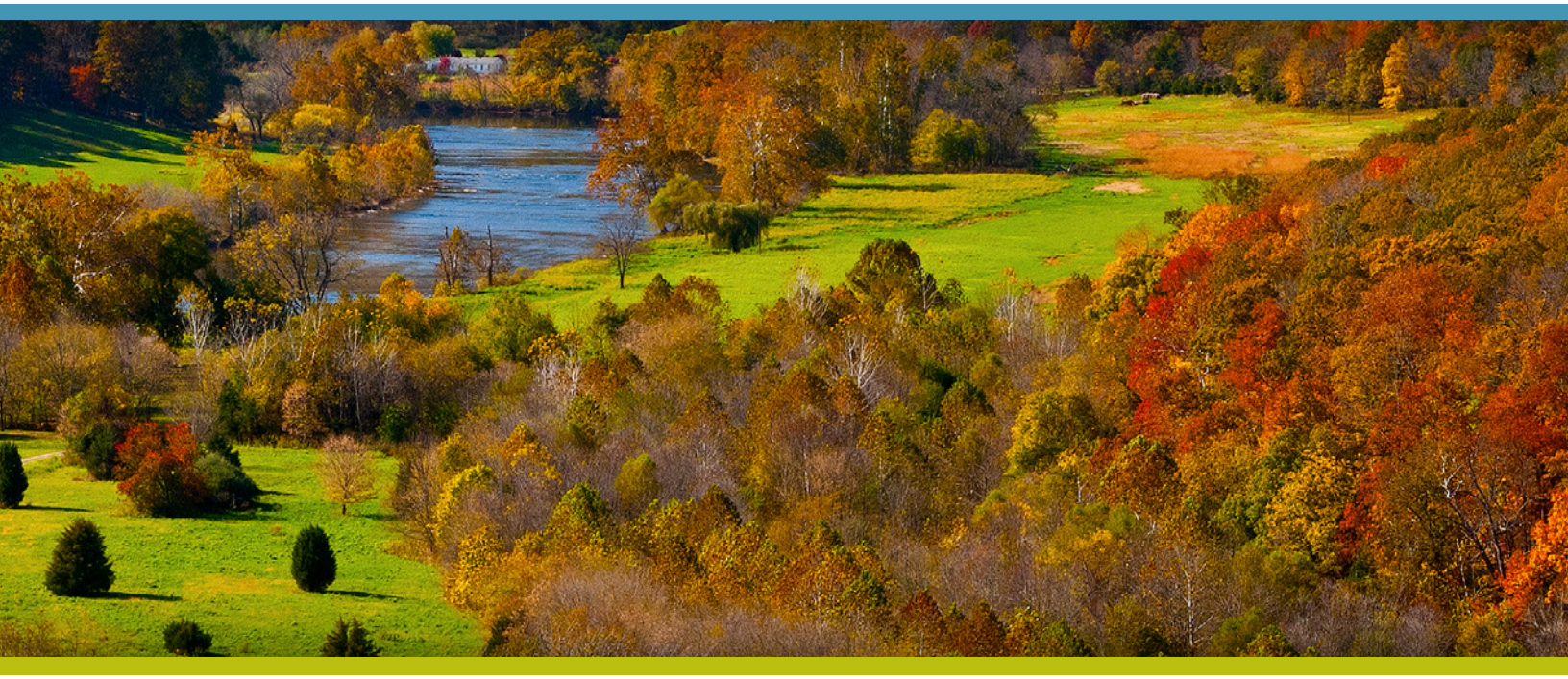
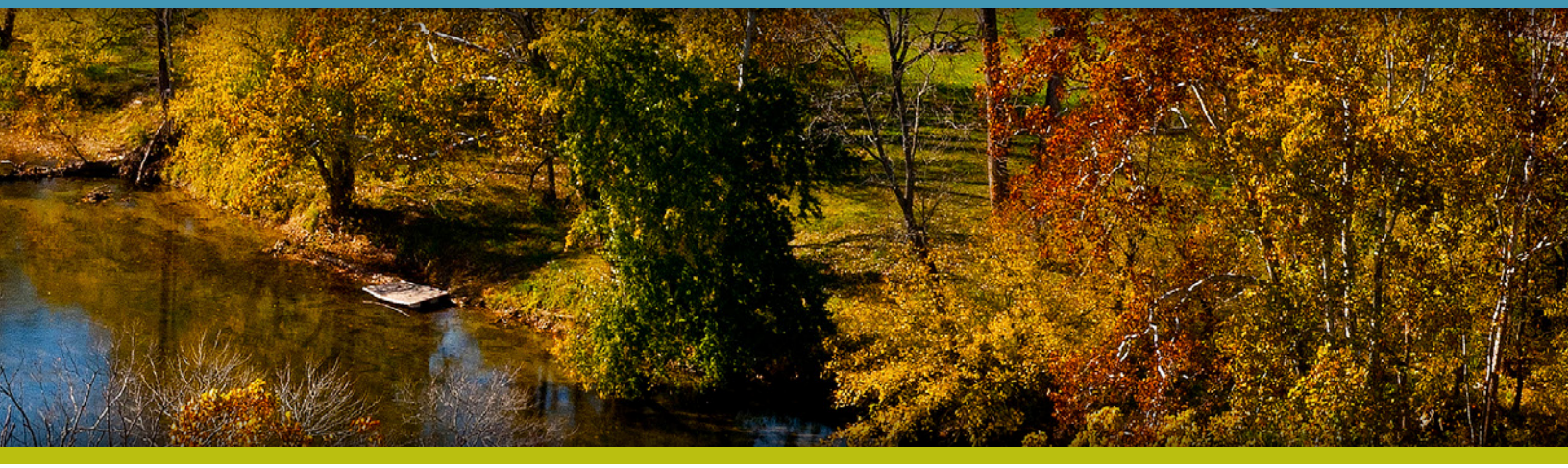


INVESTING IN THE COMMONWEALTH'S LAND AND WATER

VIRGINIA*forever*'s Five-Year Plan, 2015-2019



VIRGINIA *forever*
OUR LAND. OUR WATER. OUR QUALITY OF LIFE.

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James River

EXECUTIVE SUMMARY

Virginia's history is as much a story of its land and water as it is the story of the people and communities its natural resources have sustained. The Commonwealth encompasses the rugged Appalachian Mountains, the fertile Piedmont, the tidal rivers of the Coastal Plain, and over a third of the watershed of our nation's largest estuary, the Chesapeake Bay. Virginians often invoke the marvel of being able to travel from mountains to beaches in a matter of hours, a journey that crosses one of the most ecologically diverse landscapes on the east coast. It is also one of the most pressured.

Virginians have always altered their natural environment, first for survival, then for prosperity. But in just the past 50 years, the population of the Commonwealth has doubled to eight million citizens. As a result, the demands on our land and our water have never been greater nor has the necessity of heeding Virginia's Constitutional charge: "to protect its atmosphere, lands, and waters from pollution, impairment, or destruction, for the benefit, enjoyment and general welfare of the people of the Commonwealth." VIRGINIA*forever* stands by that commitment.

As a unique coalition of concerned businesses, environmental organizations, and outdoor enthusiasts, VIRGINIA*forever* advocates for increased funding to restore and protect the lands and waterways of the Commonwealth. VIRGINIA*forever* formed ten years ago because of a shared recognition that the Commonwealth was investing less than one percent of the state budget in natural resources, and that sum was insufficient. Since then our organization has successfully argued for increased funding for land conservation and water quality improvement, with one estimate now indicating an investment level of 1.5 percent of total state expenditures. This report succinctly captures the accomplishments of Virginia's land and water conservation strategies and proposes—for the first time—five-year goals for investing in Virginia's future.

Article XI, Section 1 of the Constitution of Virginia states:

> **". . . It shall be the policy of the Commonwealth to conserve, develop, and utilize its natural resources, its public lands, and its historical sites and buildings. Further, it shall be the Commonwealth's policy to protect its atmosphere, lands, and waters from pollution, impairment, or destruction, for the benefit, enjoyment, and general welfare of the people of the Commonwealth."**

Section 2 authorizes the State to conserve land:

> **"In furtherance of this policy the General Assembly may undertake the conservation, development, or utilization of lands or natural resources of the Commonwealth."**

Section 4 affirms the right of Virginia residents to hunt, fish, and harvest game.

For many Virginians, the motivation to protect its special places, natural beauty, wildlife habitat, waterways, and historic communities cannot be captured in language, let alone a cost analysis. Yet all Virginians benefit from safe, clean drinking water supplies, a thriving economy, productive agricultural land, and outdoor recreation.

Virginia's prosperity and its citizens' quality of life depend on a vibrant natural environment.

Virginia's natural resource industries are essential to its economy. In 2006, the total combined economic impact of farming and forestry was $79 billion and employment for over half a million people. That same year, landowners earned over $350 million for harvested timber while farms generated $2.7 billion in cash receipts. Exports of agriculture and forestry products topped $2.61 billion in 2012. Virginia's farmers are meeting the increasing demand for food raised and grown within the Commonwealth, and now Virginians can purchase locally and regionally produced food at nearly 250 farmers markets statewide.

The National Oceanic and Atmospheric Administration found that Maryland and Virginia's combined 2009 commercial seafood industry produced $3.4 billion in sales, $890 million in income, and 34,000 jobs. Investments in oyster aquaculture and restoration are providing increasing economic payback; the 2012 oyster harvest was the largest in 25 years with dockside value increasing to nearly $9 million and this year's season is on track to climb even higher. Recreational fishing, both within the Bay watershed and beyond, is also an important economic contributor; one million recreational freshwater anglers contribute millions of dollars to Virginia's local economies.

Virginia's tourism promotion focuses almost exclusively on the Commonwealth's natural beauty, outdoor recreational opportunities, history, and cultural heritage. The Virginia Tourism Corporation reports that the total benefits of travel and tourism in 2011 was $34.1 billion, an 8.1 percent increase from the previous year.

Virginians place a premium on opportunities to be active outdoors. In the 2011 Virginia Outdoors Demand Survey, 92 percent of respondents indicated that it is "important" or "very important" for them or other household members to have access to outdoor recreation opportunities. Virginia's State Parks hosted a record-breaking eight million visitors from both in and out of state in 2012, up 7 percent from the previous year. The $198 million economic impact was 6 percent higher than the 2011 record. According to the U.S. Fish and Wildlife Service's 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation, the economic impact that Virginia sees from fishing is $1.1 billion, hunting is $877 million, and wildlife watching is $950 million.

Virginia has an impressive record of safeguarding places and resources that matter. The Commonwealth has protected 15 percent of its land and taken action to clean up and prevent further degradation of its groundwater, lakes, streams, rivers, and the Chesapeake Bay. In just the past five years, Virginia has invested approximately $545 million in land conservation and $660 million in clean water initiatives to continue to make important strides in protecting our "common wealth."

Since 2006, Virginia has protected more than 591,000 acres of forests, farmland, historic sites, recreational lands, and natural areas through a variety of private and public actions. Grant programs that leverage other funding sources, the Land Preservation Tax Credit, and state acquisition with bond issuances are fundamental tools for land conservation in the Commonwealth. Communities throughout Virginia rely on cost-share collaboration with the state to protect local resources and plan strategically for their future.

Virginia's efforts to improve water quality are getting results. The Commonwealth has made progress in reducing excess nutrients and sediments flowing to the Chesapeake Bay and its tributaries through modifications to wastewater treatment and implementation of best management practices (BMPs) on agriculture and urban lands. Forty-nine upgraded wastewater treatment plants have significantly reduced nutrient loads to the Chesapeake Bay from that sector. Virginia can apply lessons gained from years of experience with wastewater improvement to the challenge of reducing pollution from urban and agricultural lands. The potential for more cost-effective stormwater BMPs and broad implementation of agricultural BMPs depends on adequate, stable funding. Efforts to reduce nutrient and sediment pollution will help to meet broader water quality goals throughout the state.

Back Bay National Wildlife Refuge

MEETING THE CHALLENGES OF THE FUTURE

The Department of Conservation and Recreation estimates that Virginia continues to convert 93,000 acres of farms, forests, and other open land to other uses every year. The majority of our river and stream miles have yet to be assessed for water quality, and of those that have been assessed, many are impaired. The Chesapeake Bay Watershed Implementation Plan sets rigorous restoration goals that the Commonwealth has committed to meet over the coming decade. The Weldon Cooper Center for Public Service projects that Virginia's population will reach ten million by the year 2040.

The work is not over. It has just begun.

Virginia must remain steadfast in its commitment to its constitutional obligation to protect its natural resources and invest accordingly in this core function of state government. We note that the investments we propose below are modest compared to the billions Virginia spends on education, the only other core function addressed by the Virginia Constitution.

VIRGINIA*forever* calls on the Commonwealth to achieve the following five-year funding goals for land conservation beginning with fiscal year 2015:

$833,785,000 to protect...

120,000 acres of working farms	240,000 acres of forestland	50,000 acres of historic places	40,000 acres of natural areas	50,000 acres of recreational lands

VIRGINIA*forever* proposes a total investment of $833,785,000 in grant programs, the Land Preservation Tax Credit, and bonds to achieve these goals. Investments were calculated based on information obtained from published reports, state agency staff, and other experts. The state has already identified $588,600,000 and must add to it $245,185,000 in new funding. Because categories of conserved land can overlap and protected acreage may meet multiple goals, it may be possible to meet these acreage goals at a lower overall cost. Achieving these goals will sustain the levels of land conservation that were achieved when the Commonwealth's efforts were at their most robust.

VIRGINIA*forever* calls on the Commonwealth to achieve the following five-year funding goals for water quality improvement:

$805,000,000 to include...

