



United States Department of Agriculture  
Natural Resources Conservation Service

## “Longleaf Pine Restoration in Virginia”

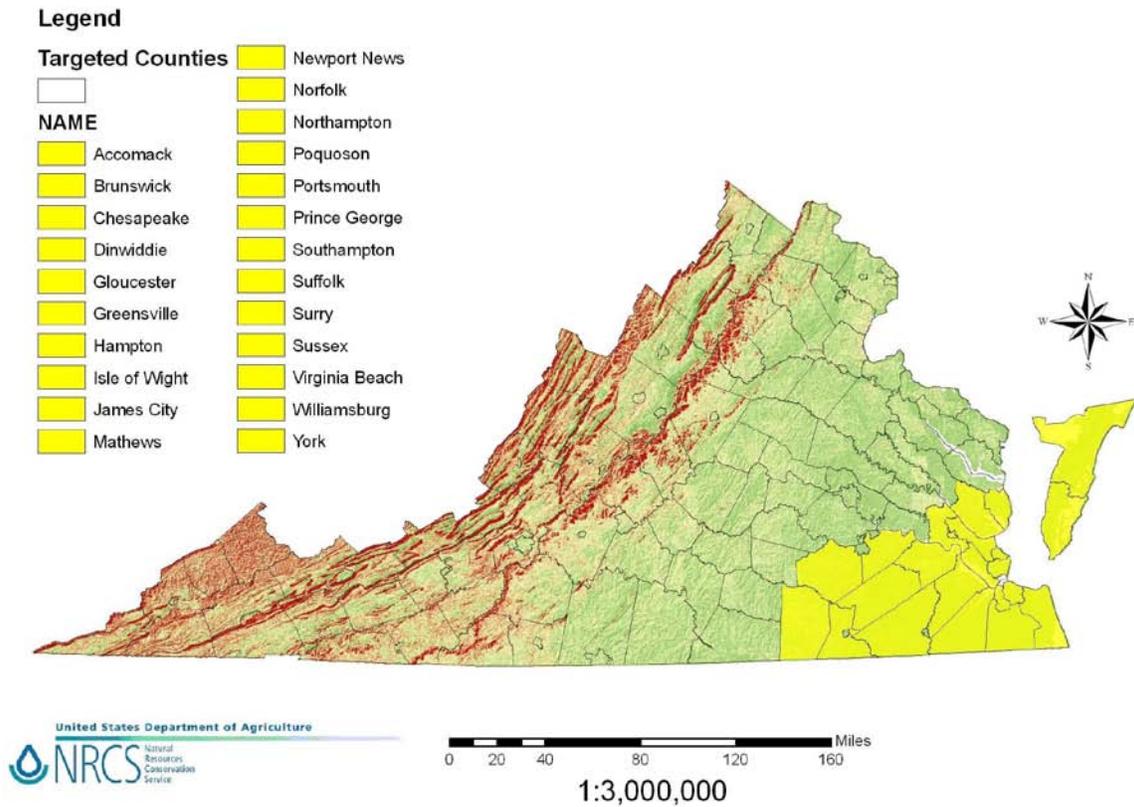
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### INTRODUCTION

It is estimated that longleaf pine (LLP) covered 60-90 million acres in the United States prior to colonial times. Their native range stretched from Virginia down to Florida and over to eastern Texas. In Virginia, an estimated 900,000 to 1 million acres occurred in the Southeast coastal counties. Today, approximately 400-1000 naturally occurring trees still exist. In addition, a few hundred acres have been planted in the last several years. There is much debate over the true historical range of LLP in Virginia, but the following counties/cities are presumed to be native Longleaf Pine range: Accomack, Brunswick, Greensville, Sussex, Prince George, Southampton, Isle of Wight, Surry, Norfolk, Hampton, Poquoson, Suffolk, Portsmouth, Chesapeake, Virginia Beach, James City, Newport News, Williamsburg, York, Gloucester, Mathews and Northampton.

## Restoring the Northern Limit of the Longleaf Pine



The longleaf pine ecosystem is characterized by a relatively sparse tree canopy and a very diverse herbaceous understory (savannah concept) with regular fire disturbance. Longleaf pine are often thought to be limited to infertile, sandy or sandy loam soils which is definitely where they grow best due to the lack of competition. The presence of fire in these communities further enhances the LLP ability to thrive and is as much a part of the LLP ecosystem as water is to the rainforest. Although LLP compete best on sandy soils, they can grow on a variety of sites from dry, sterile ridges to low flatwoods, and in sand, loam or clay. On a landscape scale, the LLP ecosystem contains innumerable embedded microhabitats, including but not limited to pitcher plant bogs, seepage slopes, wetland flats, scrub oaks and early successional vegetation. The most important point when growing LLP is competition control. In more fertile conditions, competition with other plants often leads to less than ideal results, and requires more intensive management for success.

Growth of LLP is slow initially when compared to other commercially grown pine trees. However, these two species will have comparable growth in the long term, with LLP outperforming loblolly in low fertility/sandy sites. LLP also has greater resistance to disease and insect damage than loblolly pine and is considered a superior timber tree, suitable for poles, pilings, sawlogs, plywood and pulp.

It is the nature of the longleaf pine to develop very little above ground for the first 2 to 6 years. During this time the longleaf is stemless and focuses on developing an extensive root system. The root collar increases in diameter, a dense clump of green needles is all that appears on the surface. This is the distinctive growth phase called the “grass stage” of a longleaf pine (Figure 1). The seedlings, at this stage, are highly fire resistant. When the root collar diameter approaches 1 inch in diameter, height growth begins (“bolting”; Figure 2). Once height growth is initiated, a field-grown seedling may grow 10 feet in 3 years. Branch production is often delayed until the seedling reaches 10 to 16 feet in height (the growth form of individual trees can be highly variable within a given stand). Competition for light, water, and nutrients slows the growth of the seedlings and prolongs the duration of the grass stage. Adequate control of vegetative competition will increase survival and shorten the time it takes longleaf to begin height growth.



