

TREE/SHRUB ESTABLISHMENT

S. C. Practice Job Sheet-612

Prepared for: _____

Prepared by: _____

Farm: _____ Tract: _____ Date: _____



Properly planted seedlings such as these longleaf pines are essential for establishing a new forest.

DEFINITION

Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

PURPOSE

To establish woody plants for forest products, wildlife habitat, long-term erosion control and improvement of water quality, treatment of waste, reduction of air pollution, sequestration of carbon, energy conservation, and to enhance aesthetics.

CRITERIA

Species must be adapted to soil and site conditions and be suitable for the planned purpose.

Planting at the proper time and care in handling and planting of the seed, cuttings, or seedlings will ensure that planted materials have an acceptable rate of survival.

Seedlings must be properly protected and stored from nursery through planting.

Only viable, high quality and adapted planting stock or seed should be used.

Residual chemical carryover should be evaluated prior to planting.

Species considered locally invasive or noxious should not be used.

Site preparation should be sufficient for establishment and growth of the selected species.

Adequate seed or advanced reproduction should be present or provided for when relying on natural regeneration to establish a stand.

The acceptability and timing of coppice (i.e. sprouting) regeneration should be based on species, age, and diameter.

Timing and use of planting equipment should be appropriate for the site and soil conditions.

The planting should be protected from unacceptable adverse impacts from pests, wildlife, livestock damage, or fire.

Comply with applicable federal, state, and local laws and regulations during the installation, operation and maintenance of this practice.

Site Preparation

Site preparation may vary according to the species to be planted, ground cover, soil, slope, degree of erosion and other site

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factors. The objective is to reduce competition without removing or destroying topsoil and organic matter.

Site Improvement

Growth on wet and other low quality sites often can be improved by water control.

1. Water control should be designed to maintain optimum water table. In the flatwoods, pines grow best when the water table is at least 18 inches but less than 36 inches below the surface.
2. Bedding may be needed to improve drainage, make planting easier and improve survival and initial growth of loblolly pine. Pines planted on beds in wet areas benefit from improved nutrition and soil aeration.
3. Fertilization is generally considered an operational practice only in the poorly drained flatwoods and other soils of the Coastal Plains generally deficient in phosphorus.

Spacing

Trees should be spaced so that they will make normal growth until the time of the first cutting, which is usually a commercial thinning.

Some recommended spacings for SC are:

<u>Pines</u>	<u>Hardwoods</u>
7'x10' (622tpa)	10x10' (435tpa)
8'x9' (605tpa)	12x12' (300tpa)
8x10' (544tpa)	15x15' (200tpa)
9x10' (484tpa)	

Interplanted seedlings should be no closer than 8 feet from established seedlings.

Spacing for special purpose plantings, such as wildlife or beautification, should be done in consultation with an appropriate specialist.

Planting Conifer Seedlings

1. Seedling Quality - A quality loblolly or white pine seedling is disease-free, root collar diameter no less than one-eighth inch, stiff and woody, with secondary needles present, maximum top length 14 inches and a root system no less than five inches nor more than 9 inches long.
2. Care of Seedlings - Seedling roots must be kept moist at all times. Seedlings (especially the roots) should not be exposed to the sun, wind, heating, drying, or freezing at any time from lifting at the nursery plant beds until planted. No roots should be exposed to the sun or wind for more than 10 minutes. If cold storage is not available, keep seedlings packed in bags after delivery. They should not be stored in bags longer than 2 weeks.

Additional precautions should be taken for storing bags:

- a. Keep in a cool place. Avoid heated rooms.
- b. Protect bags from freezing.
- c. Water at least once each week to keep roots and packing moss moist.
- d. Stack bags on sloping racks to ensure air circulation, easy watering, and drainage of excess water.

Stock must be kept cool (34 - 38 degrees F) and protected from "heating". Stock that is well watered, protected from direct sunlight, and properly aerated usually will not heat. Seedlings that have been subjected to heating should not be planted.

The sooner seedlings are planted after being lifted from nursery beds, the better the chances for survival and normal growth. Loose seedlings should be "heeled in" immediately upon arrival. Details are available from your forester or conservationist.

While planting, take the following precautions:

- a. Water, wet moss, or wet burlap should be kept around the seedling roots.
- b. When hand planting, one seedling should be selected at a time and immediately planted.
- c. At the end of each day, "heel in" the loose seedlings or repack them in wet moss and wrap tightly with waterproof paper.