$50 million for **wastewater treatment** facility upgrades from fiscal year 2017 through fiscal year 2019 (given that the Commonwealth has already funded upgrades for fiscal years 2015 and 2016)

$50 million each year for **stormwater management**

$505 million over the next five years for **agricultural BMPs**

VIRGINIA*forever* proposes a total investment of $805,000,000 in the Water Quality Improvement Fund and the Virginia Natural Resources Commitment Fund (VNRCF) to keep the Commonwealth on track to meet its commitments to improving water quality in the Chesapeake Bay and local rivers and streams. The state has already identified $80,000,000 and must add to it $725,000,000 in new funding. Investments were calculated based on information obtained from published reports, state agency staff, and other experts. The funding would support programs reducing pollution from wastewater, agriculture and urban stormwater over five years beginning with fiscal year 2015. This amount includes the $35 million the 2013 General Assembly has appropriated for stormwater management and $45 million for the cost of agricultural BMPs if the state maintains in the biennial budget the existing investment of the recordation fee in the VNRCF.

The story of Virginia never ends. Neither does the promise to protect its land and water for the benefit of the citizens and prosperity of the Commonwealth. VIRGINIA*forever* believes that the goals and investments detailed in this plan are the next step toward making good on that promise.

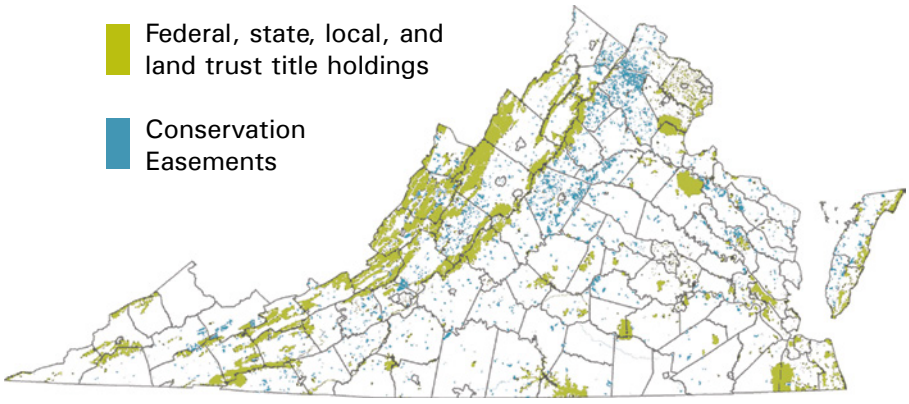
Rivanna River, Albemarle County

LAND CONSERVATION IN THE COMMONWEALTH

Virginia encompasses 25.3 million acres. As of July 23, 2013, 3.8 million acres—over 15 percent of the land mass of the Commonwealth— are under permanent protection either through conservation ownership or easements.[1] According to the state Department of Conservation and Recreation (DCR), over 591,000 of these acres have been conserved since 2006.

The DCR analysis also indicates that federal and state agencies, at 2.34 million acres and 1.14 million acres respectively, are responsible for the majority of the Commonwealth's conserved land. Private land trusts or conservation organizations own or hold easements on another 217,563 acres while local parks, greenways, easements, and Purchase of Development Rights (PDR) programs account for 143,455 acres.

Figure 1: Virginia Currently Has About 3.8 Million Acres of Conserved Land, Which Is Concentrated in Certain Parts of the State



Virginia permanently protected 428,588 acres between 2006 and 2010, simultaneously safeguarding more than 3,400 miles of streams and rivers, including 100 miles of state-designated Scenic Rivers. State agencies were responsible for approximately three quarters of the total acreage conserved, through both fee-simple and less-than-fee means, most of it in easements held by the Virginia Outdoors Foundation (VOF). Such an accomplishment demonstrates the power of a declared goal—matched by the commitment to making it a reality—to secure the future of the Commonwealth's farms, forests, and other open lands. It is important to continue this level of progress, as current estimates indicate that Virginia loses about 93,000 acres of open space lands every year.[2]

Six state agencies have land conservation responsibilities. DCR takes the lead, managing Virginia's state parks and natural area preserves and developing the Commonwealth's primary conservation planning document, The Virginia Outdoors Plan. The other agencies are the Department of Forestry (DOF), the Department of Game and Inland Fisheries (DGIF), the Department of Historic Resources (DHR), the Virginia Department of Agriculture and Consumer Services (VDACS), and VOF.

According to a Joint Legislative Audit and Review Commission (JLARC) report issued in 2012, these agencies have identified a number of conservation needs and goals:

DCR intends to meet the growing demand for state parks by conserving 10 acres of state parkland for every one thousand Virginia residents. The state would need to conserve an additional 9,500 acres statewide to meet this goal for its current population, or 18,000 acres by 2020.

DCR has identified 600 inadequately protected sites that are home to significant natural communities and rare plant and animal species.

DGIF projected deficits of 248,000 acres of hunting land statewide in 2010 and 319,000 acres in the northern regions of the state by 2020.

DGIF projected deficits in lake, river, and bay access of 9,000 acres statewide in 2010 and nearly 11,000 acres by 2020 in the Rappahannock-Rapidan region.

DGIF identifies 900 threatened or endangered species that depend on habitat conservation for survival.

DOF estimates that to meet its Chesapeake Bay Program goal of conserving 315,000 additional acres of high-priority forestland in the Chesapeake Bay watershed, the Commonwealth must increase its annual rate of conserving high priority acres by 107 percent.[3]

Additional priorities include the conservation of buffer areas around existing wildlife management areas to limit noise disturbances and encroachment on adjacent land, farmland through local PDR programs, over one hundred Civil War battlefields identified by the Civil War Sites Advisory Commission as high priority, and large tracts of land to maximize conservation benefits.

THE ECONOMIC BENEFITS OF LAND CONSERVATION

Agriculture and forestry are mainstays of Virginia's economy

In 2006, the combined economic impact of farming and forestry in Virginia was $79 billion, and the two industries employed over half a million people in over 10 percent of the state's existing jobs.[4] That same year farms generated $2.7 billion in cash receipts.[5] When a state treats its farmland as the economic asset that it is, that commitment to the agricultural industry stimulates investment. Farmers who participate in preservation programs are more likely to invest in their farming operations, to have

productive operations, and to plan long-term for continued farming.[6] Sustaining agricultural lands now also secures the capacity for farmers to continue to produce food for domestic and international markets in the future. Virginians' demand for food raised close to home continues to grow, and VDACS recently reported nearly 250 farmers' markets in operation statewide.[7]

In 2006, forest landowners earned over $350 million for harvested timber. Virginia is one of the top producers of hardwood lumber in the United States,[8] but forests also provide other less obvious economic benefits. Forests are the best line of defense for clean, safe water supplies. Degraded watersheds can lead to increased flooding, declines in habitat for all aquatic life, reduction in both quantity and quality of clean drinking water, and loss of safe recreation. A recent report by the World Bank and World Wildlife Fund found that protecting forests in watersheds "is no longer a luxury but a necessity."[9] Water treatment gets progressively more expensive with destruction of forest cover. Every 10 percent increase in forest cover (up to about 60 percent) is associated with a 20 percent decrease in treatment costs.[10] Urban tree cover serves the same function. The city of Virginia Beach, through careful analysis of rainfall, patterns of land cover, and cost factors, calculated the stormwater management value of the city's park system at over $1.5 million for 2010.[11]

So are tourism and recreation

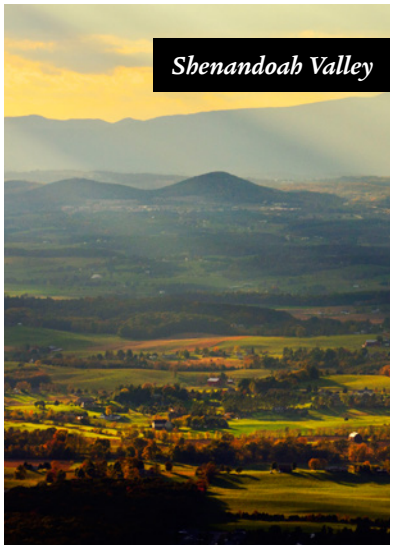
Virginia's tourism promotion focuses almost exclusively on the Commonwealth's natural beauty, outdoor recreation, history, and cultural heritage. The Virginia Tourism Corporation reports that the total economic impact of travel and tourism in 2011 was $34.1 billion, an 8.1 percent increase from the previous year.[12] In 2012, Virginia's State Parks hosted a record-breaking eight million visitors from both in and out of state, a 7 percent increase over the previous year. The economic impact--$198 million---was up 6 percent from the 2011 record.[13]

Outdoor recreation can be a major draw for some regions. An analysis by Virginia Tech in 2011 found that the town of Damascus in southwestern Virginia owed much of its economic activity to the town's proximity to the regional Virginia Creeper Trail; over half of the businesses surveyed reported that more than 61 percent of their income was from trail use and the percentage was even higher for those businesses paying meals or lodging taxes.[14] According to the U.S. Fish and Wildlife Service's 2011 National Survey of Fishing, Hunting and Wildlife-Associated Recreation, the economic impact that Virginia sees from fishing is $1.1 billion, hunting is $877 million, and wildlife watching is $950 million.

LOSSES, GAINS, AND GOALS:
HOW VIRGINIA CONSERVES LAND

Farmland

Picturesque rolling farm fields may be the Commonwealth's most enduring iconic image, but increasingly some Virginians are more apt to encounter their state's agrarian identity at a model farm or museum. The Farmland Information Center, a public/private partnership of the USDA Natural Resources Conservation Service and American Farmland Trust, reported that between 1997 and 2002 Virginia lost 81,500 acres directly to other uses, a rate that slowed to a still staggering 60,800 acres from 2002 to 2007.


Shenandoah Valley

Every five years the USDA National Agricultural Statistics Service conducts a Census of Agriculture that captures a broader understanding of changes to Virginia's agricultural economy and culture. Data from the 2007 Census reflect a nearly four-fold increase in the loss of "land in farms" from 2002 to 2007 (520,904 acres) compared to the previous five year period. While the data does not reveal the results of the changes in land use, which could include land left fallow, it does illustrate a precipitous decline in land available for agricultural use.

Working farms are protected through purchased or donated easements held by the Virginia Outdoors Foundation, a local government, or a private land trust or conservation organization. A total of 134,096 acres of agricultural land accounted for 31 percent of all land protected between 2006 and 2010 according to an analysis by the state. In 2011, land owners applying for tax credits reported a total of 27,594 acres in production agriculture, over one third of the total acres eased that year; 90 percent of that farmland was under best management practices for water quality protection, furthering progress on other natural resource goals.

Funding Recommendation for Farmland:

Ensuring that farmland remains a meaningful part of Virginia's landscape depends in part upon the reliability of the Land Preservation Tax Credit and local PDR programs. Historic levels of loss demonstrate the vulnerability of agricultural lands. The 30,000 acres of farmland permanently protected every year on average from 2006 through 2010 proves what is possible. VIRGINIA*forever* calls on the Commonwealth to provide sufficient funding for land conservation to achieve the protection of 120,000 acres of farmland over the next five years.

Forests

More than 62 percent of Virginia's land area, nearly sixteen million acres, is forested.[15] To someone unaware of Virginia's size and population, this might suggest a state that is still a near wilderness, but these forested areas are highly fragmented, ranging in size from a few acres to thousands of acres, with the average property being just seventy-five acres, less than what constitutes an "ecological core" (areas of at least one hundred acres of undisturbed interior natural habitat necessary for retaining biodiversity).

Families and individuals own over half of Virginia's forested land (63 percent) while 18 percent is publicly owned. Corporate ownership accounts for another 18 percent while one percent of forest ownership is attributed to the forest industry. The USDA forest service is the primary holder of public forest land at 1.7 million acres. Virginia's 20 state forests are well distributed throughout the state and vary in size from a compact 121 acres to a vast 19,808 acres; together they cover nearly 68,000 acres of forests managed for public use and services that include protecting water quality, sequestering carbon, providing recreation opportunities, and producing timber harvest revenue that is shared with localities.[16]

Shenandoah National Park

Virginia's rate of forest loss has recently slowed to approximately 16,000 acres annually, based on a 10 year rolling average.[17] Forest distribution generally favors the southern and western parts of the state while the majority of the least forested counties fall within the northern and coastal regions.

Loss of acreage is not the only threat to Virginia's forests. As the Commonwealth's population increases, both the risks to forests and the demands on them intensify. Uncontrolled wildland fires—almost always traceable to deliberate or accidental human behavior—burn an average of nearly 11,000 acres every year.[18] Other damage is more insidious, but often also cascades from human actions. Invasive pests and infestations of native insects have the potential to devastate Virginia's tree cover. The most urgent threat comes from the emerald ash borer, an invasive insect from Asia that has already killed more than a million trees in fifteen states, including Virginia. Foresters have identified the emerald ash borer in seventeen Virginia counties and counting, its deadly advance blamed primarily on the transport of firewood by individuals. With nearly 200 million ash trees among its dominant species, Virginia may be facing destructive changes to the composition of its forests and its urban tree canopy on a scale not seen since the chestnut blight that began a century ago.

Virginians living far from the state's forests, and even those who may never visit them, benefit from their protection and proper management. Forests act as "carbon sinks," naturally removing carbon dioxide from the atmosphere and storing it in living plants and soil. They further benefit air quality (and human health) by trapping and filtering particulate pollution and by producing in a single acre enough oxygen to sustain eighteen people every day.[19] Forest cover is crucial to healthy watersheds; the forest floor is a sponge for rain and snow melt, slowing stormwater runoff and recharging underground aquifers. Many Virginia localities rely on forested watersheds for their drinking water supply. Virginia's forests, from the savannahs of its open pine stands to its high elevation hardwood canopies, are critical habitat for native wildlife.

DOF assists landowners with permanently conserving working forestland and 25,642 forested acres are now under DOF permanent conservation easement according to a state analysis. The agency accepted 24 easements in 15 counties, accounting for nearly one third of that acreage, in fiscal year 2011 alone.[20] This is not, however, the full extent of private forestland conservation, as the Virginia Outdoors Foundation and other trusts and organizations also hold easements on forested property.

