

Carl E. Garrison III
State Forester



COMMONWEALTH of VIRGINIA

DEPARTMENT OF FORESTRY

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December 12, 2011

The Honorable Robert F. McDonnell
Governor of Virginia Forestry Association

Members, Virginia General Assembly

Pursuant to §10.1-1119, the State Forester shall develop an “annual report on the actions, conclusions and recommendations for conserving the Commonwealth’s forest supply.”

It is my pleasure to present the 2011 Annual Report on the Actions, Conclusions and Recommendations for Conserving the Commonwealth’s Forest Supply.

Please feel free to let me know if you have any questions or if I may provide any further information in this regard. You may also contact my associate, John Campbell, director of public information, at john.campbell@dof.virginia.gov or (434) 220-9070;

Sincerely,

Handwritten signature of Carl E. Garrison III in blue ink.

Carl E. Garrison III
State Forester



2011 STATE OF THE FOREST



ANNUAL REPORT
ON VIRGINIA'S FORESTS

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FROM THE STATE FORESTER

The state budget (and the national economy) continues to present us with many challenges, but it hasn't stopped us from protecting the public; providing services to landowners, and working with private enterprises to create and maintain jobs while developing new markets for Virginia's forest products. It's certainly made it more difficult operationally, but our employees continue to perform at a high level so that no citizen is unprotected or left un-served.

In our public safety role, we protected 4,023 homes and other structures – valued at more than \$475 Million – from the ravages of 1,114 wildfires that burned 22,022 acres of land during this fiscal year.

To ensure the quality of Virginia's waters, we inspected 5,905 timber harvest sites on more than 248,165 acres. Overall best management practices compliance was at 84.5 percent, and 98.7 percent of the sites inspected had no active sedimentation present following close-out of the harvest operation.

We added a new State Forest (Old Flat) and sold more than 25 million tree seedlings. And we ensured the conservation of 4,428 acres of forestland through permanent easement agreements with a number of private landowners.

Other successes included the preparation of forest management plans on more than 110,000 acres and the implementation of more than 3,300 management practices that will help build healthy, valuable and productive forests across Virginia. Our partnerships with private companies, non-governmental organizations and other government agencies continue to grow so that the citizens of the Commonwealth receive top-notch products and services.

The forest health arena is one full of twists and turns. While traditional pests, such as gypsy moth and southern pine beetle, have been on the wane, several new ones – emerald ash borer and thousand cankers disease – are threatening the state's ash and black walnut trees, respectively. And these new pests have the potential to cost the Commonwealth hundreds of millions of dollars if they decimate those tree species. We will continue to monitor the situation and do all that we can to lessen the impact of these invasive pests.

To learn more about all that's happening within the more than 15.8 million acres of Virginia's forestland, I invite you to read on.

Sincerely,



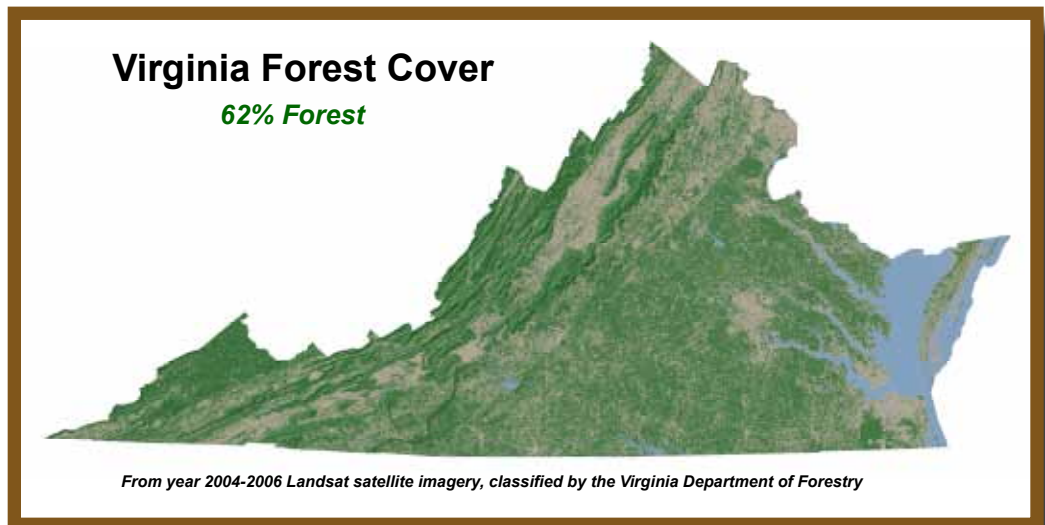
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VIRGINIA FOREST TRENDS

FORESTED LAND

For 2011, more than 15.8 million acres – more than 62 percent of the Commonwealth – qualified as forestland. Of this forestland, 15.3 million acres are categorized as commercial timberland and 500,000 acres are categorized as reserved forestland, e.g., Shenandoah National Park, VA state parks, etc.

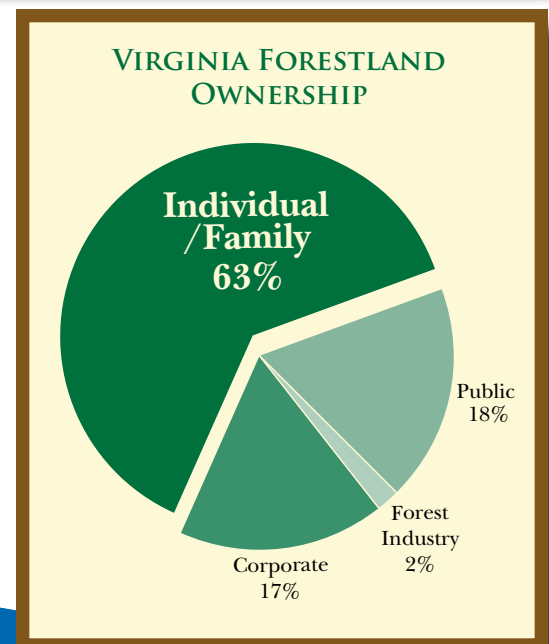
Over the past 10 years, the Commonwealth has lost an average of 16,000 acres of forestland annually. This translates to a rate of 44 acres lost every day or 1 acre every 33 minutes.



FOREST OWNERSHIP

Most of Virginia's forestland is privately owned (more than 12.9 million acres). More than 373,600 individuals and families hold a total of 10.1 million acres. These private holdings average less than 75 acres in size, but range from a few acres to thousands of acres.

