

JFSP 2005 Principal Investigator Final Report

Project Title: Conversion of upland loblolly pine-hardwood stands to longleaf pine: does it influence fuel load, restore native forest cover, and reduce fire danger

Project Location: Southern Research Station (SRS), RWU-4111, Alexandria Forestry Center, 2500 Shreveport Highway, Pineville, Louisiana 71360

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Description of Project: Without continual burning, midstory and understory woody vegetation evolves beneath pine overstories, and the accumulating litter and midstory of ladder fuels create a high fire hazard. In this Joint Fire Science Program demonstration project, we evaluated how several management schemes change fuel conditions and vegetative composition in three upland forest types (loblolly pine, mixed pine, and young longleaf pine plantation) that were at different stages of restoration to longleaf pine.

We established six 24-acre Demonstration Areas. As originally proposed, we initiated three randomly assigned treatments to about a third of each area: (a) no treatment, (b) prescribed burning, and (c) prescribed burning plus supplemental woody plant control by mechanical means. We collected pre-burn fuel samples, prescribed burned the plots during spring 2001 and 2003, and collected post-burn samples 6 weeks after each burn. We completed the understory and midstory vegetation surveys in 2001, 2003, and 2004 (14 months after the last burn). We mechanically treated brush in summer 2002. We measured the overstory trees at the beginning and end of the project period. In addition to the original project, we evaluated the effects of the fires on bark beetle populations.

Status Report: As expected, burning destroyed most of the live foliage in the understory across these four sites, but the effect was short term and the understory vegetation recovered between burns (Figure 1). Burning also reduced the amount of 1-hour and 10-hour time-lag dead fuels, but dead fuels accumulated between burns. In May 2001, there were 4330 and 3345 kg/ha of 1-hour fuels on the no burn and prescribed burned plots, and in August 2004, there were 3475 and 2435 kg/ha of 1-hour fuels on the no burn and prescribed burned plots, respectively. Therefore, 1-hour fuel loads were unaffected by burning 14 months after the second prescribed burn. Burning affected 10-hour time-lag dead fuel loads, however. In May 2001, there were 5190 and 6575 kg/ha of 10-hour fuels on the no burn and prescribed burned plots, and in August 2004, there were 3680 and 2165 kg/ha of 10-hour fuels on the no burn and prescribed burned plots, respectively. Burning has not influenced mid or overstory composition. Mechanical brush control did not affect live fuels, 1-hour, and 10-hour fuel loads, but it did remove the midstory vegetation thereby eliminating ladder fuels.

Southern pine beetle (*Dendroctonus frontalis*) and Ips engraver beetle (*Ips* spp.) are the most destructive group of insects in the pine forests of the southern United States. Therefore, a prime concern is a reduced resistance to such bark beetles in fire-stressed stands because bark beetle populations often increase following prescribed burning. Additionally, ambrosia beetles (*Platypoididae*) are often attracted to fire-stressed stands and are vectors of known and suspected root pathogens. In the mixed pine and loblolly pine stands, prescribed burning resulted in increased numbers of beetles (Figure 2). Principally the beetles trapped were in three guilds--ambrosia beetles, bark beetles (*D. terebrans*, *Hylastes tenuis* and *salebrosus*, *Ips grandicollis* and *arulsus*), and weevils (*Cossonus corticola*, *Hyllobius pales*, and *Pachylobius picivorus*). No southern pine beetles were trapped, but the majority of weevils trapped were *C. corticola*, which is an associate of the southern pine beetle. Too few ambrosia beetles were trapped to determine response trends.

