Hardwoods cont. from page 1

by the goals of the landowner. The key to this planning phase is time. Hardwood forests develop over decades or centuries, so management regimes can often require a similar commitment to fully implement.

The individual plants that will eventually survive and dominate the new stand will depend primarily on how well a given species can compete with other species for light, water, and, to some degree, soil nutrients. Sunlight is probably the most important factor. Tree species that are considered intolerant to shade usually will not survive



In Virginia, woodland owners mainly rely on natural regeneration of hardwoods, either thorough seedlings (above) or stump sprouts (right), or more commonly, both. Photos by: Jennifer Gagnon, Virginia Tech.



and grow in the understory of a mature stand or under the canopy of over-topping seedlings or small trees. Trees that are considered to be shade-tolerant can become established and grow in the shade of a dense overstory. Those that are intermediate in shade tolerance require at least partial sunlight to become established and to grow. Most of the oak species, hickories, and associated species fall into the shade-intermediate or shade-intolerant categories. Shade-tolerant species include most maples, beech, ash, basswood, dogwood, and holly. Yellow-poplar is a major shade-intolerant species.

The mixed oak or oak-hickory forest types are dominant in Virginia. Where oak is a desired species in the future, it is important to understand that without advance planning and action it is possible that the oak component in the next stand will be diminished. Oak seedlings or, preferably, larger saplings present in the understory prior to the main canopy removal, combined with sprouts from the stumps removed in harvesting, are the key to maintaining oaks in the future. It can take 10 years or more to establish the desirable understory regeneration prior to a final harvest, when the entire overstory is removed. A partial removal of the main canopy and/or the removal of a significant sub-canopy will often provide the needed light conditions on the forest floor to allow the oak regeneration to become established and to develop. This process to establish advanced regeneration of a desired species would be termed the initial harvest of the shelterwood regeneration method.

In stands that are dominated by shade-tolerant species, such as maple, beech, and basswood, where these species are desirable in the future, single mature trees can be harvested periodically, with the tolerant species being constantly re-established and growing in the understory. Under these conditions, an uneven-aged stand structure, composed of mostly shade-tolerant species, would be maintained.

The Virginia Department of Forestry can provide advice and, in many cases, financial assistance to help landowners trying to choose and implement a regeneration strategy for their hardwood forest. You can find your local VDOF forester's contact information at www.dof.virginia.gov.

Jerre Creighton is the VDOF Research Program Manager, jerre.creighton@dof.virginia.gov, 434-220-9119.

VIRGINIA FOREST LANDOWNER UPDATE VIRGINIA WINTER 2018



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Resources cont. from page 4 Cutover-Timberland-2011-11_pub.pdf edu/420/420-165/420-165_pdf.pdf

CONTACT OUR SPONSORS AND STATE NATURAL RESOURCE MANAGEMENT AGENCIES:





The Augusta Forestry Center in Crimora grows hardwood seedlings, as well as some pine species, that are available to landowners interested in developing Christmas tree plantations, stabilizing stream banks, and creating wildlife habitat. Photo by: Jennifer Gagnon, Virginia Tech.

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Shortleaf Pine: An Option for Virginia Landowners: https://pubs.ext.vt.edu/content/dam/pubs_ext_vt_

• Welcome to the Woods: http://pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/ANR/ANR-136/ANR-136-pdf.pdf



https://forestupdate.frec.vt.edu

opportunities, including hiking, hunting, fishing, and wildlife viewing. Photo by: Jennifer Gagnon, Virginia Tech.

