

# Understanding Longleaf Regeneration and Forest Structure on Ichauway

Stakeholders in the historical range of longleaf pine are interested in the restoration and management of these unique forest systems. Understanding the effects of restoration and management practices on forest structure is important to evaluating the success of these efforts. Potential management actions for the restoration of longleaf pine systems can include frequent prescribed fire, removing hardwoods, and planting longleaf pine.

Our goal on Ichauway is to manage second-growth longleaf pine forests using natural regeneration to periodically incorporate multiple age classes of trees into a self-perpetuating forest structure. This study used forest monitoring data collected from 2002-2017 to examine changes in forest structure and compare ingrowth (recruitment of trees into  $\geq 4$  inch diameter class) between three restoration treatments: hardwood removal, establishing plantations, and routine management (prescribed fire, single tree selection harvest). We calculated volume, mortality (natural and harvest), diameter distribution, and number of new trees across four 4-year sampling periods.

The tree volume on Ichauway is primarily longleaf pine, with the majority of this volume in larger trees. The overall standing volume of pine increased by 24.5% over the 16-year study period. Ingrowth of young longleaf pine increased over time (See Figure). Not surprisingly, the increase on a per-acre basis was most pronounced in longleaf pine plantations and reflects expected growth patterns based on their establishment dates. Importantly, while lower than for planted pines, ingrowth in natural longleaf stands (routine management), which comprise the majority of our forest acreage, was significant. This indicates that recruitment of natural regeneration of longleaf continues and that these young trees survive and move into larger size classes through time. Ingrowth was also present in hardwood removal areas, although at lower rates than for the other two treatments.



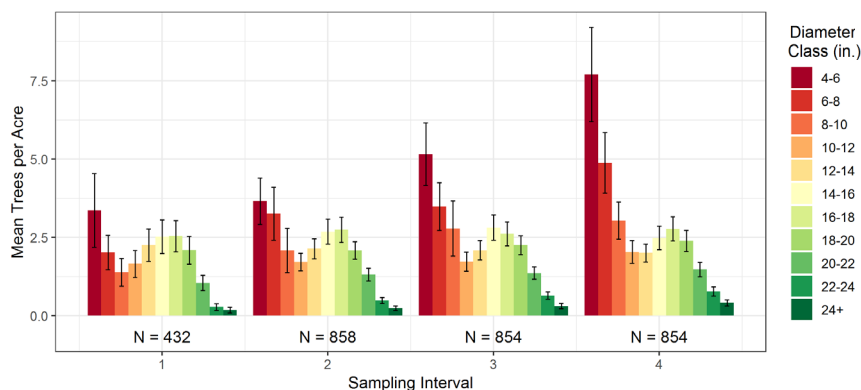
This study shows that we have made progress towards achieving our restoration goals of diversifying the age/size class distribution of the longleaf pine forests on Ichauway. We detected a net gain in tree volume, with important increases in smaller diameter classes, suggesting we are successfully moving towards a more sustainable forest structure for the long term.

## MORE INFORMATION

Holland, A.M., Rutledge, B.T., Jack, S.B., Stober, J.M. 2019. "The longleaf pine forest: long-term monitoring and restoration of a management dependent ecosystem." *Journal for Nature Conservation*, 47: 35-50.

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## KEY POINTS

Documented progress towards goal of sustainable, multiple age-class longleaf pine forest

Natural regeneration has increased through time

Significant amounts of this regeneration are moving into the  $\geq 4$ " diameter class