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A Historical Perspective on Longleaf Pine Groundcover Vegetation in the Francis Marion National Forest

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ABSTRACT - Longleaf pine groundcover vegetation is characterized by high levels of species richness and local endemism. Also species composition varies distinctively by region. Unfortunately, much longleaf groundcover vegetation has been lost or altered by fire suppression and other abuses. Management and restoration of this unique vegetation therefore requires some conception (i.e., a template) of floristics and species abundances in the original (i.e., "old growth") forests. One approach to producing such a template is to consult historical sources. In this poster we compare modern vegetation samples from the Francis Marion National Forest (FMNF) and vicinity with species lists for the same general area prepared by local botanists between 1810-1850. Particularly of interest is an unpublished list of what would now be termed "indicator species" of different types of habitats prepared by Dr. James Macbride c. 1812-1814. Approximately 60-90% of Macbride's longleaf species, depending on habitat, were encountered in our own samples. Similar results were obtained using other more comprehensive lists (e.g., Bachman's 1832 list of plants in the vicinity of Charleston, and F.P. Porcher's 1847 list of plants of St. John's-Berkeley Parish). We conclude that longleaf pine groundcover vegetation in the FMNF is not old field vegetation but rather an important remnant of the original old growth groundcover. The absence of some species from our modern samples may indicate deterioration of groundcover quality or a need for a more comprehensive survey to better compare with the 1800's data.

INTRODUCTION

Longleaf pine groundcover vegetation is characterized by high levels of species richness and local endemism. Also, species composition varies distinctiveiy by region. Unfortunately, much longleaf vegetation has been lost or altered by fire suppression and other abuses. Management or restoration of longleaf groundcover vegetation in any given region therefore requires some conception (i.e a template) of the original old growth groundcover in that region.

One approach to producing such a template is to consult historical sources. In this paper, we begin the process of constructing such a template for the Francis Marion National Forest (FMNF), SC, one of the largest areas of contiguous longleaf pine forest remaining in the Atlantic Coastal Plain. We then compare our partially constructed template to vegetation samples from existing longleaf pine forests in the FMNF. Our objective is to determine whether the existing groundcover vegetation is badly disturbed old field vegetation or remnant old growth groundcover.

METHODS

Historical Vegetation

The FMNF is located in Charleston and Berkelely Counties, SC, just north of the city of Charleston. In the period prior to 1850, this area was home to several dedicated botanists. "Flora Caroliniana", one of the first botanical manuals in North America, was published in 1782 by Thomas Walter, who lived near St. Stephens close to what is now the northwest corner of the National Forest. Thirty years later, between the dates of 1816 and 1824, Stephen Elliott, one of the preeminent botanists of his time, published his landmark "Sketch of the Botany of South Carolina and Georgia". This was the first regional flora to adequately treat the grasses and sedges of the Carolina Lowcountry.

James Macbride was a young medical doctor who lived in Pineville, another town in the vicinity of the modern FMNF. He was also a competent botanist and a close friend of Stephen Elliott's. Based on Elliott's notations in the "Sketch", as well as his acknowledgments, it is clear that Macbride provided much

information on plants around the area where he lived. Macbride died in 1817 at the age of 33, helping to treat an outbreak of yellow fever. The genus Macbridea was named in his honor by Elliott. Two species in this genus, alba and caroliniana are now considered endangered plants of longleaf pine savannas.

Among Macbride's contributions to Elliott's work was an unpublished list (available on microfilm, along with other Elliott materials, from the Harvard Library), found among Elliott's personal papers after his death, of what would now be considered indicator species of various types of habitats . Three of these, "sand ridge", "high pine" and "moist pine barrens", are directly relevant to our investigation of longleaf pine groundcover vegetation.

One difficulty with Macbride's list, and other early species lists and floras, is the archaic scientific nomenclature. Many of the plant names have changed repeatedly since the early 1800's. Thus, the process of translating the old names into modern scientific nomenclature is tedious in the extreme, involving much cross-checking among botanical manuals published during the intervening years.

