

REPORT OF THE
STATE FORESTER, DEPARTMENT OF FORESTRY

**ANNUAL REPORT ON THE ACTIONS, CONCLUSIONS
AND RECOMMENDATIONS FOR CONSERVING THE
COMMONWEALTH'S FOREST SUPPLY**

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA



COMMONWEALTH OF VIRGINIA
RICHMOND
2007

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January 15, 2008

The Honorable Timothy M. Kaine
Governor of Virginia

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 2007 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 to this regard.

Sincerely,

Carl E. Garrison, III
State Forester



2007 STATE OF THE FOREST



ANNUAL REPORT
ON VIRGINIA'S FORESTS

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FROM THE STATE FORESTER

This third edition of the annual State of the Forest Report is a candid assessment of the challenges and opportunities facing not only the Virginia Department of Forestry but the quality of life in the Commonwealth. There are several positive indicators contained herein, but there are some major issues that threaten the health and viability of our forests.

The **business of forestry** (estimated to provide more than \$27 Billion in annual benefits to Virginia) has been aided greatly by the **science of forestry** as practiced by this Agency. VDOF foresters and forestry technicians in the field are helping forest landowners meet their objectives by advising them on the application of effective forestry practices to their individual tracts. Agency researchers are proving that low-density plantings of genetically improved loblolly pine seedlings can yield well-stocked stands with high-quality crop trees, and that hardwood crop-tree release combined with fertilization can nearly double tree diameter growth. Both of these are good news for forest landowners.

Through our newly-enhanced water quality program, we now have additional, well-trained water quality specialists working with timber harvesters to ensure Virginia's water supplies in or adjacent to harvest sites remain clean. This helps reduce the need for expensive water treatment systems for individuals and municipal governments. And it can save timber harvesters and forest landowners money by avoiding costly fines because their actions aren't fouling area waterways.

Forests help clean our air, clean our water, moderate the climate, provide habitat for animals and plants, and offer unparalleled beauty. In Virginia, these "eco-systems services" are worth more than \$1.7 billion annually, yet they cost most people nothing.

Each day, more and more forest land is developed for other purposes, and this land-use change is one of the greatest challenges facing Virginia. Unless we reverse the loss of 27,300 acres (up from 26,100 last year) of forest land each year, all of the many benefits offered by our forests are at risk and so is the quality of our life.

To learn more about your Virginia Department of Forestry, I invite you to read the rest of this report. Thank you for your support as we protect and develop healthy, sustainable forest resources for Virginians.

Sincerely,



Carl E. Garrison III
State Forester

VIRGINIA FOREST TRENDS

FORESTED LAND

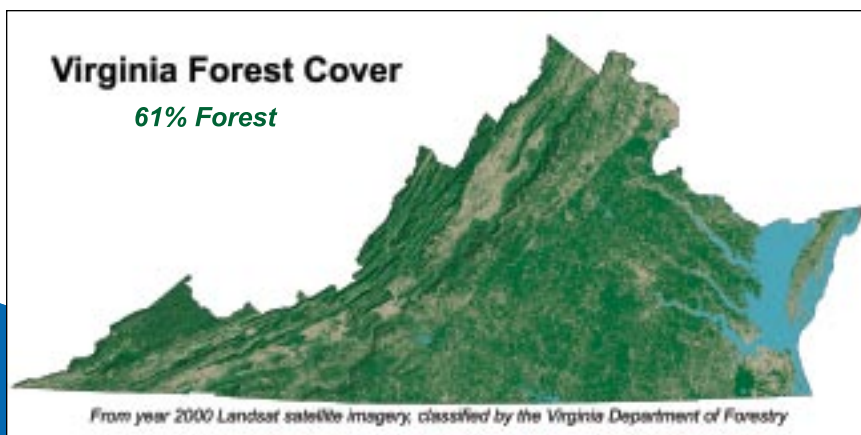
More than 60 percent of the Commonwealth – a total of 15.76 million acres – is forest land. But pressure to develop this land continues to increase. This push to develop led to a loss of 27,300 acres of Virginia forest land in the 2006-2007 fiscal year. This is up from the year before when we were losing 26,100 acres per year. As a comparison, Virginia's largest state forest (Appomattox-Buckingham State Forest) is just under 20,000 acres in size. This loss of forest land is a disturbing trend that will have consequences for all Virginians, and, if the trend continues, Virginia could lose 1 million acres of forest land within 25 years.

FOREST OWNERSHIP

Most of Virginia's forest land (13.0 million acres) is privately owned. More than 384,000 individuals or families control a total of 10.1 million acres – the largest category of ownership. These private holdings range from a few acres of woodlands to several thousand acres in size. Most parcels are relatively small (75 acres or less).

Corporate ownership of forest land amounts to 2 million acres, including 1 million acres held by forest products firms. But these firms have been selling off large portions of their holdings, a trend that began in 1992. Timber investment management organizations (TIMOs) and real estate investment trusts (REITs) have purchased more than 300,000 acres of the forest land divested by forest products firms. While these new owners have maintained professional forest management and slowed the subdivision of former industry land into smaller parcels, the long-term trend is likely to be further subdivision and development of these lands as these entities seek to maximize profits for their investors.

Virginia's remaining forest land (2.7 million acres) is owned by federal, state and local governments. The Virginia Department of Forestry, through its 17 state forests, controls just 49,000 of those 2.7 million acres.



FOREST BENEFITS

Each year, Virginia's forests provide more than \$27 billion in direct economic benefits to the Commonwealth. These economic benefits include:

- ▲ More than \$25.2 billion generated by the forest products industry and related activities;
- ▲ \$276 million paid to forest landowners for the harvest of products;
- ▲ 183,898 jobs in the forest products industry, and
- ▲ Forest-related recreational spending in excess of \$2.4 billion.

In addition to the direct economic benefits, the extensive cover of forest land in Virginia provides its citizens with many valuable ecological services, including:

- ▲ Protection of water quality;
- ▲ Protection of air quality;
- ▲ Aesthetic quality;
- ▲ Moderation of climate, including the offsetting of carbon emissions that contribute to global warming, and
- ▲ Provision of habitat for many plant and animal species.

