# 2017 State of the Forest

Virginia Department of Forestry nurseries celebrate their 100th anniversary producing seedlings for Virginia's landowners.

Annual Report
on Virginia's Forests

# Contents

From the State Forester 3

Virginia Forest Trends 4
- Forested Land and Forest Ownership 4
- Forest Types and Forest Sustainability 5

Ecosystem Services 6
- Focusing on the Ecosystem Service Values and Benefits Provided by Forests 6
- Water Quality 6
- Air Quality 7
- Mitigating Forest Conversion Impacts 7
- Management Tools 7

Forestland Conservation 8
- Conservation Easements 8
- Generation NEXT 8
- Century Forests 9

Our State Forests 10

Forest Management 11

Nurseries 13

Forest Protection from Wildfire 16
- Fire 16
- Law Enforcement 16
- Training Program 16
- Dry Hydrant Program 17
- Volunteer Fire Assistance Program (VFA) 17
- Wildfire Prevention 17
- FireWise 17

Water Quality Protection 18
- Watershed Protection 19

Forest Health 20

Forest Research 21
- Pine Forests 21
- Hardwood Forests 21
- Pine Tree Improvement 21
- Diminished Species Restoration 22
- Growth and Yield Modeling 22

Forest Industry and Markets 23

Urban and Community Forestry 26
- Urban Forest Management 26
- Partnerships With Universities 27
- Green Infrastructure 27
- Clinch River Valley Initiative (CRVI) 28
- Working With The International Society Of Arboriculture 28
- Trees Virginia (Virginia Urban Forest Council) 29

Accomplishment Report 30

# From the State Forester

It's hard to believe that this is my fourth State of the Forest Report. We've had another busy and productive year – as you will be reading about in this report – but the weeks and months are just flying by and soon it will be 2018!

As we are in the last few months of Governor McAuliffe's administration, I wanted to take a moment to thank the Governor and the First Lady for their tremendous support of the Virginia Department of Forestry during the last four years. The Governor and the First Lady have been deeply involved in a number of important projects and initiatives that directly impacted the Virginia Department of Forestry, and their active engagement has helped make these activities so very successful. They have been great advocates for our forest resources and the many benefits these forests provide to all Virginians. While we will miss the McAuliffe Family and wish them all the best, our Agency stands ready to continue its mission under the leadership of a new Governor in 2018.

Two of the most impactful things that happened this year were the Governor and the General Assembly coming together to secure new wildfire suppression vehicles for the agency and to fully fund the Reforestation of Timberlands program. The new fire vehicles were desperately needed to replace some pieces of equipment that were as much as 30 years old. Through the combined efforts of the Governor and the General Assembly, we were able to replace 71 wildfire pickup trucks and 18 fireplows and transports. These new vehicles will go a long way toward helping us protect and serve the citizens of the Commonwealth and our forest resources. And, for the first time in 16 years, the state match of the self-imposed forest products tax was fully funded. These funds go to Virginia landowners to support their efforts to replant and grow the forests of tomorrow after a timber harvest. This ensures a sustainable forest resource for Virginia and that the ecosystem services, including water quality and air quality, provided by forests are available to all Virginians.

Thanks to an economic impact study by the Weldon Cooper Center at the University of Virginia, we learned that forestry's contribution to the Virginia economy grew by more than $4 billion since the last such study (in 2013). Forestry contributes $21.5 billion to the state's economy each year (making it the third largest sector – behind agriculture and tourism – in the state) and provides employment for nearly 108,000 Virginians (an increase of almost 5,000 jobs since 2013).

We have played a key role in getting recognition for existing forest cover into the Chesapeake Bay Phase II and Phase III Watershed Implementation Plans. And, for the past two years, VDOF has led a landscape-scale partnership focused on: 1. quantifying the value of retaining forestland for meeting water quality objectives, and 2. determining what is needed – from the perspective of local leaders – to prioritize forestland retention as a land-use planning option to meeting Chesapeake Bay Watershed goals. This effort, which was reviewed and validated by the Commonwealth of Pennsylvania, proved that, in just the pilot study area alone, up to $125 million could be saved. Such savings extrapolated across all the jurisdictions with the Chesapeake Bay Watershed could, therefore, be enormous.

These successes don't just happen. They are the result of a lot of collaboration and tremendous effort on the part of many partners both inside and outside of government. There are literally dozens of partner agencies/entities with which we work, and they are vital in helping us achieve our goals and objectives. I can't begin to thank them enough for their good work and dedication. We wouldn't be where we are without them.

I invite you to read the rest of this report to learn more about how well we serve you in so very many ways, and I ask that you share with me any thoughts you may have about the information we have presented.

Sincerely,

Bettina K. Ring

Bettina K. Ring

State Forester

# Virginia Forest Trends

## Forested Land

For 2017, more than 16 million acres – more than 62 percent of the Commonwealth (Figure 1) – qualified as forestland. Of this forestland, 15.3 million acres are categorized as commercial timberland and more than 500,000 acres are categorized as reserved forestland, e.g., Shenandoah National Park, VA State Parks, etc.

Since 1977, an average of more than 16,000 acres of forestland has been converted to non-forest uses annually, a trend that is projected to continue.

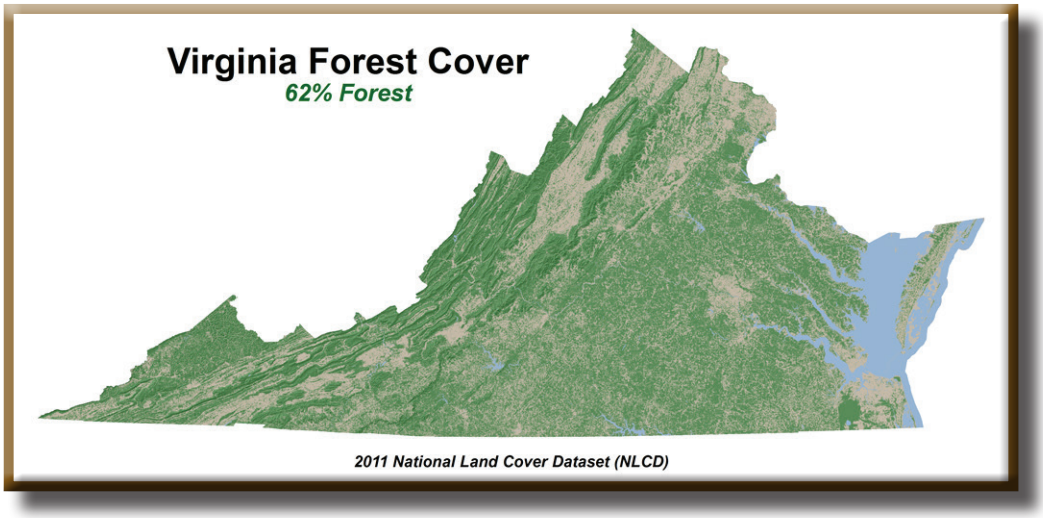



**Figure 1 Virginia Forest Cover**

## Forest Ownership

Most of Virginia's forestland is privately owned (more than 13 million acres), ranging from a few acres to thousands of acres in size. Approximately 405,000 individuals and families in Virginia hold a total of 10.6 million acres; 95 percent of these holdings are less than 100 acres in size, but range from a few acres to thousands of acres.

By 2015, ownership of forestland by forest products firms had declined to slightly more than 1 percent (175,700 acres) of the total forestland area. This is a reduction from seven percent in 2001 and down from 11 percent in 1992.

The balance of Virginia's forestlands (18 percent) is owned by federal, state and local governments – the largest entity being the USDA Forest Service National Forest System lands at 1.7 million acres (Figure 2).

The Virginia Department of Forestry – through its 24 state forests – holds 68,858 acres of forestland.

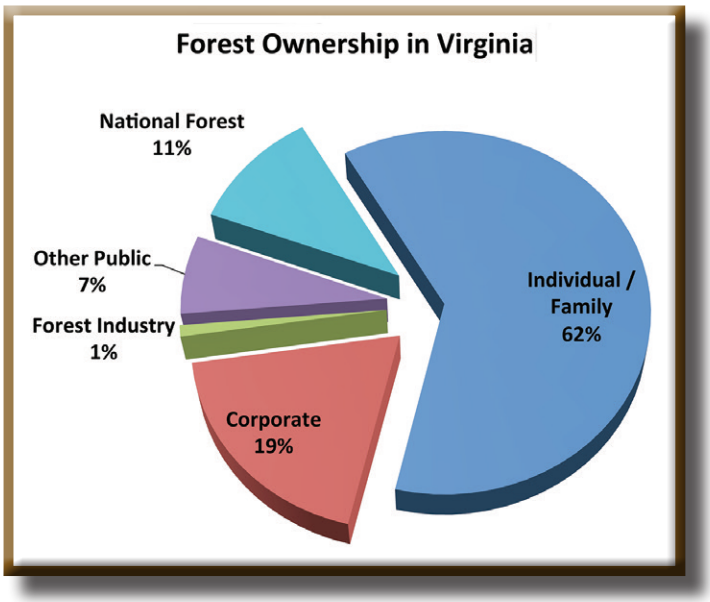



**Figure 2 Forest Ownership in Virginia, 2015**

## Forest Types

In terms of composition, the forests of Virginia continue to display good diversity. Hardwood and hardwood-pine forest types make up more than 12.7 million acres of the Commonwealth's forest – more than 79 percent. The area of hardwood forest types has increased steadily since the first forest inventory in 1940, when 8.1 million acres existed. The hardwood forests of Virginia are maturing, with more than half the hardwood acreage in stands 60 years old or older.

Pine forests represent approximately 3.2 million acres (21 percent) of Virginia's forestland. This is a decline from the 6.2 million acres of pine found during the 1940 inventory. Pine plantations now constitute more than 65 percent of the pine acreage (Figure 3).

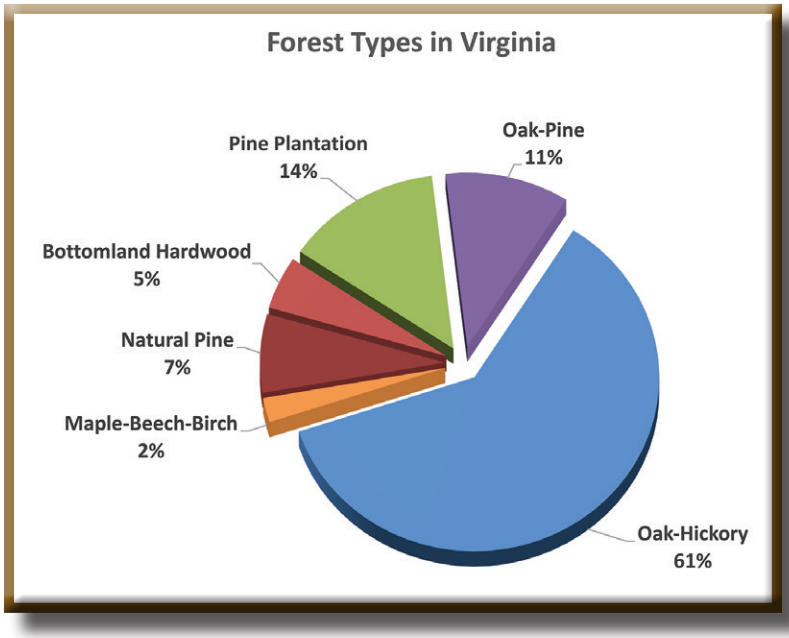



**Figure 3 Forest Types in Virginia, 2015**

## Forest Sustainability

For 2015, the ratio of the forest's annual growth compared to harvest volume (on private and state lands) was more than 2.2:1 for softwood species and 2.4:1 for hardwood species (Figure 4). This amounts to an annual surplus of 9.4 million tons of softwood and 15.5 million tons of hardwood statewide on commercial timberland.

