

Preliminary Report

Submitted to: Bob Lindsay, IDNR Natural Heritage, District 22

Project Title: Assessing the effects of prescribed burns on understory diversity, competing vegetation, and maintaining early successional characteristics in forests of Southern Illinois.

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Abstract

The effect of a fall prescribed burn in an oak-hickory forest stand was investigated using a 0.10 ha permanent plot at Ozark Hills Nature Preserve, Trail of Tears State Forest. Despite the low intensity of the burn due to fall weather conditions, the burn effectively met the primary objectives of reducing understory competition from mesophytic tree species and increasing diversity of herbaceous species. While the data have not been fully analyzed, preliminary analysis suggests that >20% of understory sugar maple and American beech seedlings were top-killed and grass-forb species increased within the plot. Future research plans include continuing biannual fall burns and monitoring of plot data. Final analysis of this year's plot data will be completed by October 2001 and a final report for this year's burn activity will follow.

Introduction

The initial intention of this project was to establish a forest fire effects monitoring system within state forest areas of southern Illinois. The reason for doing so was to collect key data on prescribed burn units to assess whether burns were meeting stated objectives. To complete a state-wide research program will require a much larger effort and more resources than those provided by this grant. However, this grant provided the seed money for developing a standardized sampling scheme, emplacing two permanent plots (one treated with a prescribed fire, the second, a control plot in adjacent, untreated forest) within a burn unit, and conducting a very successful burn. Thus, I feel this project was a success in meeting those initial objectives. However, the long-term nature of this research does not lend itself to reporting one-year revegetation data after only one burn. Thus, the principal investigator will continue conducting burns at this site and monitoring vegetation dynamics through time. In addition, the sampling scheme developed via this

project will be implemented on at least two other burn units this fall for the spring 2002 burning season.

Study Area Description

The treated 0.10 ha permanent plot (20 m wide X 50 m long) was positioned on the southwest aspect of a spur ridge at UTM Grid 16: Easting 92050/ Northing 50705 in Ozark Hills Nature Preserve (Figure 1). The plot was located at this position based on the dominant overstory of white oak, red oak, and hickory species and the potential for recruiting desirable oak species on this site. Approximately one month before burning, all stems within the 0.10 ha plot were mapped (simple x, y coordinates) by species, diameter class (pole = 3.0 cm-14 cm dbh, overstory = stems > 15 cm), and crown position. Nested quadrats (5m x 5 m) were inventoried for seedlings while herbaceous species were tallied at every meter along the long axis of the plot using a one meter wide point intercept scheme.

The prescribed burn was conducted on October 12, 2000, within 55 acres of the Ozark Hills Nature Preserve located at Trail of Tears SF, Union County. Fire lines were constructed prior to the burn and field checked by IDNR personnel. Weather conditions on the day of the burn indicated 30-40% relative humidity, 65° F temperature and wind speeds ranging between 0-3 mph, with no noticeable gusts. While warmer, drier conditions were not met during the course of the burn relative humidity did drop to 22% and the temperature increased to near 70° F after the noon hour. The burn was backlit along the ridgeline by Charles Ruffner and Bob Lindsay to develop blackline on both flanks and then a headfire was lit to run up the draws of the area. Initially, fire conditions can best be described as creeping (rate of spread < 1 chain per hour) which eventually increased to spreading (rate of spread = 1-2 chains per hour). By 1630 hours the active flame front was out and crews mopped up the fireline with conclusion of the burn by 1730 hours.

Expected Results

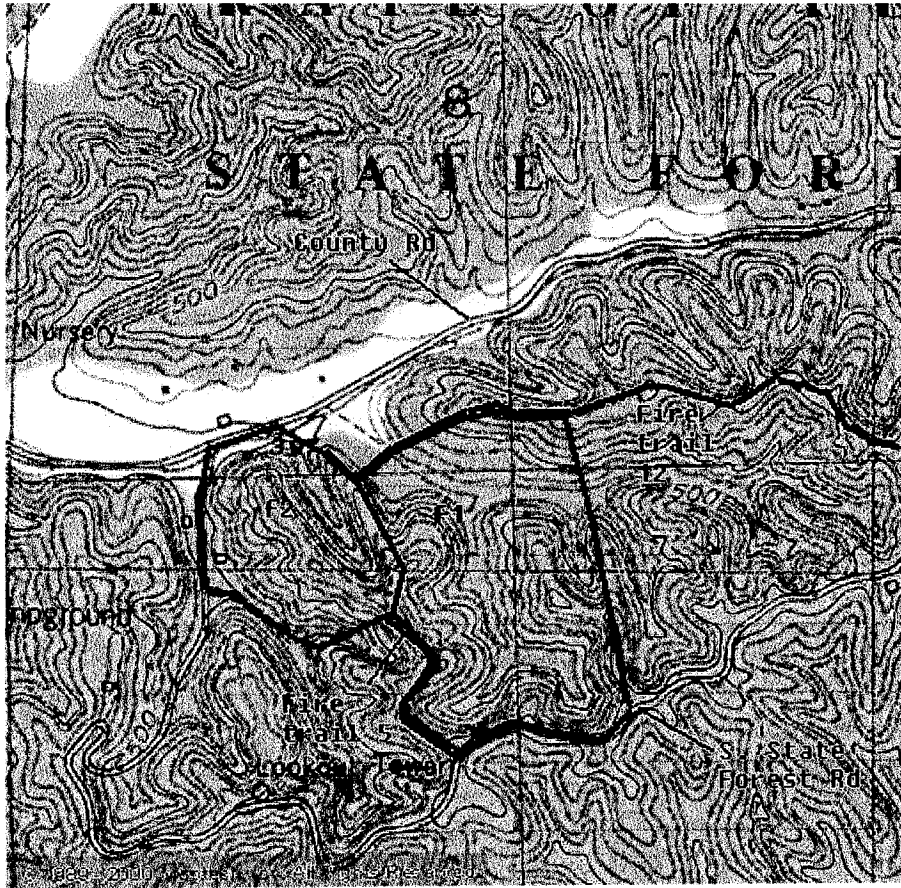
Again, since complete post-burn data have not been fully analyzed it would be imprudent of me to report unsubstantiated results. At this time, herbaceous data must still be collected on the site to ascertain seed production of grasses and other understory forbs. These data will be collected by early September and a full report will be submitted at that time.