These "non-market" services have been conservatively valued at more than \$1.7 billion annually.



FOREST SUSTAINABILITY

“We envision forest resources that support and enhance a healthy living environment.”

“We protect and develop healthy, sustainable forest resources for Virginians.”

-DOF 2014 Shaping Virginia’s Forests (Strategic Plan)

Is the current use and management of Virginia’s private and public forests maintaining healthy forests, and is this sustainable? To best answer these questions, we must first look to see if we are growing as much as is being harvested. In this case, the answer is yes. Programs of reforestation and forest management have maintained the growth of trees at a level higher than the amount removed. For every unit of hardwood volume harvested, 1.19 units are replaced by growth. For every unit of softwood (pine) volume harvested, 1.08 units are replaced by growth.

The growth to removal ratios are down somewhat from last year’s estimates and much of the decline can

be attributed to declines in the ratios in the Coastal Plain of Virginia. On September 18, 2003, Hurricane Isabel made landfall on the Outer Banks of North Carolina and continued on a north-northwest track into Virginia. Hurricane Isabel caused significant damage throughout the Coastal Plain and hurricane-force winds were felt in up to 20 Virginia counties. Previous studies have shown that category 1 hurricane-force winds cause forest damage ranging from 0.5 percent to 5.0 percent of merchantable forest stocking, with the degree of damage depending upon soil conditions, tree age, prior forest management, prior forest health and tree species. At the time, a quick estimate of the damage was made by VDOF – roughly a 3.0 percent loss for pine and a 1.5 percent loss for hardwood. Some of the damaged timber was salvaged and some was left on the ground.

The impact of Isabel will be reflected in two ways within the forest inventory data. First, increases in removals may result from salvage logging. Second, increases in mortality may be observed, resulting in direct decreases in net growth. Both impacts will result in a lower ratio of growth to removals.

Careful analysis of the most recent Coastal Plain data, in which about half of the plots have been measured since Isabel, indicate changes in removals, mortality and net growth that approach but do not, in any case, exceed half of the volume impact initially estimated from Isabel. Insufficient data are available to accurately tease out Isabel damage from other trends that may be going on in the resource. Nevertheless, it is reasonable to assume that some, if not all, of the decrease in growth to removal ratios in the Coastal Plain can be explained by the impact of the hurricane.

Are we maintaining a good mix of forest types and a good age structure? Again, the general answer is yes.

Virginia has more than 12.1 million acres of hardwood and hardwood-pine forest. This area of hardwood types has shown a steady increase since 1940 when 8.1 million acres of



hardwood types existed. The hardwood forests of Virginia are maturing, with more than 7 million acres in stands 60 years old or older. Since the first survey was conducted in 1940, board-foot volumes have more than tripled – from 24.3 billion to 90.6 billion board feet. But the picture is not perfect as we face challenges in the regeneration of young oak trees to replace the mature oaks, which dominate our forests. The exclusion of fire and high-grading harvest practices are major factors that limit oak regeneration.

Pine forests represent approximately 3 million acres of Virginia’s forest land. This is a decline of more than half of the 6.2 million pine acres found during the 1940 survey. Plantations of pine have helped slow the decline of pine forests, and these plantations now account for more than 1.5 million acres of the 3 million pine acres. Pine plantations are able to offset the loss in acreage of pine stands because of higher production from intensive management techniques. This will increase in the future with the continued use of genetically improved seedlings from the Virginia Department of Forestry nurseries. Natural pine stands, especially those of shortleaf, pitch and table-mountain pine, have declined significantly – especially in the mountains and largely due to southern pine beetle infestations.

Special forest types found in Virginia include the Atlantic white-cedar swamps of the Great Dismal

Swamp; the spruce forests of the Mt. Rogers area; the oak-gum-cypress forests of the Coastal Plain, and scattered remnants of longleaf forest in Southeastern Virginia.

While the sustainability of our use and management is generally high, specific challenges and problems do exist. Some of these will be addressed in the forest health section of this report. What are possibly the largest challenges – maintaining a sufficient area of forest and stemming fragmentation – will be addressed under land-base conservation.



A commitment to reforestation efforts by forest industry companies, such as Vaughan-Bassett’s Reforestation Program, also contributes to the sustainability of forests in Virginia.

PROTECTING OUR FORESTS

Based on a 10-year average, VDOF responds to slightly more than 1,250 wildland fires that burn more than 9,500 acres each year. This activity results in more than 70 homes and other structures being damaged or destroyed by wildland fire each year. At the same time, VDOF efforts protect more than 1,200 homes and other structures valued at more than \$151 million annually.

During fiscal year '06-'07:

- ▲ 1,058 fires burned a total of 9,470 acres of forest land;
- ▲ more than \$4 million in timber was damaged;
- ▲ damages to homes and other buildings exceeded \$750,000;
- ▲ 628 homes, worth nearly \$120 million, were protected, and
- ▲ 412 other buildings, worth an estimated \$13.9 million, were protected.

The Agency relies on a fleet of 200 4x4 pickup truck-based fire engines, nine specially equipped Hummers, five custom-designed 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. A long history of proactive wildland fire prevention, wildland risk assessment and commitment to the protection of woodland home communities from the risks of wildland fires have made Virginia a

national leader in resource protection. Every VDOF employee has a role in wildland fire prevention and protection, either on the fireline or in a support capacity.

VDOF was pleased to acquire a new mobile incident command post as a support vehicle for the Agency's emergency Incident Management Teams (IMTs). The VDOF is the only entity in Virginia with a nationally qualified Type 2 IMT. The command vehicle provides a stand-alone support facility for the Agency's IMT. This support includes radio and phone communications, satellite Internet access and generator-powered computer workstations to provide vital capabilities to managers coordinating emergency response operations.