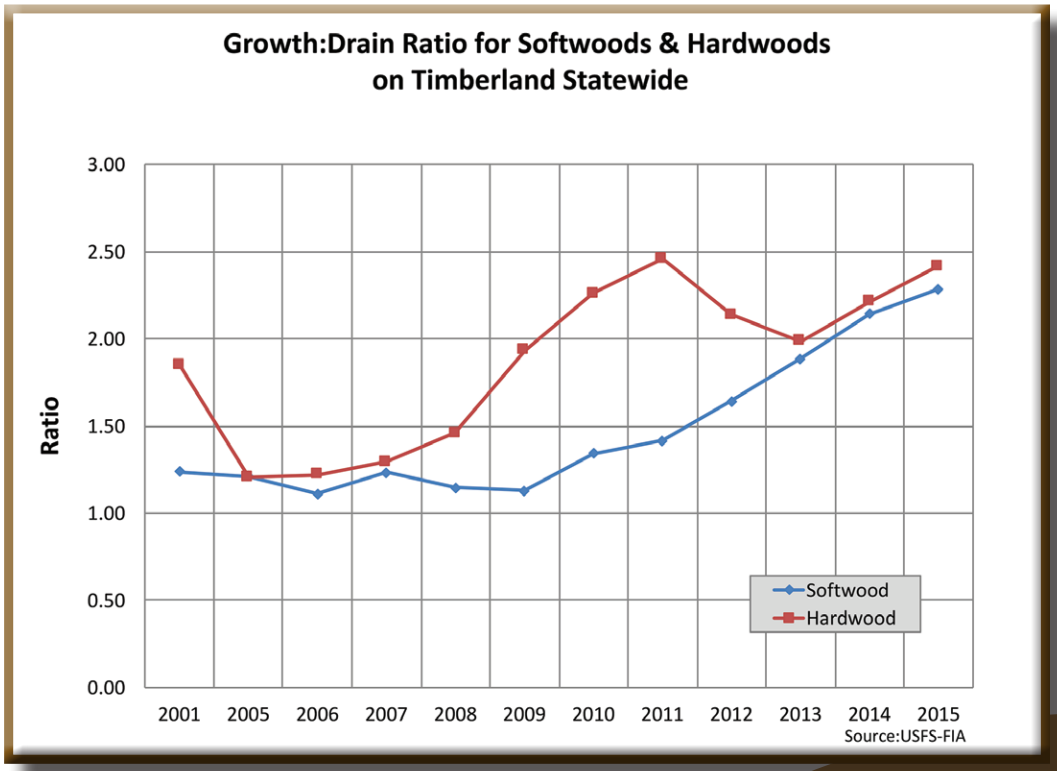
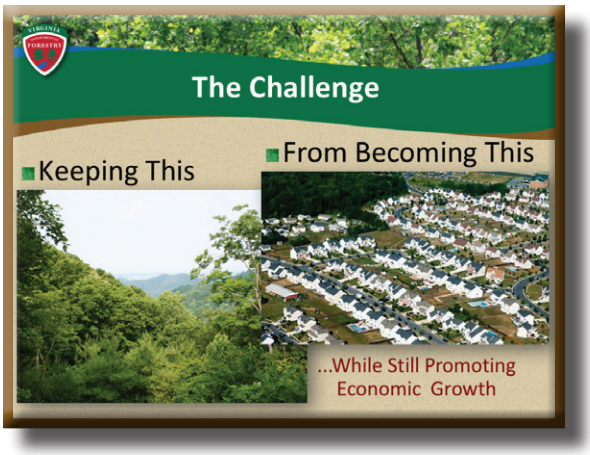



**Figure 4 Growth:Drain Ratio for Softwoods and Hardwoods, 2015**

# Ecosystem Services

## Focusing on the Ecosystem Service Values and Benefits Provided by Forests

Conserving forest cover and improving forest productivity is critical for maintaining functioning forest ecosystems and the Commonwealth's robust forest industry. Virginia's forests provide a range of important benefits including forest products, recreational opportunities, wildlife habitat, aesthetic values and protections for air and water quality. Forests contribute the lowest nutrient and sediment loadings to Virginia's waterways of any type of land cover. In addition, forests are the best land cover for intercepting precipitation required for the recharge of groundwater aquifers. Forests also reduce the loading of various air pollutants, sequester carbon dioxide and produce oxygen. Large-scale forest conversion activities reduce the ability of forests to provide these services. Forests are recognized in both state and federal policies and regulatory guidance as the best land cover for providing this multitude of environmental functions and values. VDOF is committed to finding solutions that keep working forests on Virginia's landscape providing these ecosystem services on a sustainable basis.




## Water Quality

The VDOF has played a key role in getting recognition for existing forest cover into the Chesapeake Bay Phase II and Phase III Watershed Implementation Plans (WIP). Under Virginia's Nutrient Credit Trading Program, tree planting projects on open land are recognized as a best management practice that generates saleable water quality credits to offset point-source pollution loads. The plantings reduce nitrogen, phosphorus and sediment loading and, therefore, enhance water quality.

For the past two years, VDOF has led a landscape-scale, Virginia and Pennsylvania partnership focused on, first, quantifying the value of retaining forestland for meeting water quality objectives. Secondly, Virginia engaged in more than 60 discussion and discovery sessions in the field to determine what is needed from the perspective of local leaders to prioritize forestland retention as a land-use planning option to meet Chesapeake Bay Watershed goals.

The project sponsors in Virginia were VDOF and the Rappahannock River Basin Commission. Virginia project partners were: the Virginia Department of Environmental Quality; the George Washington Regional Commission; the Water Resources Center at Virginia Tech; the Virginia Tech Land Use Education Program; the Chesapeake Bay Commission, and The Nature Conservancy. Project grant funding came from the Chesapeake Bay Program Healthy Watersheds Goal Implementation Team through the Chesapeake Bay Trust, the US Endowment for Forests and Communities and the Virginia Environmental Endowment.

# Ecosystem Services,

*continued*

Virginia successfully quantified that the value of retaining more forestland to meet Chesapeake Bay TMDL requirements could offset TMDL management investments and, thereby, save up to $125 million in the pilot study area alone, and had its methodology peer reviewed and validated by Pennsylvania. Such savings extrapolated across all the jurisdictions within the Chesapeake Bay Watershed could, therefore, be enormous. Secondly, it produced through extensive discussions with localities and numerous other stakeholder groups a "toolbox" of policy and other incentives that can be used to stimulate forestland retention in land-use planning decision making. Lastly, it identified and focused discussions on some of the key challenges that thwart enhanced forestland retention planning so possible solutions can be explored. The final report on the project's findings and recommendations was submitted June 30, 2017 to the federal, Virginia and Pennsylvania governments and numerous other parties. Follow-on efforts are now underway to act on the project's recommendations.

## Air Quality

Forest growth in Virginia sequesters (or captures) and stores about 23.5 million metric tons of carbon dioxide emissions annually. The growth of Virginia's forests offsets about 14 percent of the total annual carbon dioxide emissions in the Commonwealth. However, each year, approximately 1 million metric tons of carbon dioxide are still emitted into the atmosphere due to land-use changes.

## Mitigating Forest Conversion Impacts

Forest fragmentation is of particular concern to VDOF. Non-fragmented, large patches of forest contribute greater ecological benefits than the same total area of forest distributed among smaller patches. Larger forested patches exhibit increased resource availability to support a greater richness (i.e. number) of plant and animal species populations of greater genetic diversity than those in smaller patches. When forest cover is fragmented, biodiversity and habitat value for forest interior species diminishes. Large patches also insulate species from "edge effects" that adversely affect their ability to survive and reproduce. Further, fragmentation impacts the forest's ability to prevent erosion; retain soil; harbor pollinators that are important for agricultural lands; remove carbon from the air and store it within trees; slow and absorb runoff so groundwater is recharged; absorb solar energy keeping local areas cooler, and provide protection from storm and flood damage. For these reasons, VDOF has been partnering with the Commonwealth's other natural resource agencies to look beyond the direct footprint of infrastructure projects in an effort to measure the indirect impacts of forest fragmentation. VDOF was instrumental in creating the Virginia Forest Conservation Partnership (VFCP). This partnership was forged to better leverage agency and organization missions; forest conservation and forest mitigation initiatives, and available conservation financing. The group most recently provided analysis to state executive offices on the potential impact on Virginia's forest resources of the construction of multiple propose projects to assist in refining potential mitigation options.

VDOF also supports the Virginia Department of Environmental Quality (VDEQ) as a participating state agency in the VDEQ environmental impact review (EIR) process of infrastructure projects coming before the state for permits. VDOF performs the same function for the Virginia Department of Transportation (VDOT) with regard to road projects. VDOF's responsibility in evaluating proposed projects is to identify the forest resources that may be impacted; provide assessments, and provide recommendations and comments pertaining to forest health, conservation, management and mitigation needs aimed at conserving Virginia's forest resources in keeping with state executive policy and/or as part of the federal consistency determination/certification process.

## Management Tools

How we manage our forests and the ecosystem services they provide and plan for the development of Virginia's landscape to maximize these values has and will continue to be a priority for the Department. VDOF worked with Virginia Tech and other state agencies to developed InFOREST, a web-based tool that enhances our ability to include ecosystem service considerations in land-use planning efforts. InFOREST can be used to quantify ecosystem services, such as carbon sequestration, biodiversity, air quality and water quality provided by forestland.

# Forestland Conservation

The VDOF Forestland Conservation Program focuses on keeping family woodlands intact, in forest and, where desired, in family ownership. The three pillars of the program are conservation easements, intergenerational land transfer outreach and the Century Forest Program. FY 2017 proved to be highly successful in all three areas.

## Conservation Easements

The VDOF Conservation Easement Program enables forest landowners to make certain their lands are available for forest management in perpetuity, with a focus on forests that provide the greatest range of natural functions and values. Because larger blocks of working forest provide the greatest range of benefits, VDOF conservation easements emphasize keeping the forest land base intact and undivided, enabling landowners to manage their forestland for timber products and environmental values. In FY2017, the VDOF permanently protected 6,371 acres of open space and more than 34 miles of water courses through 23 conservation easements and another 33 acres in one amendment.