Nevertheless, we have now completed our "translation" of Macbrides list. In addition, we have largely completed work on another old list, this one published by F.P. Porcher in 1847 as part of his medical dissertation. Porcher entitled his work "A Medical-Botanico Catalogue of the Plants of St.-John's Berkeley Parish". This area encompasses much of modern day Berkeley County, and thus overlaps considerably with the Francis Marion National Forest. In contrast with Macbride's list, Porcher's list was not organized by habitat types. Nevertheless, Porcher did provide habitat notations for many of his species.

In addition to these lists by Macbride and Porcher, we also have in our possession several other early lists, including lists by John Bachman and H.W. Ravenel. However, we are still in the early stages of translating the species names on these lists into modern nomenclature.

Modern Vegetation Data

There are three sources of modern data to compare to the historic information. (1) We maintain four permanent study areas (PSA) in the FMNF as part of ongoing fire ecology studies: the Tiger Corner (TC) plots maintained by Dale Wade, as well as 62 one ha permanent plots set up by Donna Streng and Jeff Glitzenstein in 1991-1992. The Streng-Glitzenstein (SG) plots are arranged into 3 sets of 21 plots, with each set in one of three different types (wet, mesic, dry) of longleaf pine dominanted habitats (see Streng et al. this volume). We have species lists for Tiger Corner and for each of the Streng-Glitzenstein areas. (2) Bob Peet and colleagues Kjellmark and McMillan (PKM) sampled 14 0.1 ha plots in the Francis Marion National Forest as part of a broad scale study of longleaf pine dominated vegetation. (3) Richard Porcher's (1995) recently published book "Wildflowers of the Carolina Lowcountry".

RESULTS

Macbride listed 28 species as characteristic of his dry longleaf pine habitats ("high pine" and "sand ridge"). Half of these occur today in the SG dry PSA. No additional species were found in the two PKM plots located on dry soils. However, inclusion of four additional species known to occur in the FMNF brings the total to 64%. If we further include a few more species from other nearby sites, the regional total is 71%.

Interestingly, many of the missing species are characteristic of the sand ridge habitat type. The probable explanation is that true sand ridge sites are rare in the FMNF. Also, most such sites appear to have a history of fire exclusion, and are presently dominated by closed canopies of turkey oak. We suggest that substantial restoration may be warranted for this particular community.

According to Macbride (unpublished notes associated with his list) "moist pine barrens occupy about one half of the land". Also, "I cannot designate any species of oak except Quercus phellos (willow oak)...peculiar to these woods The pine is palustris (longleaf) intermingled with pond pine". Thirty six groundcover species were listed by him as characteristic of this "moist pine barren" habitat type. Of these, 78% presently occur in the SG wet and mesic PSA's. The twelve PKM plots from moist soil types also encountered a high percentage of Macbride's moist site species (69%), including two species not found in the SG plots. Inclusion of a few more species from the remainder of the forest, including the rare Schwalbea americana (American chaffseed), brings the total to a respectable 89%.

The results to date from Porcher's (1847) list are similar to the above. Thus far, we have identified 172 species on this list as longleaf pine associates. This includes species of various types of "pine barrens", as well as species associated with soil types generally dominated by longleaf (e.g. "dry soils", "sandy soils"). However species associated with ruderal habitats were specifically excluded, even if they occurred on the appropriate soils (e.g. "dry soils in fields"). Of these 172 spp, 115 (67%) occur in the SG plots. The total from the Forest as a whole, including data from all sources, is 129 species, or 75%.

CONCLUSION

We conclude that the modern FMNF contains important remnants of old growth longleaf pine groundcover and should be managed accordingly. The apparent absence of some species is troubling, however, and may indicate some loss of biodiversity on a Forest wide level. A systematic search of the FMNF is warranted in order to thoroughly test this possibility.