Virginia Department of Forestry wildland firefighters and support employees also came to the aid of Americans across the nation. During the summer and early fall of 2006, 87 VDOF staff members deployed to other states, including California, Idaho, Montana, Minnesota, Texas, and Nevada, to conduct firefighting operations. In the spring of 2007, an additional 69 employees headed south to Georgia and Florida to help suppress the massive Bugaboo fire that burned more than 400,000 acres.

The Virginia Department of Forestry is a recognized leader in the national Firewise program, which identifies and works with high-risk woodland home communities to reduce the potential for damaging wildfire. The program is based on cooperative planning through the



In May 2007, engine crews load up to head to Florida and Georgia to help suppress fires.



Larry Cochran receives the Governor's Award for Excellence in Fire Service Training from Gov. Tim Kaine.

development of a Community Wildfire Protection Plan (CWPP) with follow-up hazard mitigation projects to reduce the overall threat of wildfire. Virginia is one of the national leaders in the number of completed CWPPs and is second in the nation for the number of certified Firewise Community USA communities at 22, a national program that recognizes communities for their efforts.

DRY HYDRANT PROGRAM

The Virginia Dry Hydrant Grant Program is funded by the General Assembly using money from the Fire Programs Fund Bill. The program is administered by the Department of Fire Programs and the Department of Forestry and is assisted by an advisory committee.

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. Using the \$100,000 appropriated last year, a total of 82 new dry hydrants were installed through the program. This is a 64 percent increase in the number of hydrants installed over the previous year.

Fire departments submit grants based on established priority locations; secure any local permits necessary, and obtain landowner permission for the establishment of a dry hydrant. There is a standard specification for dry hydrant installation, so any special requirements or additional costs would have to be borne by the specific fire department. Communities and homeowner associations can obtain a dry hydrant by working with the local volunteer fire departments to secure a grant.

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 inception of this program in 1975, a total of 4,717 grants have been made that have provided almost \$2.2 million in matching grant funds.

The grant program improves the capability and effectiveness of America's 26,000 rural Volunteer Fire Departments – 585 of which are 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 2006, a total of 155 rural Volunteer Fire Departments in Virginia received \$201,992 in Title IV VFA funds. Requests for these grants greatly exceed the available funding each year.

PROTECTING VIRGINIA'S WATER QUALITY

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. The Virginia Department of Forestry has been involved with the protection and enhancement 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 is now utilizing the fourth edition of those guidelines, and has circulated copies of its latest version both nationally and internationally. 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 as well as a welcomed opportunity to educate the operators on BMPs and the latest in water quality protection techniques. In fiscal year 2006-2007, VDOF field personnel inspected more than 5,400 timber harvest sites covering 229,423 acres across Virginia.

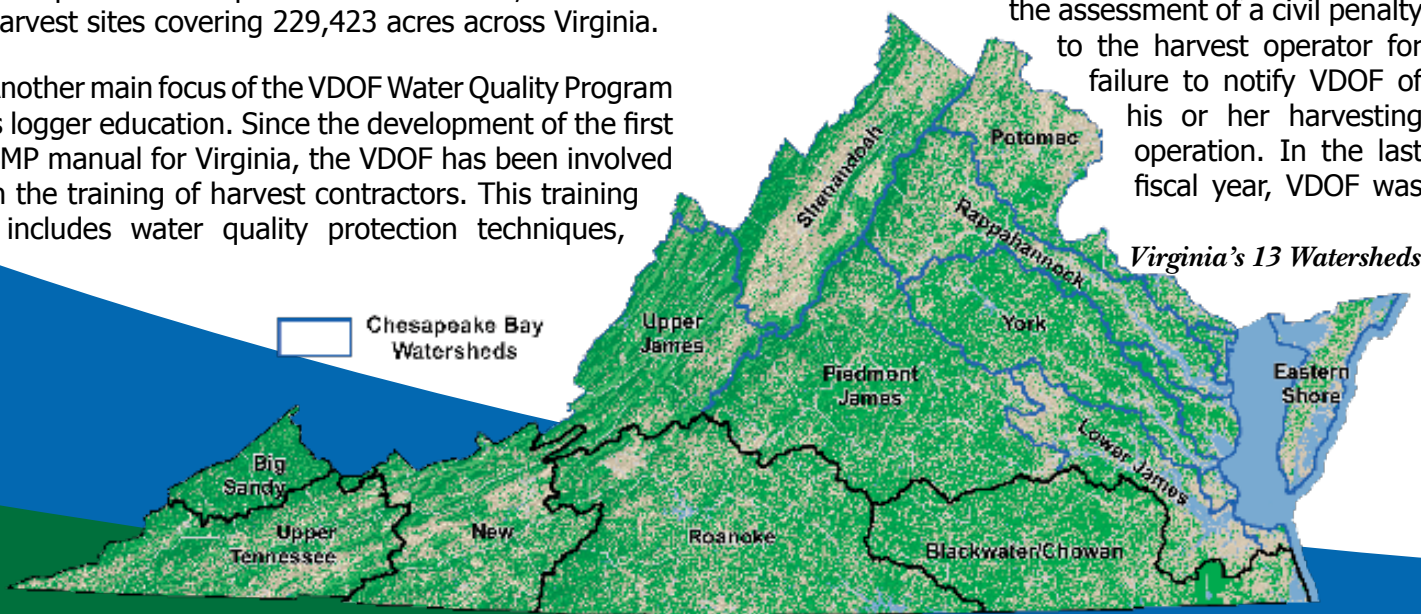
Another main focus of the VDOF Water Quality Program is logger education. Since the development of the first BMP manual for Virginia, the VDOF has been involved in the training of harvest contractors. This training includes water quality protection techniques,