The agency now holds 154 easements in 52 counties and the City of Suffolk, covering nearly 43,000 acres. VDOF easements continue to reflect the goal of conserving large blocks of forestland – perpetually preserving the sustainable flow of products, functions and values from our woodlands and serving as the backbone for a $21.5 billion economic engine. In addition to protecting nearly 38,000 acres of the working forest land base and drinking water sources for millions of Virginians, collectively they also help maintain viewsheds from state-designated scenic rivers, thoroughfares and rural communities; preserve habitat for rare species and natural communities, and are directly adjacent and provide effective buffers to federal and state public lands and other conserved lands.

## Generation NEXT

There continues to be a demonstrated need for efforts that address the intergenerational transfer of family forestland as 405,000 family forest landowners control 10.6 million acres of Virginia's forestland. About 7 million acres are owned by somebody aged 55 years or older – a figure that indicates the largest intergenerational land transfer in Virginia's history is underway and will continue for decades to come. It is important to address this issue, as the literature demonstrates a very strong correlation between the parcelization and fragmentation of family forestland and intergenerational transfer.

VDOF and Virginia Cooperative Extension (VCE) continued to offer the award-winning short course "Focusing on Land Transfer to Generation NEXT," hosting workshops in Orange and South Boston. The program uses a public-private-NGO collaboration of legal, financial and conservation professionals to focus on issues related to the transfer of forestland and its management from one generation to the next, thus providing family woodland owners information on the tools needed to keep their forestlands intact and in family ownership.

The two most recent workshops were attended by 29 families who hold approximately 15,000 acres of farm and forestland. Since 2009, a total of eight workshops have been held; 235 individuals representing 163 families have completed the course. Following participation, landowners indicated the program would increase the likelihood of their property staying intact (83 percent), in forest (80 percent) and in the family (79 percent). Follow-up surveys reveal that in the six months following the short-course, 80 percent of families have begun succession planning. As these families continue executing their plans, more than 74,000 acres of land are expected to remain intact and family-owned.

To continue building more awareness of the topic, VDOF, VCE and Julie King, Esq., (recipient of the 2016 State Forester's Crown Award) developed and hosted a Continuing Legal Education (CLE) -certified course on Farm and Forestland Transition for Estate Planning Attorneys. The program was very well-received by the legal community, as a total of 138 attorneys from across Virginia participated in the course. Nearly the entire winter 2017 issue of Virginia Forests magazine was dedicated to the topic of intergenerational forestland transfer. A readily identifiable logo, newly created for the program, was unveiled in the magazine. To protect the identity of the program and logo, we are in the process of registering the mark with the United States Patent and Trademark Office. Finally, three "You-Tube"-style videos were completed using the services of a professional

videographer to supplement outreach efforts. The three videos present the topic from the landowner's perspective, attorney's perspective and tax adviser's perspective, respectively, and are available on the VDOF Forestry, VCE and VA Tech Natural Resources channels.

## Century Forests

On July 1, 2016, Virginia launched the nation's first and only Century Forest program. The program honors and recognizes those Virginia landowners whose families have owned working forestlands for more than 100 years, acknowledging their long-term commitment to enhancing the environment and protecting the quality of life for their fellow Virginians through forestry. That this commitment continues will not only determine what Virginia's forests look like today, but will play a critical role in defining their future.

Thirty-four families holding 13,487 acres from across the Commonwealth were recognized during the program's first year. The properties ranged in size from 42 acres to 2,600 acres, and covered 29 counties from Westmoreland County in the east to Lee County in the west, and Fauquier County in the north to Pittsylvania County in the south. These families' ownerships ranged from 105 years to 261 years, with a cumulative tenure of more than five millennia. The average tenure of Century Forest landowners is 159 years – an ownership that spans more than six generations.

The Century Forest designation taps into the deep connection that family forest landowners have with their land. These families have attained a significant milestone for forest landowners and set the standard for preservation of the Commonwealth's woodland heritage. They recognize their woodland legacy is longer than their tenure, and it is important to them that their forestland, along with the associated family stories and memories, is passed forward intact to future generations.

To qualify for Century Forest designation, the property must have been owned by the same family for at least 100 consecutive years; include at least 20 contiguous acres of managed forest; be lived on or managed by a descendant of the original owners, and have a history of timber harvests or forest management activities.

## VDOF Crown Award

Congratulations to attorney Julie King (left) for receiving the 2016 Crown Award, presented by State Forester Bettina Ring. The Crown Award is the highest honor bestowed by the State Forester of Virginia and recognizes individuals, companies and organizations that have demonstrated the highest ideals in the field of forestry and/or provided extraordinary support to the Virginia Department of Forestry.

Among her many contributions, Julie has been instrumental in the Generation Next program and is passionate about helping landowners plan for estate retention, not estate division and distribution. She has had a direct hand in 52,000 acres of forestland remaining intact and in family ownership for another generation.

# Our State Forests

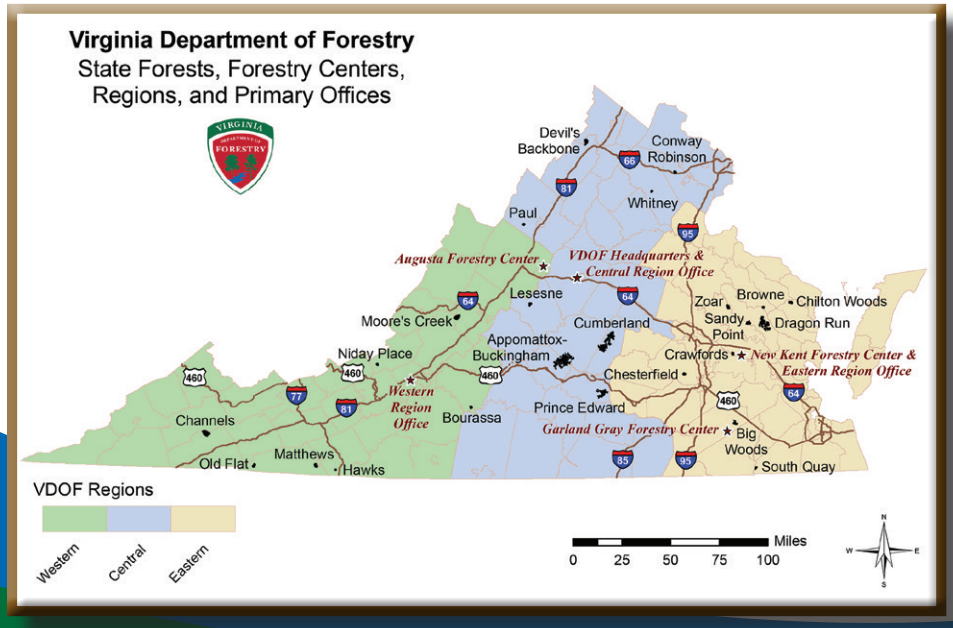
Virginia's 24 state forests, totaling 68,858 acres, are unique in their purpose, funding and use by the public. State forestlands have multiple objectives and are managed to provide the greatest range of benefits to the citizens of Virginia while remaining self-supporting and protecting or improving the forest ecosystem.

The purpose of management is for the demonstration of scientific forest management, applied forest research, development of diverse wildlife habitat, watershed protection, forest management to develop diverse timber stands that support biological diversity and to provide for passive outdoor recreation.

The state forests are well distributed around the Commonwealth and vary in size from 121 acres to 19,808 acres. The large state forests in central Virginia and southeastern Virginia are the core of the working-forest concept and provide the majority of the income to fund the forest system.

Recreational opportunities on these lands are focused on self-directed activities that are not available on many other state lands. These activities include hiking, bike riding, horseback riding, orienteering, hunting, fishing and wildlife viewing. The central Virginia state forests provide for a unique opportunity to enjoy the out-of-doors due to their large size, which provides for an outdoor experience far removed from many of the distractions found in more densely populated areas. State forest resources are limited, however, and recreational usage must be balanced with good forest management to protect the integrity of the state forest purpose.

As the areas surrounding the state forests continue to grow in population, recreational uses of the land will change along with the expectations from the general public. The department will continue to be conscious of the changing expectations of the public and work towards providing recreational opportunities compatible with state forest timber management objectives while providing a rewarding outdoor recreation experience for the public. A signage program is being expanded within the state forests to help educate the public about silvicultural operations that are required to maintain a healthy forest.




In recent years, forest users have become more diverse as have their expectations of forest accessibility and usage. Traditional uses, such as hunting and fishing, remain popular uses of the forest, while new interests, such as hiking, horseback riding, mountain biking, adventure races, orienteering, bird watching and as a place where people come just for the solitude, are becoming popular uses.

State Forests are also increasingly used for educational efforts associated not only with landowner education but for youth education programs; soil and water conservation district programs; demonstrations and continuing education credits for loggers; ecotourism; outdoor laboratories by various college disciplines, and several Extension programs.

To address the increasing use of State Forests for such activities, VDOF embarked on the establishment of a forest conservation and education center located at the Matthews State Forest in Grayson County. Construction on this facility is being primarily funded through a trust established by the late Judge Jack and Clare Matthews. Through partnerships, a 22-mile hiking trail with additional parking was created on the Channels State Forest in Washington County to help with education and ecotourism in that area.

# Forest Management

Virginia is blessed with 16 million acres of forestland that provide many benefits to its citizens. These forests provide great potential that can be more fully realized through active management. Working with private landowners to achieve their forest management goals is one of the key missions of the Virginia Department of Forestry.

"It all starts with a plan." That is a statement that VDOF often shares with forest landowners. Forests, by their very nature, grow and develop over longer periods of time. Actions taken (or not taken) in the near term will affect the forest for many years to come, so careful planning is important. VDOF field staffers are attuned to this and communicate this to forest landowners, whether they have just acquired the land or have been life-long owners. Forest management plans can take a number of forms or shapes, but they have the common elements of a statement of objectives, description of the forest, a map and recommendations for active management. As much as possible, VDOF foresters encourage landowners to develop a long-term, comprehensive plan for all of the forests on a tract of land – a blueprint for "building" and managing the forests on that property. In preparing these plans, foresters consider not only the trees on the property but all of the natural resources from soils to water, wildlife habitat to outdoor recreation, history to rare species.

Several programs provide a framework for these plans: the Forest Stewardship Program, a cooperative effort between VDOF and the U. S. Forest Service; the American Tree Farm System, a recognition and forest certification program, and the USDA Natural Resources Conservation Service's Environmental Quality Incentive Program. Plans are prepared not only by VDOF foresters but by private consulting foresters and certified Tree Farm Inspectors. In addition to comprehensive plans, foresters may prepare plans for portions of properties or smaller areas; briefer plans to meet requirements for forest use-value taxation in some counties, or plans for implementing specific practices. In total for 2016-17, nearly 3,600 plans were prepared on nearly 164,500 acres.

The purpose of planning is to lead to active management of forests to meet landowner and resource objectives. Plan recommendations result in action, which leads to healthier, vigorous and more valuable forests and resources. Some examples are harvesting, preparing and replanting harvested lands; managing competing plants, including invasive species; thinning, selecting and releasing crop trees, and prescribed burning. Implementation of these practices is a collaborative effort among loggers, contractors, consulting foresters, landowners and VDOF. While driving nearly any road in Virginia, one can see current activity and forests that have resulted from past active management. Statewide, there were 3,382 recorded forest management practices completed on 123,024 acres.