Funding Recommendation for Forestland:

Between 2006 and 2010, 249,210 acres of forestland gained permanent protection through both public and private means (acquisitions and easements). VIRGINIA*forever* calls on the Commonwealth to provide sufficient funding to achieve the protection of 240,000 acres of forestland over the next five years.

Historic Places

In a state where now busy highways once served as trails both for Native Americans and later for colonists expanding the frontier, historical scope defies the simplicity of pinpoints on a map. Historic places in Virginia range from the 16,000 year-old Cactus Hill site (one of the earliest documented human settlements in the western hemisphere), and even earlier sites now submerged off Virginia's waters, to places associated with man's reach to the moon and beyond. They include the homes of our founding fathers, of African-American slaves and free men, and of the farmers, merchants, and craftsmen who lived in thriving communities from the shores of the Chesapeake to the great Valley of Virginia. These places hold the evidence of thousands of years of Native American life throughout the Commonwealth, of English, Scots-Irish, French Huguenot, and German immigrants fleeing economic turmoil and religious persecution, and of the struggle for freedom from independence to emancipation, suffrage, and Civil Rights. As a result, there are many historic lands across the Commonwealth worthy of protection, including archaeological and architectural sites and historic landscapes, sites on the National Register

of Historic Places and Virginia Landmarks Register, and places eligible for the state and federal registers that may not be listed.

The National Park Service's National Register is the official federal list of structures, sites, objects, and districts that embody the nation's cultural history and it includes 2,884 listings in Virginia. The Virginia Landmark Register encompasses only those properties located in Virginia, but uses the same rigorous criteria. Such designations, whether given to a single structure or a large rural historic district, are wholly honorific and do not confer any restrictions or permanent protections beyond the provisions of the National Historic Preservation Act that federal agencies consider significant historic properties and attempt to spare them from damage or destruction when planning public works projects.[21] Only easements can permanently protect privately owned historic properties.

Civil War sites

When it comes to protecting Virginia's historic lands, the Commonwealth's role in the nation's cataclysmic armed conflicts demands special consideration. Much of Virginia's lands were once an arena of war.

Virginia bore the horrific brunt of the four years of fighting that decided the future of the young nation; of the 367 battles of the Civil War, 122 were fought on Virginia soil including four of the deadliest. Hundreds of thousands of American soldiers died from combat, disease, accident, and starvation on Virginia's farm fields and in homes, hospitals, and churches that to this day bear tangible memories of sacrifice and suffering.

Manassas National Battlefield Park

Virginia's Civil War battle sites historically encompassed one million acres, 576,000 of which are intact today. Non-profit organizations and the federal, state, and local governments have permanently protected about 13 percent of those battlefield lands with a remaining 502,000 acres at risk of being lost forever.[22]

In 1993 the Civil War Sites Advisory Commission (CWSAC) identified 81 Virginia battlefields according to three tiers of prioritization (41 other sites had already been obliterated or severely fragmented). Sixteen years later, 10 of the 20 First Tier ("critical need for action") sites were still threatened while development had so degraded the condition of eight others as to bump them from the urgent priorities list in favor of more pristine battlefields under similar pressures. The CWSAC has identified 27 battlefields where all of the intact land is privately owned and unprotected (based on 2009 data), a circumstance that presents ample opportunities for collaborative preservation efforts between landowners and land trusts and agencies.[23]

Revolutionary War and War of 1812 sites

Compared to the urgent risks to and remaining opportunities for Civil War battlefield preservation, sites and properties associated with the Revolutionary War and War of 1812 may appear less endangered. In the case of the Revolutionary War, this is largely due to a focus on a handful of well-known properties such as St. John's Church in Richmond and the National Battlefield Park at Yorktown.


St. John's Church, Richmond

Yet much of the battlefield lands where the Revolutionary War played out in Virginia have already vanished or are largely forgotten, such as the routes taken by Generals Washington and Rochambeau as they moved from Newport, Rhode Island south across the Virginia coastal plains to face Cornwallis at Yorktown. Exceptions are Great Bridge battlefield in Chesapeake, Green Spring battlefield in James City County, and Fort Cricket Hill in Mathews County. Green Spring, the prelude to victory at Yorktown, garnered specific attention from the National Park Service in a 2007 report to Congress; at that time 40 percent of the battlefield remained unprotected as surrounding land uses continued to shift from agricultural to other uses. In June of 2013 the James City County government purchased an 82-acre easement that included significant additional portions of the battlefield.

Land sites associated with the War of 1812 (which in Virginia was largely a naval battlefield) are subject to the same pressures as many historic sites. Notable properties such as James and Dolley Madison's Montpelier are secure, while many others remain in private hands and unprotected.

Funding Recommendation for Historic Lands:

Virginia's cultural heritage is rooted in its enduring historic places that continue to be the heart of the state's tourism industry and are often intertwined with its agricultural economy. Acknowledging them with plaques and markers is not enough; they must be protected permanently from further destruction both privately through easements and publicly through state contributions to state, local, and National Park Service acquisitions. Virginia protected 62,472 acres of historic lands from 2006 to 2010. VIRGINIA*forever* calls on the Commonwealth to provide sufficient funding to achieve the protection of 50,000 acres of historic lands over the next five years.

Natural Areas

It is Virginia's 400 million years of geologic history that set the stage for today's challenge to ensure the survival of the Commonwealth's unparalleled ecological diversity. From sea level at its eastern edge to rugged elevations of over 5,700 feet in the western mountains, Virginia comprises five major physiographic regions—Coastal Plain, Piedmont Plateau, Blue Ridge, Ridge and Valley, and Appalachian Plateaus—all with unique confluences of climate, soils, and overall habitat conditions that have fostered remarkable plant and animal communities of globally significant biodiversity.


Caledon Natural Area

Statewide, DCR's Natural Heritage program has identified over 2,000 conservation sites within more than 1.6 million acres. Conservation sites must be understood as an administrative construct used to focus attention for purposes of environmental review whether for land conservation or potential development projects; therefore site boundaries may contain areas that are already developed, cannot be protected (such as open water), or already have some level of protection that may not be sufficient to protect rare species. For conservation purposes, sites draw initial attention to a particular area which, following detailed planning, may be protected by way of a farm or forest management plan, a conservation easement, or by public or private acquisition. DCR assesses and scores conservation sites according to their value, their level of protection, and their management status. According to this system, only about 15 percent of these sites are adequately protected.[24]


Eastern Shore National Wildlife Refuge

As with Virginia's forests, natural areas face many threats. Invasive exotic species have become the second greatest threat, after habitat loss, to biological diversity. Invasive plant species, without any natural constraints, out-compete and can largely displace native flora. Complex food webs depend upon the specialized relationships between native plant and animal species that have evolved together over millions of years; the introduced and accidental interlopers from other continents serve little to no ecological role in supporting native wildlife. Professionals on the front lines of defense against invasive plant species

regard them as "biological pollution."[25] DCR's Division of Natural Heritage and the Virginia Native Plant Society have identified 115 invasive plant species that threaten or potentially threaten natural areas, parks, and other protected lands in Virginia.[26]

While many conservation sites exist on privately-owned land as well as on public land held by other state and federal agencies, DCR's unique tool for protecting them is the Natural Preserve System (NAP). NAPs are "habitats for rare, threatened, or endangered plant or animal species or state-significant natural communities or natural areas". DCR owns, co-owns, or has dedicated sixty-one NAPs totaling 54,803 acres in seven agency-defined regions. The agency's updated 2013 Virginia Outdoors Plan identifies 14 NAPs across nine regions in need of additional land conservation. Only two regions do not have a NAP and both are home to nationally and globally rare and endangered plant and animal species.[27]

Funding Recommendation for Natural Areas:

Establishing new NAPs in these two regions and protecting additional land around existing NAPs requires striving toward the same kind of goals Virginia has reached in the past. Virginia protected 47,563 acres of natural areas from 2006 and 2010. VIRGINIA*forever* calls on the Commonwealth to provide sufficient funding to achieve the protection of 40,000 acres of natural areas in the next five years.

Recreation

Virginians can enjoy a range of recreational activities in 36 state parks covering over 65,000 acres. All of Virginia's state parks offer nature and cultural programs and all have trail networks which cumulatively cover 500 miles. Twenty parks have cabins to rent and most have camp sites though only five provide for primitive camping. Visitors can fish at 29 state parks and boat at 27. Most have playgrounds and half have swimming pools.


Lake Moomaw

At a total of nearly 68,000 acres, Virginia's 22 state forests cover even more land than its state parks. Eight of these have trails, fifteen allow cycling, and ten offer hunting and fishing.

DGIF oversees 203,000 acres in 39 Wildlife Management Areas (WMAs) throughout the state. All of the WMAs offer public access and forms of recreation; 37 provide for hunting

and 30 for fishing, 36 have trail systems, and 32 offer primitive camping. The state has purchased most WMAs partly or entirely with grants through the United States Fish and Wildlife Service's Wildlife and Sportsfish Restoration Program.

Seventeen NAPs are open to the public on a daily basis and all provide for public access. North Landing River, the largest NAP, is slated to reopen this year after a decade of closure due to lack of funding. NAP trail networks provide a cumulative 65 miles of trails.

Sharp Top Mountain Trail, Peaks of Otter

Hundreds of local and regional parks and trails are often the primary source of outdoor recreation in their communities though they are not evenly distributed across regions. DCR's Virginia Outdoors Plan district chapters provide details on existing local and regional resources as well as those proposed and in the planning stages.

Virginians also benefit from access to an abundance of federally-owned lands. Shenandoah National Park provides for every preference in outdoor experience: lodge, resort, cabins, tent site campgrounds, and backcountry backpacking throughout most of its 200,000 acres. Its trail network is 500 miles long and its 70 mountain streams are all open for catch and release fishing with some open for designated harvest.

Though the largest, Shenandoah National Park is just one of 28 diverse national parks, trails, landmarks, districts, and other sites in Virginia. Many are the recreational heart of their communities, such as the 15,000 acre Prince William Forest, the largest green space in northern Virginia.[28] Most give history top billing, and others fill critical conservation needs. Some do all of the above, such as the Cold Harbor unit of the Richmond Battlefield National Park where local residents exercise on woodland trails and a stream named Bloody Run supports ecological indicator species.

Jefferson and Washington National Forests comprise nearly two million acres along the Appalachian Mountains, one of the largest contiguous areas of public land in the eastern United States. Virginia's portion covers 1,665,110 acres divided into seven ranger districts plus the Mount Rogers National Recreation Area. Visitors to the forests can picnic, hike, cycle, camp, rent a cabin, fish, hunt, swim, boat, horseback ride, and more.

The U.S. Fish and Wildlife Service manages 14 National Wildlife Refuges in Virginia covering approximately 157,425 acres. All of the refuges are in the eastern part of the state and on the eastern shore. Eleven refuges offer recreational access including hunting, fishing, and wildlife observation.

A growing population, increasing demand

In 2011, the Center for Survey Research of the Weldon Cooper Center for Public Service conducted the Virginia Outdoors Demand Survey for the Department of Conservation and Recreation. Of those surveyed, 92 percent regard it as "important" or "very important" for them or a member of their household to have access to outdoor recreational opportunities. The top two recreational needs are trails for hiking and walking (67.6 percent) and public access for swimming, fishing, and beaches (59.6 percent).[29]

Figure 2: The Importance of Access to Outdoor Recreation Opportunities

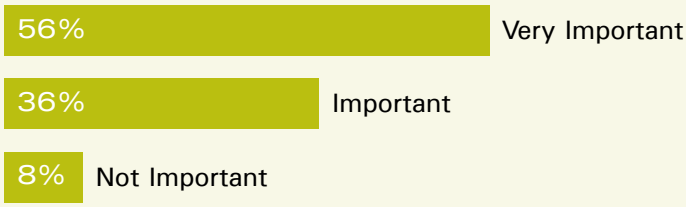
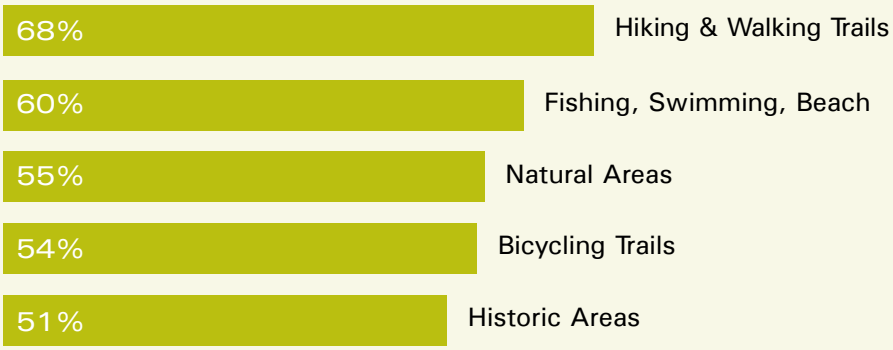


Figure 3: The Top 5 Most Needed Outdoor Recreation Opportunities



The results confirm that not only do Virginians value outdoor recreation as a priority, but they are willing to pay for it. Nearly three quarters of survey respondents believe the state should "spend public funds to acquire land to prevent the loss of natural areas and open spaces." Nearly half of all respondents equally prefer both natural areas with limited development and parks with ample recreation, while the popularity of natural areas (26.6 percent) exceeded that of developed parks (15.2 percent).[30]

Though private nonprofit organizations that manage land for public benefit provide some limited recreational opportunities, the Commonwealth meets the vast majority of the demand for outdoor recreation through acquisition of public lands such as the state forests, parks, Wildlife Management Areas, and Natural Area Preserves already discussed. All conserved lands have funding needs beyond their initial protection, as the stewardship of these assets is essential to assure their integrity in the future. When the Commonwealth acquires land in fee simple, it must plan for costs associated with natural and historical resource inventories, planning, and development and maintenance of infrastructure and amenities.

