

The Effects of Prescribed Fire and Mechanical Treatments on Insect Pests and Pathogens of Red Pine at Muskrat Lakes, Luce County, Michigan

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Abstract

This project is an ongoing study of the effects of fire and mechanical treatments on biodiversity and insects and pathogens in red pine at Muskrat Lakes in Luce County, Michigan on land managed by the Michigan Department of Natural Resources (Figure 1). The study design is modeled after that used in the national Fire and Fire-Surrogate study. The site specific objectives of the study are to 1) determine the effects of fire and mechanical treatments, alone and in combination, on incidence and impact of forest insect pests and pathogens in mature red pine stands in the Lake States and 2) document the effects of these treatments on forest vegetation and litter parameters, and relate these effects to the biology of forest pests.

Study Design and Treatment Implementation

Twelve treatment areas of approximately 17 hectares each were divided into 3 blocks based upon predominant species composition. The treatments which have been initiated are:

1. Untreated control
2. Prescribed fire only
3. Mechanical treatment only (thin to reduce canopy closure)
4. Mechanical treatment followed by prescribed fire

Treatment timetable:

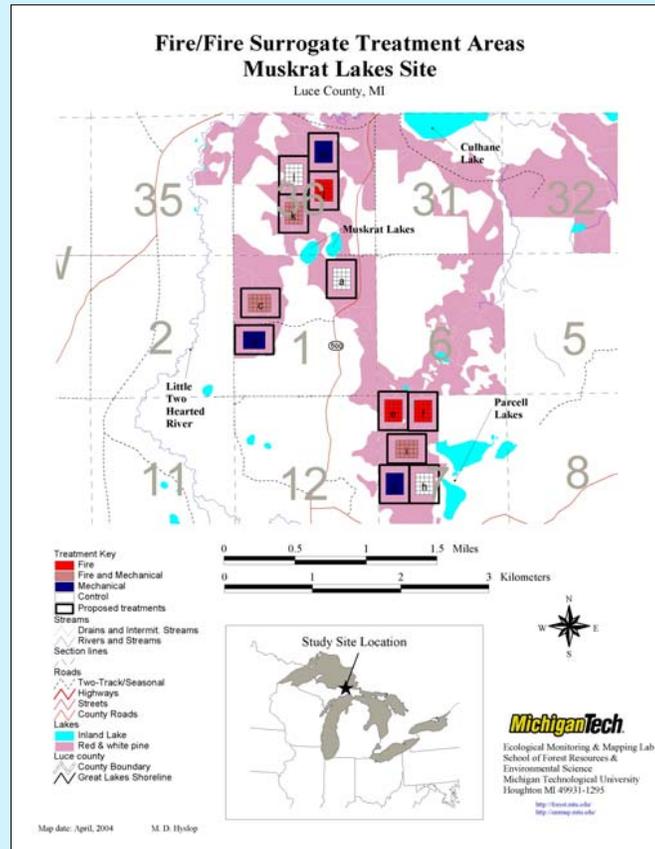
All mechanical treatments were completed in Fall 2005. Burn treatments will be implemented in spring/early summer 2006.



Fig. 1 Red pine forest at Muskrat Lakes



Fig 2. Shoot blight damage on red pine



The Forest

Composition of the forest is 54.2% red pine, 16.0% white pine, 11.3% jack pine and 8.9% red oak. Mean DBH of red pine is 11.3 inches, mean height is 49 feet, height to continuous live crown is 35 feet and height to first live crown is 22 feet.

2005 Field Activities

Intensification of trapping of spores of shoot blight pathogens

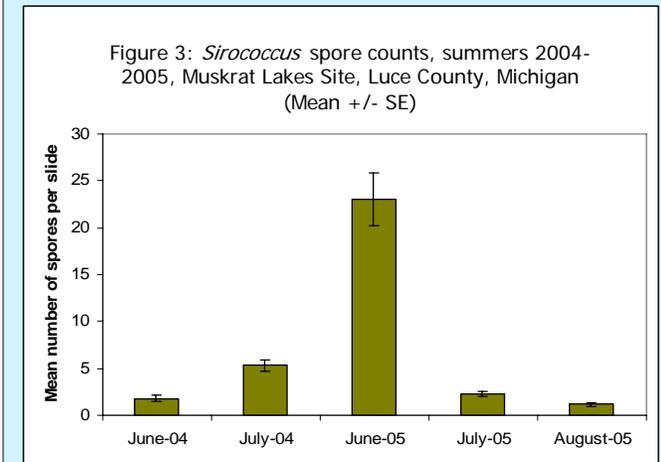
Trial use of seedlings to detect shoot blights

GPS data collection of plot centers and treatment boundaries

Recording of tag numbers of all trees to be removed during the mechanical harvest

Spore Trapping

To characterize the prevalence of the shoot blight diseases *Sphaeropsis* and *Sirococcus* (Figure 2), spore traps were placed in each of the 12 treatment areas on the Muskrat Lakes study site, with 4 traps (vaseline coated microscope slides) at each treatment area. The slides were left out for 2 weeks, then collected and replaced with fresh slides. *Sirococcus* spores were detected in each round of trapping (Figure 3). *Sphaeropsis* spores were less prevalent.



Continuation

Prior to burning in 2006, fuels will be assessed using triangles of transects within the treatment areas. Short term responses to the fire treatments and harvesting treatments will be assessed.

Causes of all tree mortality in the stands will be determined.

We anticipate continuing data collection at this site in the future in order to document short term (1-3 years) and longer term (5-10 years) effects of the treatments.

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