildlife species live in all types of habitat. Of all the habitats in Oregon and Washington, perhaps the most wildlife-friendly is the broadleaf woodland. Today, large tracts of pure broadleaf woodlands exist in very few places in Washington and Oregon. Prior to European settlement, white oak forests extended throughout the islands in Puget Sound and in Washington's Puget Sound trough as well as throughout the length of Oregon's Willamette valley and into the Umpqua Valley.

The mighty oak tree, whether black oak (*Quercus kelloggii*), white oak (*Quercus garryana*), or the occasional coast live oak (*Quercus agrifolia*), is probably the premier wildlife tree in this region. Its bountiful acorns provide food for deer, elk, bear, squirrels, chipmunks, turkeys, and many bird species. Its tender green leaves are food for browsers in the springtime and it provides good habitat for insects that are eaten by many birds

and small mammals. During hot summer months, the oaks provide shade and cover for many different animals and help keep water temperatures cool for trout and salmon. In the fall, leaves drop into the streams providing hiding cover for small fish. Fallen leaves on land provide thermal and hiding cover for amphibians and reptiles. Additionally, the floating leaves provide habitat for insects which in turn provide fish food. These hardwood trees can develop

cavities through weather or wind damage that provide snug homes for a variety of woodpeckers, cavity nesting birds, and tree-dwelling mammals. Even after these trees have died, these cavities and the bugs that take up residence in the rotting wood provide shelter and food for many wildlife species.

Mixed hardwood forests are the most common broadleaf woodlands we see today. Big leaf maple (*Acer macrophyllum*), black cottonwood (*Populus trichocarpa*), red alder (*Alnus rubra*) and Oregon ash (*Fraxinus latifolia*) are frequently found along healthy streams while broadleaf trees that prefer dry soils, such as oak, madrone (*Arbutus menziesii*), Pacific dogwood (*Cornus nuttallii*), mountain ash (*Sorbus sitchensis*), giant chinquapin (*Castanopsis chrysophylla*), and chokecherry (*Prunus virginiana*), are generally found in upland areas. Each of these broadleaf species provides at least one of the vital habitat needs of wildlife; most provide more than one. In the woodlands, all of these trees are frequently mixed in with a few Douglas-fir, western red and incense cedar, and other conifers.



**Leaves and acorns of white oak,  
*Quercus garryana*.**

## Ecology of Broadleaf Woodland

Distribution of broadleaf woodlands is partly due to fire and partly due to forest succession free from catastrophic disturbances. Although data is sparse, it appears that from the mid-1600s until European settlement in the 1850s, dense broadleaf forests were confined primarily to the mountain foothills and floodplains. Prairies and open areas were maintained in the interior valleys through fires set by the Native American inhabitants. The advent of European settlement with fire suppression and conversion of most open areas to farms and urban areas promoted closed oak forests with very little acorn production. This led to the gradual elimination of hardwoods from the forested community. With few exceptions, no large stands of broadleaf trees currently remain in upper elevation sites (red alder stands in the Mt. St. Helens area of Washington are a major exception). Broadleaf species that prefer dry soils, such as madrone, Oregon white oak, and California black oak, are often found interspersed in mixed conifer stands. Broadleaf species that prefer moist soils, such as Oregon ash, bigleaf maple, and black cottonwood, are found predominantly in broadleaf woodland areas in riparian areas.

Information on growth rates and reproductive strategies of broadleaf trees is as varied as the niches they fill. Some, like red alder and white oak, regenerate primarily by seed. Others, like black cottonwood, reproduce commonly through root suckers

and shoot sprouting. Still other species, like the Pacific madrone, use both seed and budding from stumps to assure their survival. Some of these trees, such as red alder, can be found on disturbed ground in early successional forests and others only grow in the shade of other well-established trees. All of these species have their place in a well-functioning ecosystem.



Flower and fruit of chokecherry,  
*Prunus virginiana*.

A number of shrubs important to wildlife also occur in broadleaf or mixed forest sites. Over 90 different plant species are associated with Oregon white oak communities. Pacific madrone has an important presence in seven different western ecosystem types. Some of the important wildlife plants associated with broadleaf trees include ceanothus, manzanita, red elderberry, Oregon grape, trailing blackberry, red osier dogwood, salal, oxalis, and vine maple. All of these shrubs shelter in the shade of broadleaf

trees and all of them provide food and/or shelter for wildlife species.