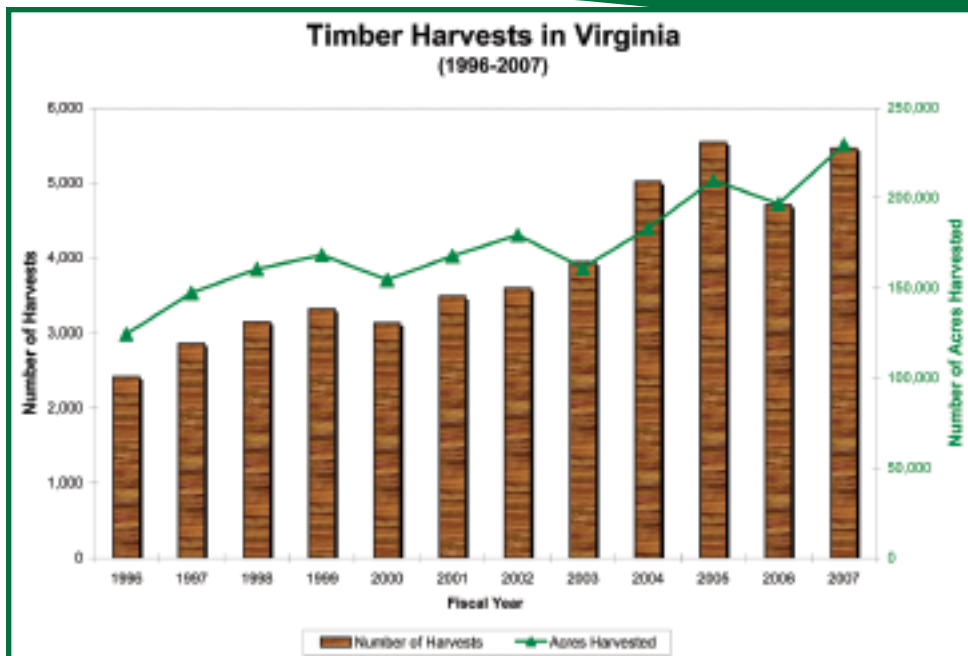
such as harvest planning, map reading, and the use of GPS units to BMP implementation. This occurred through training sponsored by VDOF as well as through VDOF participation in the Sustainable Forestry Initiative® program and the Sustainable Harvesting and Resource Professional (SHARP) Logger Training Program. Since 1996, this program has enabled VDOF to assist in the training of 5,800 harvesting professionals in 170 programs relating to water quality protection. In the last fiscal year, 517 harvest professionals took part in the 14 training programs offered. Four of these 14 programs were in the core area and had a total of 152 attendees. The remaining 10 courses were logger continuing education programs that were attended by a total of 365 individuals.

In July 1993, the Virginia General Assembly – with the support of forest industry – enacted the Virginia Silvicultural Water Quality Law, 10.1-1181.1 through 10.1-1181.7. The law was created to provide Virginia with an enforcement mechanism to address water pollution originating from silvicultural activities. 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. The law has been amended twice since 1993 – once in 1998 to provide for notification of timber harvesting operations by the harvest operator, and again in 2002 allowing for the assessment of a civil penalty

to the harvest operator for failure to notify VDOF of his or her harvesting operation. In the last fiscal year, VDOF was

Virginia's 13 Watersheds





cost-share to timber harvesting contractors who implement appropriate BMPs on eligible stream crossings. The projects must be pre-approved by VDOF and the harvesting contractors must be SHARP Logger-certified in order to participate in the program. Funding is available for culvert pipes of appropriate size; equipment time to construct water diversion structures, as well as material to revegetate the harvest site. The one feature of the program that will likely have the longest lasting effect on water quality in Virginia is the cost-share available for the

purchase of portable timber bridges that will continue to provide water quality protection for sites beyond that for which they were purchased.

In its inaugural year, the BMP Logger Cost-Share Program funded 96 BMP projects across the Commonwealth, with 60 percent of those being in the Chesapeake Bay Watershed. Eighty-seven of the 96 projects involved the purchase of portable bridges.

The Water Quality Improvement Fund also provided funding for 28 projects involving innovative BMPs for urban and riparian areas. These projects included installation of demonstration areas involving rain gardens, riparian stream restoration and riparian buffer establishment.

VDOF has reorganized the Water Quality Program and brought it under the umbrella of the Forest Resource Management Division. The program has been bolstered by the addition of nine new Water Quality Specialist positions to assist in the field implementation of BMPs and to ensure that the waters of the Commonwealth are protected from the impacts of timber harvesting.

involved with 552 water quality actions initiated under the Silvicultural Law. Of these actions, 37 resulted in Special Orders being issued for violations of the law. Three of the Special Orders resulted in the issuance of civil penalties. All 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. There have been 23 audits conducted, the latest of which shows that harvest operators are making an effort to implement Best Management Practices on 97 percent of the sites on which they operate, and that there is no evidence of active sedimentation on 94 percent of those sites. On those sites where sedimentation does occur, remediation actions are required. The audit process is under review to add more tracts and to be able to acquire more specific information on areas to concentrate additional training for harvest operators.

During the 2006 fiscal year, VDOF developed and implemented a BMP Logger Cost-Share Program. Funding for this unique initiative was made available through a grant for the Commonwealth's Water Quality Improvement Fund, which is administered by the Department of Conservation & Recreation. This program provides a 50 percent

CONSERVING THE FOREST LAND-BASE

The Virginia Department of Forestry has made significant commitments to conserving working forest lands in the past year. The agency created the position of Assistant Director for Forest Land Conservation to oversee statewide efforts. And, we are in the process of adding three regional forest conservation positions – one each in Portsmouth, Richmond and Charlottesville.

Initial goals of the VDOF conservation program include: identifying forest lands that provide the greatest benefits to the state and focusing our efforts there; conducting education and outreach to landowners on the need for and methods of forest land conservation; training agency staff to guide landowners through the land conservation process; encouraging sustainable forest management on all conserved lands; implementing new tools and strategies for forest land conservation in Virginia; accepting conservation easement donations on working forest lands, and building partnerships with other agencies and organizations.