Figure 1. Longleaf grass stage



Figure 2. Longleaf sapling

### **SITE PREPARATION**

Controlling competition and ripping to break hard pans are the two most vital management practices in establishing a successful stand. Scalping approximately 1-2 feet each side of the row prior to planting openland (pasture/cropland) has proven to be very effective as a competition control and should be given high priority as a site preparation tool. Herbicide application can also be an effective tool for controlling competition when preparing a site for planting. An alternative to herbicides for site preparation is to burn the area every year prior to planting the longleaf pines. In addition, there should also be a site prep burn in April/May of the year the trees are planted. Burning alone may not completely control the top growth of competitive vegetation and plants often come back quickly.

If the area has a hard pan or is suspected to have a hard pan, deep rip (subsoil) area to be planted 2-3 months prior to planting to allow time for soil to settle. Ripping hard pans is the second most

important management practice for establishing longleaf pine. Spray herbicide, either broadcast or banded, along ripped row where trees are to be planted. Seedlings are not to be planted directly in the subsoil rip.

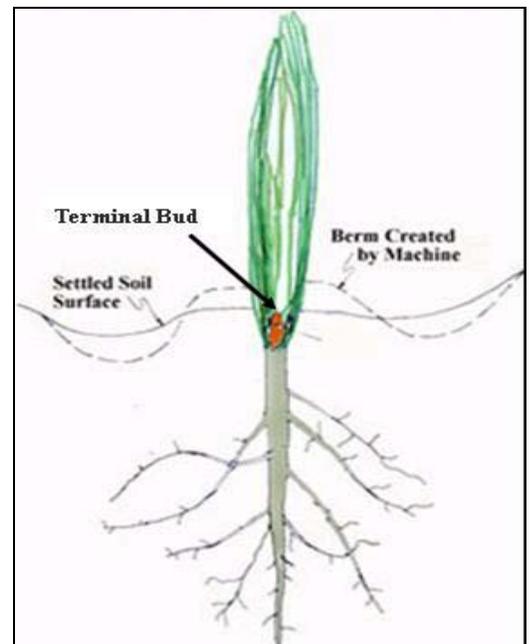
Site preparation will vary for sites that are not pastures or crop fields. These sites may be described as cutovers; abandoned cutover forest land; pine stands without longleaf in the overstory, with or a history of fire; mixed pine stands with a longleaf BA (Basal Area) of at least 20 square feet per acre, with or without a history of fire; and pure longleaf stands, with or without a history of fire. If any of these are the existing condition of the land considered for restoration, it is recommended that the landowner consult with a forester or other conservationist specifically trained in longleaf pine restoration.

### **PLANTING STOCK**

Use container grown (small tube) plants only for best results. Plants should be retained from a local source (usually North Carolina stock) but occasionally container grown seedlings can be obtained from the Virginia Department of Forestry. Native Virginia LLP are typically grown for use on public lands but there may be some leftovers each year. It is very important to get the LLP tree order in to an appropriate nursery as soon as possible (one year in advance) so the seedlings will be guaranteed. Most nurseries grow on a contract basis and do not have a lot of leftovers.

### **PLANTING DATES AND TECHNIQUES**

1. Plant the containerized longleaf pines in the late fall to early winter during the dormant season. 300-500 trees per acre on a ten by ten or twelve by twelve foot spacing will usually provide for good survival, some limited harvest, and creation of savannah conditions over time.
2. On many cutover sites where the presence of logging slash, stumps, or uneven terrain makes machine planting difficult, hand planting of container-grown seedlings is recommended. This method allows for better depth control on "trashy" sites as compared to machine-planting.
3. Plant with adequate soil moisture.
4. On flat planted sites, leave top of plug slightly exposed ABOVE the soil surface. It is very important to make sure the plants are established to the correct depth to protect the growing bud and to make contact with mineral (non-organic) soil below the duff layer.
5. Plant the longleaf pine seedling as vertically as possible.
6. In areas that have been ripped, DO NOT plant in the rip. Offset plants 4-6 inches to the side of the rip.
7. DO NOT plant in unprepared areas of pasture grass. Pasture grasses are extreme competitors and must be addressed prior to planting.



## **OPERATION AND MAINTENANCE**

Longleaf seedlings continue to be susceptible to herbaceous competition until height growth reaches 5'. Plan for 2-3 backpack herbicide sprays to control hardwoods and/or use prescribed burning during the period that trees are susceptible to fire (DO NOT BURN when trees are between 18" – 5' in height). Burning can be used during the grass stage or after the trees reach a height of 5' and can be especially useful following an herbicide application in a LLP planting. In addition to controlling hardwoods, fire is an important component to the ecosystem and after the trees are >5 feet tall, burn the pines every 2-5 years during the growing season (mid March through May).

If the pines get brown needle rust or experience dense competition after planting while in the grass stage (<18"), burning or herbicide application is recommended for eradication. Burning will remove the diseased needles and provide the plant a chance to recover.

Invasive species should be monitored and controlled where necessary. Monitor survival of the tree seedlings and replace any dead plants as necessary. Protect plantings from grazing animals and unnecessary traffic. It should be noted that selective herbicide control after planting LLP is still a developing technology and experts should be consulted before any selective herbicide attempts are made after the LLP planting has occurred.

**Reminder: If prescribed fire for management is not an option on the site, establishment of a longleaf pine ecological community is NOT RECOMMENDED. The trees can be grown without fire, but the plant community will never fully develop.**

## Longleaf Pine Establishment Timeline