By 2010, ownership of forestland by forest products firms had declined to less than two percent of the total (265,000 acres). This is a reduction from seven percent in 2001 and 11 percent in 1992.



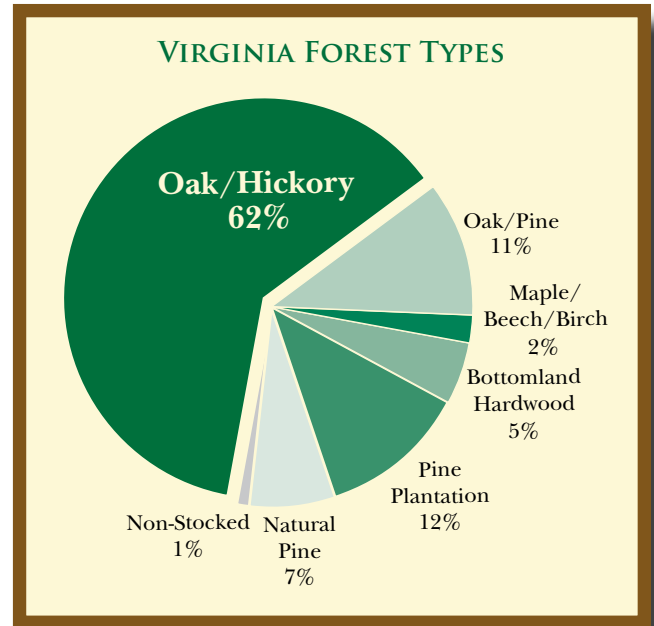
The balance of Virginia's forestlands (18 percent) are owned by federal, state and local governments – the largest entity being the USDA Forest Service National Forest lands at 1.7 million acres.

The Virginia Department of Forestry – through its 22 state forests - holds 67,888 acres of forestland.

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 million acres of the Commonwealth's forest – more than 78 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 7 million acres in stands 60 years old or older.

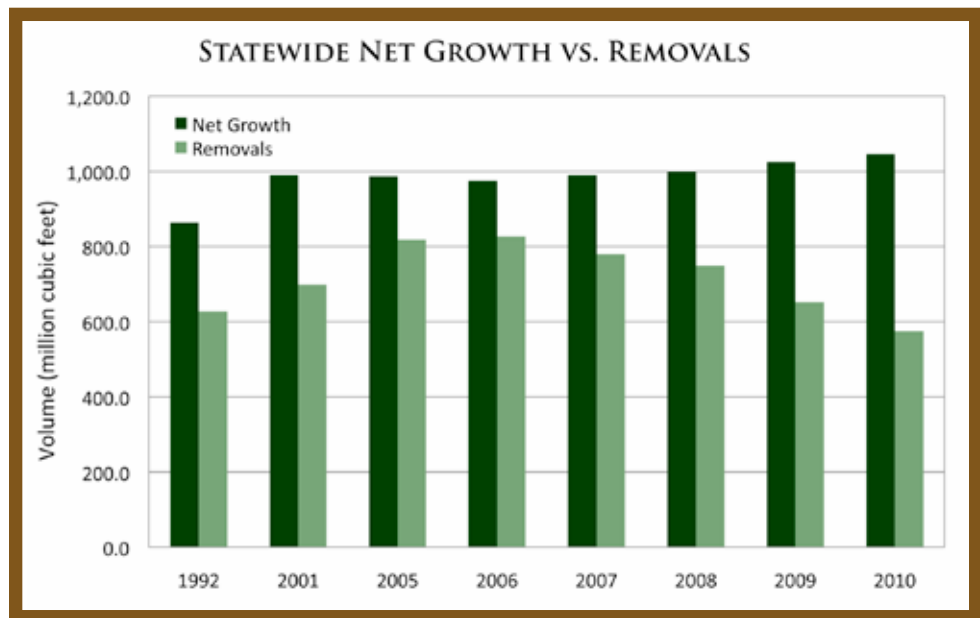
Pine forests represent approximately 3 million acres (19 percent) of Virginia's forestland. This is a decline from the 6.2 million acres of pine found during the 1940 inventory. Pine plantations now constitute more than 63 percent of the pine acreage.



FOREST SUSTAINABILITY

There are several indicators that are reviewed to determine whether Virginia's private and public forests are healthy and are being managed sustainably. One of these is the ratio of the net growth versus the removal of forest volume, due to harvesting and land conversion.

Since 2007, the ratio of net growth to removals has improved. Unfortunately, most of the change is due to the decline in removals, as related to the economic downturn. One exception to this is Southside Virginia, where the volume of removals has remained stable, in spite of the economy. This is generating concerns regarding the long-term trend in sustainability for this area of the state.



ECOSYSTEM SERVICES

Virginia's forests provide many environmental benefits and services, such as carbon sequestration, biodiversity, pollination, recreation, aesthetics, reduction of nutrient loads to streams and the enhancement of air quality. These regulating and cultural services are in addition to the traditional wood products our forests provide. Our forests are truly the natural infrastructure upon which our quality of life depends. The Department of Forestry is committed to increasing awareness of these vital services and finding solutions that keep working forests on Virginia's landscape sustainably providing ecosystem services.

Forest growth in Virginia annually sequesters or captures and stores about 6.42 million metric tons of carbon dioxide emissions. Carbon dioxide is considered by many to be a major greenhouse gas. The growth of Virginia's forests offsets about 14 percent of the total annual carbon dioxide emissions in the State. Voluntary markets are beginning to emerge to help forest landowners capture a value for the carbon sequestration service. The ability of forest growth to sequester carbon dioxide emissions and help provide solutions to climate change is a positive story to tell. However, each year, approximately one million metric tons of carbon dioxide are emitted into the atmosphere due to land-use changes, such as the loss of forest cover.

Other emerging market opportunities include planting trees to enhance water quality. For example, in Virginia's Nutrient Credit Trading Program, tree planting projects on open land are recognized as a management practice that generates saleable credits. The plantings reduce nitrogen and phosphorus loading and, therefore, enhance water quality. Forestry will have a role to play in reducing nutrient loading in the Chesapeake Bay and other Virginia waters. The Department of Forestry is also working toward having strategies that reduce the rate of forestland

conversion included in the Phase II Watershed Implementation Plan (WIP). The WIP strategies are being developed to help address the Chesapeake Bay water quality impairments.