Hardwood Forests **By: Jerre Creighton** Virginia Department of

Virginia is a hardwood state -approximately 80 percent of our forestland (12.6 million acres) is in hardwood or mixed hardwood-pine forests. They provide critical wildlife habitat, protect water and air quality, offer recreational and aesthetic benefits, and generate a valuable timber resource for landowners and for the industry that harvests lumber and

manufactures wood products. While the volume of hardwoods growing in Virginia continues to increase, there are concerns about the future condition of the resource. Among these are high-grading (cutting the best and leaving the rest) and selective harvesting, driven by markets that demand only large-diameter trees. In addition, nearly a century of fire exclusion, damage from intense deer browsing, increasing interference from invasive species, other forest health issues, and forest fragmentation have all contributed to concerns about species composition and quality.

Successfully regenerating hardwoods is a central issue in their sustainability, and the composition and diversity of that regeneration – which will comprise the future hardwood forest – is crucial. The exact species composition of hardwood stands varies widely and depends on topography, soil, geology, local climatic conditions, land-use history, previous management activities, natural disturbances, wildlife impacts, and insect and disease pressures.

A critical concept in hardwood stands is that, following the removal of the main canopy by a complete harvest or by a natural disturbance, the future stand will be formed from new growth originating on the forest floor. This regeneration will come from: (a) small stems already established in the understory prior to the overstory being removed; (b) seeds stored on the forest floor, blown in from an adjacent stand or from the crowns of downed or cut trees; (c) sprouts from cut stumps or from the exposed roots of cut or uprooted trees; or (d) a combination of the three. Although planting hardwoods can be accomplished, it is generally not recommended because of the high cost and low probability of success. The hardwoods that resprout naturally following a disturbance almost always develop more rapidly and overtop and kill any planted seedlings.

Current information describing the forest's condition – soils, topography, climate, species present in both overstory and regeneration classes, and invasive species are necessary to identify areas of concern, and determine what options might be available to address them. This is time-consuming and can be costly. But without this knowledge, the forester is simply driving blind. Armed with information, one must decide on the objective for the stand, guided

Hardwoods cont. on page 5



EVENTS CALENDAR		ENDAR	For the most complete listing of natural resource education events, visit the on-line events calendar at https://forestupdate.frec.vt.edu			
Contact	Date	Location	Event	Time	Fee	
DCR	Jan., Feb., & March	Virginia's State Parks	A variety of events and activities For a complete list, visit: www.dcr.virginia.gov/parks	Varies	Varies	
MP	Year-round	State-wide	Virginia Master Naturalist Volunteer Basic Training www.virginiamasternaturalist.org/chapters.html		Varies	
EP	Jan. 8 - nominations open; June - camp	Appomattox	The 72nd Holiday Lake Forestry Camp Nominations will open in early January. Details and forms can be found at www.dof.virginia.gov. Teens will learn skills in forestry and other natural resources. Forestry Camp is open to Virginia residents aged 13-16 who have not attended before.		Varies	
WWF	Jan. 26-28	Virginia Beach	Winter Wildlife Festival Learn what it takes to properly observe and identify wildlife in their natural settings.		Varies	
JMM	Jan. 28	Montpelier Station	Working Woods Walk Explore beyond the mansion and lawn to the woods of Montpelier and consider society's dependence on this resource then and now. This Master Naturalist-led walk will follow a state- of-the-art trail showcasing forest & habitat tending methods.		\$5.00	
VFHP	Jan. 29-30	Staunton	26th Annual Forest Health Professionals Conference Hear the latest on emerging pests, existing issues, and other forest ecology and health topics. Recertification credits offered for commercial pesticide applicators; CE credits offered for ISA and SAF members.	9 - 4:30 9 - 1:00	\$110*	
AV	Feb. 12 - May 7	On-line	On-line Woodland Options for Landowners This 12-week, on-line, self-paced class will teach you the basics of woodland management. Topics covered include: tree ID, woodland ecology, sustainability, soils, mapping, and silviculture. Registration includes a hands-on field trip, and 3 books.	Self- paced	\$45/family	
AD	Feb. 24	Culpeper	14th Annual Woods & Wildlife Conference Join Virginia Cooperative Extension and partners for a full day of presentations and workshops geared towards helping both large and small acreage landowners become better stewards.	8:30 - 4:30	\$45/person \$80/couple	
JG	March 16-18	Appomattox	Central Virginia Beginning Landowner Weekend Retreat Is woodland management a new concept for you? If so, come spend the weekend with fellow forest owners and natural resource professionals and learn how to get started. A combination of classroom talks, field tours, and hands-on experiences will provide you with the basics.	All day Saturday & Sunday	Individual \$50* Couple \$90* Individual \$100** Couple \$190**	
*Meal(s) included **Meal(s) and lodging included						
		continuing educat	Commissioner of the Revenue, please visit the Landowner U tion classes, Real Forestry for Real Estate. (https://forestupd neals included; **meals and lodging included			
EVENT CONTACTS						