It's difficult to say how many species of wildlife are dependent on all the various forms of hardwoods. Forested habitats containing just one primary tree species, as in intensively managed, even-aged Douglas-fir or pine stands, or almost any uniform-sized pole stands with closed canopy, offer much less to wildlife than stands containing a mix of conifers and hardwoods of different age classes. Analysis of different forest types throughout the region show that the highest number of wildlife species (measured as species richness) in forested environments are found in mature mixed conifer and hardwood stands. These stands are defined as containing from 30–70 percent deciduous trees (mostly red alder on the west side of the Cascade Mountains) as upper canopy cover. When all stages of all types of plant communities are compared, hardwood-dominated riparian and wetland zones contained even more species. Over 260 wildlife species are known to feed in these two habitats. Out of a total of more than 430 species of forest-dependent wildlife on the west side of the Cascades, more than 200 species breed or rear young in hardwood-dominated riparian and wetland zones. The east side has fewer species (about 325), but almost 190 use deciduous riparian habitats for feeding and more than 120 use these habitats for reproduction. Each stage of forest development in a given habitat contains wildlife species unique to the plants and community structure of that stage.



## Generating Your Broadleaf Species

Without fire, harvest, or some type of disturbance, conifers will naturally crowd out many broadleaf species. While most broadleaf species prefer the partial shade that comes from close association with conifers, too much encroachment will often result in their replacement. For this reason, either a well-managed fire regimen or selective harvesting of encroaching conifers is encouraged in areas where broadleaf trees are already established. A major exception is red alder, which is very shade intolerant and must be established in full sun.

Steps for natural regeneration of broadleaf species, with the exception of red alder, are largely untested. Many of the resprouting species, such as chinquapin and madrone, may respond well to light fire management or strategic pruning. Sprouts have an advantage over seeds because they are nourished by an already-established root system. The drawback of this type of propagation is that sprouts must manufacture enough energy to sustain a root system that formerly nourished a large tree. This requires the production of many leaves, and so they must have access to full sunlight.

Other trees, such as white and black oak, may be best started by collecting their acorns in the fall. Keep the acorns under a shallow layer of moist leaves and, after they

sprout, transplant them outdoors to a site with ample sunlight. Whenever transplanting young trees, you will need to control weeds around the tree and you will probably want to cage the young tree in order to protect it from browsing wildlife until its roots are well established. You can easily do this using commercially available plastic mesh tubing, small pieces of hardware cloth, or small mesh stock fencing. In riparian areas, reed canary grass can be a major exotic weed problem and repeated weeding may be needed to eradicate it.

If you are interested in propagation, consulting a professional arborist who is knowledgeable about raising hardwoods can be very helpful. Many of these species can also be purchased through native plant nurseries. In many cases, the skilled professionals working at these nurseries can provide you with high quality plants from local stocks and you will avoid the frustrations of trial-and-error tree propagation.

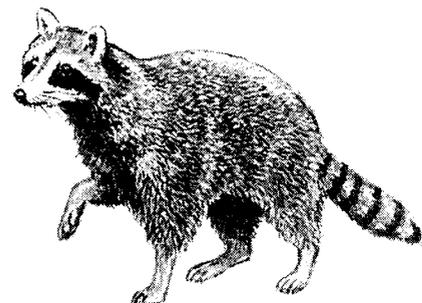
## Hardwood Management for Wildlife

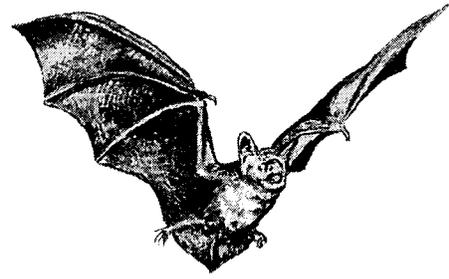
Depending on your objectives as a forestland owner and manager, and the characteristics and potential of your forestland, you may consider several methods for managing hardwoods for wildlife habitat. Management strictly as a commodity crop requires a separate set of objectives and management styles similar to management of conifers for timber. However, several of the methods listed here for wildlife are applicable to

management plans focused on economic goals. Numerous publications and hardwood management consultants can provide good information for management of hardwoods for wood products on a continuing cycle.

### 1. Maintenance of existing hardwoods within riparian zones.

This may involve excluding livestock to assure that the smaller trees are not overgrazed or trampled, and to protect shallow root zones of larger trees. Adequate buffers must be managed where important hardwood groupings exist. Where riparian zones have been degraded or severely eroded, planting native hardwood trees and shrubs in conjunction with shade-tolerant conifers, such as western cedar, may result in a more rapid response than with natural recovery. Grazing must be controlled to assure the establishment of hardwoods. Maintenance of existing hardwoods, including controlling grazing, should also be extended to springs and seeps. These are important habitats and usually support several species of hardwoods. Where fish are of concern, retention of conifers is important and is usually





required by law. Underplanting hardwood dominated riparian zones with shade tolerant conifers, such as cedar, hemlock or grand fir, is beneficial. Tree protectors on seedlings are almost always necessary to guard against loss of the planting from wildlife damage.