The VDOF convened a forest conservation stakeholders working group to develop Virginia's

response to the Chesapeake Bay Executive Council Directive 06-1. The resulting forest conservation plan developed by the Virginia stakeholders group will reduce the loss of forest land through a combination of short- and long-term protection strategies as well as permanent protection of targeted forest lands. GIS analysis was used to focus conservation tools and strategies on forests that provide the greatest benefits to water quality and that are at the highest risk for conversion. These strategies will result in the permanent protection of 121,000 forested acres within the Bay watershed by 2012 and 315,000 acres by 2020.

The VDOF is working to add three new large State Forests – one in Southwest Virginia; another in the Southern Tidewater, and the third on the Middle Peninsula – to the 17 already owned by the Commonwealth. The land for the new forest on the Middle Peninsula is being purchased from The Nature Conservancy using funding from the Forest Legacy program – a nationwide program run by the USDA Forest Service to protect working forest lands that are threatened with conversion.

The new state forests in Southwest Virginia and in Tidewater were partially funded by awards from the Virginia Land Conservation Fund (VLCF). VLCF provides grants for conservation of parks, open space, natural heritage sites, historic resources, farms and forestry. VLCF also provided funding to purchase a conservation easement on a mature hardwood forest on the banks of Piscataway Creek in Essex County.

The VDOF has been working to develop guidelines and procedures for accepting donated conservation easements on working forests. For 2007, we are working with seven landowners on donated easements.

The agency has been working with other state agencies to find ways to meet Governor Kaine's goal of conserving 400,000 acres by 2010. Working forests play an important role in achieving this ambitious goal. We are working on a new MOU with the Nature Conservancy.



FOREST RESEARCH

The Forest Research Program serves the citizens of Virginia by investigating and demonstrating emerging forestry technologies and issues. The studies help the VDOF to provide the best current technical advice to landowners. The research program is divided into four primary project areas: 1) pine silviculture; 2) hardwood silviculture; 3) tree improvement and restoration; and 4) forest growth and yield measurement and projection. In the past year, we have made noteworthy progress in existing study areas and initiated several new tests.

PINE SILVICULTURE

Our study of loblolly pine planting densities from 200-400 trees per acre (tpa) continues to show that relatively low-density plantings of genetically improved loblolly pine seedlings can result in well-stocked stands with high-quality crop trees with mean diameters approaching 10 inches by age 17. The 300 and 400 tpa stands could support a merchantable thinning now, and the 300 tpa stand will likely have greater stand vigor, residual crop tree diameter, and ability to regain wind and ice-firmness more quickly after thinning. The 300-400 tpa range may be good for single-thinning management regimes where thinning cannot be done until after 17 or 18 years of age. The 200 tpa stand may be a better choice for areas where thinning is not practical.

Through our collaboration with the NC State/VPI Forest Nutrition Cooperative, we are expanding our work in the area of forest fertilization. We completed installation in Essex County of a replicated study comparing the effects of bio-solid application compared with traditional fertilizer on the growth of a

Pine cones are collected and seed extracted for next year's pine seedlings.



loblolly pine stand. We have also established a test of planting density and fertilizer effects on loblolly pine in Buckingham County. And we are beginning work on a test of thinning and fertilizer impacts.

HARDWOOD SILVICULTURE

Our study of hardwood crop tree release and fertilization on the Appomattox-Buckingham State Forest shows that although heights have not been strongly affected by any of the treatments, diameter growth has increased by nearly 50 percent with release and has nearly doubled when both release and fertilization occur. We believe this technique could offer small landowners a low-cost option for enhancing the species composition and value of their hardwood stands.

A comparison of the field performance of different-sized hardwood seedlings was installed in early



June. White oak, northern red oak, sawtooth oak, and pin oak seedlings of varied root collar diameters were outplanted at the Augusta Forestry Center. We will check survival and growth this winter to see how it varies with initial seedling size.

VDOF collects acorns annually, the seed for next year's hardwood seedlings.

TREE IMPROVEMENT AND RESTORATION

We continue to strive to offer the best loblolly pine seedling value for reforestation efforts in Virginia. The VDOF collects seed of individual families in our second- and third-generation orchards, which enables us to provide a range of value options to better match the reforestation objectives of individual landowners. We are using historical data from the Tree Improvement Cooperative to estimate the dollar value per acre of using more refined mixes of the top families.

Also in 2007, we have completed establishment of the final block of our 3rd generation loblolly orchard; begun installation of the next cycle of progeny tests, and collected sufficient seed from native Virginia



VDOF established and maintains numerous seed orchards to collect data and seed for future generations of seedlings.

longleaf pine to grow a crop of more than 50,000 seedlings for restoration efforts in 2007-2008.

GROWTH AND YIELD

Early data from our long-term growth and yield plots is being used to test the accuracy projections from published models. We are finding generally good agreement, which provides confidence in using these models to make faster more cost-effective decisions about investments in forest management. For example, the Loblolly Pine Decision Support System developed through our collaboration with the Forest Nutrition and the Growth and Yield cooperatives integrates a number of models to give our foresters a user-friendly method of comparing the effects of different silvicultural options on forest structure and cash flow during the life of the stand.

Our thinned yellow-poplar growth and yield plots on the Lesesne State Forest show that after 17 years of post-thinning development, the unthinned plots still contain more basal area than those that were thinned. But trees on thinned plots average nearly 100 feet in height and 14 inches in diameter compared to 73 feet in height and 10 inches in diameter for trees in unthinned stands. The rapid volume growth on these plots (18,000 - 32,000 board feet per acre in 34 years) attests to the high site quality for yellow poplar on these eastern foothill slopes of the Blue Ridge.

Below is the female flower of longleaf pine; controlled pollination is part of our effort to restore this native species.



FOREST STEWARDSHIP, DIVERSITY AND HEALTH

FOREST STEWARDSHIP

The key to successful forest management is good planning. VDOF and cooperating foresters developed more than 3,100 professional management plans based on landowners' objectives and the conditions of the forests. During the 2006-2007 fiscal year, these plans covered 128,007 acres of Virginia forest land and involved landowner objectives ranging from timber production to wildlife management to recreational forest use.