An important subset of active management practices is tree planting. Virginia's forests have a remarkable ability to regenerate themselves through natural processes of casting seeds, and, for hardwood trees, through re-sprouting from the base. However, the forestry community has developed over the past 50 or so years the science and practice of renewing pine forests by planting. There have been significant advancements in improved genetics, nursery production practices, site preparation tools, selective herbicides and tree-planting improvements. Additionally, techniques for planting hardwood trees have advanced and continue to develop. Many hardwood plantings occur in areas where trees do not exist (open land) and, in many cases, to establish new forests near streams to help protect water quality. In 2017, VDOF recorded tree planting on 48,860 acres – that's more than 76 square miles. Additional acres were planted by cooperators.

Reforestation practices require an investment of financial resources by the landowner for land preparation, tree seedlings and tree planting. These costs must be carried for a number of years before any revenue is realized. When these trees are eventually harvested, they will provide benefit not only to the landowner but add to the greater good of the Commonwealth through employment of loggers, truckers, mill workers and through manufacturing, marketing and sales of forest products. Back in 1970, the forestry community and state officials were concerned about overharvesting of pine and came together to establish the Reforestation of Timberlands (RT) Program. Funded by the Forest Products Tax and general funds, the community recognized a need to provide incentive to landowners to replant lands. The RT Program has been very successful, with more than 48,000 projects on 1.8 million acres treated since the inception of the program. Due to an active harvesting cycle,

strong funding from the Forest Products Tax and the General Fund, 2016-17 was a successful year for the RT Program. The Program assisted with 1,178 projects on 49,888 acres.

Two specific areas of forest management activity in the past year are noteworthy:

1. Prescribed burning and longleaf pine in southeast Virginia: Prescribed burning is a useful tool for a variety of reasons in forest management – to prepare sites for replanting; to manage competing vegetation; to reduce loading of fuels, and to promote wildlife species that like more open conditions. Southern yellow pines, particularly longleaf (and shortleaf) pine, are well-adapted to fire. Longleaf pine once covered an estimated 1.5 million acres in southeast Virginia but, over time, had been reduced to only a few hundred trees. Significant efforts have been made in recent years to both restore longleaf pine and to increase the capacity and use of prescribed burning. These efforts are bearing fruit with 759 acres of longleaf pine planted in the past year and 4,285 acres of prescribed burning in the Southeast Virginia focal area. This has truly been a multi-faceted effort among landowners, contractors, agencies and organizations involved.
2. Invasive species management: Non-native invasive species pose a significant threat to forests. Often aggressive, they compete and affect more desirable native trees and plants. VDOF is involved in several efforts to address this concern. Starting in 2015, VDOF, with funding support from the U. S. Forest Service, began a pilot program to financially assist landowners in combating invasive species. The pilot area, in the northern Blue Ridge Mountains, has assisted landowners in the treatment of 835 acres to date. An allied effort, organized by the Blue Ridge Partnership for Invasive Species Management (PRISM), is organizing interested landowners in northwest Virginia and was instrumental in securing dedicated funding through the Natural Resources Conservation Service's Regional Conservation Partnership Program. Through this effort, invasive species treatment is planned on more than 100 properties and 3,000 acres.

## Biological Control of Emerald Ash Borer

The Emerald Ash Borer has infested ash trees in 50 Virginia counties putting more than 187 million ash trees at risk in Virginia. Biological control is a management strategy that involves importing and releasing natural enemies from the pest's native range in Asia to control the pest in the area of introduction. In the United States, biological control permits are issued by USDA APHIS (Animal and Plant Health Inspection Service) after extensive research is conducted on potential biocontrol agents, including biology, range and possible non-target effects. APHIS collaborates with federal, state and local governments, as well as landowners and other citizens, to mass-rear and ship EAB biocontrol agents to approved sites.

The Virginia Department of Forestry is testing the use of parasitoids within the confines of several State Forests. The parasitoids are tiny wasps that lay eggs in EAB eggs or larvae, effectively killing the EAB host. These wasps do not harm humans in any way, but will, hopefully, have an effect of the EAB population. The use of biocontrol agents in suppressing EAB has shown promising results, but it will take many years of controlled releases and research before we know the full effectiveness of the program.

# Nurseries

In 2017, the Virginia Department of Forestry's nursery operation celebrated its 100th anniversary and also reached a milestone of 2 Billion seedlings produced over the last 100 years. First Lady Dorothy McAuliffe and Secretary of Agriculture and Forestry Basil Gooden assisted with harvesting the landmark seedling during an anniversary celebration.

The first VDOF nursery was located at Lambeth field in Charlottesville and later moved to where the University of Virginia's Scott Stadium stands today. Subsequent nursery locations included the Navy's Camp Peary and the New Kent Forestry Center in Providence Forge.

Today, VDOF operates two nurseries to produce softwood and hardwood seedlings for reforestation needs in Virginia. The Garland Gray Forestry Center (GGFC) is located in Sussex County and produces more than 30 million bare-root loblolly pine seedlings annually. The Augusta Forestry Center (AFC) is located in Crimora on the western side of the Shenandoah National Park and produces 2 million bare- root hardwood and conifer species annually. The nurseries are self-supporting – meaning they receive no tax dollars – and their operating funds are generated from the sale of tree seedlings. Additionally, the nursery program funds the agency's seed orchard and research budgets.

The NCSU Tree Improvement Cooperative compiles data on each member's pine progeny test measurements and ranks the pine families according to their productivity (P), rust resistance (R) and straightness (S) to determine a PRS value. As a member of the Cooperative, VDOF's loblolly pine seedlings produced at the GGFC have PRS values for each of its seedling offerings. They are categorized in four "family" lots based upon their PRS values. These families out-perform unimproved loblolly stocking by 50 percent to 90 percent when managed properly. This increased productivity helps to keep Virginia's forests sustainable and producing more fiber each year for our forest product needs. The economic value of planting VDOF seedlings is well documented and is promoted to landowners and contactors to educate them on the benefits of our Virginia seedlings.

The nursery is undertaking a significant new project to start producing containerized longleaf pine seedlings at GGFC. This $400,000 project will produce up to 500,000 longleaf seedlings annually to help restore this diminished species to the landscape of Virginia. The operation will have additional capacity to grow grass species, which complement the longleaf ecosystem, as well as containerized loblolly pine seedlings to meet specific needs of some customers. The first phase of the project has been completed with the installation of a pivot irrigation system, and plans are in place for subsequent phases to be completed to sow the first crop of containerized seedlings in the spring of 2018.

Demand for loblolly pine seedlings has risen slightly over the last few years, and GGFC has made modest increases in its production to meet customer needs. Hardwood seedling demand has declined since 10 years ago as fewer acres of coal mining reclamation lands are being planted. AFC has adjusted to customer preferences and offers a variety of specialty seedling packages, such as those for quail habitat, riparian buffers and wildlife food plots. For the 2017-18 season, a pollinator seedling pack has been added for customers interested in planting species beneficial to pollinators.

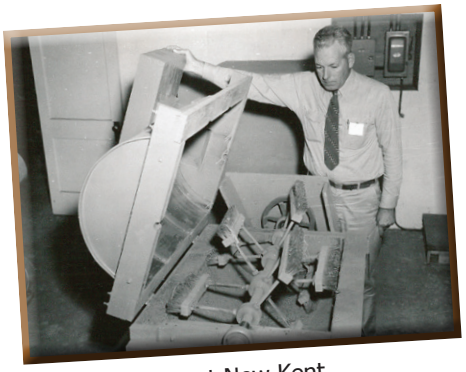
The VDOF nurseries will continue to improve on seedling productivity and species offerings to meet the needs of Virginia landowners.

Lifting seedlings in the early days (1955).

Lifting seedlings today.

# Nurseries,

*continued*

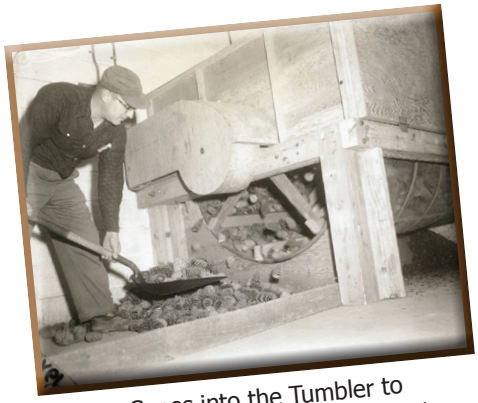


Seed Dewinger at New Kent Nursery, Sept. 1955

Preparing the Seedbeds at the Charlottesville Nursery, 1953

Seedbed Shaper, circa 1948

Cone Drying at New Kent Nursery, Oct. 1955



Feeding Cones into the Tumbler to Extract Seed at New Kent Nursery, Nov. 1955

Camp Collected 800 lbs. of Poplar Seed at Clintwood in Dickenson County, Nov. 1939

Charlottesville Nursery Cone Building used for Drying Pine Cones and Extracting Seed, circa 1952

Sowing Seed at New Kent Nursery, 1960

Charlottesville Nursery, Dec. 1956

# Nurseries,

*continued*

Grading Trees at New Kent Nursery, Nov. 1955

Weeding the Seedbeds at New Kent Nursery, Aug. 1956

Cones Piled on the Grounds, May 1959

Root Pruning Seedlings

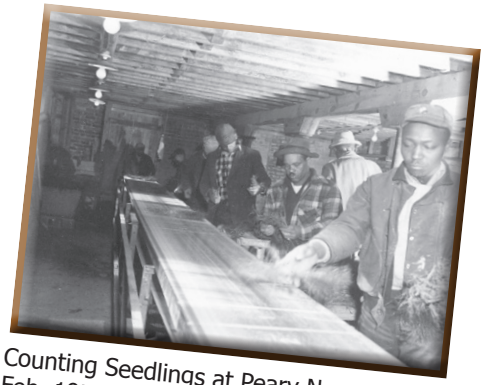
Lifting Loblolly Pine at New Kent Nursery, Nov. 1955

Tulip Poplar and Walnut Seedbeds at the Charlottesville Nursery, 1938

Packing Room at New Kent Nursery, Dec. 1958

Bundling Seedlings with Special Bundling Tape at New Kent Nursery, Feb. 1957

Sprinkler System in Operation at New Kent Nursery, 1960



Counting Seedlings at Peary Nursery, Feb. 1951

# Forest Protection from Wildfire

## Fire

The Virginia Department of Forestry responds to nearly 900 wildland fires that burn a total of approximately 12,000 acres annually (based on a 10-year average, 2007 – 2016).

Although 74 homes and other structures are damaged or destroyed by wildland fire each year, on average, agency efforts protect more than 1,300 others at a value of more than $140 Million.