## 2. Maintenance of existing hardwoods for wildlife within upland forests.

Implementation of this management measure ranges from benign (no active management at all) to labor-intensive tasks. These latter methods may include opening the conifer overstory to allow subordinate hardwoods to grow.

Slashing—the removal of stems above ground level by cutting with a chainsaw, hand-saw, axe, or loppers—is one way to open the understory. Slashing species such as alder, cottonwood, willow, cascara, aspen, big leaf and vine maple, and birch at the right stage of growth may promote vigorous stump sprouting. However, species such as red alder die when cut at ages past the juvenile stage. Hardwood species tend to form dense stands and eliminate understory vegetation including suitable wildlife forage and ground cover, if left untended. Mature

hardwood stands supply a great deal of habitat for cavity nesters and upper canopy dwellers and can also provide an economic return if harvested at maturity. However, they supply little usable wildlife forage when the trees grow beyond the reach of herbivores and small birds and mammals that nest and forage near the forest floor. If larger pure stands of these tree species exist, slashing or selective harvest should only be done on a portion of the stand to ensure a continuum of age and size classes exists that will accommodate more wildlife species. As a rule of thumb, slash less than one-fourth of the trees in a stand within any five-year period to maintain high wildlife habitat diversity within a particular stand. If harvesting of hardwoods for lumber is the primary objective, then manage the stands so that some mature hardwood trees for wildlife are always present on the site. Harvest of some species, such as big leaf maple, aspen and cottonwood, may result in stump sprouting that will continue to provide accessible quality browse and shrubby growth for wildlife. See the Woodland Fish

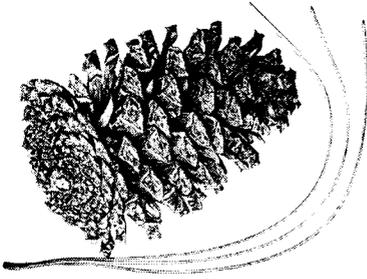


and Wildlife publications on deer, elk, grouse, and quail for some optimum site conditions and hardwoods to grow for those wildlife species.

Caution must be exercised if using herbicides to control unwanted vegetation. This is an effective, and at times necessary, technique for controlling some hardwoods that threaten to overtop developing conifer plantations. Application of herbicides can be too successful from a habitat point of view and devastate wildlife habitat composed of various deciduous species. Broadcast spraying is not recommended. If herbicides must be used in lieu of hand slashing, spot spraying with backpack or tank sprayer application is desirable. On large stands where this is not practical, protect areas around seeps and springs and consider spot spraying around individual dominant hardwoods or around small pockets of selected hardwoods that are to be maintained for wildlife habitat diversity.

## 3. Thinning and pruning conifer stands.

Appropriate levels of thinning and pruning lower branches of conifers allows more light to reach the forest floor, promoting growth and development of hardwoods in the understory. If done properly, this operation can not only increase the growth rate and wood value of conifers, but also promote the development of some hardwoods for wildlife habitat and secondary forest products in the understory.



**Conifer species such as Ponderosa pine are found mixed with hardwoods in many forest stands.**

When commercially thinning conifer stands, a variable-density thinning should be implemented if this practice is to include goals for wildlife. The variable-density thinning maintains some dense patches of conifers for thermal and hiding cover while also maintaining some sun-filled openings for hardwood tree and shrub development. Not all trees should be pruned as some wildlife species will benefit from low-lying conifer branches.

This approach may not allow the landowner to maximize tree growth and timber profit, but it does allow for the retention and development of more wildlife habitat. There is no standard for a variable-density thinning and pruning for wildlife as there is with thinning for forest products. On larger tree farms (or on landscapes where neighbors can work towards a common goal), leaving unthinned and unpruned blocks of 5–40 acres between thinned stands supplies thermal and escape cover, among other habitat components. However, on small acreages where individual stands are managed, leaving about two patches very lightly thinned or unthinned

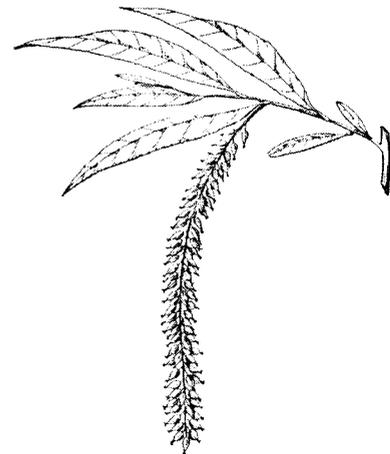
and two patches heavily thinned per acre (opening the canopy to less than 40 percent coverage) will create a highly diverse wildlife habitat. These small parcels should not be less than 50 feet in diameter; the result will be about one-eighth acre heavily thinned and one-eighth acre lightly thinned per acre of forest slated for a precommercial or commercial thinning. This treatment does not need to be uniform but applying the general concept will create more habitat diversity and include hardwoods in a conifer-dominated stand. Caution is advised—the potential for wind-throw must be assessed when applying a relatively heavy thinning regime in all patches of timber, from small to large. Even if only standard thinning prescriptions are applied to a stand, some hardwood trees can be retained for diversity.

