



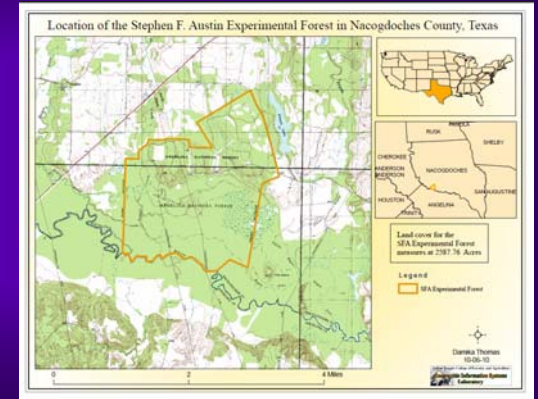
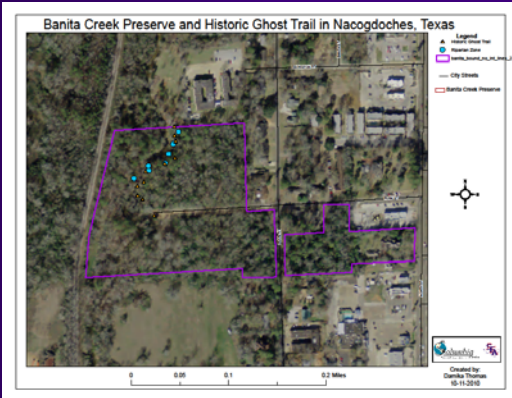
# Monitoring an Urban East Texas Riparian Forest Habitat for Restoration Potential



Ellen Denney, Markus Hodges, Mark Hammett, Damika Thomas, Tena Banks, Thomas Harris, Zachary Lazarine, Joyce Preston, Matt Reynolds, Scott Hagler, Carl Strickler, William Forbes, Margaret Forbes, William Godwin  
 Geography, Stephen F. Austin State University, Nacogdoches, Texas

## Abstract

This research estimates biological diversity, ecosystem health, and restoration potential in an urban, riparian forest habitat in East Texas. Banita Creek Preserve, located in Nacogdoches, Texas, is managed and owned by the Texas Land Conservancy (formerly the Natural Areas Preservation Association), based in Austin, Texas. Students in two different offerings of a biogeography class at Stephen F. Austin State University set up and measured vegetation transects in the Preserve. Stand history was also determined using county records. Results are compared with an adjacent, similarly disturbed riparian area (Lanana Creek) and a more rural riparian forest (SFA Experiment Forest) that has received less ground disturbance and relatively frequent prescribed fire. Consideration of restoration potential includes differences between stands and the landscape context of the urban forest. Such partnerships can offer service to remote non-profit organizations while providing educational opportunities to undergraduates interested in biodiversity and ecological restoration.



## Research Objective

To estimate biodiversity, health, and restoration potential of Banita Creek Preserve by comparing its untreated second-growth forest to similar second-growth forest sites treated with prescribed fire and removal of invasive plants

## Methods

Fixed radius, 1/100 acre plots were taken every 100 feet along transects set up to represent upland and riparian sites at both Banita Creek Preserve and the SFA Experimental Forest. Dominant pines were cored to estimate stand age. Removal and treatment of non-native Chinese privet was also observed at the Pineywoods Native Plant Center along Lanana Creek.

## Results

Banita Creek Preserve has 260 trees per acre over four inches in diameter (mostly water oak, loblolly pine, hackberry) and 262 trees per acre under four inches in diameter (mostly Chinese tallow, cherry laurel, hackberry, Chinese privet, Yaupon holly). The groundcover average for the site was 7.32% and consisted mainly of Chinese privet, greenbriar, Japanese honeysuckle, poison ivy, and Yaupon holly. There was evidence of erosion on the main creek channel.

The managed SFA Experimental Forest has 62 trees per acre over four inches in diameter (mostly loblolly pine) and 420 trees per acre under four inches in diameter (mostly recently resprouting American beautyberry saplings). The groundcover average for the site was 45.75% (mostly American beautyberry, mulberry and grasses).

## Discussion

Banita Creek Preserve has had fire suppression, resulting in higher mid-story tree density and encroachment of non-native species such as Chinese privet and tallow.

The SFA Experimental Forest has recurring prescribed burns, resulting in lower tree density, little to no non-native species, and less competition. Its high density of saplings and groundcover will likely burn back with repeated prescribed fire.

Restoration of Banita Creek Preserve to a more natural condition could involve removal of mid-story native and non-native species and introduction of prescribed fire.

Burning may not be a good option due to the Preserve's urban location and a current need for mid-story songbird habitat that is a concern on a landscape/regional level.

The Pineywoods Native Plant Center at SFA has removed Chinese privet through manual (small tractor-based) techniques and herbicide, with short-term success and little to no ground disturbance.

Banita Creek Preserve may be more appropriate for manual treatment of understory encroachment through duplicate machine techniques or volunteer manual removal that builds social capital in the Preserve.

At the request of the Texas Land Conservancy, mainstem erosion sites were located using GPS. The next monitoring will consist of surveys of stream health, measuring aquatic insects, riparian vegetation cover, streambed morphology, and amphibian (Anura) diversity.

Partnerships such as this can offer service to non-profit organizations with remote offices and limited staff, while providing educational opportunities to undergraduates interested in biodiversity and ecological restoration.

Site	Ground Cover	Trees per 1/100 Acre	Trees/ Acre	Saplings per 1/100 Acre	Saplings/ Acre	Fire w/ in past 5 years	Non-native plants
<u>Banita Creek</u>						no	yes
NE	10%	1.5	150	38.3	383		
Creek	5.2%	1.8	180	14	140		
Western	6.75%	4.5	450				
<u>SFA Experimental Forest</u>						yes	No
Transect 1	39%	2	200	4.2	420		
Transect 2	52.5%	3.25	325				