From July 1, 2016 through June 30, 2017:

- 693 fires burned a total of 23,081 acres;
- timber worth nearly $13.6 million was damaged;
- damage to homes and other buildings amounted to more than $726,000, and
- 916 homes, worth more than $112.3 million, along with an additional 794 other structures, worth an estimated $38.1 million, were protected thanks to VDOF efforts.

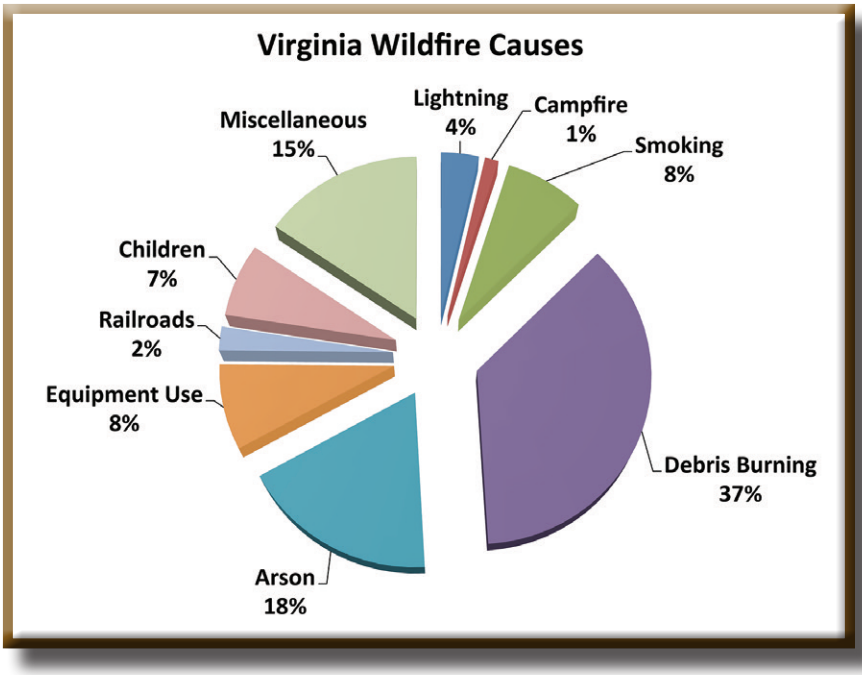



**Figure 7 Virginia Wildfire Causes**

The Agency relies on highly-trained and experienced personnel operating a fleet of 160 4x4 engines; 12 specially equipped wildland brush trucks, and 89 bulldozer/wildland fire plow suppression units for quick response to any reported wildland fire or other weather-related emergency. The assistance of Virginia's 768 fire departments and close working relationships with federal land management agencies and other public and private landholders in the Commonwealth ensure that wildland fire response in Virginia is both efficient and effective.

Virginia Department of Forestry personnel also volunteer to provide incident management expertise to support other all-risk incidents when the need exists. VDOF responded to incidents in Arizona, California, Colorado, Florida, Georgia, Idaho, Utah, Washington and Wyoming within the last 12 months. The practical experience gained during these events develops agency employees with a broad base of expertise to handle any emergency in Virginia.

## Law Enforcement

Virginia Department of Forestry personnel are unique in that they are the only responder group in the Commonwealth who are both firefighters and law enforcement personnel. Agency law enforcement duties are focused on the enforcement of forestry and fire-related laws, wildfire arson investigations and fire suppression cost collections throughout the Commonwealth. In Fiscal Year 2017, agency officers issued 127 summons/warrants and handled 509 court actions.

## Training Program

The Virginia Department of Forestry is a recognized national leader in its delivery of wildfire suppression, incident management and personnel development training for emergency responders. In June of this year, the VDOF held its 17th annual statewide Interagency Wildfire Academy, which is one of the four largest in the nation. During the 2017 fiscal year, the VDOF provided training to 982 firefighter students representing more than 10,000 hours of total training. Agency training events hosted responders from various state and federal agencies across

the Commonwealth, responders from 10 surrounding states and representatives of more than 148 Virginia volunteer fire departments.

## Dry Hydrant Program

The Virginia Dry Hydrant Grant Program is funded by the General Assembly using money from the Virginia Fire Programs Fund and administered by the VDOF. The objectives of the program are to:

- Conserve energy by reducing losses from fire;
- Conserve energy by reducing miles traveled to shuttle water;
- Fund the installation of dry hydrants that otherwise would not be installed, and
- Conserve processed domestic water supplies in urban and urbanizing areas.

Those organizations eligible to apply for dry hydrant grants include the fire departments listed with the Department of Fire Programs. A total of 26 new dry hydrants were installed through the program last year, in addition to making repairs to 12 others that were already in the program. The Virginia Dry Hydrant program has now installed a total of 1,737 dry hydrants throughout the Commonwealth.

## Volunteer Fire Assistance Program (VFA)

The Volunteer Fire Assistance Program continues to increase the fire protection capability in Virginia. This is accomplished through financial assistance to rural volunteer fire companies to provide additional training and the acquisition of small equipment and wildland personal protective equipment (PPE). Since the 1975 inception of this program, 5,724 grants have been made providing a total of $4,206,188 in matching grant funds.

The VDOF program is part of a grant that improves the capability and effectiveness of America's 26,000 rural volunteer fire departments – 580 of them in Virginia – to protect lives and other rural investments. The purpose of this program is to provide financial, technical and other assistance to State Foresters and other appropriate officials to organize, train and equip fire departments in rural communities. In 2017, 169 rural volunteer fire departments in the Commonwealth received $221,739 in Volunteer Fire Assistance funds made available to Virginia. Requests for support continue to greatly exceed the available funding as last year's requests for assistance requests totaled $1,200,000.

## Wildfire Prevention

In Virginia, 96 percent of wildfires are human-caused – the most prevalent cause being debris burning. This makes fire prevention efforts in Virginia critical to the VDOF forest protection program. One such effort focuses on a national prevention program effort called "FireWise."

## FireWise

Firefighters in the wildland/urban interface (any area where wildland fuels threaten to ignite combustible homes and structures) must overcome severe challenges. There just aren't enough resources to protect every home threatened by wildfire. Everyone in the vicinity of such a fire is at risk, and the risk is greatly increased in areas that aren't prepared. The main goal of FireWise is to educate homeowners in the wildland/urban interface on how to design, construct, landscape and maintain their homes and property to avoid destruction during a wildfire.

Virginia has an expanding wildland/urban interface and a significant wildfire problem. The VDOF has been a leader nationally in the promotion and expansion of the FireWise Program. Virginia has 67 nationally recognized FireWise USA communities, making Virginia one of the top 10 states nationally in terms of communities recognized under the program. There is little doubt that the problem of high-risk homes in a woodland environment is expanding, and the VDOF is aggressively working to reduce the total threat to Virginia's communities.

To learn more, visit www.firewisevirginia.org.

# Water Quality Protection

Water quality is important to all Virginians. Studies have shown that the cleanest water comes from forested watersheds. These watersheds are critical sources of pure drinking water; habitat for important fisheries, and areas that are treasured for their recreational value and purity of life. This is especially important when considering the Total Maximum Daily Load (TMDL) and Watershed Implementation Plan (WIP) that has been developed for the Chesapeake Bay. Two of the Department's important measures involve water quality. One focuses on Best Management Practices on forest harvesting operations and protecting streams from sediment. The other focuses on improving and protecting watersheds through management and land conservation.

The Virginia Department of Forestry has been involved with the protection of our forested watersheds since the early 1970s with the development of our first set of Forestry Best Management Practices (BMPs) for Water Quality. The Department utilizes the fifth edition of those guidelines, which came out in 2011. The backbone for the Department's water quality effort is the harvest inspection program, which began in the mid-'80s. This program has provided for one-on-one contact between VDOF and the harvest operators and is a welcomed opportunity to educate the operators on BMPs and the latest in water quality protection techniques. In fiscal year 2017, VDOF field personnel inspected 5,010 timber harvest sites consisting of a total of 22,143 site visits (an average of 4.4 visits per site) across Virginia on 220,104.9 acres – a marginally slight decrease in the number of acres harvested over FY2016.

Another main focus of the VDOF water quality program is logger education. Since the development of the first BMP Manual for Virginia, the VDOF has been involved in the training of harvesting contractors in water quality protection techniques ranging from harvest planning, map reading and the use of GPS units to BMP implementation. This occurred through training that the agency sponsored and, more recently, through VDOF participation in the SFI® SHARP (Sustainable Harvesting and Resource Professional) Logger Training Program. Since 1997, this program has enabled VDOF to assist in training 8,666 harvesting professionals in 284 programs relating to water quality protection. For fiscal year 2017, there were 16 training programs offered with a total of 430 people present. Six of these courses were in the core area (152 attendees), and the remaining 10 courses were for logger continuing education (278 attendees). VDOF has also been involved in several wetland initiatives this past year related to bottomland hardwood sustainability and the wood pellet industry. These will be on-going for the next several years.

In July 1993, the General Assembly of Virginia – with the support of the forest industry – enacted the Virginia Silvicultural Water Quality Law, §10-1-1181.1 through §10.1-1181.7. The law grants the authority to the State Forester to assess civil penalties to those owners and operators who fail to protect water quality on their forestry operations.

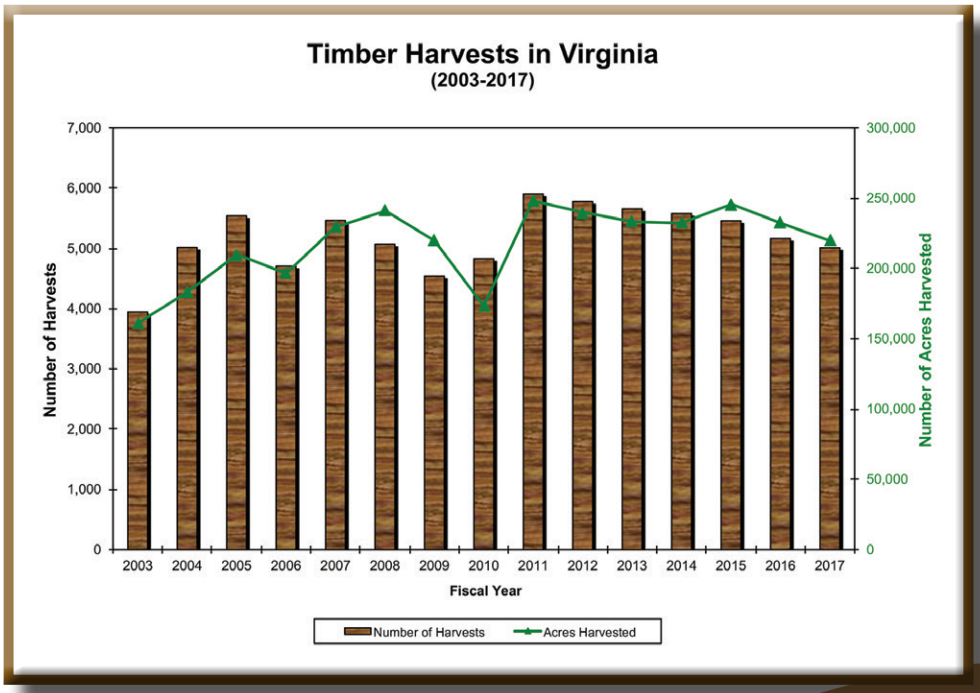



**Figure 8 Timber Harvests in Virginia**

# Water Quality Protection,

*continued*

Virginia continues to be the only state in the southeastern United States that grants enforcement authority under such a law to the state's forestry agency. In fiscal year 2017, the VDOF was involved with 186 water quality actions initiated under the Silvicultural Law. This is a decrease of 29 percent from FY2016. Of these actions, one resulted in a Special Order being issued for violation of the law.

