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## Assessing Houston's Forested Habitat

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The City of Houston has a total of 380 parks totaling 35,742 acres. Approximately 16,000 of those acres are forested habitat, each totaling over an acre in size. A method for prioritizing and assessing these areas was first established in 2017 to determine management needs and funding requirements. Prior to this time, the priority had been given to street trees through a comprehensive inventory to support tree ordinance mitigation requirements. Additionally, in 2015 the US Forest Service collected data on the tree canopy cover and species composition of trees within the City of Houston, including both natural and urbanized areas.

### Keywords

Urban forest assessment, urban tree canopy, urban natural area, invasive species

## INTRODUCTION

The City of Houston has a total of 380 parks totaling 35,742 acres. Approximately 16,000 of those acres are forested habitat, each totaling over an acre in size. A method for prioritizing and assessing these areas was first established in 2017 to determine management needs and funding requirements. Prior to this time, the priority had been given to street trees through a comprehensive inventory to support tree ordinance mitigation requirements. Additionally, in 2015 the US Forest Service collected data on the tree canopy cover and species composition of trees within the City of Houston, including both natural and urbanized areas.

## CONTEXT

The Houston Parks and Recreation Department created the Natural Resources Management Program (NRMP) in 2015 to focus on the undeveloped land within parks. This led to the establishment of priorities in habitat restoration and preservation. Assessment began with aerial imagery to measure the amount of park land that was currently forested or not being utilized for other purposes. Additionally, there was a need to determine the historic habitat type of the natural areas and to determine funding amounts needed to reach restoration goals. A common issue shared by many of the natural areas was the prevalence of invasive vegetation that dominated these sites. With a small staff of two, the NRMP began collecting randomly selected data plots to determine the distribution and abundance of invasive vegetation throughout the city's forested natural areas.



Image 1. Drought restoration in Memorial Park

## GOALS

The invasive species assessment was created to help the NRMP understand the conditions of the forested natural areas and to inform a ranking system that was created to prioritize management of these areas. Additionally, the data is used to identify funding amounts needed for invasive species removal and provides information on needs for purchase and installation of native trees.

Once complete, the assessment data can be compared to the existing street tree data and Forest Service data to assess species distribution, canopy cover, and diversity throughout the city.

## APPROACH

Forested natural area boundaries were digitized using aerial imagery. A total of five invasive species plots were randomly selected using GIS throughout the riparian zones of each park, which are characterized as the linear forested zones adjacent to the bayou from the top of the slope to 200-foot interior of the park. Beyond the riparian zone, the minimum number of plots is determined by the acreage of the forested natural area (Table 1). A 30-foot radius area from the center of each plot is analyzed for the presence of a select list of invasive species known to occur in the Houston area. This method was utilized for ease of data collection by limiting the number of species that need to be identified and recorded to 25. If invasive species are present, percent cover of those species are recorded along with total percent cover of the plot. For sites with funding to do more in-depth surveys, stem counts were collected for all species within a 30-foot radius plot, along with percent cover of all herbaceous species.

Table 1. Number of Invasive Plots Per Acre.

Park Acreage	Number of Plots
<10	4
10-50	6
51-100	8
101-200	10
201-300	12
301-400	14
401-500	16
>500	18

## RESOURCES

City of Houston staff time is utilized to conduct the forested natural area assessments, while grant funding for specific projects has supported vegetation analysis at individual parks with the help of interns and consultants. Tree mitigation funds and specific City events provide funding for tree planting projects each year.

## KEY RESULTS

Forest Service data shows that there are 33.3 million live trees in Houston, with a tree canopy coverage of 18.4 percent. Chinese tallow trees account for 6.5 million of those trees, comprising 17.1 percent of all live trees. Three out of five of the most common species in the urban area overall are invasive species. Interestingly, the data collected from the natural areas has a higher percent of invasive trees than that of the city data overall. Overall, the top three species were 22.9 percent yaupon, 17.1 percent Chinese tallow, and 6.9 percent Chinese privet. The forested natural areas consisted of 30 percent yaupon, 21 percent Chinese tallow, and 9 percent Chinese privet.



Image 2. Keith Weiss Park

Preliminary invasive species plot data collected by the City of Houston shows similar trends for forested natural areas. Current plots show an average of 47 percent of the species in forested natural areas are invasive. However, this data includes both woody and herbaceous species. Evaluating the Forest Service data with the City's invasive species list, 32.3 percent of the overall tree canopy in Houston is invasive.

One interesting factor in the high prevalence of invasive species, particularly in the forested natural areas, is that much of Houston was historically a coastal prairie habitat. With lack of natural processes, many of the undeveloped historic prairie land has been converted to forest. Without competition from existing tree canopy, invasive species have been successful at dominating these sites.

## LITERATURE CITED

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