The recent Virginia Outdoor Recreation Survey revealed that residents of Virginia's disparate regions identify common needs within their communities. Virginians recognize the fundamental connection between recreation and overall health and wellness, particularly with regard to the need for children to increase their level of outdoor activity. They want to be able to use trails not just for exercise, but as a transportation alternative fully connecting neighborhoods, schools, facilities, and community resources. In addition to trails, they identify water access and neighborhood parks as their main recreational needs. The 2013 Virginia Outdoors Plan will detail innumerable opportunities throughout the state to expand access to outdoor recreation.

Meeting the statewide need for water access and trails

DCR is unable to fund the majority of the ever-increasing number of grant applications for outdoor recreational projects it receives. In its May 2013 Strategic Plan, the agency stated that it needs increased, stable revenue to fund hiking, walking, and biking trails. Fiscal year 2014 General Fund appropriations are $1,283,283 and non-General Fund appropriations are $6,530,223 (consistent with the previous year). In its Capital Outlay Planned Management Strategic Document, DGIF planned to spend $190,000 to make trails ADA accessible in fiscal year 2014.[31]

Smith Mountain Lake

DCR's Greenways and Trails Task Force is coordinating the Statewide Trail Action Plan to assist local and regional nonprofits and governments in developing the Potomac Heritage National Scenic Trail, the East Coast Greenway, the James River Heritage Trail, the Beaches to Bluegrass Trail, and the Great Eastern Trail. While DCR leads the initiative, localities will maintain the trails. It will take greater financial and technical assistance from the state to finish the trails, complete a state trails inventory, and adopt a uniform trail assessment and signage system for long-distance trails.

The DGIF Boating Access Program provides access to all river systems, the Chesapeake Bay and the Atlantic Ocean with 219 facilities in 84 jurisdictions, on 106 water bodies. Facilities include launch lanes, courtesy piers, boat slides, river access sites, lake access sites, seven Bay access sites and two ocean

access sites. Ninety of these sites are on local property, about 55 are at bridge crossings or terminated roads at waters' edge (in cooperation with the Virginia Department of Transportation), and the remaining sites are owned, constructed, operated and maintained by DGIF.

Establishing more opportunities for Virginians to access the waters of the Chesapeake Bay watershed is part of the federal strategy to restore the Bay. The Chesapeake Bay Watershed Public Access Plan notes that 290 of the Bay's 1,150 public access sites are in Virginia, but that along the tidal shoreline the average distance between them is greater than 15 miles. Elsewhere the distance is much higher; along the southern bank of the James River between City Point Park in Hopewell and Chippokes State, there are no regularly open public access sites in a span of approximately 64 miles. Virginia added access points in six localities in 2012, and more recently the James River has gained two new access points as well as a new site along the Cowpasture River, a tributary of the James.[32] These access points allow Virginians to access public waterways for boating, swimming, fishing, and paddling.

Future access sites likely will become part of the Captain John Smith Chesapeake National Historic Trail— the 3,000 miles of water routes tracing the 1607-1609 voyages of Captain Smith to chart the land and waterways of the Chesapeake Bay. The trail is part of the National Park Service (NPS). The NPS conservation strategy for the trail includes an initial portfolio of focus areas where public-private collaborative efforts could conserve trail resources. Seventeen of those areas are along Virginia's James, York, and Rappahannock segments of the trail.[33]

Funding Recommendation for Recreational Lands:

Virginians depend upon recreational lands to enjoy all that their state has to offer. Public demand for expanded opportunities to use trails and to swim, fish, paddle, and boat is strong throughout all parts of the state. VIRGINIA*forever* calls on the Commonwealth to provide sufficient funding to achieve the protection of 50,000 acres of recreational lands such as parks, trails, boat landings, and other water access points and public hunting lands over the next five years.

FUNDING MECHNISMS IN VIRGINIA LAND CONSERVATION

Virginia uses three main funding mechanisms for land conservation: the Land Preservation Tax Credit, grant programs, and bonds (the primary means of state acquisitions for parks and other public lands). These programs differ in the conservation needs that they most effectively meet, and the stability of their revenue streams significantly influences their outcomes. According to the 2012 JLARC study

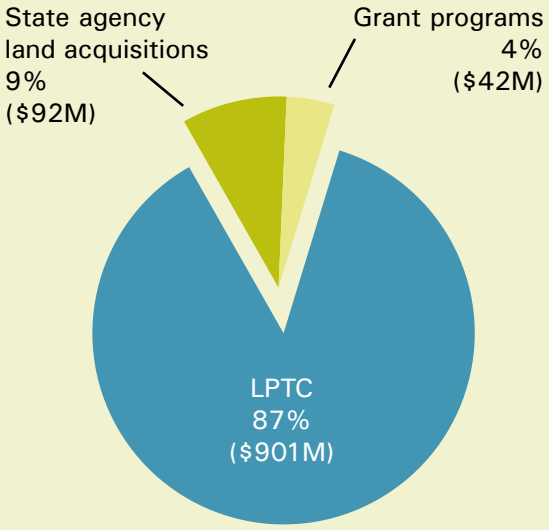
cited above, funding for grant programs has been volatile when compared to the Land Preservation Tax Credit (LPTC) and state land acquisitions; the average annual percentage change in funding for all grant programs was 148 percent during the study period, substantially higher than 4 percent for the LPTC and 26 percent for state land acquisitions.[34] The annual percentage change in funding for grant programs has been more than 50 percent on five occasions and the funding trend has reversed direction four times.

Land Preservation Tax Credit

Virginia has been a pioneer in private land conservation since the General Assembly created VOF in 1966. In 1988, the Conservation Easement Act granted private land trusts the authority to hold permanent easements, beginning a new era of land conservation in Virginia. Private land conservation accelerated with the creation of the LPTC in 1999, particularly after the credit became transferable in 2002. Virginia is one of 15 states with a conservation tax credit program and is singular in its success with extending to property owners an incentive to permanently protect land in a manner many could not otherwise financially afford.

Virginia allows an income tax credit for 40 percent of the fair market value of donations of conservation easements (this amount was 50 percent prior to 2007). Easement donors may apply up to $100,000 in credits per year up to 10 years following recordation. They also may sell unused credits, allowing individuals with little or no Virginia income tax burden to take advantage of the benefit. To be eligible for tax credits, the easement must qualify as a charitable deduction under federal IRS Code and meet additional requirements under the Virginia Land Conservation Incentives Act. DCR verifies the property's conservation value for any tax credit claim at or above $1 million according to Conservation Value Review Criteria adopted by the Virginia Land Conservation Foundation (VLCF).

Figure 4: Makeup of State Financial Support for Land Conservation (2002-2011)



The LPTC accounted for nearly 90 percent of state financial support for land conservation between 2002 and 2011 as landowners claimed $901 million in state tax credits. This proportion declined in 2007 with the implementation of a $100 million annual cap on credits which has increased each year according to the Consumer Price Index.

Legislation enacted in 2013 placed a $100 million annual hard cap on the program and directed the Governor to include in the annual budget bill an appropriation equal to the difference between the indexed amount and $100 million. This sum is

to be appropriated to Virginia's land conservation grant programs according to the following proportions: 80 percent of the unissued credits to the Virginia Land Conservation Fund (at least half of which must be used for acquisitions with public access), 10 percent to the Civil War Site Preservation Fund, and 10 percent to the Virginia Farmland Preservation Fund.[35]

Of all donations since the LPTC's inception, 98 percent have been easements rather than fee-simple ownership, which means that the LPTC is an exceptionally cost-efficient form of land conservation. The tax credit program also has been the most reliable source of conservation funding, providing property owners with the predictability necessary for long-term planning and decision-making.

As of March 15, 2013, almost 628,000 acres have been protected under the LPTC program.[36] More than 70 percent of acreage conserved through the LPTC is within the Chesapeake Bay watershed, making it instrumental to Bay restoration goals.[37] Conservation easements also protect prime agricultural land, historic places, Virginia's stunning vistas, and forests throughout the Commonwealth. VOF is responsible for about 80 percent of easement acreage throughout the state; VOF has recorded most of its 4,000 easements on nearly 700,000 acres since the inception of Virginia's LPTC program.[38]

The LPTC program is the Commonwealth's largest and most successful land conservation program—something about which Virginians are justifiably proud. There are circumstances, however, for which the LPTC is not enough to protect important lands. This is most often the case when a landowner is unable to afford to make a charitable donation of a portion of the value of his land, or when the state is acquiring land for public access. These types of projects usually can be completed only with the assistance of the Commonwealth through its grant programs or use of bond funds to acquire public lands.

Grant Programs

Four grant programs assist land trusts, local governments, and state agencies with land conservation projects. General fund appropriations have provided the vast majority of their funding. Virginia invested $42 million in four land conservation grant programs from 2002 to 2012.[39] The Commonwealth's commitment to these programs allows agencies and other recipients to take advantage of funding opportunities from the federal and local governments, nonprofit organizations, and corporations that would not be possible without the availability of state matching funds.*

Virginia Land Conservation Fund (including Open Space Lands Preservation Fund)

Since its creation in 1999 the VLCF has managed the Virginia Land Conservation Fund to conserve four categories of special land: open space and parks, natural areas, historic areas, and farmland and forests.

* When the state does not have sufficient cash matching funds, Virginia can lose out on federal dollars for projects. The Commonwealth returned approximately $1 million of a $2 million allocation from the Farm and Ranchland Protection Program (FRPP) to the U.S. Department of Agriculture in FY 2011 and $450,000 of a $4.6 million allocation in FY 2012. (JLARC p.28)

VOF's Open Space Lands Preservation Trust Fund receives a quarter of the fund's revenue while VLCF disburses the rest in grants to local governments, other public entities, nonprofits, and to state agencies to acquire land or easements. Grant awards are based on applications for fifty percent or less of total project costs pursuant to specific criteria defined in each category.[40] There is an exception for state agencies, which are not required to provide matching funds but often do.

Figure 5: VLCF Grant Request Levels Versus Available Funding

VLCF's funding has never matched demand; it received more than $106 million in grant requests through 2011, $72 million more than what was available.[41] Between 2005 and 2006 VLCF funding declined from $9.4 million to $1.9 million, an eighty percent reduction in a single year. According to JLARC's 2012 report, Virginia has missed opportunities to conserve priority lands because agencies could not count on sufficient allocations in years to come.[42]

Farmland Preservation grants

In 2007, the General Assembly passed legislation establishing the Office of Farmland Preservation (OFP) within VDACS. Since then, OFP has led the development of model policies for local PDR programs, eligibility criteria for certification of programs, and funding mechanisms and sources for those programs. OFP manages the Virginia Farmland Preservation Fund which it distributes in matching funds to local PDR programs.

PDRs are a form of agricultural conservation easement for which a farmer receives cash payments for the permanent extinguishing of development rights on his or her property. Farmers typically reinvest those payments into their farming operations. Twenty-two Virginia localities have PDR programs though not all have made acquisitions under those programs. Eighteen PDR programs have some form of available local funding and have received state matching funds through the Farmland Preservation Fund.

As of May 30, 2013, OFP has assisted 12 local PDR programs to protect a total of 6,335 acres at a cost to the state of $924 per acre.[43] Total allocations for OFP from fiscal year 2008 through fiscal year 2013 were $6,295,388.[44]

The capacity of a locality to establish and effectively use a PDR program depends upon state matching funds. Few localities have the resources and political will to operate a PDR program entirely on local funding and other sources. The OFP reports that local funds contract in response to state reductions and that the availability of state matching funds has been the impetus for the inception of several PDR

programs. According to VDACS, $5.9 million from State grant programs for farmland preservation has leveraged $8.5 million in local and federal funding.[45] Virginia's 18 active PDR programs have ensured that over 40,000 acres of actively farmed land will remain available for agricultural use in perpetuity.[46]

Civil War Battlefield Preservation Grants

The Virginia Department of Historic Resources (DHR) administers the program that disburses grants for projects that provide permanent protection, through acquisition or easements, for Civil War battlefield lands in Virginia that are listed in the National Park Service's "Update to the Civil War Sites Advisory Commission's Report on the Nation's Civil War Battlefields." DHR evaluates projects according to the significance of the battlefield, the integrity of its present condition, and the threats to it, as well as the financial and administrative capacity of the applicant, plans for future management for preservation and public benefit, and other criteria.[47] All grant awards require a 50 percent match using private or federal funds. From 2002 through 2011, the Civil War Battlefield Preservation program received $6.9 million in grant funding which leveraged more than $22 million in additional funding from non-profit organizations and corporations. Awards in the amount of $2.62 million protected almost 3,000 acres in 2012 alone.[48]

State acquisition

General obligation bonds (requiring voter approval) and Virginia Public Building Authority bonds provide most of the funding state agencies use to acquire from willing sellers full legal title to land through a fee-simple purchase at or below fair market value. While acquisition is the most expensive way to protect land, it provides the benefits of public access and recreation, which conservation easements usually cannot. Four state agencies acquire state parks, state forests, wildlife management areas, and natural area preserves. Altogether, these state-managed public lands add up to 447,288 acres.[49]

General Obligation bonds and the Virginia Public Building Authority

Borrowing money by issuance of bonds provides the state with the flexibility and upfront capital necessary for large scale projects. Bond funding does not depend on the vagaries of the operating budget, and debt service is spread out over a long time frame. Only general obligation bonds require voter approval while the Virginia Public Building Authority, a political subdivision of the Commonwealth, undertakes projects and issues bonds approved by the General Assembly.

The majority of state land acquisitions over the past decade have been financed with bond issuances when voters approved by wide margins two statewide general obligation bond measures in 1992 and 2002. In 1992, the $95.365 million General Obligation bond included $11.5 million for natural area

preserve acquisition and $17 million for state park land acquisition, adding more than 10,400 acres at 14 sites statewide. An additional $4 million in private and local acquisition financing augmented those bond funds. In 2002, the $119.04 million General Obligation bond included $36.5 million that funded the development of four state parks purchased under the 1992 bond, the acquisition of three new state parks and 10 new natural areas, and additions to 11 parks and eight preserves.[50] The Virginia Public Building Authority issued bonds in FY2002 and 2008 in the amounts of $20 and $30 million respectively to finance state agency land acquisition projects.

