

Red-Cockaded Woodpecker in Oklahoma: An Update of Wood's 1974 - 77 Study

R. E. Masters, J. E. Skeen, and J. A. Garner

Oklahoma Department of Wildlife Conservation, 1801 N. Lincoln Blvd., Oklahoma City, Oklahoma 73105

The current status of the red-cockaded woodpecker (*Picoides borealis*) in Oklahoma was evaluated from 1985 to 1987. Colony sites found by Wood (16) were visited and 51.4% were inactive. Annual mortality of cavity trees ranged from 5.2 to 6.8%. Red-cockaded woodpecker populations in Oklahoma appear to have declined because of land-use change. Population decline on the McCurtain County Wilderness Area is attributed to plant succession beyond previous fire disclimax. Reintroduction of fire in the Wilderness Area will be necessary to restore the species habitat to its former status. The first known occurrence of range expansion, in Oklahoma, following re-establishment of suitable habitat is also reported here.

INTRODUCTION

The red-cockaded woodpecker (RCW) is the only bird that depends entirely upon cavities constructed in live southern yellow pines (*Pinus* spp.). The trees in which cavities are constructed, generally, must be at least 75 years old and tend to be infected with red heart disease. The RCW's live in a clan of two to nine birds, which roost in a group of cavity trees called a colony. Good colony sites are park-like stands of old-growth pine with few or no hardwoods above 4 m in height (1). In Oklahoma, the shortleaf pine (*Pinus echinata*) is the predominant tree used for cavities.

Oklahoma's shortleaf pine forest was intensively logged during settlement and prior to statehood in the early 1900s. Only the more rugged inaccessible areas and the areas of public ownership were spared. Logging activity in the 1920s and 1930s primarily involved the cutting of old-growth mature sawtimber size pine. This left cull and immature trees for growing stock. Following a period of regrowth, industrial timber interests acquired in excess of 4,800 km², and the U.S. Forest Service acquired over 970 km², for the Ouachita National Forest in the 1960s (2).

Industrial timber companies began converting natural shortleaf pine stands and mixed pine – hardwood stands to large short-rotation even-aged pine plantations. The short-rotation management system for timber by industrial timber companies, and the moderate-length forest rotation on National Forest lands, virtually eliminates old-growth shortleaf pine infected with red heart disease. Consequently, RCW populations have not been maintained outside the McCurtain County Wilderness Area (MCWA) and some private lands. The future of these isolated populations is of concern because of the lack of genetic interchange among RCW's, and lack of recruitment of old-growth shortleaf pine infected with red heart disease.

Wood's (3) study was the first systematic attempt to evaluate the status of the RCW in Oklahoma. It was conducted from 1974-1977, after renewed timber harvest in southeastern Oklahoma. At that time no RCW colonies were known to occur on National Forest lands in Oklahoma, and only three colonies were located on private lands. The remaining colonies were located on MCWA with possible colonies thought to exist on Beavers Bend State Park. Wood (3) located 35 colonies within his extensive study area and gave a population estimate for southeastern Oklahoma of 145 to 165 RCW's, occupying 48 to 53 colonies. His survey of primary RCW range corresponded with the natural range of shortleaf pine in southeastern Oklahoma.

The present study was initiated in 1985 to reevaluate the status of the RCW in Oklahoma. Interest in nongame species had increased with the inception of the

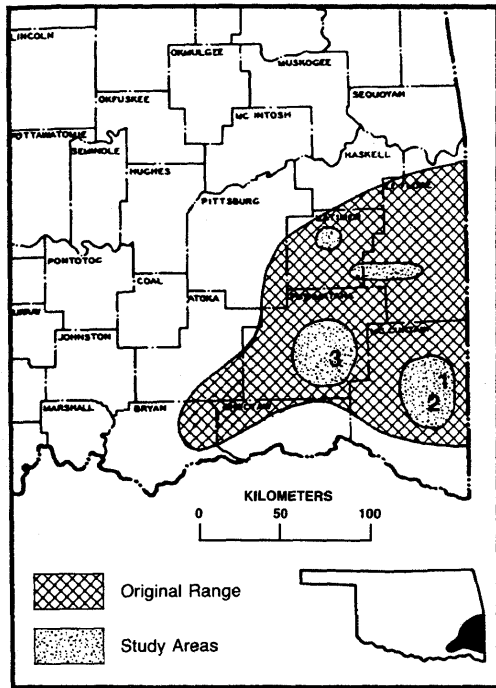


FIGURE 1. Areas surveyed and location of the populations of red-cockaded woodpeckers in Oklahoma. (1) MCWA population; (2) BBSP population; and (3) Pushmataha County population.

