Consequences of altered burn regime on plant community diversity in the Pineywoods of East Texas

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Introduction In the absence of recurring fires, landscapes became inundated with light-blocking vegetation which led to a decline in native grasses and herbaceous flora with the concomitant decline of wildlife species dependent on them. The re-establishment of historic fire return intervals is vital to restoring forest health, species diversity, natural succession regimes, and reduction of invasive vegetation. Specifically, we will investigate the changes in plant communities as they relate to prescribed fire management activities, including the effects of changing fire return intervals.

Methods

53 plots in total will be measured across five management areas. This will capture the effectiveness of management goals and objectives of federal, non-profit, and private ownerships across East Texas. All plots will be categorized into baseline (new), recapture (burned previously < 1 year), pre-burn (burn planned in current fiscal year), and post-burn (no pre-burn data collection/burned in current fiscal year). Plots will be randomly selected using the ArcGIS random point tool. Each circular plot will be 9000 ft^2. Following previously used plot techniques, transects radiating from plot center in 120^0 intervals will be 52.7 feet long. Plot center and the end of each transect will be permanently marked with metal stakes and flagged with high visibility PVC tape. Overstory, midstory, understory, and fuel composition observations will be recorded visually from plot center. Along each transect, woody species composition, herbaceous cover, downed woody debris, and litter/duff depth will be measured/collected. Overstory and midstory tree species, diameter, defects, and health status will be recorded and spatially referenced on gridded paper based on distance from plot center and transects. The overstory tree located closest to plot center will be identified on each map to aid in the location of plot center during future data acquisitions. One tree representative of the average overstory height within the plot will be selected and measured using a Haglof vertex IV hypsometer. Understory density and composition will be measured within three, 2 x 5' rectangular subplots located to the right of each transect. Species, aerial cover, and species cover % was recorded using visual estimations. Invasive, nuisance, and unexpected species will be recorded. Each 2 x 5' subplot will be marked using steel pin-flags to aid in post-fire/recapture data collection. Using a modified version of the Brown method, downed woody debris will be inventoried along each transect. 1- and 10-hour fuels will be recorded between 6 and 12 ft. 100-hour fuels will be recorded between 6 and 18ft. 1000-hour fuel diameter and length will be recorded from 0-50 ft along each transect and categorized as rotten or solid. Litter, duff, and herbaceous vegetation will be collected within 1 x 2 ft subplots located 2 ft left of each transect at 10 and 30 ft. Litter/duff depth will be measured at 5, 15, 25, 35, and 45' on each transect and stored in paper bags which will then be put into a drying oven set to 60^0C for 48 hours.

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