Laminated root rot (*Phellinus weirii*) is the most serious forest disease in western North America. This fungus can persist in the soil for 50 years or more and cause laminated root rot. It affects almost all commercially important conifer species in Oregon and Washington; Douglas-fir, Pacific silver fir and grand fir are the most susceptible. Hardwoods, such as red alder, big leaf maple and black cottonwood, are immune. Root rot pockets are good places to diversify the forest and plant broadleaf species. A silvicultural prescription for treating a west side Douglas-fir stand in which laminated root disease exists could include removing susceptible species

within 50 feet of all disease pockets and replanting with red alder.

4. **Controlled burning.** Controlled burning can be quite effective in regenerating old and declining stands of species such as aspen and birch. However, it is a delicate process that requires many safeguards to assure target species are burned, that burning of non-target species and organic topsoil is minimized, that destruction of wildlife and other wildlife habitat components is minimized, and that the fire does not spread beyond the target area. Consult with personnel from Oregon Department of Forestry or Washington Department of Natural Resources to get approval before using controlled burning.

5. **Planting of hardwoods.** Planting appropriately prepared sites can accelerate the development of hardwood wildlife habitat. Many hardwood trees can be planted from seed,



**Willow leaf and seeds.**



**Leaves and seeds of cottonwood.**

bare-rooted seedlings, larger transplant stock, layering, whips, and rooted cuttings. Many hardwoods, especially the most commercially important species, are easy to propagate and can be quite forgiving of technique. One advantage of using native species exclusively is that they are well adapted to the area and have site-appropriate methods of seed dispersal and regeneration that simplify propagation. Some hardwoods, such as madrone, have very low germination and survival rates when sown or planted. Seed or root stock can be acquired from many nurseries. More nurseries are now carrying native stock for purposes of landscaping, erosion control, and wildlife habitat development. Where permission is granted or on one's own land, native hardwoods free from insects and diseases can be dug up and used for bare rooted plantings; whips from several species such

as willow and cottonwood can be cut for planting; and fruits and nuts can be gathered for direct seeding. This latter technique can be quite successful, but many species require special handling, including stratification and temperature-controlled storage of the seeds prior to planting, to assure success. Stratification is a process that breaks down the protective seed coat and chemical inhibitors and so promotes germination. This normally takes some time and occurs when the seed is in contact with cool and moist soil or when the fruit is consumed by a bird and the seed eliminated. The digestive process of the bird allows the seed to survive and pass through but helps break down the protective coat contained on some seeds.

Additionally, cottonwood and some willow "whips" from one to three or more feet in length can be cut from winter-hardened branches and prior to bud break in spring. These whips should be pushed part way into moist soil for propagation of these species. Large clumps of stump-sprouting big leaf maple usually pose control problems for landowners attempting to regenerate conifers. One or more of the better-formed sprouts can be selected for retention for wildlife and timber and the others cut (you may need to repeat cutting for a few years). Old, declining stands of aspen can be cut (leave a few large decadent aspens for wildlife) to regenerate a vigorously-growing young stand.

## Which Hardwood Species?

It can be difficult to decide which species to plant since each site and each hardwood species has specific characteristics and requirements. Landowner objectives will play a key role. Are the trees being planted for commercial harvest, wildlife habitat, or a combination? Is the site wet or dry? Will the trees grow in the understory (requiring shade tolerant species) or will they be dominants in the stand? Compounding the problem of choice is availability of planting stock. Annual tree sales are sponsored by some county Conservation Districts, and there are nurseries specializing in native plant stocks. These sources add options to gathering wild stock. **Your decision can be aided by first doing a species assessment on your property.** Many common species with value for wildlife, timber, and special forest products are probably already on your land. Depending on your location, alder, maple, aspen, birch, or cottonwood may already be present and can be managed accordingly. The larger hardwood trees can be maintained in areas where the effect on conifer production will be minimal or where your goals are to grow hardwoods for wildlife or commercial crops as well as for forest health purposes.

Regardless of site conditions, existing forest stand characteristics, and long-range economic goals of the landowner, retention and maintenance of a variety of hardwood trees will enhance wildlife and is also good forestry practice.