Renewing forests following harvest, as well as establishing new forests, is critical to sustained management. In the last fiscal year, 81,007 acres were renewed through tree planting, with pine being the species most commonly planted. In addition, large areas (mostly deciduous or hardwood trees) were successfully managed for natural regeneration. Active forest management practices, such as forest stand improvement and thinning, were conducted on nearly 60,000 acres. Well-managed forests foster stand health through the culture of the appropriate type of tree growing in the right locations, with sufficient space to thrive.

Planning and professional advice prior to harvest is the key to successful resource management. Pine forests in Virginia have been very successfully and intensively managed through genetic improvement of seed, planting, and intermediate stand treatments. Hardwood forests are more diverse, occupy a much larger acreage and have a longer growth cycle. These

forests produce trees that are used for a wide range of products, from pallets and crossties to high-quality furniture and flooring. Many opportunities remain to improve management of hardwood forests through proper planning and appropriate management practices.



Establishment of new forests is also critical to forest sustainability.

FOREST DIVERSITY

While the acres in pine forest have declined since the 1940 survey, growth rates have increased and have more than kept pace with harvest. Department research efforts have led to programs of genetic improvement of loblolly pine; high-quality seedling production; proper planting density, and the control of competing vegetation. The net effect has been the ability of Virginia's forests to produce more pine volume on fewer acres, allowing more acres to naturally succeed to hardwood forest types.



VDOF foresters assist landowners with forest planning.

Programs of forest genetics and seedling production have been at work for more than 50 years to produce high-quality pine and hardwood seedlings, of locally adapted and improved genetics, needed for reforestation. The loblolly pine improvement program is in its third generation of improvement and has produced trees with much higher stem quality, and growth rates averaging 30 percent higher than unimproved trees. In 2006, our nurseries produced more than 35 million seedlings of pine and hardwoods.

The Agency has identified and targeted several species for restoration work. Specifically, the premier southern tree, the longleaf pine, is being promoted in easternmost parts of the state. Remaining remnant individual trees have been mapped, and used to establish areas for seed production. Acreages of shortleaf pine – a high-quality and once widely distributed species – have plummeted in recent years. Work is underway to establish new seed orchards and increase planting



Work is underway to restore longleaf pine in Virginia.

of this species throughout Virginia. Research is underway to produce American chestnut seedlings that are resistant to the devastating blight that occurred early in the last century.

Taken as a whole, the forests of Virginia are in basic good health, with positive net growth for most forest types, low mortality rates and accumulating biomass. However, specific problems and threats do exist.

FOREST HEALTH

Virginia saw a third consecutive year of drought conditions in 2007. Drought and unusually warm temperatures have been a regular occurrence in Virginia and other parts of the South during the last 10 years. The cumulative effects of drought and severe storms in some locations during the past five to seven years have taken their toll on many trees, particularly urban and landscape trees. Drought and record-high temperatures have exacerbated the impacts on previously stressed trees, leading to widespread secondary insect and disease problems and subsequent tree mortality. Red oak trees are among those that continue to be hard hit, although most tree species suffer from sustained drought.



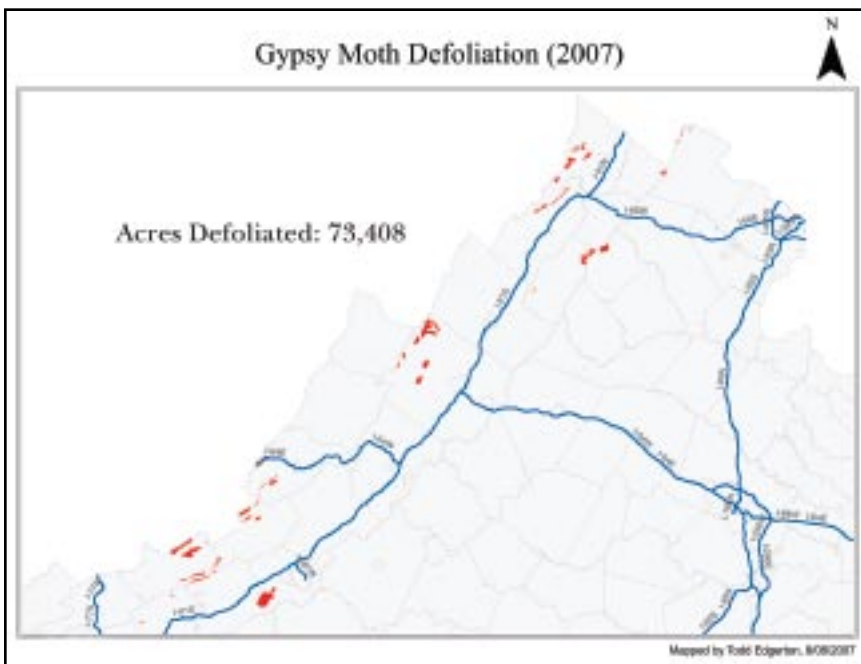
Due to extreme drought conditions, premature leaf browning and some tree mortality on rocky, mountain tops was a common sight in parts of Virginia this year.

This spring, the gypsy moth caused moderate to severe defoliation on more than 73,000 acres of Virginia's forest. This is a substantial increase from the 14,000 acres defoliated last year and represents the highest amount of defoliation in Virginia since 2001. Other states, including West Virginia, Maryland, Pennsylvania and New Jersey, have also seen huge increases in gypsy moth defoliation.

In the Commonwealth, the majority of the defoliation that was detectable from aerial surveys was spread among 13 counties in the mountainous, western portion of the state – from Loudoun County in northern Virginia to Giles County in the southwest (See map). For some areas, such as Bent Mountain near Roanoke, this is the second year of widespread, severe defoliation. A large number of oak trees suffering from complete defoliation two years in a row will inevitably die. The dry spring weather during the last three years has contributed to this gypsy moth buildup. Insecticide spraying is effective at controlling damage locally, but it cannot stop overall gypsy moth numbers from surging once these buildups gain momentum. This means that no matter what we do we are likely to see even greater amounts of damage, possibly hundreds of thousands of acres, in 2008 unless we have very wet weather during the spring.

