EFFECTS OF FIRE SEASON ON VEGETATION IN LONGLEAF PINE (*PINUS PALUSTRIS*) FORESTS

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Forest managers in the Southeastern United States are interested in the restoration of not only longleaf pine (*Pinus palustris*) trees, but also the characteristic forest structure and ground-layer vegetation of the longleaf pine ecosystem. Season of burn, fire intensity, and fire frequency are critical components of a fire regime that supports diverse ground layer vegetation and an open midstory. While some previous studies have concluded that a change to growing season burning for long periods of time (decades) facilitates restoration, such a change may be undesirable, especially for private land managers with more immediate management objectives, such as improving habitat for quail. There is a need to document short-term benefits associated with a change from dormant- to growing-season burning.

We investigated the short-term effects of a change from dormant- to growing-season prescribed burns on the abundance, structure, and composition of vegetation at Brosnan Forest in the mid-Atlantic coastal plain of SC. Fifty-two experimental units (EU's), approximately 40-ha in size, were used. Thirty-two randomly selected units were burned during the dormant season (January to March), and 20 were burned during the growing season (April to September) of 2001, 2003, and/or 2004. We tallied the number of woody stems ≥ 1 m tall in 6 to 12 randomly selected 5 by 5 m sampling plots per EU. In each of four 1 by 1 m subplots located in the corners of each sampling plot we recorded the percent cover of seven vegetation classes: wiregrass, other graminoids, cane, ferns, forbs, legumes, and woody plant species. The sub-plot mean was used for analysis.

Analysis of variance indicated that the growing season burn plots had significantly ($p \leq 0.05$) greater ground cover of species within the wiregrass (*Aristida beyrichiana*), cane (*Arundinaria gigantea*), other graminoids, and legume vegetation classes (table 1). Time since the last burn (p

Table 1—ANOVA: effects of fire season on vegetation abundance. Time since last burn (TLAST) was used as a covariate when significant.

Life form group	Source	Sum of square error	Degrees of freedom	Mean square error	F-statistic	P-value
Wiregrass	Season	59.517	1	59.517	4.707	0.035
	Error	632.155	50	12.643		
Other grasses	Season	189.865	1	188.904	8.001	0.007
	Error	1185.062	50	23.701		
Legumes	Season	12.959	1	12.959	9.684	0.003
	TLAST	5.463	1	5.463	4.082	0.049
	Error	65.574	49	1.338		
Cane	Season	9.879	1	9.879	10.121	0.003
	Error	48.804	50	0.976		
Woody	Season	471.736	1	471.736	3.925	0.053
	Error	6008.955	50	120.179		
Herbs	Season	11.789	1	11.789	1.491	0.228
	Error	395.444	50	7.909		
Ferns	Season	469.517	1	469.517	3.028	0.088
	Error	7752.287	50	155.046		
Number of woody species 1m tall	Season	4.441	1	4.441	5.858	0.019
	TLAST	18.520	1	18.520	24.426	0.000
	Error	37.152	49	0.758		

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≤ 0.05) was significant as a covariate only in the analysis of legume data. Plots burned in the dormant season had significantly ($p \leq 0.05$) more cover of woody vegetation, a higher diversity of woody species ≥ 1 m tall, and a greater number of woody stems ≥ 1 m tall (table 1). Nonmetric multidimensional scaling indicated no clear patterns in compositional response as related to season of burn.

The growing season burns during 5 years promoted an abundance of several desirable life form classes while inhibiting the development of undesirable woody vegetation. These beneficial effects of growing season burns, promoting desirable ground layer vegetation and an open midstory, will interest landowners whose objectives include management for wildlife. Incorporating a few growing season burns over a short time period can provide these benefits while increasing flexibility in the landowner's use of prescribed fire as a management tool.