

Managing for Pileated Woodpecker

Summary

The pileated wood pecker (*Dryocarpus pileatus*) derives its name from the Latin words *dryo* (tree), *kopis* (dagger), and *pileatus* (capped). The bird inhabits forests across eastern North America, the Great Lakes, the boreal forests of Canada, and parts of the Pacific Coast, and is the largest woodpecker species in North America, with adults averaging 16 – 19 inches tall and a wingspan of 24 – 30 inches. Pileated woodpeckers mate for life, and may live as much as 10 years or more in the wild. The woodpecker prefers mature forests for both nesting and foraging.

The pileated woodpecker is considered a keystone species, or keystone habitat modifier, because it (1) has a unique role in providing nesting or denning sites and foraging opportunities for other species, (2) accelerates decay processes and nutrient cycling, (3) facilitates inoculation by heart-rot fungi, and (4) may mediate insect outbreaks. The cavities that pileated woodpeckers excavate are the only ones big enough for the larger cavity-using birds and mammals, which include a variety of tree-dwelling ducks, owls, carnivores, and squirrels. Several are species of management concern in the Pacific Northwest, including the common merganser, fisher, and American marten. Altogether, more than 20 species of secondary cavity dwellers have been documented using old cavities or openings excavated by pileated woodpeckers in the Pacific Northwest.

Current Habitat and Limiting Factors

The current forest conditions at the Brighton Creek Reserve provide numerous foraging opportunities for the pileated woodpecker, but very limited opportunities for nesting and roosting. During the site assessment in the spring of 2023, foraging cavities were observed in larger western red cedars trees in the western block of the reserve, and pileated woodpeckers were both heard and directly observed to be foraging on decadent black cottonwood in the eastern block. Although the forest may provide foraging opportunities for multiple pileated woodpeckers, given its modest scale (~224 acres) it is likely that the forest will only ever support a single pair of nesting woodpeckers. However, when considering the larger landscape in which the Brighton Creek Reserve occurs, there is at present over 450 acres of mature forest within a 1,600-acre area surrounding the Reserve (see Age Class and Forest Type maps in appendix). Assuming there are large diameter dead or dying trees within this area, 1 – 2 mating pairs of pileated woodpeckers may occur here.

The lack of mature forest and large diameter trees and downed logs across the Brighton Creek Reserve represent the single most important limiting factor to providing current foraging, nesting, or roosting habitat for the woodpecker. At present the largest diameter trees are

western red cedar, Douglas-fir, and black cottonwood, very few of which exceed 20 inches DBH. Although laminated root rot and droughty soils are contributing snags of both cedar and Douglas-fir, which in turn will attract arthropods that may provide forage for the woodpecker, there is still a paucity of dead wood throughout the entire Reserve. Additionally, large downed logs are mostly absent from the forest, with small accumulations only occurring at former landings that remain from the previous cycle of timber harvesting.

Although salal, red huckleberry, and hazelnut are currently present in the forest, there is both a limited abundance of these species, and a lack of additional mast producing tree and shrub species.

[Habitat and Range of the Pileated Woodpecker](#)

Pileated woodpeckers repeatedly occupy territories of roughly 1,000 – 1,400 acres year-round. Although their ranges may overlap while foraging, pileateds are territorial, and a pair tends to remain within their territory. If one member of a nesting pair dies, the survivor stays within the same home range.

Pileated woodpeckers inhabit mature and old-growth forests and second-growth forests with large snags and fallen trees. Large snags and large decaying live trees are used for nesting and roosting. In western Washington they may use younger forests (<40 years old) as foraging habitat. Density of snags larger than 30 inches DBH is the best predictor of density of pileateds. Pileated abundance increases as the amount of forests with greater than 60 percent canopy closure and old growth trees increases. Optimal forest habitat includes 2-3 canopy layers, the uppermost being 80 – 100 feet in height; large live trees to provide cover and eventual replacement of dead trees; large dead trees for nesting; and dead standing trees and downed woody material for feeding. Mixed hardwood/conifer stands provide better habitat than single species stands.