Management Practice	Benefits to broadleaf trees and wildlife
Retain existing broadleaf trees	Stabilizes broadleaf trees over time Allows for development of large trees
Plant and regenerate broadleaf trees	Assures future broadleaf tree availability
Retain large broadleaf trees, especially those with cavities, dead limbs, and other defects	Provides food resources and nesting cavities for mammals and birds over time
Retain down logs in all stages of decay	Provides food and cover sites for many reptiles, amphibians, birds, and mammals
Maintain some small forage clearings within woodlands	Helps maintain safe forage sites for deer and turkeys
Retain all snags	Maintains cover and forage sites for woodpeckers, black bears, bluebirds, and swifts

## Suggestions for Enhancing Wildlife Habitat in Broadleaf Woodland

### Where to Get More Help

Many state and federal sources can provide you with more information to help you manage your broadleaf woodlands. Extension agents and specialists at Oregon and Washington State Universities can provide wildlife and forestry expertise. The USDA Natural Resources Conservation Service (NRCS) assists landowners in developing multiple use management plans for small woodlands. The Oregon and Washington Departments of Fish and Wildlife can assist landowners with Wildlife Habitat Conservation and Management Plans that can not only help you manage for fish and wildlife on your lands, but can also offer you tax advantages in connection with the program. The Oregon Department of Forestry and the Washington Department of Natural Resources can provide current information on programs designed

to assist woodland owners. Conservation organizations such as The Nature Conservancy, local native plant societies and Audubon Chapters can also offer insights into plant and animal communities in your area.

### References:

Anon. A Guide to Stream Corridor Revegetation in Western Washington. Thurston Conservation District, Olympia, WA.

Brown, E. R., ed. 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. USDA Forest Service, Pacific Northwest Region, Pub. No. R6-F&WL-192-1985. Portland, OR.

Defenders of Wildlife, Oregon Biodiversity Project. 1998. Oregon's Living Landscape. Defenders of Wildlife, Lake Oswego, OR.

Hibbs, D. E., D. S. DeBell, and R. F. Tarrant, eds. 1994. The Biology and Management of Red Alder. Oregon State University Press, Corvallis, OR.

Martin, A. C., H. S. Zim, and A. L. Nelson. 1951. American Wildlife and Plants: a Guide to Wildlife Food Habits. McGraw-Hill, NY.

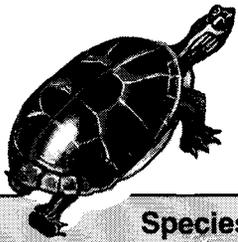
Patton, D. R. 1992. Wildlife Habitat Relationships in Forested Ecosystems. Timber Press, Inc., Portland, OR.

Thomas, J. W., ed. 1979. Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington. Wildlife Management Institute, Washington, D.C.

### Online Resources:

<http://www.fs.fed.us/database/feis/plants>

[http://www.na.fs.fed.us/spfo/pubs/silvics\\_manual/table\\_of\\_contents.htm](http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm)



**Table 1. Wildlife Species With Primary Breeding, Feeding, or Resting Habitats in Broadleaf Woodlands In Oregon and Washington**

Species	Riparian	Edge	Snags	Down Logs
<b>AMPHIBIANS AND REPTILES</b>				
Northwestern salamander	X	X	X	X
Long-toed salamander	X		X	X
Ensatina	X	X	X	X
Rough-skinned newt	X	X		X
Western toad	X	X	X	
Pacific treefrog	X	X	X	
Painted turtle	X	X	X	
Western pond turtle	X	X	X	
Northern alligator lizard		X	X	X
Southern alligator lizard		X	X	X
Western fence lizard		X	X	X
Western skink	X	X	X	X
Racer	X	X		
Sharptail snake		X	X	
Ringneck snake		X	X	
Gopher snake		X	X	X
Western aquatic garter snake	X	X	X	
Western terrestrial garter snake	X	X	X	
Common garter snake	X	X	X	X
<b>BIRDS</b>				
Great blue heron	X	X		
Wood duck	X	X	X	X
Turkey vulture	X	X	X	X
Black-shouldered kite		X		
Cooper's hawk	X	X	X	X
Red-shouldered hawk	X	X	X	
Red-tailed hawk		X		
American kestrel	X	X	X	
Ruffed grouse	X	X		X
Wild turkey		X		
California quail		X	X	
Band-tailed pigeon	X	X	X	

