

Red Oak

Project Subject/Title: Release burn – Prescribed fire for oak regeneration release

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Abstract: Oak shelterwood harvest in May 2008. Turkey Stamp funding was used to pay for a portion of the burn. Specific objectives were to set back red maple stump sprouts, aspen and other competition while releasing established oak regeneration and promoting additional oak establishment. Although there was already a good number of oak regenerating, the other hardwood species present were more vigorous and was outcompeting the oak.

Trial Location:

County: Vilas

Township: 41N **Range:** 07E **Section:** 04

GPS Coordinates: Lat: 46°3'24" **Long:** -89°37'40"

Property Name: Northern Highland American Legion State Forest

Baseline Stand Data

- *Cover Type:* Red Oak
- *Acres:* 22 acres
- *Habitat Type:* ParV, ParVa
- *Soil Type:* KaB- Karlin loamy fine sand, 0-6% slopes
- *Year of Origin:* 1940
- *Total Height:*
- *Site Index Species and Site Index:* 59
- *Mean Stand Diameter:*
- *Total Basal Area per Acre:*
- *Other stand Condition:* Prior to the shelterwood harvest in 2008, the stand was selectively cut in 1960 when it was more of a poletimber stand.

Prescription and Methods:

- *Type of Prescription:* Shelterwood
- *Year Initiated:* 05/17/2011
- *Establishment Methods:*

A shelterwood harvest was conducted in May, 2008 which reduced the basal area to about 50 square feet per acre. A prescribed burn was initiated 3 years later in 2011. Weather conditions at the day of the burn were clear skies, temperatures in the middle 60's with winds out of the NE at 3-5 mph. The relative humidity at ignition was 16% and predicted to drop to 14%. Observed fire behavior during the burn was low to moderate with periods of increased intensity occurring with wind gusts and slash pockets.

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- *Data Collection Methods:*

In 2011, several permanent plots were established to track the mortality in the overstory oak as it relates to scorch height, DBH, crown density estimation, and crown area. A stocking survey was also collected in June 2012. The stand was revisited again in June 2014. Regeneration surveys were taken as well as an ocular estimate of any residual oak mortality. An adjacent oak stand that was harvested a couple years earlier with a similar shelterwood system but without site preparation was also surveyed and compared (see chart).

Results: Competition from woody vegetation was significantly reduced. Oak was opportunistic and was the first to re-sprout immediately following the burn. Oak sprouts grew on average 2.5 feet within the first year after the burn. A stocking survey conducted in June of 2012 yielded 4790 red oak per acre. A follow up stocking survey conducted in June of 2014 yielded 4000 red oak per acre. The majority of the red oak stems were over 2.1 feet in height and 80% of the plots were considered stocked. Mortality in the oak overstory was estimated between 10-15%, and is directly attributed to the intensity of the fire where logging slash was most concentrated.

Discussion/Recommendations: Both red maple and aspen have re-sprouted but are noticeably less vigorous than the red oak regeneration. The quality of the red oak regeneration has also improved. Red oak stems appear straighter and have increased their root to shoot ratio. In addition, stem caliper is significantly larger in the new oak sprouts as compared to its competitors. Areas which appeared to burn the hottest yielded the highest concentration of red oak regeneration. In addition, some overstory oaks produced stump sprouts in response to the stress from the fire. The recent surveys found that a number of the residual overstory oak had experienced crown expansion. Mortality of the oak overstory that resulted from the burn could be mitigated by reducing the amount of slash through a whole tree chipping operation or by implementing specific contract language which required the logger to keep logging slash away from the base of the residual trees.

Follow up burns could be conducted in portions of the stand to mimic multiple burns over a number of years on oak sites.