

The importance of shortleaf pine for wildlife and diversity in mixed oak-pine forests and in pine-grassland woodlands

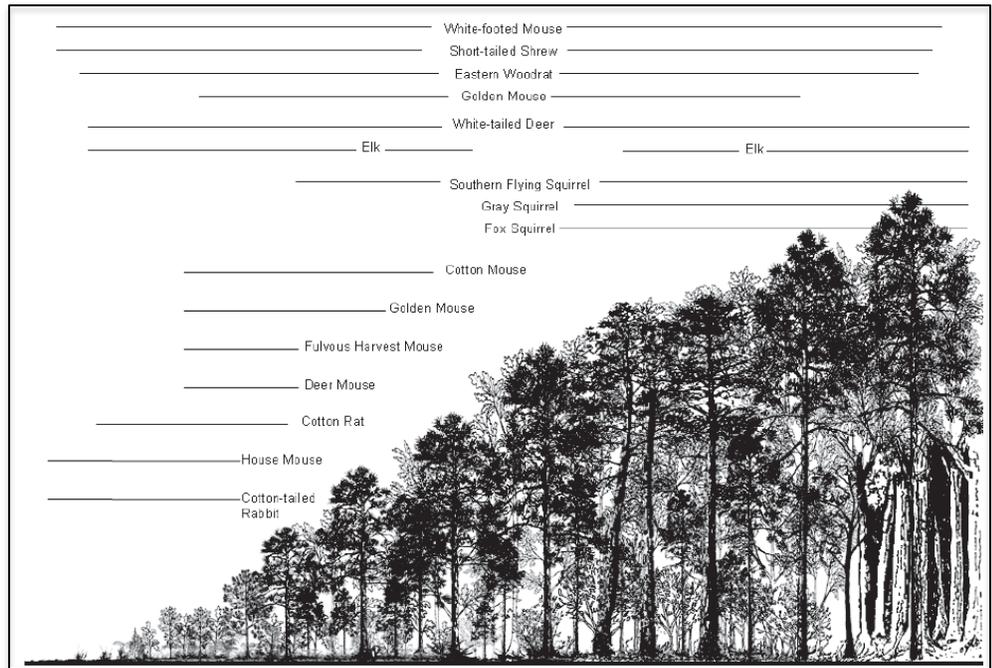


Ronald E. Masters. 2006. In: Kabrick, John M.; Dey, Daniel C.; Gwaze, David, eds.

Shortleaf pine restoration and ecology in the Ozarks: proceedings of a symposium; 2006 November 7-9; Springfield, MO. Gen. Tech. Rep. NRS-P-15. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 167.

MANAGEMENT IMPLICATIONS

- For the first 6-8 years post-fire in an oak-pine stand, forage production was 10-25 times than that of a mature stand
- After 12-60 years without a disturbance, wildlife use of the understory of oak-pine stands was reduced and songbirds begin to appear in the closing canopy
- Frequent fire in shortleaf pine dominated communities may help retain early seral plant and animal species



Plant succession and mammal community succession model of selected and common species occurrence associated with different stages of succession in the absence of fire. Horizontal lines indicate the presence of the named species at a particular successional stage.

Shortleaf pine (*Pinus echinata* Mill.) is a key species in oak-pine forest and pine-grassland ecosystems in the eastern United States. Its presence/absence and expression is commonly determined by site disturbance history, particularly fire. Fire regime characteristics (frequency and seasonality) dictate the composition and structure of the understory plant community, including the potential for shortleaf pine regeneration and establishment. The structure and species composition of understory plant communities can influence ground-dwelling and ground-foraging wildlife species populations. In this paper, the author explores mammal and bird interactions in different shortleaf pine ecosystems (oak-pine and pine-grassland) and their sensitivities to fire frequencies. This summary focuses on the oak-pine ecosystem.

Following a disturbance that sets a

stand back to an earlier seral (developmental) stage, a predictable sequence of vegetation succession (seral stages) occurs with a concomitant sequence of wildlife habitation. Masters walks us through three different seral stages (early, mid, and late) and describes wildlife usage for each. Please see the full article for references cited.

Early seral stage (0-12 years post-regeneration disturbance)