Another innovative idea being piloted in Virginia is the Forests to Faucets (F2F) program. This national-level initiative, funded by the U.S. Endowment for Forestry and Communities and the Natural Resources Conservation Service, is designed to financially link urban water consumers to the rural landowners managing the watershed that provides the water supply. The specific project area has been expanded to the entire Rivanna River Basin, including much of Albemarle, Greene and Fluvanna counties. Landowners in this basin can receive a financial incentive for tree planting, donated conservation easements, riparian buffers, forest stewardship plans and stabilizing forest harvest sites. The objective is to demonstrate that good forestland management is an effective tool in reducing sediment and nutrient loads to the reservoir.

Other ecosystem services, such as providing for and enhancing biodiversity, are extremely important. How we manage our forests and plan for the development of Virginia's landscape need to consider biodiversity values. The Department of Forestry is working with Virginia Tech and other State agencies to develop InFOREST, a web-based tool that will enhance our ability to include ecosystem service considerations in our land-use planning efforts. InFOREST will be used to quantify ecosystem services (such as carbon sequestration, air quality, biodiversity and water quality) from the forest. The first phase of the web-based effort is scheduled to be released later this year.

FORESTLAND CONSERVATION

The newest forest inventory data for Virginia indicate that the state continues to experience the conversion of forestland to development. The rate of forest loss has probably slowed in recent years in response to the decline in the economy. While the economic downturn may be reducing the current rate of forest conversion, it is also having an impact on land conservation efforts. The reduction in property values means that landowners who donate land or conservation easements on their land see the value of their donation reduced. Their donation then generates fewer of the

tax benefits that provide the financial incentive for land conservation. While most landowners conserve their land out of a desire to protect their land from development, the financial incentives are critical for helping landowners to justify the surrender of a significant portion of their property's value.

In spite of all this, the VDOF continues to see demand from landowners to donate conservation easements on their forested properties. We have more than 40 easements in development covering more than 16,000 acres. In the last fiscal year, VDOF accepted 10 conservation easements in seven counties, protecting 4,428 acres from development. This past year, we also completed acquisition of the new 2,200-acre Big Woods State Forest in Sussex County.

Three of the easements recorded last year were partially purchased using Forest Legacy funds. These three easements protect more than 1,000 acres along the beautiful New River in Grayson County. VDOF utilizes the Forest Legacy Program, administered by the USDA Forest Service, to conserve important forested properties. This competitive Federal grant program is intended to fund the purchase of conservation easements or fee acquisitions of land for conservation purposes. The program's purpose is to conserve environmentally-important forested areas that are threatened by conversion to non-forest uses. In the past year, the Legacy program has also provided partial funding for the fee acquisition of the Big Woods State Forest mentioned above, and DCR's addition of 467 acres to the Chubb Sandhill Natural Area Preserve in Sussex County.

The VDOF has developed two local sources of funding to provide incentives for landowners who donate conservation easements. The Tomorrow Woods program utilizes forest mitigation funds to reimburse landowners for the expenses associated with donating a conservation easement. These funds are available to landowners in the counties of Dinwiddie, Isle of Wight, Prince George, Southampton, Surry, Sussex and the City of Suffolk.

Recognizing that conservation easements are only one tool in our effort to preserve Virginia's legacy of working forests, the VDOF and Virginia Cooperative Extension have developed an outreach and education program for forest landowners. These highly popular seminars focus on issues related to the transfer of forestland and its management from one generation to the next. The goal of these programs is to help landowners begin to make plans for the inevitable transfer of not just the family land but also the family's land management legacy. Several programs have been held and more are planned.

We also continue to work with our conservation partners both within the state and the private organizations to encourage sustainable forest management on conserved lands. The VDOF recently signed an updated Memorandum of Agreement with the Virginia Outdoors Foundation that describes how we will work together to ensure that forest resources are managed and protected on conservation easements across Virginia.

OUR STATE FORESTS

We added one State Forest, Old Flat, in Grayson County. VDOF now has 22 State Forests totaling 67,888 acres. This year, these forests generated \$181,483 in payments to their counties from timber sales and use permits.



FOREST MANAGEMENT

Forests provide a multitude of benefits to the Commonwealth and its citizens. These include: forest products; clean water; pure air; habitat for wildlife; outdoor recreation; natural classrooms; defense against environmental stresses, and settings for quality living. The value and quality of these benefits can be greatly enhanced through planning and implementation of good forest management practices. In 2011, the Department continued to emphasize planning and practice implementation in the agency's performance measures as well as interagency collaboration.

Forests, by nature, require time to grow and develop. Because of this, long-term planning is essential to realize long-term benefits. Planned forest management practices, implemented over time, will ensure sustainable and continuous benefit from forest resources. All steps are critical in planning, beginning with determining landowner objectives. Department foresters, private consulting and industry foresters develop these plans, and partner with state and federal conservation agencies and contractors to support and implement them. In the 2011 fiscal year, foresters completed plans on 110,067 acres.

Planning is the foundation upon which good forest management work is built. Forest landowners, contractors, consulting foresters and Department staff cooperate to put the plans into action. Silvicultural practices, things that utilize the art and science of tending forests, is the means to build these forests. There are many different types of forest management practices: preparing sites and planting trees; thinning; controlling competing or invasive vegetation; crop tree management; fertilizing; partial or complete harvesting for natural forest regeneration, and prescribed burning. In the 2011 fiscal year,

3,301 forest management projects were implemented throughout the state, and all were designed to build healthy, valuable and productive forests.

There are a number of programs designed to encourage and assist private landowners in implementing forestry practices. The Virginia Reforestation of Timberlands Program provides assistance for planting and improving pine forests. The program is funded by the wood-using industry and state general funds. For the past year, the program assisted owners on nearly 1,050 sites, covering 39,468 acres. Through the history of the program, more than 1.5 million acres have been planted or improved. There are also a number of programs available through the USDA Natural Resources Conservation Service (NRCS); Department of Conservation and Recreation (DCR), and the USDA Farm Service Agency (FSA) that provide funding for forestry, conservation and wildlife practices.

