

An Analysis of the Woody and Herbaceous Vegetation of
Caddo Lake State Park

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Title

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Introduction

Caddo Lake State Park was opened to the public in 1934. It is located in northeastern Texas in Harrison County about 14 miles northeast of Marshall, Texas and contains 480 acres. It is within Goulds (1975) Pineywoods Vegetational area. The topography of the park is generally hilly with some bottomland flats. Elevation ranges from 54 m in the flats to 98 m on the hilltops. As a result of this varied topography, there are dry to mesic upland sites, mesic slopes, mesic creek bottoms, bottomland flats and swamps. Accompanying these changes in habitats are various groupings of plants. There is a rather diverse flora in the park.

The park receives an average annual rainfall of 117 cm (Larkin and Bomar 1983). The average annual low temperature is 11° C and the average annual high temperature is 22° C. East Texas, as a whole, has a subtropical humid climate characterized by warm summers (Larkin and Bomar 1983). The vegetation of the park grows upon soils that are clays, sandy clay loams, loamy sands and sandy loams.

Objectives

The main objectives of this study are to floristically describe the woody species that occupy the various habitats at Caddo Lake State Park and to provide a preliminary checklist of the herbaceous species present. In addition to these objectives, the soils associated with the various communities will be compared to vegetative analysis to determine what role the soil plays in the distribution of communities and plants.

Literature Review

The woody plant communities which cover much of the landscape of eastern Texas have been classified by Nixon (1985) on the basis of habitat: dry upland communities, mesic upland communities, mesic creek bottom communities, wet creek bottom communities, river bottom communities, and swamp communities. A number of communities within these habitat types have been analyzed. Ward and Nixon (1992) and Marietta and Nixon (1983) have described communities on dry upland sites whereas Nixon and Raines (1976) and Nixon et al. (1983) have studied the woody vegetation of mesic creek bottoms. The vegetation of wet creek bottoms has been described by Brooks (1992), Nixon et al. (1980), and Nixon and Ward (1988). Bottomland vegetation has been looked at in more detail with Nixon (1987) summarizing the

bottomland forests of central East Texas and southeast Texas and Powell (1992) describing the woody vegetation in the bottomlands of northeast Texas. East Texas swamp vegetation has been characterized to some extent by Nixon and Willett (1974) and Burandt et al. (1977).

Little is known about the woody vegetation of northeast Texas and few studies have been accomplished which describe woody vegetation associated with different habitat types within a single study area. Neck (1986) studied the vegetation of various habitat types within the Turkey Hill Unit of the Angelina National Forest. This study would accomplish the same results in Caddo Lake State Park. It would provide important information regarding mesic slopes and mesic uplands, which have not been analyzed to any great extent.

Justification/Significance/Contribution

Although there have been a number of floristic studies done in eastern Texas, most of these have been restricted to the central and southern portions of eastern Texas. These studies generally lack information concerning mesic slopes and uplands. Community descriptions of the woody vegetation would provide additional information. A checklist of existing plants would also be helpful. Two publications should result from this study.

Texas Parks and Wildlife has a great need for this vegetative information. This knowledge will aid in the preservation of the park's plant communities and in utilizing the park's natural resources for the education of the general public on the vegetation within the park and the surrounding area.

Proposed Methods of study

The sites to be chosen for the study within Caddo Lake State Park will be determined on the basis of the variety of habitats present. Communities will be defined using Nixon's (1985) description of East Texas habitats and their communities.

The data will be collected by running a transect line through each community type and analyzing five meter by five meter quadrats on both sides of the transect line until fifty quadrats are analyzed. Only woody species that are rooted in a quadrat and have a diameter at breast height (dbh) greater than 0.5 cm will be recorded. Both the scientific name and the dbh of each specimen within each quadrat will be recorded. This procedure will be repeated for each community analyzed. Nomenclature will follow Nixon (1985) for the woody taxa and Hatch (1990) for the herbaceous taxa mentioned. From the data recorded, frequency, density, basal area and importance values will

be calculated to determine the dominant and characteristic woody plants in the communities (Cox 1980). Also, community coefficients of similarity will be calculated to determine the similarity between communities and to provide an ordination of the communities (Cox 1980). The coefficients of similarities will be calculated using Sorenson's Index of Similarity (Cox 1980). Species diversity will be calculated using the Shannon-Weiner index (as modified by Cox, 1980). Surface soil samples (0-15 cm) will be collected at each study site. Soil samples will be later analyzed for pH, Ca, P, K, and Mg at the Stephen F. Austin State University soil testing laboratory. Particle size also be determined using the hydrometer method (Bouyoucos, 1962). The style guide that will be used is the CBE Style Manual (1983).

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