Structure And Composition Of The Kennesaw State University Arboretum: Past And Present

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ABSTRACT

The purpose of this study is to determine the trends in composition and structure of the Kennesaw State University (KSU) Arboretum, located on the Kennesaw Campus. To assess the trends, we identified the tree species, and measured the diameter (dbh) and locations of all stems including new growths (i.e. greater than 1cm dbh) in the permanent plot during the summer of 2014. Density, dominance, and frequency values were calculated and all trees were plotted from data collected in 2008, 2010, and 2014. Findings show that there have been an increase in Fagus grandifolia (beech), a significant decline in Cornus florida (flowering dogwood) and marked differences in the understory species compared to those dominating the canopy layer. As a small urban forest remnant, the trees located in the plot show a community transition from a pine/oak stand to one dominated by shade-tolerant mesophytic species.

INTRODUCTION

The Kennesaw State University (KSU) Arboretum is a six-acre tract on the west side of the campus behind the Science and Mathematics building at approximately 34.036° N, 84.585° W. The Arboretum was set aside and dedicated in 1976 and has served as an important area of study for many different academic programs at KSU. Over the years, additions to the Arboretum include a new stone sign marking the entrance and the new stairs through the heart of the six-acre site was unveiled in July of 2001. (www.kennesaw.edu) A wooden bridge dubbed, “Pullen’s Bridge,” by the many Geographical Information Science (“GIS”) students studying under the direction of Dr. Nancy Pullen, traverses a gully on the southeastern side of the Arboretum. Many GIS students have taken advantage of this local urban forest to learn methodology and procedural guidelines used to measure and map tree basal area, distribution, physical geography of trees, species identification, sampling and ecological health. These techniques provide GIS students the opportunity to apply this knowledge on a local, state, and even global level.

METHODOLOGY

Field Studies performed in Summer 2014 with re-checks in early 2015
Where possible, stakes at each plot hub were identified and marked. Field tape was laid along boundary lines in a south/west direction in accordance with the X/Y axis of the tract
DBH, (diameter at breast height ) is usually measured at 4.5 ft (1.3 m) above ground level
The current database of the Arboretum tree species validated to remove errors rectified in field, update field season data, and to determine indices
Geo-referenced database of data created
Statistical analyses of data performed
Maps of data using GIS and related methodologies including: reference tree map (location), composition map, structure map, specialized species maps

FINDINGS

2014 TREE SPECIES SAMPLE MAP

Importance Value: Relative frequency + Relative Density + Relative Basal Area for each species. (The maximum importance value for any one species is 300 (100 + 100 + 100).

CONCLUSION

The KSU Arboretum is typical of a small urban forest found in the Southern Appalachian region. The results of eight years of studies supports the findings that a transition from a pine/oak stand to one dominated by shade-tolerant species is taking place within the Arboretum. A substantial increase in Fagus grandifolia (beech), along with a significant decline in Cornus florida (flowering dogwood) and marked differences in the understory species compared to those dominating the canopy layer are demonstrated. This small urban forest remnant will most likely continue this trend commonly found in this type of tract, especially with the lack of natural disturbances (e.g. fire) for oak/hickory and pine dominated forests.

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