

Seeing the forest for the birds: Ten principles for bird-friendly forestry

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A European forest resident that is negatively affected by logging operations, the Lesser Spotted Woodpecker (*Dryobates minor*) has declined by 80% in boreal forests since 1980. Credit: Nico Arcilla

Most of the world's natural forests are [subject to logging operations](#),

many of which are highly detrimental to forest birds and other wildlife, and demand for timber is expected to continue to grow. [Europe](#) has the highest proportion of the world's forests dedicated to the production of wood and other commodities, and logging operations have also changed North American forests and bird communities.

In recent decades, many European resident and American migratory bird species that nest in forests have exhibited population declines related to [logging](#). We investigated [relevant research](#) to synthesize 10 principles of bird-friendly forestry that forest managers may apply to improve the bird conservation value of logged forests. The research is [published](#) in the journal *Birds*. We briefly summarize these principles below.

1. Practice uneven-aged silviculture

Old-growth forests harbor high structural complexity and habitat heterogeneity that may be diminished by logging operations. By avoiding cutting all the largest or most valuable trees in a single rotation, foresters can practice [uneven-aged silviculture](#), allowing forests to maintain a full range of development stages after stand-replacing disturbances, including old-growth trees.

2. Leave dead and dying trees

Large snags (standing dead or dying trees) and coarse woody debris (fallen dead or dying trees and tree remnants) provide [important habitat features](#) and food resources for many birds. Historically, standing dead wood in unlogged European forests could comprise 20%–50% of standing trees.

Avoiding disturbance to standing and fallen dead wood may allow a higher proportion of resident species to persist. For example, an increase

in standing dead wood to 3.2% of the total standing trees in Swiss forests was correlated with an increase in [Middle Spotted Woodpeckers](#) (*Dendrocopos medius*).

3. Maintain residual large, green trees

Retaining large (> 55 cm dbh) [mature trees](#) in production forests improves habitat for arthropods and birds in regenerating stands. [Conserving legacy trees](#) and allowing regeneration of longer-lived species partially emulates the natural successional pattern following logging operations.

For example, most [Black Storks](#) (*Ciconia nigra*) nest in trees that are over twice as old as the age when most trees of their species are logged (41–101 years). Particular tree species, such as large oaks (*Quercus* spp.), may be important for particular bird species, such as jays and woodpeckers.

4. Establish and maintain uncut reserves and corridors

Old-growth stands serve as crucial breeding, nesting, and foraging habitat for many bird taxa, including woodpeckers, raptors, storks, and grouse, with larger reserves benefiting more species. [Leaving uncut reserves](#) for species that prefer or require mature, closed-canopy forests provides a refuge from logging operations and mitigates the landscape-scale effects of logging on birds.

Protected areas play an essential role in conservation, and many forest-nesting birds appear [better able to adapt](#) to changing climatic conditions in protected areas than outside them.

5. Maximize forest interior through retaining large contiguous forest tracts

[Forest interior](#) species tend to increase in abundance at distances greater than 200–400 m from forest edge. Maintaining large areas of contiguous forest increases the amount of forest interior and mitigates the effects of forest fragmentation.

In Germany's [Black Forest](#), bird species richness and diversity in 1 ha forest patches increased with increasing proximity to other forest patches, highlighting the importance that landscape configuration has for bird conservation.

6. Maintain buffers around streams, rivers, wetlands, and known nesting areas

Many forest breeding species require riparian buffers in order to nest successfully, and foresters can allow them to do so by maintaining such buffers where logging operations take place. Buffer sizes will depend on the conservation needs of focal species.

For example, [Louisiana Waterthrush](#) (*Parkesia motacilla*), neotropical migratory birds that nest in southeastern forests of the United States, require > 40 m buffers of closed-canopy forest along contiguous > 1.5 km stream networks to breed successfully.

7. Maintain horizontal stand structure and enhance vegetation diversity in canopy gaps

Bird species richness, diversity, and abundance benefit from natural disturbances that [create light gaps](#), which are associated with higher

species richness, diversity, and breeding bird abundance compared with closed forests. Silvicultural practices that create small gaps appear to benefit many forest species without negatively influencing others, and can be used to enhance forest composition and structure.

8. Extend the temporal scale of logging cycles through prolonged rotations

Increasing the cutting age of retention trees benefits many bird species, particularly those that require mature trees for nesting and foraging. For example, [Black Storks in Latvia](#) would benefit from extending logging rotation periods of mature trees used for nesting, as well as surrounding forest within at least 500 m of nesting trees.

9. Minimize disturbance to forests after logging and during the breeding season

Whereas natural disturbances such as forest fires are typically followed by ecological succession without human disturbance, logging operations may be followed by high intensity of human activities, such as [uncontrolled hunting](#), that drive declines in bird populations that could otherwise recover over time.

Protecting forests from detrimental human activities and avoiding logging during the main bird breeding season can reduce negative impacts, including allowing nesting birds to successfully fledge young.

For example, forest landowners in [Finland](#) have voluntarily avoided logging during the bird [breeding season](#) to protect nesting raptors including European Honey Buzzards (*Pernis apivorus*), Common Buzzards (*Buteo buteo*), and Northern Goshawks (*Accipiter gentilis*).

10. Manage for focal species and guilds

Conservation strategies should focus on [birds](#) that decline in response to logging, including many ground-nesting, cavity-nesting, canopy-nesting, predatory, and insectivorous species, such as many gamebirds, raptors, woodpeckers, hornbills, and songbirds, among others. Forest management plans targeting conservation priority [focal species](#) or guilds will also benefit many other wildlife species.

Conclusion

Any or all of the principles we present here may serve as a starting point toward developing bird-friendly [forest](#) management plans. To improve the bird conservation value of production forests, conservation strategies and focal [species](#) must be area-specific, clearly articulated, and have [measurable objectives](#). In this way, bird-friendly forestry can make [important contributions](#) to conservation.

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