

FITTING FIRE INTO OAK MANAGEMENT

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SUMMARY

In the past decade, the use of prescribed fire in the mixed-oak forests of the eastern United States has markedly increased to help overcome the chronic lack of abundant, vigorous oak regeneration (Yaussy 2000). However, prescribed burns implemented under inappropriate circumstances can result in failure to establish oak regeneration and/or loss of existing oak reproduction. To correctly use fire to promote regeneration of mixed-oak forests, stand developmental dynamics (Oliver and Larson 1990) and the oak regeneration process (Sander and others 1984) must be considered simultaneously.

When a mature mixed-oak forest is in the understory re-initiation stage, timber harvest or other major disturbance will move it to the stand initiation stage. Before this can take place, oak regeneration must become established in the mature stand. Research has shown that prescribed fire can help by preparing the seedbed for acorn caching by wildlife, xerifying the soil surface to inhibit establishment of mesophytic species, and decreasing populations of acorn-infesting insects (Barnes and Van Lear 1998, Van Lear and Watt 1993). To do this, burning must take place shortly before an acorn crop occurs. This is a difficult treatment to time because acorn crop occurrence fluctuates annually and is an event impossible to accurately predict. Also, these benefits only last a year or two. Burning should not take place immediately after an acorn crop (Auchmoody and Smith 1993) or when oak regeneration is still young and small (Brose and Van Lear, this proceedings) because fire kills acorns and new seedlings. Burning in mature oak stands also can help reduce understory competition and shade. To do this, burning must occur repeatedly as single fires seldom produce sufficient intensity to remove midstory trees. Because of these caveats and limitations, using prescribed fire to establish oak regeneration in mature stands generally requires multiple burns beginning several years or more before an anticipated harvest. Mechanical site scarification or waiting for a bumper acorn crop are probably better management strategies for establishing new oak seedlings than prescribed burning.

A mixed-oak stand that is entering the stand initiation stage via the shelterwood system is an ideal site for the use of prescribed burning if it has abundant oak regeneration that is being out-competed by faster growing species (Brose and others 1999). In this setting, fire, especially during the growing season, top kills the regeneration, shifting oak reproduction to a position of dominance because of its superior fire survival and sprouting abilities. In this context, the residual crop trees must be protected from the fire by removal of logging slash near their bases before burning or prevention of slash accumulation during the logging opera-

tion (Brose and Van Lear 1999). A new oak stand formed by a complete overstory removal also may benefit from prescribed burning. Like a shelterwood, it, too, must have abundant oak regeneration that is being out-competed by faster-growing species. However, this scenario has not yet been adequately researched to provide sound guidance.

Once a new oak stand grows past crown closure into the stem exclusion stage, there is no reason to use fire in its management. To do so would damage the lower boles of the trees, resulting in long-term value loss (Carvell and Maxey 1969).

Fire in mixed-oak forests can inadvertently create a major regeneration obstacle. Burned areas attract deer as sprouting hardwoods are highly preferred browse and this could lead to a localized deer overabundance problem. If this happens, fencing will probably be necessary to protect the new regeneration until it grows out of the reach of deer.

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