Species	Riparian	Edge	Snags	Down Logs
<b>BIRDS continued</b>				
Mourning dove	X	X		
Common barn owl	X	X	X	
Western screech owl	X	X	X	
Great horned owl	X	X	X	
Northern sawwhet owl		X	X	
Pygmy owl		X	X	
Common nighthawk	X	X		X
Common poorwill		X		X
Vaux's swift	X	X	X	
Anna's hummingbird		X		
Rufous hummingbird	X	X		
Allen's hummingbird		X		
Lewis' woodpecker		X	X	X
Acorn woodpecker		X	X	X
Downy woodpecker	X	X	X	
Hairy woodpecker	X	X	X	
Northern flicker		X	X	X
Western wood pewee	X	X		
Western flycatcher	X		X	
Ash-throated flycatcher	X	X		
Tree swallow	X	X	X	
Violet-green swallow	X	X	X	
Scrub jay		X		
Stellar's jay		X		
American crow	X	X		
Common raven		X		
Black-capped chickadee	X	X	X	
Chestnut-backed chickadee	X	X	X	
Plain titmouse			X	
Bushtit		X		
White-breasted nuthatch			X	X
Bewick's wren	X	X	X	X
House wren		X	X	X
Winter wren		X	X	X
Golden-crowned kinglet		X		
Ruby-crowned kinglet		X		
Western bluebird		X	X	

Species	Riparian	Edge	Snags	Down Logs
<b>BIRDS continued</b>				
American robin		X		
Wrentit		X		
Northern Shrike		X		
Hutton's vireo		X		
Warbling vireo		X		
Orange-crowned warbler		X		
Nashville warbler		X		
Yellow-rumped warbler	X	X		
Black-throated gray warbler		X		
Western tanager		X		
Black-headed grosbeak	X	X		
Lazuli bunting		X		
Spotted towhee		X		X
Brown towhee		X		
Chipping sparrow		X		
Lark sparrow		X		
Fox sparrow		X		
Song sparrow	X	X		X
Golden-crowned sparrow		X		X
Dark-eyed junco		X		
Brewer's blackbird		X		
Brown-headed cowbird		X		
Northern oriole		X		
Purple finch		X		
House finch		X	X	
Lesser goldfinch		X		
American goldfinch		X		
<b>MAMMALS</b>				
Pacific shrew	X	X		X
Fog shrew	X	X		X
Vagrant shrew	X	X		X
Shrew mole	X	X		X
Coast mole	X	X		X
Pallid bat			X	
Big brown bat	X	X	X	
Silver-haired bat	X	X	X	

Species	Riparian	Edge	Snags	Down Logs
<b>MAMMALS continued</b>				
Hoary bat	X	X		
California myotis	X	X	X	
Little brown myotis	X	X	X	
Fringed myotis	X		X	
Long-legged myotis	X		X	
Yuma myotis	X	X	X	
Brazilian free-tailed bat	X			
Coyote	X	X		X
Gray fox	X		X	X
Red fox	X	X		X
Ringtail	X	X	X	
Raccoon	X	X	X	X
Striped skunk	X	X		X
Western spotted skunk	X	X	X	X
Elk	X			
Mule deer	X	X		X
Black-tailed deer	X	X		X
Columbian white-tailed deer	X	X		X
Western gray squirrel	X	X	X	X
Belding's ground squirrel		X		
California ground squirrel		X		
Townsend's chipmunk	X	X		X
Northern flying squirrel	X	X	X	
Northern pocket gopher		X		
Bushy-tailed woodrat	X	X		X
Dusky-footed woodrat	X	X		X
Deer mouse	X	X		X
Creeping vole	X	X		X
Western jumping mouse	X	X		X
Pacific jumping mouse	X	X		X
Western red-backed vole	X	X	X	X
Brush rabbit	X	X		X
American beaver	X			
Common porcupine		X	X	
Long-tailed weasel	X	X		X
River otter	X			
Bobcat	X	X	X	X



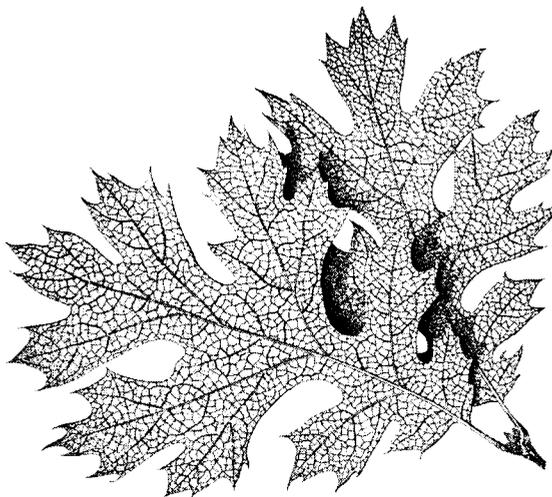
Table 2. Selected Native Hardwood Trees of Oregon and Washington