Oklahoma Department of Wildlife Conservation (ODWC) Nongame Program in 1984. Reevaluation seemed warranted in light of intensifying land-use and the fact that two new colonies had been reported on the Tiak Ranger District of the Ouachita National Forest. Also, assessment had not been made of the RCW's status in almost 10 years. Interest in the bird's status was particularly keen due to its endangered status.

STUDY AREA

The study area encompassed the primary shortleaf pine range in southeastern Oklahoma (Fig. 1). Survey locations were as follows: Latimer County, Robbers Cave Wildlife Management Area (WMA); Pushmataha County, vicinity of known colonies on Weyerhaeuser-owned lands; McCurtain County, MCWA, vicinity of known colony sites on Tiak Ranger District, Ouachita National Forest and Weyerhaeuser-owned and -operated lands. In LeFlore County, U.S. Forest Service wildlife biologists (4, 5) were contacted and questioned about potential suitable habitat.

The MCWA has been owned by the ODWC since 1918 and is located in the Kiamichi Mountains of southeastern Oklahoma in the southern portion of the Ouachita Uplift. The 5,701-ha area is characterized by steep and narrow ridges, sometimes with rock bluffs. Elevation varies from 183 m at Broken Bow Reservoir to 439 m on Hee Mountain. Five perennial streams dissect the area, and the largest are North and South Linson Creeks. Annual rainfall averages 121 cm. Temperatures range from an average high of 34 °C in July to an average low of -2 °C in January (6).

The MCWA is covered by old-growth oak - pine forest. Shortleaf pine, hickory (*Carya* spp.), post oak (*Quercus stellata*), and black jack oak (*Quercus marilandica*) dominate upper slopes while lower slopes support maple (*Acer* spp.), blue beech (*Carpinus caroliniana*), hop hornbeam (*Ostrya virginiana*), and white oak (*Quercus alba*). Mixed stands of pine and hardwood tree species are characteristic of this region with a higher frequency of pine on south-facing slopes. No habitat management activities have occurred on the area and fire has been suppressed. For a more detailed description of floristic and faunal constituents see Carter (7).

METHODS

Maps of colony locations and population data sheets were obtained from D. Wood. Colony sites were then inspected to determine status and to assess the mortality rate of cavity trees. New cavity trees were tallied also. Cavity trees were categorized as living, dead, and unknown status [i.e., trees identified by Wood (3) that we could not locate]. Living cavity trees were classified as active or inactive based on active resin flow on the plate surface, signs of recent excavation, and observations of birds using the cavity (3). Attempts were made to locate additional colonies on MCWA by walking transects with observers located 40-60 m apart (3). Transects using a single observer, in pine and

oak – pine habitats, were also walked on Robbers Cave WMA. Additional attempts to locate colonies on MCWA and Robbers Cave WMA were made by driving along roads and fence lines searching for visible signs of activity or physical presence of cavities, and by playing tape recordings (8) of RCW's. Recorded calls were played periodically at approximately 400-m intervals while transects were walked and at known colony sites. Calls were also played when suitable habitat was traversed by driving along roads and walking along fence lines. Inactive sites were thoroughly searched for a minimum 400-m radius from colony center. Recorded calls were used in an attempt to elicit response from potential foraging RCW's in an effort to determine if the colony may have drifted.

Status determinations were made in May and June of each year. However, in 1987 recorded calls were also used in March, and in 1985 recorded calls were used in October on MCWA and Robbers Cave WMA. Most work was conducted on MCWA after Wood (3).

RESULTS AND DISCUSSION

Examinations of sites on Robbers Cave WMA yielded only one old abandoned cavity tree. The site where Baumgartner (9) had located RCW's was searched, but no cavity trees remained and there was no sign of activity. No sites were discovered or reported on National Forest lands in LeFlore county.

Two colonies were located on the Tiak Ranger, District Ouachita National Forest in 1984 and 1985 (10). Management for RCW's was initiated by the U.S. Forest Service according to established guidelines (11). Management activities included midstory removal, controlled burning, delineation of foraging areas, and overstory thinning (10). In the intervening years, one colony was destroyed by a wind storm and was not re-established. Activity was noted in the spring of 1986 at the remaining site. However, no evidence of activity was observed in the spring and summer of 1987, and this colony may no longer be active. The establishment of these two colonies is noteworthy because they represent the first documented attempts by RCW's to expand their range in Oklahoma following habitat recovery.

