A Plan for Longleaf Pine Tree Improvement

An Integral Component of The Longleaf Alliance Proposal to NFWF: *Coordinating and Advancing Rangewide Longleaf Restoration*[1]

A collaborative effort by: NC State University Cooperative Tree Improvement Program
USDA Forest Service, Western Gulf Forest Tree Improvement Program, Cooperative Forest Genetics Research Program, and The Longleaf Alliance

Summary of Full Proposal, December 2023

For longleaf pine (*Pinus palustris*) restoration to be successful, reliable and dependable sources of adapted seedlings are required. Given that 80% of longleaf restoration will occur on private lands, there will be a myriad of objectives for these plantations (e.g. wildlife habitat, timber, pine straw, carbon sequestration, aesthetics, ecosystem diversity), and landowners need options for the seedlings they plant. The wide range of the restoration region also requires a diverse genetic pool for seedling adaptability, especially for cold- and drought-hardiness. Regardless of their objectives, landowners have one chance to choose the *appropriate* genetics when establishing a longleaf plantation.

There is a tremendous genetic resource available from the USDA Forest Service, cooperative tree improvement programs, state agencies, and forestry companies in the southern US. Over 50 genetics trials have been established over the last 10 to 40 years designed to test the performance of hundreds of different longleaf pine parents. Based on the performance of these hundreds of different families in range-wide trials, the best individual trees can be selected from within these families for a multitude of traits to produce progeny with desired attributes. While trials have been established, and data have been collected and analyzed, *no trees have been selected for future use*. Without a concerted tree improvement / selection effort, this priceless genetic resource will be lost.

We will receive funds for a 5-year plan to select trees from across the Southeast to have an adapted population of selections that will be available for new seed orchards and breeding programs. We plan to hire a tree improvement specialist and a longleaf pine tree improvement technician who will work closely with the project's principal investigators as well as all collaborators and stakeholders. These individuals will have primary responsibility for coordinating efforts to organize existing genetic resources and implement a selection and archiving program for longleaf pine. With stakeholder input, we will get consensus on the appropriate emphasis to place on different traits such as disease resistance, stem and wood quality, growth, and leaf production. Selected trees will be grafted into genetic archives and will be publicly available to the *tree improvement community* that includes federal and state forestry and natural resource agencies, forestry companies with seed orchards and/or nursery operations, and university tree improvement and forest genetics programs.

With input from collaborators and stakeholders, near the end of this 5-year selection and archiving effort, we will determine if a long-term breeding, testing, and selection program is desired for longleaf pine. *If stakeholders are satisfied and project goals for selection and archiving are met, funding and community support will be requested beyond the five years for future long-term tree improvement activities.*

[1] This proposal is a subcontract of a larger proposal by The Longleaf Alliance that has been funded by the National Fish and Wildlife Foundation (NFWF).