Species	Geographic Location	Moisture Requirements	Other Site Requirements	Selected Wildlife Uses
Willow, multiple species—several are shrubs <i>Salix</i> spp.	Statewide	High moisture requirements	Adaptable	Major browse and beaver food
Red Alder <i>Alnus rubra</i>	Mostly west side, shade	Adaptable; does better with higher moisture	Adaptable, rapid colonizer, shade intolerant	Dominant hardwood—excellent wildlife habitat: food, shelter, and cover, nesting habitat  Commercial lumber species—economically important
Sitka (mountain) and White Alder, <i>A. sinuate</i> , <i>A. rhombifolia</i>	Sitka—statewide White—mostly eastside	Higher moisture content than red alder	Adaptable, shade intolerant, more common in higher elevations than red alder	Not as common as red alder
Black Cottonwood <i>Populus trichocarpa</i>	Statewide, low to moderate elevations	High moisture requirement, common in riparian and wetland areas	Somewhat shade intolerant, does best on organic soils	Major “wildlife” and food tree  Commercial lumber species—economically important
Big leaf Maple <i>Acer macrophyllum</i>	West side	Adaptable, does better on moist sites	Shade tolerant, does well on organic soils	Major wildlife tree—browse cavities, nestings, perching, foraging habitat  Commercial lumber species
Oregon Ash <i>Fraxinus latifolia</i>	West side	Needs very moist site a forested wetland/ riparian species	Shade tolerant, slow grower, scattered distribution	Similar to big leaf maple, i.e. high wildlife value where it is found  Commercial species—locally important
Oregon White Oak <i>Quercus garryana</i>	Willamette Valley, Puget Trough, Columbia Gorge	Dry site species	Well drained soils, shade intolerant	Outstanding wildlife value  Commercial species—locally important
Pacific Madrone <i>Arbutus menziesii</i>	West side, usually near coastal (including Puget Sound) areas	Dry site—well drained soil	Shade intolerant, very difficult to transplant	Berries for birds  Some economic value

Species	Geographic Location	Moisture Requirements	Other Site Requirements	Selected Wildlife Uses
Bitter Cherry <i>Prunus emarginata</i>	Statewide—small tree on west side, usually a shrub on east side	Adaptable—wide range of growing conditions	Somewhat shade tolerant, scattered distribution	Excellent berry producer for wildlife foraging  Very limited commercial value
Quaking Aspen <i>Populus tremuloides</i>	Statewide—mostly east side	Wide range of conditions but does better with good moisture content	Acid soils, shade intolerant, cloning is common	Excellent wildlife habitat for cavity nesting birds and mammals, browse, bark, and cambium favored by beavers, buds consumed by grouse  Commercial species—cordage and pulp
Paper Birch <i>Betula papyrifera</i>	Mostly east side	Moist to wet sites—common in riparian areas	Somewhat shade tolerant—grows best on heavy organic soils	Excellent wildlife habitat—similar to aspen  Commercial lumber species—increasing local economic importance
Cascara <i>Rhamnus purshiana</i>	Both sides but mostly west of the Cascades	Very adaptable but may do better with good moisture content	Very adaptable to site conditions. Usually found in lower elevations (below about 1500 feet)	Small tree, very important producer of berries late in summer for early migrants and native birds and mammals, good bird nesting habitat in the lower canopy zone  Commercially valuable medicinal bark
Netleaf Hackberry <i>Celtis reticulata</i>	East side	Almost always found in riparian areas	Shade intolerant	Good berry for wildlife, nesting and foraging habitat
Pacific Dogwood (some consider this species a shrub) <i>Cornus nuttali</i>	Mostly west side	Adaptable, may do better with moderate moisture conditions	Does better with moderately drained forest soils with organic matter. Shade tolerant, scattered throughout understory	Excellent berry and seed for wildlife  Supplies some nesting habitat in lower forest canopy as well as limited browse
Golden Chinkapin <i>Castanopsis chrysophylla</i>	Mostly coast ranges	Adaptable, one variety found on drier sites	Adaptable, uncommon	Produces an excellent nut for wildlife food but is a rather uncommon forest tree

**Table 3. Large Shrubs**

Species	Location	Wildlife Use
Hazel	Both sides	Excellent wildlife nut
Vine maple	East side, somewhat shade intolerant	Habitat structure and browse, good seed
Serviceberry	Both sides, all sites	Excellent food and cover
Holly	Naturalized all sites	Excellent berry
Red-Osier Dogwood	Both sides, wetlands	Excellent food and shelter
Crabapple	Both sides, sunlight	Excellent food and cover
Mountain Ash	Both sides, small tree	Excellent berry
Hawthorne, multiple varieties	Both sides, small tree	Excellent fruit and shelter
Oceanspray	Both sides, tolerant	Good seed and bird cover
Oso Plum	West side, tolerant, first to bloom	Good early fruit
Blue Elderberry	Somewhat intolerant, both sides, all sites	Excellent berry, major bird food
Pacific Ninebark	Both sides, wetlands	Cover and shelter
Bitter Cherry	Both sides, somewhat shade tolerant	Good wildlife berry
Devils Club	West side tolerant, moist sites	Good berry and hiding cover