Pileated woodpeckers are not fast fliers and typically evade predators by flying in erratic, undulating patterns through the forest. Consequently, open habitats may provide inadequate escape cover for pileated woodpeckers. Known predators of the pileated woodpecker include the northern goshawk (*Accipiter gentiles*), Cooper's hawk (*A. cooperii*), red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), American martin (*Martes americana*), and northern goshawks (*Accipiter gentilis*).

Management Recommendations

1. Manage for older forest (>60 years) conditions that include a minimum of 70 percent conifer stocking, trees that exceed 30 inches DBH and 90 feet tall, areas with 60 percent canopy closure, and more than two canopy strata.

2. Retain and/or recruit large diameter and tall snags and large diameter downed logs that occur in groups.
3. Increase habitat conservation area to a minimum of 300 acres.

Nesting and Roosting

Pileated woodpeckers require large diameter and tall trees for nesting and roosting. They select for nest trees larger than 21 inches DBH as trees of this diameter are needed to contain the large nest cavity (8" wide and 22" deep) at 20-85 feet aboveground. Typical nest trees are either recently dead (2-10 years), or are decadent live trees with dead and broken tops. Each pair of pileated woodpeckers almost always excavates a new nest annually and usually uses a different tree each year. A pair needs only one nest tree each year, however, each bird uses an average of seven or more different roost trees during the course of the year. Therefore, consistent recruitment of dead, dying, or decadent trees are necessary to support the bird.

Pileated woodpeckers require nest sites that are easy to access and defend from potential predators. Although most nest trees had some remaining limbs or branch stubs, there were few large branches near nest cavities, and all nests in decadent trees occurred well above the highest live limbs. Numerous limbs close to the cavity opening may hinder the ability of adult birds to fly in and out of the nest and may interfere with the fledging of young. Tree squirrels are a potential nest predator of pileated woodpeckers.

The pileated woodpecker utilizes a wide variety of tree species for nesting and roosting. Species preferred for nesting include ponderosa pine, western larch, quaking aspen, western hemlock, and pacific silver fir. Large-diameter grand fir and Douglas-fir are typically avoided because they usually retain their bark and limbs. Pileated woodpeckers frequently select nest trees that have heartwood softened by decay to facilitate excavation, and sound sapwood for structural support. Western red cedar, western hemlock, and pacific silver fir are commonly used for roosting, and two or more roost trees in close proximity may be advantageous if a bird is disturbed by a predator while roosting and needs an immediate alternative.

Management Recommendations

1. Recruit and/or retain a minimum of 12 snags and a minimum of three live, but decaying, trees per acre that are greater than 30 inches DBH and 90 feet tall to provide nesting and roosting structures.
2. As trees reach the preferred diameter and height thresholds, they can be manually converted to snags by topping, herbicide, girdling, or other methods. Limbing between 20 – 90 feet is recommended for all species, and debarking is recommended for Douglas-fir and grand fir.
3. Snags should be clumped in close proximity to each other.

4. Plant additional tree species that are preferred for nesting and roosting, such as western red cedar, western hemlock, pacific silver fir, ponderosa pine, western larch, and quaking aspen.

Forage

Pileated woodpeckers are primarily insectivores, but also forage on a limited variety of berries and nuts. Although carpenter ants (*Camponotus modoc*) are their main prey, the bird also consumes round-headed wood-boring beetle larvae (*Coleoptera* spp. and *Cerambycidae* spp), dampwood termites (*Zootermopsis angusticollis*), thatch ants (*Formica* spp.) and other ant species (*Lasius* spp). Other arthropods that round off the woodpecker's diet include species in the following orders: mites (*Acari*), spiders (*Araneae*), flies (*Diptera*), true bugs (*Hemiptera*), and adult beetles. In the fall of the year the pileated woodpecker may be found feeding on many species of fruits as well as mast in the form of wild nuts. Salal (*Gaultheria shallon*), red huckleberry (*Vaccinium parvifolium*), elderberry (*Sambucus* spp.), hazelnuts (*Cornus* spp.), and acorns (*Quercus* spp.) are common forage species.

