Minnesota Forestry Research Notes

Published by the Department of Forest Resources, University of Minnesota, St. Paul

September 2013 No. 297

Influence of Site Preparation on Natural Regeneration and Understory Plant Communities Within Red Pine Shelterwood Systems

Anthony W. D'Amato[1]

The most common silvicultural prescription for regenerating red pine in the Lake States is clearcutting followed by planting; however, the use of partial harvesting is increasingly being used to maintain aesthetic values and wildlife habitat. The purpose of this study, which was established by Dr. Dan Gilmore, is to evaluate the success of four alternative vegetation management methods in promoting the natural regeneration of a 90 yr-old red pine stand that was thinned (in 1960, 1970, and 1985; thinned to 120 ft^2 ac^{-1}) 5 years prior to final harvest.

Treatment	Description
Underburning (B)	-all understory shrubs and trees felled by brushsaw in June 2001 -prescribed burn in August 2001 (Figure 1)
Herbicide (H)	-application of granular hexazinone at 3.3 kg ha^{-1} in June 2001
Mechanical (M)	-mechanical mulching treatment using hydraulic mulcher applied in October 2000 (Figure 1)
Mechanical+Herbicide (M+H)	-mechanical mulching treatment using hydraulic mulcher applied in October 2000 -application of glyphosate at 2.48 kg ha^{-1} in September 2003
Control (C)	-no treatment

(a) (b)

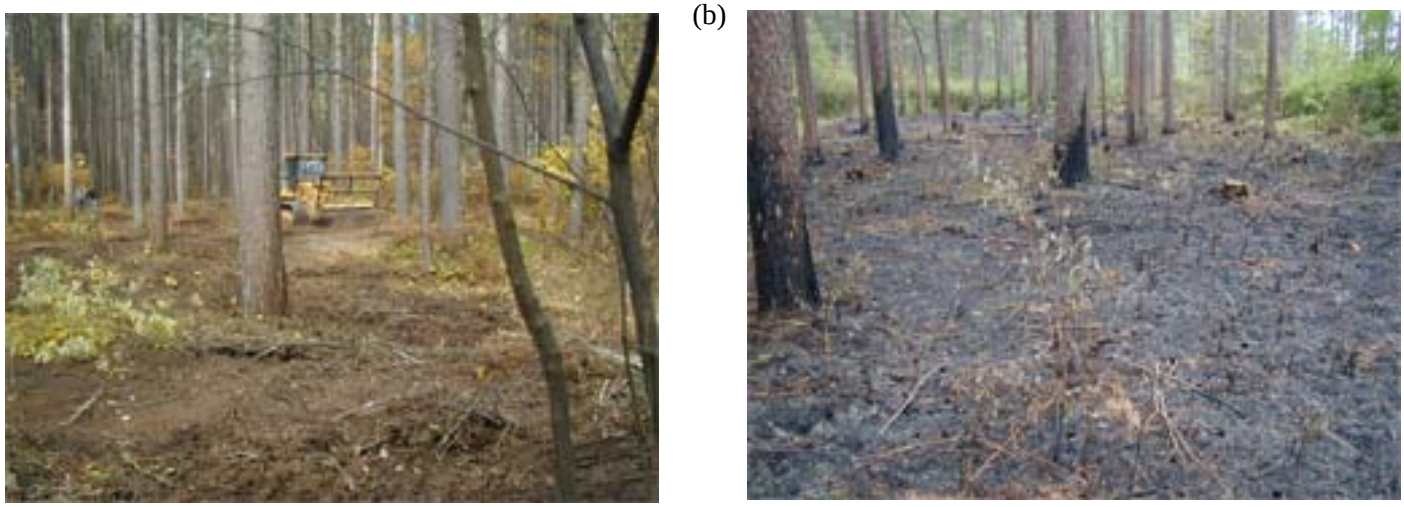

Figure 1. (a) Mechanical mulching and (b) underburning treatments within the red pine regeneration study immediately following treatment implementation.

[1]Associate Professor, Department of Forest Resources (www.forestry.umn.edu), University of Minnesota, St. Paul.

Research supported by the University of Minnesota Agricultural Experiment Station.

Main findings:

- Mechanical mulching and mechanical mulching + herbicide site preparation treatments were the most effective at securing natural red pine regeneration within a shelterwood setting. These treatments also had the greatest impact on reducing competing shrub densities.

- Although underburning has been suggested as a technique for reducing competition and preparing seedbeds for red pine, our findings indicate that a single prescribed burn is not sufficient for achieving favorable conditions for natural regeneration. Shrub densities did not change following burning and actually increased relative to pretreatment levels on some plots.

- This work highlights that regeneration methods based on partial harvesting treatments can successfully secure red pine natural regeneration when appropriate site preparation treatments are applied. Nonetheless, these approaches should be limited to regions with low *Diplodia*/*Sirococcus* risk.

For more details on this study, see:

D'Amato, Anthony W., John Segari and Daniel Gilmore. 2012. Influence of site preparation on natural regeneration and understory plan communities within red pine shelterwood systems. *Northern Journal of Applied Forestry* 29(2): 60-66.