

Forest Management Contributions to Biodiversity in the Southeastern United States

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Introduction

Almost 90% of forests throughout the southeastern US are privately owned. These managed forest landscapes provide a mosaic of structural conditions that contribute to conserving biodiversity. In this fact sheet, NCASI outlines the contributions of active forest management, with a focus on pine (*Pinus* spp.) management, to conservation of biological diversity by describing each forest cycle stage.

Active Forest Management

Forest managers use site preparation (a method to ensure seedlings can be planted successfully), planting, genetics, thinning(s), mid-rotation management, and a final harvest to manage pine stands on a sustainable basis. Some species depend on a specific forest condition (e.g., early succession – open canopy with diverse ground cover) throughout their life cycles, while others require a combination of different forest conditions. Therefore, there is no single set of forest management recommendations that will benefit all species in a specific stand. Instead, at the landscape scale, forest management can provide a mosaic of complex structure needed for various species and meet their changing needs throughout their life cycle and the year (e.g., Miller et al. 2009).

Young Stands



CAPTION:
A pine stand immediately after site preparation and planting (left) and a young pine stand in the early successional stage (right)

Photos: Angela Larsen-Gray

Stand establishment (site preparation and planting seedlings) creates young stands that provide early successional forest structure. Planting at lower tree densities can extend the time until canopy closure, thus extending value for wildlife. Targeted herbicide applications are often used to temporarily suppress competition with young pines and may enhance plant communities (Demarais et al. 2017). Prescribed fire can also be used when establishing stands, but fire is increasingly difficult to use on private lands because of liability risks and other factors. Ground cover plants generally establish quickly and are abundant for several years following stand establishment, and biodiversity is relatively high in these young stands until canopy closure (Demarais et al. 2017). Although overall biodiversity tends to decline during the closed canopy stage, it is a valuable stage for species such as Swainson’s warblers (*Limnothlypis swainsonii*), a species of conservation concern.



CAPTION:
Young pine stands provide structural requirements for a diversity of species, including prairie warblers (*Dendroica discolor*; Greene et al. 2019a)

Thinning and Mid-Rotation Management

Thinning of pine crop trees is widely applied to promote growth of high quality sawtimber and poles and/or promote forest health and productivity. In addition, prescribed fire and targeted herbicide applications may be used to reduce cover of hardwood stems, thus promoting development of a pine-grassland structure (e.g., Iglay et al. 2018). Use of herbicides can provide structural characteristics similar to fire-maintained stands (Iglay et al. 2014), with simultaneous responses by some wildlife species (Iglay et al. 2018). Mid-rotation management can extend open canopy conditions after thinning (Greene et al. 2019b). Overall, thinning effects have been found to be positive for game species, some birds, rodents, reptiles, and bats. However, responses are often species-specific and, not surprisingly, most negative impacts are linked to disturbance-sensitive species (Demarais et al. 2017).



CAPTION:
A pine stand in Mississippi before thinning and mid-rotation management (left); and a similar pine stand after thinning, herbicide application, and prescribed fire (right)

Photos: Darren Miller

Final Harvest



CAPTION:
Two pine stands following final harvest; soon after these pictures were taken, the stands underwent site preparation and planting to start the cycle over

Photos: Angela Larsen-Gray (left), Jonathan Lowery (right)

Clearcutting is the most common type of final harvest, as it allows seedlings to grow in open conditions. Historically, young forest conditions were created with natural disturbances. However, clearcutting is now important for providing early successional conditions required by many species. Species responses to a final harvest vary, mainly because of a species' life history, harvest size, and landscape context (Demarais et al. 2017). During a final harvest, certain features are commonly retained within or near the harvested stand. For example, streamside management zones are a component of state-approved best management practices designed to protect water quality, but they also provide structural characteristics of older forests (Warrington et al. 2017) and potential connectivity across the landscape. Snags (dead, standing trees important for cavity nesting species) and some live trees are also often retained when a stand is harvested, thereby adding value for biodiversity.

Conclusion

At a landscape scale, standard forest management practices described herein provide structural characteristics that meet most forest species' needs. However, some species require targeted management that can be implemented by forest managers to meet conservation and sustainability objectives.

For more information, please see [NCASI Briefing Note: Private, Working Forests and Biodiversity in the Southeastern United States](#).

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