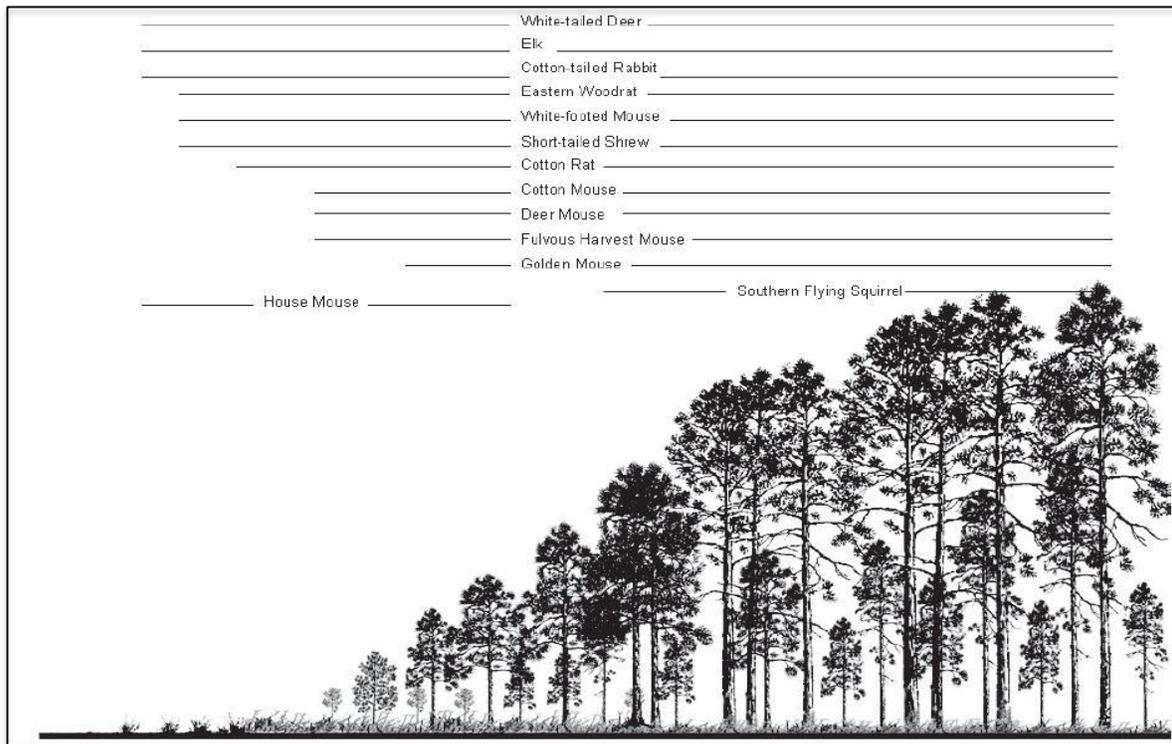
Immediately following a fire, bare ground is invaded by herbaceous plants. During the first 6-8 years the forage and browse production can be 10-25 times greater than in a mature oak-pine stand. During the early herbaceous invading period, small mammals such as eastern cotton-tailed rabbits quickly colonize

the area, along with their predators. White-tailed deer and elk also utilize this stage. Squirrel (flying, gray, and fox) use is very low. As a sapling layer emerges during the latter portions of this stage, small mammalian use decreases, though white-tail deer and elk continue use for escape, bedding, and browse. As crown closure occurs, herbaceous vegetation declines, along with small mammal richness and density.

Mid-seral stage (12-60 years post-regeneration disturbance)

In this seral stage oak-pine stands are characterized by a closed canopy and sparse herbaceous cover in the understory. During the pole-size stage (4-6 inch diameter at breast height) of

The importance of shortleaf pine for wildlife and diversity



Based on Masters et al. (1998, 2002).

Plant succession and mammal community succession model of selected and common species occurrence associated with different stages of succession with frequent fire at least 1- to 5-year intervals. Horizontal lines indicate on the presence of the named species at a particular successional stage.

these undisturbed sites, wildlife use is drastically reduced as the mid-story hardwood layer develops with an associated herbaceous layer decline and litter buildup. A study on the Ouachita National Forest in Arkansas examined northern bobwhite quail use of even-aged stands 12-15 years old (Walsh 2004). After only 3-4 years of fire exclusion, these birds avoided stands that had shown extensive usage previously. As these stands age to a 25-60 year old pole-size class, a wide variety of songbirds use the canopy, particularly if the mid-story is kept open with frequent fire. If fire is excluded, herbaceous species richness and cover decrease dramatically as a dense hardwood mid-story develops.

Late seral stage (60+ years post-regeneration disturbance)

Late seral oak-pine stands are characterized by an uneven-aged tree

diameter distribution, minimal herbaceous understory, significant horizontal and vertical structure, and snags. Compared to previous stages, the populations of small mammals are typically less dense, have lower species richness, and are less diverse. Stands are likely inhabited by squirrels, the population positively correlated with the amount of hardwoods present. Many songbirds utilize mature pine-oak forests, though many of these same species can be found in mature hardwood stands as well. Compared to northern forests, there are very few conifer-specialized bird species in southern pine forests.

It is clear that the presence of fire (or lack of) and the frequency which it is applied can have significant influence on which wildlife species utilize a site. Fire may be introduced to retain early seral plant and wildlife communities. Masters notes that mature shortleaf-

dominated communities in the presence frequent fire retain many of the early seral plant and animal species – i.e. pine-grassland constituents. Depending on the fire regime characteristics there is usually a trade-off between species occurrence. The deliberate use (or omission) of fire can lead to forest stand conditions appropriate for different wildlife species depending on management goals. Masters offers a graphical representation of plant and mammal community succession in the absence and presence of fire application (1-5 year frequency).

FOR FURTHER READING

Walsh, R. 2004. Response of Northern bobwhites to managed forest landscapes. Stillwater, OK. Oklahoma State University. 59 p. M.S. Thesis.