INVESTING IN LAND CONSERVATION

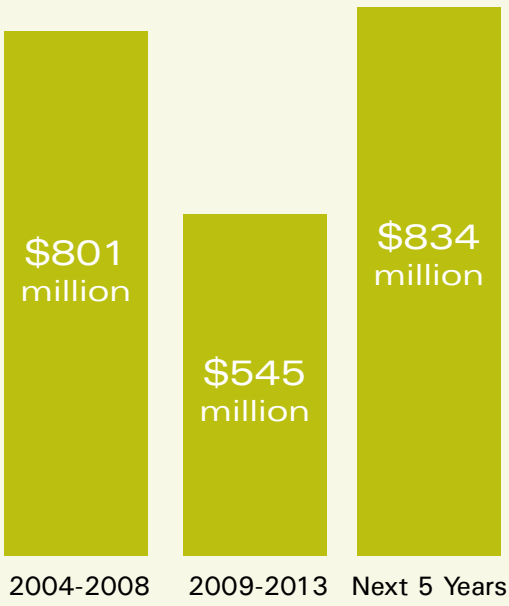
Figure 6: The Cost of Land Conservation In The Commonwealth

Type of Open Space Land	Proposed 5-year goal	Investment proposed†
Natural Areas	40,000	$668,785,000
Farmland	120,000	
Forestland	240,000	
Historic lands	50,000	
Recreational lands	50,000	$165,000,000
TOTAL	**500,000**	**$833,785,000**
Funding already†† identified		$588,600,000
New dollars needed		**$245,185,000**

Important notes regarding Figure 6:

Overlapping Resources. When considering these acreage goals and costs, it is important to keep in mind that Virginia's conserved lands can only be neatly divided up on paper. Farmlands often were once battlefields and forests are home to rare and endangered species. The Captain John Smith Chesapeake National Historic Trail is an excellent example of where history meets recreation. In other words, categories of conserved land can overlap and protected acreage may meet multiple goals. Therefore, it is possible to achieve the individual resource goals without achieving the overall acreage goal. If many such overlaps occur, the overall cost will also be reduced.

Figure 7: Five-Year Funds Appropriated and Need for Land Conservation



Recreational Lands. This category includes lands that would be acquired to become public lands that are managed for public access. As discussed on pages 17-21 of this report, some of the lands that are in highest demand by the public are those for parks, trails, and water access points such as boat landings and canoe launches. This category also includes public hunting lands such as Wildlife Management Areas and other public lands that provide recreational opportunities such as State Forests and Natural Area Preserves.

Ongoing costs. It is important to note that there are ongoing costs associated with all conserved lands, as the holder must ensure proper stewardship of that asset. The need for adequate ongoing funding is particularly acute for recreational lands, which require significant infrastructure to provide access and amenities to the public. As discussed on pages 25-26 of this report, General Obligation Bond packages generally both funding for infrastructure and for acquisition. Agencies also need ongoing funding to properly manage the lands they own and to dissuade users of these lands from encroaching on neighboring private property.

Willing sellers. VIRGINIA*forever* notes that all of the land and easements that Virginia will conserve pursuant to these goals can and must be acquired from willing sellers only.

WATER QUALITY IN THE COMMONWEALTH

Our nation began on a journey up the James River over four centuries ago. The settlements, expansion, farming, and manufacturing that followed would never have been possible without the plentiful and pure water of Virginia's streams, rivers, aquifers, wetlands, and Bay. As with the early settlers and the Native Americans before them, today's Virginians are just as dependent on these sources of water. We must work towards solutions to bring back their vitality from the intervening centuries that have altered Virginia's waters just as they have its landscapes.

Only about one-third of Virginia's 52,255 miles of rivers have been assessed for impairments and of those assessed waters, 71 percent are impaired for one or more uses as are over 80 percent of Virginia's lakes and the Chesapeake Bay.[51]

Discussions about the quality of Virginia's waterways usually begin and end at the Chesapeake Bay; declared a "national treasure" by Presidents Reagan and Obama and perilously degraded for decades, state and federal mandates and deadlines to restore the waters of the Bay drive much of Virginia's water quality policy, planning, and funding. The Bay's massive watershed extends from New York State to Norfolk and 37 percent of it belongs to Virginia. Over half of Virginia's land mass lies within the Bay watershed with five of the Commonwealth's nine river basins draining to this once bountiful and pristine estuary, the largest in the nation.[52] Each of those basins presents particular conditions that reflect the different activities within it and contribute to the pollution degrading the health and productivity of the Bay.

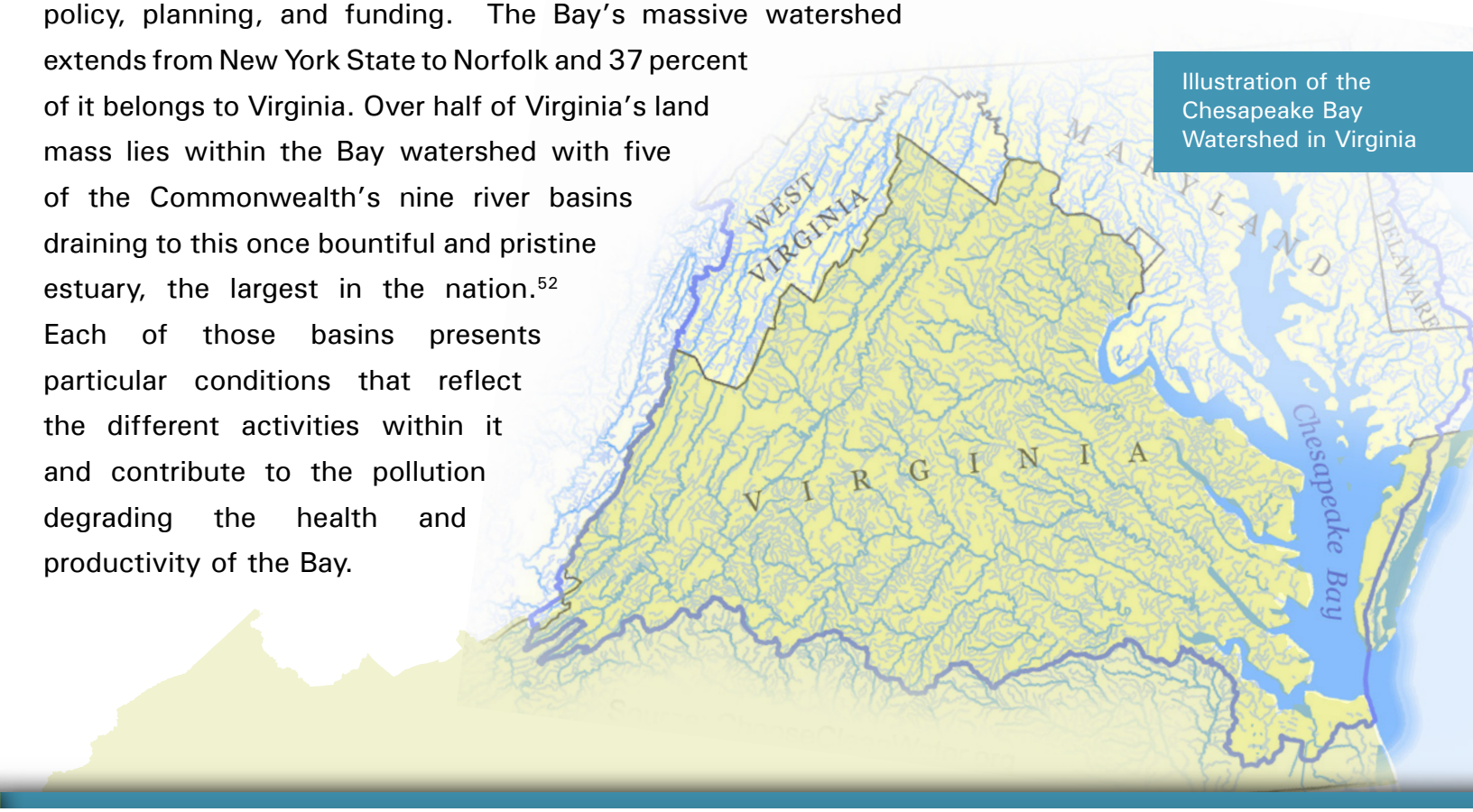


Illustration of the Chesapeake Bay Watershed in Virginia

THE ECONOMIC BENEFITS OF IMPROVING WATER QUALITY

While conditions in the Bay are improving according to several benchmarks, water quality is still poor, habitat is still degraded, and fish and shellfish populations are still a shadow of their historic numbers. Incremental hopeful indicators, such as a 2012 seasonal reduction of the size of the oxygen-depleted so-called "dead zone," are counterbalanced with ongoing beach closures and fish consumption restrictions. Progress must be an encouragement to press on.


St. Mary's Falls

Safe, clean water is not a luxury. Though the price tag for cleaning up our waters is high, the cost of falling short is untenable. Virginians know this and polling numbers reflect how much the Chesapeake Bay matters to voters. In a July 2013 poll commissioned by the Chesapeake Bay Foundation and conducted by professional polling firms that work across the political spectrum, 72 percent of respondents regarded a strong economy and water quality protection as compatible and equally important goals. Nearly half of the voters surveyed believe that Virginia's Bay clean-up plan will help create jobs while 26 percent believe that cleaning up the Bay will not have any impact, positive or negative, on employment in Virginia. The overwhelming majority of voters interviewed endorsed Virginia's clean-up plan and 96 percent agreed that state government must play an important role in water quality improvements.[53]

Yet concerns about cleaning up our polluted waters often fall back on predictions of negative consequences for the economy. Experience has not just disproven the concern that environmental restoration threatens economic prosperity, it has demonstrated just the opposite — **economies cannot thrive in a world of depleted and degraded natural resources, and in fact, innovation, investment, and competition have spurred job growth in new sectors just when traditional sectors were faltering.**

The high price of failure

Virginia's commercial fisheries have suffered economically from the poor condition of the Chesapeake Bay and its tributaries. Populations of oysters and blue crabs are two species, along with their fisheries, that have suffered the most as a result of degraded conditions. The value of Virginia's commercial seafood harvest fell by thirty percent between 1994 and 2004. In September 2008, the Department of Commerce declared the blue crab fishery a "commercial failure" and the next year issued $10 million

in disaster relief to each Bay state.[54] Crab population numbers remain a concern, after modest increases identified between 2008 and 2012 have receded and the overall population is now similar to the pre-2008 disaster levels.

The significance of the Bay to Virginia's economy must not be underestimated. According to the Virginia Tourism Corporation, the Bay region accounted for $428 million in travel and tourism expenditures in 2011, a four percent increase since 2007.[55] The National Oceanic and Atmospheric Administration found that Maryland and Virginia's combined 2009 commercial seafood industry produced $3.4 billion in sales, $890 million in income, and 34,000 jobs.[56] Investments in oyster aquaculture and restoration are providing rapid economic payback; the 2012 oyster harvest was the largest in 25 years with dockside value increasing to nearly $9 million and the 2013 season is on track to climb even higher.[57] The success of this industry does depend on improving environmental conditions in the Bay. Recreational fishing, both within the Bay watershed and beyond, is also an important economic contributor. One million recreational freshwater anglers contribute millions of dollars to Virginia's local economies, but the 2005 fish kill in the Shenandoah River cost the state and local communities $700,000 in lost sales and revenue.[58]

New industry, new jobs

The Washington-based Economic Policy Study Institute concluded in 2011 that the majority of studies indicate "that regulations either had a close to neutral or small positive effect on employment levels." [59] The Clean Water Council (an association of trade organizations that build infrastructure projects) estimates that every $1 billion of investment in water and wastewater construction projects creates 20,000 jobs.[60]

$1 billion of investment in water and wastewater construction projects creates 20,000 jobs.

For instance, the Norman Cole Pollution Plant, an award-winning wastewater treatment facility in Lorton, Va., hired contractors employing 118 workers during a $63 million upgrade beginning in 2011, a lifeline to many who had been laid off during the recession. Stormwater system and agricultural runoff projects promise the same potential. An October 2011 estimate by the Economic Policy Institute projected that Virginia could gain 35,000 new jobs just through stormwater control projects.[61]

Committing state funds to the long-term task of restoring the health of Virginia's streams, rivers, ground water, lakes, and the Chesapeake Bay is among the most responsible, far-sighted decisions Virginia's elected officials can make, not just for the commonwealth's natural environment, but for its economic future.

PRIORITY WATER QUALITY CONCERNS

This report focuses on state investments to address three types of pollution—phosphorus, nitrogen, and sediment—coming from three major contributing sectors: wastewater treatment, urban/suburban stormwater runoff, and agricultural runoff. Taken together these sources of contaminants include both "point source pollution" (often characterized as "end of pipe" pollution) and "nonpoint source pollution."

Nutrients

Phosphorus and Nitrogen are both naturally occurring inorganic nutrients essential to plant growth and reproduction. They become pollution when added to the environment in excessive amounts and then discharged or washed into streams, rivers, and estuaries. In the Chesapeake Bay and tributaries such as the Potomac River they literally fertilize surface waters, giving rise to expansive algae blooms that have spanned distances as great as thirty miles. The masses of algae block sunlight from reaching the shallows where growth of numerous species of submerged aquatic vegetation is essential to aquatic habitat. The blooms further degrade water quality and habitat as they begin to decompose, consuming oxygen needed by animals; the result is anoxia, more commonly known as an oxygen-depleted "dead zone," which degrades aquatic habitat for fish and shellfish.