Pileated woodpeckers search for food predominantly in dead wood, with a preference for snags over logs. Nearly all structures used by pileated woodpeckers for foraging are trees (93% snags and 2% decadent); 3% were cut stumps and only 2% logs. Pileated woodpeckers select relatively tall, large-diameter snags in early to moderate stages of decay for foraging. They prefer trees larger than 30 inches in diameter, at least 25 feet tall, and with at least 75 percent of the bark intact. Pileated woodpeckers select sites for foraging that have greater densities of large snags.

Although Douglas-fir, western larch, and ponderosa pine are favored tree species, the pileated woodpecker may forage across most tree species that are either dead or decadent. Selection of foraging structures by pileated woodpeckers is not related to the characteristics of individual tree species, but rather to wood characteristics and microsite conditions that influence the presence and abundance of arthropod prey. For instance, greater than 50 percent canopy cover significantly reduces the likelihood that carpenter ants can successfully establish and maintain their nests, likely due to the higher humidity present beneath forest canopies. It is this reason that standing structures provide more suitable habitat for carpenter ants because they contain drier and warmer microhabitat conditions than logs. Standing structures provided superior nest sites because their greater vertical surface intercepted more solar radiation, creating warmer conditions for brood maturation.

Large snags provide greater volumes of wood and better habitat conditions for arthropods over a longer period of time than small snags. In closed canopy coastal forests, the coolest and dampest environmental conditions are near ground level. Snags that are taller than the understory vegetation receive greater solar radiation and more drying action from wind than

those near the ground, creating more suitable temperature and moisture regimes for wood-dwelling arthropods.

Because snags tend to be patchy in distribution, pileated woodpeckers may maximize energetic returns by foraging in areas that have high densities of potential foraging structures.

Additionally, wood-dwelling arthropods may be more abundant in areas with high volumes of dead wood. Large carpenter ant colonies often establish satellite colonies in other structures near the parent colony. Thus, sites with high densities of large snags may provide optimal habitat for carpenter ant colonies to grow and persist. Although little is known about the ecology of round-headed beetles, adults typically lay their eggs in or on the bark of dead trees. Therefore, adult round-headed beetles may be attracted to sites with high densities of dead trees, where they are more likely to find suitable egg-laying sites. Dampwood termites produce winged reproductives that disperse to new substrates and establish new colonies. When reproductives leave the colony, they are especially vulnerable to predation; thus, higher densities of suitable structures would decrease dispersal distances and exposure to predation and increase the likelihood that reproductives would be able to establish new colonies.

Management Recommendations

1. Protect existing deadwood structures, including snags, downed logs, and stumps.
2. Retain and/or recruit a minimum of 12 snags per acre, including hardwoods and conifers in the following size classes. Snags should be clumped, vs dispersed. Recruit and/or retain at least three additional decadent trees per acre.

Size Class (DBH)	# of snags/acre
10" – 20"	7
20" – 30" inches DBH	3
>30"	2

3. Retain and/or recruit more than 40 logs per acre, with a preference for logs greater than 15 inches in diameter and for all species except lodgepole pine. Logs can be piled to create varying decay rates, with logs on the bottom decaying faster than logs stacked on top. When manually recruiting logs, disperse and/or stack them along northern edges of openings or in areas where canopy cover is less than 50%.
4. Plant mast-producing trees and shrubs, including salal, red huckleberry, elderberry, hazelnut, and oak.

Maintain areas of the forest with less than 50% canopy cover to create drier microclimates.