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Effects of Prescribing Burn on Cavity Trees of Red-Cockaded Woodpeckers

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ecology of ruffed grouse in northeastern Iowa. J. Wildl. Manage. 36:793–802.
OBINETTE, W. L., C. M. LOVELESS, AND D. A. JONES. 1974. Field tests of strip census methods. J. Wildl. Manage. 38:81–96.
WOBODA, F. J. AND G. W. GULLION. 1972. Preferential use of aspen by ruffed grouse in northern Minnesota. J. Wildl. Manage. 36:1166–1180.
THURMAN, J. R. 1966. Ruffed grouse ecology in southeastern Monroe County, Indiana. M.S. Thesis. Purdue Univ., W. Lafayette, IN. 101pp.

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EFFECTS OF A PRESCRIBED BURN ON CAVITY TREES OF RED-COCKADED WOODPECKERS

Prescribed burning helps maintain low-density understory vegetation apparently preferred by red-cockaded woodpeckers (*Picoides borealis*) at colony sites (Hopkins and Lynn 1971, Jackson et al. 1977). Beckett (1971), Hopkins and Lynn (1971), and Jackson et al. (1977) suggested that caution be used during routine prescribed burns on colony sites because resin flows on cavity trees can ignite and damage cavities. Hopkins and Lynn also recommended that combustible material be raked away from the bases of active cavity trees, but suggested no distance.

On 21 March 1978, we discovered that a prescribed burn had been conducted in an area containing 4 red-cockaded woodpecker colonies. We reconstructed pre-burn conditions of each cavity tree using records kept by personnel conducting the prescribed burn and our own field examinations after the burn. Our objectives were to assess fire damage to 21 cavity trees in the area and to recommend measures to prevent damage to red-cockaded colony sites in future burns.

The burn was conducted on 21 and 22 February 1978 in a 330-ha longleaf pine (*Pinus palustris*) mature timber stand in Jasper County, East Texas. Basal area of trees in the area was 18–20 m²/ha and sparse understory vegetation was 1–2 m high. Fuel for the burn was 6 years' accumulation of grass, leaf litter, and branch slash; 3 years' accumulation is recommended for hazard reduction in southeastern United States (Sackett 1975). Combustible fuel had been raked to about 1 m away from 11 woodpecker cavity trees, and the ground at the base of 10 trees was left unraked.

At the start of the burn air temperature was 6.5 C and the wind was steady from the northwest at 8 km/hr; conditions were suitable for a safe burn (Crow 1973). Although a back fire (burning into the wind) was attempted, a head fire (burning with the wind) burned through most of the area on both days. On the second day, gusts of wind caused the fire to burn hotter than desirable, scorching the bark on some trees.

On 21 March we examined the 21 cavity trees for resin flow and degree of burn. Resin flow was classified as follows: abundant—resin flow covering at least 4 vertical meters of the tree; moderate—resin flow covering less than 4 vertical meters of the tree; none—no fresh resin flow present. Degree of burn was classified as: severe—burnt into crown; slight—burnt 1–2 m up the bole; unburned.

RESULTS AND DISCUSSION

Six of the 21 cavity trees had abundant resin flow, and all 6 were burned severely, even though the ground at 2 of them had been

Table 1. Amount of resin flow and extent of burn on 21 red-cockaded woodpecker cavity trees, Jasper County, Texas.

Degree of burn	Resin flow: Abundant, Raked *N*	Abundant, Unraked *N*	Moderate, Raked *N*	Moderate, Unraked *N*	None, Raked *N*	None, Unraked *N*
Severe	2	4		1		
Slight			3	3		
Unburned			3	1	3	1

raked (Table 1). On trees with abundant flows, resin was so flammable that raking was ineffective.

Six of 11 cavity trees with moderate resin flows had been raked; 3 were slightly burned and 3 were unburned (Table 1). Of the 5 unraked trees with moderate resin flow, 1 was severely burned, 3 were slightly burned, and 1 was unburned. On trees with moderate resin flows, raking may have helped prevent burns. The 4 cavity trees that lacked fresh resin did not burn, whether the ground around them had been raked or not.

The bark of noncavity trees in the area was often scorched up to 1 m above the ground, and occasionally up to 2.5 m. Fire never entered the crowns of noncavity trees.

Red-cockaded woodpeckers nested in existing cavities in 2 of the 7 severely burned cavity trees during 1978; 3 young fledged from the 2 trees. Clans nesting in these burned trees scaled the burnt bark from tree exteriors and pecked wells that provided substantial, new resin flow. None of the other 19 trees examined were used for nesting. We could not find nest trees of the other 2 clans in the burned area. Nest trees previously used by these 2 clans were severely burned and had all cavities burned out, and 1 tree had burned through at a cavity and fallen.