Sediment

Sediment formed from deposits of soil and rocks may sound like the least threatening form of pollution, but as with nutrients, too much in the wrong place has devastating repercussions. Runoff heavy with these "suspended solids" overwhelms a stream's natural channel, eroding its banks and bed, destroying streamside vegetation, and burying in-stream habitat. Murky waters, as with nutrient-rich algal blooms, impede navigation and discourage recreation for health, safety, and aesthetic reasons. Runoff accounts for over eighty percent of the sediment reaching the Bay.

These priority pollutants earn the spotlight because they are the main sources of impairment of the Chesapeake Bay and therefore are the subjects of state and federal targets and deadlines for pollution reductions within its watershed. These mandates provide a framework that allows for quantitative projections of what the state must accomplish and the associated costs. It is important to note that pollution in Virginia's waterways, and the state's work to remediate it, is not limited to nutrients and sediment nor to the Chesapeake Bay watershed. In fact, bacteria contamination accounts for eighty percent of water quality impairment statewide.[62] Many tools to reduce nutrient and sediment pollution can also address bacteria contamination. The investments called for in this report, particularly for agricultural runoff, will help meet other water quality goals across the state.

While Virginia has made dramatic progress in addressing "point source pollution" from wastewater treatment facilities, the task at hand is to meet the same high bar with "nonpoint source" pollution. The slight difference in nomenclature does not do justice to the sweeping challenge of nonpoint source pollution which scientists, engineers,

and regulators cannot simply identify, trace, and attribute to a single, specific location or producer that is then held accountable for corrective action. Rather than coming from a discrete source, nonpoint source pollution literally comes from everywhere. Combined surface runoff from agricultural lands and developed areas is the vehicle for the greatest proportion of excess nutrients and sediment reaching the Bay.

Reducing wastewater pollution involves technological fixes to individual facilities. Reducing and cleaning up runoff from farmland, cities, and suburbs calls for a broad palette of approaches including infrastructure overhauls in some cases, but also projects that restore or more closely mimic nature's own hydrology. The strategies for reining in this storm of pollution represent a fundamental shift in Virginians' understanding of how their farms, communities, businesses, and homes relate to the living waters that connect them.

The good news is that Virginia's long experience with wastewater treatment-- which predates the national focus by more than a decade-- has yielded results and lessons that can be applied to management of nonpoint source pollution.

THE CHESAPEAKE BAY TMDL AND WATERSHED IMPLEMENTATION PLAN

Since the signing of the first Chesapeake Bay Agreement in 1983, Virginia has participated in an interstate program for restoring water quality and habitat in the Chesapeake Bay and the streams, creeks, and rivers that feed it. At the same time, the jurisdictions in the watershed underwent exponential rates of population growth and development. After 25 years of extensive efforts to restore the Bay neither it nor its tributaries were sufficiently healthier, resulting in renewed focus by Virginia and the federal government.

In 2010, the Environmental Protection Agency (EPA) established limits on the amounts of nitrogen, phosphorus, and sediment flowing into the estuary every year. Throughout the Chesapeake Bay watershed, this Total Maximum Daily Load (TMDL) calls for a 25 percent reduction in nitrogen, a 24 percent reduction in phosphorus, and a 20 percent reduction in sediment based on 2009 levels.[63] Meeting the TMDL, which is allocated according to jurisdictions and major river basins, requires that the Bay watershed's states and District of Columbia implement all pollution control measures necessary for full restoration (and removal from the EPA's impaired water list) by 2025 with an interim goal of 60 percent implementation by 2017. Each of the watershed's six states and the District of Columbia detail their clean up actions in Watershed Implementation Plans (WIP).

Virginia has completed and is now beginning to implement Phase II of its WIP, which includes local strategies within the major pollution source sectors: wastewater treatment plants; agricultural runoff; and urban/suburban stormwater runoff. Virginia will prepare Phase III of its WIP in 2017 based on progress by that time.

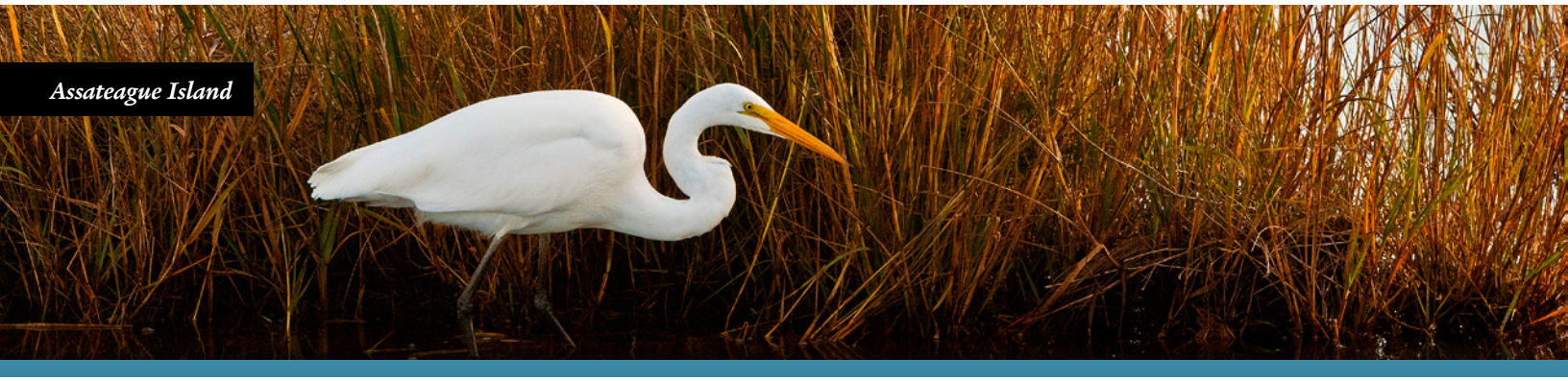
Over the years, cost estimates for Bay restoration have varied according to source and methodology, but the numbers always run to the billions of dollars. Virginia's Senate Finance Committee issued a report in November 2011 that estimated Virginia's own share of the WIP to be between $7 and $10 billion by the 2025 deadline.[64] Inexact projections complicate planning and budgeting, but they are an inevitable byproduct of varying levels of confidence for different elements of the WIP.

An ongoing study specific to the tidal waters of the James River has the potential to significantly alter Virginia's WIP and its costs. Dissolved oxygen, water clarity, and chlorophyll a are the three standards used to assess water quality related to nutrient and sediment reductions. Chlorophyll a is a measure of overall algae abundance and is used as a surrogate for measuring the occurrence of the most harmful species of algae and achieving a healthy balance of algae species to support the aquatic food chain. Because controlling algae growth is the primary driver for nutrient reductions in the James, in 2005 Virginia and the EPA developed specific chlorophyll a standards for the James River and the associated pollution reductions needed to achieve them. Under the Chesapeake Bay TMDL, additional pollution reductions and costs now may be required from wastewater dischargers to meet the James River chlorophyll a standards.

In 2011, before requiring this additional investment, Virginia initiated a $3 million Tidal James Chlorophyll Criteria Study to assess algae levels in the James River and provide an opportunity to revise the standards if needed. The Department of Environmental Quality (DEQ) is now in the process of determining the best scientific basis for a chlorophyll a standard through analysis of new monitoring data and enhanced computer modeling. The results may revise the chlorophyll a criteria and nutrient discharge limits for the tidal James River by 2018.[65]

Figure 8: Chesapeake Bay TMDL Tracking for Virginia

Pollutant	2009 baseline	2017 target	2025 target
Nitrogen lbs./year	68,127,540	58,726,490	52,459,123
Phosphorus lbs./year	8,671,812	7,345,829	6,461,840
Sediment lbs./year	3,742,921,311	3,447,997,699	3,251,381,958



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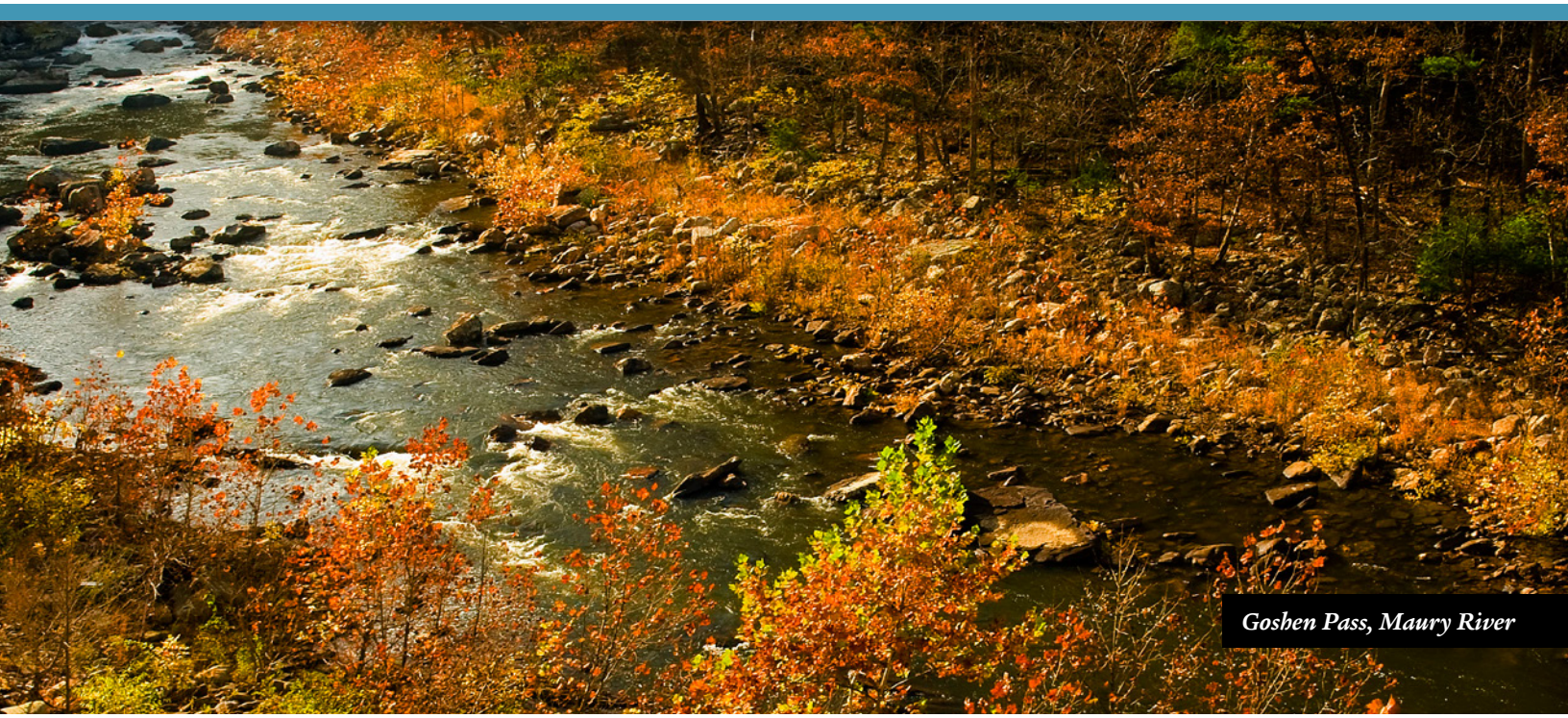


Goshen Pass, Maury River

GETTING TO THE SOURCE:

HOW VIRGINIA IMPROVES WATER QUALITY

Wastewater Treatment

The 2009 baseline for the Bay TMDL found that wastewater facility discharges accounted for nearly 32 percent of Virginia's nitrogen loads and over 20 percent of its phosphorus loads entering the Chesapeake Bay. Wastewater is an insignificant contributor to sediment loads.[66]

Over the past fifteen years, the Water Quality Improvement Fund (WQIF) Point Source Program has received $849 million in appropriations and accrued interest, amounting to Virginia's state-level total investment in nutrient removal at wastewater treatment facilities. This includes the General Assembly's 2012 appropriation of $87.6 million for nutrient removal grant and the 2013 legislative session's bond authorization of $101 million, and a supplemental grant for the Hopewell Regional Wastewater Treatment Facility.

DEQ has signed agreements for upgrades to 58 of Virginia's wastewater treatment facilities, 49 of which are fully upgraded as of the end of June 2013.[67] All of the upgraded facilities are operating well below their capacity and are generating nutrient credits that can be transferred to those treatment plants that have not yet upgraded under Virginia's Nutrient Credit Exchange.

As a result, Virginia achieved more dramatic reductions of nutrient discharges from wastewater facilities

Army Base Treatmant Plant, Elizabeth River

than any other state in the Bay watershed between 2009 and 2011. Nitrogen loads dropped 4.83 million pounds annually and phosphorus discharges declined by 585,433 pounds.[68]

The WQIF should have sufficient funds to cover estimated reimbursements for projects with signed grant agreements through FY2016 after which projections indicate the WQIF will have a shortfall of $34 million unless additional funds are appropriated. Accounting for both projects with signed grant agreements and for new projects, current total estimates for funding needs through FY 2019 are approximately $50 million. It should be noted that multiple factors hamper the predictability of wastewater treatment costs including the uncertain timing of when operators will submit applications for facilities yet to be upgraded, the differences between anticipated and final costs of construction (many projects have come in under-budget), and the undetermined outcome of the James River chlorophyll a study as more projects could be required.

Funding Recommendation for Wastewater Treatment:

VIRGINIA*forever* calls on the Commonwealth to provide $50 million through FY 2019 beginning with FY 2017 (given that the Commonwealth has already funded upgrades for fiscal years 2015 and 2016).