DELIVERING CONSERVATION ASSISTANCE: COOPERATION IS KEY

Forest resource management in Virginia is truly a cooperative effort, with assistance to owners delivered by a corps of professionals from many agencies and groups. Knowledge and coordination is the key to effective accomplishments. Recognizing this, VDOF partnered with the NRCS to provide training, enhance program knowledge and foster relationships among resource professionals. VDOF, NRCS, consulting foresters, Virginia Soil and Water Conservation Districts (SWCD), Virginia Department of Conservation and Recreation (DCR), USDA Farm Service Agency, Virginia Cooperative Extension, and the Va. Department of Game and Inland Fisheries all participated in joint training in conservation programs and technical assistance topics. This was accomplished through a series of nine one-day regional meetings, focusing on programs and interagency cooperation. Perhaps the pinnacle of this training initiative was the week-long "Lands for Tomorrow" conference, held in late June at Longwood University. During the week, nearly 300 participants learned through 30 specialized classes in forestry and resource management skills. Plans are underway to continue inter-agency training in the coming year.

REGIONAL EMPHASIS

In addition to the well-established statewide programs to emphasize and encourage forest management, the Department of Forestry is working on several special regional initiatives. Forest Foundations: Chesapeake Bay Restoration Through Forestry began in June of 2011. The program provides assistance to owners in the York River and Rappahannock River watersheds for management planning; forestry practices that protect water quality, and retention of land in forests. Funding is through the NRCS Cooperative Conservation Partnership Initiative program.

The Tomorrow Woods Program continues in Southeast Virginia, providing assistance for open land tree planting, conservation easements and enhanced forest management. A similar project will begin soon the in Roanoke area.

The Forest to Faucets Program in the Rivanna River watershed in Central Virginia focuses on implementing practices and protecting lands that have a high water-quality benefit.

In southwest Virginia, VDOF is working to promote and demonstrate methods to restore productive mixed hardwood forests on previously mined lands. All of these projects will help in enhancing Virginia's forests adding to the benefits they provide to our landowners and citizens.



THREE VIRGINIA FAMILIES CONSERVE 1,600 ACRES OF PRIVATE FORESTLAND

The Tomorrow Woods program – a VDOF partnership with Dominion Virginia Power – is designed to conserve, establish and enhance forests, with a focus on productive, private working forests. Forest Conservation Specialist Rob Suydam assisted the Johnson family of Dinwiddie County; the Forehand family of Prince George and Sussex counties, and the Oliver family from Isle of Wight County in the development of conservation easements on more than 1,600 acres of forestland. Suydam said, “VDOF’s goal is to work with landowners to protect large blocks of working forests by keeping them intact and unfragmented, while protecting what is often a family’s greatest heirloom, their land. These first Tomorrow Woods easements have done just that.”

FOREST PROTECTION FROM WILDFIRE

The Virginia Department of Forestry responds to almost 1,200 wildland fires that burn more than 11,300 acres annually (based on a 10-year average, 2001 – 2010).

Although more than 60 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 \$178 Million.

From July 1, 2010 through June 30, 2011:

- ▲ 1,114 fires burned 22,022 acres;
- ▲ almost \$11 Million of timber was damaged;
- ▲ damage to homes and other buildings amounted to \$4.7 million;
- ▲ an astounding 2,412 homes, worth almost \$426 Million, were protected thanks to VDOF efforts, along with the protection of an additional 1,611 other structures, worth an estimated \$48.8 Million.

The Agency relies on highly-trained and experienced personnel operating a fleet of 180 4x4 engines; six specially equipped Hummers; five 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 765 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. The VDOF responded following

Hurricane Irene to open more than 800 miles of roads by handling the removal of more than 2,800 trees from roadways in 11 counties. Additionally, VDOF responded to incidents in Florida, Georgia, North Carolina and Texas 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.

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 11th annual statewide Interagency Wildfire Academy. This academy, one of the four largest in the nation, provided training to more than 350 students representing more than 11,000 hours of total training. The event hosted responders from various state and federal agencies through the Commonwealth, responders from three surrounding states and representation from more than 70 Virginia Volunteer Fire Departments. On a more local basis, VDOF personnel provide at least one regionally based academy every year as well as numerous county-based training opportunities in an effort to further develop the expertise of Virginia's fire service.

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 27 new dry hydrants were installed through the program last year.

VOLUNTEER FIRE ASSISTANCE PROGRAM (VFA)

The Volunteer Fire Assistance Program continues to increase the fire protection capability in Virginia. This is accomplished by making available 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, 4,949 grants have been made providing a total of \$2,622,196 in matching grant funds.

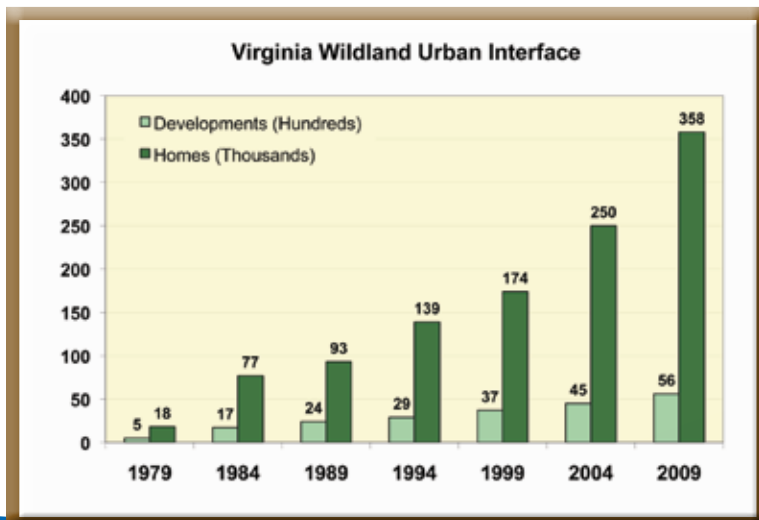
The VDOF program is part of a grant that improves the capability and effectiveness of America's 26,000 Rural Volunteer Fire Departments – 585 of them in Virginia – to protect lives and other rural investments. The purpose of this program is to provide financial, technical and other assistance to State Foresters and other appropriate officials to organize, train and equip fire departments in rural communities. In 2010, 79 rural volunteer fire departments in the Commonwealth received \$233,984 in Volunteer Fire Assistance funds made available to Virginia. Requests for support continue to greatly exceed the available funding.

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 Firewise Program. In an effort to track the problem, the VDOF has conducted a woodland home survey every five years since 1979. There is little doubt that the problem of high-risk homes in a woodland environment is expanding.

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 Improvement 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 FY2011. 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 a welcomed opportunity to educate the operators on BMPs and the latest in water quality protection techniques. In fiscal year 2011, VDOF field personnel inspected 5,905 timber harvest sites across Virginia on 248,165 acres – a 43 percent increase in the number of acres harvested over FY2010.