Beyond that only a few anecdotal comments can be made concerning the outcome of this one burn. As mentioned in the abstract, the burn was successful in topkilling >20% sugar maple and beech seedlings (Figure 2). However, these species are capable of resprouting which indeed many did. Nonetheless, it is expected that continual burning at this site will eventually reduce the density of these species and allow recruitment of oak regeneration on the site. It is the researchers intent to continue burning this site biannually for five to six years to reduce understory density of sugar maple and beech, then once some advance regeneration of oak are evident reduce the fire return interval from 2 years to the suggested 5-8 years.

Conclusion

The effects of one prescribed burn are not the real interest points for this project. The most important contribution to forest management that this project offers is a standardized, simple sampling scheme that could easily be implemented by state agencies currently conducting prescribed burns.

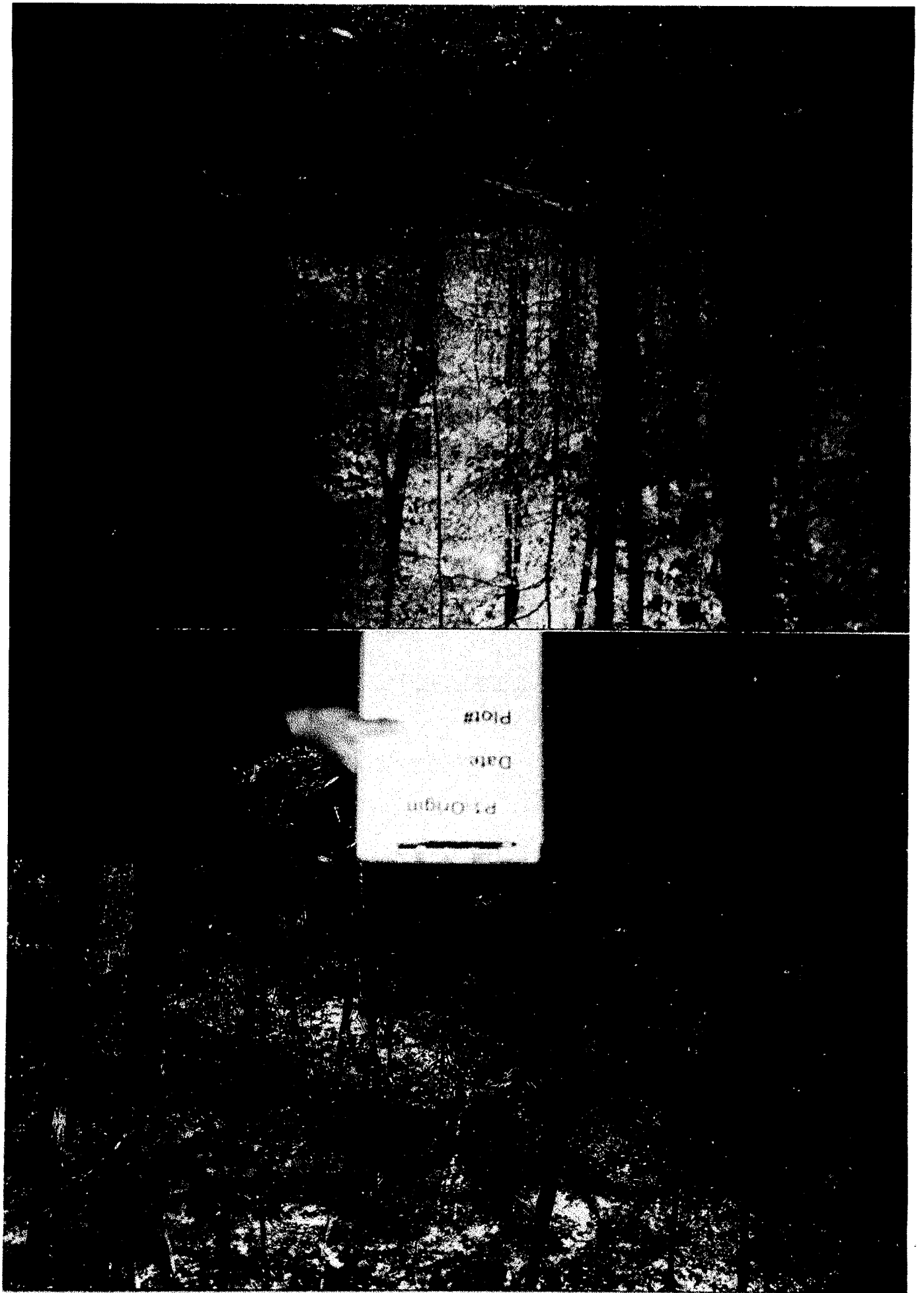
Figure 1: Burn Unit Map Trail of Tears State Forest/Ozark Hills
Burn Unit TTSF f1 and f2



Scale 1:15000

Legend

- Red- Burn Units f1 and f2
- Black- Fire Trails 5 and 12
- Picnic shelters
- Lookout Tower



Pl. Origin

Date

Plot #

Figure 1: Burn Unit Map Trail of Tears State Forest/Ozark Hills
Burn Unit TTSE f1 and f2



Legend

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