Stormwater Management

The 2009 baseline for the Bay TMDL found that urban runoff accounted for approximately 15 percent of phosphorus and nitrogen loads and nearly 19 percent of sediment loads.[69] Virginia regulates stormwater through permitting required for municipal storm sewer systems (MS4s), and requirements for new development found in the Soil and Erosion Control Law, the Virginia Stormwater Management Program (VSMP), and the stormwater provisions of the Chesapeake Bay Preservation Act. It is the MS4 municipalities that literally carry the load with regard to mandated pollutant reductions from existing development and their associated costs. MS4 permits operate on five year cycles. The first five year permit requires a 5 percent reduction in nitrogen, phosphorus, and sediment loads. That reduction

requirement jumps to 35 percent in the next cycle and to 60 percent in the third cycle. There are two types of MS4 permits—individual permits for Virginia's largest eleven municipalities and a general permit for smaller municipalities.[70]

A 2011 analysis for the Senate Finance Committee placed Virginia's total watershed-wide costs for stormwater reduction needs as somewhere between $9.4 billion to $11.5 billion; the high end of the range assumes structural best management practice (BMP) retrofits (i.e., overhauls of existing infrastructure) while the low end, based on percentages of pervious and impervious cover in each locality, assumes that preventive measures known as Urban Nutrient Management will occur on 90 percent of pervious land.[71] Some Urban Nutrient Management practices enacted by the 2011 General Assembly will begin to go into effect by the end of 2013. These include prohibition of the sale, distribution, and use of lawn maintenance fertilizers containing phosphorus and prohibition of deicing agents containing nutrients, while golf courses must implement nutrient management plans by July 1, 2017.[72]

Virginia is just entering the start-up phase of these new stormwater requirements, but it can benefit from its nearly 20 years of lessons in wastewater treatment. Over time, with experience and performance improvements, costs of wastewater treatment came down and the same should prove true with stormwater management. While urban nutrient management would seem to be a case of prevention being worth a pound of cure, many corrective BMPs are far more cost-effective than either urban nutrient management or the most drastic structural retrofits. Alternative BMPs have the potential to pull costs down, as a recent study conducted by the Center for Watershed Protection for the James River Association vividly demonstrates.

The "Cost-Effectiveness Study of Urban Stormwater BMPs in the James River Basin" analyzed 35 urban stormwater BMPs according to performance and cost, with cost-effectiveness defined as an annual unit cost per unit of pollutant removed. The study included all practices currently approved by the Chesapeake Bay Program (CBP) for use in meeting Bay pollution reduction goals as well as two BMPs--illicit discharges and the pet waste program-- under review by the CBP but not yet approved. When the most cost effective practices were applied to the specific pollution reduction goals for the City of Richmond, the study found that the cost of meeting the new stormwater requirements could be reduced by over 70% from initial estimates.

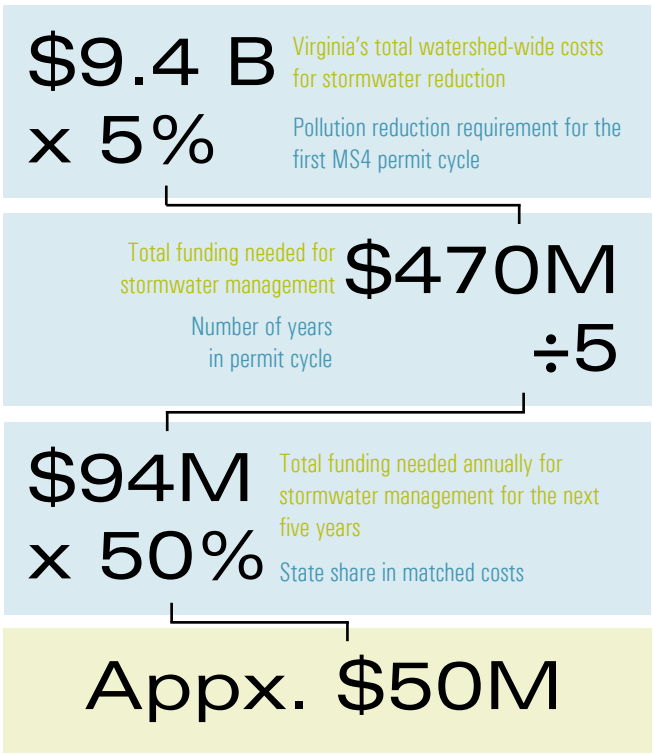
Capitol Square, Richmond

Of all possible BMPs, illicit discharges (addressed with sewer repair and correction of cross-connections) and pet

waste program scored the highest for nutrient and sediment reductions (pet waste program applies only to nutrient pollution) and they have the potential to play a key role if they are approved by CBP. Of already approved BMPs, forest buffers and urban stream restoration were among the most cost-effective. Permeable pavement is among the most expensive BMPs and, in general, retrofits and practices that have underdrains or those on sites with poorly drained soils have the lowest cost-effectiveness.[73] Many BMPs have supplemental benefits such as those to public health and safety, flood control, recreation, reduction in the urban heat island effect, and wildlife habitat. Illicit discharge and pet waste program would simultaneously reduce bacteria contamination and help to meet the many bacteria TMDLs.[74]

With greater focus on less expensive BMPs as highlighted above, and the prospect of increased knowledge and innovation, the estimated costs of managing stormwater runoff will come down over time. Virginia's program to reduce nutrient pollution from wastewater serves as a shining example of innovation as facility treatment costs did decline in part due to advanced knowledge over the last decade.

Figure 9: Calculation for Funds Needed to Invest in Stormwater Pollution Reduction



A formula developed using the conservative figure of $9.4 billion from the Senate Finance Committee report calculates state funding needs for stormwater management for the next five years. Applying the five percent pollution reduction requirement for the first MS4 permit cycle to $9.4 billion yields an amount of $470 million which, divided by the five year permit cycle, becomes $94 million annually. Assuming a state share of approximately 50 percent in matched costs and rounding that sum, Virginia thus needs to invest $50 million annually over the next five years to assist MS4 municipalities in successfully curbing stormwater pollution in the Chesapeake Bay watershed. During the 2013 Virginia General Assembly session, the Governor and legislators approved $35 million to begin meeting the needs for stormwater management.

Funding Recommendation for Stormwater Management:

VIRGINIA*forever* calls on the Commonwealth to provide $50 million each year for the next five fiscal years, minus the $35 million appropriated during the 2013 legislative session.

Agricultural Best Management Practices

Agriculture constitutes the largest actively managed land use in the Commonwealth and thus accounts for a greater proportion of nonpoint source totals. According to the 2009 baseline for the Bay TMDL, agriculture contributed over 30 percent of nitrogen loads, more than 55 percent of phosphorus loads, and over 64 percent of sediment loads in the Chesapeake Bay.[75] Along with all sectors, 60 percent of pollution reduction measures must be in place by 2017 and all measures must be in place by 2025 including nutrient reduction strategies from agricultural best management practices (BMPs) necessary to meet restoration goals.

Source: DCR

Virginia's WIP specifies implementation of high levels of a suite of BMPs covered under the Virginia Agricultural BMP Cost Share Program (VACS) including, but not limited to: cover crops, conservation tillage, nutrient management, livestock exclusion from streams, and riparian buffers. In addition to 2025 pollution reduction targets, the WIP identifies specific reductions for nitrogen, phosphorus, and sediment pollution by 2013, 2015, and 2017. Virginia's restoration plan for the Bay places considerable emphasis on voluntary, incentive-based implementation of agriculture BMPs. During FY2012, the Department of Conservation and Recreation (DCR) allocated over $28 million to VACS which operates through 47 soil and water conservation districts statewide. Nearly all of it -- $25.7 million -- was contracted with farmers as cost-share for implementation of BMPs. State funding in FY2013 for agricultural BMP implementation was $22.5 million.

The EPA's Virginia Interim Assessment of 2012-2013 Milestones and WIP Progress stated that Virginia is generally on track for its two-year agriculture BMP installation goals, and even exceeded its 2013 goals for some BMPs such as nutrient management and mortality composting.[76] Virginia launched a new Virginia Enhanced Conservation Initiative to provide financial and technical assistance to farmers for stream exclusion and pasture conservation practices. The Resource Management Plan Program and new regulations finalized this year provide tools that act as incentives for the agricultural community to implement high priority water quality BMPs outlined in Virginia's WIP.

In accordance with statutory language establishing the Natural Resources Commitment Fund (VNRCF), every year DCR must consult with stakeholders (including representatives of the agricultural and conservation communities and the Soil and Water Conservation Districts) to calculate the funding amount for effective Soil and Water Conservation District technical assistance and implementation of agricultural

BMPs. This analysis, referred to as the "Needs Assessment," has become the guiding document for determining state funding needs for addressing agricultural stewardship activities. Virginia's 2012 Virginia Soil and Water Conservation Districts Funding Study promotes funding totals for agriculture BMP cost share and for technical assistance that agriculture and conservation interests did not support because the state's methods did not calculate full funding for cost-shared BMPs to achieve 60 percent reduction of nutrient and sediment pollution by 2017.

Funding Recommendation for Agriculture Stewardship Activities:

VIRGINIA*forever* calls on the Commonwealth to provide $505 million over the next five years*[77]:

Cost Share Funding:	FY15	FY16	FY17	FY18	FY19
Chesapeake Bay	$27	$42	$66	$69	$71
Southern Rivers	$18	$28	$44	$46	$47
Technical Assistance:					
Chesapeake Bay	$5	$5	$5	$6	$6
Southern Rivers	$4	$4	$4	$4	$4
Total	**$54**	**$79**	**$119**	**$125**	**$128**

*These funding needs may be reduced by approximately $9 million per year if annual investments to the VNRCF from the state's existing recordation fee are maintained in the biennial budget.

INVESTING IN THE FUTURE:
HOW VIRGINIA FUNDS WATER QUALITY IMPROVEMENT

Virginia's two dedicated means for funding water quality improvement efforts are the Water Quality Improvement Fund (WQIF) and its sub-fund, the Virginia Natural Resources Commitment Fund (VNRCF). The Department of Conservation and Recreation (DCR) and the Department of Environmental Quality (DEQ) historically have shared responsibility for the administration of the WQIF. DCR manages the VNRCF.

In 1997, the General Assembly passed the Virginia Water Quality Improvement Act "to restore and improve the quality of state waters and to protect them from impairment and destruction for the benefit of current and future citizens of Virginia." The Act created the WQIF and structured it to reflect that these express responsibilities are shared; the WQIF's purpose is "to provide Water Quality Improvement Grants to local governments, soil and water conservation districts, institutions of higher education and individuals for point and nonpoint source pollution prevention, reduction, and control programs." The WQIF is a permanent, non-reverting fund with minimum capitalization of 10 percent of the state budget

surplus and 10 percent of the unexpended general fund balances.

Since 2008, the VNCRF has specifically supported agricultural BMPs and associated technical assistance by matching farmers' private funding. The funding allocated to the VNRCF falls short of what is necessary to meet water quality goals, but it has expanded through funding from the budget surplus, the general fund, and the recordation fee.

During the 2010 legislative session, the General Assembly amended the 2008-2010 biennial budget to dedicate 10 dollars, or one-half, of a 20 dollar recordation fee to the VNRCF for Virginia's agricultural BMPs cost-share program. This language has remained in the budget during all sessions since its initial inception. Funding from the recordation fee has reached approximately $9 million annually.

WQIF Point Source Funding

Since 1998, Virginia has invested nearly $845 million of the WQIF funds into point source programs and it has been the driver enabling upgrades of wastewater treatment facilities within the Chesapeake Bay watershed.[78] The WQIF provides state grants ranging from 35 percent to 90 percent cost-share for the design and installation of nutrient reduction technology at point source discharges. The WQIF has helped to ensure compliance with discharge regulations, achieving nitrogen and phosphorus "cap" loads and maintaining them to offset future growth.

Nonpoint Source Funding

Distribution of nonpoint source WQIF and VNRCF grants includes allocating funds to the Virginia Agricultural Best Management Practices Cost-Share Program (VACS) and the Conservation Reserve Enhancement Program (CREP) and soliciting applications for Water Quality Initiative grants and Cooperative Nonpoint Source Pollution Program projects with local governments. Virginia statute dictates that funding from the VNRCF is distributed as 8 percent for technical assistance provided by local Soil and Water Conservation Districts, 55 percent for VACS projects in the Bay watershed and 37 percent for VACS projects outside the Chesapeake Bay watershed.

Virginia Agricultural Best Management Practices Cost-Share Program

VACS supports the use of conservation measures most effective in reducing excess nutrient and sediment runoff from agricultural lands. Virginia's 47 soil and water conservation districts (SWCDs) lead the implementation of the VACS program with funding from DCR to cover cost share expenditures and technical assistance.

Fiscal Year 2013-14 Appropriations

The FY2014 appropriations included a $16.9 million in surplus funds to the WQIF and $9.1 million from real estate recordation fees to the VNRCF that were directed to nonpoint source pollution programs, as well as a current bond authorization of a total $221 million for water quality and supply projects includes outlays for the following:

Stormwater Assistance Fund: $35 million for a new stormwater local assistance fund for grants to local government capital projects meeting all pre-requirements for implementation including but not limited to new stormwater best management practices (BMPs), stormwater BMP retrofits, stream restoration, low impact development projects, buffer restoration, pond retrofits, and wetlands restoration.

Combined Sewer Overflow Matching Fund: $75 million to the Virginia Resources Authority and the State Water Control Board to make grants to the cities of Richmond ($45 million) and Lynchburg ($30 million) to cover some of the expense of their combined sewer overflow control projects.

Nutrient Removal: $101 million to DEQ's WQIF point source program to reimburse eligible dischargers in the Chesapeake Bay watershed for the costs of the design and installation of nutrient removal technology and an additional supplemental grant (up to $5 million) to the Hopewell Regional Wastewater Treatment Authority.

Appomattox River Water Authority: Up to $5 million to DEQ to disburse as a matching grant to increase the supply of drinking water for Dinwiddie, Prince George, and Chesterfield counties, the cities of Colonial Heights and Petersburg, and the U.S. Army Garrison at Fort Lee and to improve stream flow within the Appomattox River.[79]

Conservation Reserve Enhancement Program (CREP)

The SWCDs also administer Virginia's participation in CREP, a program of the United States Department of Agriculture. Through CREP, landowners may receive cost-share incentives for eligible BMPs establishing riparian buffers and restoring wetlands and for rental payments up to 15 years. DCR provides additional financial incentives for permanent easements on restored riparian lands.