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 6,807 harvesting professionals in 215 programs relating to water quality protection. For fiscal year 2011, there were 18 training programs offered with a total of 483 present. Six of these courses were in the core area (199 attendees), and the remaining 12 courses were for logger continuing education (284 attendees).

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 operations. 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 2011, the VDOF was involved with 249 water quality actions initiated under the Silvicultural Law. This is a reduction of 11 percent from FY2010. Of these actions, 12 resulted in Special Orders being issued for violations of the law, and three involved the issuance of Emergency Special Orders (Stop Work Orders). None of these proceeded to the issuance of civil penalties, however any penalties collected under this law are placed in the Water Quality Penalty Fund, which is a non-reverting fund to be used for education, demonstration and research.

A statewide audit system has been in place since 1993 to track trends in BMP implementation and effectiveness. Results from the calendar year 2011 data show that overall BMP implementation on 240 randomly selected tracts is 84.5 percent – an increase of two percentage points over the previous audit cycle. The audit results also show that 98.7 percent of the sites visited had no active sedimentation present after the close-out of the operation, a one percentage point increase over the previous audit cycle. 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. This whole BMP Implementation Monitoring effort has been automated over the past year to be compatible with VDOF's enterprise database system known as IFRIS (Integrated Forest Resource Information System).

VDOF continues to offer 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 unique program shares the cost of the installation of forestry BMPs on timber harvest sites by harvest contractors.

WATERSHED PROTECTION

Because forests provide the best protection for watersheds, one of the Department's goals is to increase the amount of forestland conserved, protected and established in Virginia's watersheds. The focus is on practices that will have a high benefit to water quality, specifically conserving land permanently; 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.

The Department and other state agencies have been very active and have made significant progress in promoting land conservation that will protect watersheds and other forest benefits. In FY 2011, land permanently protected through purchase or private land conserved through a VDOF-held easement totaled 4,428 acres.

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 is increasing, and in FY 2011, 31 landowners participated in this watershed protection option by retaining timber valued at \$745,804.19 in the streamside areas of their property.

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. In the 2011 season, trees were established or protected on 3,292 acres of land.



FOREST HEALTH

The year 2011 has been mixed concerning forest health news in Virginia. Traditional pests, such as gypsy moth and southern pine beetle, have been on the wane while new pests, such as the emerald ash borer and the recently discovered thousand cankers disease of black walnut, threaten to spread further destruction. It's also becoming increasingly apparent to foresters and other natural resource professionals that traditional forest management practices in many locations can no longer be carried out without considering the impacts of invasive weeds.

The weather was highly variable in 2011, with an unusually cold and dry winter leading directly into very warm spring temperatures. A generally wet spring in western Virginia stood in contrast to a dry one in the east. Combined with record high temperatures and multiple heat waves with temperatures exceeding 100 degrees, moderate drought conditions prevailed across much of the Commonwealth during summer.

As predicted, gypsy moth populations were at an 11-year low, producing no visible defoliation during aerial detection surveys. This was due in large measure to the excessively wet spring and summer of 2009, which allowed for the gypsy moth fungus, *Entomophaga maimaiga*, to wreak havoc on larval populations. Few caterpillars survived to adulthood to lay eggs for the 2010 season. As well, wet spring conditions occurred during 2010-11 in the mountains, where gypsy moth populations tend to be the most severe historically. Therefore, low gypsy moth populations will likely hold at least through 2013 or until sustained drought conditions during successive springs allow for resurgence of populations.

That said, the last wave of gypsy moth outbreaks beginning in 2005, and culminating in 114,000 acres of

severe defoliation in 2008, has left a great deal of oak mortality in its wake. The hardest hit areas include parts of Shenandoah National Park on the northern end (much of which can be seen from Skyline Drive); parts of the George Washington National Forest in Augusta and Rockingham counties; the Jefferson National Forest in Giles County, and on private land near Poor and Bent mountains to the southwest of Roanoke. Oak mortality and decline in these areas will lead to significant changes in forest composition, with pioneer species, such as poplar, maple and birch, replacing oak as the dominant species in many locations.

The southern pine beetle has been relatively quiet during the last nine years. The last significant outbreak was during the late 1990s and had a major impact on pine in the mountains, particularly in southwest Virginia. As a result, many isolated areas once dominated by pine will revert to hardwood cover. However, the pine resource in central and southeast Virginia remains healthy and productive. Federal funds from the USDA Forest Service, Forest Health Protection support our (Southern Pine Beetle Prevention) cost-share program with landowners for pre-commercial thinning of pine stands. To date, Virginia has pre-commercially thinned about 32,000 acres of loblolly pine out of approximately 130,000 acres estimated to be overstocked and in the appropriate pre-commercial age class. Overstocked pine stands are more vulnerable to bark beetle outbreaks, and thinning is the best method of reducing this threat. First commercial thinnings on small tracts are also being supported with a logger incentive program. Due to high moving costs, loggers often lose money visiting tracts smaller than 40 acres. Because of increasing rates of fragmentation and parcelization in Virginia, smaller tract sizes are becoming more common but are in no less need of thinning to maintain health. To date, more than 2,000 acres of small pine tracts have been commercially thinned under the logger incentive program, with almost \$250,000 going directly to logging companies for carrying out this work over the two years.

Invasive species remain the most significant threat to forest health. The pathogens that cause chestnut blight and Dutch elm disease have virtually eliminated the American chestnut and American elm, respectively, from our natural and urban forests. If introduced, the pathogen that causes sudden oak death in western forests can potentially devastate Virginia's oaks and other species.

Other pathogens that cause

butternut canker, dogwood anthracnose and beech bark disease threaten those tree species with serious decline over longer time scales. Eastern hemlock faces the same threat from the hemlock woolly adelgid, a tiny, aphid-like insect that has killed up to 90 percent of the hemlocks in Shenandoah National Park and other areas in Virginia during the last 50 years.

The most recent threat is the emerald ash borer (EAB). First discovered in Virginia during 2004 in Fairfax County, it has since spread to Arlington, Prince William and Frederick counties. Virginia and the nation face the prospect of losing all ash species from natural and urban landscapes in the forthcoming decades, an impact that could eventually cost the Commonwealth many millions of dollars. Its primary means of spread is through the unrestricted movement of firewood across state lines by private citizens. A survey by the Virginia Dept. of Agriculture and Consumer Services (VDACS) also demonstrated that firewood was being brought into Virginia for sale from 15 states and three countries. At the very least, all out-of-state firewood for sale in Virginia should be kiln-dried to kill all possible pests living within the wood. Some states are doing more than others to regulate firewood movement, but the idea is catching on that preventing untreated firewood movement over long distances is essential to limiting the impact of new and emerging pest problems.

