Herbicide Can Speed the Restoration Of Sandhills Longleaf Sites

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Introduction

The longleaf (*Pinus palustris* Mill.) - wiregrass (*Aristida stricta* L.) community is rapidly disappearing, about 1.2 million hectares remain. Only about one fourth of this is on public lands where its continued existence and management is relatively assured. Florida is a key state because it has the most area (170,000 ha) of longleaf pine habitat on public lands. A portion of this area on the Withlacoochee State Forest is in need of restoration to re-establish the longleaf component. These sites were converted to slash pine plantations, which we now know is a poor species for sandhills soils. The off site slash can easily be removed but the scrub oaks which invaded during the era of fire exclusion are much more difficult to control. The oaks can be reduced with series of three to four prescribed burns, but because of limited time and resources it is not feasible to burn all of the existing longleaf stands and those areas in need of restoration. Thus, what is needed is a technique for reducing scrub oaks on off-site slash pine plantations so the longleaf component of the community can be successfully reestablished. The site preparation treatment also must not significantly impact the wiregrass, which fortunately is still prevalent on most sites. The objective of this study was to compare different site preparation techniques for restoring longleaf communities to determine which is best at reducing scrub oaks and retaining and promoting the development of the diverse native grassy understory layer.

Methods

The study was done on the northwestern portion of the Withlacoochee State Forest located in west central Florida. Sites were selected from former sandhills longleaf sites that had been anchor-chained and planted to slash pine in the 1960's. The design was a randomized block with three blocks, i.e. sites, and 3 treatments in each. Treatments consisted of a logged only control; logging followed by prescribed burning and herbicide application followed by logging and prescribed burning. The herbicide, hexazinone (Velpar-L), was applied with a backpack sprayer and a spot gun in May 1994 as a 3 ml spray on a 2 x 2 m grid pattern which equaled an application rate of 2.2 kg/ha active ingredient. Logging was done with feller bunchers and rubber tired skidders in January 1995. The appropriate plots were burned along with the rest of the sites in January 1997 with strip headfires. All plot were machine planted with container grown longleaf pine seedlings in January 2000. A second prescribed burn was done on all treatment plots

in May 2001. Prior to any treatments nine 15m transects were established in each treatment plot. Data pre and post treatment was collected on these transects using the line intercept method. Treatments were compared using analyses of covariance with the initial cover values used as the covariant.

Results

Prior to study establishment woody species cover, predominantly scrub oaks, averaged 40 % across the sites. Logging alone reduce woody cover on control sites by about 10 %. The reduction in woody cover was about the same on areas that were burned after logging. Hexazinone, logging and burning was the most effective reducing woody species cover to 6 %. The second burn had no apparent effect on woody cover in any of the treatments. Wiregrass cover was equal at 34 % across sites prior to any treatments. Any reduction of wiregrass cover due to logging was compensated for by expansion of remaining bunches. The first prescribed burn appears to have reduced wiregrass cover slightly. Wiregrass cover was not affected by treatments. Like wiregrass, cover of other grasses was equal across sites prior to study initiation. Logging alone had little effect on other grasses while logging and burning increased cover slightly. The addition of the hexazinone treatment greatly benefited other grasses, more than doubling cover. The planting operation and the second burn reduced cover of all grasses on all treatments. Forbs responded similarly to grasses with a slight increase on the logged and burned treatment but a big gain on the hexazinone and burned plots. Legume cover was low at the beginning of the study and logging seemed to reduce it. Burning compensated for loss from logging and legumes recovered to pre-harvest levels one season after the fire, but declined again following planting. Species richness increased on all sites following treatments. It appears that burning resulted in slightly more species than logging alone. This same trend is shown by Shannon's diversity with an increase on all treatments but a somewhat greater gain on the treatments that were burned.

Conclusions

Scrub oak structure and cover can be successfully reduced in long unburned longleaf sandhills communities by a one-time application of hexazinone. A single prescribed fire, however is not very effective at reducing scrub oaks on these sites. Any loss of wiregrass cover due to logging such sites seems to be compensated for by increased growth following release from competition. Hexazinone application at these low rates does not harm wiregrass. Other grasses and forbs respond to the decreased woody competition by expanding significantly on hexazinone treated plots. Burning seems to improve site conditions, resulting in increased grass and forb cover and greater species richness and diversity. Hexazinone treatment prior to logging followed by prescribed burning can successfully restore community balance giving a sharp decrease in woody species combined with a big increase grass and forb species.