Planting Hardwood Seedlings

Care of hardwood seedlings is similar to conifer seedlings with the following additions:

1. Seedlings must be large (at least 3/8" root collar diameter) and healthy. Small or weak seedlings invite planting failures.
2. Seedlings must be of the correct geographic source.
3. The trees must be adapted to the site.
4. Site preparation and logging must be such that the soil is not abused, which causes erosion or puddling from working the soils when they are too wet.
5. Newly planted seedlings should be free to grow without severe competition. Intensive site preparation and proper follow-up to control competing vegetation are required.
6. Plantations must be carefully protected. Hardwoods are killed or injured by light fires; they can be destroyed by grazing cattle and deer, and they are sensitive to herbicides.

Time to Plant - Plant during the dormant season. (The season can be extended from two to four weeks by placing dormant seedlings in cold storage.) Avoid planting when ground is frozen or dry - or excessively wet and sticky. Planting when soil is in poor condition results in low

survival, poor planting production, improperly planted seedlings and poor growth.

Planting Methods - Seedlings may be planted by hand or with a machine transplanter.

1. **Depth of Planting** - Plant seedlings slightly deeper (1" to 2") than they grew in the nursery in all soils except deep sands where they should be planted 2 to 4 inches deeper than they grew in the nursery, exercising due care not to cover the terminal bud. Longleaf pine should be planted with the terminal bud at ground level (or slightly above for containerized seedlings) after the soil has settled.
2. **Condition of Roots** - Roots must be planted straight down, not twisted, balled or U-shaped. The opening (slit, hole, or furrow) should be large and deep enough to accommodate the root system in its normal position.

Firmness - Soil must be packed firmly around the planted seedlings with no air pockets around roots.

Direct Seeding

Note: Direct seeding is not commonly practiced in SC due to predation of seed, inconsistent germination, and uncontrollable stocking rates.

1. **Seed Quality** - Seed should be ordered from a reliable commercial seed dealer.
2. **Seed Treatment** - Seed stratification (exposure of seed to a cold moist treatment to overcome dormancy and promote germination) and repellent coating are essential for all pines except longleaf.
3. **Timing and Rates** - Seed should be sown about the time of the last killing frost. November or February are preferred seeding times for longleaf. Leaf litter must be burned if it is deep enough to prevent seed from reaching

mineral soil. If the tract cannot be burned, spots must be raked and the seed placed in mineral soil.

4. **Release of Seedlings** - One advantage of direct seeding is that overtopping hardwoods do not hamper the operation; they offer shade to the seed during germination time and while the seedlings are becoming established. The hardwoods should be killed by the middle of the following summer. Otherwise, they will compete for vital moisture and growing space. Deep, sandy soils should be avoided because they dry out too fast for good seed germination.

SPECIFICATIONS (as applicable)

Species to be established _____

Plant spacing _____

Site preparation method _____

Planting method _____

Equipment to be used _____

Planting dates _____

Soil amendments _____

Cultural practices _____

Forest management plan by forester _____

Other: _____

OPERATION AND MAINTENANCE

Planting Follow-Up - Seedling stocking and survival can be determined a year after planting by taking 1/100 acre randomly sampled plots in the plantation. The radius of a 1/100-acre plot is 11.75'. Sufficient plots are needed to give a good representation of area. As a rule, if 300 or more well-established seedlings survive per acre, it will not pay to replant. Replacement plantings should be made within 2 years after the original planting.

Release and Cultural Practices

- Planted seedlings or cuttings should be released from any overtopping vegetation not later than 2 years after planting. "Foliage Spraying" methods should not be used on areas planted to hardwood species.
- Noxious weeds must be controlled.
- Damaging pests (insects, rodents, and disease) must be monitored and controlled.
- Periodic applications of nutrients may be needed to maintain plant vigor.

Protection of Planted Seedlings

Livestock Exclusion

All plantations should be protected from grazing by livestock until the trees are at least 8 to 10 feet high. Domestic livestock should be completely excluded from all hardwood and Christmas tree plantations throughout the life of the stands. Hogs must be completely excluded from plantations of all species.

Interplanted stands and young plantations of all species must be protected from fires.

This job sheet was prepared in cooperation with local Soil and Water Conservation Districts and

**the South Carolina Forestry
Commission.**