EVENT CONTACTS						
Contact	Name/Affiliation	Phone	e-mail/website			
DCR	Virginia Department of Conservation & Recreation	804/786-1712	www.dcr.virginia.gov			
MP	Michelle Prysby	434/872-4580	www.virginiamasternaturalist.org			
EP	Ellen Powell	434-220-9083	ellen.powell@dof.virginia.gov			
WWF	Winter Wildlife Festival	757/385-2990	VBGov.com/winterwildlife			
JMM	James Madison's Montpelier	40/672-2728 x 450	www.montpelier.org			
VFHP	Virginia Forest Health Professionals	www.vafhp.org				
AV	Andrew Vinson	540/231-6494	josephav@vt.edu			
AD	Adam Downing	540/948-6881	adowning@vt.edu			
JG	Jennifer Gagnon	540/231-6391	jgagnon@vt.edu			

Regenerating Pine Forests By: Peter Eales & Jerre Creighton, Virginia Department of Forestry

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 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 precommercial thinning (within two to five years after harvest) was often required to establish enough space for crop trees to survive and grow.

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, Virainia Tech.

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 and cover to numerous early-successional is due to the advent in the early 1900's of nurseries to produce pine seedlings for planting (also classified as artificial regeneration). This timber within 15-20 years. Photo by: represented a quantum leap in the ability to quickly restore harvested Jennifer Gagnon, Virginia Tech. 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



A young loblolly pine plantation provides food wildlife species, and will provide marketable

Pines cont. on page 4

Pines cont. from page 3

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 spring 2017, Garland Gray shipped out over 30 million seedlings (right). Photo 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.

Peter Eales is the VDOF Pine Resource Forester, peter.eales@dof.virginia.gov, 434-471-0182. *Jerre Creighton is the VDOF Research Program Manager, jerre.creighton@dof.virginia.gov, 434-220-9119.*

Resources for Regeneration

Getting ready to harvest your timber? Interested in planning for the regeneration of your next forest? Here are some additional resources to help you get started:

Virginia Department of Forestry

- Find your local forester: http://www.dof.virginia.gov/locations/index.htm, 434-977-6555
- Purchase seedlings: http://www.dof.virginia.gov/nursery/index.htm
 - Augusta Forestry Center, 540-363-5732
 - Garland Gray Forestry Center, 804-834-2855
- Learn about cost share programs that may help you pay for your regeneration project: http://www.dof.virginia.gov/ costshare/index.htm

Private consulting foresters

http://www.dof.virginia.gov/services/consultant-forester.htm

Publications

- Best Genetics in Loblolly Pine: http://www.dof.virginia.gov/infopubs/_forestry-topics/FT0001-VAs-Best-Genetics_ pub.pdf
- Forests of Virginia: Importance, Composition, Ecology, Threats, and Management: http://www.
- virginiamasternaturalist.org/uploads/2/1/8/6/21860850/465-315_pdf.pdf
- Preserving Longleaf Pine in Virginia: http://www.dof.virginia.gov/infopubs/_forestry-topics/FT0008-Preserving-Longleaf-Pine-In-VA-2007-09_pub.pdf *Resources cont. on page 6*