The newest threat to Virginia's forests is thousand cankers disease (TCD) of black walnut, which has been discovered in and around the Richmond area at multiple locations. This disease has been widespread on ornamental black walnut planted in western US cities where it has devastated the black walnut population. Fears that TCD would spread to the eastern US (the native range of black walnut) from the western states (where black walnut is planted as an urban tree) were realized last year when it was discovered in Knoxville, TN. Furthermore, it appears that this slow-acting and difficult to detect disease was present for many years in both Knoxville and Richmond. Therefore, it's likely to be found in other places as more people begin to look for it.

With the long list of invasive pest problems continuing to grow and economic resources to combat them continuing to dwindle, our best efforts should be put towards slowing the spread of these pests when practical and limiting effective pathways for these organisms to spread. Slowing the spread has value because it defers the cost of dealing with the pest and allows time for research to come up with remedies or protocols for management. Limiting pathways for pests by such means as heat treatment of all firewood moving across state lines is essential, but cannot be effectively accomplished without the willing cooperation and coordination among government agencies, industry and the public. We must recognize that this issue affects all citizens in a negative way, and, if we do nothing, our forests will continue to lose economic, environmental and aesthetic value over time.



FOREST RESEARCH

In 2011, the Virginia Department of Forestry's Applied Research Program has continued its mission of developing and providing research information on forest resources in Virginia to all stakeholders and providing outstanding loblolly pine seed for Virginia's forest landowners. The program staff (one research program manager, one tree improvement manager, and one technician) established six new studies (bringing the total number of active research studies to 47); collected new data from more than 250 existing plots, and reported results in 14 written summaries and nine oral presentations. In addition, they were responsible for developing the improved loblolly pine selections in our three seed production orchards; caring for those orchards, and collecting the seed for our nursery's crop of more than 20 million seedlings.

Research projects are designed to provide information in support of VDOF's strategic plan goals. We continue to organize the program in primary subject areas including: pine genetics/tree improvement; pine silviculture; hardwood silviculture; diminished species restoration, and forest growth and yield modeling. And we continue to collaborate on regional and national studies through our memberships in the Cooperative Tree Improvement, Forest Productivity and Forest Modeling research cooperatives.

PINE GENETICS/TREE IMPROVEMENT

The tree improvement program continues to improve the variety and growth rates of the loblolly pine seedlings grown at our Garland Gray Forestry Center and distributed to the landowners of the Commonwealth. Primarily as a result of our long affiliation

with the North Carolina State University Cooperative Tree Improvement Program, we now offer seedling families and mixes that range from 25 to more than 60 percent greater in productivity (growth rate) than those available before selection and breeding efforts began more than 50 years ago. The 2011-2012 nursery crop includes 4 million seedlings from our traditional second generation orchard mix; 5 million from our new third-cycle orchard; 14 million from our 3rd and 4th best families ("premium"); 1.5 million from our top two second-generation families ("elite"), and a quarter million each from our first-ever mass controlled pollination (MCP) work and our very best family from the third cycle of breeding ("Virginia's Best"). Our MCP efforts will continue on a modest scale, with a goal of providing 250,000 seedlings per year of this genetically uniform offering. In addition, we have in progress studies to determine optimum pollination frequency, pollen quality and amount of pollen per bag to further improve the efficiency of our MCP efforts.

PINE SILVICULTURE

Ongoing work in pine silviculture includes studies of: combinations of thinning and nutrients for maintaining forest vigor and increasing productivity (in collaboration with the Virginia Tech/NC State Forest Nutrition Cooperative); growth effects of biosolid applications to those of traditional inorganic fertilizers; effects of planting density and interplanting following mortality to maximize product yields; pre-commercial thinning; long-term growth and yield monitoring, and effects of various competition control methods and strategies.

In addition, we are embarking on a major new study to address emerging policy and silvicultural issues. On Feb. 18, 2011, the U.S. Department of Agriculture's National Institute of Food and Agriculture announced the award of a five-year, \$20 million grant to a consortium led by the University of Florida, to fund research, outreach and education to develop and transfer better management methods for southern pine, notably loblolly pine. The field trial for this grant is designed to improve our ability to harness pine forest productivity to mitigate atmospheric carbon dioxide; more efficiently utilize nitrogen and other fertilizer inputs, and adapt forest management approaches to increase resilience in the face of changing climate.

Through our membership in the Forest Productivity Research Cooperative, we are

members of that grant consortium and have begun installation of the test (named "Pinemap") at Appomattox-Buckingham State Forest.

HARDWOOD SILVICULTURE

We continue to evaluate growth responses of Appalachian hardwoods following shelterwood harvests; crop tree release/fertilization; different establishment methods for hardwood planting (particularly in riparian areas under CREP), and planted hardwood seedling size. In 2011, we installed plots for a new study (at the Paul State Forest) to assess the effects of different harvesting systems on hardwood regeneration (both natural and planted, with and without deer browse protection). In addition, we installed a new study to compare the impacts of different brands and styles of tree shelters on the growth of hardwoods in CREP plantings.

DIMINISHED SPECIES RESTORATION

We continue to maintain studies pertaining to three diminished species: shortleaf pine (establishment methods, geographic seed sources); American chestnut (breeding for blight resistance, establishment methods), and longleaf pine (establishment methods, geographic seed source and grafting techniques). In the past year, we have added two new tests to compare the suitability of different geographic sources of longleaf (in collaboration with the USDA Forest Service and Cooperative Tree Improvement Program) and shortleaf (in collaboration with Virginia State University). And we have established a new chestnut breeding and seed production area on the Matthews State Forest.

GROWTH AND YIELD

Plot layout has begun on a test of alternative planting configurations for loblolly pine. With increasing interest in biomass as an emerging market for pine trees, and as our nursery program expands the range of values offered by our seedling crops, it makes sense to think about planting specific genotypes for specific products. To most efficiently use the land base, it is also worthwhile to consider growing these crops on different timelines on the same piece of land. This new study will include seedlings planted for biomass, pulpwood and sawtimber objectives at different densities on alternating rows in the same plantation. The objective is to develop growth and yield information for the various genotypes and target products grown simultaneously in a mixed stand. Locations are planned for Cumberland, Appomattox- Buckingham and other state forests as sites become available.



