Technical Guidelines
For
East Texas Tree (Longleaf Pine) Establishment and Quality Assurance

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Definition

Planting of longleaf pine seedlings within the historical and native range located primarily in the southeastern region of the area east of I-45 known as the Pineywoods Region of East Texas and primarily in Natural Resource Conservation Service (NRCS) Major Land Resource Area (MLRA) Regions 152B, southern portion of 133B and the eastern portion of 150A.

Purpose

- Establish or reinforce a stand of trees
- Encourage and expand economically desirable wood production
- Improve quality of soil, air, and water resources
- Provide suitable wildlife habitat
- Protect watersheds
- Enhance aesthetic value

Where Applicable

- Open fields
- Prepared sites

Species to Consider

- Longleaf pine

Planting Date

Planting should be done during optimal conditions when soil moisture is adequate. Planting should be completed between November and February. Reforestation activities may be restricted if environmental conditions create a high risk for survival of the planted seedlings.

Planting Site

Longleaf pine is a site specific species and should only be planted on proper sites. Moderately to well drained sites are ideal for Longleaf but avoid planting in poorly drained soils and/or in locations where water tends to stand/pool for long periods of time. Longleaf can be planted in a range of soils but ideally in deep sandy to sandy loam sites. If planting on marginal soils it may be necessary to rip and/or bed the site prior to planting.

Planting Rate

Longleaf seedlings can be planted at varying densities depending upon landowner objectives. If the site is being planted for timber production it is recommended that a minimum of 650 trees per acre be planted

preferably as many as the landowner can reasonably afford. However, if the site is being planted for wildlife or aesthetics less than 650 trees per acre can be planted. Upon completion of planting the total number of trees per acre should be within 10% of the prescribed density. For example if the target density prescribed is 545 trees per acre the allowable planting range is between 490 and 600 trees per acre. When planting adjacent to borders or fences allow enough space for future fire suppression efforts or other equipment if necessary.

Although overall per acre stocking of a tract may be within the allowable stocking range, it is undesirable for some areas to be overstocked and some areas to be understocked. Even though overstocked areas compensate for understocked areas in determining the tract average, the planting job will not be accepted. A forester should be consulted before increasing or decreasing the recommended spacing standards.

Planting Method

Hand planting must be done using equipment capable of producing a 10-inch deep planting slit. Hand planting tools should be limited to dibble bars, plug bars, planting shovels or sharpshooters and must have blades at least three inches wide. Creating an hourglass-shaped hole with a dibble bar is unacceptable. When using a dibble bar, a second hole is required to close the bottom of the first hole. Seedlings should be planted so that the root collar is ¼ to ½ inch above ground level and soil should be firmly packed around the seedling. Seedlings should be properly cared for during pickup, transportation, and storage to ensure they are not damaged or exposed to adverse conditions. Detailed instructions for seedling care can be found below and should be adhered to.

The following technical guides can be referenced for additional information as well as illustrations demonstrating proper planting techniques for both hand and machine planting operations.

- *Guide for Planting Southern Pines*. 1974. W.E. Balmer and H.L.Williston, Southeastern Area, State and Private Forestry USDA Forest Service.

- *Tree Planting is Easy*. 2008. Dr. John D. Kushla and Dr. Andrew W. Ezell, Mississippi State University Forestry Extension Service. www.msucares.com/pubs/publications/p0160.pdf.

Proper Equipment for Handplanting: Plug bars are the recommended planting tool, if other tools (e.g. dibble bar, planting shovel or sharpshooter) are used great care must be taken to ensure proper planting.