Strategic Nonpoint Source Water Quality Initiatives

This catch-all category is a source of funding for other nonpoint source pollution priorities, particularly innovative projects that are exceptionally cost-effective and provide for measurable improvements. They include partnerships with other state agencies, SWCDs, planning district commissions, local governments, educational institutions, and individuals and may cover education and research as well as tangible reduction.

Cooperative Nonpoint Source Pollution Program Projects with Local Governments

Through this program, DCR collaborates with local governments, providing matching funds for projects that employ local solutions for runoff that either degrades local water quality, impairs state waters outside the jurisdiction, or both.

INVESTING IN THE COMMONWEALTH'S WATER:
THE NEXT FIVE YEARS OF WATER QUALITY IMPROVEMENTS

Figure 10: Proposed Five Year Water Quality Investment

Sector	Proposed five year investment
Wastewater Treatment	$50,000,000†
Stormwater Management	$250,000,000††
Agricultural BMPs	$505,000,000†††
TOTAL	**$805,000,000**
Funding already identified††††	$80,000,000
New dollars needed	**$725,000,000**

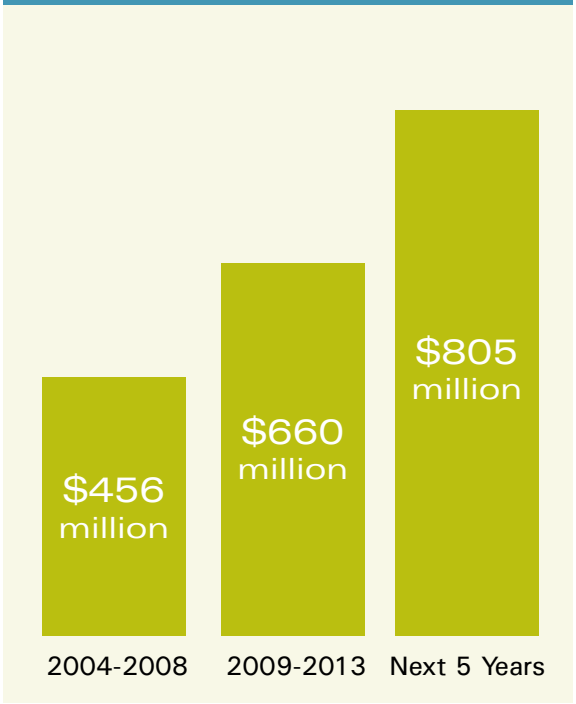
† Beginning with FY 2017 (given that the Commonwealth has already funded upgrades for fiscal years 2015 and 2016)

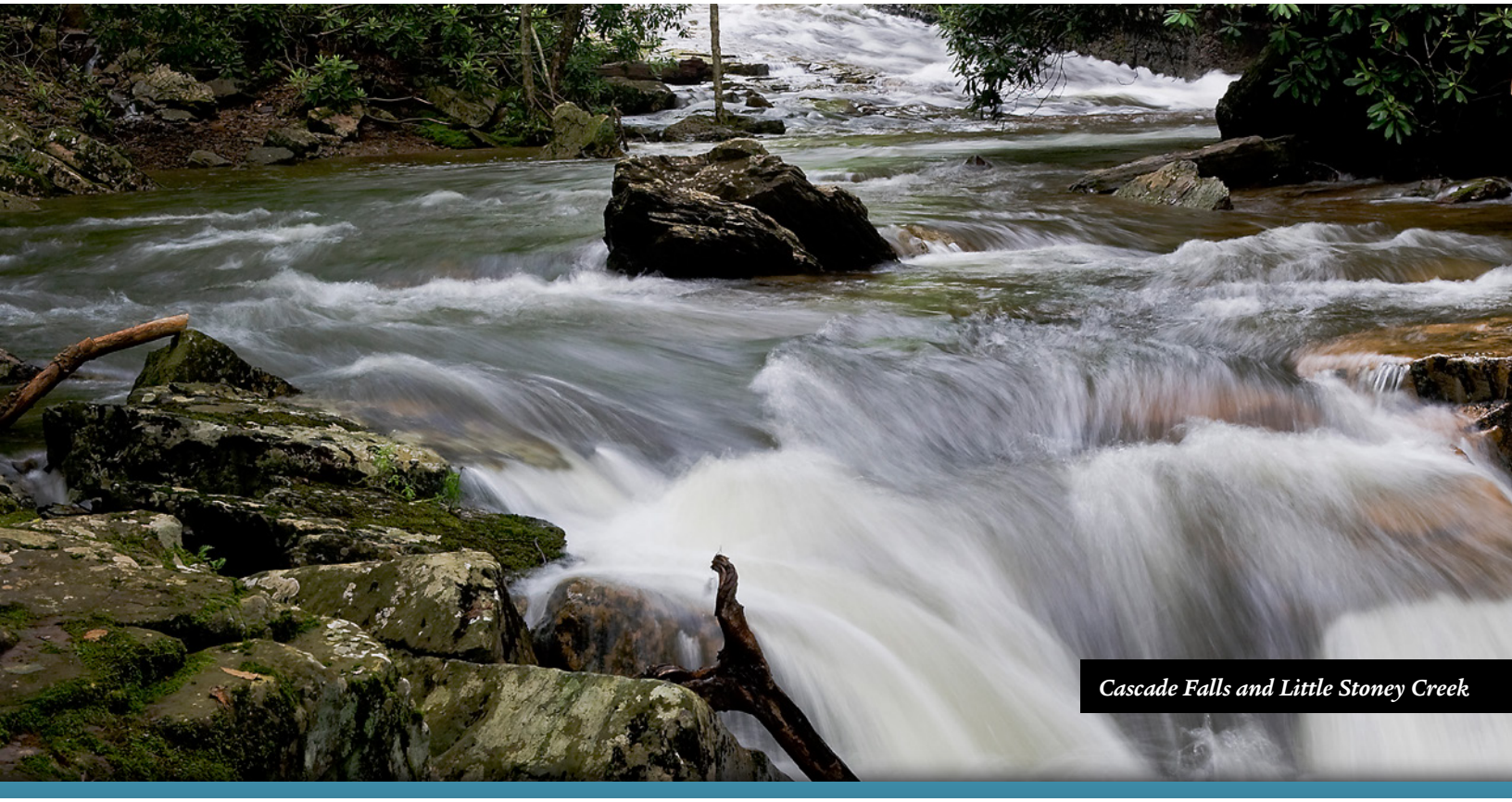
†† $50 million each year

††† See agricultural stewardship for annual breakdown

†††† For stormwater management, the 2013 General Assembly appropriated $35 million. $45 million is available for agricultural BMPs if annual investments to the VNCRF from the state's existing recordation fee are maintained in each biennial budget.

Figure 11: Five-Year Funds Appropriated and Need for Water Quality





Cascade Falls and Little Stoney Creek

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Fig 4 Same as Figure 1.

Fig 5 Virginia Department of Conservation and Recreation, Virginia Land Conservation Foundation, brochure, http://www.dcr.virginia.gov/virginia_land_conservation_foundation/documents/vllegalbro.pdf

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† Assume 100% of recreational lands will be acquired with bond funds and that the state will pay the entire cost. $500 M in land preservation tax credits will protect 281,215 acres. The remaining acreage is 168,785, and this will largely be protected through the grant programs. This plan assumes the following per-acre values, based on the track record of the relevant programs: $1000/acre state share for matching grant programs and $1778/acre state share for tax credit projects. For bond projects, a $3300/acre value was derived from an analysis of grant projects that would be appropriate for state acquisition.

†† Statutorily required funds consist of the following. Over five years, $100 million in land preservation tax credits per year equals $500M. As provided in House Bill 1398 (2013), there will also be $13.9 M (FY15) + $16.1 M (FY16) + $18.6 M (FY17) + $20 M (FY 18) + $20 M (FY19) = $88.6 M in cash for the grant programs over five years. Each year's allocation is to be divided 80% to the Virginia Land Conservation Foundation, 10% to the Office of Farmland Preservation and 10% to the Civil War Site Preservation Fund.

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Fig 10 VIRGINIA*forever* data and analysis.

Fig 11 VIRGINIA*forever* analysis of biennial budget legislation.

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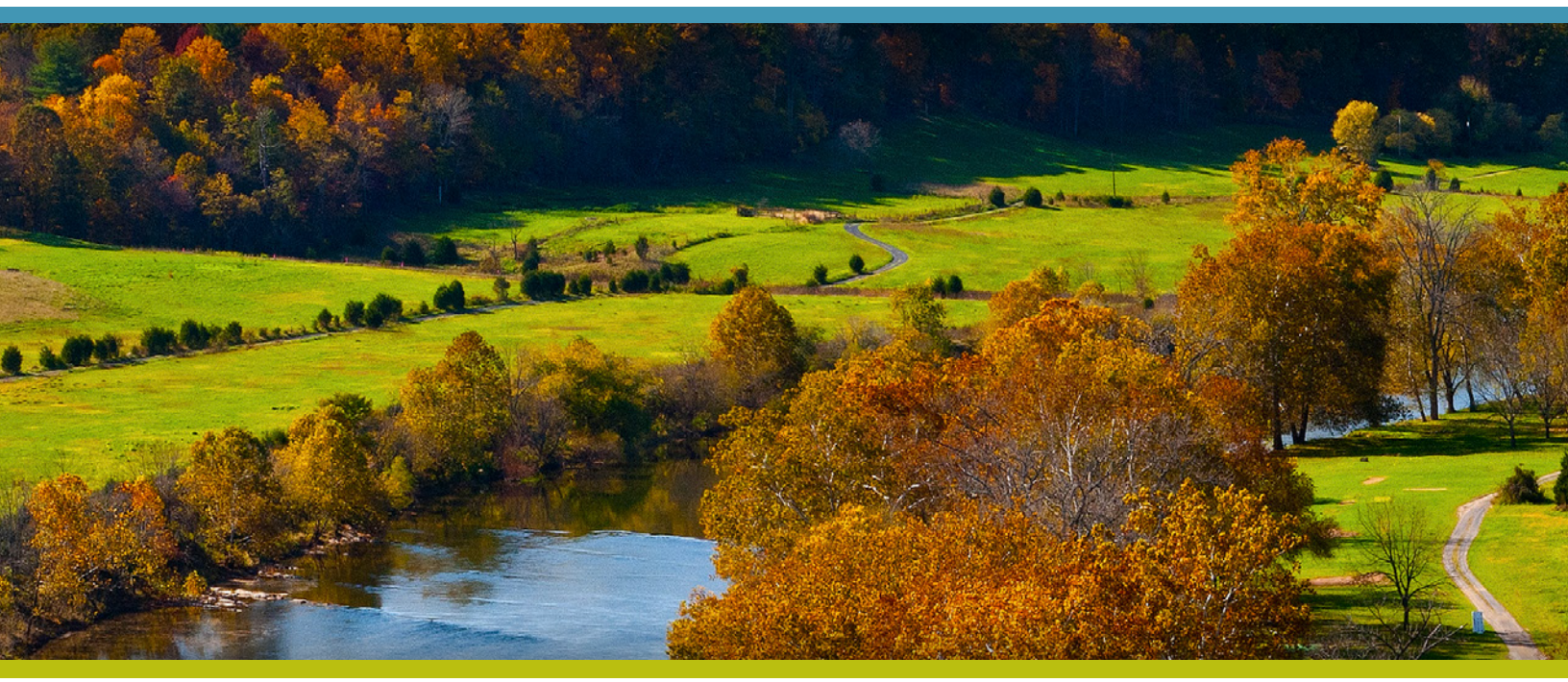

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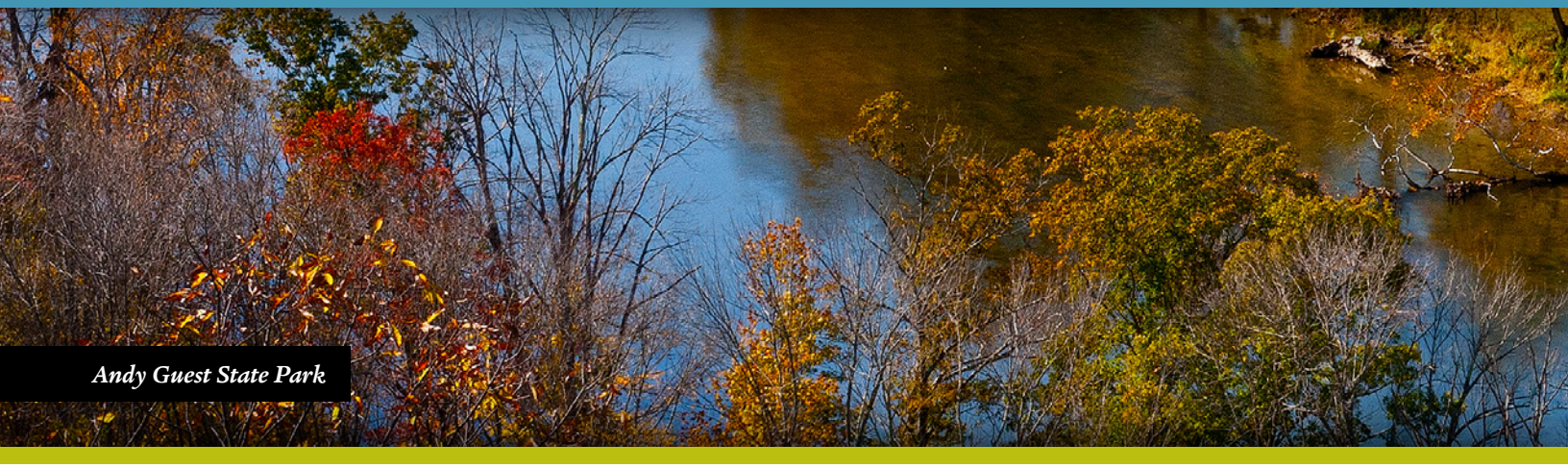

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