

Regenerating Pine Forests

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A mature, twice-thinned loblolly pine plantation near Wakefield provides and protects environmental services, such as clean water and air, while also providing timber for wood products. Photo by: Jennifer Gagnon, Virginia Tech.

Pine forests occupy about 20 percent of Virginia's forested acres, and 65 percent of that total is comprised of sustainable plantations. These forests protect water, soil and air quality, and provide wildlife habitat, recreation, and aesthetic benefits. They also contribute significant financial benefits to the landowner, to forest industry, and to the economy of the Commonwealth. The most common and commercially valuable pine species in Virginia today is loblolly pine. After a harvest or natural disturbance removes most or all of an existing stand (or in some cases when a landowner wants to establish a new forest on former agricultural fields), the ability to quickly regenerate a healthy and productive pine forest or plantation is important for many landowners.

It is often helpful to first look at past efforts and lessons learned as we make plans for future activities. Without intervention from humans, pine forests regenerate through a process of natural succession that can take decades. Emulating that process, prior to the early 1900's most pine regeneration was achieved by relying on seed from the preceding stand or sourced from mature trees around or in the harvest area (seed trees). This natural regeneration approach offered the advantage of low cost and minimum effort, but required advance knowledge and planning to ensure that a seed crop was available after harvest. The resulting stands were



A young loblolly pine plantation provides food and cover to numerous early-successional wildlife species, and will provide marketable timber within 15-20 years. Photo by: Jennifer Gagnon, Virginia Tech.

highly variable and often inferior because of seed predation by insects, birds, or mammals, poor germination, or unfavorable weather. The method offered no control of tree spacing or density, so an investment in an early or pre-commercial thinning (within two to five years after harvest) was often required to establish enough space for crop trees to survive and grow.

Technically categorized as an artificial regeneration method, direct seeding evolved as an approach that mimics natural regeneration. It entailed collecting seeds and then spreading them across a harvested site as a source of new seedlings. The approach was used to offer increased control over seed quantity, genetics, and the spacing and distribution of the resulting seedlings. But the approach was more expensive and required more labor than natural regeneration, yet still presented most of the same disadvantages.

Neither natural regeneration nor direct seeding is commonly practiced or recommended for regenerating pine forests in Virginia today. This is due to the advent in the early 1900's of nurseries to produce pine seedlings for planting (also classified as artificial regeneration). This represented a quantum leap in the ability to quickly restore harvested or otherwise disturbed pine forests to a healthy and highly productive state. Today, the most common method of regenerating pine in Virginia, and the Southeast US overall, is planting nursery-grown seedlings at a pre-determined spacing, using either hand crews or machines. The Virginia Department of Forestry (VDof) began its tree nursery program in 1916. Since that time, the Agency's nurseries have grown 2 billion tree seedlings that have been planted across the Commonwealth. Approximately 60,000 acres in Virginia and more than 750,000 acres across the Southeast are planted in loblolly pine alone each year.

Planted pine seedlings are one year old when planted and come from a nursery where they have received water, fertilizer, and insect/pathogen protection as needed. This results in vigorous seedlings with excellent survival and a high potential for rapid, healthy growth. The landowner can have confidence in the resulting stand density (trees per acre) and spacing, which optimizes resource availability for each tree. In addition, by selecting and breeding individual trees with desirable traits (a process known as tree improvement) over the last 65 years, the VDof's nursery, several universities, and forest industries have collaborated to develop loblolly pine seedlings that grow straighter and much faster (up to twice as fast in the first six years after planting) than those available in the past.



***The Virginia Department of Forestry grows loblolly pine seedlings in the sandy soils at the Garland Gray Forestry Center in Courtland (left). In the spring of 2017, they shipped out over 30 million seedlings (right).
Photos by: Jennifer Gagnon, Virginia Tech.***

Tree planting costs more than natural regeneration or direct seeding, and close attention to seedling care and planting quality are critical. Landowners who view their pines as a crop to generate income may want to include additional activities, such as control of competing vegetation, applying fertilizer, or selective thinning to remove some of the trees as the stand matures, to maximize returns. For many of these activities and for many landowners, financial assistance programs administered by the VDOF are available. The Virginia Reforestation of Timberlands Program (RT) is particularly helpful in assisting landowners with the cost of site preparation, tree planting, and follow-up improvement work. A VDOF forester can help determine the appropriate actions and expected costs and direct you with what programs may be helpful in meeting your objectives. You can find your local VDOF forester's contact information at www.dof.virginia.gov. Even without cost-share advantages, investing in pine regeneration by planting and managing plantations offers financial returns comparable to many other investment options.

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