FOREST INDUSTRY AND MARKETS

Virginia's forest industry and forests provides billions of dollars of economic output and other benefits annually. Although there is a long way to go for many of the markets to return to pre-recession levels, and there are still many challenges ahead, the last year has seen some positive signs after several years of decline. Challenges going forward will include changing forest markets; a slow economy; changing demographics and forestland ownership; loss of forestland, and concerns on the sustainability of the resource. With 80 percent of Virginia's forests owned by private landowners, the future of the industry and available markets will depend on ensuring that the values and benefits they seek for owning forestlands complement each other. The Department of Forestry continues to be very active in looking for solutions to improving markets and value for Virginia's forests.

Industries and markets that are becoming more active include bio-energy; forest products exports, and utilization of new technology and advanced manufacturing. Over the last year or two, there have been several announcements for and construction of biomass energy plants in Virginia, including three coal-to-biomass conversions – Dominion Power, NOVI Energy biomass plant, Ferrum College biomass plant – and updates and expansions of systems by MeadWestvaco and Longwood University. There have also been several wood pellet mill announcements along with the Enviva pellet export facility in Chesapeake. While these plants have been very welcome, as with new major-market expansions, there are concerns with volatility, resource availability and sustainability and competition with existing markets and industry.

More Virginia forest industries are expanding into exporting their products,

opening up new market opportunities.

This has been critical to many businesses' survival as domestic demand decreased. The low value of the dollar, export-related programs and excellent port facilities should continue to expand export opportunities.

The Department of Forestry continues to work 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.

The VDOF continues to address issues identified by the Forest Industry Roundtable in 2009. Working with partners, we are analyzing barriers that are preventing more landowners from participating in forest certification programs. We are also looking at how the barriers affect timber harvesters and primary industry. As demands for documenting the sustainability of forest products increase, it is important that our landowners and industry can provide those assurances. Additional activities included developing a priority list upon which agencies can focus, including educational activities, technical assistance and governmental issues that impact business growth.

The VDOF has continued to expand partnerships to focus on changes to forest markets and industry. These partnerships not only enable us to utilize the expertise of multiple sources, they also have opened up opportunities to additional grants and funding to promote business and job creation. Working with state agencies, such as the Virginia Economic Development Partnership (VEDP) and the Virginia Department of Agriculture and Consumer Services (VDACS), we work closely to promote new and expanding forest-related business formation in Virginia. An example of this is the new promotional effort for wood products under the Virginia Grown program that will be implemented next year.

Other partners, including the Virginia Biomass Energy Group; 25x25 Initiative; Virginia Forest Products Association; Virginia Forestry Association; the Tobacco Commission; Virginia Association of RC&D Councils, and Virginia Tech, also work with the VDOF to promote sustainable forest markets.

The VDOF has been working closely with our partners to be a leader in the advancement of renewable energy opportunities for

landowners and business. We are promoting biomass energy development to provide markets for low-value wood that is generated from forest management and health operations, disaster clean up, urban areas and manufacturing. A plan has been developed for the Matthews State Forest to have a focus on renewable energy with educational programs and demonstrations of various technologies. There has been wide support from a variety of entities to implement this project. Other efforts include working with partners on a statewide biomass inventory report that will be published soon to assist in identifying resources for bio-energy production; working with institutions and private firms to convert to or expand the use of thermal and combined heat and power biomass energy systems, and developing a community wood energy program.

As forest landowner, industry and market demands increase and/or change, new forest operators and service providers are needed to address these demands. The VDOF continues working with partners to identify these changes and develop programs to assist businesses, mostly through educational and outreach efforts, with these new opportunities and also help in developing new businesses. Types of business opportunities include: operations that focus on small woodlot or community forest activities; utilizing urban wood; harvesting biomass for energy production; invasive species control and natural disaster mitigation, and ecosystem services assistance.

Associated with these efforts are projects to promote rural development activities through specialty forest products. Projects include VDOF's work with developing small-scale natural lump charcoal production from invasive species and other low-value woods and providing small-scale forestry and wood products companies support.

Also associated with improving conditions for local landowners and communities is the VDOF Resources Conservation and Development (RC&D) program that focuses on local grassroots efforts to address issues within the seven RC&D Council Areas in the state. The VDOF has had a cooperative agreement with the USDA Natural Resources Conservation Service (NRCS) for more than 20 years to help support an RC&D forester. Although future activities will need to adapt to changing federal policies and funding, this partnership has a long history of meeting locally identified needs and attracting large amount of additional resources to Virginia. A related activity has been the NRCS Technical Service Provider program that has promoted cost-share and management activities for forest landowners and worked to develop more service providers.

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.

Although a small program area within the VDOF, utilization and marketing is working with partners 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.



URBAN AND COMMUNITY FORESTRY

Clean air, water quality, community revitalization, business district enhancement, community health and well being, viewshed protection, aesthetics and contact with nature are all important benefits of Virginia's urban and community forests. Through its Urban and Community Forestry (UCF) Program, the Department of Forestry helps Virginia communities maintain and enhance their community forests.

The Department provides technical assistance to communities of all sizes. It provides expertise on tree selection and long-term tree maintenance through direct contact with communities as well as through a variety of workshops and conferences. The Tree City USA® program promotes standards for community forestry. Participation reached 57 communities and military installations with a combined population of more than 4.5 million during 2011. In addition, a second Tree Line USA® utility company was added in 2011 as Dominion Power joined this program.

Through its Urban and Community Forestry Assistance Program, the Department supports the capacity building efforts of municipalities, county governments, non-profit organizations and educational institutions. It has assisted 65 cities and towns, 24 counties, 67 non-profit organizations, and a number of universities, colleges and community colleges. The Department also administers project support with funds under the Water Quality Improvement Act (WQIA). Under the WQIA Regional Grant, VDOF's Urban and Community Forestry Program supported 12 community water quality projects that involved tree planting and other habitat improvement in the 2010-2011 grant cycle. Many of the projects utilize volunteers to implement, consequently, they also learn about the benefits of trees in improving water quality.

The UCF Program maintained strong partnerships with

Virginia Tech and the University of Virginia, as well as several community colleges. At Virginia Tech, the program supports the urban and community forestry curriculum in the School of Natural Resources, and the Urban and Community Forestry coordinator serves on college's advisory board. Under his leadership in 2011, the school developed a three-year strategic plan for the urban forestry program. The program is a major supporter of the Community Design Assistance Center (CDAC) that provides open space and landscape design planning to interested communities. CDAC's projects help underserved communities across the state. At the University of Virginia, the program has a strong partnership with the Virginia Natural Resources Leadership Institute (VNRLI), providing both financial and training support. VNRLI focuses on critical natural resource issues; conflict resolution through collaborative effort, and leadership.