Those colonies located by Wood (3) in Pushmataha County on Weyerhaeuser Co. lands were inspected in the spring of 1985 and following. One colony was active but the other two colony sites had been abandoned and subsequently clearcut.

The remaining Pushmataha County colony is surrounded on three sides by clearcuts of varying age and a poor-quality cutover pine-hardwood stand on the fourth side. Management activities instigated by Weyerhaeuser were controlled burning, stem removal of midstory hardwoods and removal of 43.3 ha from the harvest schedule. The original colony contained eight cavity trees, six of which were abandoned or dead. In this stand, 13 cavity trees were located, and two adults and one juvenile were sighted in June 1987. Another bird was heard vocalizing on the edge of the colony site, but may have been one of the previously sighted birds.

From May 1985 to June 1987, all of Wood's (16) colony sites were visited. Only 17 or 48.6 percent of the original 35 colonies were active. Early on in the study, it became apparent that colonies which were still active had moved somewhat. This was due to cavity tree mortality and the encroaching hardwood midstory. No attempt was made to determine average distance moved by a given colony because this distance may be a function of cavity tree mortality rate at a given site, and habitat availability adjacent to a location. Only one new colony site was discovered on MCWA during our study.

Mortality of Cavity Trees

Wood (3) documented an annual cavity tree mortality rate of 6.7 percent. We located and determined fate for 81 of 177 original cavity trees, for a known minimum mortality rate. The remainder were placed in an "unknown" category and used to figure a potential maximum mortality rate of all cavity trees (active and inactive). The minimum/maximum annual mortality for all cavity trees ranged from 5.2 percent to 6.8 percent.

We identified an additional 43 cavity trees of which eight were dead or dying. When our cavity trees (live and dead) were added, the

annual mortality rates dropped to a minimum/maximum range of 3.4 percent to 5.8 percent. It would appear that the mortality rate is remaining relatively constant. With encroaching hardwood midstories there will be a decline in remaining suitable habitat. The rate of this decline is unknown and is further compounded by the lack of pine recruitment. In other words, suitable habitat is being degraded and lost without being replaced. At some point in time, RCW habitat will be eliminated by default. A case in point is the Robbers Cave WMA. When it was acquired, previous land use was one of periodic burning of the woods by settlers and grazing with cattle. Since 1966 fire has been all but eliminated. By the time Wood (3) did his study, the RCW was gone from Robbers Cave WMA. At present, there is little if any suitable habitat on Robbers Cave WMA. Hardwoods have achieved a dominant or co-dominant position over much of the area (ODWC, unpublished data).

Fire and Forest Community Relationships

Prior to 1926 annual burning was common in southeast Oklahoma, with 1/3 to 3/4 of the upland pine -oak area of the Ouachita Mountains being burned each year (12). The virgin stands of pure pine in upland areas such as on the Wilderness Area developed because of frequent fire of aboriginal or lightning origin (13). Frequent fire has been shown to be effective at controlling hardwood stems of small to moderate diameters (14). Where fire is excluded, midstory hardwoods will replace overstory pines as they die out (13, 15).

The relationship between fire and the forest community is illustrated by a study conducted in southern Arkansas. The relative density of dominant pine versus dominant hardwoods were observed over a 28-year period in an unmanaged pine-oak stand excluded from fire. In that length of time, through senescence and mortality, pine density declined dramatically and hardwoods dominated (15). Presumably this is happening on MCWA also.

Use of Recorded Calls

In three of the five colonies known to have drifted some distance, the new colony center could not have been located without the use of recorded calls. Recorded calls were indispensable in determining colony status.

Nesbitt et al. (8) indicated that RCW's responded to recorded calls throughout the year. We obtained no response from woodpeckers during October or in March. The best response was obtained during May and June. Birds in the immediate vicinity usually responded within 10 to 15 min; they would vocalize and display vigorously in trees around the immediate playing location.