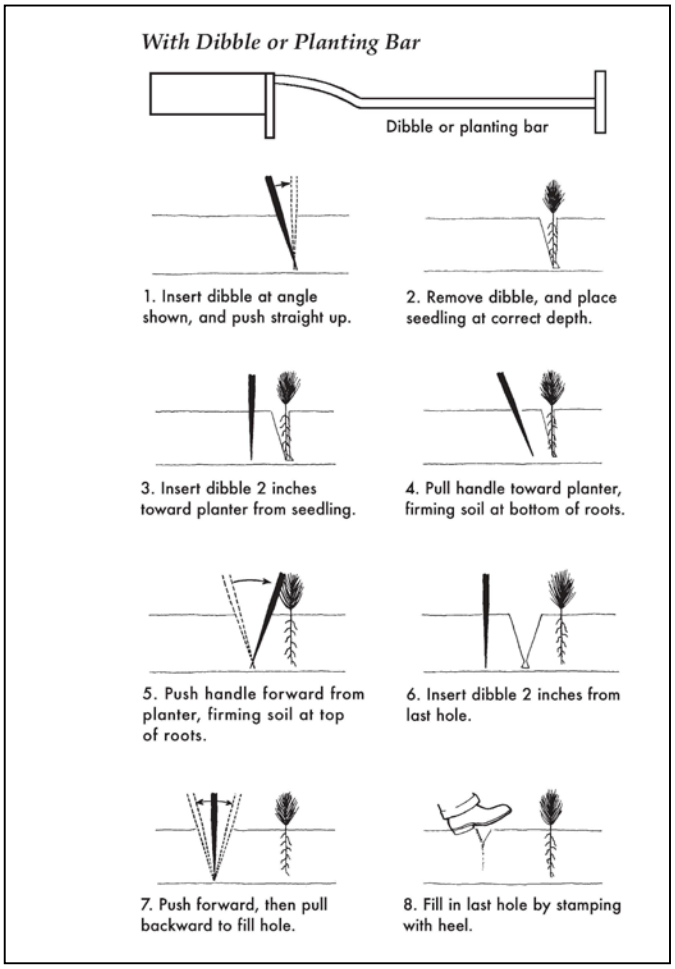
- **Plug bars** – Generally have a round or conically shaped blade that is approximately 6 inches long and 1.5 inches in diameter and should only be used for planting containerized seedlings.
- Dibble bar – Should have a blade at least 10 to 12 inches long and 3 to 4 inches wide.
- Planting shovels – Generally are shovels with an approximate length of 11”.
- Sharpshooters – Generally reinforced blades that are 4 to 5 inches wide and 12 to 15 inches long

The following criteria will be used to judge whether a pine seedling has been properly planted:

- Soil must have adequate moisture at time of planting and must be packed firmly around the planted seedling. All seedlings must pass a “four-needle” test, i.e. seedlings must remain firmly planted when pulled by four needles.
- Roots should be planted vertically with only lateral roots in a horizontal plane. A root angle of up to 30 degrees from the vertical is permissible.
- Roots should not be twisted, balled, or planted in U-, V-, J-, or L-shaped manner. Plantable seedlings (not culls) properly planted otherwise, may have a J- or L-shaped bend at the end of the roots if the bend does not exceed one inch.

- Seedlings should be planted such that the root collar is at ground level or up to ½ inch above surrounding soil.
- If the terminal bud has dirt on it (e.g. covering bud) then the seedling should be considered as improperly planted.

Following illustration shows proper hand planting technique:



Seedling Care

Seedlings come in both boxes and bags but both should be placed in cold storage as soon as possible. Once seedlings are removed from cold storage they should be planted within two weeks of removal.

Proper care of seedlings from lifting and packaging until they are actually planted is extremely important. The most vital precautions involve keeping the seedlings moist, not allowing them to dry out, freeze, or experience excessive heat, and storing them properly until the seedlings are properly planted. During transport from pickup point to the tract, bags/boxes must not be stored more than three deep. Cold storage is highly recommended for bagged seedlings whenever possible. Dormant seedlings can be held at temperatures from 32 – 40° F for no more than 10 weeks. If cold storage is not possible, then seedlings may be placed on racks. When storing on racks, bags should be kept in shade, protected from wind and weather, and not allowed to dry out or freeze. Bags should be stored no more than three deep and rotated every few days. Exposure to freezing temperatures and air temperatures greater than 70° F for more than two hours in unacceptable and can result in a major decrease in seedling survival. Steps must be taken to

protect seedlings if they are left on the job site overnight (i.e., covering or storing in a structure and stacking properly).