A statewide audit system has been in place since 1993 to track trends in BMP implementation and effectiveness. Results from the calendar year 2016 data show that the BMP harvest median implementation rate on 240 randomly selected tracts is 95.0 percent statewide (the harvest median score is the best judge of central tendency of the tract score). The audit results also showed that 98.32 percent of the sites visited had no active sedimentation present after the close-out of the operation. The information compiled using this audit process will be the basis of reporting for the Watershed Implementation Plan (WIP) that is in response to the TMDL for the Chesapeake Bay. Since the information is captured through GIS technology, this information can be compiled spatially for reporting on those forestry operations that occur within the boundaries of the Bay watershed. For calendar year 2016, the BMP implementation rate harvest median score for forest harvesting within the Bay Watershed was 94.7 percent. This entire BMP Implementation Monitoring effort has been automated over the past several years to be compatible with VDOF's enterprise database system known as IFRIS (Integrated Forest Resource Information System).

VDOF offers cost-share assistance to timber harvest operators through a unique program offered through the utilization of funding from the Commonwealth's Water Quality Improvement Fund. This program shares the cost of the installation of forestry BMPs on timber harvest sites by harvest contractors. This program funded 29 stream protection projects in FY17 that are incorporating the use of portable bridges that will provide stream crossing protection for not just the site that they were funded for but will continue to provide stream protection on other sites for years to come.

## Watershed Protection

Because forests provide the best protection for watersheds, one of the Department's goals is to increase the amount of forestland protected and established in Virginia's watersheds. The focus is on practices that will have a high benefit to water quality, specifically protection of water quality on land that is permanently protected by a conservation easement; establishing and maintaining riparian buffer zones; planting trees on non-forested open land, and increasing urban forest canopy by planting trees. All of these activities are closely related to meeting water quality goals associated with the Chesapeake Bay restoration and watersheds for Virginia's southern rivers. FY17 proved to be one of the most active years in the young history of the VDOF easement program, as the year saw the agency review harvest plans and inspect for BMP compliance on 16 VDOF-held easements.

Virginia's Forestry BMPs that address harvesting have been highly successful. One of the most valuable BMPs for water quality is the uncut or partially cut streamside management zone. This voluntary measure assures an unbroken forest groundcover near the stream; shade for the water, and wildlife corridors. Landowners can elect to receive a state tax credit for a portion of the value of the uncut trees in the buffer. By doing so, they agree to leave the buffer undisturbed for 15 years. The number of landowners electing this option in Tax Year 2016 was 70, a slight increase in number of applications over the previous year. This watershed protection option provided a tax credit of $443,085.38 on timber valued at $2,101,493.85 that was retained in the streamside areas of their property. This was an increase in both value of buffer retained and tax credit issued.

Forests provide superior watershed benefits over nearly every other land use. Because of this, the Department is encouraging planting of open land with trees; establishing new riparian forested buffers where none previously existed, and providing protection of existing riparian forests through a tax credit.

# Forest Health

*Gypsy moth defoliation*

Forest health is an essential part of our livelihood and provides benefits to our economy, human health and wildlife. The VDOF Forest Health Program surveys and monitors for major forest pests, pathogens, non-native invasive plants and other disturbances. A variety of forest health threats were identified in 2017.

Outbreaks of gypsy moth in Virginia have historically been cyclical with years of heavy activity and severe defoliation, followed by years with virtually no noticeable damage. After a recent period of very little gypsy moth activity in Virginia, there was a surge in populations last year in southwest Virginia, particularly in Bland and Giles counties. Defoliation was observed in similar areas in 2017, although less severe. Aerial surveys revealed approximately 11,000 acres with heavy defoliation and approximately 22,000 acres with moderate defoliation. In previous years, populations of gypsy moth have been controlled, in part, by a fungus that kills the larval stage. This fungus proliferates in wet weather, meaning that a spring season with abundant rainfall may lead to decreased gypsy moth populations and less defoliation. If gypsy moth populations in southwest Virginia remain high for another year, tree mortality is likely to increase – especially in mature oaks that may already be stressed. Oak decline, a disease complex associated with an aging cohort of oaks that results from a combination of abiotic and biotic factors, is one of the largest mortality factors for mature hardwoods in Virginia. Declining oaks are common and widespread throughout the state, and increased pressure by defoliators, such as the gypsy moth, only exacerbate the issue.

An unexpected forest pest in 2017 was the variable oakleaf caterpillar. This native insect is consistently present throughout the state in low populations and sometimes experiences population outbreaks. The larvae prefer oak trees, and they caused scattered heavy defoliation throughout eastern and Southside Virginia in 2017. While previously stressed trees may suffer some long-term health impacts from this defoliation event, healthy trees should recover just fine. Natural enemies of the variable oakleaf caterpillar usually cause population booms to crash after one to two years.

The most destructive insect pest of pines in Virginia is a native insect: the southern pine beetle (SPB). However, despite causing millions of dollars' worth of damage throughout the southeast since the 1980s, this insect has been relatively quiet the last 14 years. Only areas near the Eastern Shore of Virginia experienced significant southern pine beetle activity in 2017. Thinning has long been accepted as an effective strategy to reduce a stand's susceptibility to the SPB, and VDOF offers financial assistance to landowners who preform pre-commercial thinning on their pine stands and the loggers who perform first commercial thinning on small tracts of land. Federal funds from the USDA Forest Service, Forest Health Protection, Southern Pine Beetle Prevention Program support our cost-share programs for landowners and loggers. Through this program, we have cost-shared more than 50,000 acres of pre-commercial thinning since the program's inception in 2004.

Exotic pests continue to spread throughout the state. The emerald ash borer (EAB), first discovered in Virginia in 2008, has now been confirmed in more than 50 Virginia counties. This insect is one of the most destructive forest insects to invade Virginia, and it is causing widespread ash mortality across the state. EAB attacks all species of ash and will greatly impact the approximately 187 million ash trees across the Commonwealth. Other invasive pests that continue to negatively affect forest health include the hemlock woolly adelgid, beech bark disease and thousand cankers disease. Monitoring efforts continue for the Asian longhorned beetle and laurel wilt disease, both of which have the potential to cause detrimental effects to Virginia's forest if they become established.

*Emerald ash borer*

# Forest Research

The Applied Forest Research Program has been installing controlled scientific studies across Virginia since 1955 with the goal of providing new information to better protect and improve Virginia's forests. By working closely with a broad array of partners and collaborators, we are able to leverage our modest resources to deliver practical solutions for forest owners across the Commonwealth. Without this spirit of teamwork and technical support, valuable current practices, such as selecting and deploying the best-growing loblolly pine seedlings; customizing forest management to best suit individual sites and objectives; using crop tree release to sustain desirable hardwood regeneration, or restoring longleaf pine using seedlings native to Virginia, might not have been fully developed or implemented here.

There are more than 50 active studies at 82 locations scattered across the Commonwealth, and more than 50,000 individual trees on nearly 700 plots are being periodically monitored for vigor and growth. These efforts can be categorized in five broad subject areas:

## Pine Forests

Information and decision support for the agency's pine resource sustainability strategy is a top priority. New on this year's agenda is an effort to adopt a soil classification developed at Virginia Tech for use in guiding silvicultural choices on a site-specific basis. Several interim or final reports have been issued in this subject area:

- Effects on loblolly pine productivity of controlling competing vegetation before planting compared to two years after planting;
- Potential of mitigating first-year mortality by conducting a second "interplanting" one year after the initial planting;
- Using projected stand growth and discounted cash flow as a decision-making aid for loblolly pine plantations, and
- Alternative planting spatial designs to maximize fiber production and diversify market opportunities for loblolly pine.

## Hardwood Forests

The sustainability of our hardwood resource is also a high priority. We are finalizing a hardwood strategic plan for the agency, and, in support of that effort, the research team has installed a crop tree release demonstration in Halifax County; a regeneration inventory tracking project in Mecklenburg County, and a test of invasive understory control effects on regeneration in Orange County. Our new study plots comparing different harvest systems' effects on future forest composition and the effects of invasive species on hardwood regeneration at Appomattox-Buckingham State Forest are beginning to show results and will be included on a landowner education tour this fall. They demonstrate how the structure of the stand left after harvest (and the resulting level of shade it generates) influences the species composition of the regenerating stand.

## Pine Tree Improvement

We continue to be one of the most active members of the North Carolina State Tree Improvement Program. Two new progeny tests were installed again this year to support ongoing selections of the best pine families to plant in Virginia, bringing the total number of active test sites to 17. By measuring these trees and selecting those with the fastest growth, best form and most disease resistance, we are able to continually ensure that the trees included in our future seed production orchards are the very best for Virginia landowners. We have also planted several locations of demonstration plots comparing the various levels of seedling growth achieved by our improved nursery offerings. With the increasing demand for seedlings and the high concern for future pine productivity / sustainability, ensuring the supply of nursery offerings that grow as much as twice as fast as the average loblolly pine is a critical effort. Studies have shown that every 0.1 percent increase in growth achieved by tree improvement has an impact of approximately $14 million on Virginia's economy.

## Diminished Species Restoration

Our diminished species work was highlighted with two poster presentations at the Biennial Longleaf Conference in Savannah, GA. One described our planting date study (which has led to the recommendation that longleaf be planted in October – December in Virginia), and the other summarized the 10-year data from our provenance test, which proved the value of preserving the native Virginia longleaf genotype. This was followed up with two new reports:

- Comparison of planting months for maximizing survival and early growth of restored longleaf pine, and
- Relative performance of native Virginia longleaf pine compared to other geographic sources from North Carolina to Mississippi.

## Growth and Yield Modeling

Tree measurements were collected for six of our 16 active loblolly pine growth and yield studies. The data from these tests are the foundation for the predictive models we use to project the effects of different site conditions and activities on the future of our pine forests. Compiled by the Forest Modeling Cooperative at Virginia Tech, these tools help us to predict and compare the effects of different operations on the long-term development and value of our forests. These tools are becoming more and more important in helping us to compare different management options for pine forests by projecting their eventual growth and value.

More details and results from all of VDOF's Applied Forest Research Program activities can be found on our website at http://dof.virginia.gov/infopubs/index-research.htm .

## Pine Tree Grafting

Ones Bitoki, tree improvement forester, conducts a workshop for new VDOF employees about pine tree grafting as part of the Agency's research program. The workshop was held in one of the pine tracts at the New Kent Forestry Center.

