

Natural Regeneration Dynamics and Survival in an East Texas Bottomland Hardwood Forest

Lydia Rurup

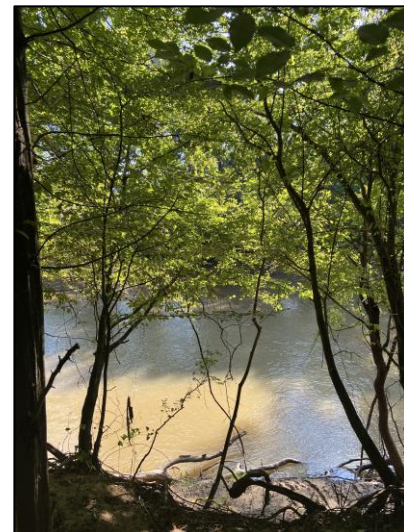
Drs. Kathryn R. Kidd, Brian Oswald, Jeremy Stovall, Steve Jack



Arthur Temple College of Forestry and Agriculture

STEPHEN F. AUSTIN STATE UNIVERSITY

Riparian forests provide critical services such as water quality improvement, nutrient cycling, flood and erosion control, carbon sequestration, and support of biodiversity. Located along meandering streams/rivers, bottomland hardwood forests are unique, transitional zones between permanently flooded swamps and upland forests. In recent decades, these forests have been negatively impacted by river regulation, altering hydrology and flooding patterns, and the invasion of non-native species such as Chinese tallow. These forests are naturally susceptible to the incursion of exotic plant species due to their regular disturbances, ample soil moisture, and widespread dispersal system through rivers. The overall goal of this research is to identify where natural regeneration of native tree species has been successful in bottomland hardwood forests adjacent to river systems. Specifically, we will 1) evaluate species composition, density, and height and diameter of established seedlings and saplings in relation to varied abiotic (i.e. microtopography, presence of woody debris and leaf litter, light) and biotic factors (i.e. presence of invasive Chinese tallow, occurrence of feral hog damage), 2) determine the impacts of Chinese tallow occurrence, past treatments used to reduce effects, and time since past treatments on current regeneration dynamics, and 3) quantify annual survival for individually selected desired-native (i.e. oak species), less desired-native (i.e. green ash, sweetgum, American hornbeam, American elm, water-elm, persimmon, water hickory, etc.), and Chinese tallow seedlings and determine the influence of aforementioned factors, stem size and vigor, and flooding on survival. Identifying natural regeneration establishment and survival patterns of native and non-native tree species in an individual bottomland hardwood forest will aid managers in pinpointing restoration and management needs.



Methods

This study will be conducted in a bottomland hardwood forest along the Neches River at Boggy Slough Conservation Area. In order to assess the effectiveness of tallow treatments, sampling plots will be



established in areas treated in 1) 2015 and 2018 and 2) 2019 and 3) an untreated area. In the summer of 2020, twelve plots per area will be placed along transects at: 50 m, 150 m, and 300 m from the river. Overstory density and composition will be estimated using a 10 BAF wedge prism. Regeneration will be measured in a 1/100th acre plot, with the species, height, and basal diameter of seedlings and saplings recorded. Ground cover will be evaluated using the Daubenmire class system. The depth of organic matter will be measured in each cardinal direction at full radius from plot center, and down woody debris will be tallied along the N-S and E-W transects of the plot. Abiotic factors of canopy cover, presence of gaps, feral hog damage, and microtopography will also be measured at each plot. Seedling and sapling survival will be tracked over one year. Three species groups will be targeted: oaks, other native hardwoods, and tallow. Within each group, two stems in

three size classes will be mapped and species, diameter, height, vigor, and micro-location details will be recorded. In summer 2021, plots will be revisited, and survival and growth of marked regeneration will be assessed.

Lydia Rurup is pursuing a Master of Science in Forestry at Stephen F. Austin State University. She received her Bachelor of Science in Forest and Natural Resource Management from the University of Minnesota, with a specialization in Forest Ecosystem Management and Conservation.