Small tears in bags should be patched with duct tape. Tears that cannot be fixed with tape will require placing the torn bag in another seedling bag. Torn seedling bags should not be placed in garbage bags as the seedlings are more susceptible to overheating. The date and seedling type information must remain with the seedlings. Prior to taping, torn bags should be checked to make sure the seedlings have adequate moisture

Damage to seedlings should be avoided during handling. Seedlings should never be ripped apart, as this can damage the root systems, foliage or cambium. Never allow seedlings to dry out, freeze, or get too warm. Exposure of the root system in the open for more than 20 minutes should be avoided. Trees culled ahead of time should be covered with wet burlap or Terra-sorb® or soaked in water if the 20-minute period is exceeded. Seedlings should be covered in the planting trays or kept moist by other means (e.g. Terra-sorb®). Bags should not be exposed to direct sunlight, as this can cause lethal heating of the seedlings. Internal bag temperatures greater than 85° F are lethal.

Storage of seedlings before planting and during transport:

- Seedlings should be picked up from the nursery as close to the planting date as possible
- Store seedlings in cold storage until the planting date
- Keep containers closed to minimize drying of the roots
- Seedlings should be transported in an enclosed trailer if possible but at the very minimum they should be covered to protect containers from possible wind damage

Storage of seedlings during planting:

- When possible take only as many seedlings to the tract that can be planted in 1 day
- When on site, seedlings should be stored in the shade, in a structure, or under an insulated tarp to protect them from excessive heat and cold
- Container temperatures should remain above freezing and below 65° F

The inspector should look for the following problems:

- J- or L- rooting – seedlings with taproots that are J or L shaped out of the container
- Dry seedlings – seedlings that are very dry (usually due to damage to the container and/or improper storage)
- Disease – seedlings that show signs of fusiform rust or have galls or balled roots
- Discoloration or stem weak – usually indicates the seedlings have become overheated in the bag and will not survive if planted
- Moldy or rotten odor – usually indicates the bag has overheated and/or there was too much moisture in the sealed bag.
- Bag data- lift date, storage date, correct species, variety and related seedling information for the site

Protection

Grazing should be excluded from all planted sites until the terminal bud is a minimum of 5 feet above ground level. Any earlier grazing must be approved by the funding agency. Damage from grazing will be the liability of the landowner. The livestock stocking rate should be acceptable for the available forage as defined by local professionals.

Firebreaks should be constructed around the perimeter of the planted site to reduce the probability of a wildfire entering the property. In the event a wildfire enters the site firebreaks will assist firefighters in

controlling the wildfire. Larger plantations of more than 50 acres should have firebreaks established through the tract to minimize potential risk from wildfire.

When applicable it may be necessary to treat for insects and disease particularly for Texas leaf cutting ants, town ants and pocket gophers. Texas A&M Forest Service pest control specialists should be consulted for additional information on pesticides and control methods.
The following pests can damage seedlings after planting:

- Texas leaf cutting ants – These ants are typically found on sites having sandy soils. They harvest green vegetation and store it underground to grow a fungus that is used for food. They typically do most of their damage to pine seedlings during the winter when there is little green vegetation except for evergreens. When possible the site should be treated before planting begins.
- Livestock – Livestock should be kept off planting sites for a minimum of 4 to 5 years because they will bite off trees, pull them up, and/or stomp them as they graze.
- Deer – Deer at times will bite tops off seedlings while they are small but as the trees grow to 3 or 4 feet tall deer will rub their antlers on them.
- Hogs – Hogs will root up freshly planted trees, especially on machine-planted jobs where the soil had been loosened by the planting machine.
- Rabbits – Rabbits will at times bite seedlings off making them appear like they were snipped off by a knife or pair of scissors.
- Gophers – Gophers will attack the roots of a seedling and sometimes pull the seedling completely in the ground as they feed. Small dirt mounds are typically present in the areas where seedlings are being damaged. When possible gophers should be controlled before planting begins.

Environmental Considerations

All Texas Best Management Practices (BMPs) for forestry should be followed during all reforestation and other silvicultural operations. Texas BMP guidelines can be viewed at http://texasforestservice.tamu.edu/sustainable/bmp_manual or by visiting your local Texas A&M Forest Service office.

When using chemicals for herbaceous weed or pest control, follow all regulations and directions on the label. Pesticide applicators must have a certified applicator license from the Texas Department of Agriculture (TDA). All chemicals must be federally and locally registered for proper use.

All application of herbicides and pesticides must be done with extreme precaution to avoid potential pollution of food and water supplies.