## Creighton Named Natural Resource Professional of the Year

Jerre Creighton, VDOF research program manager, received the Bill Boyer Natural Resource Professional of the Year Award from the Longleaf Alliance for his outstanding contributions to longleaf pine ecosystem conservation. Jerre is a nationally-recognized technical expert in forest management, research and policy implementation with more than 30 years of experience in his field. He is highly regarded both within and outside the VDOF as a leader in applied forest research. The VDOF research program has been providing outstanding information and service to the citizens of the Commonwealth for more than 50 years, and Jerre monitors and reports findings from more than 50 active research studies in a broad array of subjects pertaining to the health, sustainability and future of Virginia's forestlands.

# Forest Industry and Markets

Virginia's forest industry is continuing to adapt and has seen growth and some declines in both domestic and international economies as various forest markets fluctuate to adjust to different conditions. Some of the best news was the release of the new study "The Economic Impact of Virginia's Agriculture and Forest Industries" that states that Virginia's forest industries now provide a total annual economic impact of more than $21.5 billion and are responsible for almost 108,000 jobs. This is an increase of more than $4 billion and 4,000 new jobs, respectively, since the last study in 2013.

As the economy continues to improve and we see both domestic and international markets for Virginia's forest products grow, we still need to be aware of challenges and issues that impact our forests and forest industries. While some international markets are improving, the strong U.S. dollar and weak economies in other countries continue to change product demands and where they go. Also, low energy prices have had a significant impact on biomass energy and fuel use. On the domestic side, housing (a key indicator of wood demand) is still recovering more slowly than expected; at the same time, changes in demographics and forestland ownership, forestland loss and fragmentation and changing product demands are increasing concerns on forest resource sustainability.

Based on the latest Forest Products Tax data for fiscal year 2016, we show record harvest volumes overall in Virginia. Most of the increase was due to recent addition of mixed chips used mostly for bioenergy and fuel production. Without including mixed chips, there was a general decline in harvest for everything except pine sawtimber. The most significant decline was with hardwood sawtimber, mostly due to reductions in exports to China. Recent increases in Chinese wood imports and weakening of the dollar are improving hardwood exports. One area of concern is lack of markets for chips, especially hardwood chips. A combination of low energy prices, increased chip production capacity and improving sawtimber harvests has led to excess production in various areas. We are working with state agencies and forest-related associations to identify new markets and opportunities for these products.

Since a prosperous and diverse forest industry depends on healthy, sustainable working forests, we continue to work with various partners and forestry related-groups to monitor Virginia's forests, engage with private landowners on forest management and implement programs to maintain their health and growth. Some of these activities include implementing parts of the VDOF Forest Sustainability Initiative; working with the VA Tech Center for Natural Resource Assessment and Decision Support (CeNRADS), continuing FIA work and participating in the Southern Group of State Foresters' (SGSF) Services, Utilization and Marketing (SUM) Committee.

As mentioned earlier, the forest industry in Virginia is slowly continuing to expand with increased interest in some new markets, but there are areas of concern, too. Hardwood lumber and log exports have recovered some over the last year with increased imports from China and expanding sales in Europe, India and Mexico. Low oil prices and a weaker dollar compared to other currencies also help make our products more attractive and affordable overseas. The low fuel prices and mild winters have had the opposite effect on biomass energy and fuels, with many harvesters having difficulty finding markets for chips and in wood residues, especially hardwood. This lack of markets is causing concerns for businesses that are having difficulties selling their products or residues. The recent announcement that Bear Island Paper is closing increased those concerns.

The VDOF continues to work to obtain new resources to identify and promote emerging markets as well as opportunities to enhance the traditional markets that have been the backbone of the industry. Maintaining diverse markets, cutting-edge technology and a trained workforce are necessary for all forest-related businesses to remain prosperous and relevant in today's world. Working with VDACS' International Marketing Division, we are increasing our efforts to promote Virginia's forest industry and products around the world to maximize opportunities to participate with and improve access to international customers. In the

*Mass Timber Conference, Portland, Oregon, 2017*

last year, we have assisted with trade promotions in Mexico, India and Germany, and we helped host trade missions from Great Britain and Central America. We continue our efforts to expand the Virginia Grown Forest Products program to increase demand for local forest products and to try to increase other Virginians' awareness of the important role that forest products have in their lives. We continue to work with counties, companies and agencies to utilize state programs – like the Agriculture and Forestry Industries Development (AFID) Fund – to improve opportunities for new or expanding business. Close cooperation with state and local economic development agencies is also important in our efforts to expand forest industry in Virginia.

Working with various agencies, partners and stakeholders, VDOF continues to seek and leverage resources for programs and activities to ensure that forest landowners and industry continue to have markets for their products now and in the future. As part of our efforts to maintain sustainable working forests, we continue to work with partners to improve landowner access to forest certification programs and certified wood markets. Virginia is also working with regional and national partners to educate other countries on the health and sustainability of our forests through articles, meetings and tours. As demands for documenting the sustainability of forest products increase, it is important that our landowners and industry can provide those assurances.

VDOF continues to work with Center for Natural Capital and other partners on the community wood energy program in Virginia and with the U.S. Forest Service-funded State Wood Energy Team (SWET). The goal of the program is to help local schools, communities and industry reduce energy costs and improve job and economic opportunities by converting to biomass energy systems that use local resources and producers, while developing markets for low-quality and waste wood that can improve forest management and health and waste reduction. Several resources, including the website http://www.woodenergyva.org/, education materials, project ranking and evaluation tools and technical assistance, have been developed.

As part of VDOF efforts to improve forests and identify new market opportunities, work is expanding on developing uses for urban wood and increasing service providers that can deliver management assistance on small forestland acres and forests in more populated areas. With approximately 30 percent of Virginia's forestland now considered to be in small acreage or in urban/suburban areas, care of this growing part of our resource is becoming more critical.

Several workshops and trainings for service providers (including forest operators, municipalities, private and public foresters and arborists) have taken place across the state. Additional activities include developing a Virginia Urban Wood Group in association with Trees Virginia http://treesvirginia.org/outreach/virginia-urban-wood-group; holding a

## *Selling Virginia Forest Products Around the World*

*DelhiWood, New Delhi, India, 2017*

*ZOW, Bad Salzuflen, Germany, 2016*

Mid-Atlantic Urban Wood Forum in Richmond, and developing additional educational materials, workshops and demonstrations for landowners, service providers, municipalities and other stakeholders. We are also developing a Service Providers database for interface and small-scale forest landowners. These efforts should lead to better small woodlot or community forest management, increasing urban wood use and better ability to address impacts of invasive species and natural disasters in these areas.

Another exciting new market is Cross-Laminated Timber (CLT) that is being used in building construction as an alternative to concrete and steel. These large panels can be made from softwoods or hardwoods and offer a great opportunity for additional uses of low-quality lumber. VDOF is working with VA Tech, Southern VA Higher Education Center, state agencies, forest-related associations and others to increase awareness of this opportunity and to bring the manufacturing and use of CLT to Virginia. Efforts are underway to identify and document Virginia's advantages.

VDOF and the Department of Taxation worked with Virginia's forest industry, associations and stakeholders on changes to the Virginia Forest Products Tax to better reflect current timber harvesting and processing activities. The revenue-neutral changes that took effect in July 2015 contained a new category called mixed chips, which was an effort to better account for in-woods chipping and biomass fuels. The new category accounted for more than 1.8 million tons produced and a tax collection of more than $90,000. Overall for fiscal year 2016, the Forest Products Tax collected $2,462,490 of tax for use in protecting and reforesting private forestlands in Virginia. With matching funds from the General Assembly, these funds will provide needed resources in our efforts to maintain healthy, sustainable forests and prosperous forest industries.

To be able to provide the needed assistance on forest markets and other forest benefits that landowners, industry and other stakeholders require, the VDOF maintains or has access to information on forest inventory and values, forest industries, new technologies, technical consultants, service providers, agencies and other organizations and other technical support services. The VDOF Utilization and Marketing Program continues working with partners and other VDOF offices to keep Virginia at the forefront of assisting our forest landowners, industry and other stakeholders in being able to take advantage of both the traditional and emerging market opportunities and other forest values, both domestically and internationally. This is because, to have healthy, sustainable forests, we need healthy, sustainable forest industries and markets.

## *Selling Virginia Forest Products Around the World*

*Interzum, Cologne, Germany, 2017*

*Tecnomueble – International Fair for Industrial Woodworking and Furniture Supply, Guadalajara, Mexico, 2016*

# Urban and Community Forestry

Community forests provide multiple benefits to Virginia's cities and towns. The Urban and Community Forestry (U&CF) Program helps Virginia communities maintain and enhance their community forests and raise citizen awareness as to the many benefits these forests provide: clean air, clean water, storm water management, community revitalization, community health and wellbeing, business district enhancement, aesthetics and the all-important contact with nature.

The Urban and Community Forestry Program works with communities of all sizes, providing project coordination and networking, technical assistance, educational opportunities, professional development, academic program support and grants for specific projects. Technical assistance, such as tree selection and maintenance, riparian planting and restoration, tree/utility issues, urban tree canopy assessment and green infrastructure planning, is provided across the Commonwealth. Educational opportunities include workshops around the state as well professional forums in Northern Virginia and Tidewater. The program also provides scholarship opportunities to statewide, regional and national educational events, such as the Mid-Atlantic Horticulture Short Course, the Municipal Foresters Institute and the Arbor Day Foundation Partner's Conference. VDOF continues to oversee the Tree City USA® program in which 56 communities are certified. There are now six college campuses in the Tree Campus USA® program – including the first certified community college in Virginia – and three utility companies continue to participate in the Tree Line USA® program. Through its Urban and Community Forestry Assistance Program, the Department has supported projects in 127 cities and towns, 57 counties, along with 112 non-profit organizations and multiple educational institutions, Planning District Commissions and Soil and Water Conservation Districts since the program's inception. Funding for the program continues to be modest, supported by funds from the USDA Forest Service, but the program is very popular and shows definite positive results.

The Virginia Trees for Clean Water (VTCW) grant program continues to gain popularity. Through funds from the USFS Chesapeake Watershed Forestry Program and Virginia Department of Conservation and Recreation Water Quality Improvement Funds, VDOF has developed the Virginia Trees for Clean Water program, which is designed to improve water quality across the Commonwealth through on-the-ground efforts to plant trees where they are needed most.

Projects include tree-planting activities of all types: riparian buffer tree planting, community and neighborhood tree plantings, etc. Grants are awarded through this program to encourage local government and citizen involvement in creating and supporting long-term and sustained canopy cover. There have been 123 active projects with funds totaling $503,353 being awarded. To date, this has resulted in more than 40,846 trees being planted and more than 17,757 volunteer hours logged across the state.

## Urban Forest Management

Utilization of urban trees removed due to development, storm damage, landscape renewal or any other reason has traditionally been restricted to firewood, mulch or the landfill. This is a major source of woody material that could often be utilized in a more sustainable manner. We have been working with the Agency's Marketing and Utilization office to promote the use of this resource. Some communities have made the effort to develop contracts for the wood to be chipped and sent for biofuel. We are working on the development of a Virginia Urban Wood Utilization Group that will spearhead the higher use of some of the wood. Potential products include: boards, custom-made furniture or crafted items, such as bowls, spoons and cutting boards. The resource is there waiting to be more sustainably used, and we are working to develop the interests and markets for urban wood.