During wet periods, gypsy moth caterpillars are effectively killed and controlled by a naturally occurring fungus. When it's dry over multiple years, the fungus is not as effective at keeping gypsy moth populations in check. A naturally occurring virus can also cause these populations to crash, but it can often take a number of years of severe defoliation before this happens.

The southern pine beetle has been relatively quiet during the last four to five years. The last significant outbreak was during the late 1990s and had a major impact on pine in the mountains, particularly in southwestern Virginia. As a result, many isolated areas once dominated by pine will revert to hardwood cover. However, the pine resource in central and southeastern Virginia remains healthy and productive. Federal funds from the USDA Forest Service, Forest Health Protection support our cost-share program with landowners for pre-commercial thinning of pine stands. This practice will, hopefully, help mitigate future impacts of pine beetle outbreaks. Other, less aggressive bark beetles have been somewhat active and are able to exploit trees weakened by drought. Pine mortality has been widespread but relatively light in most places. It will only be a matter of time, however, before the next major bark beetle outbreak occurs.



Invasive species remain the most significant threat to forest health. During the last century and most recently, our efforts to keep invasive species from entering North America and wreaking havoc represent a battle that we are largely losing. 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. The pathogen that causes sudden oak death in western forests can potentially devastate Virginia's oaks

and other species, if introduced. Other pathogens that cause butternut canker and dogwood anthracnose diseases threaten those tree species with ecological irrelevance if not eventual extinction. Eastern hemlock faces the same threat from the hemlock woolly adelgid, an insect that has killed up to 90% of the hemlocks in Shenandoah National Park and other areas in Virginia during the last 50 years. The most recent threats include the Asian longhorned beetle and emerald ash borer - wood boring insects that were likely introduced through our ports accidentally via solid wood packing material on ships, a route of entry for many important pests. The emerald ash borer is out of control in the mid-West and is quickly spreading beyond the point where eradication measures are likely to have long-term success. This means Virginia and neighboring states stand a good chance of losing all species of ash trees from their forests in the coming decades, regardless of what money and resources are put towards the problem.

All of this tree mortality in conjunction with trends towards increasing land parcelization and forest fragmentation serve to disturb intact forest and create ideal environments for invasive weeds. Many species of invasive weeds, including trees, shrubs, vines, grasses and forbs, plague Virginia's forests. Some of these plants were brought here by European colonists hundreds of years ago for urban and landscape

plantings and erosion control. What most of these plants have in common are their ability for rapid growth and reproduction and their ability to colonize disturbed habitats, such as roadsides and forest edges. Once established, many invasive weeds are able to encroach upon intact forest, out-competing native plant species. Complete eradication of well-established invasive plants is all but impossible and management is often impractical. Forests dominated by invasive weeds typically have less biodiversity, productivity and natural beauty.

Many of these devastating pests are only of secondary importance in their native habitat or were completely unknown to science prior to their introduction. Therefore, current risk analysis procedures designed to forecast potential problem pests before their arrival have been cumbersome and largely ineffective. In addition, free trade agreements designed to maximize efficiency and short-term profits have undermined our ability to adequately inspect more than 5 percent of incoming shipments. To change this disturbing trend will require bold, decisive and enforceable legislation at the federal level to ensure that no new organisms are introduced into North America via international travel or trade. Commodities, such as live plants and animals, and cargo shipped with solid wood packing material must be certified and verifiably free of non-native invasive pest organisms. Plants introduced for horticultural, ornamental or other purposes should be denied unless the importer can verify that the organism(s) are not invasive or in any other way a threat to American species, forests and ecosystems. Compliance must be enforced at all levels. Anything less than this and we will continue to put the forests of Virginia's - and all North American forests - at risk of catastrophic changes.



URBAN AND COMMUNITY FORESTRY

Trees and forests in communities provide many benefits to the citizens of the Commonwealth. The obvious benefits include aesthetic appeal, shade and contact with nature. Just as important, yet less obvious, are the positive impacts community forests have on clean air, water quality, business district enhancement, watershed protection, community health and quality of life in general. The VDOF helps communities maintain and enhance their community forests through its Urban and Community Forestry Program.

The Agency provides technical assistance to communities of all sizes – from large metropolitan areas to small cities and towns. VDOF provides expertise on tree selection and tree maintenance through direct contact as well as through a variety of workshops and conferences it organizes and/or supports. The demand for urban and community forestry assistance will continue to increase as the population of the Commonwealth continues to grow.

The Department administers the Tree City USA program that promotes standards for community forestry. The program reached a milestone in 2007 by certifying 50 cities and towns in Virginia. A first-of-its-kind recognition banquet was held in Charlottesville to celebrate this achievement. Interest in this program remains strong, and additional communities will seek certification in 2008.

Through its Urban and Community Forestry Assistance Grant Program, the VDOF supports the capacity building efforts of municipalities, non-profit organizations and educational institutions. The purpose of the program is to strengthen local programs and organizations. Since its inception in 1991, the program has funded an average of 45 projects annually and has assisted 61 cities and towns, 22 counties, 65 non-profit organizations, as well as several universities and community colleges. The program has also funded 23 educational events, several of which continue to be offered on an

annual basis. Unfortunately, funding for this program has been trending downward due to federal budget constraints. VDOF is investigating state-level funding and other resources to keep this component of the program strong.

The Urban and Community Forestry Program has developed strong partnerships with Virginia Tech and the University of Virginia, as well as with several community colleges. At Virginia Tech, the program helps support the Community Design Assistance Center that provides open space and landscape design planning to interested communities. Research projects



funded at Tech's Hampton Roads Agricultural Research and Extension Center have received national attention. The program also supports the evolving urban and community forestry curriculum in Tech's College of Natural Resources. At the University of Virginia, the program has a strong partnership with the Virginia Natural Resources Leadership Institute, providing both financial and training support. VDOF is also working with several community colleges to support urban forestry-related curricula as well as arboreta.

