Project Subject/Title: Dugan Lake Oak Shelterwood cut
County: Washburn
TRS: T39N, R10W Sec. 28

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Type Of Prescription: Shelterwood
Year Initiated: 1981

Abstract/Prescription:
This study was initiated in 1981 to evaluate and oak shelterwood cut, leave-tree marking system. Observations recorded were seedling establishment, epicormic branching, competition, impact of fire on competition and oak seedlings.
Year of stand origin was 1911. Basal area at the time of treatment was 105. The site contained a good proportion of large crown dominant oak. Treatment carried out were 1st shelterwood cut, mechanical release, prescribed burn, 2nd shelterwood cut. The burn area was about 3 acres and mechanical release was 2 acres. After the prescribe burn oak seedlings were tagged to follow survival.
Results:
After the initial shelterwood cut regeneration plots were established. In 1988, 3340 oak seedlings per acre were recorded on the site. Heavy competition from hardwood and rubus species was documented. Due to competition two release treatments were planned; A power saw mechanical release and a spring burn. After release, regeneration increased to 4600 (100%) stocked in 1991. Three years after treatment (1991) some competition is returning. Photo points were established and taken every year. Average age of oak seedlings at the time of treatment was 5.8 years and average height 1.13 ft.
Burn statistics are included in the enclosed report

Discussion/Recommendations:
- Properly timed burns were the key in controlling competition.
- For PAM and low end AVDe sites management should follow periodic improvement cuts (eliminating unwanted species and crop tree release).
- For high AVDe and AA sites, can be maintained in oak but at a higher cost. Lots of competition, release of oak is required (burned within 6 years after first shelterwood, then followed by a 2nd shelterwood harvest. Following this cut another fire or mechanical release.
- Oak resprouted after burn.
- Hand release may be needed to progress the stand and is successful in combination with fire.
- Higher nutrient sites AVDe/AA can be maintained but at a higher cost.

Site statistics:
Habitat Type AVDe/ AA

3/92

DUGAN LAKE, OAK SHELTERWOOD CUT (SEC 28-39-10)

Background

This study was initiated in 1981 to evaluate an oak shelterwood cut, leave tree marking system. Specific questions were to be examined as they relate to:

- seedling establishment on AVDe/AA habitat types
- epicormic branching
- competition control
- timing of control
- impact of fire on competition and oak seedlings

The stand is an AA/AVDe habitat type. Year of origin is 1911. Basal area was 105. Site contained a good proportion of large crown dominant oak. Treatments carried out:

- 1st shelterwood cut
- mechanical release
- prescribe burn
- 2nd shelterwood cut (site has been marked 1991, not cut as of this report)

Discussion

After the initial shelterwood cut regeneration plots were established. In 1988 3320 oak seedlings per acre were recorded on the site. It also became readily apparent at this time heavy competition including a mix of hardwood species and rubus species were having a severe impact on oak seedling development. Due to this competition two release treatments were planned. A power saw/mechanical release and a spring burn.

The mechanical release involved the use of the WCC crew at $3.35/hr/member. All competition above knee high was to be severed with the attempt on not cutting any oak seedling/saplings. Oak seedlings have increased from 3320 t/ac, 76% of the plots stocked in 1988 to 4600 t/ac, 100% of the plots stocked in 1991. Three growing seasons after this treatment competition is coming back but is still under control. Photo points have been established and have been taken every year following this treatment. Average age of oak seedlings at time of treatment was 5.8 years, average height 1.13 ft.

Fire burn release involved a spring burn, burning indexes were:

Sky condition	- 0
Dry bulb	- 71
Wet bulb	- 51
Dew point	- 25
Rel. Hum.	- 18
Stk Wt.	- 8
Wind Dir.	- W
Wind speed	- 4
Max. Temp.	- 72
Min. Temp.	- 46
Max. Hum.	- 18
Precip.	- 0

The vegetative indicators were:

- trillium just starting to sprout
- oak, bud swell, leaves not yet emerged
- ash still dormant
- maple, ironwood, leaves just emerged

It was two days since the last rain and the duff layer was cool and moist. Large fuels in the 100-1000 hr. lag fuels were moist. Seventy-one (71) oak seedlings were tagged to provide post-burn resprouting information.

The burn was completed with excellent top kill on all species 3" DBH and below. All our burning objectives were met. Mop-up was minimal, if mop-up was delayed 2-3 hours following burn it would have approached 0% due to the moist duff and larger fuels.

All oak seedlings following the burn were top killed. At the end of the growing season (fall of 1989) 92% of the tagged seedlings resprouted. It was also noted numerous new oak seedlings sprouted from buried acorns. An increase was noted form 3200 t/ac pre-burn to 7200 t/ac post-burn. This flush of seedling leveled off as of 1991 to 3889 t/ac. The majority of the seedlings remain around 1 foot tall with some in the 2-4 ft. range.

After examination of the site in 1991 it was recommended the overstory be reduced 50% (2nd shelterwood cut). This cut is expected to provide the needed sunlight for additional height growth.

Recommendations

Properly timed burns look very favorable based on the indexes provided by this pilot study. It was very encouraging on the amount of resprouting noted by the oak and minimal mop-up after the burn. It is becoming more apparent that the establishment of oak seedlings is a relatively easy matter. The main concern we presently have is the development of a management scheme to carry these 1 foot seedlings into the sapling stage. The development of an economical and environmentally safe release scheme is critical. Along with this is a need to inform the public that a final removal/clearcut will be required at some point in management of oak.

The management scenario derived from this study follows three routes and is tied closely with the respective habitat type the stand falls under be it either PAm, AVDe, or AA. For PAm and low end AVDe sites, management should follow periodic improvement cuts emphasizing eliminating unwanted species and crop tree release. When stands reach maturity a 1-2 stage shelterwood cut should be instituted and follow procedures identified in the silvicultural handbook. In addition to the procedures identified the sites may need release. Instead of the recommended use of herbicides either fire or mechanical release is recommended pre or post to the 2nd and/or final removal cut. If burning is recommended sites should be banked and the fire breaks established early on. These sites would then be burned when fire indexes are favorable. If fire is not possible mechanical release is an option if low cost labor is available.