

TWENTY-FIVE-YEAR EFFECTS OF CUTTING AND PRESCRIBED FIRE ON NORTHERN RED OAK REGENERATION IN MICHIGAN OAK AND PINE STANDS

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Abstract—Reviews of likely causes of the oak regeneration problem in the 1980s and 1990s stimulated several studies designed to test different methods of reducing competition between oaks and other hardwoods. A study involving multiple overstory and understory treatments was established in 1991 in Michigan oak stands and red pine plantations to test the hypotheses that (1) northern red oak regeneration would be more successful in pine than oak stands, and (2) removal of competitors would enhance northern red oak seedling performance. Late spring prescribed fires were implemented in 2002 and 2008 to investigate their effectiveness in controlling understory red maple. Planted northern red oak performance and natural regeneration of oak and red maple have been documented since 1991. A subset of planted seedlings has been protected against deer browsing since planting. Results suggest partial removal of competitors enhances oak seedling performance, whereas complete removal greatly increases mortality from browsing and frost. Although the stature of many red maple stems was reduced, red maple abundance increased and oak abundance decreased after the two fires. The timing of the fires likely reduced their impact on red maple. Greater growth and survival of planted oaks occurred in the pine stands, provided they were protected from browsing. Based on these results, the most viable technique for regenerating oak in the study region may include protecting oak seedlings from deer in 25 percent canopy cover shelterwoods in pine plantations. Opportunities exist for developing systems involving alternating rotations and mixtures of oak and pine species.

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