

Status of Longleaf Pine Seed & Orchard Resources to Support Restoration

Barbara Crane¹, Jill Barbour²

The longleaf pine restoration initiative in the south has been underway for several decades with various governmental, non-governmental, public and private landowners being proactive in restoring longleaf pine ecosystems. Since 1995, the Longleaf Alliance has played a major leadership role in guiding these activities. Most recently, the USDA Forest Service created the America's Longleaf Initiative, where they sponsored a charrette to produce a Southwide Longleaf Pine Conservation Plan to further support longleaf pine restoration.

Artificial regeneration of longleaf pine ecosystems is a large part of restoration activities. Approximately 250,000 acres per year are projected to be planted in longleaf pine over the next decade (Longleaf Alliance). Do we have enough longleaf pine seed resources to support these large scale planting efforts? Calculations show that planting 500 trees per acre (assuming an 80% germination rate and 5000 seed per pound) would require annual seed needs of approximately 27,500 pounds. Current region wide seed inventories contain only about 7500 pounds of viable seed. There is clearly a need for more seed.

How many productive longleaf seed orchards and/or seed production areas exist in the south? Most federal, state, private and academic agencies were surveyed over the past year to find out who had these types of longleaf pine resources. Approximately 463 acres of 1st generation, 33 acres of 2nd generation and 5 acres of 3rd generation longleaf seed orchards exist. Not all acres are in active production, as several agencies have mothballed their orchards. Only the 1st generation trees are mature enough to produce cones. Approximately 164 acres of un-improved seed production acres currently exist, all of which contain mature trees capable of producing cones. In a good cone crop year, the seed orchards and seed production areas could produce about 13,500 pounds, only one-half of the projected annual seed needs of 27,500 pounds. Therefore, acreage of seed orchards and seed production areas need to be doubled.

Currently, the only alternative to supplement annual seed needs is to collect cones on the native forests, including the Forest Service's National Forests. Proper seed zones are a critical factor when collecting native wild seed or when establishing additional orchard acres. When planting seedlings Schmidting (2001) recommends moving longleaf pine seed within east to west seed zones, rather than between south to north zones. This is because longleaf pine trees are more sensitive to temperature, which is a limiting factor in seedling survival and seed production.

Are these orchards healthy and sustainable? From the region wide survey, most seed orchards and seed production areas were reported as healthy. However the 463 acres of 1st generation

¹ USDA Forest Service, National Forest System, 1720 Peachtree Rd, Atlanta, GA 30309, barbaracrane@fs.fed.us

² USDA Forest Service National Seed Laboratory, 5675 Riggins Mill Rd, Macon, GA 31020, jbarbour@fs.fed.us

trees are over 40 years old and are under stress from pests and hurricane impacts. Three orchards have been abandoned by agencies due to lack of funds or changes in agency priorities.

Long-term cone collection data shows that collectible longleaf pine cone crops occur only once every 4-5 years, so what is the capacity to produce a reliable cone crop in these areas? In a good year, 400 acres of productive orchards would yield approximately 13,500 pounds, assuming 100 cones per tree, 60 cones per bushel, 2000 cones per acre, yielding 30 bushels per acre, and one pound of seed per bushel yield or 30 pounds per acre. To attain artificial regeneration acreage targets, a total of 24,000 bushels (at one pound of seed per bushel yield) would need to be collected annually.

What is the capacity among seed extractories to process and clean longleaf pine cones and seed during a bumper crop year? Presently, there are 10 extractories in the southern region. If we assume each extractory has capacity to process 600-700 bushels of longleaf pine cones per week, then it would take about 3-4 weeks to extract seed from 24,000 bushels. This creates a potential bottleneck because longleaf pine cones must be processed within 14 days after picking, because of biological constraints (USDA Forest Service National Seed Laboratory).

Once seed is recovered, what is the storage capacity and vigor longevity for this seed? Seed, (processed and stored properly at an 8 % moisture content and 20⁰ F temperatures), will remain viable up to 10 years. If stored at 0⁰ F, it could remain viable up to 15 years (National Seed Laboratory). Many of the seed kiln facilities have refrigeration units to house seed but most are old.

What is the genetic composition of these orchards? Are all the various seed zones represented in the orchards? It was found from the survey that most of the orchards contain breeding populations representing a majority of the seed zones across the south. However, due to hurricane impacts over the past decade some of the seed zones are very limited and need to be replenished. In addition, there are 17 acres of montane (mountain) longleaf pine seed orchards, representing north Alabama and north Georgia seed sources. The montane sources are uniquely different from other sources. Only 10 of these acres are mature enough for cone production.

What is the ownership of these longleaf pine resources? The USDA Forest Service owns about 45% of the longleaf seed orchards in the south, the remaining 55% belong to state, private industry or private seed owners. The USDA Forest Service owns over 55% of the longleaf pine seed currently in inventory; the remaining seed is owned by various entities. Approximately 1 million acres of mature longleaf pine forests is owned by the USDA Forest Service, where select stands could potentially be managed or converted to seed production areas. This would enable additional seed collection for the agency and its partners. These southern forests are located within all the longleaf pine seed zones; thus representing most of the species' genetic diversity.

What economic and management strategies do we need to consider in order to protect these resources? Recent economic stimulus money may aid the efforts. Who are the key players orchestrating these efforts? Much of the restoration effort has been fragmented and agencies have been focused on meeting their own needs. Members within the Forest Service, the Longleaf Alliance, the American Longleaf Initiative and America's Longleaf Charette are improving their

partnership efforts, so that the restoration and management of longleaf pine ecosystems can be successful on a landscape scale.

In summary, current longleaf pine resources across the southern region have been surveyed and collated. This information will be posted on the Longleaf Alliance's website and shared with the many partners active in longleaf pine restoration. Propagation by seed is still the most economical and effective way to produce tree seedlings. But seed orchards and seed inventories are not adequate to support current restoration objectives, therefore more seed needs to be collected. Vegetation and clonal propagation would mitigate the need for more seed, but the process is not fully developed yet and costs are prohibitive at this time. Approximately 80% of the landbase targeted for longleaf restoration is owned by private non-industrial landowners, who may not be able to afford trees more expensive than the currently available bareroot and container longleaf pine seedlings. Without additional seed and orchard resources, future plans for artificial regeneration of the longleaf pine ecosystem will be limited.

Schmidting, R.C. 2001. Southern Pine Seed Sources. GTR-SRS-44.
USDA Forest Service National Seed Laboratory, www.nsl.fs.fed.us
Longleaf Alliance, www.longleafalliance.org