**Table 4. Small Shrubs**

Species	Location	Wildlife Use
Wild Rose, several varieties	Both sides, shade intolerant, all sites	Browse, fruit, shelter, and nesting
Currant, several varieties	Both sides, all sites	Berry
Salal	West side, tolerant, major forest component	Berry and browse
Oregon Grape, two varieties	Both sides, tolerant	Berry
Snowberry	Both sides, tolerant	Berry, browse, and cover
Huckleberry, red	West side, sunlight	Berry and major browse species
Huckleberry, evergreen	West side, tolerant	Berry, browse, and cover
Huckleberry, blue, several varieties	Both sides, sunlight, higher elevation	Excellent berry and browse
Red Elderberry	West side, sunlight	Good early berry
Salmon Berry	West side, wet sites	Good berry and browse
Thimble Berry	West side, tolerant	Good berry
Blackberry, two species	Naturalized, open forest, sunlight	Good berry and browse
Black Cap	West side, sunlight	Good berry and browse
Rhododendron	Both sides, sunlight	Cover and seed pod consumed by mammals
Buffaloberry	East side, forest edge	Berry eaten by birds
Douglas Spirea	Both sides, wetlands	Browse and cover

**Table 5. Ground Cover**

Species	Location	Wildlife Use
Bunchberry	Both sides, tolerant	Excellent seed for birds and small mammals
Kinnikinick	Both sides, tolerant	Excellent berry for birds
Creeping Blackberry	West side, shade intolerant	Excellent browse and berry

**Titles available in this series:**

Is There a Place for Fish and Wildlife in Your Woodland?	MISC0132
Riparian Areas: Fish and Wildlife Havens	MISC0133
Managing Small Woodlands for Grouse	MISC0141
Wood Ducks on Small Woodlands	MISC0142
Managing Ponderosa Pine Woodlands for Fish and Wildlife	MISC0158
Managing Small Woodlands for Cavity-Nesting Birds	MISC0160
Trout in Small Woodlands	MISC0161
Managing Small Woodlands for Elk	MISC0164
Coastal Douglas-fir Forests and Wildlife	MISC0168
Hawk, Eagle and Osprey Management on Small Woodlands	MISC0169
Wetlands as Varied as our Region	MISC0179
Wildlife on White Oak Woodlands	MISC0180
Quail on Small Woodlands	MISC0187
Managing Deer on Small Woodlands	MISC0189
Beaver, Muskrat, and Nutria on Small Woodlands	MISC0196
Managing Forest Habitats for Neotropical Migrant Songbirds	MISC0198
Habitat Management for Bats on Small Woodlands	MISC0226
Managing Western Juniper for Wildlife	MISC0286

*These publications may be ordered from Washington State University Extension Bulletin Office, (800) 723-1763 or online <http://pubs.wsu.edu>. You may also download copies at: <http://www.WoodlandfishandWildlife.org>.*

## A Woodland Fish and Wildlife Project Publication

By Marnie Allbritten, Wildlife Biologist, Oregon Department of Fish and Wildlife, and Jim Bottorff, Wildlife Biologist, Washington Department of Natural Resources.

The Woodland Fish and Wildlife Project is a cooperative effort among the World Forestry Center, Oregon State Department of Forestry, Oregon Department of Fish and Wildlife, Washington State Department of Natural Resources, Oregon State University Extension Service, Washington State University Extension, Oregon Association of Conservation Districts, Oregon Small Woodlands Association, Washington Farm Forestry Association, Washington Department of Fisheries, Washington Department of Fish and Wildlife, USDA Natural Resources Conservation Service, USDA Forest Service, and the Western Forestry and Conservation Association.

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.

### WASHINGTON STATE UNIVERSITY EXTENSION

Issued by Washington State University Extension and the U.S. Department of Agriculture in furtherance of the Acts of May 8 and June 30, 1914. Extension programs and policies are consistent with federal and state laws and regulations on nondiscrimination regarding race, sex, religion, age, color, creed, national or ethnic origin; physical, mental or sensory disability; marital status, sexual orientation, and status as a Vietnam-era or disabled veteran. Evidence of non-compliance may be reported through your local Extension office. Trade names have been used to simplify information; no endorsement is intended. Published June 2004. Subject code 400, 440. B. MISC0534

*Reprinting of this publication, in whole or in part, is allowed with written permission of Woodland Fish and Wildlife.*