With USFS funds for an Urban Wood Utilization project (where North Carolina Forestry Service was the lead agency), Forestry FastBreak videos were developed, and Virginia was able to have them customized with the Virginia Department of Forestry logo and information. A new video has been developed to promote urban wood as a renewable resource. Forest FastBreak videos can be accessed via www.youtube.com/ForestryTV or via the following links: Posted on the VDOF website under Publications

http://www.dof.virginia.gov/print/index.htm

# Urban and Community Forestry,

*continued*

*Mid-Atlantic Urban Wood Forum, Richmond, VA, 2017*

And under the Urban Forestry page

http://www.dof.virginia.gov/forestry/community/index.htm

With funding from a USFS competitive grant, we have developed a new resource for Virginia's communities: the Urban Forest Emergency Management Planning workbook and template. Communities may use the resource to develop plans to better manage their urban forest to reduce damage from storms and how to deal with the potentially huge volumes of wood should a major natural disaster hit their communities. The workbook and template are available in hardcopy to the current Tree City USA communities and also available to all to download online from our website.

The Urban Forest Strike Teams (UFST) are comprised of specially trained ISA-Certified arborists who assist communities with the classification of damaged urban trees based on FEMA 325 guidelines for the purpose of reimbursement under Public Assistance during the recovery phase of a federally declared disaster. At the same time, they provide on-site rapid individual evaluation of trees damaged during a natural disaster that pose a risk to the community. UFSTs are stand-alone resources that use an Incident Command structure with UFST team leader and UFST team leader assistant directly supervising UFST task specialists. Arborists can provide disaster planning assistance, risk assessment and FEMA Public Assistance information to communities following natural disasters to develop in-state and regional capacity to respond to disasters by providing effective, practical and comprehensive urban tree assessment training to state agency arborists. Virginia has nine personnel trained as UFST leaders and 30 as UFST task specialists. Personnel have been deployed to assist communities in Oklahoma, Arkansas and Kentucky after ice storms, to Louisiana after a hurricane and in state following a tornado. The UFST participated in an interagency mock disaster in Alabama this year. This provided opportunities to integrate the UFST with the other state agencies and to utilize new technologies for data collection.

## Partnerships With Universities

Our partnership with Virginia Tech supports the urban and community forestry curriculum in the School of Forest Resources and Environmental Conservation (FREC), and VDOF continues to have representation on the FREC Advisory Board. VDOF also continued its long and productive partnership with the Community Design Assistance Center (CDAC). CDAC continues to provide landscape and environmental planning assistance to communities statewide. Projects completed this year include: Russell County Fairgrounds Conceptual Improvements and Master Tree Planting Plan; Pearisburg Sports Complex/ Town Park Conceptual Master Plan and Master Tree Replacement Plan; Dante Downtown Master Plan and Park Design, and the Dungannon Town Playground and Park Conceptual Design. At the University of Virginia, the U&CF program continues to provide support to the Virginia Natural Resources Leadership Institute (VNRLI), which focuses on critical natural resource issues, new skills in conflict resolution and collaborative problem solving. The Department also continues to provide assistance to an evolving urban forestry program at Virginia State University.

## Green Infrastructure

The Department continued a strong partnership with the Green Infrastructure Center (GIC) in 2017. A GIC publication, Evaluating Conserving Green Infrastructure Across the Landscape, originally supported by VDOF, was published for national distribution by Island Press in February. VDOF continues to network GIC with state forestry agencies in other states, resulting in green infrastructure initiatives in both the South and the Northeast. VDOF received federal Landscape Scale Restoration (LSR) grant funding, and these funds are supporting green infrastructure planning in 11 selected cities, towns and/or counties. Selected communities include: the towns of Buchanan, Woodstock, South Boston and Tappahannock; the cities of Charlottesville, Radford, Suffolk and Hampton, and the counties of Albemarle, Essex and Grayson. VDOF has provided support for the development of these plans, and these communities are benefiting not only by receiving these plans but also up-to-date urban tree canopy or land cover analyses; comprehensive GIS data to use for planning purposes, and comprehensive planning strategies to help conserve natural assets.

*Urban Wood Utilization Workshop shared demonstrations of small equipment products useful in urban tree removal and processing, Lynchburg, VA, 2017*

Another project with the Green Infrastructure Center focuses on the connections between urban tree canopy and stormwater management. The project has worked in detail with three communities to show how tree canopy protection and restoration can help with issues such as stormwater compliance, reducing flooding, meeting TMDL targets for impaired waters by linking current and future canopy to goals for water quality.

## Clinch River Valley Initiative (CRVI)

VDOF was the initial funder of the Clinch River Valley Initiative (CRVI) and remains a long-term partner in this collaborative, grassroots effort working to make the Clinch River Valley a global destination based on its biodiversity, natural beauty and outdoor recreation opportunities. In 2016, the CRVI Action Plan was revised to highlight the vision, goals, action items and next steps for the five action groups of the Initiative that include:

- Exploring the creation of a Clinch River State Park;
- Developing and Integrating Access Points, Trails and Campgrounds;
- Enhancing Water Quality;
- Developing and Enhancing Environmental Education Opportunities for all Community Members, and
- Connecting Downtown Revitalization and Outdoor Recreation Efforts along the Clinch River, and Expanding Entrepreneurship and Marketing Opportunities.

CRVI also completed an infographic to highlight some of the accomplishments of the five action groups. The Virginia General Assembly approved an appropriation to begin development of the proposed state park. Several river clean ups were held; a new boat launch was completed; two kiosks were put up, and three communities joined the Hometowns of the Clinch program. In 2016, VDOF also received federal Landscape Scale Restoration (LSR) grant funding to support the initiatives of CRVI, including facilitation from the Institute of Environmental Negotiation (IEN), two youth summits and a Save Our Streams coordinator position dedicated to training volunteers to help monitor the health of the Clinch River. More detail about CRVI is provided at: https://clinchriverva.wordpress.com

## Working With The International Society Of Arboriculture

VDOF has had a long partnership with the Mid-Atlantic Chapter of the International Society of Arboriculture (MAC-ISA) in promoting the Certified Arborist Program. VDOF has more ISA-Certified Arborists than any other state forestry agency in the nation. In addition, VDOF hosts an annual training each year at its headquarters for prospective certified arborists. This training has resulted in more than 500 individuals passing the certified arborist exam since the training was first offered in 2000. VDOF also provides continuing education units (CEUs) for ISA-Certified Arborists at all of its education events. VDOF provides scholarship funding to MAC-ISA for the ISA certification study course and the Tree Risk Assessment Qualification course.

Each year, MAC-ISA presents its Gold Leaf Award to deserving landscape beautification and Arbor Day projects. In 2017, two VDOF-assisted projects were recipients of the award:

- Town of Buchanan for its continuing outstanding Arbor Day activities

- Old Dominion University and the City of Norfolk were acknowledged for the integration of their Tree City USA and Tree Campus USA Arbor Day events.

## Trees Virginia (Virginia Urban Forest Council)

VDOF continues its strong and longstanding partnership with Trees Virginia (the non-profit Virginia Urban Forest Council). Together with Trees Virginia, the Department hosts quarterly roundtables in Northern Virginia (NOVA) and bi-annual roundtables in Southeast Virginia (SEVA) attended by local urban forestry professionals from municipalities as well as interested citizens and Tree Stewards. These roundtables have been tremendously successful and continue to draw a sizable audience for both education and networking. Again in 2017, Trees Virginia and VDOF made major contributions to the Mid-Atlantic Horticulture Short Course (Virginia's major conference for green industry professionals), providing both speaker contacts and numerous scholarships for participants. The partnership with Trees Virginia also continued with the very successful and long-running Waynesboro and Roanoke workshops. Proceeds from these workshops are used to fund scholarships in both urban forestry and horticulture programs, and $4,000 was awarded in 2017. Trees Virginia also continued its practice of offering a scholarship to the national Municipal Forest Institute. The volunteer Tree Steward component of Trees Virginia continued to grow with several groups seeing significant increases in membership. The Tree Steward Symposium was held this year in Richmond and drew enthusiastic Tree Steward representatives from across the state for an excellent program. Trees Virginia also sent representatives from local Tree Steward groups to the Arbor Day Foundation Partners in Community Forestry Conference in Indianapolis.

The continued partnership with the Flora of Virginia Project has made possible the advancement of the Flora App, which is a K-12 program with the goal of teaching children botany and ecology outdoors, and four train-the-trainer workshops in the use of the 13 lesson plans created based on the Flora.

### Waynesboro Tree Workshop

Chris Fields-Johnson shared his knowledge about soils and organic soil amendments with Waynesboro Tree Workshop attendees at Ridgeview Park.

### New Wildlife Garden

Charlottesville Tree Stewards joined VDOF employees to plant a wildlife demonstration garden at the VDOF headquarters building.

# Accomplishment Report

*July 2016 - June 2017*

| Objectives | Target Goal | Accomplished |
|---|---|---|
| **Goal 1: Protect the citizens, their property and the forest resource from wildfire.** | | |
| Measure 1.1.1: Percentage of wildfire responses that are 30 minutes or less. | 86% | 82% |
| Measure 1.2.1: Percentage of eligible rural volunteer fire departments receiving available state and federal financial assistance. | 27% | 28% |
| **Goal 2: Protect, promote and enhance forested watersheds, non-tidal wetlands and riparian areas.** | | |
| Measure 2.1.2: Percentage of harvest sites with sediment not reaching streams. | 95% | 98% |
| Measure 2.2.1: Cost to conduct a forest harvest water quality inspection. | $4.50/acre | $6.21/acre |
| Measure 2.2.2: Percentage of Best Management Practices properly installed on timber harvesting operations statewide. | 90% | 95% |
| **Goal 3: Improve the stewardship, health and diversity of the forest resource.** | | |
| Measure 3.1.1: Number of acres of trees planted in Virginia. | 44,500 acres | 53,435 acres |
| Measure 3.1.2: Number of acres funded by Reforestation of Timberlands Act financial incentives. | 50,000 acres | 49,888 acres |
| Measure 3.3.1: Number of acres of all forest management plan types achieved on private and appropriate public forestland. | 193,764 acres | 164,361 acres |
| Measure 3.2.1: Number of communities assisted with forest and/or tree resource management. | 120 communities | 126 communities |
| **Goal 4: Conserve the forest land base.** | | |
| Measure 4.1.1: Number of acres protected from conversion to development. | 5,250 acres | 6,404 acres |
| **Goal 5: Promote forest industry and diversified markets for forest landowners including ecosystem service markets.** | | |
| Measure 5.1.1: Number of new and/or expanding forest-related businesses or markets. | 4 markets/ businesses | 3 markets/ businesses |
| Measure 5.3.1: Percentage of customers who rate the quality of VDOF's seedlings as satisfactory. | 96% | 95% |

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