On 15 July we discovered that 3 of the remaining 5 severely burned trees with abundant resin were dead. They had been attacked and infested by several species of beetles. No other trees within 150 m of each tree had been infested. Examination of beetle galleries and individuals emerging from logs in the lab revealed that *Ips avulsus*, *I. calligraphus*, an *Dendroctonus frontalis* (Scolytidae) were th initial invaders. Flatheaded borers (Bupres tidae) and long-horned beetles (Cerambyci dae) were secondary invaders. The beetle coincidentally inoculated the trees with a imperfect fungus: bluestain, or *Ceratocysti* spp. Bluestain fungus grows rapidly and clog both xylem and phloem tissue, thus killing th tree. Because red-cockaded woodpeckers al most always nest in living pine trees, any fac tor that kills cavity trees is detrimental to th woodpecker.

We estimated the effects of fire on the 1 cavities and 7 cavity starts within the 6 se verely burned trees that had abundant resi flows by vertically sectioning the 4 dead tree with a chain saw and visually inspecting th 2 standing live trees. Only 6 cavities and starts would have been useable had all tree remained alive. Seven cavities were burne so severely that gaping holes, 30–40 cm i diameter, were left in the trees. Entrance tubes of the 3 other cavities were burned ou to 12–24 cm in diameter, and the cavities were burned about 3 cm larger on all dimensions Cavity entrances of this size are seldom use by red-cockaded woodpeckers (Jackson 1978) The 4 cavity starts judged unuseable were burned 2–3 times their normal size. The mean height of cavities was 8.5 m ± 2.5, a distance well above the height fire reached on noncav ity trees.

MANAGEMENT RECOMMENDATIONS

Use extreme caution when conducting prescribed burn on red-cockaded woodpecke colony sites. The most active cavity trees which are probably the most important tree to red-cockaded woodpecker reproductive ef forts (Jackson 1977), are most susceptible t burning because of highly volatile turpene in abundant, fresh resin flows. Burns on cavit trees can destroy the trees, cavities, and cavit starts. Even if burns do not destroy cavities they can enlarge entrance tubes, possibly dis couraging use by red-cockaded woodpecker and encouraging predators and nest compet itors (Jackson 1978).

Because colony sites are typically more sensitive to burning than the forest around them, we suggest that a fire lane be plowed at a distance of 60 m from the edge of colony sites and that they be burned separately. Since a 3-m raking distance was ineffective on trees with abundant resin, we also suggest that combustible materials be raked at least 3 m away from bases of cavity trees, which hopefully will be a sufficient distance to prevent ignition. Adequate fire suppression equipment should be kept available to protect cavity trees with heavy resin flows covering most of the lower portions of the trees. Prescribed burning at colony sites should be done with a *back fire* at least every 3 years to prevent accumulation of too much fuel.

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LITERATURE CITED

BECKETT, T. 1971. A summary of red-cockaded woodpecker observations in South Carolina. Pages 87–95 *in* R. L. Thompson, ed. The ecology and management of the red-cockaded woodpecker. Bur. Sport Fish. and Wildl. and Tall Timbers Res. Stn., Tallahassee, FL.

CHOW, A. B. 1973. Use of fire in southern forests. J. For. 71:629–632.

HOPKINS, M. L. AND T. E. LYNN, JR. 1971. Some characteristics of red-cockaded woodpecker cavity trees and management implications in South Carolina. Pages 140–169 *in* R. L. Thompson, ed. The ecology and management of the red-cockaded woodpecker. Bur. Sport Fish and Wildl. and Tall Timbers Res. Stn., Tallahassee, FL.

JACKSON, J. A. 1977. Determination of the status of red-cockaded woodpecker colonies. J. Wildl. Manage. 41:448–452.

———. 1978. Competition for cavities and red-cockaded woodpecker management. Pages 103–112 *in* S. A. Temple, ed. Endangered birds: Management techniques for preserving threatened species. University of Wisconsin Press, Madison, WI.

———, W. W. BAKER, V. CARTER, R. T. CHERRY, AND M. L. HOPKINS. 1977. Recovery plan for the red-cockaded woodpecker. U.S. Fish and Wildl. Serv., Atlanta, GA. 38pp. (Typewritten draft).

SACKETT, S. S. 1975. Scheduling prescribed burns for hazard reduction in the southeast. J. For. 73:143–147.

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MINIMUM STANDARDS AND FOREST WILDLIFE MANAGEMENT

As demands for timber products increase, many forest managers will want to shorten timber rotation times to meet demand and to further minimize losses to decay. Anticipating such management policies on lands designated for multiple use, wildlife scientists have presented minimum standards of selected habitat factors to be provided for wildlife.

Conner et al. (1975) suggested that the minimum diameter of trees used for nest sites by pileated woodpeckers (*Dryocopus pileatus*) might be the best to use when setting length of timber rotations. Thomas et al. (1976) and Bull (1978) listed minimum diameters and heights of snags to be provided when managing for cavity-nesting birds in the Pacific Northwest. Bull and Meslow (1977:337) recommended "managing for a group of snags greater than 20 inches in d.b.h." when managing snags for pileated woodpeckers. Measurements of pileated nest trees in the area averaged 76 cm DBH (30 inches) and the smallest nest tree observed was 58 cm DBH (23 inches). Berner and Gysel (1969) recom-

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