VDOF made significant progress in helping Virginia's municipalities establish urban tree canopy (UTC) goals. The Chesapeake Bay Agreement has identified the development, retention and enhancement of urban tree canopy as an effective strategy to improve the health of the Chesapeake Bay, based on USDA Forest Service research that has shown that urban tree canopy makes a significant contribution to urban water quality and storm flow reduction. Virginia has now provided 27 communities with assistance in evaluating their urban tree canopy and is working aggressively to help these communities establish UTC goals.

The Department is partnering with and/or supporting efforts in a number of Planning District Commissions to develop and conserve green infrastructure networks. Green infrastructure networks have already been mapped and presented to elected officials for inclusion in long-range comprehensive plans in several counties. VDOF has established a partnership with the Green Infrastructure Center (GIC) to continue and expand this work. VDOF is also supporting a green infrastructure curriculum for graduate planning students at the University of Virginia. In 2011, VDOF secured a large USDA Forest Service grant to develop a green infrastructure process manual and to deliver several workshops across the state.

URBAN STORM RESPONSE

VDOF has trained 24 members of its staff who are ISA-certified arborists to become members of urban forest storm damage response teams. Ten of its response team members are now qualified as team leaders and

have assisted with the training of personnel from other southern states. These urban forest storm response teams are trained to assist storm-damaged communities by coordinating with FEMA and state emergency response agencies to provide estimates of tree debris as well as assess the condition and safety of the residual urban forest. In a new development in 2011, the Department formalized a memorandum of understanding (MOA) with the Virginia Department of Emergency Management (VDEM) specifying how that agency will call on the UFSTs.

GREENWAYS

The Department has been encouraging the development of greenway projects throughout the Commonwealth. Greenways are environmental corridors that often contain recreational amenities, such as trails and parks, and are important components of a community's green infrastructure. The Department works closely with the Department of Conservation and Recreation (DCR) and the National Park Service (NPS) to assist interested communities. The Department's role in the greenway arena is to provide conceptual planning and see that projects gather grassroots support. This partnership has resulted in the implementation of several successful projects. In 2011, VADOF hosted a greenway tour in Luray for representatives of several SW Virginia communities and identified potential new projects in Spotsylvania and Wise counties.

VIRGINIA URBAN FOREST COUNCIL

Through its partnership with Trees Virginia (the non-profit Virginia Urban Forest Council), the Department continued to host the quarterly Northern Virginia Urban Forestry Roundtable. Trees Virginia also sponsors other educational events and uses the profits from these efforts to support scholarships for students in forestry and horticulture. The annual workshops held in Waynesboro, Roanoke and northern Virginia continued to draw large crowds. The Department and Trees Virginia worked to expand the number of volunteer tree steward groups across Virginia. These citizen volunteer groups assist municipalities in caring for public trees.

AMERICAN RECOVERY AND REINVESTMENT ACT (ARRA)

In 2011, the majority of projects funded through the American Recovery and Reinvestment Act of 2009 (federal stimulus funding) were implemented. These funds, totaling \$1.1 million, were obtained through the U.S. Forest Service in two large grants focusing on the Shenandoah Valley and Southside Virginia. Funding was directed to projects including public tree planting; hazard tree removal; tree maintenance; greenway planning and enhancements, and stream bank restoration/stabilization. Funding supported 10 projects in Southside Virginia and 32 projects in the Shenandoah Valley.

CERTIFIED ARBORIST PROGRAM

The Department continues to support the training and professional development of ISA-certified arborists. The Department has 32 certified arborists on its staff, more than any other state forestry agency in the South.



ACCOMPLISHMENT REPORT

JULY 2010 - JUNE 2011

Objectives	Goal/Target	Accomplished
Goal 1: Protect the citizens, their property and the forest resource from wildfire.		
Measure 1.1.1: Percentage of human-caused fires.	94.7%	92.5%
Measure 1.1.2: Percentage of eligible rural volunteer fire departments receiving available state and federal financial assistance.	40%	39%
Measure 1.1.3: Agency preparedness assessment score	75%	98%
Goal 2: Protect, promote and enhance forested watersheds, non-tidal wetlands and riparian areas.		
Measure 2.1.1: Cost to conduct a forest harvest water quality inspection.	\$10.34	\$8.85
Measure 2.1.2: Percentage of Best Management Practices implemented on timber harvesting operations.	85%	84.5%
Measure 2.1.3: Percentage of annual allowable harvests actually harvested.	80%	81%
Goal 3: Improve the stewardship, health and diversity of the forest resources.		
Measure 3.1.1: Percentage of eligible Reforestation of Timberlands incentive received by landowners.	92%	96%
Measure 3.1.2: Number of forestry management projects implemented on private land.	2,600 projects	3,301 projects
Measure 3.1.3: Number of acres of all forest management plan types achieved on private and appropriate public forestland.	135,000 acres	111,242 acres
Measure 3.1.4: Number of communities assisted with forest and/or tree resource management.	110 communities	128 communities
Goal 4: Conserve the forestland base.		
Measure 4.1.1: Number of acres of forestland established and/or protected in Virginia watersheds.	3,500 acres	3,292 acres
Goal 5: Promote forest industry and diversified markets for forest landowners including ecosystem service markets.		
Measure 5.1.1: Number of presentations/workshops/events promoting forest industry and markets.	6 events	16 events
Measure 5.1.2: Number of presentations/workshops/conferences and projects developed to promote market opportunities for landowners.	10 events	27 events
Goal 6: Collect, maintain and disseminate forest resource inventory and applied research information.		
Measure 6.1.1: Number of research reports issued annually.	8 reports	14 reports
Measure 6.1.2: Number of forest inventory count panels measured annually.	1 panel	1 panel
Measure 6.1.3: Percentage of State Forest Management Plans updated annually.	100%	100%
Goal 7: Manage agency resources to effectively and efficiently accomplish the strategic initiatives.		
Measure 7.1.1: Percentage of customers who rate the quality of VDOF's seedlings as satisfactory.	90%	100%
Measure 7.1.2: Percentage increase in net revenue generated by the state nurseries.	5%	2.77%