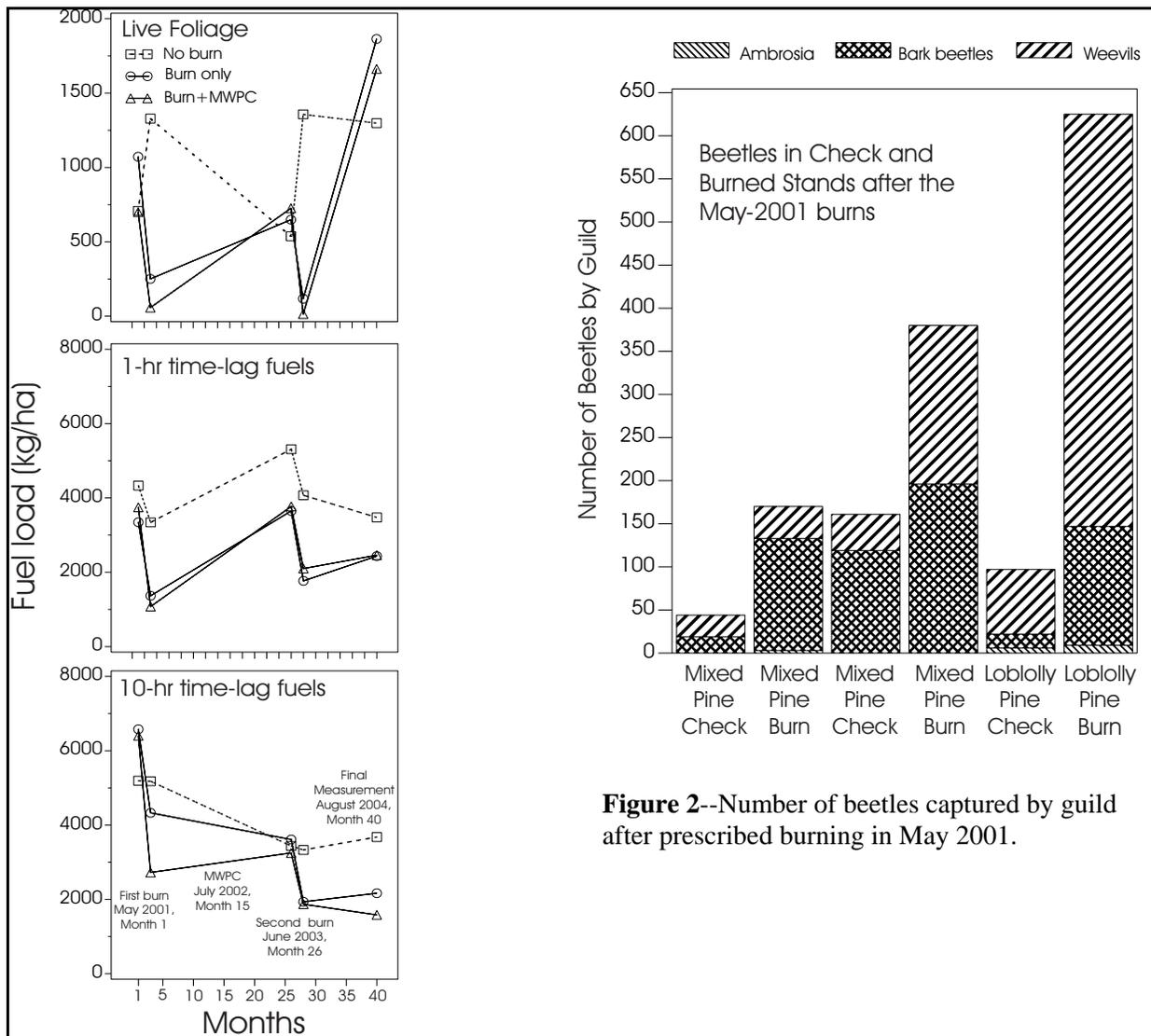


Figure 2--Number of beetles captured by guild after prescribed burning in May 2001.

Figure 1--Fuel load changes after two prescribed burns and mechanical woody plant control (MWPC) in three fuel classes (live foliage, 1-hr time-lag dead fuels, and 10-hr time-lag dead fuels) across four sites in central Louisiana; the burns were in May 2001 and June 2003 and the mechanical treatment was done in July 2002

The following posters and publications were completed by 2005:

1. Haywood JD, Bauman TA, Goyer RA, Harris FL. 2002. Restoration of upland forests dominated by loblolly pine to longleaf pine: Does it influence fuel load, restore native forest cover, and reduce fire danger. Poster presented at the North Florida Prescribed Fire Council Spring Meeting, April 18, 2002, Tallahassee, FL. (Unpublished Poster)
2. Haywood JD, Bauman TA, Goyer RA, Harris FL. 2003. Restoration of upland forests to longleaf pine: Does it influence fuel load, restore native forest cover, and reduce fire danger. Poster and proceedings paper for the 4th Longleaf Alliance Regional Conference, Southern Pines, NC, November 17-20, 2002. (Poster paper)
3. Haywood JD, Bauman TA, Goyer RA, Harris FL. 2004. Restoring upland forests to longleaf pine:

initial effects on fuel load, fire danger, forest vegetation, and beetle populations. In: Connor, Kristina F., ed. Proceedings of the 12th biennial southern silvicultural conference. Gen. Tech. Rep. SRS-71. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. P. 299-303. <http://www.srs.fs.usda.gov/pubs/6676>

4. Haywood, JD. 2004. Prescribed burning research in longleaf pine on the Kisatchie National Forest. Proceedings of the fifth Longleaf Alliance Regional Conference, Southern Pines, NC, October 12-15, 2004. Longleaf Alliance Report (Poster paper)

An additional publication is in press:

5. Haywood, JD. In press. Restoring fire adapted forested ecosystems--research in longleaf pine on the Kisatchie National Forest. In: Proceedings of the 2005 national silviculture workshop. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.

Issues/Concerns affecting the project: The project fieldwork is completed. We finished all of our original objectives and completed the insect work as well, which was not originally part of the project. Final data will be included in appropriate journal manuscripts. Meta data files are being prepared for FRAMES.