USDA Forest Service research has shown that urban tree canopy cover can make a significant contribution to water quality and storm flow reduction. 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 Bay. The Agreement has established a goal of five Virginia communities establishing urban tree canopy goals by 2010. The VDOF has identified several target communities and will provide technical assistance and grant support to communities that commit to the urban tree canopy strategy. And the VDOF has obtained commitments from six Virginia communities wishing to work towards establishment of urban tree canopy goals.

Additional Forest Service research has also documented the contribution of urban tree canopy in removing air pollutants and improving air quality. VDOF participated in an effort, with other partners, to include tree planting as a voluntary measure in the Northern Virginia State Implementation Plan (SIP) for air quality in this designated non-attainment area. The effort was successful, and this air-quality region is one of first in the nation to include the tree-planting measure.

Through the Virginia Municipal Tree Restoration Program, the VDOF is working with Virginia's utility companies and Virginia Tech to promote the planting of utility-appropriate species in cities and town to minimize tree/utility conflicts. Through this partnership, the VDOF has expanded the number of demonstration sites and utility arboreta. The research sponsored through this partnership has received national attention and some federal funding.

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. Greenways are recognized as important community assets for recreation, environmental protection and public health. VDOF has provided greenway planning funds to several communities; provided technical assistance, and sponsored planning workshops. The Agency works closely with the Department of Conservation and Recreation and the National Park Service to assist interested communities. VDOF's role is to provide conceptual planning and see that projects garner grassroots support. The other agencies implement detailed planning and construction of greenways on the ground. This partnership has resulted in the implementation of several successful projects, and there are several other projects in progress.

Lastly, land-use patterns in Virginia are consuming land at a rate three to four times the rate of population growth. Many formerly rural areas are now in what is called the "wildland-urban interface." This is a landscape where urban and suburban influences mingle with the rural landscape and present a whole host of forest management challenges. In this setting, conserving the forest land base is critical. Through its Urban and Community Forestry Program, the VDOF has been promoting the "green infrastructure" approach to strategic land conservation. The Department is working with The Conservation Fund and the New River Valley Planning District Commission on a pilot green infrastructure project throughout a four-county area. When completed, this project will serve as a model for other regions that are dealing with rapid growth and the resultant pressures on the forest land base. The Agency has also developed a partnership with the University of Virginia and the non-profit Green Infrastructure Center to promote green infrastructure planning in Central Virginia. This partnership includes support for a planning course at UVA and a pilot project in Madison County. In addition, VDOF is supporting the green infrastructure planning effort of the Thomas Jefferson Planning District Commission.

THE FUTURE OF OUR FORESTS

Recognizing that forest resource benefits are dependent on land protected and retained in forest, forest land conservation is paramount and serves as the Agency's core foundation. A resource-based, healthy living environment requires both natural and social interactions with forest land at the center.

If our management of the forest resource is successful, the forests of Virginia will:

- ▲ Be protected from damaging fire, theft, insects, pathogens and weeds, including invasive species;
- ▲ Be diverse in age, species, location, pattern and size;
- ▲ Provide extensive cover in all 13 river basins;
- ▲ Include unique and fragile habitats;
- ▲ Be available for use and enjoyment of all, and
- ▲ Contribute to the state's financial diversity and provide economic vitality to the rural communities.

Specific challenges include:

- ▲ Conserving the forest land base;
- ▲ Maintaining the ability to respond to wildfire and other emergency incidents;
- ▲ Providing for continued growth and sustainable harvests from our forests;
- ▲ Maintaining the diversity and health of our forests;
- ▲ Ensuring that benefits of clean water and clean air continue to flow from our forests, and
- ▲ Maintaining a well-trained and educated staff.



ACCOMPLISHMENT REPORT

JULY 2006 - JUNE 2007

Objectives	Accomplished	Not Accomplished
Goal 1: Protect the citizens, their property and the forest resource from wildfire.		
Measure 1.1: Decrease the percentage of forest land burned by wildfires to no more than .075 percent .	0.067%	
Measure 1.2: Increase the number of rural volunteer fire departments that receive financial assistance to 102 .	155 VFDs	
Goal 2: Protect, promote and enhance forested watersheds.		
Measure 2.1: Increase the percentage of harvest sites with sediment not reaching streams to 94 percent .	94%	
Measure 2.2: Establish 350 miles of new trees planted along riparian areas.		41 miles
Goal 3: Conserve the forest land base.		
Measure 3.1: We will maintain the existing number of reforested and improved acres (142,605 acres) through FY 2007.		140,951 acres
Goal 4: Improve the stewardship, health and diversity of the forest resource.		
Measure 4.1: Plant 27,500 acres of pine trees under the Reforestation of Timberlands (RT) Act.	34,396 acres	
Measure 4.2: Improve 20,000 acres under the Reforestation of Timberlands (RT) Act.		18,351 acres
Measure 4.3: Plant 340 acres to shortleaf and longleaf pine annually.	443 acres	
Measure 4.4: Complete 400 new Forest Stewardship Plans annually.	517 plans	
Measure 4.5: Achieve 75 percent of annual allowable State Forest harvest actually harvested.		74%
Measure 4.6: Increase the number of communities with active urban forest management programs to 51 communities .	51 communities	
Measure 4.7: Increase the number of communities that participate in the Tree City USA program to 46 communities.	50 communities	
Goal 5: Facilitate the development and implementation of a statewide forest policy.		

Objectives	Accomplished	Not Accomplished
Goal 6: Collect, maintain and communicate forest resource information.		
Measure 6.1: Publish 6 forest research reports annually.	8 reports	
Goal 7: Manage agency resources to effectively and efficiently accomplish the Strategic Plan.		
Measure 7.1: Achieve 100 percent of Governor's Management scorecard categories marked as meets expectations for the agency.		90%
Measure 7.2: Achieve 75% percent of customers who rate the quality of DOF's seedlings as satisfactory.	97%	
Measure 7.3: Increase net revenue generated by the state nurseries by 5 percent.		2.3%
Measure 7.4: Update 7 State Forest Management Plans annually.		0





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