CONCLUSION

Throughout its range in the United States, RCW populations have declined over the past several years, primarily because of land-use practices that eliminate old-growth southern pine (1). In Oklahoma, this species range has greatly contracted (3) and the greatest population density is within MCWA. Here 51.4 percent of the original colony sites have been abandoned. Although MCWA is forested with old-growth timber, the plant community continues to change. Wood (16) notes that the hardwood midstory was more prominent recently than during his original study. The relatively constant mortality rate of cavity trees warrants concern because pine recruitment to older age-classes is virtually nonexistent. As midstory hardwoods become predominant and grow into the overstory, RCW's will cease to use that stand as a colony site (1). This vegetative change has taken place because of fire exclusion (12, 13, 15). Because MCWA is vital to the species survival in Oklahoma, efforts should be made to ensure that the species habitat requirements continue to be provided there. To arrest the successional trend to hardwood dominance, prescribed fire should be introduced in RCW management units at three- to four-year intervals in a manner similar to early aboriginal set fire (17).

A more intensive investigation of population status is needed to determine the degree of decline in RCW populations and the extent of colony drifting. Studies of plant succession dynamics on MCWA are needed in order to quantify and characterize vegetative change. Comparison of high-altitude photography at different points in time could give some indication of past overstory change, but permanent, Continuous Forest Inventory (CFI) plots should be established in order to quantify understory, midstory, and overstory change over time.

ACKNOWLEDGMENTS

This study was funded through Federal Aid in Wildlife Restoration Project W-80-R, Study 4, Job 1, Technical Assistance and ODWC's Nongame Program. The authors wish to acknowledge the assistance of D. Wood, G. Woods, S. Lauzon, D. Base, and F. James in completing fieldwork on this project. D. Wood graciously provided data on colony locations and spent personal vacation time assisting in the relocation of colonies. We also wish to acknowledge M. Webber with the U.S. Forest Service and T. Melchoirs of Weyerhaeuser Company for assistance in locating colonies on their respective organization's lands.

REFERENCES

1. R.G. Hooper, A.F. Robinson, and J.A. Jackson, *The red-cockaded woodpecker: Notes on life history and management*. USDA Forest Serv., Gen. Rep. SA-GR 9, 1980. pp. 8.
2. K.L. Smith, in: P.A. Murphy (Ed.), *Symposium on the Shortleaf Pine Ecosystem*, South For. Exp. Sta., USDA For. Serv., Montecello, Ark., 1986. pp. 1-8.
3. D.D. Wood, *Status, Habitat, Home Range, and Notes on the Behavior of the Red-cockaded Woodpecker in Oklahoma*, M.S. Thesis, Oklahoma State University, 1977.
4. G. Bukenofer, personal communication, from the Ouachita National Forest, Choctaw Ranger District, 1987.
5. G.E. Morris, personal communication, from the Ouachita National Forest, Kiamichi Ranger District, 1987.
6. R.C. Reasoner, *Soil Survey, McCurtain County, Oklahoma*, U.S. Government Printing Office, Washington D.C., 1974.
7. W.A. Carter, *Ecology of the Summer Nesting Birds of the McCurtain County Wilderness Game Preserve*, Ph.D. Dissertation, Oklahoma State University, 1965.
8. S.A. Nesbitt, B.A. Harris, C. B. Brownsmith, and R. E. Repenning, in: *Report of the Investigation of Red-cockaded Woodpeckers in Charlotte County, Florida*. Gainesville, Florida, 1979.
9. F.M. Baumgartner, *Audubon Field Notes* 8:477 - 479 (1961).
10. M. Webber, personal communication, from the Ouachita National Forest, Tiak Ranger District, 1987.
11. U.S. Forest Service, *Wildlife Habitat Management Handbook*, USDA For. Serv. South, Reg., Atlanta, Ga., 1980.
12. E.L. Little, Jr. and C.E. Olmstead, *An Ecological Study of the Southeastern Oklahoma Protective Unit*. (Manuscript edited by W. T. Penfound), Univ. of Oklahoma Library, 1931.
13. K.H. Garren, *Bot. Rev.* 9:617-654 (1943).
14. D.H. Van Lear, in: D.D. Wade (Ed.), *Prescribed Fire and Smoke Management in the South: Conf. Proc.*, USDA For. Serv. South. For. Exp. Sta., Asheville, N.C., 1985. pp. 57-75.
15. M.D. Cain, in: *Proc. Central Hardwood Forest Conf.*, Knoxville, Tennessee, 1987. pp. 141-147.
16. D.D. Wood, personal communication, from the Florida Game and Fresh Water Fish Commission, 1985.
17. R. Guyette and E.A. McGinnes, Jr., *Trans. Mo. Acad. Sci.* 16:85 - 93 (1982).